TWO WINDS AVIATION, LLC

CESSNA CITATION 501

S/N 501-0091

RVSM/MNPS/RNP-10/B-RNAV/P-RNAV OPERATIONS MANUAL

PART 91 MMEL

I

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Serial Number 501-0091

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Serial Number 501-0091

Description	Page No.	Effective Date	Revision
NOTE: SECTIONS IX THRU XII ARE FOR REFERENCE ONLY. THEY CONTAIN INFORMATION PERTINENT TO THE RVSM SYSTEMS ON THIS AIRCRAFT. NO REVISION UPDATE IS REQUIRED, AND THEY ARE NOT REQUIRED TO BE KEPT IN THE RVSM MANUAL ONBOARD THE AIRCRAFT.			
Crew Information Title Page	VIII	27 January 2014	Original
Reference Materials Title Page	IX	27 January 2014	Original
AFM Title Page	X	27 January 2014	Original
FAA Approved AFM Supplement For Cessna Model 500/501 and 550/551 Aircraft Equipped with a Single Flight Director with RVSM Capability Document #50-8008-003 (Garrett)	1 thru 17	2 June 2002	Rev. A
FAA Approved AFM Supplement For Cessna 501/551 Document #ES551-120028-100 (ElectroSonics)	1 thru 13	8 August 2003	Rev. B
FAA Approved AFM Supplement: Garmin 400W Series GPS-WAAS Document #190-00356-03	1 thru 16	31 July 2009	Rev. B
Service Documents Title Page	XI	27 January 2014	Original
Supplemental Type Certificate No. SA01637CH	Selected pages	6 May 2002	-
Supplemental Type Certificate No. SA01558CH-D	1 thru 2	3 May 2002	-
Instructions for Initial and Continued Airworthiness for Cessna Model 500/501 And 550/551 Series Aircraft Qualified for Operations in RVSM Airspace Document No. 50-8008-004 (Garrett)	i thru 25	28 June 2006	Rev. L
FAA Accepted Instructions for Continued Airworthiness, Cessna 501/551 Document #ES551-120028-201 (ElectroSonics)	1 thru 6	3 May 2002	Rev. 1R
Aircraft Documentation Title Page	XII	27 January 2014	Original

RECORD OF REVISIONS

Revision No.	Revision Date	Insertion Date	Initials
Original	27 January 2014	N/A	MRM

II

APPLICATION LETTER

Two Winds Aviation, LLC
PO BOX 257
East Setauket NY 11733

January 27, 2014

Attn: General Manager
FAA, Farmingdale Flight Standards District Office
7150 Republic Airport
Suite 235
Farmingdale, NY 11735

Subject: Application for Approval of Two Winds Aviation, LLC to Operate Cessna Citation 501 Serial Number 501-0091 in RVSM, MNPS, RNP-10 and B-RNAV/P-RNAV Airspace and Approval to Use the Citation 500 Series MMEL as an MEL under Part 91

Reference: Title 14, Code of Federal Regulations (14 CFR) Part 91 Section 91.180 (Domestic US Operations) and 91.706 (RVSM Operations Outside the US)

FAA Advisory Circular AC 91-85 "Authorization of Aircraft and Operations for Flight in Reduced Vertical Separation Minimum (RVSM) Airspace"

FAA Order 8900.1: Flight Standards Information Management System, Volume 4, Chapter 10, Section 1 (Evaluate Operator's Application for Flight in Airspace Where RVSM Is Applied) and Volume 4, Chapter 12, Section 1 (Issue/Renew a Letter of Authorization for Operations in Special Use Airspace)

Dear Sir or Madam:

Two Winds Aviation, LLC respectfully requests the following 14 CFR Part 91 authorizations listed below. We are submitting documentation showing that our aircraft is properly configured and meets the aircraft requirements for each requested LOA, that the qualified pilot has proper training, and that operations procedures have been adopted.

Paragraph	Title	Description
B-034	B-RNAV/P-RNAV	B-RNAV/P-RNAV
B-036	RNP	RNP-10
B-039	MNPS	North Atlantic MNPS Special Contingency Routes
B-046	RVSM	RVSM
D-095	MMEL	Use MMEL as an MEL

The aircraft is Cessna Citation 501 serial number 501-0091. This aircraft became RVSM compliant following installation of Garrett Aviation Services STC #SA01637CH and ElectroSonics STC #SA01558CH-D. Copies of the FAA Form 337s documenting installation of these STC's have been placed behind the Aircraft Documentation tab along with copies of the log entries documenting compliance with the most recent RVSM inspections.

Please let me know if you have any questions. My phone number is (775) 453-4496 and my email address is mrmetzger@gmail.com. You may also contact Christy DeYoung of Jet RVSM Services at (510) 299-2605. Ms. DeYoung is authorized by Two Winds Aviation, LLC to work with Farmingdale FSDO inspectors during the review process.

Kind Regards,

Mark R. Metzger

Mark R. Metzger
Managing Member

OPERATOR DATA SHEET

OPERATOR INFORMATION	
Name of Aircraft Operator	Two Winds Aviation, LLC
Operator Address	PO BOX 257 East Setauket NY 11733
Shipping Address	600 Rt 25A East Setauket NY 11733
Aircraft Base of Operations	Long Island Mac Arthur Airport (KISP)
Crew Training Conducted By	ATR, Inc., King Schools
RVSM Representative Name	Mark R. Metzger
RVSM Representative Email Address	mrmetzger@gmail.com
RVSM Representative Phone	(775) 453-4496

AIRCRAFT INFORMATION	
Aircraft make and model	Cessna Citation 501
Registration Number	N2158U
Aircraft Serial Number	501-0091
Aircraft Color	Overall white with green and tan
Passenger Seats	8
RVSM STC Compliance Date	October 30, 2004

NAVIGATION EQUIPMENT			
Qty	**Manufacturer/Model**	**Part Number**	**Type Of Equipment**
2	Garmin GNS-430W	011-01060-00	Nav/Comm/GPS

COMMUNICATIONS EQUIPMENT			
Qty	**Manufacturer/Model**	**Part Number**	**Type Of Equipment**
2	Garmin GNS-430W	011-01060-00	Nav/Comm/GPS

RVSM CRITICAL EQUIPMENT			
Qty	**Manufacturer/Model**	**Part Number**	**Type Of Equipment**
2	IS&S/ADDU	9D-80130-16	Air Data Display Unit
1	IS&S/AIU	9B-81040-26	Analog Interface Unit
2	IS&S/CM	9B-03508-15	Configuration Module
1	Garmin/GTX-327	011-00490-00	Transponder
1	Garmin/GTX-330ES	011-00455-60	Transponder
1	Honeywell/SP-200	4008519-911	Autopilot Computer
1	Honeywell/VN-212	4020571-901	Altitude Alerter

TCAS II NOT INSTALLED
HF COMM NOT INSTALLED

RVSM WORKSHEET

Aircraft Information
Aircraft Make, Model, Series: Cessna Citation 501
Serial Number: 501-0091
Operating Rule Utilized: Part 91

RVSM Airworthiness Approval Date: October 30, 2004*
*Date work was completed in compliance with Garrett Aviation Services STC #SA01637CH. A copy of this STC has been provided behind the Service Documents tab in this RVSM manual.

Operator Information
Aircraft Operator: Two Winds Aviation, LLC
Operator Address: PO BOX 257 East Setauket NY 11733
RVSM Representative: Mark R. Metzger
Phone: (775) 453-4496
Email: mrmetzger@gmail.com

Shipping Address
600 Rt 25A East Setauket NY 11733

Operator RVSM Compliance Statement
The above listed aircraft meets the requirements for conducting operations in airspace where Reduced Vertical Separation Minimum (RVSM) applies. It has been determined that the required equipment has been installed (in accordance with approved data) and appropriate aircraft records have been completed to reflect the installation of this equipment. The aircraft equipment list and weight and balance have been updated. All aircraft records concerning equipment installations and aircraft inspections will be available if a conformity inspection is to be accomplished by an FAA Inspector.

Name: Mark R. Metzger
Title: Managing Member

Signature: Mark R. Metzger

U.S. Department
of Transportation
Federal Aviation Administration

14 CFR Part 91 Operations

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Part A

U.S. Department
of Transportation
**Federal Aviation
Administration**

14 CFR Part 91 Operations

Waiver or Letter of Authorization

Issuance and Applicability

1. These documents are issued to Two Winds Aviation, LLC. , whose principal base of operation is located at:

Primary Business Address:	Mailing Address:
PO Box 257	600 Route 25A
Setauket, New York 11733	Setauket, New York 11733

2. A change in the aircraft base of operations location constitutes an administrative change only to this Letter of Authorization (LOA) A001 and would not require nor preclude a new inspection.

a. The existing authorizations, deviations, waivers, etc., are still valid and not intended to be reissued due to a change in the operator's base of operations.

b. If the operator relocates its principal base of operations (address) listed in subparagraph 1 above, it must notify, in writing, the losing Flight Standards District Office (FSDO) of its new location and mailing address within 30 calendar days following relocation and, advise the losing FSDO of the receiving FSDO where the operator proposes to do business.

3. The attached waivers, authorizations, and/or deviations are effective as of the "Date Approval is Effective" listed in each authorizing document, and those issued without an expiration date shall remain in effect as long as the party listed in subparagraph 1 above continues to meet all appropriate Parts of the CFR or until any of the following:

a. It is voluntarily surrendered by the operator,

b. The operator ceases to be the operator of the aircraft listed in the applicable authorization,

c. It is surrendered or revoked for cause by the FAA,

d. The person signing the authorizing document relinquishes responsibility,

e. The aircraft changes ownership and should be removed from the authorizing document,

f. An aircraft or listed equipment is no longer used for that operation and should be removed from the authorization,

g. An aircraft or other equipment needs to be added to the existing authorizing document,

h. An aircraft listed on the authorization changes nationality numbers,

i. An aircraft listed on the authorization is issued an experimental, special airworthiness certificate for research and development (R&D) or changes projects associated with an experimental, special airworthiness certificate for the purpose of R&D.

4. If the Responsible Person as the signee changes for an authorization, the Responsible Person or the operator should notify the issuing office of the change within 30 days and request an updated LOA.

HQ Control: 07/14/2011 HQ Revision: 020

This Waiver or Authorization is Issued by the Federal Aviation Administration and approved by direction of the Administrator.

Digitally signed by Craig P. Jordan on behalf of Hughes, Ronald, Manager (EA11)
[1] EFFECTIVE DATE: 2/21/2014, [2] AMENDMENT #: 0
DATE: 2014.02.21 10:14:52 -06:00

I hereby accept and receive this Waiver or Authorization.

Metzger, Mark, Manager	2/21/14 Date

U.S. Department
of Transportation
**Federal Aviation
Administration**

14 CFR Part 91 Operations

Letter of Authorization

Summary of Authorizations

The operator, in accordance with the reference documents, is authorized to:

	Reference Paragraphs
Use an Agent for Service.	A007
Conduct operations within airspace designated as terminal or en route European Area Navigation airspace with specific aircraft.	B034
Conduct operations within airspace designated as RNP Airspace.	B036
Conduct operations within North Atlantic Minimum Navigation Performance Specifications (NAT/MNPS) Airspace.	B039
Conduct operations within RVSM Airspace.	B046
Operate aircraft using MMEL as an MEL.	D095

HQ Control: 08/31/2004 HQ Revision: 000

This Waiver or Authorization is Issued by the Federal Aviation Administration and approved by direction of the Administrator.

Digitally signed by Craig P. Jordan on behalf of Hughes, Ronald, Manager (EA11)
[1] EFFECTIVE DATE: 2/21/2014, [2] AMENDMENT #: 0
DATE: 2014.02.21 10:14:53 -06:00

I hereby accept and receive this Waiver or Authorization.

2/24/14

Metzger, Mark, Manager Date

U.S. Department of Transportation
Federal Aviation Administration

14 CFR Part 91 Operations

Agent for Service

The following person is designated as the operator's Agent for Service:

Table 1 - Agent for Service

Name	Address	Telephone
Metzger, Mark	PO Box 257 Setauket, NY 11733	775-453-4496

HQ Control: 06/20/2005 HQ Revision: 000

This Waiver or Authorization is Issued by the Federal Aviation Administration and approved by direction of the Administrator.

Digitally signed by Craig P. Jordan on behalf of Hughes, Ronald, Manager (EA11)
[1] EFFECTIVE DATE: 2/21/2014, [2] AMENDMENT #: 1
DATE: 2014.02.21 12:45:11 -06:00

I hereby accept and receive this Waiver or Authorization.

Mark Metzger 2/21/14

Metzger, Mark, Manager Date

U.S. Department of Transportation
Federal Aviation Administration

14 CFR Part 91 Operations

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Part B

U.S. Department
of Transportation
Federal Aviation Administration

14 CFR Part 91 Operations

Letter of Authorization

Navigation Equipment Eligibility to Operate in Terminal and En Route Airspace Designated as P-RNAV and/or B-RNAV/RNAV 5 Airspace

1. Authorization or Finding. The aircraft and navigation equipment listed in Table 1 below has been inspected and found to conform to the B-RNAV/RNAV 5 criteria as set forth in FAA Advisory Circular 90-96A, Approval of U.S. Operators and Aircraft to Operate Under Instrument Flight Rules (IFR) in European Airspace Designated for Basic Area Navigation (B-RNAV)/RNAV 5 and Precision Area Navigation (P-RNAV).

a. This document constitutes a Letter of Finding which establishes that the aircraft listed in Table 1 are eligible to operate in designated European FIR's where B-RNAV/RNAV 5 is required.

b. This finding will also substitute for appropriate Airplane Flight Manual wording, as defined in AC 90-96A, Appendix 1, paragraph 1c(3).

2. Limitations and Provisions. The operator must conduct these operations in accordance with the limitations and provisions of this letter of authorization and is subject to the conditions that all operations conducted within that airspace are in accordance with:

a. Title 14 CFR Part 91 and the flight rules contained in ICAO Annex 2, and

b. All operations outside of the United States comply with Part 91, §91.703 and Annex 2.

3. Authorized Aircraft. The operator is authorized to use the aircraft listed below for operations in designated Precision RNAV (P-RNAV) airspace when the required track-keeping equipment is approved and maintained. Compliance with P-RNAV equipment criteria includes approval for both P-RNAV and Basic RNAV (B-RNAV)/RNAV 5.

Table 1 - Aircraft Approved for P-RNAV and/or B-RNAV/RNAV 5

Serial Number	Registration Number	Aircraft M/M/S	Area Navigation Systems Manufacturer	Model	Navigation Performance	Limitations and Conditions
501-0091	N2158U	CE-501-501	(2) Garmin	GNS-430W w/GPS	B-RNAV/RNAV 5 (+/-5NM)	None

4. Crew Training. Crew training conducted by ATR, Inc., King Schools.

5. Responsible Person. The Responsible Person for crew operations may be either an agent for service (who must be a U.S. citizen) or a person who is a U.S. citizen or holds a U.S. pilot certificate and accepts responsibility for complying with the stated regulations by signing this document.

a. If the Responsible Person signing this LOA relinquishes responsibility, this LOA becomes invalid.

b. Enter the name, e-mail address, and telephone number in Table 2 of the Responsible Person signing this LOA:

Table 2 - Responsible Person

Name	E-mail Address	Telephone Number
Metzger, Mark	mrmetzger@gmail.com	775-453-4496

HQ Control: 12/04/2010 HQ Revision: 010

This Waiver or Authorization is Issued by the Federal Aviation Administration and approved by direction of the Administrator.

Digitally signed by Craig P. Jordan on behalf of Hughes, Ronald, Manager (EA11)
[1] EFFECTIVE DATE: 2/21/2014, [2] AMENDMENT #: 1
DATE: 2014.02.21 12:45:13 -06:00

I hereby accept and receive this Waiver or Authorization.

Mark Metzger 2/21/14

Metzger, Mark, Manager Date

U.S. Department of Transportation
Federal Aviation Administration

14 CFR Part 91 Operations

Letter of Authorization

Operations in Required Navigation Performance Airspace

1. Authorization. The Operator listed at the bottom of this document is authorized to conduct operations within airspace designated as Required Navigation Performance (RNP) airspace in accordance with the limitations and provisions of this Letter of Authorization (LOA) and is subject to the conditions that all operations conducted within the designated RNP Airspace are in accordance with Title 14 CFR Part 91, Section 91.703, and the flight rules contained in International Civil Aviation Organization (ICAO) Annex 2.

2. Authorized Airplanes. The operator is authorized to use the airplanes listed below for operations in designated RNP airspace when the required equipment is operational and maintained in accordance with the airplane or equipment manufacturer's recommendations.

Table 1 – Airplanes and Equipment

A/C Serial Number	Registration Number	Airplane M/M/S	Long-Range Navigation Systems M/M	Communications Equipment M/M	RNP Type
501-0091	N2158U	CE-501-501	(2) Garmin GNS-430W w/GPS	(2) Garmin GNS-430w Nav/Comm/GPS	RNP-10

3. Crew Training. Crew training conducted by ATR, Inc., King Schools. In accordance with 14 CFR Sections 91.3 and 91.703(a)(1)(2) and ICAO Annex 2 (Rules of the Air), paragraph 2.3.2 (Pre-flight action) crews are responsible for policies and procedures in areas of operations where flights are conducted.

4. Responsible Person. The Responsible Person for crew operations may be either an agent for service (who must be a U.S. citizen) or a person who is a U.S. citizen or holds a U.S. pilot certificate and accepts responsibility for complying with the stated regulations by signing this document.

a. If the Responsible Person signing this LOA relinquishes responsibility, this LOA becomes invalid.

b. Enter the name, email address, and telephone number in Table 2 of the Responsible Person signing this LOA:

Table 2 - Responsible Person

Name	E-mail Address	Telephone Number
Metzger, Mark	mrmetzger@gmail.com	775-453-4496

5. Deviations to RNP requirements. The administrator may authorize an operator to deviate from RNP requirements for a specific individual flight in airspace where an RNP type is specified if the Air Traffic Service provider determined that the airplane will not interfere with, or impose a burden on other operators. Operations conducted under such authority will be conducted in accordance with the following limitations and provisions:

a. If fuel planning is predicated on en route climb to flight levels where RNP is normally required, an appropriate request must be coordinated in advance of the flight with the Air Traffic Service provider.

b. The appropriate information blocks in the ICAO flight plan filed with the Air Traffic Service provider must show that the airplane is **not** approved for the specified RNP type.

HQ Control: 01/03/2006 HQ Revision: 01b

This Waiver or Authorization is Issued by the Federal Aviation Administration and approved by direction of the Administrator.

Digitally signed by Craig P. Jordan on behalf of Hughes, Ronald, Manager (EA11)
[1] EFFECTIVE DATE: 2/21/2014, [2] AMENDMENT #: 1
DATE: 2014.02.21 12:45:14 -06:00

I hereby accept and receive this Waiver or Authorization.

2/21/14

Metzger, Mark, Manager Date

U.S. Department of Transportation
Federal Aviation Administration

14 CFR Part 91 Operations

Letter of Authorization

Operations in North Atlantic Minimum Navigation Performance Specifications (NAT/MNPS) Airspace

1. The operator listed at the bottom of this document is authorized to conduct operations within North Atlantic Minimum Navigation Performance Specifications (NAT/MNPS) Airspace in accordance with the limitations and provisions of this Letter of Authorization (LOA) and is subject to the conditions that all operations conducted within the NAT/MNPS Airspace are in accordance with Title 14 CFR Part 91, § 91.703 and the flight rules contained in International Civil Aviation Organization (ICAO) Annex 2, Rules of the Air.

2. Airplanes Authorized with Multiple Long-Range Navigation Systems (M-LRNS). The operator is authorized to use the airplanes listed in Table 1 below for unrestricted operations within the entire NAT/MNPS Airspace. At least two long-range navigation systems must be operational at entry into NAT/MNPS Airspace. The installed equipment must be maintained in accordance with the airplane or equipment manufacturer's recommendations. *(If this authorization does not apply, select or enter N/A for each cell in Table 1).*

Table 1 – Airplanes with Multiple Long-Range Navigation Systems (M-LRNS) Authorized for Unrestricted Operations within NAT/MNPS Airspace

Airplane Serial Number	Airplane Registration Number	Airplane M/M/S	Multiple Long-Range Navigation Systems M/M	Communications Equipment M/M	Restrictions or Limitations
N/A	N/A	N/A	N/A	N/A	N/A

3. Airplanes Authorized with Single Long-Range Navigation Systems (S-LRNS). The operator is authorized to operate within NAT/MNPS airspace over special routes/Blue Spruce Routes using the airplanes equipped with a S-LRNS listed in Table 2 below. Detailed information about these routes is published in NAT Doc 007, North Atlantic Operations and Airspace Manual and the Icelandic Aeronautical Information Publication (AIP). The installed equipment must be operational and maintained in accordance with the airplane or equipment manufacturer's recommendations. *(If this authorization does not apply, select or enter N/A in each cell in Table 2).*

Table 2 – Airplanes with Single Long-Range Navigation Systems (S-LRNS) Authorized to Use Special Contingency Routes Only in NAT/MNPS Airspace

Airplane Serial Number	Airplane Registration Number	Airplane M/M/S	Single Long-Range Navigation Systems M/M	Communications Equipment M/M
501-0091	N2158U	CE-501-501	Garmin GNS-430W w/GPS	Garmin GNS-430W Nav/Comm/GPS

4. Airplanes Authorized with Only Short-Range Navigation Equipment: VOR, DME, ADF. The operator is authorized to use the airplanes equipped with only short-range navigation equipment such as VOR, DME, and ADF listed in Table 3 below to operate within NAT/MNPS Airspace over special routes of short stage lengths. Detailed information about these special routes is published in NAT Doc 007, North Atlantic Operations and Airspace Manual and the Icelandic Aeronautical Information Publication (AIP). The installed equipment must be operational and maintained in accordance with the airplane or equipment manufacturer's recommendations. *(If only M-LRNS and/or S-LRNS equipped airplanes are authorized, select or enter N/A in each of the cells for*

Table 3).

Table 3 – Airplanes with Only Short-Range Navigation Equipment, VOR, DME, and ADF Authorized to Use Special Routes of Short Stage Lengths Only in NAT/MNPS Airspace

Airplane Serial Number	Airplane Registration Number	Airplane M/M/S	Short-Range Navigation Equipment M/M	Communications Equipment M/M
N/A	N/A	N/A	N/A	N/A

5. Crew Training. Crew training conducted by ATR, Inc., King Schools. In accordance with 14 CFR § 91.3 and 91.703 (a)(1)(2) and ICAO Annex 2 (Rules of the Air), paragraph 2.3.2 (Pre-flight action) crews are responsible for policies and procedures in areas of operations where flights are conducted.

6. Responsible Person. The Responsible Person for crew operations may be either an agent for service (who must be a U.S. citizen) or a person who is a U.S. citizen or holds a U.S. pilot certificate and accepts responsibility for complying with the stated regulations by signing this document.

a. If the Responsible Person signing this LOA relinquishes responsibility, this LOA becomes invalid.

b. Enter the name, email address, and telephone number in Table 4 of the Responsible Person signing this LOA:

Table 4 – Responsible Person

Name	Email Address	Telephone
Metzger, Mark	MRMETZGER@GMAIL.COM	775-453-4496

HQ Control: 01/09/2014 HQ Revision: 020

U.S. Department
of Transportation
Federal Aviation Administration

14 CFR Part 91 Operations

This Waiver or Authorization is Issued by the Federal Aviation Administration and approved by direction of the Administrator.

Digitally signed by Craig P. Jordan on behalf of Hughes, Ronald, Manager (EA11)
[1] EFFECTIVE DATE: 2/21/2014, [2] AMENDMENT #: 1
DATE: 2014.02.21 12:45:17 -06:00

I hereby accept and receive this Waiver or Authorization.

Mark Metzger	2/21/14
Metzger, Mark, Manager	Date

Letter of Authorization

Operations in Reduced Vertical Separation Minimum (RVSM) Airspace

1. The operator, Two Winds Aviation, LLC., is authorized to conduct operations within airspace designated as Reduced Vertical Separation Minimum (RVSM) airspace in accordance with the limitations and provisions of this Letter of Authorization (LOA) and is subject to the conditions that all operations conducted within RVSM airspace are in accordance with:

a. Title 14 CFR Part 91, Section 91.703, and the flight rules contained in International Civil Aviation Organization (ICAO) Annex 2, and

b. Title 14 CFR Part 91, Section 91.180, Operations within airspace designated as Reduced Vertical Separation Minimum airspace, and

c. Title 14 CFR Part 91 Appendix G.

2. Authorized Airplanes. The operator is authorized to use the airplanes listed below for operations in designated RVSM airspace when the required altitude-keeping equipment is approved and maintained in accordance with an approved RVSM maintenance program:

Table 1 – Airplanes Approved for RVSM

Serial Number	Registration Number	Airplane M/M/S	Remarks
501-0091	N2158U	CE-501-501	None

3. Crew Training. Crew training conducted by ATR, Inc., King Schools. In accordance with 14 CFR Sections 91.3 and 91.703(a)(1)(2) and ICAO Annex 2 (Rules of the Air), paragraph 2.3.2 (Pre-flight action) crews are responsible for policies and procedures in areas of operations where flights are conducted.

4. Responsible Person. This person should be the individual person who will be the operator, or, if the operator is a legal entity, then an officer, employee or person who that entity has contracted with in order to act on behalf of the legal entity with respect to the RVSM authorization. This person must be a U.S. citizen, or a person who holds a U.S. pilot certificate and who accepts responsibility for complying with the stated regulations.

a. If the Responsible Person named on this LOA relinquishes responsibility, this LOA becomes invalid.

b. Enter the name, email address, and telephone number of the Responsible Person in Table 2:

Table 2 – Responsible Person

Name	E-mail Address	Telephone Number
Metzger, Mark	mrmetzger@gmail.com	775-453-4496

5. RVSM Point of Contact (POC). If the operator has decided to use a separate individual other than the Responsible Person to fulfill this role, then the POC will be listed in Table 3, otherwise the Responsible Person will be listed in Table 2 and Table 3.

a. The POC is the individual the FAA should first contact with respect to the operator's RVSM-Compliant Aircraft operations and maintenance status.

b. If the POC is other than the Responsible Person that individual is not authorized to sign the LOA.

c. Enter the name, email address, and telephone number of the RVSM Point of Contact in Table 3:

Table 3 - RVSM Point of Contact

Name	E-mail Address	Telephone Number
Metzger, Mark	mrmetzger@gmail.com	775-473-4496

6. Deviation from RVSM requirements. In accordance with Section 91.180, the Administrator may authorize an operator to deviate from RVSM requirements for a specific individual flight in RVSM airspace if:

a. The operator submits an appropriate request with the air traffic control (ATC) center controlling the airspace in advance of the operation.

b. At the time of filing the flight plan for the flight, ATC determines that the airplanes may be provided appropriate separation and the flight will not interfere with, or impose a burden on other operators.

7. A copy of this LOA must be kept on the applicable aircraft while operating in RVSM airspace.

HQ Control: 01/24/2014 HQ Revision: 01b

U.S. Department of Transportation
Federal Aviation Administration

14 CFR Part 91 Operations

This Waiver or Authorization is Issued by the Federal Aviation Administration and approved by direction of the Administrator.

Digitally signed by Craig P. Jordan on behalf of Hughes, Ronald, Manager (EA11)
[1] EFFECTIVE DATE: 2/21/2014, [2] AMENDMENT #: 1
DATE: 2014.02.21 12:45:19 -06:00

I hereby accept and receive this Waiver or Authorization.

Metzger, Mark, Manager	2/21/14
	Date

U.S. Department
of Transportation
Federal Aviation Administration

14 CFR Part 91 Operations

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Part D

U.S. Department
of Transportation
Federal Aviation Administration

14 CFR Part 91 Operations

Letter of Authorization

MMEL Used as an MEL

1. This Letter of Authorization (LOA) is issued under the provisions of 14 CFR Section 91.213 (a)(2) and authorizes the operator listed at the bottom of this document ***only*** (herein referred to as *operator*) to operate the aircraft listed in Table 1 below under the master minimum equipment list (MMEL), using it as a minimum equipment list (MEL).

Table 1 – Aircraft Identification

Aircraft Serial Number	Aircraft Registration Number	Aircraft M/M/S
501-0091	N2158U	CE-501-501

2. This LOA and the MMEL with the procedures document constitute a supplemental type certificate for the aircraft and must be carried on board the aircraft as prescribed by Section 91.213 (a)(2), and are considered the approved MEL.

3. Operations must be conducted in accordance with the MMEL and the procedures document.

4. The operator must develop Operations and Maintenance (O and M) procedures that correspond with those listed in the MMEL.

a. Operations and maintenance (O and M) procedures for the accomplishment of rendering items of equipment inoperative must be developed by the operator.

b. Those procedures should be developed from guidance provided in the manufacturer's aircraft flight and/or maintenance manuals, manufacturer's recommendations, engineering specifications and other appropriate sources.

c. Such operations or maintenance procedures must be accomplished in accordance with the provisions and requirement of Title 14 Part 91, Part 145, or Part 43, as appropriate.

5. The operator must also list the "as required by FAR" by specific part and section of the applicable regulations or state the operational requirements/limitations for dispatch.

a. These items must be contained in a document separate from the MMEL and must accompany the MMEL, preamble and this LOA.

b. They must all be on board the aircraft anytime it is operated.

6. A means of recording discrepancies and corrective actions must be in the aircraft at all times and available to the pilot-in-command.

a. Failure to perform O and M procedures in accordance with Part 91, Part 145 or Part 43, as appropriate, or to comply with the provisions of the MMEL, preamble, O and M procedures and other related documents, is contrary to the regulations and invalidates this LOA.

b. All MMEL items that contain the statement "as required by FAR" must either state the regulation by part and section (i.e., 14 CFR Section 91.213) with the appropriate CFR carried aboard the aircraft, or the operational requirements/limitations required for dispatch must be clearly stated.

c. When the MMEL is revised by the Flight Operations Evaluation Board (FOEB), the operator must obtain a copy of the revision from this Flight Standards District Office (FSDO), or the FSDO having jurisdiction, and incorporate any changes as soon as practicable including O's and M's as required. Revised MMEL's may also be obtained by downloading them from the Internet at fsims.faa.gov.

7. Equipment installed on this aircraft (other than Nonessential Equipment and Furnishings (NEF) such as galley equipment and passenger entertainment devices) that are in excess of what is required, and are not listed on the MMEL, must be operational for dispatch unless a request is made to this FSDO (or subsequent FSDO that has jurisdiction) to seek relief from the FOEB, through a revision to the MMEL, at the earliest opportunity for the FOEB to convene.

a. If MMEL relief is sought, this FSDO (or subsequent FSDO) must be notified within 10 calendar days (including weekends and holidays) following installation. The operator may then conduct operations with the equipment inoperative for dispatch provided it is disabled, or rendered inoperative, in accordance with all applicable regulations.

b. It is the responsibility of the operator to endeavor to determine if O and/or M procedures must be developed for disabling, rendering inoperative or removal of the equipment. If so, any procedures that are developed must comply with all applicable regulations. If MMEL relief is not sought, the FSDO need not be notified following installation of the equipment.

8. Should the operator relocate its principal base of operations (address), it must notify, in writing, the losing FSDO advising them of the receiving FSDO that will have jurisdiction within 30 calendar days following relocation.

9. This LOA is issued without an expiration date and will remain valid until:

a. Voluntarily surrendered by the operator, or

b. The operator ceases to be the operator of the aircraft listed in Table 1 of this LOA, or

c. It is surrendered or revoked for cause by the FAA, or

d. The person signing this document relinquishes responsibility, or

e. The aircraft changes ownership and should be removed, or

f. An aircraft is no longer used for that operation and should be removed, or

g. An aircraft needs to be added to the existing LOA, or

h. An aircraft changes registration number.

10. <u>Responsible Person.</u> The Responsible Person for crew operations may be either an agent for service (who must be a U.S. citizen) or a person who is a U.S. citizen or holds a U.S. pilot certificate and accepts responsibility for complying with the stated regulations by signing this document.

a. If the Responsible Person signing this LOA relinquishes responsibility, this LOA becomes invalid.

b. Enter the name, email address, and telephone number in Table 2 of the Responsible Person signing this LOA :

Table 2 – Responsible Person

Name	Email Address	Telephone
Metzger, Mark	mrmetzger@gmail.com	775-453-4496

HQ Control: 07/26/2013 HQ Revision: 02c

This Waiver or Authorization is Issued by the Federal Aviation Administration and approved by direction of the Administrator.

Digitally signed by Craig P. Jordan on behalf of Hughes, Ronald, Manager (EA11)
[1] EFFECTIVE DATE: 2/21/2014, [2] AMENDMENT #: 1
DATE: 2014.02.21 12:45:21 -06:00

I hereby accept and receive this Waiver or Authorization.

Mark Metzger 2/21/14

Metzger, Mark, Manager Date

III

OPERATIONS PROGRAM:
RVSM
MNPS
RNP-10
B-RNAV/P-RNAV

RVSM OPERATIONS

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FAA ACCEPTED
FARMINGDALE FSDO
FAA-AEA-FSDO-11

SIGN: [signature]

DATE: 2/21/14

RECORD OF REVISIONS

Revision No.	Revision Date	Insertion Date	Initials
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1) RVSM Mandate

At 0901 UTC on January 20, 2005, the FAA implemented RVSM between flight level (FL) 290-410 (inclusive) in the following airspace: the airspace of the lower 48 states of the United States, Alaska, Atlantic and Gulf of Mexico High Offshore Airspace and the San Juan FIR. RVSM was also introduced into the adjoining airspace of Canada and Mexico to provide a seamless environment for aircraft traversing those borders. In addition, RVSM was implemented on the same date in the Caribbean and South American regions.

2) RVSM Authorization

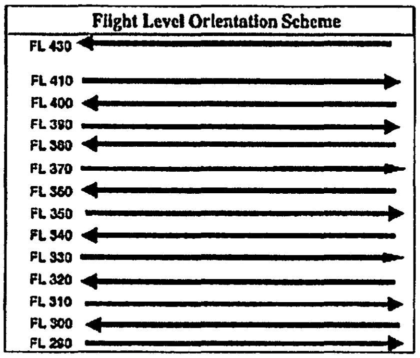
In accordance with Title 14 of the Code of Federal Regulations (14 CFR) Section 91.180, with only limited exceptions, prior to operating in RVSM airspace, operators and aircraft must have received RVSM authorization from the responsible civil aviation authority.

Aircraft that have been approved for RVSM can be used in RVSM operations worldwide. This includes RVSM operation in continental areas such as Europe and the United States. Aircraft equipage and altitude keeping performance requirements were developed using the highest density traffic counts in the world so that aircraft could receive one-time approval for worldwide operations.

If either the operator or the aircraft or both have *not* received RVSM authorization (Non-RVSM aircraft), the pilot will neither request nor accept a clearance into RVSM airspace unless an emergency situation exists or the pilot intends to climb to or descend from FL430 or above.

3) Flight Level Orientation Scheme

Altitude assignments for direction of flight will follow a scheme of odd altitude assignment for magnetic courses 000-179 degrees and even altitudes for magnetic courses 180-359 degrees for flights from FL290 up to and including FL410.



4) Flight Crew Training

The Two Winds Aviation, LLC pilot will accomplish RVSM pilot training at King Schools. Training certificates will be kept on file with the Two Winds Aviation, LLC RVSM Responsible Person.

The following items will be included in the Two Winds Aviation, LLC pilot training program, as conducted through King Schools:

a) Area of Operations Specific Policy and Procedures Including Standard ATC Phraseology;

b) Importance of crew members cross checking each other to ensure that ATC clearances are promptly and correctly complied with;

c) Use and limitations in terms of accuracy of standby altimeters in contingencies. Where applicable, the pilot should review the application of SSEC/PEC through the use of correction cards;

d) Problems of visual perception of other aircraft at 1,000 ft (300 m) planned separation during night conditions, when encountering local phenomena such as northern lights, for opposite and same direction traffic, and during turns;

e) Characteristics of aircraft altitude capture systems which may lead to the occurrence of overshoots;

f) Operational procedures and operating characteristics related to TCAS (ACAS) operation in an RVSM operation;

   i) TCAS must be operated in the TA/RA mode during all operations in the RVSM airspace and Transition Areas.

   ii) Climb and descent rates in the RVSM airspace and Transition Areas should be limited to 1000 fpm when operating within five (5) NM and ±2000 feet of other aircraft to minimize the generation of TAs and RAs.

g) Relationship between the altimetry, automatic altitude control, and transponder systems in normal and abnormal situations;

h) Aircraft operating restrictions related to RVSM airworthiness approval;

i) Use of track offset procedures in oceanic airspace to mitigate the effect of wake turbulence and to mitigate the effect of operational errors.

5) Flight Planning

During flight planning, the Two Winds Aviation, LLC pilot will pay particular attention to conditions that may affect operation in RVSM airspace. These include, but may not be limited to:

a) Review maintenance logs to verify that the aircraft is approved for RVSM operations;

b) Using the equipment block of the FAA Flight Plan (FAA Form 7233-1) or the ICAO Flight Plan to inform ATC whether or not the operator has received authorization to fly the aircraft in RVSM airspace;

   i) FAA Flight Plan Form

   Note: The pilot will check the "Aircraft Equipment Suffixes" table in Chapter 5, Section 1 (Preflight) of the Aeronautical Information Manual (AIM) for the current equipment suffix to file in FAA Flight Plans.

   ii) ICAO Flight Plan Form

   The pilot will file letter "W" to indicate RVSM authorization along with the appropriate ICAO flight plan suffixes to indicate RNAV capability.

c) The pilot will **NOT** annotate the equipment block of the ATC flight plan with the letter indicating RVSM authorization unless the responsible civil aviation authority has determined that both the operator and the aircraft are RVSM-compliant and has issued RVSM authorization to the operator;

d) Reported and forecast weather conditions on the route of flight;

e) Minimum equipment requirements pertaining to height-keeping systems;

f) Review the Citation 501 Airplane Flight Manual Supplement for any aircraft operating restrictions related to RVSM airworthiness approval.

6) Pre-Flight Procedures

The following actions will be accomplished by the pilot during preflight:

a) Review maintenance logs and forms to ascertain the condition of equipment required for flight in the RVSM airspace. Ensure that maintenance action has been taken to correct defects to required equipment.

The airplane is approved for operations in Reduced Vertical Separation Minimum (RVSM) airspace when the following equipment is installed and operating normally upon entering RVSM airspace:

- Two primary altitude measurement systems
- One automatic altitude-control system
- One altitude-alerting device
- One ATCRBS Transponder

Should any of the required equipment fail prior to the aircraft entering RVSM airspace, the pilot will request a new clearance so as to avoid flight in this airspace.

b) During the external inspection of the aircraft, particular attention will be paid to the condition of static sources and the condition of the fuselage skin in the vicinity of each static source and any other component that affects altimetry system accuracy (this check may be accomplished by a qualified and authorized person other than the pilot, e.g., a flight engineer or maintenance personnel).

c) Before takeoff, the aircraft altimeters will be set to the local altimeter (QNH) setting and should display a known elevation (e.g., field elevation) within the limits specified in aircraft operating manuals. The difference between the known elevation and the elevation displayed on the altimeters should not exceed 50 ft. The two primary altimeters should also agree within limits specified by the aircraft operating manual.

d) Before take-off, equipment required for flight in RVSM airspace will be operational, and indications of malfunction will be resolved.

7) Procedures Prior to RVSM Airspace Entry

The pilot will ensure that the following equipment is operational before entry into RVSM airspace:

a. Two primary altitude measurement systems

b. One automatic altitude-control system

c. One altitude-alerting device

d. At least one ATCRBS transponder

Should any of the required equipment fail prior to the aircraft entering RVSM airspace, the pilot will request a new clearance so as to avoid flight in this airspace

Note: The standby altimeter is not approved for RVSM operations.

Note: The pilot will ascertain the requirement for an operational transponder in each RVSM area where operations are intended. The pilot will also ascertain the transponder requirements for transition areas adjacent to RVSM airspace.

8) In-Flight Procedures

The pilot will follow the following procedures:

a) The pilot will comply with aircraft operating restrictions listed in the Citation 501 Airplane Flight Manual Supplement related to RVSM airworthiness approval.

b) Emphasis will be placed on promptly setting the sub-scale on all primary and standby altimeters to 29.92 in. Hg/1013.2 (hPa) when passing the transition altitude and rechecking for proper altimeter setting when reaching the initial cleared flight level (CFL).

c) In level cruise it is essential that the aircraft is flown at the CFL. This requires that particular care is taken to ensure that ATC clearances are fully understood and followed. Except in contingency or emergency situations, the aircraft will not intentionally depart from CFL without a positive clearance from ATC.

d) During cleared transition between levels, the aircraft should not be allowed to overshoot or undershoot the cleared flight level by more than 150 feet (45 m).

Note: It is recommended that the level off be accomplished using the altitude capture feature of the automatic altitude-control system.

e) An automatic altitude-control system must be operative and engaged during level cruise, except when circumstances such as the need to re-trim the aircraft or turbulence require disengagement. Adherence to cruise altitude will be done by reference to one of the two primary altimeters.

f) The altitude-alerting system must be operational.

g) At intervals of approximately one hour, cross-checks between the primary altimeters and the stand-by altimeter will be made. A minimum of two primary altimeters should agree within 200 feet (60 m). (Failure to meet this condition will require that the altimetry system be reported as defective and notified to ATC). The difference between the primary and standby altimeters will be noted for use in contingency situations on either the airplane flight plan or in the Altimeter Log (Appendix A).

The normal pilot scan of cockpit instruments will suffice for altimeter crosschecking on most flights.

h) Normally, the altimetry system being used to control the aircraft will be selected to provide the input to the altitude-reporting transponder transmitting information to ATC.

i) If the pilot is notified by ATC of an AAD error that exceeds 300 feet (90 m) then the pilot will take action to return to CFL as quickly as possible.

j) Contingency procedures after entering RVSM airspace: The pilot will notify ATC of contingencies (aircraft system failures, weather conditions) that affect the ability to maintain the CFL and coordinate a plan of action.

9) Post-Flight Procedures

In making maintenance log book entries regarding malfunctions in height keeping systems, the pilot will provide sufficient detail to enable maintenance to effectively troubleshoot and repair the system. The pilot will detail the actual defect and the crew action taken to try to isolate and rectify the fault. ATC must be informed if errors are noted, or as required for enroute operations.

The following information will be noted when appropriate:

- Primary altimeter readings and standby altimeter reading (used for contingency situations only)
- Altitude selector setting
- Subscale setting on altimeter
- Autopilot used to control the airplane and any differences when the alternate system was selected.
- Differences in altimeter readings if alternate static ports selected
- Use of air data computer selector for fault diagnosis procedure
- Transponder selected to provide altitude information to ATC and any difference if alternate transponder or altitude source is manually selected

10) Non-RVSM Aircraft Requesting Climb/Descent Through RVSM Flight Levels (Without Intermediate Level-Off) To/From Flight Levels Above RVSM Airspace

Pilots of non-RVSM aircraft climbing to and descending from RVSM flight levels should just file a flight plan. The pilot of non-RVSM aircraft will inform the controller of the lack of RVSM approval.

Non-RVSM aircraft climbing to and descending from flight levels above RVSM airspace will be handled on a workload-permitting basis. The vertical separation standard applied in RVSM airspace between Non-RVSM aircraft and all other aircraft shall be 2,000 feet.

Non-RVSM aircraft climbing to/descending from RVSM airspace can only be considered for accommodation provided:

a) Aircraft is capable of a continuous climb/descent and does not need to level off at an intermediate altitude for any operational considerations and

b) Aircraft is capable of climb/descent at the normal rate for the aircraft.

11) Procedures for Non-RVSM Aircraft

If either the operator or aircraft or both have not been authorized to conduct RVSM operations, the aircraft will be referred to as a "Non-RVSM" aircraft. 14 CFR 91.180 and part 91 Appendix G enable the FAA to authorize a deviation to operate a non-RVSM aircraft in RVSM airspace. The FAA will handle non-RVSM aircraft flights on a workload-permitting basis. The vertical separation standard applied between aircraft not approved for RVSM and all other aircraft shall be 2,000 feet. The pilot of non-RVSM aircraft will inform the controller of the lack of RVSM approval in accordance with the instructions provided in Section 12, "Pilot/Controller Phraseology", of this Operations Program.

As stated, with limited exceptions, the RVSM mandate calls for only RVSM authorized aircraft/operators to fly in designated RVSM airspace. Policies for accommodation of non-RVSM aircraft are intended exclusively for use by aircraft that the FAA has agreed to accommodate. They are not intended to provide other operators a means to circumvent the normal RVSM approval process.

12) Pilot/Controller Phraseology

The following table details the standard phraseology that the pilot will use to communicate in domestic RVSM flight operations.

Message	Pilot Phraseology
For a controller to ascertain the RVSM approval status of an aircraft:	***(Call Sign) Confirm RVSM approved***
Pilot indication that flight is RVSM approved	***Affirm RVSM***

Pilot will report lack of RVSM approval (Non-RVSM status): a. On the initial call on any frequency in the RVSM airspace and... b. In all requests for flight level changes pertaining to flight levels within the RVSM airspace and... c. In all read-backs to flight level clearances pertaining to flight levels within the RVSM airspace and... d. In read back of flight level clearances involving climb and descent through RVSM airspace (FL290-410)	***Negative RVSM (supplementary information, e.g., "Certification flight".)***
Pilot report of one of the following after entry into RVSM airspace: all primary altimeters, automatic altitude control systems or altitude alerters have failed. NOTE: This phrase is to be used to convey both the initial indication of RVSM aircraft system failure and on initial contact on all frequencies in RVSM airspace until the problem ceases to exist or the aircraft has exited RVSM airspace).	***Unable RVSM Due Equipment***
ATC denial of clearance into RVSM airspace	***Unable issue clearance into RVSM airspace, maintain FL ____.***
Pilot reporting inability to maintain cleared flight level due to weather encounter (See Section 13 of this Operations Program "Contingency Actions: Weather Encounters and Aircraft System Failures")	***Unable RVSM due (state reason, e.g. turbulence, mountain wave)***
ATC requesting pilot to confirm that an aircraft has regained RVSM-approved status or a pilot is ready to resume RVSM	***Confirm able to resume RVSM***
Pilot ready to resume RVSM after aircraft system or weather contingency	***Ready to resume RVSM***

13) Contingency Actions: Weather Encounters and Aircraft Systems Failures

The following section provides pilot guidance on actions to take under certain conditions of aircraft system failure and weather encounters. It also describes the expected ATC controller actions in these situations. It is recognized that the pilot and controller will use judgment to determine the action most appropriate to any given situation.

If the aircraft is unable to continue flight in accordance with the ATC clearance, and/or the aircraft is unable to maintain the navigation performance accuracy specified for the airspace, a revised clearance shall be obtained whenever possible prior to initiating any action.

The radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) spoken three times shall be used as appropriate. Subsequent ATC action with respect to the aircraft shall be based on the intentions of the pilot and the overall air traffic situation. If the pilot is unsure of the vertical or lateral position of the aircraft or the aircraft deviates from its assigned altitude or track without prior ATC clearance, then the pilot must take action to mitigate the potential for collision with aircraft on adjacent routes or flight levels. In this situation, the pilot should alert adjacent aircraft by making maximum use of aircraft lighting and broadcasting position, flight level, and intentions on 121.5 MHz. The pilot will watch for conflicting traffic both visually and by reference to the TCAS.

<u>Procedures if Unable to Obtain Prior ATC Clearance – Oceanic Operations</u>

If prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. Until a revised clearance is received, the pilot shall adhere to the following contingency procedures:

a) Leave the assigned route or track by initially turning at least 45 degrees to the right or to the left. When possible, the direction of the turn shall be determined by the position of the aircraft relative to any organized route or track system. Other factors which may affect the direction of the turn are:

    (1) The direction to an alternate airport, terrain clearance;

    (2) Any lateral offset being flown, and the flight levels allocated on adjacent routes or tracks.

NOTE: A turn of less than or greater than 45 degrees may be required depending on the type of contingency and whether the pilot intends to continue in the same direction or reverse course.

b) Following the turn, the pilot will follow the following procedures:

    (1) If unable to maintain the assigned flight level, initially minimize the rate of descent to the extent that is operationally feasible;

    (2) Take account of other aircraft being laterally offset from its track,

(3) Acquire and maintain in either direction a track laterally separated by 28 km **(15 NM)** from the assigned route, and

(4) Once established on the offset track, climb or descend to select a flight level that differs from those normally used by 150 m (500 ft),

c) Establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: aircraft identification, flight level, position (including the ATS route designator or the track code, as appropriate) and intentions on the frequency in use and on 121.5 MHz (or, as a back-up, on the inter-pilot air-to-air frequency 123.45 MHz),

d) Maintain a watch for conflicting traffic both visually and by reference to ACAS,

e) Turn on all aircraft exterior lights (commensurate with appropriate operating limitations),

f) Keep the SSR transponder on at all times, and

g) Take action as necessary to ensure the safety of the aircraft.

h) When leaving the assigned track to acquire and maintain the track laterally separated by 28 km (15 NM), the pilot shall, ***where practicable***, avoid overshooting the track to be acquired, particularly in airspace where a 55.5 km (30 NM) lateral separation minimum is applied.

The following tables provide pilot guidance for the Two Winds Aviation, LLC pilot on actions to take under certain conditions of aircraft system failure and weather encounters when in communication with ATC. It also describes the expected ATC controller actions in these situations (continued on next page).

Initial Pilot Actions in Contingency Situations
Initial pilot actions when unable to maintain flight level (FL) or unsure of aircraft altitude-keeping capability:
• Notify ATC and request assistance as detailed below. • Maintain cleared flight level, to the extent possible, while evaluating the situation. • Watch for conflicting traffic both visually and by reference to TCAS, if equipped. • Alert nearby aircraft by illuminating exterior lights (commensurate with aircraft limitations).

Mountain Wave Activity (MWA) Encounters	
Pilot actions:	**Controller actions:**
• Contact ATC and report experiencing MWA • If so desired, request a FL change or re-route • Report location and magnitude of MWA to ATC	• Advise pilot of conflicting traffic at adjacent FL • If pilot requests, vector aircraft to avoid merging target with traffic at adjacent RVSM flight levels, traffic permitting • Issue FL change or re-route, traffic permitting • Issue PIREP to other aircraft

Wake Turbulence Encounters	
Pilot should:	**Controller should:**
• Contact ATC and request vector, FL change or, if capable, a lateral offset	• Issue vector, FL change or lateral offset clearance, traffic permitting

Severe Turbulence and/or Mountain Wave Activity (MWA) Induced Altitude Deviations of Approximately 200 feet	
Pilot will:	**Controller will:**
• When experiencing severe turbulence and/or MWA induced altitude deviations of approximately 200 feet or greater, pilot will contact ATC and state "Unable RVSM due (state reason, e.g. turbulence, mountain wave) • If not issued by the controller, request vector clear of traffic at adjacent FL's • If desired, request FL change or re-route • Report location and magnitude of turbulence or MWA to ATC	• Vector aircraft to avoid merging target with traffic at adjacent flight levels, traffic permitting • Advise pilot of conflicting traffic • Issue FL change or re-route, traffic permitting • Issue PIREP to other aircraft

"Unable RVSM Due Equipment" Failure of Automatic Altitude Control System, Altitude Alerter or All Primary Altimeters	
Pilot will:	**Controller will:**
• Contact ATC and state "Unable RVSM Due Equipment" • Request clearance out of RVSM airspace unless operational situation dictates otherwise	• Provide 2,000 ft. vertical separation or appropriate horizontal separation • Clear aircraft out of RVSM airspace unless operational situation dictates otherwise

One Primary Altimeter Remains Operational	
Pilot will:	**Controller will:**
• Cross check stand-by altimeter • Notify ATC of operation with single primary altimeter • If unable to confirm primary altimeter accuracy, follow actions for failure of all primary altimeters	• Acknowledge operation with single primary altimeter

Transponder Failure	
Pilot will:	**Controller will:**
• Contact ATC and request authority to continue to operate at cleared flight level • Comply with revised ATC clearance, if issued Note: 14 CFR Section 91.215 (ATC transponder and altitude reporting equipment use) regulates operation with the transponder inoperative.	• Consider request to continue to operate at cleared flight level • Issue revised clearance, if necessary

14) Severe Turbulence and Mountain Wave Activity (MWA)

The information and practices in this section are provided to emphasize to the pilot the importance of taking appropriate action in RVSM airspace when aircraft experience severe turbulence and/or MWA that is of sufficient magnitude to significantly affect altitude-keeping.

Severe Turbulence

Severe turbulence causes large, abrupt changes in altitude and/or attitude usually accompanied by large variations in indicated airspeed. Aircraft may be momentarily out of control. Encounters with severe turbulence must be remedied immediately in any phase of flight. Severe turbulence may be associated with MWA.

Mountain Wave Activity (MWA)

Significant MWA occurs both below and above the floor of RVSM airspace, FL 290. MWA is generally experienced in the months between late fall and early spring. It often occurs in western states in the vicinity of mountain ranges. It may occur when strong winds blow perpendicular to mountain ranges resulting in up and down or wave motions in the atmosphere. Wave action can produce altitude excursions and airspeed fluctuations accompanied by only light turbulence. With sufficient amplitude, however, wave action can induce altitude and airspeed fluctuations accompanied by severe turbulence. MWA is difficult to forecast and can be highly localized and short lived.

Wave activity is not necessarily limited to the vicinity of mountain ranges. Pilots experiencing wave activity anywhere that significantly affects altitude-keeping can follow the guidance provided below.

In-flight indicators that the aircraft is being subjected to MWA are:

- Altitude excursions and airspeed fluctuations with or without associated turbulence.
- Pitch and trim changes required to maintain altitude with accompanying airspeed fluctuations.
- Light to Severe Turbulence depending on the magnitude of the MWA.

Use of Merging Target Procedures

ATC will use "merging target procedures" to mitigate the effects of both severe turbulence and MWA. Enroute controllers will advise pilots of potential traffic that they perceive may fly directly above or below his/her aircraft at minimum vertical separation. In response, pilots are given the option of requesting a radar vector to ensure their radar target will not merge or overlap with the traffic's radar target.

Pilot requests for vectors for traffic avoidance when encountering MWA or pilot reports of "Unable RVSM due turbulence or MWA" are considered first priority aircraft separation and sequencing responsibilities.

TCAS Sensitivity

For both MWA and severe turbulence encounters in RVSM airspace, an additional concern is the sensitivity of collision avoidance systems when one or both aircraft operating in close proximity receive TCAS advisories in response to disruptions in altitude hold capability.

Pre-flight tools

Sources of observed and forecast information that can help the pilot ascertain the possibility of MWA or severe turbulence are: Forecast Winds and Temperatures Aloft (FD), Area Forecast (FA), SIGMETs and PIREPs.

Pilot Actions When Encountering Weather (e.g. Severe Turbulence or MWA)

Weather Encounters Inducing Altitude Deviations of Approximately 200 feet: When the pilot experiences weather induced altitude deviations of approximately 200 feet, the pilot will contact ATC and state "Unable RVSM Due (state reason)" (e.g., turbulence, mountain wave).

Severe Turbulence (including that associated with MWA)

When pilots encounter severe turbulence, they should contact ATC and report the situation. Until the pilot reports clear of severe turbulence, the controller will apply merging target vectors to one or both passing aircraft to prevent their targets from merging:

Example

Pilot: *Yankee 123, FL 310, unable RVSM due severe turbulence.*

Controller: *Yankee 123, fly heading 290; traffic twelve o'clock, 10 miles, opposite direction; eastbound MD-80 at FL 320; (or the controller may issue a vector to the MD-80 traffic to avoid Yankee 123)*

MWA

When pilots encounter MWA, they should contact ATC and report the magnitude and location of the wave activity. When a controller makes a merging targets traffic call, the pilot may request a vector to avoid flying directly over or under the traffic. In situations where the pilot is experiencing altitude deviations of 200 feet or greater, the pilot will request a vector to avoid traffic. Until the pilot reports clear of MWA, the controller will apply merging target vectors to one or both passing aircraft to prevent their targets from merging:

Example

Pilot: *"Yankee 123, FL 310, unable RVSM due mountain wave."*

Controller: *"Yankee 123, fly heading 290; traffic twelve o'clock, 10 miles, opposite direction; eastbound MD-80 at FL 320" (or the controller may issue a vector to the MD-80 traffic to avoid Yankee 123).*

Flight Level (FL) Change or Re-route

To leave airspace where MWA or severe turbulence is being encountered, the pilot may request a FL change and/or reroute, if necessary.

15) Wake Turbulence

The pilot is aware of the potential for wake turbulence encounters following RVSM implementation. Experience gained by European authorities in Europe since 1997, however, has shown that such encounters in RVSM airspace are generally moderate or less in magnitude.

It is anticipated that, in domestic RVSM airspace, wake turbulence experience will mirror European RVSM experience gained since January 2002. European authorities have found that reports of wake turbulence encounters had not increased significantly since RVSM implementation (eight versus seven reports in a ten month period). In addition, they found that reported wake turbulence was generally similar to moderate clear air turbulence.

Pilots should be alert for wake turbulence when operating:

a) In the vicinity of aircraft climbing or descending through their altitude.
b) Approximately 10-30 miles after passing 1,000 feet below opposite direction traffic.
c) Approximately 10-30 miles behind and 1,000 feet below same-direction traffic.

Pilots encountering or anticipating wake turbulence in domestic RVSM airspace have the option of requesting a vector, FL change or if capable, a lateral offset.

NOTE: Offsets of approximately a wing span upwind generally can move the aircraft out of the immediate vicinity of another aircraft's wake vortex.

NOTE: In domestic U.S. airspace, pilots must request clearance to fly a lateral offset. Strategic lateral offsets flown in oceanic airspace do not apply.

The FAA will track wake turbulence events as an element of its post implementation program. The FAA will advertise wake turbulence reporting procedures to the operator community and publish reporting procedures on the RVSM Documentation Web page. Please refer to Section 17 "FAA Reporting" of this Operations Program.

16) RVSM Procedures and Strategic Lateral Offset Procedures: Gulf of Mexico

This section outlines the procedures for Two Winds Aviation, LLC operations in the Gulf of Mexico associated with the implementation of Reduced Vertical Separation Minimum (RVSM) and for Strategic Lateral Offset Procedures in the Gulf of Mexico oceanic airspace.

NOTE: RVSM airspace is "exclusionary" airspace. Prior to operating in designated RVSM airspace, with only limited exceptions, operators and aircraft must have received authorization from the responsible civil aviation authority.

Procedures Applicable in Gulf of Mexico Airspace

The pilot will use the RVSM operations procedures detailed in this manual for operations in the Gulf of Mexico High and Atlantic High Offshore airspace.

It is the responsibility of the pilot to check the FAA RVSM Web page for any operational changes for the airspace that they will enter. The FAA's RVSM Homepage address is: http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/enroute/rvsm/.

The Strategic Lateral Offset Procedure

The offset procedure can be used as standard operating practice in the course of normal operations. It is intended to mitigate both wake vortex encounters and to mitigate the heightened risk of collision when non-normal events occur (e.g. operational altitude deviation errors and turbulence induced altitude deviations).

a) Pilots should apply an offset outbound once ATC terminates radar service or reports that radar contact is lost. Pilots **must return** to centerline or request ATC clearance to remain offset once radar contact is re-established.

b) Strategic lateral offsets and those executed to mitigate the effects of wake turbulence are to be made to the **right** of a route or track;

c) In relation to a route or track, there are three positions that an aircraft may fly: centerline, one or 2 NM **right** and,

d) Offsets are not to exceed 2 NM right of centerline.

The intent of this procedure is to reduce risk (increase the safety margin) by distributing aircraft laterally and equally across the three available positions.

a) Aircraft without automatic offset programming capability must fly the centerline.

b) Aircraft capable of being programmed with automatic offsets may fly the centerline or offset 1NM or 2NM right of centerline to obtain lateral spacing from nearby aircraft.

c) Pilots should use whatever means are available (e.g. TCAS, communications, visual acquisition, GPWS) to determine the best flight path to fly.

d) Any aircraft overtaking another aircraft is to offset within the confines of this procedure, if capable, so as to create the least amount of wake turbulence for the aircraft being overtaken.

e) For wake turbulence purposes, pilots are also to fly one of the three positions at 1c above and never offset to the left of centerline nor offset more than 2 NM right of centerline.

NOTE. It is recognized that the pilot will use his/her judgment to determine the action most appropriate to any given situation and has the final authority and responsibility for the safe operation of the airplane. The use of air-to-air channel, 123.45, may be used to co-ordinate the best wake turbulence offset option.

f) There is no ATC clearance required for this procedure and it is not necessary that ATC be advised.

g) Voice position reports are to be based on the current ATC clearance and not the exact co-ordinates of the offset position.

17) FAA Reporting

All incidents of height keeping error must be reported to the FSDO within 72 hours of the occurrence. Errors that must be reported are:

a) Total Vertical Error (TVE) equal to or greater than 300 feet.

- Total Vertical Error is the vertical geometric difference between the actual pressure flown by the aircraft and its assigned pressure altitude (Flight Level)

b) Altimetry System Error (ASE) equal to or greater than 245 feet.

- Altimetry System Error is the difference between the pressure altitude displayed to the pilot when referenced to International System of Units (SI) standard ground pressure setting (29.92 in. Hg/1013.25 hPa) and free stream pressure altitude.

c) Assigned Altitude Deviation (AAD) equal to or greater than 300 feet.

- Assigned Altitude Deviation is the difference between the transponder Mode C altitude and the assigned altitude / flight level.

Appendix A

RVSM Altimeter Log

Date: ________
Flight From: _______ Flight To: ______
Aircraft Registration: ____________
Aircraft Serial Number: __________

Crew:
P.I.C. _________________
S.I.C. _________________

Prior to departure, aircraft altimeters should be set to the local altimeter (QNH) setting and should display a known elevation (e.g., field elevation) within the limits specified in aircraft operating manuals. The difference between the known elevation and the elevation displayed on the altimeters should not exceed 50 ft. The two primary altimeters should also agree within limits specified by the aircraft operating manual.

Known Elevation	Primary Altimeter	Secondary Altimeter	Standby Altimeter

Time (UTC)	Flight Level	Primary Altimeter	Secondary Altimeter	Standby Altimeter	Standby Altimeter Setting*

*Standby Altimeter setting is the hectapascal/inches of Mercury setting required to bring the altitude in feet to the same reading as the primary altimeters.

NOTE: In flight – Primary altimeters are to be within 200 feet of each other. The standby altimeter is noted and then set for zero difference from the primary altimeter for use in case of contingencies. The standby altimeter is not approved for RVSM flight operations.

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MNPS OPERATIONS

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FARMINGDALE FSDO
FAA-AEA-FSDO-11

SIGN: [signature]

DATE: 2/21/14

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RVSM FLIGHT IN MNPS AIRSPACE

1. General Information

The aircraft altimetry and height keeping systems necessary for flying in RVSM airspace are capable of high performance standards. However it is essential that stringent operating procedures are employed, both to ensure that these systems perform to their full capabilities and also to minimize the consequences of equipment failures and possible human errors.

As is the case with lateral navigation systems, technical failures of altimetry and/or height keeping systems are extremely rare within the MNPSA. However, less rare in the MNPSA are situations in which an aircraft is flown at a level other that cleared by ATC. ATC Loop Errors, when there is a misunderstanding or miscommunication between ATC and the pilot over the actual cleared level, unfortunately do occur. In an SSR environment ATC are alerted to any such error immediately the aircraft departs from the cleared level. Furthermore with Direct Controller Pilot Communications (DCPC) the controller can instantly intervene to resolve the situation and/or to provide potential conflict warnings to other traffic.

Severe turbulence in the MNPSA is uncommon but mountain waves in the vicinity of Greenland and clear air turbulence associated with jet streams are not unknown. Aircraft encountering such conditions can inadvertently depart from their cleared levels or the pilot may elect to change level to avoid the effects of the turbulence. Other circumstances also occur in which the pilot will be forced to change level, before an appropriate ATC re-clearance can be obtained, e.g. power or pressurization failure, freezing fuel, etc. Again, without surveillance or DCPC, there can be a significant lag between the aircraft's departure from its cleared level and any possible action from the controller to provide separation from any other potentially conflicting traffic.

Pre-Flight

Prior to conducting flight through MNPS Airspace, the RVSM Representative will verify that the aircraft has the requisite FAA approvals for both MNPS and RVSM operations. The appropriate Letters of Authorization will be onboard the aircraft along with the operations manual.

The RVSM Representative will also verify that a pilot, acting as Pilot In Command, is qualified for flight in RVSM and MNPS airspace by ensuring appropriate flight training has been accomplished at ATR, Inc., King Schools or another FAA accepted training facility.

The pilot will verify that the aircraft is equipped with operational altimetry and height-keeping systems that meet RVSM Minimum Aircraft System Performance Specifications (MASPS). The Cessna Citation 500 Series Master Minimum Equipment List (MMEL) will be strictly observed.

A 'W' will be entered by the pilot into Item 10 of the ICAO flight plan to indicate that the aircraft is approved for flight at RVSM levels; the letter 'X' will still be included to show that the aircraft satisfies MNPS lateral navigation performance requirements.

Most flights through the MNPSA enter via European and/or North American RVSM airspace. On these flights, the pilot will perform standard pre-flight checks of altimeters for initial operations in those continental RVSM areas. Other flights departing directly into the NAT Region will ensure that such checks are made.

Due to the range and equipment limitations of Citation 501 serial number 501-0091 (no HF comm), flights will be planned on the special routes known as the 'Blue Spruce' Routes. These Blue Spruce Routes are as follows:

- MOXAL – RATSU (for flights departing Reykjavik Airport) (VHF coverage exists. Non HF equipped aircraft can use this route)
- OSKUM – RATSU (for flights departing Keflavik Airport) (VHF coverage exists. Non HF equipped aircraft can use this route)
- RATSU – ALDAN – KEF (Keflavik) (VHF coverage exists. Non HF equipped aircraft can use this route)
- ATSIX – 61°N 12°34'W – ALDAN – KEF (HF is required on this route)
- GOMUP – 60°N 15°W – 61°N 16°30'W – BREKI – KEF (HF is required on this route)
- KEF – EMBLA – 63°N 30°W – 61°N 40°W – OZN
- KEF – GIMLI – DA (Kulusuk) – SF (Kangerlussuaq) – YFB
- SF (Kangerlussuaq) - 67°N 60°W - YXP
- OZN – 59°N 50°W – PRAWN – YDP
- OZN – 59°N 50°W – PORGY – HO
- OZN – 58°N 50°W – LOACH – YYR

The following special routes may also be flown without an LRNS (i.e. with only short-range navigation equipment such as VOR, DME, ADF):

- VALDI - MY (Myggenes) - ING – KEF (G3)
- GONUT - MY (Myggenes) (G11)

Use of a Master Document

The pilots will accomplish all flight planning and creation of a computerized journey log, referred to as the "Master Document". This Master Document contains a computerized flight plan that lists sequentially the waypoints defining the route, the track and distance between each waypoint and other information relevant to navigation along the cleared route, and a plotting chart.

Only one Master Document will be used on the flight deck. The FMS generated or inserted waypoints will be carefully compared to Master Document waypoints and cross checked by both pilots. The pilots will use the following annotation (continued):

1. The waypoint number will be entered against the relevant waypoint coordinates to indicate that the waypoint has been inserted into the navigation computers.

2. The waypoint number will be circled, to signify the insertion of the correct coordinates in the navigation computers has been double-checked.

3. During flight, the circled waypoint number will be ticked to signify that the relevant track and distance information has been double-checked by the pilot.

4. The circled waypoint number will be crossed out to signify that the aircraft has overflown the waypoint concerned.

All navigational information appearing on the Master Document will be checked against the best available prime source data. When a re-route is necessary, a new Master Document will be prepared for the changed portion of the flight. If the original Master Document must be used, the old waypoints will be clearly crossed out by the pilot and new ones carefully entered in their place so there is no confusion.

When ATC clearances or reclearances are being obtained, the pilot will wear headsets. The pilot will monitor such clearances and will record the clearance on the Master Document as it is being received. All waypoint coordinates will be read back in detail, adhering strictly to ICAO phraseology, except where approved local procedures make this unnecessary.

In-Flight - Before Operating in MNPS Airspace

When approaching the MNPSA through European or North American RVSM airspaces, the pilot will continually monitor the serviceability of the aircraft's height keeping systems. In view of the significant change of operating environment (i.e. to indirect surveillance and communications), a final confirmation of the aircraft systems serviceability will be performed immediately prior to entering the MNPSA. An altimeter crosscheck will be carried out, and at least two primary altimeters must agree within plus or minus 200 feet. The readings of the primary and standby altimeters will be recorded on the flight plan to be available for use in possible contingency situations.

In-Flight – Entering and Flying in MNPS Airspace

One automatic altitude-control system will be operative and engaged throughout the cruise. This system will only be disengaged when it is necessary to retrim the aircraft, or when the aircraft encounters turbulence and operating procedures dictate.

When passing waypoints, or at intervals not exceeding 60 minutes (whichever occurs earlier), or on reaching a new cleared flight level, a cross-check of primary altimeters will be conducted. If at any time the readings of the two primary altimeters differ by more than 200 feet, the aircraft's altimetry system will be considered defective and ATC will be informed as soon as possible.

The pilot will ensure that the vertical closure speed is not excessive when first approaching any cleared flight level in RVSM airspace. It is considered that, with about 1500 feet to go to a cleared flight level, vertical speed will be reduced to a maximum of 1500 feet per minute and ideally, to between 1000 feet per minute and 500 feet per minute. The pilot will also ensure that the aircraft neither undershoots nor overshoots the cleared level by more than 150 feet, manually overriding if necessary.

Abnormal operational circumstances (e.g. engine failures, pressurization problems, freezing fuel, turbulence, etc.), sometimes require a pilot to change level prior to obtaining a re-clearance from ATC. Such a re-clearance is more difficult to obtain in oceanic or remote areas where DCPC are not necessarily available. As previously indicated, extreme caution and vigilance will be exercised by the pilot when executing any such (uncleared) level changes, as the potential collision risk (particularly in the OTS) is significant.

Even under normal operations when using such indirect communication methods, there does exist the potential for misunderstanding between pilot and controller regarding the detail of any issued clearances or re-clearances. Occasionally, such "ATC Loop Errors" can lead to an aircraft being flown at a level other than that expected by the controller. In such circumstances, separation safety margins may be eroded. To avoid possible risks from any of the foregoing situations, the pilot recognizes it is essential in NAT MNPS Airspace that they always report to ATC immediately on reaching any new cruising level.

Strategic Lateral Offset Procedure (SLOP)

The pilots will utilize the Strategic Lateral Offset Procedure (SLOP), which has been established as a standard operating procedure in the NAT Region to assist in mitigating the potential risks of any of the foregoing height deviations or errors. This procedure provides for offsets within the following guidelines:

a) Along a route or track there will be three positions that an aircraft may fly: centreline or one or two miles right;

b) Offsets will not exceed 2 NM right of centreline; and

c) Offsets left of centreline must not be made.

This is standard operating procedure for the entire NAT region and the pilot is required to adopt this procedure as is appropriate. It will be noted by the pilot that:

a) Aircraft without automatic offset programming capability must fly the centreline.

b) Operators capable of programming automatic offsets may fly the centreline or offset one or two nautical miles right of centreline to obtain lateral spacing from nearby aircraft. An aircraft overtaking another aircraft will offset within the confines of this procedure, if capable, so as to crate the least amount of wake turbulence for the aircraft being overtaken.

c) The pilot will use whatever means are available, including TCAS, communications, visual acquisition, GPWS, to determine the best flight path to fly.

d) For wake turbulence purposes, the pilot will also fly one of the three positions detailed above. The pilot will not offset to the left of centreline nor offset more than 2 NM right of centreline.

The pilots may contact other aircraft on the air-to-air channel, 123.60 MHz as necessary to coordinate the best wake turbulence mutual offset option.

e) The pilot may apply an offset outbound at the oceanic entry point and must return to the centreline prior to the oceanic exit point.

f) Aircraft transiting radar-controlled airspace mid-ocean will remain on their already established offset positions.

g) There is no ATC clearance required for this procedure and it is not necessary that ATC be advised.

h) Voice position reports will be based on the waypoints of the current ATC clearance and not the offset positions.

2. Equipment Failures

The pilot will report the following equipment failures to ATC as soon as practicable following their identification:

- loss of one or more primary altimetry systems; or
- failure of all automatic altitude-control systems

The pilot will then follow the appropriate procedures described in "Special Procedures for In-Flight Contingencies", or as instructed by the controlling ATC unit.

3. Horizontal and Vertical Navigation Performance Monitoring

The navigation performance of operators within NAT MNPS Airspace is monitored on a continual basis by the NAT CMA. Such monitoring includes both measurement of the technical height-keeping accuracy of RVSM approved aircraft and assessment of collision risk associated with all reported operational deviations from cleared levels.

All identified operational situations or errors which lead to aircraft deviating from ATC cleared levels are subject to thorough investigation. Follow-up action after flight is taken, both with the operator and the State of Registry of the aircraft involved, to establish the reason for the deviation or cause of the error and to confirm the approval of the flight to operate in NAT MNPS and RVSM Airspace. Operational errors, particularly those in the vertical plane, can have a significant effect on risk in the system. For their safety and the safety of other users, crews are reminded of the importance of co-operating with the reporting OAC in the compilation of appropriate documentation including the completion of an 'Altitude Deviation Report Form', as illustrated at Attachment 2.

The detailed circumstances of all operational errors, both in the vertical and horizontal planes, are thoroughly reviewed by the CMA, together with a Safety Management Co-ordination Group of the NAT SPG, which includes current NAT pilots and controllers. The intent is to improve standard operating procedures, thereby reducing the future frequency of operational errors and thus contribute to the safety of the overall system.

At RVSM levels, moderate and severe turbulence may also increase the level of system risk and the pilot will report all occasions while flying in MNPS Airspace when a 300 foot or more deviation occurs. The form at Attachment 2 may also be used for this purpose.

PROCEDURES IN THE EVENT OF NAVIGATION SYSTEM DEGRADATION OR FAILURE

1. General Information

The navigation systems fitted to MNPS approved aircraft are generally very accurate and very reliable and GNEs as a result of system technical failures are rare in NAT MNPS Airspace. The risks that such errors pose can be significant and they must employ rigorous procedures to ensure early detection of any possible errors and hence mitigation of the ensuing risk. The majority are the result of human error, therefore diligent application by the pilot of operating procedures will help to minimize the frequency of such errors. When failures do occur, their potential effects on the aircraft's navigation capability can be subtle or progressive, resulting in a gradual and perhaps not immediately discernible degradation of performance.

For operation in MNPS Airspace, the approved aircraft must be equipped with a minimum of two fully serviceable LRNSs. MNPS approved aircraft that have suffered any equipment failures that result in only a single LRNS remaining serviceable may still be flight planned and flown through the MNPS Airspace but only on specified routes established for this purpose.

If after take-off, abnormal navigation indications occur, they will be analyzed by the pilot to discover their cause. Unless the flight can proceed safely using alternative approved navigation sources only, the pilot will consider landing at the nearest appropriate airfield to allow the problem to be fully investigated, using technical assistance if necessary. Under no circumstances will a flight continue into oceanic (MNPS) Airspace with unresolved navigation system errors.

Pilot training and consequent approval for MNPS operations includes instruction on what actions are to be considered in the event of navigation system failures. This section provides guidance on the detection of failures and what crew action should be considered, together with details of the routes that may be used when the aircraft's navigation capability is degraded below that required for unrestricted operations in NAT MNPS Airspace.

Detection of Failures

The pilot will frequently check the FMS/GPS system to detect any failure of the system. The pilots will refer to the FMS/GPS system Pilot's Guide as necessary to determine if failure of a system has occurred.

Guidance on What Constitutes a Failed System

The FMS/GPS Pilot's Guide includes guidelines on how to decide when a navigation system is considered to have failed, e.g. failures may be indicated by a warning message (as in the case of loss of RAIM), or by self-diagnosis indications. ATC will be informed if the navigation system has failed.

GPS Failures

If the GPS displays a loss of RAIM message, the pilots will immediately revert to other available means of navigation, including dead reckoning procedures if necessary, until GPS navigation is regained. The pilot will report the degraded navigation capability to ATC.

Satellite Fault Detection Outage

If the GPS receiver displays an indication of a fault detection function outage (i.e. RAIM is not available), navigation integrity must be provided by comparing the GPS position with the position indicated by another LRNS sensor (i.e. other than GPS). However, if the only sensor for the approved LRNS is GPS, then comparison will be made with a position computed by extrapolating the last verified position with airspeed, heading and estimated winds. If the positions do not agree within 10 nm, the pilot will adopt navigation system failure procedures as subsequently described, until the exclusion function or navigation integrity is regained, and will report degraded navigation capability to ATC.

Fault Detection Alert

If the GPS receiver displays a fault detection alert (i.e. a failed satellite), the pilot may choose to continue to operate using the GPS-generated position if the current estimate of position uncertainty displayed on the GPS from the FDE algorithm is actively monitored. If this exceeds 10 nm, the pilot will immediately begin using the following navigation system failure procedures, until the exclusion function or navigation integrity is regained, and will report degraded navigation capability to ATC.

2. Loss of Navigation/FMS Capability

The following guidance is offered for the pilots when operating aircraft equipped with a single operational LRNS:

The System Fails Before Take-Off

The pilot will consider:

- delaying departure until repair is possible.

The System Fails Before the OCA Boundary is Reached

The pilot will consider:

- landing at a suitable airport before the boundary or returning to the airport of departure;
- obtaining a re-clearance above or below MNPS Airspace.

The Remaining System Fails After Entering MNPS Airspace

The pilot will:

- immediately notify ATC;
- make best use of procedures specified above relating to attempting visual sightings and establishing contact on VHF with adjacent aircraft for useful information;
- keep a special look-out for possible conflicting aircraft, and make maximum use of exterior lights;
- if no instructions are received from ATC within a reasonable period consider climbing or descending 500 feet, broadcasting action on 121.5 MHz and advising ATC as soon as possible.

SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

1. Introduction

Although all possible contingencies cannot be covered, these procedures provide for the more frequent cases such as:

a) inability to comply with assigned clearance due to meteorological conditions, aircraft performance or pressurization failure;
b) en route diversion across the prevailing traffic flow; an
c) loss of, or significant reduction in, the required navigation capability when operating in an airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations.

With regard to a and b above, the procedures are applicable primarily when descent and/or turnback or diversion is required. The pilot shall take action as necessary to ensure the safety of the aircraft, and the pilot's judgment shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air traffic control shall render all possible assistance.

2. General Procedures

If an aircraft is unable to continue the flight in accordance with its ATC clearance, and/or an aircraft is unable to maintain the navigation performance accuracy specified for the airspace, a revised clearance shall be obtained, whenever possible, prior to initiating any action.

The radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) preferably spoken three times shall be used as appropriate. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and the overall air traffic situation.

If prior clearance cannot be obtained, until a revised clearance is received the following contingency procedures should be employed and the pilot shall advise air traffic control as soon as practicable, reminding them of the type of aircraft involved and the nature of the problem. In general terms, the aircraft should be flown at a flight level and on an offset track where other aircraft are least likely to be encountered.

Specifically, the pilot shall:

a) leave the assigned route or track by initially turning 45 degrees to the right or to the left, in order to acquire a same or opposite direction track offset 15 NM (28 km) from the assigned track centerline. When possible, the direction of the turn should be determined by the position of the aircraft relative to any organized route or track system. Other factors which may affect the direction of the turn are:

   (1) the direction to an alternate airport;
   (2) terrain clearance;
   (3) any strategic lateral offset being flown, and:
   (4) the flight levels allocated on adjacent routes or tracks;

b) having initiated the turn:

   (1) if unable to maintain the assigned flight level, initially minimize the rate of descent to the extent that is operationally feasible (pilots should take into account the possibility that aircraft below on the same track may be flying a 1 or 2 NM strategic lateral offset procedure (SLOP)) and select a final altitude which differs from those normally used by 500 ft (150 m) if at or below FL 410, or by 1,000 ft (300 m) if above FL 410; or;
   (2) if able to maintain the assigned flight level, once the aircraft has deviated 10 NM (19 km) from the assigned track centerline, climb or descend to select a flight level which differs from those normally used by 500 ft (150 m), if at or below FL 410, or by 1,000 ft (300m) if above FL 410.

c) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.45 MHz) and where appropriate on the frequency in use: aircraft identification, flight level, position (including the ATS route designator or the track code, as appropriate) and intentions;
d) maintain a watch for conflicting traffic both visually and by reference to ACAS (if equipped);
e) turn on all aircraft exterior lights (commensurate with appropriate operating limitations); and
f) keep the SSR transponder on at all times.

When leaving the assigned route:

a) if the intention is to acquire a same direction offset track, the pilot should consider limiting the turn to a 45 degree heading change, in order not to overshoot the offset contingency route; or

b) if the intention is to acquire and maintain an opposite direction offset route, then:

   (1) operational limitations on bank angles at cruising altitudes will normally result in

overshooting the track to be acquired. In such cases a continuous turn should be extended beyond 180 degrees heading change, in order to re–intercept the offset contingency track as soon as operationally feasible; and

(2) furthermore, if executing such a turnback in a 30 NM (56km) lateral separation route structure, extreme caution pertaining to opposite direction traffic on adjacent routes must be exercised and any climb or descent, as specified in 3b (2) above, should be completed preferably before approaching within 10 NM (19km) of any adjacent ATS route.

3. Actions to be Taken When Controller Pilot Communications Are Established

The pilot will notify ATC and request clearance to deviate from route, advising, when possible, the extent of the deviation expected.

ATC should take one of the following actions:

a) when appropriate separation can be applied, issue clearance to deviate from track; or
b) if there is conflicting traffic and ATC is unable to establish appropriate separation, ATC shall:

   (1) advise the pilot of inability to issue clearance for the requested deviation;
   (2) advise the pilot of conflicting traffic; and
   (3) request the pilot's intentions.

The pilot will take the following actions:

a) comply with the ATC clearance issued; or
b) advise ATC of intentions and execute the procedures detailed in the section below on "Actions to be taken if a revised ATC Clearance cannot be obtained".

4. Actions to be Taken If Revised ATC Clearance Cannot be Obtained

NOTE: The provisions of this section apply to situations where a pilot needs to exercise the authority of a pilot-in-command under the provisions of ICAO Annex 2, 2.3.1.

If the aircraft is required to deviate from track to avoid adverse meteorological conditions and prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. Until an ATC clearance is received, the pilot shall take the following actions:

a) if possible, deviate away from an organized track or route system;
b) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: aircraft identification, flight level, position (including ATS route designator or the track code) and intentions, on the frequency in use and on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.45 MHz);
c) watch for conflicting traffic both visually and by reference to ACAS (if equipped);

NOTE: If, as a result of actions taken under the provisions of items b and c above, the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

d) turn on all aircraft exterior lights (commensurate with appropriate operating limitations);
e) for deviations of less than 10 NM (19 km) remain at a level assigned by ATC;
f) for deviations greater than 10 NM (19 km), when the aircraft is approximately 10 NM (19 km) from track, initiate a level change in accordance with Table 4-1;
g) when returning to track, be at its assigned flight level when the aircraft is within approximately 10 NM (19 km) of the centreline; and
h) if contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.

TABLE 4-1

Route centre line track	*Deviations* *> 10 NM (19 km)*	*Level change*
EAST 000°– 179° magnetic	LEFT RIGHT	DESCEND 300 ft (90 m) CLIMB 300 ft (90 m)
WEST 180°– 359° magnetic	LEFT RIGHT	CLIMB 300 ft (90 m) DESCEND 300 ft (90m)

The following scenarios summarize pilot actions to mitigate the potential for conflict with other aircraft in certain contingency situations. They will be reviewed in conjunction with the expanded contingency scenarios, beginning on page 18, that contain additional technical and operational detail.

Scenario 1: The pilot is: 1) unsure of the vertical position of the aircraft due to the loss or degradation of all primary altimetry systems, or 2) unsure of the capability to maintain CFL due to turbulence or loss of all automatic altitude control systems.

The pilot should:	**ATC can be expected to:**
Maintain CFL while evaluating the situation;	
Watch for conflicting traffic both visually and by reference to ACAS (TCAS), if equipped;	
If considered necessary, alert nearby aircraft by: 1) Making maximum use of exterior lights; 2) Broadcasting position, FL, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency may be used).	
Notify ATC of the situation and intended course of action. Possible courses of action include:	Obtain the pilot's intentions and pass essential traffic information.
1) Maintaining the CFL and route provided that ATC can provide lateral, longitudinal or conventional vertical separation.	1) If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or increased vertical separation, and if so, apply the appropriate minimum.
2) Requesting ATC clearance to climb above or descend below RVSM airspace if the aircraft cannot maintain CFL and ATC cannot establish adequate separation from other aircraft.	2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.
3) Executing the contingency maneuver to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.
	4) Notify adjoining ATC facilities/sectors of the situation.

Scenario 2: There is a failure or loss of accuracy of one primary altimetry system (e.g., greater than 200 feet difference between primary altimeters).

The Pilot should:
Cross check standby altimeter, confirm the accuracy of a primary altimeter system and notify ATC of the loss of redundancy. If unable to confirm primary altimeter system accuracy, follow pilot actions listed in the preceding scenario.

Expanded Equipment Failure And Turbulence Encounter Scenarios

The pilot will consider this material as guidance for equipment failures and turbulence encounter scenarios.

Scenario 1. All automatic altitude control systems fail (e.g., Automatic Altitude Hold).

The pilot should:	ATC can be expected to:
Initially maintain CFL, and	
Evaluate the aircraft's capability to maintain altitude through manual control.	
Subsequently watch for conflicting traffic both visually and by reference to TCAS, if equipped.	
If considered necessary, alert nearby aircraft by: 1) Making maximum use of exterior lights; 2) Broadcasting position, FL, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency may be used).	
Notify ATC of the failure and intended course of action. Possible courses of action include:	
1) Maintaining the CFL and route, provided that the aircraft can maintain level.	1) If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or increased vertical separation, and if so, apply the appropriate minimum.
2) Requesting ATC clearance to climb above or descend below RVSM airspace if the aircraft cannot maintain CFL and ATC cannot establish lateral, longitudinal or conventional vertical separation.	2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.
3) Executing the contingency maneuver to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.
	4) Notify adjoining ATC facilities/ sectors of the situation.

Scenario 2. Loss of redundancy in primary altimetry systems.

The pilot should:	ATC can be expected to:
If the remaining altimetry system is functioning normally, couple that system to the automatic altitude control system, notify ATC of the loss of redundancy and maintain vigilance of altitude keeping.	Acknowledge the situation and continue to monitor progress.

Scenario 3. All primary altimetry systems are considered unreliable or fail.

The pilot should:	**ATC can be expected to:**
Maintain CFL by reference to the standby altimeter (if the aircraft is so equipped).	
Alert nearby aircraft by: 1) Making maximum use of exterior lights; 2) Broadcasting position, FL, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency may be used).	
Consider declaring an emergency. Notify ATC of the failure and intended course of action. Possible courses of action include:	Obtain pilot's intentions, and pass essential traffic information.
1) Maintaining CFL and route provided that ATC can provide lateral, longitudinal, or conventional vertical separation.	1) If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or increased vertical separation, and if so, apply the appropriate minimum.
2) Requesting ATC clearance to climb above or descend below RVSM airspace if ATC cannot establish adequate separation from other aircraft.	2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.
3) Executing the contingency maneuver to offset from the assigned track and FL, if ATC clearance cannot be obtained.	3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.
	4) Notify adjoining ATC facilities/sectors of the situation.

Scenario 4. The primary altimeters diverge by more than 200 ft (60 m).

The pilot should:
Attempt to determine the defective system through established trouble-shooting procedures and/or comparing the primary altimeter displace to the standby altimeter (as corrected by the correction cards, if required).
If the defective system can be determined, couple the functioning altimeter system to the altitude-keeping device.
If the defective system cannot be determined, follow the guidance in Scenario 3 for failure or unreliable altimeter indications of all primary altimeters.

Scenario 5. Turbulence (greater than moderate) that the pilot believes will impact the aircraft's capability to maintain FL.

The pilot should:	**ATC can be expected to:**
Watch for conflicting traffic both visually and by reference to TCAS, if equipped.	
If considered necessary, alert nearby aircraft by: 1) Making maximum use of exterior lights; 2) Broadcasting position, FL, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency may be used).	
Notify ATC of intended course of action as soon as possible. Possible courses of action include:	
1) Maintaining CFL and route provided ATC can provide lateral, longitudinal or conventional vertical separation.	1) Assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or increased vertical separation, and if so, apply the appropriate minimum.
2) Requesting flight level change, if necessary.	2) If unable to provide adequate separation, advise the pilot of essential traffic information and request pilot's intentions.
3) Executing the contingency maneuver to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	3) Notify other aircraft in the vicinity and monitor the situation.
	4) Notify adjoining ATC facilities/ sectors of the situation.

5. Deviations Around Severe Weather

If the aircraft is required to deviate from route to avoid weather (e.g. thunderstorms), the pilot will request a revised clearance from ATC and obtain essential traffic information, if possible prior to deviating. However, if such prior ATC clearance cannot be obtained, the procedures described below will be adopted and in the meantime efforts will be continued to obtain an appropriate ATC clearance.

a) If possible, deviate away from the route or track system;

b) Establish communications with and alert nearby aircraft broadcasting, at suitable intervals: aircraft identification, flight level, aircraft position (including ATS route designator) and intentions, on the frequency in use and on frequency 121.5 MHz (or, as a back-up, on the VHF inter-pilot air-to-air frequency 123.60 MHz);

c) Turn on all aircraft exterior lights.

d) For deviations of less than 10 nms, aircraft will remain at the level assigned by ATC;

e) For deviations of greater than 10 nms, when the aircraft is approximately 10 nms from track, initiate a level change of 300 feet.

- If flying generally Eastbound (i.e. a magnetic track of 000° to 179°) and deviating left (ie north) of track then **descend** 300 feet; if, however, deviating right (i.e. south) of track then **climb** 300 feet.

- If flying generally Westbound (i.e. a magnetic track of 180° to 359°) and deviating left (i.e. south) of track then **climb** 300 feet; if, however, deviating right (i.e. north) of track then **descend** 300 feet.

i.e.

Route centerline track	*Deviations>19 km (10 NM)*	*Level change*
EAST (000° 179° magnetic)	LEFT RIGHT	DESCEND 90 m (300 ft) CLIMB 90 m (300 ft)
WEST (180° 359° magnetic)	LEFT RIGHT	CLIMB 90 m (300 ft) DESCEND 90 m (300 ft)

f) When returning to route, regain the last assigned flight level, when the aircraft is within approximately 10 nms of centreline.

The pilots will inform ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to the centerline (or previously adopted SLOP Offset) of its cleared route.

6. Wake Turbulence

Any pilot who encounters a wake turbulence incident when flying in MNPS Airspace will ensure that a detailed report is provided to the NAT CMA. A suggested 'Wake Turbulence Report Form' for this purpose is shown at Attachment 3.

As mentioned previously, the Strategic Lateral Offset Procedure is now a standard operating procedure throughout the MNPS Region. Thus when flying within MNPS Airspace, if the aircraft encounters wake turbulence and the pilot considers it necessary to offset from the current route then the pilot may only elect to fly another of the three options allowable in SLOP (i.e. cleared route centerline, or 1 nm or 2 nms right of centerline). It is no longer possible to offset left of the track centerline to avoid wake turbulence. If neither of the remaining SLOP offset tracks are upwind of the other aircraft which is causing the wake turbulence, then the pilot will co-ordinate with the other aircraft via the inter-pilot frequency 123.60 MHz, and perhaps request that the other aircraft adopt an alternative (SLOP) allowable downwind offset.

7. ACAS/TCAS Alerts and Warnings

All Resolution Advisories (RAs) will be reported to ATC within 72 hours. These errors will be reported verbally, as soon as practicable. They will also be reported in writing to the FAA office, after the flight has landed, using the necessary procedure and forms. The Altitude Deviation Report Form in Attachment 2 will be used for this purpose.

Attachment 1 - Sample of Error Investigation Form

(Name and address of reporting agency):	
Please complete Parts 2 and 3 (and Part 4 if applicable) of this investigation form. A copy, together with copies of all relevant flight documentation (fuel flight plan, ATC flight plan and ATC clearance) should then be returned to the above address and also to: the North Atlantic Central Monitoring Agency, -c/o National Air Traffic Services - Room G41 - Scottish & Oceanic Area Control Centre, Sherwood Road,- Prestwick, Ayrshire - KA9 2NR	
Part 1 – General Information	
Operator's name	
Aircraft identification	
Date/time of observed deviation	
Position (latitude and longitude)	
Observed by (ATC unit)	
Aircraft flight level	

Part 2 – Details of Aircraft and Navigation Equipment Fit

Number Type	**INS**	**GNSS**	**IRS/FMS**	**OTHER (please specify)**
Single Dual Triple				
Model No				
Navigation system Program No				
State which system coupled to autopilot				
Aircraft Registration and Model/Series				

<table>
<tr><td colspan="14">Part 3 – Detailed description of incident
Please give your assessment of the actual track flown by the aircraft and the cause of the deviation (continue on a separate sheet if required)</td></tr>
<tr><td colspan="14"></td></tr>
<tr><td colspan="14">Part 4 – Only to be completed in the event of Partial or Full Navigation failure</td></tr>
<tr><td>Indicate the number of equipment units which failed</td><td colspan="3">INS</td><td colspan="3">GNSS</td><td colspan="3">IRS/FMS</td><td colspan="4">OTHER</td></tr>
<tr><td>Circle estimated longitude at which equipment failed</td><td>60°W</td><td>55°W</td><td>50°W</td><td>60°W</td><td>40°W</td><td>35°W</td><td>30°W</td><td>25°W</td><td>20°W</td><td>15°W</td><td>10°W</td><td>5°W</td><td>0°E/W</td></tr>
<tr><td>Give an estimate of the duration of the equipment failure</td><td colspan="13">Time of failure :
Time of exit from MNPS :
Duration of failure in MNPS :</td></tr>
<tr><td>At what time did you advise ATC of the failure</td><td colspan="13"></td></tr>
</table>

Thank you for your cooperation

Attachment 2 - Altitude Deviation Report Form

MESSAGE FORMAT FOR A REPORT TO THE CENTRAL MONITORING AGENCY OF AN ALTITUDE DEVIATION OF 300 FT OR MORE, INCLUDING THOSE DUE TO TCAS, TURBULENCE AND CONTINGENCY EVENTS

1. REPORT OF AN ALTITUDE DEVIATION OF 300 FT OR MORE
2. REPORTING AGENCY
3. DATE AND TIME
4. LOCATION OF DEVIATION
5. RANDOM / OTS[1]
6. FLIGHT IDENTIFICATION AND TYPE
7. FLIGHT LEVEL ASSIGNED
8. OBSERVED / REPORTED[1] FINAL FLIGHT LEVEL[2] MODE "C" / PILOT REPORT[1]
9. DURATION AT FLIGHT LEVEL
10. CAUSE OF DEVIATION
11. OTHER TRAFFIC
12. CREW COMMENTS WHEN NOTIFIED
13. REMARKS[3]

1. State one of the two choices.

2. In the case of turbulence, state extent of deviation from cleared flight level.

3. In the event of contingency action, indicate whether prior clearance was given and if contingency procedures were followed

When complete send this form to the appropriate FAA office and:

North Atlantic Central Monitoring Agency
c/o National Air Traffic Services
Room G41
Scottish & Oceanic Area Control Centre,
Sherwood Road,
Prestwick, Ayrshire - KA9 2NR
natcma@nats.co.uk

Attachment 3 - Wake Turbulence Report Form

For use by pilots involved in Wake Vortex incidents which have occurred in NAT MNPS Airspace. This information is requested by the North Atlantic Central Monitoring Agency and will be forwarded for inclusion in the UK National Air Traffic Services Limited Wake Vortex database.

SECTION A

DATE OF OCCURRENCE	TIME (UTC) *DAY/NIGHT	OPERATOR	FLIGHT NUMBER
AIRCRAFT TYPE & SERIES		REGISTRATION	AIRCRAFT WEIGHT (KG)
ORIGIN & DESTINATION	POSITION IN LAT & LONG	CLEARED TRACK CO-ORDINATES	
FLIGHT LEVEL	SPEED/MACH NBR.	FLIGHT PHASE: *CRUISE/CLIMB/DESCENT	WERE YOU TURNING? *YES/NO
DID YOU APPLY A TRACK OFFSET? *YES/NO	SIZE OF TRACK OFFSET? Nautical Miles	WAS ATC INFORMED? *YES/NO	
MET CONDITIONS IMC VMC	ACTUAL WEATHER WIND VISIBILITY CLOUD TEMPERATURE / km / °C	DEGREE OF TURBULENCE *LIGHT/MODERATE/SEVERE	
OTHER SIGNIFICANT WEATHER?			

(*Circle the appropriate reply only)
SECTION B

1 What made you suspect Wake Vortex as the cause of the disturbance? ____________________

____

____

____

2 Did you experience vertical acceleration? *YES/NO
If YES please describe briefly ____________________

____

3 What was the change in attitude? (please estimate angle) Pitch ____ ° Roll ____ ° Yaw ____ °
4 What was the change in height if any? ____________________ *INCREASE/DECREASE

5 Was there buffeting? *YES/NO

6 Was there stick shake? *YES/NO

7 Was the Autopilot engaged? *YES/NO

8 Was the Auto throttle engaged? *YES/NO

9 What control action was taken?

Please describe briefly ______________________________

____

____

10 Could you see the aircraft suspected of causing the wake vortex? *YES/NO

11 Did you contact the aircraft suspected of causing the vortex? *YES/NO

12 Was the aircraft suspected of causing the vortex detected by TCAS? *YES/NO

If YES to any of questions 10 to 12, what type of aircraft was it? ______________________________

and where was it relative to your position? ______________________________

(Estimated separation distance) ______________________________

Were you aware of the preceding aircraft before the incident? *YES/NO

OTHER INFORMATION

13 Have you any other comments that you think may be useful? ______________________________

____

____

____

____

____

Signed ______________________________

Name (BLOCK CAPITALS) ______________________________ DATE ______________

(*Circle the appropriate reply only)

When complete send this form to: North Atlantic Central Monitoring Agency
c/o National Air Traffic Services
Room G41
Scottish & Oceanic Area Control Centre,
Sherwood Road,
Prestwick, Ayrshire - KA9 2NR
natcma@nats.co.uk

APPENDIX A: OCEANIC OPERATIONS CHECKLIST

Flight Planning

- Plotting Chart – plot route from coast out to coast in
- Equal Time Points (ETP) - plot
- Track message (current copy available for all crossings)
- Note nearest tracks on plotting chart
- Review possible navigation aids for accuracy check prior to coast out

Preflight

- Master Clock for all ETAs/ATAs
- Maintenance Log – check for any navigation/ communication/surveillance or RVSM issues
- RVSM
- Altimeter checks (tolerance)
- Wind shear or turbulence forecast
- Computer Flight Plan (CFP) vs ICAO Flight Plan (check routing, fuel load, times, groundspeeds)
- Dual Long Range NAV System (LRNS) for remote oceanic operations
- HF check (including SELCAL) – *if installed*
- Confirm Present Position coordinates (best source)
- Master CFP (symbols: O, V, \, X)
- LRNS programming
- Check currency and software version
- Independent verification
- Check expanded coordinates of waypoints
- Track and distance check (+/- 2 ° and +/- 2 NM)
- Upload winds, if applicable
- Groundspeed check

Taxi and prior to take-off

- Groundspeed check
- Present Position check

Climb Out

- Transition altitude – set altimeters to 29.92 in (1013.2 hPa)
- Manually compute ETAs above FL180

Prior to Oceanic entry

- Gross error accuracy check – record results
- HF check, if not done during pre-flight – *if installed*
- Log on to CPDLC or ADS 15 to 45 minutes prior, if equipped
- Obtain oceanic clearance from appropriate clearance delivery
- Confirm and maintain correct Flight Level at oceanic boundary
- Confirm Flight Level, Mach and Route for crossing
- Advise ATC When Able Higher (WAH)
- Ensure aircraft performance capabilities for maintaining assigned altitude/assigned Mach
- Reclearance – update LRNS, CFP and plotting chart

- Check track and distance for new route
- Altimeter checks - record readings
- Compass heading check – record

After Oceanic Entry

- Squawk 2000 – 30 minutes after entry, if applicable
- Maintain assigned Mach, if applicable
- VHF radios-set to interpilot and emergency frequencies
- Strategic Lateral Offset Procedures (SLOP) - SOP
- Hourly altimeter checks

Approaching Waypoints

- Confirm next latitude/longitude

Overhead Waypoints

- Confirm aircraft transitions to next waypoint
- Check track and distance against Master CFP
- Confirm time to next waypoint
- *Note: 3-minute or more change requires ATC notification*
- Position report - fuel

10-Minute Plot (Approximately 2° of Longitude after Waypoint)

- Record time and latitude/longitude on plotting chart – non steering LRNS

Midpoint

- Midway between waypoints compare winds from CFP, LRNS and upper millibar wind charts
- Confirm time to next waypoint

Coast In

- Compare ground based NAVAID to LRNS
- Remove Strategic Lateral Offset
- Confirm routing after oceanic exit

Descent

- Transition level - set altimeters to QNH

Destination/Block In

- Navigation Accuracy Check
- RVSM write-ups

Other Issues

1. Contingencies
   Published Weather Deviation Procedure
   15 NM offset (formerly 30 NM in the NAT, 25 NM in the Pacific)
   Lost Comm/NAV Procedures
2. Weather – Destination/Alternate(s) Airport(s)

3. Data Link Contingency Procedures
4. Dead Reckoning (DR)
5. GPS – RAIM/FDE Requirements

Detail of checklist

The detail of the check items listed above and the rationale for their inclusion follow.

Flight Planning

Plotting Chart
A plotting chart of appropriate scale should be used for all remote oceanic operations. This includes using a plotting chart for published oceanic routes and tracks. ICAO groups who review oceanic errors have determined that the routine use of a plotting chart is an excellent aid to reduce lateral errors. A plotting chart can also serve as a critical aid in case of partial or total navigation failure. It should be noted that the pilot should read from the plotting chart back to the master CFP when verifying data. To read from the Master CFP to the plotting chart is a human factor's issue that has lead to errors based on seeing what we expect to see

Equal Time Points (ETP)
ETPs should be computed for contingencies such as medical divert, engine loss or rapid depressurization. A simultaneous engine loss and rapid depressurization should also be considered. It is advisable to note the ETPs on the plotting chart. Crewmembers should review with each other the appropriate diversion airport(s) when crossing ETPs. Pilot procedures should also include a manual method for computing ETPs.

Track message
Crews must have a current track message even if filed for a random route. Reviewing the date, effective Zulu time and Track Message Identifier (TMI) ensures having a current track message on board. The TMI is linked to the Julian Date. Operators must also ensure that their flight planning and operational control process notify crewmembers in a timely manner of any amendments to the daily track message. Plotting tracks near the assigned route can help situational awareness in case the crew needs to execute a contingency.

Review possible navigation aids for accuracy check prior to coast out
It is good practice to discuss in advance a primary and secondary ground based navigational aid that will be used to verify the accuracy of the Long Range Navigation System (LRNS). This planning may help to identify intended navigation aids that are limited or NOTAMed unusable and is helpful when departing airports close to oceanic airspace. Examples include Shannon (EINN), Lisbon (LRRT), Los Angeles (KLAX), etc.

Preflight

Master Clock
It is a requirement to have a master clock on board synchronized to UTC or GPS. This time source, which is typically the Flight Management System (FMS), must be used for

all ETAs and ATAs. The use of multiple time sources on the aircraft has lead to inconsistencies in reporting times to ATC and resulted in a loss of longitudinal separation.

Maintenance Log

Before entering a special area of operation, crews should focus on any write-ups that affect communication, navigation, surveillance or RVSM requirements. Any discrepancies noted in the maintenance log or during the walk-around may require delays or rerouting.

RVSM

Required equipment includes two primary independent altimetry sources, one altitude alert system and one automatic altitude control system. In most cases a functioning transponder that can be linked to the primary altimetry source is also required. Crews should note any issues that can affect accurate altimetry.

Altimeter checks

Before taxi, crews should set their altimeters to the airport QNH. Both primary altimeters must agree within + 75 feet of field elevation. The two primary altimeters must also agree within the limits noted in the aircraft operating manual.

Wind Shear or Turbulence Forecast

The Master Computer Flight Plan (CFP) with projected wind shear or the turbulence forecast documents should be reviewed for flights in RVSM airspace. Forecast moderate or greater turbulence could lead to RVSM suspension. Operators are cautioned against flight planning through areas of forecast moderate or greater turbulence.

Computer Flight Plan (CFP)

The document designated as the Master CFP should be carefully checked for date, type aircraft, fuel load and performance requirements. Crosschecks should also be done for routing and forecast groundspeeds. The CFP should be carefully checked against the ICAO filed flight plan to ensure the routing is in agreement with both documents. The enroute time on the CFP should be compared against the distance to destination for a reasonable groundspeed. The enroute time should also be compared against the total distance for a reasonable fuel load.

Dual Long Range NAV System (LRNS)

Two operational LRNSs are required for remote oceanic operations. A single FMS is not authorized for remote oceanic operations.

HF check (if installed)

An HF check should be conducted on the primary and secondary HF radios in areas where dual HF radios are required. If possible, the HF checks should be done on the ground or before entering oceanic airspace. A SELCAL check should also be accomplished.

Confirm Present Position coordinates

If two pilots are onboard, both pilots should independently verify the present position coordinates using either published ramp coordinates or determine position from the airfield diagram. They should not rely solely on the present position when the LRNS was shut down from the previous flight. A master source such as an enroute chart should also be used to confirm accuracy of coordinates at the oceanic boundaries.

Master CFP symbols

Operators are encouraged to use consistent symbology on the Master CFP. For example, a circled number (O) means the second crewmember has independently verified the coordinates entered or crosschecked by the first crewmember. A checkmark (V) may indicate that the track and distances have been confirmed. A diagonal line (\ ) may indicate that the crew has confirmed the coordinates of the approaching and next way point. An X-symbol (X) may indicate having flown overhead the way point.

LRNS programming

Check currency and software version

It is important to check the effective date of the database. Crews should note if the database is projected to expire during their trip. Crews are discouraged from flying with expired databases. MELs may allow relief to fly with an expired database but require the crews to manually crosscheck all data. The software version of the database should also be confirmed in case there has been a change.

Independent verification

It is critical that one crewmember enters waypoint coordinates and that these are independently checked by another crewmember if another crewmember is onboard. It should be noted that the pilot should read from the FMS screen back to the master CFP when verifying data. To read from the Master CFP to the FMS is a human factor's issue that has lead to errors based on seeing what we expect to see.

Check expanded coordinates of waypoints

Most FMSs allow entering abbreviated oceanic coordinates. There have been cases when there was an error in the expended waypoint coordinate, but crews only checked the abbreviated coordinate. Verifying only the abbreviated coordinate could lead to a lateral error. Flight crews should conduct a magnetic course and distance check between waypoints to further verify waypoint coordinates.

Track and distance check

To minimize oceanic errors, it is important to conduct a magnetic course and distance check from oceanic entry to oceanic exit. Operators should establish a tolerance such as +/- 2 ° and +/- 2 NM. The course and distance check comparing the Master CFP against the LRNS are critical in detecting errors that may not have been noticed by simply checking coordinates. A difference of more than 2° between waypoints may be due to a difference of the magnetic variation in the database versus the variation used in the Master CFP. Any difference outside the +/- 2 ° and +/- 2 NM should be rechecked and verified.

Upload winds

Some LRNS units allow the crew to upload projected winds. This procedure allows more accurate reporting of ETAs.

Groundspeed check
The groundspeed should be noted before taxiing the aircraft. Crews should expect the groundspeed to read zero (0) knots. This procedure is a good practice to detect an error that may be developing in the LRNS.

Taxi and prior to take-off

Groundspeed check
During taxi to the active runway, pilots should check the groundspeed to see if it is reasonable.

Present Position check
This Present Position check is conducted after leaving the gate. Check for gross difference between this Present Position and the gate coordinates. This check will alert the crew to possible error in the LRNS database that can be investigated/corrected prior to take-off.

Climb Out

Transition altitude
Crews should brief the transition altitude based on information from the approach plate or from the ATIS. After climbing through the transition altitude, the altimeters should be reset to 29.92 in or 1013.2 hPa.

Manually compute ETAs
After climbing above the sterile altitude and time permitting crews should manually compute ETAs from departure to destination. These should be noted on the Master CFP. This is an excellent crosscheck against ETAs computed by the LRNS.

Prior to oceanic entry

Gross error accuracy check
Before oceanic entry, the accuracy of the LRNS should be checked against a ground-based NAV-AID. The results of the accuracy check should be recorded with the time and position. A large difference between the ground-based NAV-AID and the LRNS may require immediate corrective action. Operators should establish a gross error check tolerance based on the type LRNS. It is not advisable for crews to attempt to correct an error by doing an air alignment or by manually updating the LRNS since this has often contributed to a Gross Navigation Error.

HF checks (if installed)
If the crew was unable to accomplish the HF and SELCAL checks on the ground, these checks must be accomplished before oceanic entry.

Log on to CPDLC or ADS
Operators approved to use Controller Pilot Data Link Communications (CPDLC) or Automatic Dependent Surveillance (ADS) should log on to the appropriate FIR 15 to 45 minutes prior to the boundary.

Obtain oceanic clearance
If two pilots are onboard, both pilots must obtain oceanic clearance from the appropriate clearance delivery. (Clearance via voice should be at least 40 minutes prior to oceanic entry and via data link should be 30 to 90 minutes prior to oceanic entry). It is important that the pilot confirms and enters the ocean at the altitude assigned in the oceanic clearance (this may be different than the domestic cleared flight level). An oceanic clearance typically includes a route, flight level and assigned MACH. Crews should include their requested flight level in their initial clearance request. Some oceanic centers require pilots to advise them at the time of their oceanic clearance "When Able Higher" (WAH). Crews should be confident that they are able to maintain requested flight levels based on aircraft performance capabilities.

Re-clearance
A re-clearance (that is different from the oceanic route requested with the filed flight plan) is the number one scenario which leads to a Gross Navigation Error. Crews must be particularly cautious when receiving a re-clearance. Both pilots should receive and confirm the new routing and conduct independent crosschecks after the LRNS, Master CFP and Plotting Chart are updated. It is critical that crews check the magnetic course and distance between the new waypoints as noted in PREFLIGHT under the paragraph "LRNS Programming".

Altimeter checks
Crews are required to check the two primary altimeters that must be within 200 ft of each other. This check is conducted while at level flight. The stand-by altimeter should also be noted. The altimeter readings should be recorded along with the time.

Compass heading check
It is recommended to conduct a compass heading check and record the results. This check is particularly helpful with inertial systems. The check can also aid in determining the most accurate compass if a problem develops over water.

After oceanic entry

Squawk 2000
Thirty minutes after oceanic entry crews should Squawk 2000, if applicable. There may be regional differences such as maintaining last assigned Squawk in the West Atlantic Route System (WATRS). Crews transiting Reykjavik's airspace must maintain last assigned Squawk.

Maintain assigned Mach
Some oceanic clearances include a specific Mach. There is no tolerance for this assigned Mach. The increased emphasis on longitudinal separation requires crew vigilance in a separation based on assigned Mach. The requirement is to maintain the true Mach which has been assigned by ATC. In most cases, the true Mach is the indicated Mach. Some aircraft, however, require a correction factor.

VHF Frequency Monitoring.
After going beyond the range of the assigned VHF frequency, crews should set their radios to interpilot (123.45 Mhz) and emergency frequencies (121.5 Mhz).

Strategic Lateral Offset Procedures (SLOP)
The SLOP should be Standard Operating Procedure (SOP) for all oceanic crossings. This procedure was developed to reduce the risk from highly accurate navigation systems or operational errors involving the ATC clearance. SLOP also replaced the contingency procedure developed for aircraft encountering wake turbulence. Depending upon winds aloft, coordination between aircraft to avoid wake turbulence may be necessary. This procedure of flying centerline, 1 NM or 2 NM right of centerline, greatly reduces the risk to the airspace by the nature of the randomness. Aircraft that do not have an automatic offset capability (that can be programmed in the LRNS) should fly the centerline only. SLOP was not developed to be used only in contingency situations.

Hourly altimeter checks
Crews are required to observe the primary and stand-by altimeters each hour. It is recommended that these hourly checks be recorded with the readings and times. This documentation can aid crews in determining the most accurate altimeter if an altimetry problem develops.

Approaching waypoints

Confirm next latitude/longitude
Within a few minutes of crossing an oceanic waypoint crews should crosscheck the coordinates of that waypoint and the next waypoint. This check should be done by comparing the coordinates against the Master CFP based on the currently effective ATC clearance.

Overhead waypoints

Confirm aircraft transitions to next waypoint
When overhead an oceanic waypoint, crews should ensure that the aircraft transitions to the next leg. This is confirmed by noting the magnetic heading and distance to the next waypoint compared against the Master CFP.

Confirm time to next waypoint
Crews must be vigilant in passing an accurate ETA to ATC for the next waypoint. A change of three (3) minutes or more requires that ATC be notified in a timely manner. There is substantial emphasis on reducing longitudinal separation and this timely update must be a priority for the crews.

Position report
After passing over the oceanic waypoint, crews that give a position report to ATC must use the standard format. Flights designated as MET reporting flights or flights on random routes should be including in the position report additional items such as winds and temperatures. Crews should also note and record their fuel status at each oceanic

waypoint. This is especially important if the cleared route and flight level differ significantly from the filed flight plan.

10-minute plot

Record time and latitude/longitude on plotting chart
Approximately 10 minutes after passing an oceanic waypoint, crews should plot the latitude, longitude and time on the plotting chart. It is advisable to plot the non-steering LRNS. A 10-minute plot can alert the crew to any lateral deviation from their ATC clearance prior to it becoming a Gross Navigation Error. A good crosscheck for the position of the 10-minute plot is that it is approximately 2o of longitude past the oceanic waypoint.

Midpoint

Midway between waypoints
It is good practice to crosscheck winds midway between oceanic waypoints by comparing the Master CFP, LRNS and upper millibar wind chart. As noted before, this information will be included in a position report if the flight has either been designated as a MET reporting flight or is a flight on a random route. This crosscheck will also aid crews in case there is a need for a contingency such as Dead Reckoning (DR).

Confirm time
It is recommended that during a wind check the crews also confirm the ETA to the next waypoint noting the two (2) minute tolerance.

Coast In

Compare ground based NAVAID to LRNS
When departing oceanic airspace and acquiring ground based NAVAIDs, crews should note the accuracy of the LRNS by comparing it to those NAVAIDs. Any discrepancy should be noted in the Aircraft Maintenance Log

Remove Strategic Lateral Offset
Crews using a Lateral Offset of 1 NM or 2 NM right of centerline at oceanic entry need a procedure to remove this Lateral Offset at coast in prior to exiting oceanic airspace. It is advisable to include this as a checklist item.

Confirm routing after oceanic exit
Before entering the domestic route structure, crews must confirm their routing to include aircraft speed.

Descent

Transition level
During the approach briefing, crews should note the transition level on the approach plate or verified by ATIS. Crews must be diligent when descending through the transition level to reset the altimeters to QNH. This is particularly important when encountering

IFR, night or high terrain situations. Any confusion between a QNH set with inches of Mercury or hPa must be clarified.

Destination/block in

Navigation Accuracy Check
When arriving at the destination gate, crews should note any drift or circular error in the LRNS. A GPS Primary Means system normally should not exceed 0.27 NM for the flight. Some inertial systems may drift as much as 2 NM per hour. Because the present generation of LRNSs is highly accurate, operators should establish a drift tolerance which if exceeded would require a write-up in the Maintenance Log. RNP requirements demand that drift be closely monitored.

RVSM write-ups
Problems noted in the altimetry system, altitude alert or altitude hold must be noted in the Maintenance Log. The RVSM airspace is closely monitored for any Height Deviations. An aircraft not meeting the strict RVSM standards must not be flight-planned into RVSM airspace without corrective action.

RNP-10 OPERATIONS

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1. GENERAL INFORMATION

RNP-10 and RNP-4 are the only RNP navigation specifications (NavSpecs) currently applicable to oceanic and remote area operations. Other Area Navigation (RNAV) and RNP NavSpecs are applicable to continental en route, terminal area and approach procedures. States and operators are implementing RNAV and RNP NavSpecs as part of a worldwide ICAO effort to implement Performance-based Navigation (PBN) and communication, navigation, surveillance and air traffic management (CNS/ATM) concepts.

RNP-10 and 50 nautical mile (nm) lateral separation were implemented first in 1998 in the North Pacific (NOPAC) route system. Implementation of additional Pacific oceanic area proceeded over the next two years. RNP-10 and 50 NM lateral separation is also currently applicable to the following:

- Routes in the European-South American Corridor;
- Routes between Santiago, Chile and Lima, Peru;
- The West Atlantic Route System (WATRS) and parts of the San Juan and Miami Oceanic Control Areas;
- The Gulf of Mexico where single long range navigation system (S-LRNS) RNP10 is authorized; ie, the Houston oceanic control area (CTA)/flight information region (FIR) and the portion of the Miami CTA/FIR overlying the Gulf of Mexico, Monterrey CTA and Merida High CTA within the Mexico FIR/upper control area (UTA).

2. COMPLIANCE

Two Winds Aviation, LLC operates in compliance with 14 CFR Part 91, sections 91.703(a)(1) and (a)(2), which requires each certificate holder operating a civil aircraft of U.S. registry outside of the United States, to comply with ICAO, Annex 2 when over the high seas, and to comply with the regulations of a foreign country when operating within that country's airspace.

Two Winds Aviation, LLC pilots are knowledgeable in RNP-10 operations under 14 CFR Part 91. Prior to conducting operations in RNP-10 airspace, the pilots will have received training from an FAA accepted training facility. Training certificates will be kept on file with the RVSM Representative.

3. AIRCRAFT ELIGIBILITY

RNP-10 requires that each individual aircraft be qualified and approved by appropriate FAA offices before the operator conducts flight in RNP-10 airspace. Two Winds Aviation, LLC's aircraft is in compliance with RNP-10 requirements. The aircraft's GPS systems are approved under TSO C129a (class b1c1), and have been demonstrated capable of, and been shown to meet the requirements for the following operations:

1. Oceanic/Remote – Two FMS's are installed and operating, and are receiving usable signals from each (dual or combination) of the following navigation sensors (or one FMS and one navigation sensor for those routes requiring only one Long Range Navigation (LRN) sensor):

a. GPS (meets the requirements of FAA Notice 8110.60 for primary navigation sensor).
b. Intertial Reference System (IRS)

2. RNP-10 Airspace – Operation in RNP-10 Airspace is approved in accordance with the criteria of Order 8400.12B, as revised, when receiving usable signals from one or more of the following sensors:

   a. GPS (meets requirements of FAA Notice 8110.60 for primary navigation sensor).
   b. Inertial Reference System (IRS). For operations with the IRS as the only position sensor, operations are limited to 6.2 hours (or as stated in the aircraft AFM) after the last position update from VOR/DME, DME/DME or GPS source.

3. Enroute and Terminal including RNP5/BRNAV – In accordance with AC 20-130A, provided it is receiving usable navigation information from one or more of the following:

   a. One VOR/DME or multiple DMEs
   b. GPS
   c. Inertial Reference System (IRS)

Maintenance of LRNS: The aircraft LRNS will be maintained in accordance with the appropriate airplane maintenance manual.

4. PAST PERFORMANCE

This is Two Winds Aviation, LLC's initial RNP-10 application; therefore no past performance records are available for Cessna Citation 501 serial number 501-0091. Two Winds Aviation, LLC will maintain operating history of incidents related to poor height keeping performance, which indicates weaknesses in pilot training, procedures or maintenance. If any weaknesses are noted, the RVSM Representative will take appropriate action as necessary until the situation is resolved.

5. FLIGHT PLANNING

During flight planning, the pilot will pay particular attention to conditions that may affect operations in RNP-10 airspace (or on RNP-10 routes). These include, but may not be limited to:

a. Verify that the aircraft is approved for RNP-10 operations;

b. Verify that two long range navigation systems (LRNS) are operational;

c. Verify that the RNP-10 time limit has been accounted for;

d. Verify that the letter "R" is annotated in Block 10 (Equipment) of the ICAO Flight Plan and, if required for the area of operations to be flown, that item 10 is also annotated with the letter "Z" and item 18 with "NAV/RNP10";

e. Verify the requirements for GPS, such as FDE, if appropriate for the operation; and

f. If required for a specific navigation system, accounting for any operating restriction related to RNP-10 approval in accordance with the aircraft's AFM.

The pilot will use the appropriate FAA or ICAO flight plan designation specified for the RNP-10 route flown. The letter "R" will be placed in Block 10 of the ICAO flight plan to indicate that the pilot has reviewed the planned route of flight to determine RNP-10 requirements and the aircraft and operator have been approved by the FAA to operate in areas or on routes where RNP-10 is a requirement for operation.

When filing an ICAO flight plan under new ICAO FPL 2012 provisions beginning November 15, 2012, to inform ATC that the aircraft is RNP-10 authorized and eligible for 50 NM lateral separation, pilots shall:

(1) annotate ICAO Flight Plan Item 10a (Equipment) with the letter "R" and

(2) annotate Item 18 (Other Information) with, as appropriate, "PBN/A1" for RNP-10 aircraft (no space between letters and numbers). PBN is the acronym for Performance Based Navigation.

At dispatch or during flight planning, the pilot will analyze the route to be flown in order to ensure that adequate navigation aids are available en route to enable the aircraft to navigate to RNP-10.

When planning operations in areas where RNP-10 is applied, the pilot will evaluate their intended route(s) of flight in relation to the RNP-10 time limit. In making this evaluation, the pilots will consider the effect of headwinds. The headwind component considered for the route will be obtained from any source found acceptable to the FAA. (Acceptable sources for wind data include: National Weather Service, Bracknell, industry sources such as Boeing Winds on World Air Routes). The pilots may choose to make this evaluation on a one-time basis (75% probability wind components) or on a per flight basis.

Certain sources of wind data establish the probability of experiencing a given wind component on routes between city pairs on an annual basis. If the pilot chooses to make a one time calculation of RNP-10 time limit compliance, they may use the annual 75% probability level to calculate the effect of headwinds (this level has been found to be a reasonable estimation of wind components).

The pilot may choose to evaluate each individual flight using flight planned winds to determine if the aircraft will comply with the specified time limit. If it is determined that the time limit will be exceeded, then the aircraft must fly an alternate route or delay the flight until the time limit can be met. This evaluation will be considered a flight planning task.

The pilot will establish their capability to satisfy the RNP-10 time limit established for dispatch or departure into RNP-10 airspace. The start point for calculation will start at the point where the system is placed in the navigation mode or the point where it is expected to be updated. The stop point may be one of the following:

(a) the point at which the aircraft will begin to navigate by reference to ICAO Standard Navaids (VOR, DME, NDB) and/or comes under radar surveillance from ATC; or

(b) the point at which the navigation system is expected to be updated.

6. PREFLIGHT PROCEDURES AT THE AIRCRAFT

The pilot will complete the following actions during preflight:

a. Review maintenance logs and computerized maintenance tracking reports to ascertain the condition of equipment required for flight in RNP-10 airspace or on an RNP-10 route. Ensure that maintenance action has been taken to correct defects to required equipment.

b. Confirm that the aircraft navigation database is current.

c. During external inspection of the aircraft, particular attention will be paid to the condition of navigation antennas and the condition of the fuselage skin in the vicinity of each of these antennas (this check may be accomplished by a qualified and authorized person other than the pilot, e.g., a flight engineer or maintenance personnel).

d. Emergency procedures for operations in RNP-10 airspace or on RNP-10 routes are no different than normal oceanic emergency procedures with one exception: pilots must be able to recognize and ATC must be advised when the aircraft is no longer able to navigate to its' RNP-10 approval capability.

7. EN-ROUTE

Except for operation in the Gulf of Mexico, at least two Long Range Navigation Systems capable of navigating to RNP specifications must be operational at the oceanic entry point. If this is not the case, then the pilot will consider an alternate routing that does not require that equipment or diverting for repairs. The pilot will notify ATC and operate in accordance with policy applicable to the airspace.

Before entering oceanic airspace, the aircraft's position will be checked as accurately as possible by using external navigation aids (Navaids). This may require distance measuring equipment DME/DME and/or DME/VHF omnidirectional (VOR) checks to determine navigation system errors through displayed and actual positions. If the system is updated, the proper procedures should be followed with the aid of a prepared checklist.

In-flight procedures will include mandatory cross checking to identify navigation errors in sufficient time to prevent the aircraft from inadvertent deviation from ATC cleared routes.

Pilots will advise ATC of any deterioration or failure of the navigation equipment below the navigation performance requirements or of any deviations required for a contingency procedure.

ATC will be advised immediately of loss of navigation capability. The pilots will operate in accordance with the policy applicable to the airspace. Refer to Appendix B of this RNP-10 operations program for contingency procedures.

8. WEATHER DEVIATION PROCEDURES FOR OCEANIC OPERATIONS

The pilot's judgment will ultimately determine the sequence of actions taken and ATC shall render all possible assistance. If the aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an air traffic control clearance shall be obtained at the earliest possible time. The pilot shall advise ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to the centerline of its cleared route.

Contingency procedures can be found in Appendix B of this RNP10 operations program.

9. ERROR REPORTING

Oceanic airspace is procedural airspace based on strategic clearances, which means controllers issue oceanic clearances and pilots must follow specific navigation, speed, and altitude procedures. Because many oceanic errors occur in the non-radar environment, they tend to be more pronounced and of a longer duration than those within radar coverage. Therefore, whether or not there is a loss of separation, the reporting of oceanic errors is essential for evaluating the overall safety of oceanic airspace. Besides being hazards to flight safety, they create barriers to future reductions in separation. Timely reporting of oceanic errors allows prompt corrective action.

Radar or satellite Automatic Dependent Surveillance - Contract (ADS-C) observations of each aircraft's proximity to the centreline and altitude are typically noted by Air Traffic Organization (ATO) facilities. If an observation indicates that an aircraft was not within an established limit, the reason(s) for the apparent deviation from centreline or altitude may need to be determined and steps taken to prevent a recurrence.

FAA Order 7110.82 (as revised) establishes GNEs and Height Errors (HE). When appropriate, the FAA may consider these reports in determining remedial action. Repeated GNE or HE occurrences attributed to a specific piece of navigation equipment may result in rescinding the Two Winds Aviation, LLC LOA for use of that equipment. Information that indicates the potential for repeated errors may require a modification of an operator's training program. Information that attributes multiple errors to a particular pilot will necessitate additional training, re-testing or airman certification review. It is the RVSM Representative's responsibility to ensure the pilot has been re-trained and is qualified to operate an aircraft in RNP10 airspace.

The pilots will be aware of the necessity for timely follow up action after a navigation error report, and the potential for removal of RNP-10 operating authority.

10. POSITION REPORTING

Unless otherwise requested by Air Traffic Control, position reports from flights on routes which are not defined by designated reporting points will be made by the pilots at the significant points listed in the flight plan. In requiring aircraft to report their position at intermediate points, ATC is guided by the requirement to have positional information at approximately hourly intervals and also by the need to cater for varying types of aircraft and varying traffic and MET conditions.

If the estimated time for the 'next position', as last reported to ATC, has changed by three minutes or more, a revised estimate will be transmitted to the ATS unit concerned as soon as possible.

The pilots will always report to ATC as soon as possible on reaching any new cruising level.

Contents of Position Reports

For flights outside domestic ATS route networks, position will be expressed in terms of latitude and longitude except when flying over named reporting points. For flights whose tracks are predominantly east or west, latitude will be expressed in degrees and minutes, longitude in degrees only. For flights whose tracks are predominantly north or south, latitude will be expressed in degrees only, longitude in degrees and minutes. All times will be expressed in four digits giving both the hour and the minutes UTC.

Standard Message Types

To enable ground stations to process messages in the shortest possible time, the pilot will observe the following rules:

1. use the correct type of message applicable to the data transmitted;
2. state the message type in the contact call to the ground station or at the start of the message;
3. adhere strictly to the sequence of information for the type of message;
4. all times in any of the messages will be expressed in hours and minutes UTC.

11. MASTER DOCUMENT (MASTER FLIGHT LOG)

For extended overwater flights along routes utilizing long range navigation systems as the primary source of navigation, a Master Document will be prepared showing waypoints along the planned route of flight, to monitor system performance and record navigation information as an aid in the event of a navigation system failure.

The Master Document will be comprised of a computerized flight plan and an oceanic plotting chart sequentially listing waypoints defining the route or track, the distance between waypoints and the estimated time between waypoints.

The pilots will utilize the following procedures for a Master Document:

1. Only one copy of a Master Document will be used.
2. Waypoints will be numbered in sequence (1, 2, 3...) and the same numbering sequence shall be used in entering the waypoints into the navigation system.
3. When a waypoint has been entered into a navigation system, its' number shall be circled to signify entry.
4. When waypoints have been entered into the navigation system, one pilot will recall each waypoint and verify the coordinates with the Master Document. The pilots will checkmark the waypoint number to signify the waypoint has been verified.

5. When a waypoint is to be overflown the following procedures will be utilized:
    a. Prior to the waypoint, check the present position coordinates of each navigation system against the cleared route in the Master Document.
    b. Check the next two waypoints in each navigation system against the Master Document.
    c. At the waypoint, check the distance to the next waypoint.
    d. Confirm the autopilot is still engaged and coupled with the navigation system being used. Confirm position coordinates against the Master Document and confirm that the aircraft turns in the correct direction and takes up a new heading to the next waypoint as appropriate.
    e. After confirming waypoint overflight, the pilot will place an "X" through the waypoint number to signify passage.

All navigational information on the Master Document will be checked against the navigational charts. When ATC changes the planned track or route, or an ATC clearance is otherwise updated, the Master Document will be updated accordingly. All old waypoints will be clearly crossed out and new waypoints entered.

When ATC clearances or reclearances are being obtained, headsets will be worn. Both crewmembers will monitor these clearances, one of them recording the clearance on the Master Document as it is received, the other will crosscheck the receipt and read-back. All waypoint coordinates will be read back in detail, adhering strictly to ICAO phraseology, except where approved local procedures make this unnecessary. The Two Winds Aviation, LLC PIC will retain the Master Document and all flight planning and plotting charts for a minimum of two months following the flight.

APPENDIX A: WATRS PLUS AIRSPACE

1. General Information

On 5 June 2008, the FAA implemented a redesigned route structure, a reduced lateral separation standard and associated operational policies on oceanic routes or areas in the WATRS Plus Control Areas (CTA).

CTAs Affected

Route structure redesign and 50 NM lateral separation was implemented in the following CTAs:

- o the Atlantic portion of the Miami Oceanic CTA
- o the San Juan CTA/FIR and
- o the West Atlantic Route System (WATRS).

New York Oceanic airspace outside of WATRS is transition airspace. 50 NM lateral separation may be applied in this airspace between aircraft authorized RNP 10.

Note: The WATRS Plus route structure redesign chart is posted on the WATRS Plus Webpage copied below:

http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/enroute/oceanic/WATRS_Plus/

Project Objectives

The WATRS Plus project:

- Reduced lateral separation on oceanic routes or areas from 90 NM to 50 NM between aircraft authorized RNP 10 or RNP 4.
- Has over 95% of WATRS Plus flights conducted by operators/aircraft that have been authorized RNP 10 or RNP 4 by the appropriate State (country) authority.
- Accommodates operation of the small percentage of flights not meeting the RNP 10 minimum requirement. See paragraph below and paragraph 4 for further explanation.
- Redesigned the WATRS Plus route structure to make approximately 40% more routes available to enhance operator access to time/fuel efficient routes and altitudes and to enhance en-route capacity.
- Harmonized the WATRS Plus route structure with that in the Caribbean and North Atlantic regions.

Lateral Separation Standards To Be Applied

A 50 NM lateral separation is applied in the WATRS Plus CTAs between aircraft authorized RNP 10 operating at any altitude above the floor of controlled airspace.

A 50 NM lateral separation is applied in the New York Oceanic CTA/FIR outside of WATRS between aircraft authorized RNP 10 operating at any altitude above the floor of controlled airspace.

Within the WATRS Plus CTAs, the lateral separation standard applicable to NonRNP10 aircraft is 90 NM. Policies for application of other lateral separation standards in airspace outside the WATRS Plus CTAs are not affected.

Operation On Routes Within the WATRS Plus CTAs Not Requiring RNP 10 Authorization

Operation on certain routes that fall within the boundaries of WATRS Plus CTAs is not affected by the introduction of RNP 10 and 50 NM lateral separation. Operation on the following routes is **not** affected:

a) Routes that are flown by reference to ICAO standard ground-based navigation aids (VOR, VOR/DME, NDB), such as the routes in the airspace between Florida and Puerto Rico.

b) Routes located within radar and VHF coverage. New WATRS Plus route segments M201 between BAHAA and PAEPR and L453 between PAEPR and AZEZU have replaced A761 between HANRI and ETOCA and R511 between ELTEE and AZEZU. At and above FL 310, the new route segments are within radar and VHF coverage. Operations at and above FL 310 on these route segments does not require RNP 10 authorization and remain the same as those conducted on the old A761 and R511 route segments. *Pilots shall not apply Strategic Lateral Offset Procedures (SLOP) on these route segments.*

c) Special Area Navigation (RNAV) routes located in the airspace between Florida and Puerto Rico. The old "T-routes" were re-designated as "Y-routes" on 5 June 2008. These special RNAV routes are not part of the WATRS Plus route structure. A Notice entitled "Special RNAV Routes Between Florida and Puerto Rico: Change From T-routes to Y-routes On 5 June 2008" is posted on the WATRS Plus Webpage. It is published in the FAA Domestic/International NOTAM Book.

2. Non-RNP10 Aircraft in WATRS Plus Airspace

Pilots of NonRNP10 aircraft will annotate ICAO flight plan Item 18 as follows:

"RMK/NONRNP10" (no space between letters and numbers)

Pilots of NonRNP10 aircraft that are flight planned to operate or are operating on WATRS Plus "L" and "M" routes shall report the lack of authorization by stating "Negative RNP 10" in the:

- Atlantic portion of the Miami Oceanic CTA
- New York Oceanic CTA/FIR
- New York Atlantic High Offshore Airspace
- San Juan CTA/FIR

In addition to the above, pilots of NonRNP10 aircraft that are flight planned to operate on the WATRS Plus "L" and "M" routes shall report the lack of authorization by stating "Negative RNP 10":

- on initial call to ATC; and
- in read back of clearance to descend from FL 410 and above.
- if approval status is requested by the controller.

Operators of NonRNP10 aircraft will not annotate ICAO flight plan Item 18 (Other Information) with "NAV/RNP10" or "NAV/RNP4" if they have not obtained RNP 10 or RNP 4 authorization.

NonRNP10 approved aircraft are able to file most WATRS Plus routes at any altitude. Some routes, however, may require special routing for NonRNP10 aircraft. The pilots will check the WATRS Plus webpage for related FAA Notices. NonRNP10 aircraft are cleared to operate on preferred routes and altitudes as traffic permits. Aircraft that are authorized RNP10 or RNP4, however, will have a better opportunity of obtaining their preferred altitude and route because the 50 NM lateral separation standard is applied to these aircraft. 50 NM lateral separation is not applied to NonRNP10 aircraft.

NonRNP10 aircraft retain the option of climbing to operate at altitudes above those where traffic is most dense (ie, at/above FL410). To minimize the chance of conflict with aircraft on adjacent routes, NonRNP10 aircraft will plan on completing their climb to or descend from higher FLs within radar coverage.

All aircraft can enhance their opportunity to be cleared on their preferred route and altitude if they operate at non-peak hours, approximately 0100 to 1100UTC.

Operators capable of meeting RNP10 or RNP4 that operate on oceanic routes or areas in WATRS Plus CTAs between flight level (FL) 290-410, where competition for routes and altitudes is greatest, will obtain authorization for RNP10 or RNP4 and annotate the ICAO flight plan in accordance with this RNP10 operations program.

3. RNP10 or RNP4 Authorization: Policy and Procedures for Aircraft and Operators

In accordance with ICAO guidance, RNP 10 and RNP 4 are the only navigation specifications (nav specs) applicable to oceanic and remote area operations. Other RNAV and RNP nav specs are applicable to continental en route, terminal area and approach operations.

Note: "RNP navigation specification" (e.g., RNP 10) is the term adopted in the new ICAO Performance Based Navigation (PBN) Manual (Doc 9613). It replaces the term "RNP type".

<u>FAA Documents</u>
The guidance and direction of FAA Order 8400.12 (as amended) (RNP 10 Operational Approval) will be used to grant RNP 10 authorization to operators and aircraft for which the FAA is responsible. FAA Order 8400.33 (as amended) (Procedures For Obtaining Authorization For RNP 4 Oceanic/Remote Area Operations) will be used to authorize RNP 4. The FAA RNP 10 and RNP 4 orders are consistent with the ICAO PBN Manual guidance discussed below. FAA and ICAO documents are posted on the WATRS Plus Webpage.

<u>Requirement For Equipage With At Least Two Long-Range Navigation Systems (LRNS) Meeting RNP 10 or RNP 4 Standards</u>

See "Acceptable Navigation System Configurations" in Section 2 of the WATRS Plus Webpage (Operator/Aircraft RNP 10 Authorization Policy/Procedures). RNP 10 and RNP 4 authorization require aircraft equipage with at least two LRNS with functionality and display adequate for the operation.

4. RNP10 Time Limit for INS or IRU Only Equipped Aircraft

The pilots will review the AFM, AFM Supplement or other appropriate documentation and/or contact the airplane or avionics manufacturer to determine the RNP10 time limit applicable to the aircraft. The pilots will then determine its effect, if any, on their planned operation. Unless otherwise approved, basic RNP10 time limit is 6.2 hours between position updates for aircraft on which Inertial Navigation Systems (INS) or Inertial Reference Units (IRU) provide the only source of long range navigation. Extended RNP10 time limits of 10 hours and greater are already approved for many IRU systems.

5. Flight Planning Requirements

The pilots will make ICAO flight plan annotations in accordance with this section. ICAO flight plans shall be filed for operation on oceanic routes and areas in the WATRS Plus CTAs.

<u>ICAO Flight Plan AFTN Addressing For Operations in the New York Oceanic CTA/FIR (including WATRS)</u>

All flights entering the New York Oceanic CTA/FIR shall address flight plans to KZWYZOZX. All flights entering the New York Oceanic CTA/FIR and a U.S. ARTCC (except Boston) and/or Bermuda airspace shall address flight plans to both KZWYZOZX and the appropriate U.S. ARTCC.

The pilots understand that if they do not address flight plans to KZWYZOZX, 50 NM lateral separation cannot be applied to them.

Airspace To Be Entered: New York Oceanic CTA/FIR and U.S. ARTCCs	Required AFTN addresses
New York (NY) Oceanic CTA/FIR	KZWYZOZX
Boston ARTCC & NY Oceanic	KZWYZOZX **<u>only.</u>** (This change confirmed on 19 June 08).
NY domestic and/or Bermuda & NY Oceanic	KZNYZQZX & KZWYZOZX
Washington (KZDC) & NY Oceanic	KZDCZQZX & KZWYZOZX
Jacksonville (KZJX) & NY Oceanic	KZJXZQZX & KZWYZOZX
Miami (KZMA) & NY Oceanic	KZMAZQZX & KZWYZOZX
San Juan & NY Oceanic	TZSUZRZX & KZWYZOZX

To inform ATC and to key Ocean21 automation that they have obtained RNP 10 authorization and are eligible for 50 NM lateral separation, the pilots shall:

- Annotate ICAO Flight Plan Item 10 (Equipment) with the letters "R" and "Z"; and
- Annotate Item 18 (Other Information) with, as appropriate, "NAV/RNP10" or "NAV/RNP4" (no space between letters and numbers).

When filing an ICAO flight plan under new ICAO FPL 2012 provisions beginning November 15, 2012, to inform ATC that the aircraft is RNP-10 authorized and eligible for 50 NM lateral separation, the pilots shall:

(1) annotate ICAO Flight Plan Item 10a (Equipment) with the letter "R" and

(2) annotate Item 18 (Other Information) with, as appropriate, "PBN/A1" for RNP-10 aircraft (no space between letters and numbers). PBN is the acronym for Performance Based Navigation.

The 50 NM lateral separation will only be applied to operators/aircraft that annotate the ICAO flight plan in accordance with these procedures.

Note: On the ICAO Flight Plan, letter "R" indicates that the aircraft will maintain the appropriate RNP navigation specification for the entire flight through airspace where RNP is prescribed. Letter "Z" indicates that information explaining aircraft navigation and/or communication capability is found in Item 18.

Recommendation For Filing To Show Domestic U.S. RNAV and Oceanic RNP Capabilities

The initiative discussed in this paragraph was implemented on 29 June 08. See the project website for details (address below). On 29 June 2008, the FAA implemented a program to enhance operators' capability to communicate their domestic US RNAV capabilities to ATC by requiring an entry following the NAV/ indicator in item 18 of the ICAO flight plan. The initiative has provisions for showing RNAV capabilities for departure ("D"), enroute ("E") and arrival ("A") with RNAV accuracy values. An example item 18 entry is: NAV/RNVD1E2A1. The numerals in the example indicate RNAV 1 and RNAV 2 accuracy. The website for this initiative is at:

http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/enroute/flight_plan_filing/

It is recommended that operators show their RNAV capability for domestic U.S. and capabilities for oceanic operations (RNP 10 or RNP 4) by filing: "NAV/", then the domestic US alphanumeric sequence, then a mandatory space and then "RNP10" or "RNP4", as appropriate. The following is an example: "NAV/RNVD1E2A1 RNP10"

Caution For Westbound Flights From Europe:

1. Alphanumeric Character Limitation As of 27 May 2008, operators may enter up to 50 characters after the "NAV/" indicator in flight plan item 18 for flight plans filed with Eurocontrol.
2. Multiple NAV/ Entries The pilots will be aware that if they make multiple "NAV/" entries in a flight plan filed with Eurocontrol, only the last "NAV/" entry will be forwarded. For example, if "NAV/D1E2A1" and "NAV/RNP10" are entered, only "NAV/RNP10" will be forwarded.
3. Recommendation: Item 18 entries made in accordance with "Recommendation For Filing To Show Domestic U.S. RNAV and Oceanic RNP Capabilities" mentioned previously, will limit the number of characters needed to show domestic U.S. RNAV and oceanic RNP capabilities and mitigate the chance that one or the other will not be forwarded for use by FAA domestic and oceanic automation systems.

6. LRNS Failure or Malfunction

The following is WATRS Plus CTA policy for LRNS failure or malfunction enroute:

a) To conduct operations as an RNP 10 approved operator/aircraft, at least two RNP 10 authorized LRNSs will be operational at entry on to oceanic route segments or areas in the WATRS Plus CTAs.

b) After entry on to an oceanic route segment or area within the WATRS Plus CTAs, if an LRNS fails or malfunctions and only one LRNS remains operational, the pilot will inform ATC. ATC will acknowledge and monitor the situation. The aircraft may continue on the cleared route provided that, in the pilot's judgment, the remaining LRNS will enable the aircraft to be navigated within approximately 10 NM of the cleared route centerline. If that is not the case, then paragraph (3) below applies.

c) If, in the pilot's judgment, the aircraft cannot be navigated within approximately 10 NM of the cleared route centerline the following actions will be accomplished by the pilots:

   i. the pilots will advise ATC of the situation and coordinate a course of action

   ii. the pilot will consider the best option to maintain the safety of the operation (e.g., continuing on route or turning back); whenever possible obtain an ATC clearance before deviating from cleared route or flight level and keep ATC advised.

   iii. ATC will establish an alternative separation standard as soon as practicable, coordinate the safest course of action with the pilot and monitor the situation.

   iv. if coordination with ATC cannot be accomplished within a reasonable period of time, the pilots will consider climbing or descending 500 feet, broadcasting action on 121.5 and advising ATC as soon as possible.

7. In-flight Contingency Procedures (e.g., Rapid Descent, Turn-back, Diversion)

In-flight contingency procedures for oceanic airspace now published in FAA Notices, posted on the WATRS Plus Website and published in ICAO Document 4444 will be emphasized in pilot training/knowledge programs. The published procedures are applicable to the WATRS Plus CTA reduction of lateral separation from 90 NM to 50 NM. The full text of the in-flight contingency procedures is published on the WATRS Plus Webpage under "Operating Policy" in Section 2 and Appendix B of this operations program.

8. Special Emphasis: Maneuvering to Avoid Convective Weather in a 50 nm Separation Environment

Pilots are required to maneuver (deviate) around convective weather on a regular basis in the course of WATRS Plus operations. Weather deviation procedures, therefore, must be emphasized in accordance with the following (continued on next page):

- Pilot training/knowledge programs and operations manuals or comparable operations documents must emphasize weather deviation procedures as published in FAA Notices and ICAO Document 4444 and posted under "Operating Policy" in Section 2 of the WATRS Plus Website. In addition, a pilot bulletin/aid for understanding and executing weather deviation procedures is posted under "Operating Policy" in Section 2 of the WATRS Plus Webpage.

- It is imperative that pilots keep ATC advised of their intentions during the initial weather avoidance maneuver and any subsequent maneuvers to avoid convective weather.

- For distress or urgent situations, direct Air/Ground and Ground/Air satellite telephone service (SATVOICE) is available for communication with New York Oceanic, San Juan Center and ARINC. (See the WATRS Plus Webpage for details).

- Pilots must be aware of the provision to climb or descend 300 feet (depending on the direction of flight and direction of deviation from track) to mitigate the chance of conflict with other aircraft when forced to deviate without a clearance.

- It is recommended that, if equipped, the Airborne Collision Avoidance System (ACAS (TCAS) be operational. ACAS provides a valuable tool to alert the pilot to the presence and proximity of nearby aircraft in weather deviation situations.

9. Strategic Lateral Offset Procedures (SLOP)

Pilots will use SLOP procedures in the course of regular oceanic operations. SLOP procedures are published in FAA Notices, posted under "Operating Policy" in Section 2 of the WATRS Plus Webpage and published on ICAO Document 4444. SLOP is addressed in this RNP10 operations program, Appendix C.

10. Pilot Report of NonRNP10 Status

The pilot will report the lack of RNP 10 or RNP 4 status in accordance with the following (continued):

- when the operator/aircraft is not authorized RNP 10 or RNP 4.
- if approval status is requested by the controller in accordance with paragraph 8h below.
- when an operator/aircraft previously granted RNP 10 or RNP 4 authorization is operating with only one operational LRNS.

11. Pilot Statement of RNP 10 or RNP 4 Approval Status, If Requested

If requested by the controller, the pilot shall communicate approval status using the following phraseology:

Controller Request	Pilot Response
(call sign) confirm RNP 10 or 4 approved	"Affirm RNP 10 approved" or "Affirm RNP 4 approved", as appropriate, or... "Negative RNP 10"

12. Flight Of Aircraft Previously Authorized RNP 10 Or RNP 4 With One Long-Range Navigation System Operational

To the maximum extent possible, pilots that are authorized RNP 10 or RNP 4 will operate on WATRS Plus oceanic routes in compliance with those standards. If the situation warrants, however, operators may fly an aircraft on WATRS Plus oceanic routes with one LRNS operational. The intent of this policy is to allow an aircraft to complete the flight to its destination and/or be flown to a location for repair.

<u>One LRNS Operational Prior to Takeoff For Flight Into WATRS Plus Oceanic Routes or Areas</u>

In the situation where only one LRNS is determined to be operational prior to takeoff, operators shall follow the practices detailed in paragraph 4 (Provisions For Accommodation of NonRNP10 Aircraft) (i.e., ICAO flight plan item 18 annotation and pilot report to ATC of aircraft NonRNP10 status). The aircraft will be treated as NonRNP10 aircraft and appropriate lateral separation will be applied.

<u>Failure or Malfunction of LRNS Enroute, One LRNS Operational Prior to Entering a WATRS Plus CTA</u>

In the situation where at least two LRNS are operational at takeoff, but LRNS failure or malfunction occurs en route and only one LRNS remains operational, the pilots will take action to inform ATC. Approximately 175-125 NM prior to entering a WATRS Plus CTA, the pilots will report to ATC that only one LRNS is operational and request that ATC amend the flight plan item 18 entry to delete "NAV/RNP10" or "NAV/RNP4" and enter "RMK/NONRNP10" in accordance with paragraph 4a. In addition, after entering on to a WATRS Plus oceanic route or area, the pilots will report the "NonRNP10" status of the aircraft in accordance with this RNP10 operations program.

APPENDIX B: IN-FLIGHT CONTINGENCIES AND WEATHER DEVIATIONS IN OCEANIC AIRSPACE

1. General Information

The purpose of this section is to provide pilot guidance on acceptable in-flight contingency procedures. Although all possible contingencies cannot be covered, the procedures in this section provide for the more frequent cases such as:

- inability to comply with assigned clearance due to meteorological conditions, aircraft performance or pressurization failure;
- En route diversion across the prevailing traffic flow; and
- Loss of, or significant reduction in, the required navigation capability when operating in airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations.

These procedures are applicable primarily when rapid descent and/or turn-back or diversion is required. The pilot's judgement shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air traffic control shall render all possible assistance.

2. General Procedures

If an aircraft is unable to continue the flight in accordance with its ATC clearance, and/or an aircraft is unable to maintain the navigation performance accuracy specified for the airspace, a revised clearance shall be obtained, whenever possible, prior to initiating any action.

The radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) preferably spoken three times shall be used as appropriate. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and the overall air traffic situation.

If prior clearance cannot be obtained, until a revised clearance is received, the following contingency procedures will be employed and the pilot will advise air traffic control as soon as practicable, reminding them of the type of aircraft involved and the nature of the problem. In general terms, the aircraft will be flown at a flight level and on an offset track where other aircraft are least likely to be encountered. Specifically, the pilot will:

a) Leave the assigned route or track by initially turning at least 45 degrees to the right or to the left in order to acquire a same or opposite direction track offset 15 NM (28 km) from the assigned track centreline. When possible, the direction of the turn will be determined by the position of the aircraft relative to any organized route or track system. Other factors which may affect the direction of the turn are:

   - The direction to an alternate airport;
   - terrain clearance;
   - Any lateral offset being flown, and;
   - the flight levels allocated on adjacent routes or tracks.

b) Having initiated the turn, the pilot will:

   (1) If unable to maintain the assigned flight level, initially minimize the rate of descent to the extent that is operationally feasible (pilots should take into account the possibility that aircraft below on the same track may be flying a 1 or 2 NM strategic lateral offset procedure (SLOP)) and select a final altitude which differs from those normally used by 150 m (500 ft) if at or below FL 410, or by 300 m (1 000 ft) if above FL 410;

   (2) If able to maintain the assigned flight level, **once the aircraft has deviated 10 NM (19 km) from the assigned track centreline,** climb or descend to select a flight level which differs from those normally used by 500 feet (150 km), if at or below FL410, or by 1,000 feet (300 km) if above FL410.

c) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.45 MHz) and where appropriate on the frequency in use: aircraft identification, flight level, position (including the ATS route designator or the track code, as appropriate) and intentions;

d) Maintain a watch for conflicting traffic both visually and by reference to TCAS;

e) Turn on all aircraft exterior lights (commensurate with appropriate operating limitations);

f) Keep the SSR transponder on at all times; and

g) Take action as necessary to ensure the safety of the aircraft.

When leaving the assigned track, if the intention is to acquire a same direction offset track, the pilot will consider limiting the turn to a 45 degree heading change in order not to overshoot the offset contingency track.

If the intention is to acquire and maintain an opposite direction offset track, then operational limitations on bank angles at cruising altitudes will normally result in overshooting the track to be acquired. In such cases a continuous turn will be extended beyond 180 degrees heading change, in order to re-intercept the offset contingency track as soon as operationally feasible.

If executing such a turnback in a 30 NM (56 km) lateral separation route structure, extreme caution pertaining to opposite direction traffic on adjacent routes must be exercised and any climb or descent, as specified in b) (2) above, will be completed preferably before approaching within 10 NM (19 km) of any adjacent ATS route.

If the contingency procedures are employed by a twin-engine aircraft as a result of an engine shutdown or failure of an ETOPS critical system, the pilot should advise ATC as soon as practicable of the situation, reminding ATC of the type of aircraft involved, and request expeditious handling.

3. Weather Deviation Procedures for Oceanic Operations

General Procedures

The following procedures are intended to provide guidance for deviations around thunderstorms. All possible circumstances cannot be covered. The pilot's judgment will ultimately determine the sequence of actions taken and ATC shall render all possible assistance.

If the aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an air traffic control clearance will be obtained at the earliest possible time. The pilot will advise ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to the centerline of its cleared route.

Obtaining priority from ATC when weather deviation is required

When the pilot initiates communications with ATC, rapid response may be obtained by stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response.

The pilot still retains the option of initiating the communications using the urgency call "PAN PAN PAN" to alert all listening parties to a special handling condition which will receive ATC priority for issuance of a clearance or assistance. The pilot will comply with the ATC clearance issued or advise ATC of intentions.

The pilot will inform ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to its cleared route.

Actions to be taken when controller-pilot communications are established

The pilot notifies ATC and requests clearance to deviate from track, advising, when possible, the extent of the deviation expected. ATC will take one of the following actions:

- If there is no conflicting traffic in the horizontal dimension, ATC will issue clearance to deviate from track; or
- If there is conflicting traffic in the horizontal dimension, ATC separates aircraft by establishing vertical separation.
- If there is conflicting traffic and ATC is unable to establish vertical separation, ATC shall:

    a. Advise the pilot unable to issue clearance for requested deviation;
    b. Advise pilot of essential traffic;
    c. Request pilot's intentions.

PHRASEOLOGY: *"Unable (requested deviation), traffic is (call sign, position, altitude, direction), advise intentions."*

The pilots will take the following actions:

- Advise ATC of intentions; and
- Comply with air traffic control clearance issued; or
- Execute the procedures detailed in the next section titled "Actions to be taken if a revised ATC clearance cannot be obtained". (ATC will issue essential traffic information to all affected aircraft.)
- If necessary, establish voice communications with ATC to expedite dialogue on the situation.

Actions to be taken if a revised ATC clearance cannot be obtained

Note: The provisions of this section apply to situations where a pilot needs to exercise the authority of a pilot-in-command under the provisions of Annex 2, 2.3.1.

The pilot shall take the actions listed below under the provision that the pilots may deviate from rules of the air, when it is absolutely necessary in the interests of safety to do so.

If the aircraft is required to deviate from the track to avoid adverse meteorological conditions and prior clearance cannot be obtained, an ATC clearance will be obtained at the earliest possible time. Until an ATC clearance is received, the pilots will take the following actions:

a) If possible, deviate away from an organized track or route system.

b) Establish communication with and alert nearby aircraft by broadcasting, at suitable intervals: flight identification, flight level, aircraft position (including the ATS route designator or the track code) and intentions (including the magnitude of the deviation expected) on the frequency in use, as well as on frequency 121.5 MHz (or, as a back-up, the VHF inter-pilot air-to-air frequency 123.45).

c) Watch for conflicting traffic both visually and by reference to TCAS.

   Note: If, as a result of actions taken under the provisions of items b) and c) above, the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

d) Turn on all aircraft exterior lights (commensurate with appropriate operating limitations).

e) For deviations of less than 10 NM, aircraft should remain at the level assigned by ATC.

f) For deviations of greater than 10 NM, when the aircraft is approximately 10 NM (19 km) from track, initiate a level change based on the criteria in the following table:

Route center line track	Deviations >10 NM	Level change
EAST (000-179 magnetic)	LEFT RIGHT	*DESCEND 300 ft* *CLIMB 300 ft*
WEST (180-359 magnetic)	LEFT RIGHT	*CLIMB 300 ft* *DESCEND 300 ft*

g) If contact was not established prior to deviating, the pilots will continue to attempt to contact ATC to obtain a clearance. If contact was established, the pilots will continue to keep ATC advised of intentions and obtain essential traffic information.

h) When returning to track, be at its assigned flight level, when the aircraft is within approximately 10 NM (19 km) of centerline.

APPENDIX C: STRATEGIC LATERAL OFFSETS (SLOP) IN OCEANIC AIRSPACE

1. Introduction

SLOP are approved procedures that allow aircraft to fly on a parallel track to the right of the centre line relative to the direction of flight. An aircraft's use of these procedures does not affect the application of prescribed separation standards.

The decision to apply a strategic lateral offset shall be the responsibility of the flight crew. The flight crew will only apply strategic lateral offsets in airspace where such offsets have been authorized by the appropriate ATS authority and when the aircraft is equipped with automatic offset tracking capability.

2. SLOP Offset Positions

The pilot will apply the following Strategic Lateral Offset Procedures guidelines:

a) Strategic lateral offsets and those executed to mitigate the effects of wake turbulence are to be made to the **right** of a route or track;

b) In relation to a route or track, there are three positions that an aircraft may fly: centerline, one or 2 NM **right**; and,

c) Offsets are not to exceed 2 NM **right** of centerline.

3. ATS Authority Considerations

The following will be taken into account by the appropriate ATS authority when authorizing the use of strategic lateral offsets in a particular airspace:

a) strategic lateral offsets shall only be authorized in en-route oceanic or remote continental airspace. Where part of the airspace in question is provided with an ATS surveillance service, transiting aircraft should normally be allowed to initiate or continue offset tracking;

b) strategic lateral offsets do not affect lateral separation minima and may be authorized for the following types of routes (including where routes or route systems intersect):

    1) uni-directional and bi-directional routes; and

    2) parallel route systems where the spacing between route centre lines is not less than 55.5 km (30 NM);

c) in some instances it may be necessary to impose restrictions on the use of strategic lateral offsets, e.g. where their application may be inappropriate for reasons related to obstacle clearance;

d) strategic lateral offset procedures should be implemented on a regional basis after coordination between all States involved;

e) the routes or airspace where application of strategic lateral offsets is authorized, and the procedures to be followed by pilots, shall be promulgated in aeronautical information publications (AIPs); and

f) air traffic controllers shall be made aware of the airspace within which strategic lateral offsets are authorized.

4. SLOP Procedures, Gulf of Mexico

The intent of this procedure is to reduce risk (increase the safety margin) by distributing aircraft laterally and equally across the three available positions. In this connection, pilots must take account of the following:

a) Aircraft without automatic offset programming capability **must** fly the centerline;

b) Aircraft capable of being programmed with automatic offsets may fly the centerline or offset one or 2 NM right of centerline to obtain lateral spacing from nearby aircraft;

c) Pilots will use whatever means are available (e.g. TCAS, communications, visual acquisition, GPWS) to determine the best flight path to fly;

d) Any aircraft overtaking another aircraft is to offset within the confines of this procedure, if capable, so as to create the least amount of wake turbulence for the aircraft being overtaken;

e) For wake turbulence purposes, the pilot is also to fly one of the three positions at 2b above and never offset to the left of centerline nor offset more than 2 NM right of centerline;

NOTE: It is recognized that the pilot will use his/her judgment to determine the action most appropriate to any given situation and has the final authority and responsibility for the safe operation of the airplane. The use of air-to-air channel, 123.45, may be used to co-ordinate the best wake turbulence offset option.

f) Pilots may apply an offset outbound at the oceanic entry point but must return to centerline at the oceanic exit point. This provision applies to aircraft entering airspace in the San Juan FIR where direct controller-pilot VHF or UHF voice communication is available.

g) **Bermuda.** Aircraft transiting radar-controlled airspace in the vicinity of Bermuda may remain on their established offset positions;

h) There is no ATC clearance required for this procedure and it is not necessary that ATC be advised; and,

i) Voice position reports are to be based on the current ATC clearance and not the exact co-ordinates of the offset position.

APPENDIX D: GOMEX OPERATIONS

1) General

On October 20, 2011, the FAA, SENEAM and DGAC of Mexico implemented 50 nautical mile (nm) lateral separation between aircraft authorized Required Navigation Performance 10 (RNP10) or RNP4 operating in the Gulf of Mexico (GoMex) Oceanic Control Areas (CTA).

<u>Lateral Separation Minima To Be Applied:</u>

- 50 NM lateral separation will be applied in the GoMex CTA's between aircraft authorized RNP 10 or RNP 4 at all altitudes above the floor of controlled airspace.
- The current lateral separation minima of 100 NM in the Houston, Monterrey and Merida CTAs, and 90 NM in the Miami Oceanic CTA will continue to be applied between aircraft not authorized RNP 10 or RNP 4.

<u>Operation on Routes on the periphery of the Gulf of Mexico CTAs:</u>

Operations on certain routes that fall within the boundaries of affected CTAs will not be affected by the introduction of 50 NM lateral separation. Operation on the following routes is **<u>not</u>** affected:

a) Routes that are flown by reference to ICAO standard ground-based navigation aids (VOR, VOR/DME, NDB).

b) Special Area Navigation (RNAV) routes Q100, Q102 and Q105 in the Houston, Jacksonville and Miami CTA's.

<u>Provisions for Accommodation of NonRNP10 Aircraft (Aircraft Not Authorized RNP 10 or RNP 4)</u>

a) Operators of NonRNP10 aircraft shall annotate ICAO flight plan Item 18 as follows:

   "RMK/NONRNP10" **(no space between letters and numbers)**.

b) Pilots of NonRNP10 aircraft that operate in GoMex CTA's shall report the lack of authorization by stating **"Negative RNP 10":**

   - on initial call to ATC in a GoMex CTA:
   - in read back of a clearance to climb to or descend from cruise altitude; and
   - when approval status is requested by the controller.

c) Operators of NonRNP10 aircraft shall **<u>not</u>** annotate ICAO flight plan Item 18 (Other Information) with "NAV/RNP10" or "NAV/RNP4", if they have **<u>not</u>** obtained RNP 10 or RNP 4 **<u>authorization</u>**.

d) NonRNP10 operators/aircraft may file any route at any altitude in a GoMex CTA. They will be cleared to operate on their preferred routes and altitudes as traffic permits. 50 NM lateral separation will not be applied to NonRNP10 aircraft.

e) NonRNP10 aircraft are encouraged to operate at altitudes above those where traffic is most dense (i.e., at/above FL 380), if possible. NonRNP10 aircraft should plan on completing their climb to or descent from higher FLs within radar coverage, if possible.

2) Flight Planning Requirements

ICAO flight plans will be filed for operation on oceanic routes and areas in the Houston Oceanic CTA/FIR, the Gulf of Mexico portion of the Miami CTA/FIR, the Monterrey CTA and Merida High CTA.

To inform ATC that they have obtained RNP10 or RNP4 authorization and are eligible for 50 NM lateral separation, the pilots will:

(1) Annotate the ICAO Flight Plan Item 10 (Equipment) with the letters "R" and "Z", and

(2) Annotate Item 18 (Other Information) with, as appropriate, "NAV/RNP10" or "NAV/RNP4" (no space between letters and numbers).

Note 1: On the ICAO flight plan, the letter "R" in Item 10 indicates that the aircraft will maintain the appropriate RNP navigation specification for the entire flight through airspace where RNP is prescribed. Letter "Z" in Item 10 indicates that information explaining aircraft navigation and/or communication capability is found in Item 18.

When filing an ICAO flight plan under new ICAO FPL 2012 provisions beginning November 15, 2012, to inform ATC that the aircraft is RNP-10 authorized and eligible for 50 NM lateral separation, pilots shall:

(1) annotate ICAO Flight Plan Item 10a (Equipment) with the letter "R" and

(2) annotate Item 18 (Other Information) with, as appropriate, "PBN/A1" for RNP-10 aircraft (no space between letters and numbers). PBN is the acronym for Performance Based Navigation.

The 50 NM lateral separation will only be applied to operators/aircraft that annotate the ICAO flight plan in accordance with the above procedures. Operators that have not obtained RNP10 or RNP4 authorization shall not annotate the ICAO flight plan Item 18 (Other Information) with "NAV/RNP10" or "NAV/RNP4" but shall follow the procedures outlined in the Gulf of Mexico 50 NM Lateral Separation Initiative FAA Notice.

3) Pilot Action when Navigation Systems Malfunction

In addition to the actions outlined in Appendix B of this RNP-10 operations program, when pilots suspect a navigation system malfunction, the following actions will be taken:

- Immediately inform ATC of navigation system malfunction or failure
- Accounting for wind drift, fly magnetic compass heading to maintain track
- Request radar vectors from ATC, when available.

4) Pilot Report of Non-RNP10 Status

The pilots will report the lack of RNP10 or RNP4 status in accordance with the following:

- When the operator/aircraft is not authorized RNP10 or RNP4
- If approval status is requested by the controller in accordance with the following table below.

If requested by the controller, the pilots will communicate approval status using the following phraseology:

Controller Request	Pilot Response
(call sign) confirm RNP10 or RNP4 approved	"Affirm RNP10 approved" or "Affirm RNP4 approved" as appropriate, or "Negative RNP10"

Operators of non-RNP10 aircraft shall annotate ICAO flight plan Item 18 as follows:

"RMK/NONRNP10" (no space between letters and numbers

Pilots of NonRNP10 aircraft that operate in GoMex CTA's will report lack of authorization by stating "Negative RNP10":

- On initial call to ATC in a GoMEx CTA;
- In read back of a clearance to climb or to descend from cruise altitude; and
- When approval status is requested by the controller.

NonRNP10 operators/aircraft may file any route at any altitude in a GoMex CTA. They will be cleared to operate on their preferred routes and altitudes as traffic permits. 50 NM lateral separation will not be applied to RNP10 aircraft.

NonRNP10 aircraft are encouraged to operate at altitudes above those where traffic is most dense (i.e. at/above FL380) if possible. NonRNP10 aircraft will plan on completing their climb to or descent from higher FLs within radar coverage, if possible.

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B-RNAV/P-RNAV OPERATIONS

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DATE: 2/21/14

RECORD OF REVISIONS

Revision No.	Revision Date	Insertion Date	Initials
Original	27 January 2014	N/A	MRM

1. Background

B-RNAV procedures apply to en route and certain terminal operations. P-RNAV procedures are expected to apply to operations including departures, arrivals, and approaches up to the point of the final approach fix (FAF). For the immediate future, expect holding patterns to be flown with conventional procedures. For P-RNAV operations in terminal airspace, obstacle clearance protection, up to the FAF, will assume that aircraft comply with the P-RNAV accuracy requirements.

Since January 1998, Europe has mandated a Basic RNAV (B-RNAV) capability for operations in European en route airspace. JAA AMJ 20X2 is the European source document for obtaining B-RNAV approval. In 2001, Europe concluded that B-RNAV did not meet the needs for terminal area operations/procedures. In 2003, Europe announced the intent to implement P-RNAV in high-density terminal airspace by November 2004; and in the remaining terminal maneuvering areas by April, 2005.

The FAA identifies eligible navigation system types and the criteria to determine acceptable means of compliance for U.S. operators for JAA AMJ 20X2 (B-RNAV) and/or JAA TGL 10 (P-RNAV) approval(s).

2. Definitions

Area Navigation (RNAV): A method of navigation that permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these. For the purpose of this AC, RNAV equipment is considered to be equipment that operates by automatically determining aircraft position from one or a combination of the following sensors with the means to establish and follow a desired path:

(1) VOR/DME
(2) DME/DME
(3) INS or IRS
(4) LORAN C
(5) GNSS or GPS

Basic Area Navigation (B-RNAV): B-RNAV is defined as RNAV that meets a track keeping accuracy equal to or better than +/-5 NM for 95 percent of the flight time. This value includes signal source error, airborne receiver error, display system error, and flight technical error. This navigation performance assumes the necessary coverage provided by satellite or ground-based navigation aids is available for the intended operation.

Precision Area Navigation (P-RNAV): P-RNAV is defined as RNAV that meets a track keeping accuracy equal to or better than +/- 1 NM for 95 percent of the flight time. This value includes signal source error, airborne receiver error, display system error, and flight technical error. This navigation performance assumes the necessary coverage provided by satellite or ground-based navigation aids is available for the intended operation.

Global Positioning System (GPS): The U.S. Global Navigation Satellite System (GNSS) core satellite constellation that provides space-based positioning, velocity, and time. GPS is composed of space, control, and user elements. The space element nominally is composed of at least 24 satellites in 6 orbital planes. The control element consists of five monitor stations, three ground antennas and a master control station. The user element consists of antennas and receiver processors that provide positioning, velocity, and precise timing to the user.

Receiver Autonomous Integrity Monitoring (RAIM): A technique used within a GPS receiver/processor to monitor GPS signal performance. This integrity determination is achieved by a consistency check among redundant measurements.

3. Basic Area Navigation (B-RNAV) Approval

Two Winds Aviation, LLC's Cessna Citation 501 aircraft serial number 501-0091 is considered eligible for Basic Area Navigation (B-RNAV) approval, as it is equipped with two aircraft navigation systems approved and installed in accordance with the guidance contained in FAA AC 20-130A.

This is Two Winds Aviation, LLC's initial B-RNAV application; therefore no past performance records are available. Two Winds Aviation, LLC will maintain operating history of incidents related to poor height keeping performance, which indicates weaknesses in training, procedures or maintenance.

4. General B-RNAV Operating Procedures

A. Normal Operations

The normal operating procedures for use of navigational equipment on B-RNAV routes by the pilot includes the following:

1. When a navigation database is installed, the database will be checked to ensure that it is current before the flight.
2. Other NAVAIDs (e.g., VOR, DME, and ADF) will be selected to allow immediate crosschecking or reversion in the event of loss of RNAV capability.

The pilot will be familiar with the following general provisions:

1. Pilots will notify ATC of conditions (e.g., equipment failures and weather conditions) that may affect the ability of the aircraft to maintain position within the designated B-RNAV airspace. In this case, flight crewmembers will state their intentions, coordinate a plan of action, and obtain a revised ATC clearance. If unable to obtain an ATC clearance prior to deviating from the B-RNAV airspace, the pilots will follow established contingency procedures and obtain an ATC clearance as soon as possible.

B. Pilot Knowledge Requirements

The pilot has been trained and is knowledgeable in the following areas:

1. RNP-5 as it relates to B-RNAV requirements in B-RNAV airspace;
2. Airspace where B-RNAV is required;
3. Changes to charting and documents to reflect B-RNAV;

4. Navigation equipment required to be operational for flight in designated B-RNAV airspace, and the limitations associated with the RNAV equipment;
5. Flight planning requirements;
6. Contingency procedures (ie: for aircraft equipment failures);
7. En route, terminal, and approach procedures applicable to B-RNAV; and
8. Operating information contained in this operations program.

C. Flight Planning

When filing flight plans into B-RNAV designated airspace, the pilots will meet the B-RNAV airspace requirements. The pilots will indicate approval for B-RNAV operations by annotating block 10 (Equipment) of the ICAO flight plan as defined within ICAO Doc 7030 for these operations. If there are any other flight plan annotations required by individual States, the pilots will make appropriate annotations.

5. Precision Area Navigation (P-RNAV) Approval

Two Winds Aviation, LLC's Cessna Citation 501 aircraft is considered eligible for P-RNAV approval. The appropriate Airplane Flight Manual shows the appropriate instrument flight rules (IFR) navigation system installation has received airworthiness approval in accordance with AC20-130A.

6. Precision Area Navigation (P-RNAV) General Operating Procedures

Note: This material is based on the assumptions contained in Joint Aviation Authorities (JAA) temporary guidance leaflet (TGL) 10 for P-RNAV operations in the European region. The following is a subset of the assumptions contained in JAA TGL-10 for P-RNAV operations in the European region.

In addition to B-RNAV operating procedures mentioned in the previous section, the pilots are familiar with the following P-RNAV normal operating and contingency procedures:

A. Preflight Planning

a) During the pre-flight planning phase, the availability of the navigation infrastructure required for the intended operation, including any non-RNAV contingencies, shall be confirmed by the pilots for the period of intended operation. The pilots shall confirm availability of the onboard navigation equipment necessary for the route to be flown. The onboard navigation database will be confirmed appropriate for the region of intended operation and must include the navigation aids, waypoints, and coded terminal airspace procedures for the departure, arrival and alternate airfields.

b) Where dual P-RNAV systems are required for a specific terminal P-RNAV procedure, the pilots will confirm the availability of dual P-RNAV systems. This typically will apply where procedures are effective below the applicable minimum safe altitude/minimum obstacle clearance altitude or where radar coverage is inadequate for the purposes of supporting P-RNAV. This will also take into account the particular hazards of a terminal area and the feasibility of contingency procedures following loss of P-RNAV capability.

If a stand-alone GPS is to be used for P-RNAV, the pilots will confirm the availability of receiver autonomous integrity monitoring (RAIM) with the latest information from the U.S. Coast Guard giving details of satellite non-availability (see http://www.navcen.uscg.gov). The U.S. Notices to Airmen (NOTAM) Office also provides satellite non-availability data.

NOTE: RAIM prediction may be a function of the equipment when satellite non-availability data can be entered. In the absence of such a function, an airspace service provider may offer an approved RAIM availability service to users. The use of the EUROCONTROL AUGUR tool may be used to satisfy this requirement (see http://www.augur.ecacnav.com).

B. Departure

a) At system initialization, the pilot will confirm the navigation database is current and will verify the aircraft's present position is entered correctly. The pilots will check the active flight plan by comparing the charts, Standard Instrument Departure (SID) or other applicable documents, with the map display (if applicable) and the MCDU. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over. If required by a procedure, a check will be made to confirm that updating will use a specific navigation aid(s), or to confirm exclusion of a specific navigation aid. A procedure will not be used if doubt exists as to the validity of the procedure in the navigation database.

NOTE: At a minimum, the departure checks could be a simple inspection of a suitable map display that achieves the objectives of the above paragraph.

b) The creation of new waypoints by manual entry into the aircraft system is not permitted and invalidates any affected P-RNAV procedure, e.g., manual entry or modification by the pilots of the loaded procedure, using temporary waypoints or fixes not provided in the database, is not permitted. Route modifications in the terminal area may take the form of radar headings or 'direct to' clearances and the pilots must be capable of reacting in a timely fashion. This may include the insertion of waypoints into the flight plan loaded from the database.

c) Prior to commencing take off, the pilot will verify the aircraft's RNAV system is available and operating correctly and, where applicable, the correct airport and runway data is loaded.

d) The pilot will ensure initialization on the runway either by means of a manual runway threshold or intersection update, as applicable, unless automatic updating of the actual departure point is provided. This is to preclude any inappropriate or inadvertent position shift after take-off. Where GNSS is used, the signal must be acquired before the take-off roll commences and GNSS position may be used in place of the runway update.

e) During the procedure and where feasible, flight progress will be monitored for navigational reasonableness, by crosschecks with conventional navigation aids using the primary flight displays.

f) Where the initialization described in above item (d) is not achieved, the departure will be flown by conventional navigation means. A transition to the P-RNAV structure will be made at a point where the aircraft's RNAV system has had sufficient time to provide a position update.

NOTE: If a procedure is designed to be started conventionally, then the latest point of transition to the P-RNAV structure will be marked on the charts. If a pilot elects to start a P-RNAV procedure using conventional methods, there will not be any indication on the charts of the transition point to the P -RNAV structure.

C. Arrival Procedures

a) Prior to the arrival phase, the pilot will verify that the correct terminal procedure has been loaded, and check the active flight plan by comparing the charts with the map display (if applicable) and the MCDU. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over. If required by a procedure, a check will be made to confirm that updating will exclude a particular navigation aid. A procedure shall not be used if doubt exists as to the validity of the procedure in the navigation database.

NOTE: At a minimum, the arrival checks could be a simple inspection of a suitable map display that achieves the objectives of this paragraph.

b) Manual entry creation of new waypoints into the aircraft's system invalidates the P-RNAV procedure and is not permitted.

c) The pilots will make the necessary preparation to revert to a conventional arrival procedure where required as a contingency.

d) During the procedure and where feasible, the pilots will monitor flight progress for navigational reasonableness by crosschecks with conventional navigation aids using the primary displays in conjunction with the MCDU. In particular, the pilots shall display and check the reference VOR/DME used for the construction of a VOR/DME RNAV procedure. A navigation reasonableness check is required during the descent phase before reaching the initial approach fix (IAF) for RNAV systems without GNSS updating.

NOTE: For example, display bearing/range to a VOR/DME from the RNAV system and compare the result with the radio magnetic indicator (RMI) read-out (selected to same VOR/DME) where feasible.

e) Route modifications in the terminal area may take the form of radar headings or "direct to" clearances and the pilots must be capable of reacting in a timely fashion. This may include the insertion of tactical waypoints loaded from the database. Manual entry or modification by the pilots of the loaded procedure, using temporary waypoints or fixes not provided in the database, is not permitted.

f) All published altitude and speed constraints will be observed by TWO WINDS AVIATION, LLC pilots, even though a particular method is not mandated.

D. Contingency Procedures

The pilot will comply with the following contingency procedures:

a) The pilot will notify ATC of any loss of the P-RNAV capability, together with the proposed course of action.

b) The pilot will notify ATC of any loss of RNAV system component, including those affecting flight technical error (ie: failures of the flight director or autopilot), together with the proposed course of action.

c) The pilot will continue with the P-RNAV procedure in accordance with the published lost communication procedure in the event of communications failure.

d) The pilot will navigate using an alternative means of navigation that may include the use of an inertial system in the event of loss of P-RNAV capability. The alternative does not need to be RNAV.

E. Incident Reporting

The pilot will report significant incidents associated with the operation of the aircraft that affect or could affect the safety of P-RNAV operations, in accordance with JAR-OPS 1.420. Specific examples may include:

a) Aircraft system malfunctions during P-RNAV operations which lead to:

- Navigation errors (e.g., map shifts) not associated with transitions from an inertial navigation mode to radio navigation mode;
- Significant navigation errors attributed to incorrect data or a navigation database coding error;
- Unexpected deviations in lateral or vertical flight path not caused by pilot input;
- Significant misleading information without a failure warning; and
- Total loss or multiple navigation equipment failure.

b) Problems with ground navigational facilities leading to significant navigation errors not associated with transitions from an inertial navigation mode to radio navigation mode.

F. Pilot Knowledge Requirements

The pilot will complete training at an FAA approved training facility. In addition to the requirements specified in this program, pilots are knowledgeable in the following areas:

a. RNP-1 definition as it relates to P-RNAV requirements in P-RNAV airspace;
b. Airspace where P-RNAV is required;
c. Changes to charting and documents to reflect P-RNAV;
d. Required navigation equipment for flight in designated P-RNAV airspace, and limitations associated with the RNAV equipment;
e. Flight planning requirements;
f. Contingency procedures (e.g., for equipment failure);
g. En route, terminal, and approach procedures applicable to RNAV;
h. Information contained in this operations program
i. Theory of RNAV, including the differences between B-RNAV and P-RNAV; and
j. Limitations of RNAV.
k. Charting, database and avionics issues including:
    - Waypoint naming concepts;
    - RNAV Path terminator concepts and especially:
        1. Use of the 'CF' path terminator;
        2. Use of the 'TF' path terminator; and
        3. Fly-by and fly-over waypoints.
l. Use of the RNAV equipment including:
    - Retrieving a procedure from the database,
    - Verification and sensor management,
    - Tactically modifying the flight plan,
    - Addressing discontinuities,
    - Entering associated data such as:
        1. Wind,
        2. Altitude/Speed constraints, and
        3. Vertical Profile/Vertical Speed.
    - Flying the procedure,
    - Use of Lateral Navigation Mode and associated lateral control techniques,
    - Use of Vertical Navigation Mode and associated vertical control techniques,
    - Use of automatic pilot, flight director and auto-throttle at different stages of the procedure, and
    - The implications of system malfunctions not RNAV related (e.g., hydraulic failure or engine failure).

G. Flight Planning

When filing flight plans into P-RNAV designated airspace, the pilot will meet the P-RNAV airspace requirements. The pilots will indicate approval for P-RNAV operations by annotating block 10 (Equipment) of the ICAO flight plan as required in ICAO Doc 7030. If there are any other flight plan annotations required by individual States, the pilots will make appropriate annotations.

Appendix A

International Civil Aviation Organization (ICAO)
Flight Planning

ICAO Flight Plan (FPL) Item 10 (a), Area Navigation (RNAV) Equipment Information

The implementation of RNAV for en route applications requires the mandatory carriage of Basic Area Navigation (B-RNAV) for instrument flight rules (IFR) operations. The ECAC-agreed concept for the RNAV implementation will allow for three types of terminal area procedures, with respect to the minimum airborne Navigation (NAV) equipment fit required, namely:

a) Precision Area Navigation (P-RNAV),
b) B-RNAV, or
c) Non-RNAV.

It is a fundamental requirement for air traffic control (ATC) to be able to distinguish, systematically, between the various levels of RNAV equipment fit, such that the assignment of Standard Instrument Departure (SID)s/standard terminal automation replacement system (STAR)s can be accomplished in a systematic, efficient and unambiguous manner, without the creation of undue additional controller workload.

The FPL is the vehicle that supports this requirement. The automated processing of the FPL Item 10 information will be fundamental to enabling the systematic display, to all relevant ATC control positions, of the individual aircraft RNAV level of equipage.

Flight planning provisions, in respect of ECAC RNAV equipment carriage requirements, were developed with the following considerations:

a) Consistency with the ICAO required navigation performance (RNP) concept;
b) Consistency with the conclusions reached by ICAO in respect of filing of information with respect to B-RNAV, namely:
    i. That B-RNAV equipment shall form part of the standard equipment fit and shall therefore be indicated through the use of the letter S in item 10
    ii. The requirement for the letter R to also be inserted in item 10, in conjunction with the letter S, filed in respect of B-RNAV
c) Consistency with the mandatory carriage requirements of B-RNAV for en route operations
d) Consistency with exemptions to B-RNAV carriage requirements, granted to operators of State aircraft;
e) The fact that P-RNAV is not mandatory for en route or terminal operations;
f) The fact that an aircraft certification with respect to P-RNAV also represents certification with respect to B-RNAV;
g) The fact that P-RNAV will be required for designated RNAV terminal area procedures; and

h) That P-RNAV is a transitory step to a possible eventual mandatory requirement for the carriage of RNP-RNAV.

Apply the following when filing RNAV equipment information for flights operating within ECAC airspace:

	Item 10	Item 18
Aircraft not equipped with RNAV (State a/c)	--	**RMK/NONRNAV**
Aircraft equipped with B-RNAV	**SR**	--
Aircraft equipped with P-RNAV	**PSR**	--

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IV

RVSM MAINTENANCE PROGRAM

RVSM MAINTENANCE PROGRAM

CONTENTS

LIST OF EFFECTIVE PAGES

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FAA APPROVED

FAA Inspector Signature: RAY MELCER EA-1

Date: 1/20/2014

FAA, Farmingdale Flight Standards District Office
7150 Republic Airport
Suite 235
Farmingdale, NY 11735

RECORD OF REVISIONS

Revision No.	Revision Date	Date of Insertion	Initials
Original	27 January 2014	N/A	MRM

1) RVSM MAINTENANCE PROGRAM OVERVIEW

This RVSM Maintenance Program will be used by Two Winds Aviation, LLC to ensure that Cessna Citation 501 serial number 501-0091, approved for Reduced Vertical Separation Minimum (RVSM), will be maintained within current FAA regulations and to specifications required for RVSM operations. A copy of this FAA approved RVSM Maintenance Program is required to be carried aboard the aircraft and available to the pilot along with the appropriate OPSS Letters of Authorization when RVSM operations are in effect.

Two Winds Aviation, LLC conducts operations with Cessna Citation 501 serial number 501-0091 in accordance with 14 CFR Part 91. Two Winds Aviation, LLC currently utilizes the manufacturer's approved maintenance program, which contains both the maintenance practices and requirements outlined in the manufacturer and component manufacturer maintenance manuals, in accordance with 14 CFR Part 43 and 91.409(f)(3).

Two Winds Aviation, LLC's FAA approved RVSM maintenance program contains all the elements identified in FAA Order 8900.1, Volume 4, Chapter 10 and is sufficient to maintain the aircraft systems and equipment in accordance with RVSM requirements. Two Winds Aviation, LLC will use this FAA approved RVSM maintenance program when performing maintenance on the Cessna Citation 501 RVSM system or components.

The RVSM critical equipment, as defined in Appendix A, installed on the Cessna Citation 501 complies with RVSM requirements via installation of Garrett Aviation Services STC #SA01637CH and ElectroSonics STC #SA01558CH-D. An initial verification flight to monitor/verify the aircraft's altimetry system will be completed on Cessna Citation 501 serial number 501-0091 within six months of issuance of the RVSM LOA, or as required. Recurrent height monitoring flights will be conducted at 24 month or 1,000-hour intervals, whichever is longer.

Responsibility for compliance with the requirements of this maintenance program lies with the Two Winds Aviation, LLC Managing Member, who will be referred to as the RVSM Responsible Person. The RVSM Responsible Person is responsible for distribution, control and revision of this RVSM Maintenance Program. In the event the RVSM Responsible Person is replaced, the new RVSM Responsible Person will call or write the Farmingdale FSDO and inform the appropriate FAA inspector of this change.

FAA approval of this RVSM Maintenance Program is indicated on the List of Effective Pages together with the date of approval, the FAA inspector's signature and the FAA office and address. The revision status is indicated on the Record of Revisions Page. Revisions to this manual will be submitted for approval in coordination with the assigned Principals at the Farmingdale FSDO.

After the RVSM Responsible Person receives FAA approval for the revision, he will give each authorized holder of this RVSM Maintenance Program an emailed or hard copy of the revision. The RVSM Responsible Person will receive either verbal or written confirmation from each authorized holder of the RVSM Maintenance Program that the revision was placed in the RVSM binder.

This is Two Winds Aviation, LLC's initial RVSM application; therefore no past performance records are available for Cessna Citation 501 serial number 501-0091. The RVSM Responsible Person will maintain operating history of incidents related to poor height keeping performance, which may indicate weaknesses in training, procedures or maintenance. If any incidents are recorded, they will be inserted into this RVSM manual behind the Reference Materials tab and be kept as long as Two Winds Aviation, LLC operates Cessna Citation 501 serial number 501-0091. If the incident is related to poor operations training or procedures, additional training will be provided as warranted.

Two Winds Aviation, LLC's primary base of operation is located at Long Island Mac Arthur Airport (KISP). To ensure continued compliance with RVSM maintenance and inspection requirements, Two Winds Aviation, LLC utilizes FAA approved Part 145 maintenance facilities that are authorized to perform RVSM maintenance on the Cessna Citation 501.

The RVSM Responsible Person will inquire with the management of the FAA approved Part 145 repair station he intends to use to confirm they are FAA rated and approved to perform RVSM maintenance on the Cessna Citation 501 aircraft. If documented proof of appropriate ratings and approvals are not supplied to the RVSM Responsible Person, the RVSM Responsible Person will locate a repair station that can supply this documentation and have the maintenance performed on the aircraft at this alternate location. The RVSM Responsible Person will then ask the management of this repair station to fill out the Service Facility Compliance Form found in Appendix B. The compliance form will be kept behind this RVSM Maintenance Program and updated each time a maintenance facility is utilized for RVSM related maintenance.

2) RVSM MAINTENANCE REQUIREMENTS

This FAA approved RVSM Maintenance Program identifies all aircraft equipment required for RVSM together with scheduled maintenance requirements for that equipment.

Cessna Aircraft Company CE-500 Series Airplane Maintenance Manual (AMM) and Garrett Aviation Services STC SA01637CH Instructions for Initial and Continued Airworthiness Document No. 50-8008-004 outline the maintenance requirements for this RVSM equipment. To retain RVSM approval for this aircraft, it is necessary to accomplish the following inspections:

After initial airworthiness approval has been granted, the following tasks must be conducted every 12 months in service (in accordance with Garrett Aviation Services STC Document No. 50-8008-004):

1. Verify the correct avionics components are installed in accordance with Section 2.3 Table 2.1 or Table 2.1a of Document No. 50-8008-004.

2. Conduct the air data system accuracy check presented in Section 3.1.1 of Document No. 50-8008-004 using using accurate ground test equipment, and verify the air data system errors are within specified RVSM tolerances.

3. Conduct the following inspections of the RVSM critical region in accordance with Document No. 50-8008-004:

    a. Conduct a visual inspection of the RVSM Critical Region and verify that the RVSM Critical Region corner markings as defined in Section 3.1.2 and Figure 3.1 are discernable and in good condition. Verify that the RVSM modification compliance Placard as defined in Section 3.1.2 and Figures 3.1 and 3.2 is in place and readable.
    b. Verify the absence of waviness, scratches, damage or prior repairs.
    c. Verify that the entire inspection area meets any criteria found in the Cessna 500 Series Structural Repair Manual, Chapter 51-00-03, Aerodynamic Surfaces – Description. Repair any discrepancies found using standard procedures found in the Structural Repair Manual. If any repairs are made, complete the tasks required in Section 2.4.3.
    d. Verify that all placards or stencils are located outside of the RVSM Critical Area defined in Figure 3.1.

In addition to the tasks required every 12 months in service, the following additional task must be completed every 24 months in service (in accordance with Garrett Aviation Services STC Document No. 50-8008-004):

4. Conduct an in-flight autopilot altitude hold check as described in Section 3.1.3 of Document No. 50-8008-004. Verify the airplane can maintain the specified tolerance.

5. Conduct a transponder check in accordance with the CE-500 Series AMM at 24-month intervals (14 CFR Part 91.413).

6. Any other maintenance requirement recognized by Cessna Aircraft Company or Garrett Aviation Services as needed to ensure continued compliance with RVSM requirements will be incorporated into this RVSM Maintenance Program.

3) INSTRUCTIONS FOR CONTINUED AIRWORTHINESS (ICA)

To ensure the continued airworthiness keeping ability of RVSM approved aircraft, the Two Winds Aviation, LLC RVSM Responsible Person is responsible for ensuring the following practices are accomplished:

- Avionics components of identical part number may be interchanged freely during the service lifetime of this airframe. If alternate equipment part numbers are to be installed, the units must be analyzed on a system level to determine if the new components are acceptable for RVSM.
  NOTE: The STC holder (Garrett Aviation Services) will make this determination.
- An inspection of the pitot/static areas by the flight crew during preflight. It is imperative that prior to all flights in RVSM airspace, the pilot visually inspects the RVSM Critical Region for obvious damage or deformation, such as paint chips or dents, to the skin surface. The RVSM Critical Region is clearly marked on the aircraft with yellow corner markings. An image of the RVSM Critical

Region is also provided in Appendix A of this RVSM Maintenance Program for pilot reference.

- Airframe and static systems will be maintained in accordance with the airframe manufacturer's inspection standards and procedures, and instructions for continued airworthiness.
- Any modification, repair, or design change that in any way alters the initial RVSM approval will require a design review by Garrett Aviation Services engineering.
- Any maintenance practices that may affect the continuing RVSM approval integrity (e.g. the alignment of pitot/static probes, dents, or deformation around static plates) will be evaluated by Garrett Aviation Services engineering.
- A system leak check will be accomplished any time a quick disconnect or static line is broken.

RVSM specific maintenance procedures are in accordance with the Garrett Aviation Services Instructions for Initial and Continued Airworthiness (Document #50-8008-004) and the Cessna Citation 500 Series Airplane Maintenance Manual. For further information, the following publications may be used:

- Cessna Citation 500 Series Structural Repair Manual (SRM), used to identify the aerodynamic critical areas, and require Two Winds Aviation, LLC to meet specific tolerances as specified in the Structural Repair Manual.

4) RVSM PARTS AND COMPONENTS CONTROL

The RVSM Responsible Person will ensure that all persons responsible for obtaining or replacing RVSM system components are knowledgeable of the aircraft's RVSM status and requirements. Parts and components required for RVSM operations will be procured from the manufacturer of that equipment or from an authorized vendor. The following procedures shall be utilized:

1. The RVSM Responsible Person and maintenance personnel will ensure that all RVSM related parts and components used on the aircraft are the part numbers that are described in Appendix A of this RVSM Maintenance Program.

2. Any deviations to part or model numbers of RVSM related equipment requires Garrett Aviation Services engineering review and approval.

3. Maintenance reports and a computerized maintenance tracking program, will be used by the RVSM Responsible Person to track RVSM related components and maintenance. The RVSM Responsible Person will monitor these reports to ensure compliance with required maintenance inspections.

5) REMOVAL FROM RVSM SERVICE/ RETURN TO RVSM SERVICE PROCEDURES

When RVSM component malfunctions occur, the Cessna Citation 500 Series Master Minimum Equipment List (MMEL) will be referred to for specific, allowable flight operations.

At such time an RVSM related malfunction occurs, the aircraft will become RVSM non-compliant and the following procedures will be adhered to (continued):

- The maintenance technician will add an entry to the maintenance records to indicate that the aircraft is not compliant with RVSM requirements until the discrepancy(s) are corrected.

- The RVSM Responsible Person will place a placard on the aircraft instrument panel and/or pilot's control yoke stating "RVSM NON-COMPLIANT". An example of this placard format can be found in Appendix C. The placard must be printed either on a computer or written by hand on a self-adhesive sticker in black or blue writing with a white background.

- The pilot will add flight plan remarks to their flight plan in order to prevent aircraft operation in RVSM airspace until corrective action is accomplished. The aircraft will not be operated in RVSM airspace.

The placard on the instrument panel and/or control yoke stating "RVSM Non-Compliant" informs the pilot that the aircraft is RVSM non-compliant.

The RVSM Responsible Person will report any height-keeping performance error to the Farmingdale FSDO within 72 hours, along with initial analysis of what caused the error, what corrective action has been taken and measures to prevent further events. A maintenance technician will troubleshoot and test the system until the error has been corrected.

For the aircraft to return to RVSM compliant status, the failure and/or malfunction of the affected component must be confirmed and isolated by maintenance action. Following any corrective action procedure, the RVSM Responsible Person must make a determination that the affected equipment is operational prior to conducting RVSM operations. The RVSM Responsible Person will review records of all RVSM related maintenance performed to ensure compliance with the requirements of this program and to ensure continued height-keeping ability of covered aircraft.

After accomplishment of corrective maintenance and testing, the RVSM Responsible Person will ensure that the RVSM Non-Compliant placard is removed from the aircraft instrument panel and that an entry is made by the maintenance technician in the aircraft maintenance record that will return the aircraft to RVSM authorized status in accordance with FAR Part 43.9. The maintenance entry will state the aircraft is "RVSM Compliant".

6) RVSM MAINTENANCE TRAINING

Two Winds Aviation, LLC does not provide in-house training for maintenance personnel. Two Winds Aviation, LLC will ensure that all maintenance personnel that work on critical RVSM systems are properly trained on the Cessna Citation 501 by auditing the maintenance facility. The Service Facility Compliance Form in Appendix B will be used for this purpose.

It is the responsibility of the RVSM Responsible Person to inquire with the management of the FAA Part 145 maintenance facility to ensure that any personnel performing maintenance on the RVSM systems are properly trained, qualified, and knowledgeable to perform maintenance on RVSM systems. The RVSM Responsible Person will record the information and complete the RVSM Service Facility Compliance Form found in Appendix B of this RVSM Maintenance Program. The completed form will be inserted behind this RVSM Maintenance Program until maintenance is required on RVSM critical equipment again. At this time, a new Service Facility Compliance Form will then be completed and inserted behind this RVSM Maintenance Program. If the RVSM Responsible Person notes any discrepancies with the repair station or repair station personnel, the issue will be resolved prior to using the maintenance facility.

7) RVSM TEST EQUIPMENT

Two Winds Aviation, LLC does not own or control test equipment specific to the maintenance or calibration of RVSM equipment. Therefore Two Winds Aviation, LLC will use only FAA certified repair stations operating under FAR Part 145 who, by virtue of their approval from the FAA, are qualified and responsible for the utilization, calibration, and operation of approved test equipment.

Two Winds Aviation, LLC will utilize these facilities on an as-needed basis for maintenance of RVSM equipment. Two Winds Aviation, LLC's quality assurance program, detailed below, ensures continuing accuracy and reliability of test equipment used for testing aircraft to confirm compliance with RVSM aircraft requirements.

The RVSM Responsible Person will provide the maintenance facility with a copy of this RVSM Maintenance Program and review the following requirements with the FAA certified repair station:

1. Calibration of RVSM test equipment does not exceed 12 calendar months.
2. Traceability of calibrated test equipment to standards of the NIST.
3. Appropriate list of repair station personnel trained in the use of specialized RVSM test equipment.
4. Adherence to acceptable shop and line maintenance practices.
5. Specific test equipment, as identified in the Garrett Aviation Services Instructions for Initial and Continued Airworthiness (Document #50-8008-004) utilized during RVSM maintenance/inspection procedures.

The results of the review will be recorded by the RVSM Responsible Person on the RVSM Service Facility Compliance Form found in Appendix B of this RVSM Maintenance Program. The manager at the FAA repair station and the RVSM Responsible Person will sign this compliance form to acknowledge that the above requirements will be met.

NOTE: Maintenance providers may use built-in test equipment (BITE) testing of RVSM components and systems recommended by manufacturers and design holders in appropriate ICAs for return to service (RTS) determinations.

8) FAA REPORTING

Errors exceeding 200 feet require corrective action only. Height keeping errors that must be reported to the Farmingdale FSDO within 72 hours of the occurrence are:

a) Total Vertical Error (TVE) equal to or greater than 300 feet.
   - Total Vertical Error is the vertical geometric difference between the actual pressure flown by the aircraft and its assigned pressure altitude (Flight Level).

b) Altimetry System Error (ASE) equal to or greater than 245 feet.
   - Altimetry System Error is the difference between the pressure altitude displayed to the pilot when referenced to ISA standard ground pressure setting (29.92 in. Hg / 1013.25 hPa) and free stream pressure altitude.

c) Assigned Altitude Deviation (AAD) equal to or greater than 300 feet.
   - Assigned Altitude Deviation is the difference between the transponder Mode C altitude and the assigned altitude / flight level.

Appendix A

RVSM CRITICAL EQUIPMENT			
Qty	**Manufacturer/Model**	**Part Number**	**Type Of Equipment**
2	IS&S/ADDU	9D-80130-16	Air Data Display Unit
1	IS&S/AIU	9B-81040-26	Analog Interface Unit
2	IS&S/CM	9B-03508-15	Configuration Module
1	Garmin/GTX-327	011-00490-00	Transponder
1	Garmin/GTX-330ES	011-00455-60	Transponder
1	Honeywell/SP-200	4008519-911	Autopilot Computer
1	Honeywell/VN-212	4020571-901	Altitude Alerter

TCAS II NOT INSTALLED

RVSM CRITICAL REGION DESCRIPTION/IMAGE
2 Static Ports: RVSM critical region is clearly identified on the aircraft by corner markings around each static port on both sides of the aircraft. The image extracted below from Garrett Aviation Services' ICA Document No 50-8008-004 is for operator reference only to illustrate the RVSM critical region.

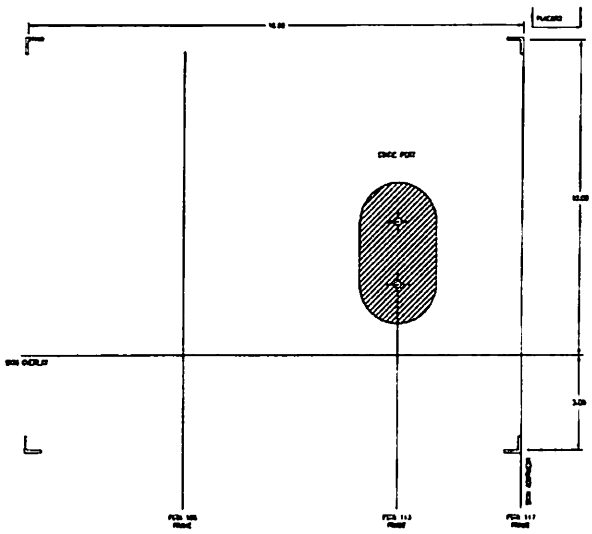

FIGURE 3.1 RVSM Critical Region Definition, Left Side Shown

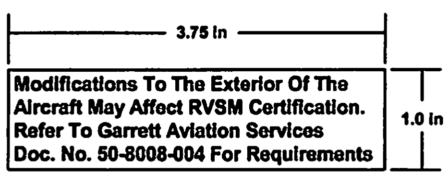

FIGURE 3.2 RVSM Critical Region Placard

Appendix B

RVSM SERVICE FACILITY COMPLIANCE FORM		
Date: ____________		
Facility		
Name of Facility:		
Address:		
City, State, Zip:		
Country (if non-US):		
Phone #:		
Fax #:		
Years in Business:		
FAA Certified Repair Station CRS#: ______________ Repair Station Ratings: ________________		
Please list any other regulatory agencies from which this facility is authorized (EASA, CAA, DOT, etc.) and the appropriate authorization numbers.		
Personnel at this facility responsible for RVSM		
Name and A&P License No.	Title	Phone Number

RVSM Certification Status:

All RVSM repairs will be completed by RVSM trained technicians and those training certificates are available for inspection by the RVSM Responsible Person.

All RVSM equipment and tools required are in working condition and meet the requirements of Garrett Aviation Services Instructions for Initial and Continued Airworthiness Document No 50-8008-004. These items have been calibrated within the appropriate time period and those records are available for inspection by the RVSM Responsible Person.

Required documents relating to airworthiness of RVSM repairs or modifications will be reviewed to ensure conformity with the FAA approved RVSM Maintenance Program for Cessna Citation 501 serial number 501-0091.

The parts control program at this facility is adequate to meet the requirements of RVSM.

I certify that the above Statements are true (responsible person at this facility signs):

Name: ____________________ Signature: ______________________

Title: ____________________ Date:__________

I have reviewed the information supplied above and find this repair facility qualified to perform RVSM service.

RVSM Responsible Person Signature: ________________________ Date: ________

Appendix C

Placard format:

**RVSM NON-
COMPLIANT**

V

MASTER MINIMUM EQUIPMENT LIST
(MMEL)

Revision: 9
Date: 07/17/2007

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C.

MASTER MINIMUM EQUIPMENT LIST

Cessna 500, Series Citations
CE-500, CE-501, CE-550, CE-551, CE-S550, CE-560

Jeff C. Spangler
Chairman, Flight Operations Evaluation Board
(FOEB)

Federal Aviation Administration
AIRCRAFT EVALUATION GROUP, MKC-AEG
Department of Transportation Building
901 Locust, Room 332
Kansas City, MO 64106

Telephone: (816)-329-3233
FAX: (816)-329-3241

****This MMEL is applicable to Part 91 operations only and may not be used for operations conducted under Parts 121, 125, 129 or 135.****

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HIGHLIGHTS OF CHANGE

Cover page updated to remove CE-552.

Revised definitions to revision 11 IAW PL-25 revision 13.

Revised (O) & (M) Guidelines.

ATA 21-1 Added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 21-2 Added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 21-3 Added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 21-4 Added applicability, and requirement for (O) procedure.

ATA 21-5 Revised applicability, revised relief available, added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 21-7 Revised applicability, revised relief available, added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 21-8 Added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 21-9 Revised relief title, added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 21-10 Added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 21-13 Revised relief title, and revised Remarks and Exceptions.

ATA 21-14 Revised applicability, added requirement for (O) or (M) procedure, and revised Remarks and Exceptions.

ATA 21-15 Revised relief title, and added requirement for (O) procedure.

ATA 21-18 Revised Remarks and Exceptions.

ATA 21-19 Revised relief title, and applicability.

ATA 21-20 Revised relief title, applicability, added requirement for (O) procedure, and revised Remarks and Exceptions.

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HIGHLIGHTS OF CHANGE

ATA 21-21 Added "****" for if installed.

ATA 21-24 Revised (O) procedure guideline and revised Remarks and Exceptions.

ATA 22-1 Revised Remarks and Exceptions, and added RVSM note.

ATA 22-2 Revised Repair Category, revised Remarks and Exceptions, and added RVSM note.

ATA 22-3 Changed Number Installed to a dash.

ATA 22-4 Revised relief, revised Remarks and Exceptions, and added RVSM note.

ATA 22-5 Revised relief title.

ATA 22-6 Changed Number Installed to a dash, and revised Remarks and Exceptions.

ATA 22-7 Revised Remarks and Exceptions.

ATA 23-1 Revised Remarks and Exceptions.

ATA 23-2 Revised applicability, and revised Remarks and Exceptions.

ATA 23-3 Revised relief category, and revised Remarks and Exceptions.

ATA 23-4 Added "****" for if installed, and revised Remarks and Exceptions.

ATA 23-5 Revised IAW PL-29 revision 4.

ATA 23-6-1) Revised relief title.

ATA 23-7 Revised relief title.

ATA 23-8 Revised Remarks and Exceptions.

ATA 23-9 Added "****" for if installed.

ATA 23-10 Revised relief title.

ATA 23-12 Revised Number Required for Dispatch, and revised Remarks and Exceptions.

ATA 23-13 Added "***" for if installed.

ATA 23-14 Revised Remarks and Exceptions.

ATA 23-15 Added "***" for if installed, and revised applicability.

ATA 23-16 Moved from ATA 25, and updated IAW PL-120 revision 0.

ATA 24-2 Added requirement for (M) procedure, and revised Remarks and Exceptions.

ATA 24-3 Revised relief title, revised Repair Category, and revised Remarks and Exceptions.

ATA 25-1 Revised Remarks and Exceptions.

ATA 25-2 Revised Repair Category, added relief for Tracking Mechanism, and Revised Remarks and Exceptions.

ATA 25-5 Deleted and moved to ATA 23.

ATA 25-6 Revised IAW PL-116 revision 0.

ATA 25-7 Revised Remarks and Exceptions.

ATA 25-8 Revised relief title, revised relief available, and revised Remarks and Exceptions.

ATA 25-9 Added "***" for if installed, and revised relief title.

ATA 25-10 Revised relief title.

ATA 25-11 Revised relief title, revised relief available, added "***" for if installed, and revised Remarks and Exceptions.

ATA 25-12 Revised Remarks and Exceptions.

ATA 25-13 Added relief.

ATA 26-2 Deleted relief.

ATA 27-1 Relief reinstated and revised.

ATA 27-2 Deleted and moved to ATA 31-5.

ATA 27-3 Deleted and moved to ATA 31-5.

ATA 27-4 Deleted relief.

ATA 27-6 Revised Number Installed, and revised Remarks and Exceptions.

ATA 27-7 Revised relief title, revised Number Installed, changed (O) procedure to an (M) procedure, and revised Remarks and Exceptions.

ATA 27-8 Added relief expiration date.

ATA 27-9 Added relief expiration date.

ATA 28-1 Revised Remarks and Exceptions.

ATA 28-2 Revised Repair Category, number required for dispatch, and revised Remarks and Exceptions.

ATA 28-3 Revised Remarks and Exceptions.

ATA 28-5 Revised relief title, and applicability.

ATA 28-6 Added "***" for if installed, revised relief title, added relief expiration, and added requirement for (O) procedure.

ATA 29-1 Revised relief title.

ATA 29-2 Added relief.

ATA 30-1 Revised relief title, revised relief available, and revised Remarks and Exceptions.

ATA 30-2 Revised Remarks and Exceptions.

ATA 30-5 Revised relief title, revised Number Installed to a dash, revised Number Required to a dash, revised Remarks and Exceptions, and added RVSM note.

ATA 30-6 Deleted and combined with ATA 30-5.

ATA 30-7 Deleted and combined with ATA 30-8.

ATA 30-8 Revised Number Installed to a dash, revised Number Required to a dash, revised Remarks and Exceptions, and added RVSM note.

HIGHLIGHTS OF CHANGE

ATA 30-9 Revised relief title, revised applicability, revised Number Installed, revised Number Required for Dispatch, and revised Remarks and Exceptions.

ATA 30-10 Revised relief title, and revised Remarks and Exceptions.

ATA 30-11-1) Deleted and moved to ATA 33-22.

ATA 30-11-2) Revised applicability.

ATA 30-12 Revised relief title, revised Number Installed, removed requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 30-13 Added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 31-1 Updated IAW PL 87 revision 8.

ATA 31-3 Added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 31-4 Revised applicability.

ATA 31-5 Revised relief title, revised applicability, revised relief available, and revised Remarks and Exceptions.

ATA 31-6 Deleted and moved to ATA 31-5.

ATA 31-7 Revised relief title, and revised Remarks and Exceptions.

ATA 31-8 Revised Remarks and Exceptions.

ATA 31-9 Added relief.

ATA 31-10 Added relief.

ATA 32-1 Deleted relief.

ATA 32-2 Revised applicability.

ATA 32-4 Added relief expiration date.

ATA 32-5 Added relief expiration date.

HIGHLIGHTS OF CHANGE

ATA 32-6 Added relief expiration date.

ATA 33-1 Revised Repair Category, and revised Remarks and Exceptions.

ATA 33-2 Revised relief title, revised Number Installed, and revised Remarks and Exceptions.

ATA 33-3 Revised applicability, revised relief available, and revised Remarks and Exceptions.

ATA 33-5 Revised applicability, revised relief available, and revised Remarks and Exceptions.

ATA 33-6 Revised applicability, revised relief available, and revised Remarks and Exceptions.

ATA 33-9 Revised Remarks and Exceptions.

ATA 33-12 Revised relief title, and revised Remarks and Exceptions.

ATA 33-15 Added "***" for if installed, and revised Remarks and Exceptions.

ATA 33-18 Deleted and combined with ATA 33-2.

ATA 33-19 Revised Remarks and Exceptions.

ATA 33-22 Moved from ATA 30-11-1), and revised relief.

ATA 34-1 Revised relief title, and revised relief available.

ATA 34-2 Revised relief title.

ATA 34-4 Revised Repair Category.

ATA 34-8 Revised IAW PL-76 revision 4, and added RVSM note.

ATA 34-9 Revised relief title, and revised relief available.

ATA 34-10 Revised relief category, and revised Remarks and Exceptions.

ATA 34-11 Revised relief title, revised applicability, revised relief category, revised Remarks and Exceptions, and added RVSM note

ATA 34-12 Revised relief title, revised Number Installed, and added RVSM note.

ATA 34-12-1) Deleted and combined with ATA 34 item 28.

ATA 34-13 Revised relief title, revised relief available, and revised Remarks and Exceptions.

ATA 34-15 Revised relief title, revised Number Installed, and revised Remarks and Exceptions.

ATA 34-16 Revised relief title, revised applicability, and revised Remarks and Exceptions.

ATA 34-17 Revised relief title, revised applicability, revised relief available, and revised Remarks and Exceptions.

ATA 34-18 Revised Remarks and Exceptions.

ATA 34-19 Revised IAW PL-32 revision 7.

ATA 34-20 Deleted (to match revision 6), and combined with ATA 34 item 19.

ATA 34-21 Revised IAW PL-54 revision 10.

ATA 34-22 Added "***" for if installed.

ATA 34-23, Revised applicability, and revised Remarks and Exceptions.

ATA 34-27 Revised Remarks and Exceptions.

ATA 34-28 Revised relief available.

ATA 34-29 Deleted relief.

ATA 34-29-1) Deleted relief.

ATA 34-30 Revised relief title, and revised applicability.

ATA 34-30-1) Revised Remarks and Exceptions.

ATA 34-30-3) Revised Remarks and Exceptions.

ATA 34-32-1) Deleted relief.

ATA 34-32-2) Added "***" for if installed, and revised Remarks and Exceptions.

ATA 34-33 Revised applicability.

ATA 34-34 Added relief.

ATA 35-1 Revised relief available.

ATA 35-2 Revised relief title, revised Repair Category, revised relief available, and revised Remarks and Exceptions.

ATA 35-3 Added relief.

ATA 35-4 Added relief.

ATA 38-2 Revised relief available, and revised Remarks and Exceptions.

ATA 52-1-1) Revised relief title, and revised Remarks and Exceptions.

ATA 52-1-2) Added relief expiration date.

ATA 52-1-3) Added relief expiration date.

ATA 52-1-5) Deleted relief.

ATA 52-2 Revised relief title, revised applicability, added relief expiration date, and revised Remarks and Exceptions.

ATA 52-3 Deleted relief and combined with ATA 52-2.

ATA 52-4 Revised relief available, added requirement for (O) procedures, and revised Remarks and Exceptions.

ATA 52-5 Revised relief title, revised relief available, and revised Remarks and Exceptions.

ATA 52-6 Revised relief title, revised applicability, added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 52-7 Revised applicability, added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 52-8 Revised applicability, added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 52-9 Revised relief title, revised applicability, revised relief available, added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 52-10 Revised relief title, revised applicability, added requirement for (O) procedure, and revised Remarks and Exceptions.

ATA 73-1 Removed "***" for if installed, and revised applicability.

ATA 73-3 Deleted relief.

ATA 74-1 Revised relief title, revised applicability, and revised Remarks and Exceptions.

ATA 77-1 Revised applicability, and revised Remarks and Exceptions.

ATA 77-2 Revised relief title, and revised applicability.

ATA 77-3 Added relief.

ATA 78-1 Added "***" for if installed, and removed note.

Definitions Revision 20

1. **Accessible Lavatory Items.** Under 14 CFR § 382.63, accessible lavatory items include: ability to enter lavatory and maneuver by means of on-board wheelchair. The lavatory shall provide door locks, accessible call buttons, grab bars, faucets, other controls, and dispensers. As an air carrier, you must maintain all aircraft accessibility features in proper working order, per 14 CFR § 382.71. The accessible lavatory requirement, in part, applies to aircraft with more than one isle in which lavatories are provided per § 382.63(a). Aircraft operators are not required to retrofit cabin interiors of existing aircraft to comply with the requirements of § 382.63.

2. **Administrative Control Item (ACI).** An ACI is listed by the aircraft operator in the MEL for tracking and informational purposes. As an example, ACI may be used to track ETOPS accomplishment of required APU cold-soak, or in-flight verification starts. An ACI may be added to an aircraft operator's MEL by approval of the POI provided no relief is granted, or provided conditions and limitations are contained in an approved document (e.g., Structural Repair Manual (SRM) or Airworthiness Directive (AD)). If relief other than that granted by an approved document is sought for an ACI, a request must be submitted to the Administrator. If the request results in review and approval by the FOEB, the item becomes an MMEL item rather than an ACI.

3. **ATA System Page.** The ATA system page is divided into four (4) columns and contains: item and repair category; number installed; number required for dispatch; and remarks or exceptions. Standard ATA categories are used. Items are numbered sequentially.

A. **Item.** span style='font-family: Arial'

B. **Repair Category.** See definition #24.

C. **Number Installed.** This column depicts the number (quantity) of instrument and equipment items normally installed in the aircraft. This number represents the aircraft configuration considered in developing this MMEL. Should the number be a variable (e.g., fleet configuration differences, cockpit lighting items, cabin lighting items, cargo restraint components) a number is not required and the "-" symbol is used.

D. **Number Required for Dispatch.** This column depicts the minimum number (quantity) of instrument and equipment items required for operation provided the conditions specified in the "Remarks or Exceptions" column are met. Where the MMEL shows a variable number required for dispatch, the MEL must reflect the actual number required for dispatch or an alternate means of configuration control approved by the Administrator.

E. **Remarks or Exceptions .** This column may include a statement(s) either prohibiting or permitting operation with a specific number of instrument and equipment items inoperative, provisos (conditions and limitations) for such operation, and appropriate notes.

F. **Provisos.** Provisos are indicated by a number or a lower case letter in "Remarks or Exceptions". Provisos are conditions or limitations that must be complied with for operation with the listed instrument or equipment item inoperative.

G. **Notes.** Notes provide additional information for crewmember or maintenance consideration. Notes are used to identify applicable material, which is intended to assist with compliance, but do not relieve the aircraft operator of the responsibility for compliance with all applicable requirements. Additional notes may be amended, deleted, or added to the MEL by the aircraft operator, as appropriate. Notes are not a part of the provisos.

H. **Vertical Bar (change bar).** A vertical bar indicates a change, addition, or deletion in the adjacent text for the current revision of that page only. All change bars applicable to the previous revision of the MMEL are removed prior to the release of the next revision.

4. **Airplane Flight Manual (AFM), Rotorcraft Flight Manual (RFM).** The FAA-approved AFM/RFM is the document approved by the responsible FAA Aircraft Certification Office (ACO) during type certification. The approved flight manual for the specific aircraft is listed on the applicable Type Certificate Data Sheet (TCDS). The approved flight manual is the source document for operational limitations and performance parameters for an aircraft. The term "approved flight manual" can apply to either an AFM or an RFM. The FAA requires an approved flight manual for aircraft type certification.

5. **As Required by 14 CFR.** When the MMEL states, "As Required by 14 CFR," the listed instrument or equipment item is subject to certain provisions (restrictive or permissive) expressed in the 14 CFR operating rules. The number of items required by 14 CFR must be operative. When the listed item is not required by 14 CFR, it may be inoperative for the time specified by repair category. The term "14 CFR" has replaced "FAR" as the current reference to Federal Regulations pertaining to aviation. However, many, if not most, MMELs still contain the acronym "FAR"; therefore, this acronym is acceptable and retained in PL-025 and this definition.

6. **Code of Federal Regulations (CFR) and Federal Aviation Regulations (FAR).** CFR, the current term, and FAR both refer to the applicable portions of the Federal Aviation Act and Code of Federal Regulations.

7. **Considered Inoperative.** The phrase, "Considered Inoperative", as used in the provisos, means that an instrument and equipment item must be treated for dispatch, taxi and flight purposes as though it were inoperative. The item will not be used or operated until the original deferred item is repaired. Additional actions include: documenting the item on the dispatch release (if applicable), placarding, and complying with all remarks, exceptions, and related MMEL provisions, including any (M) and (O) procedures and observing the repair category.

8 . **Continuing Authorization – Single Extension.** An aircraft operator who has the authorization to use an FAA-approved MEL may also h ave the authority to use a continuing authorization to approve a single (one-time) extension to the repair interval for category B or C items in accordance with Operations Specification D095. Continuing Authorization – Single Extension is not authorized for repair category A and D items.

9. **Dash (-).** Indicates a variable number (quantity) of the instrument and equipment items may be installed or required for dispatch. This is common when a fleet MEL is used since aircraft of the same make and model may have differing numbers of specific instrument and/or equipment items installed.

10. **Day of Discovery.** This is the calendar-day an equipment/instrument malfunction was recorded in the aircraft maintenance record/logbook. This day is excluded from the calendar-days or flight-days specified in the MMEL for the repair interval of an inoperative instrument and/or equipment item. This provision is applicable to all MMEL items; i.e., categories A, B, C, and D.

11. **Deactivated and/or Secured.** When the MMEL refers to an instrument and/or equipment item as deactivated and/or secured, the specified component must be put into an acceptable condition for safe flight. An acceptable method of deactivating and/or securing will be established by the aircraft operator.

12. **Deleted.** "Deleted" in the remarks column after a sequence item indicates that the item was previously listed but is now required to be operative if installed in the aircraft.

13. **Extended Range Operations (ER).** ER refers to extended range operations (ETOPS) of an airplane with operational approval to conduct ETOPS in accordance with the applicable regulations.

14. **Excess Items.** Excess items are those instrument and equipment items that have been installed that are redundant to the requirements of the 14 CFR.

15. **Flight Day.** A flight-day is a 24-hour period (from midnight to midnight) either universal coordinated time (UTC) or local time, as established by the aircraft operator, during which at least one flight is initiated for the affected aircraft.

16. **Heavy Maintenance Visit (HMV).** HMV is a scheduled C-check/D-check or airworthiness maintenance program inspection where the aircraft is scheduled to be out of service for 4 or more days.

17. **Icing Conditions.** An atmospheric environment that may cause ice to form on the aircraft (structural) or in the engine(s) (induction).

18. **Inoperative .** A system and/or component malfunction to the extent that it does not accomplish its intended purpose and/or is not consistently functioning normally within its approved operating limit(s) and/or tolerance(s).

19. Inoperative Components of an Inoperative System. Inoperative instrument and equipment items, which are components of a system that is inoperative, are usually considered components directly associated with and having no other function than to support that system (warning/caution systems associated with the inoperative system must be operative unless relief is specifically authorized per the MMEL).

20. Is Not Used. The phrase "Is Not Used" in the provisos, remarks or exceptions for an MMEL instrument or equipment item may specify that another item in the MMEL "is not used". In such cases, crewmembers must not activate, actuate, or otherwise utilize that item under normal operations. It is not necessary for aircraft operators to accomplish the (M) procedure(s) associated with the item. However, operational requirements must be complied with, and an additional placard must be affixed, to the extent practical, adjacent to the control or indicator for the item that is not used. This informs crewmembers that an instrument or equipment item is not to be used under normal operations.

21. Nonessential Equipment and Furnishings (NEF). NEFs are those items installed on the aircraft as part of the original type certification (TC), STC, engineering order, or other form of alteration that have no effect on the safe operation of flight and would not be required by the applicable certification rules or operational rules. They are those items that, if inoperative, damaged, or missing, have no effect on the aircraft's ability to be operated safely under all operational conditions. NEF items are not instrument and equipment items already identified in the MEL or CDL of the applicable aircraft. They do not include instrument and equipment items that are functionally required to meet the certification rule or for compliance with any operational rule.

22. Operative. An operative system and/or component will accomplish its intended purpose and is consistently functioning normally within its design operating limit(s) and tolerance(s). When an MMEL item specifies that an item of equipment must be operative, it does not mean that it's operational status must be verified; it's to be considered operative unless reported or known to be malfunctioning. When an MMEL item specifies that an item of equipment must be verified operative, it means that it must be checked and confirmed operative at the interval(s) specified for that MMEL item. When an MMEL item specifies that an item of equipment must be verified but no interval is specified, verification is required only at the time of deferral.

Other terminology sometimes used interchangeably with "operative" within the MMEL is "operates normally", "fully operative", and "considered operative". The aircraft operator's MEL may incorporate standardized terminology of the aircraft operator's choice to specify that an item of equipment must be operative, provided the aircraft operator's MEL definitions indicate that the selected "operative" terminology means that the required item of equipment will accomplish its intended purpose and is consistently functioning normally within its design operating limit(s) and tolerance(s).

23. Placarding. Each inoperative instrument or equipment item must be placarded to inform and remind the crewmembers and maintenance personnel of the item condition. To the extent practical, placards should be located adjacent to the control or indicator for

the item affected; however, unless otherwise specified (i.e. AFM), placard wording and location will be determined by the aircraft operator.

24. Repair Category . All users of an MEL approved under parts 91K, 121, 125, 129, 135 and 142 must effect repairs of inoperative instrument and equipment items, deferred in accordance with the MEL, at or prior to the repair times established by the following letter designators. Part 91 MEL users (D095/D195 LOAs) are not required to comply with the repair categories, but will comply with any provisos defining a repair interval (flights, flight legs, cycles, hours, etc):

A. **Repair Category A.** This category item must be repaired within the time interval specified in the "Remarks or Exceptions" column of the aircraft operator's approved MEL. For time intervals specified in "calendar days" or "flight days", the day the malfunction was recorded in the aircraft maintenance record/logbook is excluded. For all other time intervals (i.e., flights, flight legs, cycles, hors, etc.), repair tracking begins at the point when the malfunction is deferred in accordance with the operator's approved MEL.

B. **Repair Category B.** This category item must be repaired within 3 consecutive calendar-days (72 hours) excluding the day the malfunction was recorded in the aircraft maintenance record/logbook. For example, if it were recorded at 10 a.m. on January 26th, the 3-day interval would begin at midnight the 26th and end at midnight the 29th.

C. **Repair Category C.** This category item must be repaired within 10 consecutive calendar-days (240 hours) excluding the day the malfunction was recorded in the aircraft maintenance record/logbook. For example, if it were recorded at 10 a.m. on January 26th, the 10-day interval would begin at midnight the 26th and end at midnight February 5th.

D. **Repair Category D.** This category item must be repaired within 120 consecutive calendar-days (2880 hours) excluding the day the malfunction was recorded in the aircraft maintenance record/logbook.

25. Takeoff. Takeoff is the act of beginning a flight in which an aircraft is accelerated from a state of rest to that of flight. For the purposes of MEL relief, this translates to the point at which the pilot physically begins to apply power to initiate the takeoff from the runway or takeoff surface.

26. Triple Asterisk (***). Indicates an item which is not required by regulation but which may have been installed on some models of aircraft covered by this MMEL. This item may be included on the aircraft operator's MEL after the approving office has determined that the item has been installed on one or more of the aircraft operator's aircraft. The symbol, however, must not be carried forward into the aircraft operator's MEL. It should be noted that neither this policy nor the use of this symbol provides authority to install or remove an item from an aircraft.

27. Visible Moisture . An atmospheric environment containing water, in any form, that can be seen in natural or artificial light; for example, clouds, fog, rain, sleet, hail, or snow.

28. Visual Flight Rules (VFR). VFR is as defined in 14 CFR Part 91. This precludes a pilot from filing an Instrument Flight Rules (IFR) flight plan.

29. Visual Meteorological Conditions (VMC). VMC means the atmospheric environment is such that would allow a flight to proceed under the visual flight rules applicable to the flight. This does not preclude operating under Instrument Flight Rules.

30. (M). This symbol indicates a requirement for a specific maintenance procedure which must be accomplished prior to operation with the listed item inoperative. Normally, these procedures are accomplished by maintenance personnel; however, other personnel may be qualified and authorized to perform certain functions. Procedures requiring specialized knowledge or skill, or requiring the use of tools or test equipment, should be accomplished by maintenance personnel. The satisfactory accomplishment of all maintenance procedures, regardless of who performs them, is the responsibility of the aircraft operator. Appropriate procedures are required to be produced as part of the aircraft operator's manual or MEL.

31. (O). This symbol indicates a requirement for a specific operations procedure which must be accomplished in planning for and/or operating with the listed item inoperative. Normally, these procedures are accomplished by the flightcrew; however, other personnel may be qualified and authorized to perform certain functions. The satisfactory accomplishment of all procedures, regardless of who performs them, is the responsibility of the aircraft operator. Appropriate procedures are required to be produced as a part of the aircraft operator's manual or MEL.

32. Electronic Fault Alerting System. New generation aircraft display system fault indications to the flight crew by use of computerized display systems. Aircraft manufacturers incorporate individual design philosophies when determining the data that is represented. The following are customized definitions (specific to each manufacturer) to help determine the level of messages affecting the aircraft's dispatch status.

NOT APPLICABLE TO THE CE-500 SERIES MMEL.

***** PART 91 PREAMBLE *****

PL-36 Revision 2, August 15,1997

This preamble is applicable to, and will be included in, master minimum equipment lists (MMEL) issued under the provisions of Section 91.30(a) [NEW Section 91.213(a)(2)]. It is not applicable to MMEL's issued under the provisions of Parts 121, 125, 129, and 135 of the FAR.

Except as provided in Section 91.30(d) [NEW Section 91.213(d)],or under the provisions of an approved MMEL, all equipment installed on an aircraft in compliance with the airworthiness standards or operating rules must be operative. Experience has shown that with the various levels of redundancy designed into modern aircraft, operation of every system or component installed may not be necessary when the remaining equipment can provide an acceptable level of safety.

An MMEL is developed by the FAA, with participation by the aviation industry, to improve aircraft utilization and thereby provide more convenient and economic air transportation for the public. The FAA-approved MMEL includes only those items of equipment which the Administrator finds may be inoperative and yet maintain an acceptable level of safety by appropriate conditions and limitations. The MMEL and FAA-issued letter of authorization are used as an MEL by an operator and permit operation of the aircraft with inoperative equipment.

The MMEL includes all items of installed equipment that are permitted to be inoperative. Equipment required by the FAR, and optional equipment in excess of FAR requirements, is included with appropriate conditions and limitations. For each listed item, the installed equipment configuration considered to be normal for the aircraft is specified. Items of equipment installed on aircraft (except for passenger convenience items such as galley equipment and passenger entertainment devices), such as "TCAS," windshear detection devices, and ground proximity warning systems (GPWS) that are in excess of what is required, and are not listed on the MMEL, must be operational for dispatch unless MMEL relief is sought through the FSDO having jurisdiction for the operator. If MMEL relief is sought, the operator must notify the FSDO who will make a request of the FOEB to convene and consider adding the equipment to the MMEL. The operator may then dispatch with the equipment disabled, or rendered inoperative, in accordance with all FAR. It is incumbent on the operator to endeavor to determine if O and/or M procedures for that equipment must be developed. If so, any procedures developed must comply with all FAR. Procedures developed to use the MMEL must not conflict with either the aircraft flight manual limitations, emergency procedures, or with airworthiness directives (AD), all of which take precedence over the MMEL and those procedures. Suitable conditions and limitations in the form of placards, maintenance procedures, crew operating procedures, and other restrictions, as necessary, are required to be accomplished by the operator to ensure that an acceptable level of safety is maintained. Those procedures should be developed from guidance provided in the manufacturer's aircraft flight and/or maintenance manuals, manufacturer's recommendations, engineering specifications, and other appropriate sources. Procedures must not be contrary to any FAR. Wherever the statement "as required by FAR" appears in the MMEL, the operator must either list the specific FAR by part and section and carry the FAR on board the aircraft or specify the requirements and/or limitations to conduct the flight in accordance with the appropriate FAR.

The MMEL is intended to permit operations with inoperative items of equipment for the minimum period of time necessary until repairs can be accomplished. It is important that repairs be accomplished at the earliest opportunity in order to return the aircraft to its design level of safety and reliability. Inoperative equipment in all cases must be repaired, or inspected and deferred, by qualified maintenance personnel at the next required inspection [Section 91.165(c), NEW Section

91.405(c)]. The repair intervals indicated by the Letters A, B, and C inserted adjacent to column 2 are NOT applicable to this MMEL.

The MMEL provides for release of the aircraft for flight with inoperative equipment. When an item of equipment is discovered to be inoperative, it is reported by making an entry in the aircraft maintenance records. The item is then either repaired or deferred per the MMEL or other approved means acceptable to the Administrator prior to further operation. In addition to the specific MMEL conditions and limitations, determination by the operator that the aircraft is in condition for safe operations under anticipated flight conditions must be made for all items of inoperative equipment. When these requirements are met, the aircraft may be considered airworthy and returned to service.

Operators are responsible for exercising the necessary operational control to ensure that an acceptable level of safety is maintained. When operating with multiple inoperative items, the interrelationship between those items, and the effect on aircraft operation and crew workload, must be considered. Operators are expected to establish a controlled and sound repair program, including the parts, personnel, facilities, procedures, and schedules to ensure timely repair.

WHEN USING THE MMEL, COMPLIANCE WITH THE STATED INTENT OF THE PREAMBLE, DEFINITIONS, CONDITIONS, AND LIMITATIONS SPECIFIED IN THE MMEL IS REQUIRED.

The FOEB has identified a need for certain procedures to provide an adequate level of safety while providing relief for some items. These procedures must be established by the operator and may be based on the aircraft manufacturer's recommended procedures, Supplemental Type Certificate modifier's recommended procedures, or equivalent operator procedures. When recommended procedures are published, the operator should comply with these procedures. If recommended procedures are not published, the following guidelines delineate the aspects to be considered by the operator in the development of required procedures.

21-1	(O) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
21-2	(O) (pressurized) Operations procedure to verify No Flow from inoperative side. (M) Maintenance procedure to ensure both Flow Control and Shutoff Valves are verified closed. (O) (unpressurized) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
21-3	(O) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
21-4	(O) Operations procedure to verify Ground Flow Control valve is closed.
21-5, and 21-5-3)	(O) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
21-7	(O) (unpressurized) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below. (O) (pressurized) Operations procedure to configure and operate the aircraft.
21-8	(O) Operations procedure to operate the aircraft at 10,000 feet MSL or below.
21-9	(O) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
21-10	(O) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
21-14	(M) Maintenance procedure to ensure the Emergency Pressurization System is operative. (O) Operations procedure to verify Emergency Pressurization System is operative.

Guidelines for (O) & (M) Procedures

21-15	(O) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
21-18	(M) Maintenance procedure to ensure the Freon Air Conditioning system is deactivated.
21-20	(O) Operations procedure to verify flow control valves are closed, and to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
21-24	(M) Maintenance procedure to secure one Outflow Valve OPEN. (O) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
23-3-1)	(O) Operations procedure to ensure alternate, normal and emergency procedures, and/or operating restrictions are established and used.
23-4	(O) Operations procedure to ensure equivalent checklists are available and used.
23-7	(O) Operations procedure to verify the Auxiliary Com/Nav Control Display Unit operates normally.
23-13	(O) Operations procedure to determine SATCOM equipment is functionally checked prior to flight and sufficient coverage exists on route of flight.
23-15-2)	(O) Operations procedure to verify both fans are operative.
24-2	(M) Maintenance procedure to deactivate inoperative inverter.
25-12	(O) Operations procedure to provide alternate means of securing and displaying required documents.
25-13	(O) Operations procedure to ensure affected seat(s) is adjusted to correct position for pilot(s) visibility requirements.
27-1	(M) Maintenance procedure to deactivate the Electric Trim System.
27-5	(M) Maintenance procedure to secure T-handle unlocked.
27-7	(M) Maintenance procedure to mark trim or flap position pointer(s).

Guidelines for (O) & (M) Procedures

28 -1	(O) Operations procedures to determine and track fuel quantity.
28-6	(O) Operations procedures for visual inspection.
29-1	(O) Operations procedure to verify adequate fluid level.
29-2	(O) Operations procedure to verify adequate fluid level, and to verify hydraulic system operates normally on affected side.
30-10	(O) Operations procedure to verify all other components of the Pitot Heat system are operative.
30-13	(O) Operations procedure to ensure basins are empty and not used.
31-3	(O) Operations procedure to record flight time.
33-7	(O) Operations procedure to ensure passengers are adequately briefed and/or notified.
33-19	(O) Operations procedure to verify Cabin Emergency Lighting is operative
33-22	(O) Operations procedure to monitor for possible ice accumulation.
34-12	(O) Operations procedure for crew altitude awareness.
34-16-1),2)	(O) Operations procedure to provide for loss of Multi-Function Display (MFD).
34-17-1),2)	(O) Operations procedure to provide for loss of the Multi-function Display (MFD) System.
34-19	(M) Maintenance procedure to deactivate and secure the system.
34-19-2)	O) Operations procedure to ensure TA only mode is selected and all TA functions/elements are operative.

34-19-3)	(O) Operations procedure to ensure all RA display and audio functions are operative.
34-21-A-1)	(O) Operations procedure to ensure crew awareness of aircraft altitude, performance, and terrain clearance at all times.
34-21-A-1)-a)	(O) Operations procedure to ensure crew awareness with inoperative modes.
34-21-A-1)-d)	(O) Operations procedure to ensure crew awareness with advisory callouts inoperative.
34-21-A-1)-e)	(O) Operations procedure to ensure crew awareness including a review of windshear avoidance and recovery procedures.
	(O) Operations procedure to ensure crew awareness using predictive windshear system.
34-21-A-2)	(O) Operations procedure to ensure crew awareness of aircraft altitude, performance, and terrain clearance at all times.
34-21-B-1)	(O) Operations procedure to ensure crew awareness of aircraft altitude, performance, and terrain clearance at all times.
34-21-B-1)-a)	(O) Operations procedure to ensure crew awareness with inoperative modes.
34-21-B-1)-d)	(O) Operations procedure to ensure crew awareness with Advisory Callouts inoperative.
34-21-B-1)-e)	(O) Operations procedure to ensure crew awareness including a review of windshear avoidance and recovery procedures.
34-21-C-1)	(O) Operations procedure to ensure crew awareness of aircraft altitude, performance, and terrain clearance at all times.
34-27	(O) Operations procedure to verify aircraft has operable Flight Director Mode displays on a PFD or EADI, and mode verification procedures.

34-28-1)	(O) Operations procedure to verify status and suitability of Navigation Facilities used to define route of flight.
35-3	(M) Maintenance procedure to fill bottle and determine there are no leaks.
38-1	(M) Maintenance procedure to deactivate or isolate system, and to verify there are no leaks. (M) Maintenance procedure to drain the system, and ensure the system is not serviced.
38-2	(M) Maintenance procedure to deactivate or isolate system, and to verify there are no leaks.
52-1-1)	(O) Operations procedure to physically check door(s).
52-2-1)	(O) Operations procedure to physically check door.
52-4-1)	(O) Operations procedure to physically check door.
52-4-2)	(O) Operations procedure to perform preflight through other door.
52-4-4)	(O) Operations procedure to physically check door.
52-5-1)	(O) Operations procedure to verify entry step support cables or chains will not interfere with door operation, and ensure safe entry/egress.
52-6	(O) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
52-7	(O) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
52-8	(O) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
52-9	(O) (pressurized) Operations procedure to verify door seal inflates. (O) (unpressurized) Operations procedure to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.
52-10	(O) Operations procedure to physically check door.
78-1	(M) Maintenance procedure to secure the appropriate thrust reverser.

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

MASTER MINIMUM EQUIPMENT LIST

AIRCRAFT: CE-500 | REVISION NO: 9 DATE: 07/17/2007 | PAGE NO: 21-1

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
21 AIR CONDITIONING				
1 Air Cycle Machine	C	1	0	(O) May be inoperative provided: a) Flight is conducted unpressurized, b) Cabin Pressurization Source Selector remains OFF and c) Aircraft is operated at 10,000 feet MSL or below.
2 Flow Control and Shutoff Valves	C	2	1	(O) One may be inoperative provided: a) Cabin Pressurization Source Selector remains on the opposite source, b) Failed Flow Control and Shutoff Valve is verified CLOSED and c) Flight is conducted at FL 250 or below.
	C	2	0	(M) (O) May be inoperative provided: a) Flight is conducted unpressurized, b) Both Flow Control and Shutoff Valves are verified CLOSED, c) Cabin Pressurization Source Selector remains OFF and d) Aircraft is operated at 10,000 feet MSL or below.
3 Emergency Pressurization Valve	C	1	0	May be inoperative provided: a) Aircraft is operated at FL 250 or below, b) Air Cycle Machine is operative and c) Both L and R bleed sources are operative. (Continued)

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

MASTER MINIMUM EQUIPMENT LIST

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
21 AIR CONDITIONING				
3. Emergency Pressurization Valve (cont'd)	C	1	0	(O) May be inoperative provided: a) Flight is conducted unpressurized, b) Cabin Emergency Dump is operative and selected to Dump, c) Aircraft is operated at 10,000 feet MSL or below, d) Cabin Altitude is set above 10,000 feet MSL and e) Cabin Rate is set to maximum.
4. Ground Flow Control Valve (500, 501, 550, S550, 551, 560 units 0001 - 0538)	C	1	0	(O) May be inoperative provided: a) Ground Flow Control Valve is verified CLOSED and b) Bleed Air GND is not used.
5. Cabin Pressurization System	C	1	0	(O) May be inoperative provided: a) Flight is conducted unpressurized, b) Cabin Emergency Dump is operative and selected to Dump, c) Aircraft is operated at 10,000 feet MSL or below, d) Cabin Altitude is set above 10,000 feet MSL and e) Cabin Rate is set to maximum.
1) Auto-Schedule Mode (550 units 0801 and on, 560 units 0539 - 5000)	C	1	0	May be inoperative provided: a) Isobaric Control Mode is operative, b) Manual Control Mode is operative, c) Cabin Altimeter is operative, d) Cabin Rate Indicator is operative and e) Aircraft is operated at FL 410 or below. (Continued)

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

MASTER MINIMUM EQUIPMENT LIST

AIRCRAFT: CE-500 | REVISION NO: 9 DATE: 07/17/2007 | PAGE NO: 21-3

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
21 AIR CONDITIONING				
5. Cabin Pressurization System (cont'd)				
2) Isobaric Mode (550 units 0801 and on, 560 units 0539 - 5000)	C	1	0	May be inoperative provided: a) Auto-Schedule Mode is operative, b) Manual Cabin Pressure Control System is operative, c) Cabin Differential Pressure Gauge is operative, d) Cabin Altimeter is operative, e) Cabin Rate Indicator is operative and f) Aircraft is operated at FL 410 or below.
3) Manual Control Mode (550 units 0801 and on, 560 units 0539 - 5000)	C	1	0	(O) May be inoperative provided: a) Flight is conducted unpressurized, b) Cabin Emergency Dump is operative and selected to Dump, c) Aircraft is operated at 10,000 feet MSL or below, d) Cabin Altitude is set above 10,000 feet MSL and e) Cabin Rate is set to maximum.
6. Emergency Dump Valve				DELETED, REVISION 6. (continued)

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

MASTER MINIMUM EQUIPMENT LIST

AIRCRAFT: CE-500 | REVISION NO: 9 DATE: 07/17/2007 | PAGE NO: 21-4

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
21 AIR CONDITIONING				
7. Cabin Differential Pressure Gauge	C	1	0	(O) May be inoperative provided: a) Flight is conducted unpressurized, b) Cabin Emergency Dump is operative and selected to Dump, c) Aircraft is operated at 10,000 feet MSL or below, d) Cabin Altitude is set above 10,000 feet MSL and e) Cabin Rate is set to maximum.
(500, 501, S550, 551, 550 units 0001 - 0800, 560 units 0001 - 0538)	C	1	0	(O) May be inoperative provided: a) All other components of the pressurization system are operative, b) The Cabin Altitude Selector is set not to exceed maximum differential pressure and c) A Chart is provided and used to convert cabin and aircraft altitude to differential pressure.
(550 units 0801 and on, 560 units 0539 - 5000)	C	1	0	(O) May be inoperative provided: a) All other components of the pressurization system are operative and b) A Chart is provided to convert cabin and aircraft altitude to differential pressure.
8. Cabin Altitude Warning System	C	1	0	(O) May be inoperative provided aircraft is operated at 10,000 feet MSL or below.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
21 AIR CONDITIONING				
9. Cabin Vertical Speed or Cabin Rate Indicator	C	1	0	(O) May be inoperative provided: a) Flight is conducted unpressurized, b) Cabin Emergency Dump is operative and selected to Dump, c) Aircraft is operated at 10,000 feet MSL or below, d) Cabin Altitude is set above 10,000 feet MSL and e) Cabin Rate is set to maximum.
	C	1	0	May be inoperative provided all other components of the pressurization system are operative.
10. Cabin Altimeter	C	1	0	(O) May be inoperative provided: a) Flight is conducted unpressurized, b) Cabin Emergency Dump is operative and selected to Dump, c) Aircraft is operated at 10,000 feet MSL or below, d) Cabin Altitude is set above 10,000 feet MSL and e) Cabin Rate is set to maximum.
	C	1	0	May be inoperative provided all other components of the pressurization system are operative.
11. Automatic Cabin Air Temperature Control System	C	1	0	May be inoperative provided Manual Cabin Air Temperature Control System is operative.
12. Manual Cabin Air Temperature Control System	C	1	0	May be inoperative provided Automatic Cabin Air Temperature Control System is operative.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
21 AIR CONDITIONING				
13. Bleed Air GND or Bleed Air GND/HI Annunciator (500, 501, 550, S550, 551, 560 units 0001 - 0538)	C	1	0	May be inoperative provided Bleed Air GND or Bleed Air GND/HI is not used.
14. Emergency Pressurization Annunciator				
(500, 501, 550, S550, 551, 560 units 0001 - 0538)	C	1	0	(M) May be inoperative provided the Emergency Pressurization System is verified operative prior to each flight.
(560 units 0539 - 5000)	C	1	0	(O) May be inoperative provided the Emergency Pressurization System is verified operative prior to each flight.
15. AIR DUCT O'HEAT Annunciator	C	1	0	(O) May be inoperative provided: a) Cabin Pressurization Source Selector switch remains OFF, b) Flight is conducted unpressurized and c) Aircraft is operated at 10,000 feet MSL or below.
16. Door Seal Pressurization Regulator				DELETED, REVISION 6.
17. Overhead Cabin Blower	C	1	0	
18. *** Freon Air Conditioning System	C	1	0	(M) May be inoperative provided Freon Air Conditioning System is deactivated.
19. *** ACM EJECTOR ON Annunciator	C	1	0	May be inoperative provided the Pressurization Source Selector remains OFF during ground operations.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
21 AIR CONDITIONING				
20. PRECOOL FAIL *** Annunciator	C	2	1	One may be inoperative provided: a) Pressurization Source Selector remains on the opposite source and b) Flight is conducted at FL 250 or below.
	C	2	0	(O) May be inoperative provided: a) Flow Control Valves are verified CLOSED, b) Cabin Pressurization Source Selector remains OFF, c) Flight is conducted unpressurized and d) Aircraft is operated at 10,000 feet MSL or below.
21. Cabin Temperature *** Indicator	C	1	0	
22. Cabin Door Secondary Seal (550 units 0801 and on, 560)				DELETED, REVISION 8. Moved to ATA Ch 52 - DOORS.
23. Cabin Door Primary Seal (550 units 0801 and on, 560)				DELETED, REVISION 8. Moved to ATA Ch 52 - DOORS.
24. Outflow Valves	C	2	0	(M) (O) Both may be inoperative provided: a) At least one valve is secured OPEN, b) Aircraft is operated unpressurized and c) Aircraft is operated at 10,000 feet MSL or below.
25. Pilot Gaspers (WEMACs)	C	-	0	

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
22 AUTO FLIGHT				
1. Autopilot	B	1	0	May be inoperative provided: a) Enroute operations do not require its use, b) Approach minimums do not require its use and c) Aircraft is operated using a minimum crew of two. NOTE: RVSM is not authorized.
2. Yaw Damper	B	1	0	May be inoperative provided Autopilot is considered inoperative. NOTE: RVSM is not authorized.
3. Go-Around Button(s)	C	-	1	May be inoperative for pilot not flying.
	C	-	0	May be inoperative provided: a) Flight Director is not used during a go-around and b) Autopilot is disconnected for go-around. NOTE: FMS Missed Approach Procedure must be activated via the FMS CDU.
4. Autopilot Disconnect Yoke Switches	C	2	1	One may be inoperative provided: a) The autopilot is not used below 1500 feet AGL and b) Approach minimums do not require the use of the autopilot.
	B	2	0	May be inoperative provided Autopilot is not used and is considered inoperative. NOTE: RVSM is not authorized.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
22 AUTO FLIGHT				
5 Autopilot/Flight Director Touch Control Steering (TCS) or SYNC Switches	C	2	0	
6 Flight Director Mode Select Panel Functions	B	-	0	Individual functions may be inoperative provided procedures do not require their use.
7 Course Selector Knob(s)	B	2	1	One may be inoperative for the pilot not flying.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
23 COMMUNICATIONS				
1. VHF Communications System	C	-	-	Any in excess of those required by FAR may be inoperative provided it is: a) Not powered by any Emergency Bus and b) Not required for emergency procedures.
2. Copilot's Audio Control Panel	C	1	0	May be inoperative for operations not requiring a second in command.
3. Passenger Address (PA) System				
1) Passenger Configuration	C	1	0	(O) May be inoperative provided: a) PA not required by FAR and b) Alternate, normal and emergency procedures, and/or operating restrictions are established and used. NOTE: Any station function (s) that operates normally may be used.
2) Cargo Configuration	D	1	0	
4. *** Electronic Checklist System	D	1	0	(O) May be inoperative provided equivalent checklists are available and used.

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
23 COMMUNICATIONS				
5. *** Cockpit Voice Recorder (CVR) System (With Flight Data Recorder (FDR) Installed)	A	1	0	May be inoperative provided: a) Flight Data Recorder (FDR) operates normally and b) Repairs are made within three flight days.
*** Cockpit Voice Recorder (CVR) (No Flight Data Recorder Installed)	A	1	0	May be inoperative provided repairs are made within three flight days.
*** Cockpit Voice Recorder (CVR) (For operators other than a holder of an Air Carrier or Commercial Operator)	A	1	0	May be inoperative provided repairs are made in accordance with applicable FARs.
6. Boom Microphones				
(COCKPIT VOICE RECORDER WITH FLIGHT DATA RECORDER INSTALLED)				
1) Cockpit Voice Recorder Equipped to Record Boom Microphones per FAR 135.151(d)	A	-	0	May be inoperative provided: a) Flight Data Recorder (FDR) operates normally and b) Repairs are made within three flight days.
2) *** Cockpit Voice Recorder not Equipped to Record Boom Microphone	D	-	0	Any in excess of those required by FAR may be inoperative. (Continued)

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
23 COMMUNICATIONS				
6. Boom Microphones (cont'd)				
(COCKPIT VOICE RECORDER WITHOUT FLIGHT DATA RECORDER INSTALLED)				
1) Cockpit Voice Recorder Equipped to Record Boom Microphones per FAR 135.151(d)	A	-	0	May be inoperative provided repairs are made within three flight days.
2) *** Cockpit Voice Recorder Not Equipped to Record Boom Microphone	D	-	0	Any in excess of those required by FAR may be inoperative.
7. *** Radio Management Unit (RMU)	C	2	1	(O) One may be inoperative provided: a) Remaining RMU operates normally and b) Auxiliary Com/Nav Control Display Unit is verified to operate normally.
8. Static Wicks	C	-	-	One may be missing or broken from each of the following areas, not to exceed a total of three: a) Right wing, wingtip, or aileron (560 units 0539 - 5000 wingtip only), b) Left wing, wingtip, or aileron (560 units 0539 - 5000 wingtip only) and c) Vertical stabilizer, stinger, or rudder (560 units 0539 - 5000 stinger only).
1) *** AFIS Antenna Static Wick	C	1	0	May be missing or broken.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
23 COMMUNICATIONS				
9. Automatic Cabin Briefer ***	D	1	0	May be inoperative provided passengers are briefed by alternate means.
10. Airborne Flight Information Systems (VHF or SATCOM Data Link, XM / NEXRAD / Satellite Weather) ***	D	-	0	
11. Flight Phone ***	D	1	0	
12. Cockpit Speakers	C	2	1	One may be inoperative provided a headset is installed, operative, and used for the affected side.
13. High Frequency (HF) Communications Systems ***	D	-	-	Any in excess of those required by FAR may be inoperative.
	C	-	1	(O) May be inoperative while conducting extended overwater operations that require two LRCS provided: a) SATCOM (High or Low Gain) Data Link and ACARS operate normally and b) SATCOM coverage exists for the intended route of flight.
14. Hand Held Microphone	C	2	0	May be inoperative provided an associated headset microphone is operative and used.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
23 COMMUNICATIONS				
15. Radio Package Cooling Fan (Com/NAV/ XSPDR) (550 units 0801-1136) ***				
1) Fan 1	B	1	0	May be inoperative provided Fan 2 FAIL annunciator and fan is operative.
2) Fan 1 Fail Annunciator	C	1	0	(O) May be inoperative provided Fan 1 and Fan 2 are verified operative.
16. Emergency Locator Transmitter (ELT)				
1) Survival type ELTs	D	-	-	Any in excess of those required by FAR may be inoperative or missing.
2) Fixed ELTs	A	-	0	May be inoperative or missing provided repairs are made within 90 days.
	D	-	-	Any in excess of those required by FAR may be inoperative or missing.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
24 ELECTRICAL POWER				
1. D.C. Ammeters	C	2	1	One may be inoperative.
2. Avionics A.C. Power Inverters (All except: 560 units 0751 - 5000).	C	2	1	(M) One may be inoperative provided: a) Inoperative inverter is deactivated, b) Flight is not conducted at night and c) Aircraft is operated in VMC only.
3. BATT O'HEAT or BATT O'TEMP Annunciator	D	1	0	May be inoperative provided aircraft is equipped with a Lead Acid Battery.
4. *** Battery Temperature Indicator	C	1	0	
5. *** Ground Power Dispatch Switch	D	1	0	
6. External Power Receptacle	C	1	0	

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
25 EQUIPMENT/ FURNISHINGS				
1. Flotation Equipment (Crew and Passenger)	D	-	0	Any in excess of those required by FAR may be inoperative or removed.
2. Passenger Seats	C	-	-	May be inoperative provided: a) Seat does not block an Emergency Exit, b) Seat does not restrict any passenger from access to the main aisle and c) The affected seat(s) are blocked and placarded "DO NOT OCCUPY". NOTE 1: A seat with an inoperative seatbelt is considered inoperative. NOTE 2: Affected seat(s) may include the seat(s) behind and/or adjacent seat(s).
1) Recline Mechanism	C	-	-	May be inoperative and seat occupied provided seat is secure in the upright position.
2) Underseat Baggage Restraining Bars	C	-	-	DELETED, REVISION 8.
3) Armrests	C	-	-	May be inoperative or missing and the seat occupied provided: a) Armrest does not block an Emergency Exit, b) Armrest does not restrict any passenger from access to the main aircraft aisle and c) For an armrest with a recline mechanism, seat is secure in the upright position.
4) Tracking Mechanism	C	-	-	May be inoperative provided seat is failed outboard, and is positioned to have no affect on emergency egress.

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
25 EQUIPMENT/ FURNISHINGS				
3. Passenger Seat Ashtray				DELETED, REVISION 6.
4. Crewmember Shoulder Harnesses	B	-	-	Right side may be inoperative provided seat is not occupied.
5. Aircraft Emergency Locator Transmitter (ELT)				DELETED, REVISION 9. Moved to ATA 23 item 16.
6. Passenger Convenience / NEF Items				
1) Passenger Convenience Items (Expires on December 31, 2007)		-	0	Passenger Convenience Items, as expressed in this MMEL, are those related to passenger convenience, comfort or entertainment such as, but not limited to, galley equipment, movie equipment, ash trays, stereo equipment, overheard reading lamps. Items addressed elsewhere in this document shall not be included. (M) and (O) procedures may be required and included in the air carrier's appropriate document. NOTE: Exterior lavatory ash trays are not considered convenience items.
2) Non-Essential Equipment and Furnishings (NEF)		-	0	May be inoperative, damaged, or missing provided that the item(s) is deferred in accordance with the operator's NEF deferral program. The NEF program, procedures, and processes are outlined in the operator's (insert name) Manual. (M) and (O) procedures, if required, must be available to the flight crew and included in the operator's appropriate document. NOTE: Exterior lavatory door ash trays are not considered NEF items.

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
25 EQUIPMENT/ FURNISHINGS				
7. Cockpit Sunvisors	D	2	0	May be inoperative provided the sunvisor(s) can be stowed in a manner that: a) Does not obstruct the pilot's field of view for takeoff and landing and b) Does not impede the quick-donning capability of the oxygen masks.
8. Emergency Medical Equipment				
1) Automatic External Defibrillator (AED) and/or Associated Equipment	A	-	0	(O) May be incomplete, missing or inoperative provided: a) AED is resealed in a manner that will identify it as a unit that can not be mistaken for a fully serviceable unit and b) Repairs or replacements are made within three flight cycles.
	D	-	-	Any in excess of those required by FAR may be incomplete, missing or inoperative.
2) Emergency Medical Kit (EMK) and/or Associated Equipment	A	-	0	(O) May be incomplete, missing or inoperative provided: a) EMK is resealed in a manner that will identify it as a unit that can not be mistaken for a fully serviceable unit and b) Repairs or replacements are made within three flight cycles.
	D	-	-	Any in excess of those required by FAR may be incomplete, missing or inoperative. (Continued)

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25 EQUIPMENT/ FURNISHINGS				
8. Emergency Medical Equipment (cont'd)				
3) First Aid Kit (FAK) and/or Associated Equipment	A	-	-	(O) If more than one is required by FAR, only one of the required first aid kits may be incomplete, missing or inoperative provided: a) FAK is resealed in a manner that will identify it as a unit that can not be mistaken for a fully serviceable unit and b) Repairs or replacements are made within three flight cycles.
	D	-	-	Any in excess of those required by FAR may be incomplete, missing, or inoperative.
9. *** Emergency Vision Assurance System (EVAS)	C	-	0	
10. Yoke Mounted Chart Holders	C	2	0	
11. Pilot and/or Copilot Seat				
1) Vertical Adjustment	C	2	0	May be inoperative provided: a) Affected seat has failed in a position that permits pilot normal visibility, b) Full flight control movement is available and c) The crewmember can reach all necessary controls and equipment. (Continued)

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25 EQUIPMENT/ FURNISHINGS				
11. Pilot and/or Copilot Seat (cont'd)				
2) *** Lumbar Support	C	2	0	
3) Armrest	C	-	0	May be inoperative provided affected armrest is stowed in the retracted position.
4) *** Recline / Tilt Function	C	2	0	May be inoperative provided: a) Affected seat has failed in a position that permits pilot normal visibility, b) Full flight control movement is available and c) The crewmember can reach all necessary controls and equipment.
5) *** Thigh Support	C	2	0	May be inoperative provided full flight control movement is available.
12. Required Documents Holder (Registration, Airworthiness Certificate etc.)	C	1	0	(O) May be missing or inoperative provided an alternate means of securing and displaying the documents is used.
13. Pilot or Copilot Eye Locator	C	2	0	(O) May be inoperative or missing provided alternate procedures are established and used.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
26 FIRE PROTECTION				
1. Portable Fire Extinguishers	D	-	-	Any in excess of those required by FAR may be inoperative or missing provided: a) The inoperative fire extinguisher is tagged inoperative, removed from the installed location and placed out of sight so it can not be mistaken for a functional unit, and b) Required distribution is maintained.
2. Fuselage Fire *** Extinguishing System (Total Flood)				DELETED, REVISION 9.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
27 FLIGHT CONTROLS				
1. Electric Trim	B	1	0	(M) May be inoperative provided: a) Electric Trim System is deactivated and b) Autopilot is considered inoperative. NOTE: RVSM is not authorized.
2. Angle of Attack System	C	1	0	DELETED, REVISION 9. Moved to ATA 31 item 5.
3. Angle of Attack Indicator	C	1	0	DELETED, REVISION 9. Moved to ATA 31 item 5.
4. Flap/Trim Interconnect System (S550, 552, 560)				DELETED, REVISION 9.
5. Control Lock T-Handle	C	1	0	(M) May be inoperative provided the system is secured unlocked. NOTE: Appropriate measures should be taken to prevent damage from gusts while on the ground.
6. Rudder Pedal Adjustment System	C	4	0	May be inoperative provided full control movement and brake application is available.
7. Trim and Flap Position Indicator Tips (All except 560 units 0751 - 5000)	C	4	0	(M) May be missing provided alternate means of marking pointer is established and used.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
27 FLIGHT CONTROLS				
8. Left Aileron - Electrical Bonding Strap (560) Expires December 31, 2008 without CDL approval.	B	3	2	No more than one bonding strap may be broken or missing.
9. Right Aileron - Electrical Bonding Strap (560) Expires December 31, 2008 without CDL approval.	B	3	2	No more than one bonding strap may be broken or missing.

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28 FUEL				
1. Fuel Quantity Indicating Systems	B	2	1	(O) One may be inoperative provided: a) Fuel Tanks are completely filled with fuel for first flight of the day and any subsequent refueling, b) Fuel cross-feed operation is restricted to emergency use only, c) FMS Fuel Used function or Fuel Remaining Indicator is operative, d) Fuel Low Level Indicating System is operative on the affected side and e) Fuel quantity is determined and tracked by other acceptable means.
2. Fuel Low Level Indicating System	B	2	1	Both Fuel Quantity Indicating Systems are operative.
3. *** Fuel Remaining / Fuel Used Indicating System	C	1	0	May be inoperative provided both Fuel Quantity Indicating Systems are operative.
4. *** Single Point Refueling System	C	1	0	
5. L/R Fuel Temperature Indication (560 unit 0539 - 5000)	C	2	1	
6. *** Pressure Refueling/Defueling Adaptor (Dust Cap or Lanyard) (Expires December 31, 2008 without CDL approval)	C	1	0	(O) May be inoperative or missing provided a) Refueling receptacle is visually checked for contamination prior to each refueling and b) No leakage can be detected after each fueling is complete.

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29 HYDRAULIC POWER				
1. Low Hydraulic Fluid Annunciator / Light	C	1	0	(O) May be inoperative provided adequate fluid level is verified before each flight.
2. LO HYD FLOW L/R / HYD FLOW LOW LH/RH Annunciator	C	2	1	(O) May be inoperative provided: a) Adequate fluid level is verified before each flight and b) Hydraulic system operation is verified with only the associated side engine operating.

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30 ICE AND RAIN PROTECTION				
1. Engine Anti-ice Systems	C	2	1	One may be inoperative provided: a) Aircraft is not operated in visible moisture with the static air temperature less than +10 degrees C and b) Aircraft is not operated in known or forecast icing conditions.
1) Engine Anti-Ice Valves	C	2	1	One may be inoperative provided: a) Engine Anti-Ice Valve remains OPEN and b) Takeoff and Landing field temperatures are not in excess of +10 degrees C. NOTE: See AFM Performance Data.
2) ENG ANTI-ICE Annunciators	C	2	1	One may be inoperative provided: a) Aircraft is not operated in visible moisture with the static air temperature less than +10 degrees C and b) Aircraft is not operated in known or forecast icing conditions.
2. Windshield Anti-Ice Systems	C	2	1	One may be inoperative provided: a) Flight is not conducted in known or forecast icing conditions and b) Left windshield anti-ice system must be operative for single pilot operations.
3. Windshield Alcohol System	C	1	0	May be inoperative provided flight is not conducted in known or forecast icing conditions.

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30 ICE AND RAIN PROTECTION				
4. Rain Removal Systems	C	2	0	May be inoperative provided flight is not conducted in precipitation within 5 nautical miles of the airport for takeoff or intended landing.
5. Pitot Heaters	B	-	-	One may be inoperative provided: a) Flight is not conducted in known or forecast icing conditions, b) Flight is not conducted at night and c) Aircraft is not operated in visible moisture. NOTE: RVSM is not authorized.
6. Pitot Heaters (Pilot, Co-Pilot, and Standby) (550 units 0801 - 1136, 560 units 0260 - 5000)				DELETED, REVISION 9. Combined with ATA 30 item 5.
7. Static Pressure Port Heaters (Pilot, Co-Pilot, & Standby) (550 units 0801 - 1136, 560 units 0260 - 5000)				DELETED, REVISION 9. Combined with ATA 30 item 8.
8. Static Pressure Port Heaters	B	-	-	One may be inoperative provided: a) Flight is not conducted in known or forecast icing conditions, b) Flight is not conducted at night and c) Aircraft is not operated in visible moisture. NOTE: RVSM not authorized.

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30 ICE AND RAIN PROTECTION				
9. Wing and Tail De-Ice or Anti-Ice Systems				
1) Pneumatic De-Ice Systems (500, 501, 550, 551, 560)	C	-	0	May be inoperative provided: a) Aircraft is not operated in visible moisture with a static air temperature less than +10 degrees C and b) Aircraft is not operated in known or forecast icing conditions.
2) Surface Anti-Ice Pumps (S550)	C	2	1	One may be inoperative provided: a) Aircraft is not operated in visible moisture with a static air temperature less than +10 degrees C and b) Aircraft is not operated in known or forecast icing conditions.
3) Wing Electrical Systems (500, 501, 550, 551)	C	2	1	One may be inoperative provided: a) Aircraft is not operated in visible moisture with a static air temperature less than +10 degrees C and b) Aircraft is not operated in known or forecast icing conditions.
4) Surface Anti-Ice Pumps (S550 and 552)				DELETED, REVISION 7a. Moved to ATA 30 item 9-2).
5) Wing Bleed Air Anti-Ice Systems (560 units 0539 - 5000)	C	2	0	May be inoperative provided: a) Aircraft is not operated in visible moisture with a static air temperature less than +10 degrees C and b) Aircraft is not operated in known or forecast icing conditions. (Continued)

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30 ICE AND RAIN PROTECTION				
9. Wing and Tail De-Ice or Anti-Ice Systems (cont'd)				
5) Wing Bleed Air Anti-Ice Systems (560 units 0001 - 0538)	C	2	1	One may be inoperative provided: a) Aircraft is not operated in visible moisture with a static air temperature less than +10 degrees C and b) Aircraft is not operated in known or forecast icing conditions.
6) WING ANTI-ICE Annunciators (560 units 0539 - 5000)	C	2	1	One may be inoperative provided: a) Aircraft is not operated in visible moisture with a static air temperature less than +10 degrees C and b) Aircraft is not operated in known or forecast icing conditions.
10. Pitot/Static Heater Off Annunciators	B	-	0	(O) May be inoperative provided: a) All other components of the Pitot Heat system are verified operative before each takeoff and b) Aircraft is not operated in known or forecast icing conditions.

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30 ICE AND RAIN PROTECTION				
11. Ice Detection Systems				
1) *** Windshield Ice Detection Systems (Glareshield Mounted Stalk Lights)				DELETED REVISION 9. Moved to ATA 33 item 22.
2) Surface Ice Detection System (S550)	B	1	0	May be inoperative provided flight is not conducted at night in known or forecast icing conditions.
12. Angle of Attack Probe / Vane Heater	C	-	0	May be inoperative provided: d) Flight is not conducted at night, a) Aircraft is operated in VMC only and b) Aircraft is not operated in known or forecast icing conditions.
13. Drain Mast Heaters	C	-	0	(O) May be inoperative provided: a) Associated basins are not used and b) Any remaining ice or liquid is removed from the basins.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
31 INDICATING/ RECORDING SYSTEMS				
1. Flight Data Recorder *** (FDR) System	C	-	-	Any in excess of those required by FAR may be inoperative.
	A	-	0	May be inoperative provided: a) Cockpit Voice Recorder (CVR) operates normally, b) Airplane is not dispatched from a designated airport as listed in the operator's MEL unless: 1. The FDR failure occurs after pushback but prior to takeoff, or 2. The FDR repair was attempted but was not successful. c) In those cases where repair is attempted but not successful, the aircraft may be dispatched on a flight or series of flights until the next designated airport, where repair must be accomplished prior to dispatch and d) Repairs are made within three flight days.
FDR Recording Parameters Required by FAR	A	-	-	May be inoperative provided: a) CVR operates normally and b) Repairs are made within 20 calendar days.
FDR Recording Parameters Not Required by FAR	A	-	-	May be inoperative provided repairs are made prior to the completion of the next heavy maintenance visit. (Continued)

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31 INDICATING/ RECORDING SYSTEMS				
1. Flight Data Recorder *** (FDR) System (cont'd)				
FLIGHT DATA RECORDER (FDR) INSTALLED FOR OTHER THAN AIR CARRIER OR COMMERCIAL OPERATOR				
Flight Data Recorder (FDR) System	C	-	1	Any in excess of those required by FAR may be inoperative.
	A	-	0	May be inoperative provided repairs are made in accordance with applicable FARs.
2. Clocks	C	-	-	As required by FAR.
3. Flight Hour Meter	C	1	0	(O) May be inoperative provided flight time is recorded by other means.
4. N1 Reminder (Mechanical and Electric) All except: (560 units 0751 - 5000)	D	1	0	

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
31 INDICATING/ RECORDING SYSTEMS				
5. Angle of Attack (AOA) System				
1) Angle of Attack Indicator (500,501, 550 units 0001 - 0800, 551)	C	1	0	
2) Angle of Attack Indicator (S550, 552, 560, 550 units 0801 - 1136)	C	1	0	May be inoperative provided the Stall Warning (Stick Shaker) System is operative.
3) *** Angle-of-Attack (AOA) Indexer	C	1	0	
6. Angle-of-Attack (AOA) Indexer				DELETED REVISION 9. Moved to ATA 31 item 5-3).
7. Master Caution Lights (550 units 0801 - 1136, 560 units 0539 - 5000)	C	2	1	Left side must be operative for single pilot operations.
8. Master Warning Lights	C	2	1	Left side must be operative for single pilot operations.
9. Master Caution Reset Function (550 units 0801 - 1136, 560 units 0539 - 5000)	C	2	1	Left side must be operative for single pilot operations.
10. Master Warning Reset Function	C	2	1	Left side must be operative for single pilot operations.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
32 LANDING GEAR				
1. *** Power Brake System (500,501)				DELETED, REVISION 9.
2. *** Anti-Skid System (All except: 560 units 0539 - 5000)	C	1	0	NOTE: See AFM Abnormal Procedures and Section IV.
3. *** Skid Warning System (500 & 501)	C	1	0	
4. Nose Gear Spade Door - Electrical Bonding Straps (500) (Expires December 31, 2008 without CDL approval)	B	2	1	
5. Nose Gear Doors- Electrical Bonding Straps (550, S550, 560) (Expires December 31, 2008 without CDL approval)	B	2	0	
6. Main Gear Doors Electrical Bonding Straps (550, S550, 560) (Expires December 31, 2008 without CDL approval)	B	2	0	

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
33 LIGHTS				
1. Anti-Collision Light System	C	1	0	May be inoperative provided aircraft is not operated at night.
2. Position Lights	C	3	0	May be inoperative provided aircraft is not operated at night.
3. Wing Inspection Light				
Aircraft equipped with Pneumatic Wing De-ice Boots (500, 501, 550, 551, 560 units 0001-0538)	C	-	0	May be inoperative provided: a) Aircraft is not operated in known or forecast icing conditions at night, b) A portable lamp / light of adequate capacity for wing and / or control surface inspection is available for night operations and c) Ground deicing procedures do not require their use.
Aircraft not equipped with Pneumatic Wing De-ice Boots (S550, 560 units 0539 - 5000)	C	-	0	May be inoperative provided: a) Aircraft is not operated in known or forecast icing conditions at night and b) Ground deicing procedures do not require their use.
	C	-	1	May be inoperative provided: a) Ground deicing procedures do not require their use and b) The left light must be operative for single pilot operations.

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
33 LIGHTS				
4. Cockpit/Flight Deck/Flight Compartment and Instrument Lighting System	C	-	-	Individual lights may be inoperative provided remaining lights are: a) Sufficient to clearly illuminate all required instruments, controls, and other devices for which it is provided, b) Positioned so that direct rays are shielded from flight crewmembers eyes and c) Lighting configuration and intensity is acceptable to the flight crew.
5. Landing Lights				
1) Main Gear Mounted Landing Lights	C	2	0	May be inoperative provided aircraft is not operated at night.
2) Wingtip Mounted Landing Lights	C	2	0	May be inoperative provided aircraft is not operated at night.
	C	2	1	One may be inoperative for night operations provided the aircraft is equipped with Main Gear Mounted Landing / Taxi Lights and the associated Main Gear Mounted Landing Light is operative.
6. Main Gear Mounted Taxi Lights (550 units 0801 - 1136, 560 units 0260 - 5000)	C	2	0	May be inoperative provided aircraft is not operated at night.
	C	2	1	One may be inoperative for night operations provided the Wing Tip Mounted Landing Light on the associated side is operative.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
33 LIGHTS				
7. Fasten Seat Belt and No Smoking Signs	B	1	0	(O) May be inoperative provided: a) Passenger Address System is operative and b) Alternate procedures for notifying passengers are established and used.
	B	1	0	May be inoperative provided no passengers are carried.
8. Strobe Light System *** (Supplemental System)	C	1	0	
9. Master Warning Lights				DELETED, REVISION 8. Moved to ATA 31 item 8.
10. Recognition Lights ***	C	2	0	
11. Logo Lights ***	C	2	0	
12. Ground Recognition Light (Flashing Beacon)	C	1	0	May be inoperative provided aircraft is not operated at night.
13. Tail Cone Lights	C	-	0	
14. Nose Baggage Compartment Light	C	1	0	
15. Exterior Emergency *** Lighting System	C	1	0	May be inoperative provided aircraft is not operated at night.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
33 LIGHTS				
16. Cabin Dropped Aisle *** Lighting System	C	-	-	
17. Pulselite System ***	D	1	0	
18. Tail Mounted Position Lights				DELETED, REVISION 9. Combined with ATA 33 item 2.
19. Cabin Interior Lighting System Lights (including Cabin Indirect Lighting System and Cabin Reading Lights)	C	-	-	(O) Individual lights may be inoperative provided: a) Cabin Emergency lighting is verified operative and b) Sufficient lighting is operative for the crew to perform required duties.
20. Light Sources for Exit Signs (LED)	C	23	7	
21. Light Sources for Exit Signs (Incandescent)	C	4	1	
22. Windshield Ice Detection *** System (Glareshield Mounted) Stalk Lights	B	2	1	(O) May be inoperative provided: a) Alternate procedures are established and used and b) Left side must be operative for single pilot operations.
	B	2	0	May be inoperative provided aircraft is not operated at night.

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
1. Turn and Slip Indication				
1) Mechanical Indicators	B	2	1	
2) Bezel Mounted Inclinometer	B	-	1	
2. *** Radio Magnetic Indicators (RMI)	C	2	-	May be inoperative provided: a) Affected instrument is a repeater of the HSI and b) Aircraft is not equipped with dual EFIS.
3. Standby Attitude Indicator (3rd Attitude Indicator)	C	1	0	DELETED, REVISION 8.
4. Distance Measuring Equipment (DME) Systems	D	-	-	As required by FAR.
5. Weather Radar System	C	1	-	As required by FAR.
6. Automatic Direction Finding (ADF) Systems	C	-	-	As required by FAR.
7. Marker Beacon Receiver Systems	C	2	-	May be inoperative provided approach procedures do not require their use.
8. ATC Transponders and Automatic Altitude Reporting Systems	B	-	0	May be inoperative provided: a) Enroute operations do not require its use and b) Prior to flight, approval is obtained from ATC facilities having jurisdiction over the planned route of flight. NOTE: RVSM is not authorized. (Continued)

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
8. ATC Transponders and Automatic Altitude Reporting Systems (cont'd)	D	-	1	Any in excess of those required by FAR may be inoperative.
9. Radio (VHF/UHF) Navigation Equipment (VOR/ILS)	C	-	-	As required by FAR.
10. Radio Altimeter Systems	A	-	0	May be inoperative provided: a) Approach minimums or operating procedures do not require its use, b) GPWS is considered inoperative, c) TCAS is considered inoperative and d) Repairs are made within two flight days.
11. *** Flight Director / Guidance Computer(s) (FDC/FGC) (Except 560 units 0751 - 5000)	B	-	0	May be inoperative provided: a) Approach Minimums do not require its use, and b) Indicators are retracted from view. NOTE: Autopilot may be inoperative. NOTE: RVSM is not authorized if Autopilot is inoperative.
12. Altitude Alerting System	A	1	0	(O) May be inoperative provided: a) Autopilot with altitude hold is operative, b) Enroute operations do not require its use, and c) Repairs are made within three flight days. NOTE: RVSM is not authorized.
1) Vertical Navigation System				DELETED, REVISION 9. Combined with ATA 34 item 28.

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
13. *** Global Positioning System (GPS)	C	-	-	Any in excess of those required by FAR may be inoperative.
14. *** TACAN	C	1	-	As required by FAR.
15. Outside Air Temperature Indicating System(s)	C	-	1	
16. Symbol Generators for Electronic Flight Instrument System (EFIS)				
1) 5 Tube System	C	3	2	(O) One may be inoperative provided: a) EFIS displays at pilot's and co-pilot's stations are operated from independent symbol generators, b) Alternate procedures are established and used and c) Enroute or approach procedures do not require use of the MFD.
2) 3 Tube System				
(550 units 0001 - 0733, 551, and S550)	C	2	1	(O) One may be inoperative provided: a) Alternate procedures are established and used and b) Enroute or approach procedures do not require use of the MFD. (Continued)

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
16. Symbol Generators for Electronic Flight Instrument System (EFIS) (cont'd)				
2) 3 Tube System (cont'd)				
(550 units 0801 - 1136)	B	2	1	One may be inoperative provided: a) Flight is not conducted at night and b) Aircraft is operated in VMC only.
(560 units 0001 - 0259)	C	2	1	(O) One may be inoperative provided: a) Alternate procedures are established and used and b) Enroute or approach procedures do not require use of the MFD.
(560 Units 0260 - 0750)	B	2	1	One may be inoperative provided: a) Flight is not conducted at night and b) Aircraft is operated in VMC only.
17. Electronic Flight Instrument System Multifunction Display (MFD)				
1) *** MFD installed with Honeywell EDZ-605 EFIS	C	1	0	(O)
2) Honeywell Primus 1000 EFIS System MFD	C	1	0	(O) May be inoperative provided the aircraft is operated by a crew of two. NOTE: The Traffic Alert Display System of TCAS will be unavailable. See ATA-34 item 19-3).

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
18. Vertical Speed Indicator	B	2	1	May be inoperative on the right side.
	B	2	0	May be inoperative on left side except for IFR passenger carrying operations.
19. Traffic Alert and Collision Avoidance System (TCAS I)	B	-	0	(M) May be inoperative provided: a) System is deactivated and secured and b) Enroute or approach procedures do not require its use.
	C	-	0	(M) May be inoperative provided: a) Not required by FAR, b) System is deactivated and secured and c) Enroute or approach procedures do not require its use.
Traffic Alert and Collision Avoidance System (TCAS II)	B	-	0	(M) May be inoperative provided: a) System is deactivated and secured and b) Enroute or approach procedures do not require its use.
	C	-	0	(M) May be inoperative provided: a) Not required by FAR, b) System is deactivated and secured and c) Enroute or approach procedures do not require its use.
1) Combined Traffic Alert (TA) and Resolution Advisory (RA) Dual Display	C	2	1	May be inoperative on the non-flying pilot side provided: a) TA and RA visual display is operative on the flying pilot side and b) TA and RA audio function is operative on flying pilot side. (Continued)

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
19. Traffic Alert and Collision Avoidance System (TCAS II) (cont'd)				
2) Resolution Advisory (RA) Display System(s)	C	2	1	May be inoperative on non-flying pilot side.
	C	-	0	(O) May be inoperative provided: a) Traffic Alert (TA) visual display and audio functions are operative, b) TA only mode is selected by the crew and c) Enroute or approach procedures do not require its use.
3) Traffic Alert Display System(s)	C	-	0	(O) May be inoperative provided: a) RA visual display and audio functions are operative and b) Enroute or approach procedures do not require its use.
4) Audio Functions	B	1	0	May be inoperative provided enroute or approach procedures do not require use of TCAS.
5) *** Airspace Selection Function	C	-	0	
20. Traffic Alert Collision Avoidance				DELETED, REVISION 6. Combined with ATA 31 item 19.

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34 NAVIGATION				
21. Terrain Awareness and Warning System (TAWS)				
A Class A TAWS Equipment Required				
1) Ground Proximity Warning System (GPWS)	A	1	0	(O) May be inoperative provided: a) Alternate procedures are established and used and b) Repairs are made within two flight days.
a) Modes 1 - 4	A	4	0	(O) May be inoperative provided: a) Alternate procedures are established and used and b) Repairs are made within two flight days.
b) Test Mode	A	1	0	May be inoperative provided: a) GPWS is considered inoperative and b) Repairs are made within two flight days.
c) Glideslope Deviations (Mode 5)	C	-	1	
	B	-	0	
d) Advisory Callouts	B	-	0	(O) May be inoperative provided alternate procedures are established and used.
	C	-	0	(O) May be inoperative provided: a) Advisory callout not required by FAR and b) Alternate procedures are established and used.
				(Continued)

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34 NAVIGATION				
21. Terrain Awareness and Warning System (TAWS) (cont'd)				
A Class A TAWS Equipment Required (cont'd)				
1) Ground Proximity Warning System (GPWS) (cont'd)				
e) *** Windshear Mode (Reactive)	B	1	0	(O) May be inoperative provided alternate procedures are established and used. NOTE: Operator's alternate procedures should include reviewing windshear avoidance and windshear recovery procedures.
	C	1	0	(O) May be inoperative provided: a) Alternate procedures are established and used and b) Windshear Detection and Avoidance System (Predictive) operates normally.
2) Terrain System-Forward Looking Terrain Avoidance (FLTA) and Premature Descent Alert (PDA) Functions	B	1	0	(O) May be inoperative provided alternate procedures are established and used.
3) Terrain Displays	C	-	1	
	B	-	0	
				(Continued)

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34 NAVIGATION				
21. Terrain Awareness and Warning System (TAWS) (cont'd)				
A Class A TAWS Equipment Required (cont'd)				
4) *** Runway Awareness and Advisory System (RAAS)	C	1	0	
B Class B TAWS Equipment Required				
1) Ground Proximity Warning System (GPWS)	A	1	0	(O) May be inoperative provided: a) Alternate procedures are established and used and b) Repairs are made within two flight days.
a) Modes 1 & 3	A	2	0	(O) May be inoperative provided: a) Alternate procedures are established and used and b) Repairs are made within two flight days.
b) Test Mode	A	1	0	May be inoperative provided: a) GPWS is considered inoperative and b) Repairs are made within two flight days.
c) *** Modes 2, 4 & 5	C	3	0	

(Continued)

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34 NAVIGATION)				
21. Terrain Awareness and Warning System (TAWS) (cont'd)				
B Class B TAWS Equipment Required (cont'd)				
1) Ground Proximity Warning System (GPWS) (cont'd)				
d) Advisory Callouts	B	-	0	(O) May be inoperative provided alternate procedures are established and used.
	C	-	0	(O) May be inoperative provided: a) Advisory Callouts not required by FAR and b) Alternate procedures are established and used.
e) *** Windshear Mode (Reactive)	C	1	0	(O) May be inoperative provided alternate procedures are established and used.
2) Terrain System-Forward Looking Terrain Avoidance (FLTA) and Premature Descent Alert (PDA) Functions	B	1	0	
3) *** Terrain Displays	C	-	0	
4) *** Runway Awareness & Advisory System (RAAS)	C	1	0	

(Continued)

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
21. Terrain Awareness and Warning System (TAWS) (cont'd)				
C Class C TAWS / GPWS Equipment				
1) TAWS / GPWS ***	C	1	0	(O) May be inoperative provided alternate procedures are established and used. NOTE: Any mode that operates normally may be used.
22. Storm Scope or Lightning Detector System ***	C	1	0	As required by FAR.
23. Air Data Computer (550 units 0801 - 1136, 560 units 0260 - 5000)	A	2	1	One may be inoperative for one flight day provided: a) Flight is not conducted at night and b) Aircraft is operated in VMC only. NOTE: RVSM is not authorized.
24. Heads Up Display (HUD) ***	C	-	0	

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
25. Moving Map Display ***	C	-	0	
26. SkyWatch Traffic Advisory System ***	C	1	0	
27. Flight Director Mode Selector Annunciations	C	-	0	(O) May be inoperative provided: a) Annunciation(s) is available to the crew on another display and b) Crew verifies annunciation(s) is appropriate to the function(s) selected.
28. Flight Management System (FMS) (All except 560 units 0751 - 5000)	C	-	-	Any in excess of those required by FAR may be inoperative provided functions are not required by other procedures.
1) Navigation Databases ***	C	-	-	(O) May be out of currency provided: a) Current Aeronautical Charts are used to verify navigation fixes prior to dispatch, b) Procedures are established and used to verify status and suitability of Navigation Facilities used to define route of flight and c) Approach Navigation Radios are manually tuned and identified.
29. Navigation Management System				DELETED, REVISION 9.
1) Navigation Databases				DELETED, REVISION 9.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
30. Display Controller (PFD) (Primus 1000 System)				
1) VOR / Localizer Source Selector Switches (NAV)	C	2	-	May be inoperative provided procedures do not require their use. NOTE: NAV source can not be changed. Aircraft powers up on the onside VHF.
2) FMS Source Selector Switches	C	2	0	May be inoperative provided procedures do not require their use.
3) Elapsed Time Function Switch (ET)	C	2	0	
4) Horizontal Indicator Mode Select Switches (HSI)	C	2	0	NOTE: Weather radar requirements must be considered if ARC display modes are inoperative on both PFDs.
5) Radio Altitude Knob	C	2	0	May be inoperative provided approach minimums do not require its use.
6) Single Cue/Cross Pointer Switch (SC/CP)	C	2	0	
7) Groundspeed/Time To Go Switch (GSPD/TTG)	C	2	0	

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
31. Display Controller (MFD)				
1) MAP/PLAN Switch	C	1	0	
2) WX Switch	C	1	0	May be inoperative provided at least one PFD HSI switch operates normally.
3) Range Selector	C	1	0	
4) Checklist Function Buttons (NORM, EMER, RCL, PAG, SKIP, ESC or ENT)	C	6	0	
5) Joystick Controller	C	1	0	
6) Symbol Display Buttons (APT, VOR, DAT)	C	3	0	
32. *** Standby Flight Display Heading Information				
1) Meggitt Standby Flight Display Heading Information (550 units 0809 - 1044, 560 units 0260 - 0643)				DELETED, REVISION 9.
2) *** GH-3000 Electronic Standby Instrument System Heading Information	C	1	0	Heading information may be inoperative provided: a) Both PFD heading information is operative and b) Magnetic compass is installed and operative.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
34 NAVIGATION				
33. GH-3000 Internal Cooling Fan ***	C	1	0	
34. Non-Stabilized Magnetic Compass ***	B	1	0	May be inoperative provided: a) Aircraft is equipped with dual AHRS, b) Both AHRS heading information sources are operative and c) Aircraft is equipped with a GH-3000 Electronic Standby Instrument and its System Heading Information is operative.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
35 OXYGEN				
1. Passenger Oxygen System	C	1	0	May be inoperative provided: a) Aircraft is operated without passengers and b) Crew Oxygen System is operative.
2. Cabin Passenger Oxygen Drop Out Panels Including Oxygen Masks	B	-	0	Individual Dispensers/Panels may be inoperative or missing provided associated seat is blocked and placarded, "DO NOT OCCUPY."
3. Oxygen Tank Fill Port	C	1	0	(M) May be inoperative provided: a) It is verified there are no leaks in the system and b) The bottle is filled using alternate means.
4. Protective Breathing Equipment (PBE) ***	D	-	-	Any in excess of those required by FAR may be inoperative.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
38 WATER/WASTE				
1. Potable Water System	C	-	-	(M) Individual components may be inoperative provided: a) Associated components are deactivated or isolated and b) Associated system components are verified not to have leaks. NOTE: Any portion of the system that works normally may be used.
	C	-	-	(M) May be inoperative provided: a) System is drained and b) Procedures are established to ensure the system is not serviced.
2. Lavatory Waste Systems	C	-	-	(M) Individual components may be inoperative provided: a) Associated components are deactivated or isolated, and b) Associated system components are verified not to have leaks. NOTE: Any portion of the system that works normally may be used.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
52 DOORS				
1. Nose Baggage Doors				
1) Annunciator System (550 units 0801 - 1136, 560 units 0260 - 5000)	C	2	0	(O) May be inoperative provided a crewmember verifies by physical inspection prior to each departure, the associated door(s) is secured and locked.
2) Electrical Bonding Straps (500) (Expires December 31, 2008 without CDL approval)	B	2	1	
3) Electrical Bonding Straps (550, S550, 560) (Expires December 31, 2008 without CDL approval)	B	2	0	
4) Gust Locks	C	-	0	
5) Gas Support Struts				DELETED, REVISION 9.
2. Aft Baggage or Tailcone Door				
1) Annunciator System (550 units 0801 - 1136) (560 units 0260 - 5000)	C	1	0	(O) May be inoperative provided a crewmember verifies by physical inspection prior to each departure, the door is secured and locked.
2) Electrical Bonding Straps (Expires December 31, 2008 without CDL approval)	B	1	0	

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
52 DOORS				
3. Tailcone Door				DELETED, REVISION 9. Combined with ATA 52 item 2.
1) Annunciator (560 units 0260 - 5000)				DELETED, REVISION 9. Combined with ATA 52 item 2.
2) Electrical Bonding Straps				DELETED, REVISION 9. Combined with ATA 52 item 2.
4. Door Key Locks				
1) Aft Baggage / Tailcone Door	D	1	0	(O) May be inoperative in the unlocked position provided the door is verified closed and latched prior to flight.
2) Nose Baggage Doors	C	2	1	(O) One may be inoperative in the locked position provided required preflight actions may be performed through the opposite door.
3) Cabin Door	D	1	0	May be inoperative provided the lock is in the unlocked position.
4) Single Point Refueling *** Door	D	1	0	(O) May be inoperative provided the door is verified closed and latched.
5. Entry Step Support *** Components				
1) Cables / Chains	C	-	0	(O) May be inoperative provided: a) It is verified Cables or Chains do not interfere with door operation and b) Alternate procedures are developed and used to ensure safe entry/egress.
2) Rate Controllers	C	2	0	May be inoperative provided the Entry Step is lowered with caution.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
52 DOORS				
6. Cabin Door Seal 500, 501, S550, 551 (550 units 0001 - 0733)	C	1	0	(O) May be inoperative provided: a) Door Seal does not interfere with door operation, b) Flight is conducted unpressurized, c) Cabin Emergency Dump is operative and selected to Dump, d) Aircraft is operated at 10,000 feet MSL or below, e) Cabin Altitude is set above 10,000 feet MSL and f) Cabin Rate is set to maximum.
7. Cabin Door Secondary Seal (550 units 0801 - 1136, 560)	C	1	0	May be inoperative provided: a) Secondary Seal does not interfere with door operation, b) Primary Seal is operative and c) Flight is conducted at FL 250 or below.
	C	1	0	(O) May be inoperative provided: a) Secondary Seal does not interfere with door operation, b) Flight is conducted unpressurized, c) Cabin Emergency Dump is operative and selected to Dump, d) Aircraft is operated at 10,000 feet MSL or below, e) Cabin Altitude is set above 10,000 feet MSL and f) Cabin Rate is set to maximum.
8. Cabin Door Primary Seal (550 units 0801 - 1136, 560)	C	1	0	May be inoperative provided: a) Primary Seal does not interfere with door operation, b) Secondary Seal is operative and c) Flight is conducted at FL 250 or below. (Continued)

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
52. DOORS				
8. Cabin Door Primary Seal (550 units 0801 - 1136, 560) (cont'd)	C	1	0	(O) May be inoperative provided: a) Primary seal does not interfere with door operation, b) Flight is conducted unpressurized, c) Cabin Emergency Dump is operative and selected to Dump, d) Aircraft is operated at 10,000 feet MSL or below, e) Cabin Altitude is set above 10,000 feet MSL and f) Cabin Rate is set to maximum.
9. DOOR SEAL Annunciator System (550 units 0801 - 1136, 560)	C	1	0	(O) May be inoperative provided: a) Primary door seal is verified operative, and b) Flight is conducted at FL 250 or below.
	C	1	0	(O) May be inoperative provided: a) Flight is conducted unpressurized, b) Cabin Emergency Dump is operative and selected to Dump, c) Aircraft is operated at 10,000 feet MSL or below, d) Cabin Altitude is set above 10,000 feet MSL and e) Cabin Rate is set to maximum.

SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
52. DOORS				
10. Cabin Door Annunciator System (560 units 0260 - 5000, 550 units 0801 - 1136)	B	1	0	(O) May be inoperative provided: a) All door lock flags are visible in the sight glass locations on the door and b) Interior door handle securing pin is verified engaged (unable to rotate the handle without depressing the push button in the handle grip).

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
73 ENGINE FUEL & CONTROL				
1. Engine Synchronizer System (Except 560 units 0751 - 5000)	C	1	0	
2. Fuel Flow Indicating Systems	B	2	1	One may be inoperative provided both Fuel Quantity Indicating Systems are operative.
3. Ground Idle System (560, 550 units 0801 - 1136)				DELETED, REVISION 9.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
74 IGNITION				
1. Engine Igniter Lights / Annunciators (All except 560 units 0751 - 5000.)	B	2	1	One may be inoperative provided igniter snapping is verified audibly prior to start.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
77 ENGINE INDICATING				
1. ITT Indicating Systems Digital Function (All except 560 units 0751 - 5000)	C	2	1	One may be inoperative provided both Analog Indicators are operative.
2. N1 Indicators				
1) N1 Digital Display (All except 550 and 560)	B	2	1	One may be inoperative provided: a) Corresponding N1 Tape Display is operative and b) All other engine indicators on both engines are operative.
2) N1 Tape Display (All except 550 and 560)	B	2	1	One may be inoperative provided: a) Corresponding N1 Digital Display is operative and b) All other engine indicators on both engines are operative.
3. Standby Engine ITT Indicating System (560 units 0751 - 5000)	C	2	1	One may be inoperative provided: a) Corresponding ITT indicator on the EICAS display is operating normally, b) Standby N1 and N2 indicators are operating normally and c) All other engine indicators are operative.

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SYSTEM SEQUENCE & NUMBERS	1. REPAIR CATEGORY	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS AND EXCEPTIONS
78 ENGINE EXHAUST				
1. Thrust Reversers ***	C	2	0	(M) May be inoperative provided affected Thrust Reverser is secured using approved maintenance procedures.

VI

OPERATIONAL AND MAINTENANCE (O&M) PROCEDURES

CE-501

Operations and Maintenance Procedures

Developed from Cessna's O&M Procedures manual dated 16 Jun 2008, Revision 9.3

CONTROL PAGE

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PREFACE

This Manual contains procedures of a general nature to be used when a Maintenance (M) or Operating (O) procedure is to be accomplished by Authorized Personnel. Authorized Personnel is defined as a person qualified in accordance with applicable Federal Aviation Regulations who has been given the responsibility by appropriate company management to perform these procedures.

Procedures requiring specialized knowledge or skill, or requiring the use of tools or test equipment should be accomplished by maintenance personnel.

Crew Operating Procedures

MEL authorized inoperative items marked with an (O) require specific operating procedures be performed. Prior to conducting further operations, the following procedures and/or restrictions shall be complied with by authorized personnel:

Determine that continued operation with the inoperative item is authorized according to the approved MEL.

Determine that continued operations with the authorized item inoperative will not affect the safety of the flight.

Determine that any MEL required alternate equipment is operative.

The PIC will brief the SIC on the procedure to be used during the flight.

Maintenance Procedures

MEL authorized inoperative Items marked with an (M) require specific maintenance procedures be performed. Prior to conducting further operations, the following procedures and/or restrictions shall be complied with by authorized personnel:

Determine that continued operation with the inoperative item is authorized according to the approved MEL.

Determine that continued operations with the authorized item inoperative will not affect the safety of the flight.

Determine that any MEL required alternate equipment is operative.

Authorized personnel shall utilize the procedures in the Manufacturer's Maintenance Manuals and Technical Publications any time maintenance is being performed.

THIS DOCUMENT HAS BEEN DERIVED FROM PROCEDURES PRODUCED BY THE MANUFACTURER IN THEIR DOCUMENT "OPERATIONAL & MAINTENANCE PROCEDURES" DATED 16 JUN 2008.

OMP-1

Circuit Breaker Disengagement, Safetying and Fuse Removal

This describes the requirements when authorized personnel disengage a circuit breaker (CB) and the maintenance procedure for safetying CBs in the off position and/or fuse removal. Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

A. On aircraft to depart from an airport where company authorized maintenance is not available:

Appropriate CB is disengaged (pulled or turned off) as required by the applicable MEL authorized inoperative item procedure.

B. On aircraft to depart an airport where company authorized maintenance is available:

1) Toggle type CBs are safetied in the off position by securing the toggle with twisted safety wire to a nearby screw.

2) Push button type CBs are locked in the off position by slipping a CB lockout device over the push button shaft or by tying off with a plastic bundle tie.

3) Fuses are inspected and replaced or removed if necessary.

Note: Verify that deactivation of circuit breaker does not affect another system

OMP-2

Placarding Procedures

This describes the requirements when authorized personnel placard inoperative items of equipment. Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

An authorized inoperative item is required to be placarded by the MEL, it shall be placarded as follows:

A. The placard should preferably be white, self-adhesive, with the word "INOP" or "INOPERATIVE" clearly marked across the label. In some cases, the Operator and Maintenance Procedures manual will specify alternate wording. If a white self- adhesive placard is not available, a piece of paper with the specified wording written on it shall be taped in place.

B. When, due to position or number of placards, a doubt exists as to the purpose or intent of the placard, identify the item. One method is to write the MEL's Item number or description on the placard. The following are examples of methods to identify an inoperative item, when necessary for clarity:

Here is an Example of a Placard label format:

INOPERATIVE DATE: SIGNED:

C. The placard shall be placed in the position specified in the MEL or the Operator and Maintenance Procedures manual. When the position is not specified then the placard shall be placed on or immediately adjacent or over to the defective instrument, control, switch, or device.

D. Placards will normally accompany this manual, inside an interior pocket.

Installation of a placard is not maintenance. Therefore the actual installation of the placard does not require a maintenance release or approval for return to service.

OMP-3

Stowing Electrical Wiring or Connectors

Whenever a procedure calls for disconnecting, unplugging or stowing an electrical wire or electrical connector, the following procedures shall be accomplished:

A. Stowing Electrical Wiring

Assure the electrical wire(s) will not arc or short and, if necessary, wrap wire ends in a non-conductible material.

Place end of wire(s) in a liquid proof material (plastic bag, etc.) and tie-wrap.

Secure the wire(s) to a suitable nearby stationary object.

B. Stowing Electrical Connector

Place electrical connector in a liquid proof material (plastic bag, etc) and tie-wrap.

Secure the electrical connector to a suitable nearby stationary object.

Fuel lines, hydraulic lines, control cables, etc. are not suitable objects for securing electrical wires or electrical connectors. Protection against chafing, battery acids, fluids, personnel and cargo, high temperatures, and protection in wheel wells and landing gear areas must be assured.

OMP-4

Securing Components via Safety Wire or Tie Wrap

1. Whenever a procedure calls for securing a component *using safety wire*, the following procedures shall be accomplished:

Ensure the wire(s) will not damage component, and do not overtighten.

Cut Safety Wire short enough to ensure no other component will be affected by its presence.

Wrap end of wire back onto itself, to ensure no possibility of chaffing wires, conduit or tubing by sharp end.

Fuel lines, hydraulic lines, control cables, etc. are not suitable objects for securing components to with safety wire. The possibility exists for the wire to provide a path for electrical current. Ensure that any possible chaffing of electrical wires or components would not produce an open circuit. Wrap the wire, if necessary, in an insulated tape to eliminate these risks.

2. Whenever a procedure calls for securing a component *using a tie-wrap*, the following procedures shall be accomplished:

Cut Tie-wrap short enough to ensure no other component will be affected by its presence. When cutting off excess, be aware that the end of the tie-wrap may be sharp enough to cut insulation, or pierce tubing. Dull the edges as necessary.

Fuel lines, hydraulic lines, control cables, etc. are not suitable objects for securing components to with tie-wraps. Ensure that any possible chaffing of electrical wires, tubing, or components would not pierce insulation or tubing. Wrap the wire, if necessary, in an insulated tape to eliminate these risks.

Note: Refer to the Aircraft Service Manual or contact the Director of Maintenance for proper size and type of safety wire needed to secure components.

OMP 21-1

This describes the procedures to be used with the Air Cycle Machine inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. Place the PRESS SOURCE select knob in the OFF position.
2. Place a placard stating, "ACM INOP. FLIGHT ABOVE 10,000 FEET MSL NOT AUTHORIZED", above pressurization controls.
3. Make appropriate entry in discrepancy report.

OMP 21-2

This describes the procedures to be used when one or both Flow Control & Shutoff Valve(s) is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To verify No Flow from inoperative side.

For one valve Inoperative:

NOTE: The cabin and defog fans must be off to insure that any airflow from the wemacs is coming from the engine and not from a fan.

1. Start engine on side with inoperative valve.
2. Select OVHD fan, DEFOG fan, and A/C (Freon air conditioner) switches to OFF.
3. Select temperature control to MANUAL.
4. Turn PRESS SOURCE selector to setting corresponding to inoperative valve (e.g., if left valve failed, select LH).
5. Absence of Wemac flow (overhead duct outlets, armrest manifolds, cabin foot warmer manifolds, cockpit foot warmer outlets) indicates that valve is closed.
6. Place INOP placard on or adjacent to setting for inoperative valve on PRESS SOURCE selector.
7. Review flight planning to ensure that flight is conducted at or below FL250.

For both valves Inoperative:

1. Check that PRESS SOURCE selector is OFF.
2. Review flight planning to ensure that flight is conducted at or below 10,000 feet MSL.

(M) MAINTENANCE PROCEDURES

To ensure both Flow Control and Shutoff Valves are verified CLOSED.

1. Start both engines.
2. Select OVHD fan, DEFOG fan, and A/C (Freon air conditioner) switches to OFF.
3. Select temperature control to MANUAL.
4. Turn PRESS SOURCE selector to OFF. Absence of Wemac flow (e.g., overhead duct outlets, armrest manifolds, cabin foot warmer manifolds, cockpit foot warmer outlets) indicates that both valves are closed.
5. Place an "INOP" placard next to the PRESS SOURCE switch.
6. Make appropriate entry on discrepancy report.

(cont.)

OMP 21-2 (cont.)

NARRATIVE:

The failed Flow Control and Shutoff valve must have failed in the closed position. Failure in the open position will not allow that source to be shut off in emergency situation. To ensure the Flow Control and Shutoff portions of the valve are closed, the engine that supplies bleed air to the failed Flow Control and Shutoff Valve is started and the PRESS SOURCE switch is turned to that engine. The A/C and OVHD fans must be off, to ensure that any airflow from the Wemacs is coming from the engine and not from a fan. If airflow is detected, the valve is not closed and must be repaired prior to flight.

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. Place the PRESS SOURCE select knob in the OFF position.
2. Place a placard stating, "ACM INOP. FLIGHT ABOVE 10,000 FEET MSL NOT AUTHORIZED", above pressurization controls.
3. Make appropriate entry in discrepancy report.

OMP 21-3

This describes the procedures to be used when Emergency Pressurization Valve is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. Lift red EMER DUMP toggle switch cover and activate EMER DUMP.
2. Prior to taxi, set Cain Controller above 10,000 feet MSL.
3. Set Cabin Rate to maximum.
4. Place a placard stating, "EMER PRESS VALVE INOP. FLIGHT ABOVE 10,000 FEET MSL NOT AUTHORIZED", above pressurization controls.
5. Make appropriate entry in discrepancy report.

OMP 21-4

This describes the procedures to be used when the Ground Flow Control Valve is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

1. Position aircraft in a suitable run-up area and chock both main landing gear.
2. Using AFM Normal Procedures, start both engines.
3. Place Pressurization selector knob to NORM and select GND mode.
4. Verify the GND mode annunciator is illuminated.
5. Check for no additional airflow from environmental system.
6. Using AFM Normal Procedures, power down aircraft.
7. Make appropriate entry in discrepancy report.

OMP 21-5

This describes the procedures to be used when the Cabin Pressurization System is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. After engine start, lift red cover for EMER DUMP switch and activate EMER DUMP switch.
2. Prior to taxi, set Cain Controller above 10,000 feet MSL.
3. Set Cabin Rate to maximum.
4. Place a placard stating, "CABIN PRESS SYSTEM INOP. FLIGHT ABOVE 10,000 FEET MSL NOT AUTHORIZED", above pressurization controller.
5. Make appropriate entry in discrepancy report.

OMP 21-7

This describes the procedures to be used when the Cabin Differential Pressure Gauge is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. After engine start, lift red cover for EMER DUMP switch and activate EMER DUMP switch.
2. Prior to taxi, set Cain Controller above 10,000 feet MSL.
3. Set Cabin Rate to maximum.
4. Place a placard stating, "CABIN DIFF PRESS GAUGE INOP. FLIGHT ABOVE 10,000 FEET MSL NOT AUTHORIZED", above pressurization controller.
5. Make appropriate entry in discrepancy report.

OR

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft.

1. Set Cabin Altitude Selector to a pressure less than the maximum pressure differential.
2. Use the chart on next page to convert cabin and aircraft altitude to differential pressure.
3. Place an "INOP" placard on the Cabin Diff Press gauge.
4. Make appropriate entry in discrepancy report.

(cont'd)

OMP 21-7 (cont'd)

CABIN ALTITUDE vs. CABIN PRESSURE DIFFERENTIAL CONVERSION
(Cabin Pressure Differential Display or Cabin Altimeter Inoperative)

CABIN ALTITUDE x 1000' — CABIN ALT	AIRCRAFT PRESSURE ALTITUDE x 1000'																	
x 1000'	0	5	10	15	20	25	28	31	33	35	37	39	41	43	45	47	49	51
11.0				1.4	3.0	4.3	4.9	5.6	5.9	6.3	6.6	6.9	7.1	7.4	7.6	7.8	8.0	8.1
10.5				1.6	3.2	4.5	5.1	5.8	6.1	6.4	6.8	7.1	7.3	7.5	7.8	8.0	8.1	8.3
10.0			0.0	1.8	3.4	4.7	5.3	6.0	6.3	6.6	7.0	7.3	7.5	7.7	8.0	8.2	8.3	8.5
9.5			0.2	2.0	3.6	4.9	5.5	6.2	6.5	6.8	7.2	7.5	7.7	7.9	8.2	8.4	8.5	8.7
9.0			0.4	2.2	3.8	5.1	5.7	6.4	6.7	7.0	7.4	7.7	7.9	8.1	8.4	8.6	8.7	8.9
8.5			0.6	2.4	4.0	5.3	5.9	6.6	6.9	7.2	7.6	7.9	8.1	8.3	8.6	8.8	8.9	9.1
8.0			0.8	2.6	4.2	5.5	6.1	6.8	7.1	7.5	7.8	8.1	8.3	8.6	8.8	9.0	9.2	9.3
7.5			1.0	2.8	4.4	5.7	6.4	7.1	7.3	7.7	8.0	8.3	8.5	8.8	9.0	9.2	9.4	9.5
7.0			1.2	3.0	4.6	5.9	6.6	7.3	7.5	7.9	8.2	8.5	8.7	9.0	9.2	9.4	9.6	9.7
6.5			1.5	3.3	4.8	6.1	6.8	7.5	7.8	8.1	8.4	8.7	9.0	9.2	9.4	9.6	9.8	10.0
6.0			1.7	3.5	5.0	6.3	7.0	7.7	8.0	8.3	8.6	8.9	9.2	9.4	9.6	9.8	10.0	
5.5			1.9	3.7	5.2	6.5	7.2	7.9	8.2	8.5	8.9	9.1	9.4	9.6	9.9	10.1		
5.0			2.1	3.9	5.5	6.8	7.5	8.2	8.4	8.8	9.1	9.4	9.6	9.9	10.1			
4.5			2.4	4.2	5.7	7.0	7.7	8.4	8.7	9.0	9.3	9.6	9.9	10.1				
4.0			2.6	4.4	5.9	7.2	7.9	8.6	8.9	9.2	9.5	9.8	10.1					
3.5			2.8	4.6	6.2	7.5	8.2	8.9	9.1	9.5	9.8	10.1						
3.0			3.1	4.9	6.4	7.7	8.4	9.1	9.4	9.7	10.0							
2.5			3.3	5.1	6.7	8.0	8.6	9.3	9.6	10.0								
2.0			3.6	5.4	6.9	8.2	8.9	9.6	9.9	10.2								
1.5			3.8	5.6	7.2	8.5	9.1	9.8	10.1									
1.0			4.1	5.9	7.4	8.7	9.4	10.1										
0.5		0.0	4.3	6.1	7.7	9.0	9.7											
0.0	0.0	0.3	4.6	6.4	7.9	9.2	9.9											
-0.5	0.3	0.6	4.9	6.7	8.2	9.5	10.2											
-1.0	0.5	0.8	5.1	6.9	8.5	9.8	10.5											

EXAMPLE: Aircraft is at FL 350 and Cabin Pressure Differential Gauge reads 8.8 PSID, Cabin Altitude is 5,000'

EXAMPLE: Aircraft Is At FL 350 and Cabin Altimeter reads 5,000', Cabin Pressure Differential is 8.8 PSID.

OMP 21-8

This describes the procedures to be used when the Cabin Altitude Warning System is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. Place EMER DUMP switch to ON.
2. Place a placard stating, "CABIN ALTITUDE WARNING SYSTEM INOP. FLIGHT NOT AUTHORIZED ABOVE 10,000 FEET MSL.", on the fire tray adjacent to the annunciator panel.
3. Make appropriate entry in discrepancy report.

OMP 21-9

This describes the procedures to be used when the Cabin Vertical Speed or Cabin Rate Indicator is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. After engine start, lift red cover for EMER DUMP switch and activate EMER DUMP switch.
2. Prior to taxi, set Cain Controller above 10,000 feet MSL.
3. Set Cabin Rate to maximum.
4. Place a placard stating, "CABIN VERT SPEED/RATE INDICATOR INOP. FLIGHT NOT AUTHORIZED ABOVE 10,000 FEET MSL", above pressurization panel.
5. Make appropriate entry in discrepancy report.

OMP 21-10

This describes the procedures to be used when the Cabin Altimeter is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. After engine start, lift red cover for EMER DUMP switch and activate EMER DUMP switch
2. Prior to taxi, set Cain Controller above 10,000 feet MSL.
3. Set Cabin Rate to maximum.
4. Place an "INOP" placard on the Cabin Altimeter.
5. Make appropriate entry in discrepancy report.

OMP 21-14

This describes the procedures to be used when the Emergency Pressurization Annunciator is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(M) MAINTENANCE PROCEDURES

To ensure Emergency Pressurization system is operative.

1. Position the aircraft in a suitable run-up area.
2. Set Parking Brake and place Antiskid switch to OFF.
3. Disengage the GEAR CONTROL circuit breaker.

CAUTION: When engines are operating, antiskid switch is in the on position, and squat switch is disabled or in air position, aircraft brakes will not function.

4. Disengage FLT/HR circuit breaker.

CAUTION: If squat switch is positioned to air mode and engine(s) are operating, do not raise landing gear control handle.

5. Using AFM Normal Procedures, start the Left engine and operate at 60% N2.
6. On the LH Main Landing Gear Torque Link, remove the hardware mounting the squat switch to the torque link and allow the squat switch to place the aircraft in AIR mode.
7. Select EMER position on bleed air select switch.

CAUTION: Do not leave switch in EMER position longer than necessary to verify air flow. Hot bleed air is entering through valve.

8. Verify airflow into the cabin through emergency pressurization valve by listening to air entering through valve.
9. Select LH position on the bleed air select switch. Emergency Pressurization airflow will stop.
10. Using AFM Normal Procedures, power down aircraft.
11. Reinstall Torque Link to the Landing Gear.
12. Engage GEAR CONTROL and FLT/HR circuit breakers.
13. Place an "INOP" placard on the EMER PRESS annunciator.
14. Make appropriate entry in discrepancy report.

OMP 21-15

This describes the procedures to be used when the AIR DUCT O'HEAT Annunciator is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. Place PRESS SOURCE knob to OFF.
2. Place a placard stating, "AIR DUCT O'HEAT LIGHT INOP. FLIGHT NOT AUTHORIZED ABOVE 10,000FEET MSL", above pressurization controls.
3. Make appropriate entry in discrepancy report.

OMP 21-18

This describes the procedures to be used when the Freon Air Conditioning System is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(M) MAINTENANCE PROCEDURES

To ensure the Freon Air Conditioning system is deactivated.

1. AIR COND Circuit Breaker - Pull and secure.
2. Place an "INOP" placard next to the air conditioner controls.
3. Make appropriate entry on discrepancy report.

OMP 21-20

This describes the procedures to be used when the PRECOOL FAIL Annunciator is inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To verify flow control valves are closed, and to configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. Place the PRESS SOURCE select knob in the OFF position.
2. Place a placard stating, "ACM INOP. FLIGHTABOVE 10,000 FEET MSL NOT AUTHORIZED", above pressurization controls.
3. Make appropriate entry in discrepancy report.

NARRATIVE

The failed Flow Control and Shutoff valve must have failed in the closed position. Failure in the open position will not allow that source to be shut off in emergency situation. To ensure the Flow Control and Shutoff portions of the valve are closed, the engine that supplies bleed air to the failed Flow Control and Shutoff Valve is started and the PRESS SOURCE switch is turned to that engine. The A/C and OVHD fans must be off, to ensure that any airflow from the Wemacs is coming from the engine and not from a fan. If airflow is detected, the valve is not closed and must be repaired prior to flight.

To verify No Flow from either side:

NOTE: The cabin and defog fans must be off to insure that any airflow from the wemacs is coming from the engine and not from a fan.

1. Start engine on one side.
2. Select OVHD fan, DEFOG fan, and A/C (Freon air conditioner) switches to OFF.
3. Select temperature control to MANUAL.
4. Turn PRESS SOURCE selector to setting corresponding to inoperative valve (e.g., if left valve failed, select LH).
5. Absence of Wemac flow (overhead duct outlets, armrest manifolds, cabin foot warmer manifolds, cockpit foot warmer outlets) indicates that valve is closed.

Repeat procedure for other side.

OMP 21-24

This describes the procedures to be used when the Outflow Valves are inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(M) MAINTENANCE PROCEDURES

To secure the outflow valve in the OPEN position.

1. Gain access to the Outflow Valves via both sides of the aft pressure bulkhead.
2. From the tailcone side of the aft pressure bulkhead, remove bolts securing either Outflow Valve to its mount on the forward side of the aft pressure bulkhead.
3. With all hoses and wiring still connected, secure the Outflow Valve away from its mount using wire, etc. The Outflow Valve must not be allowed to slip back into position and block the opening in the aft bulkhead.
4. Place an "INOP" placard above pressurization controls.
5. Make appropriate entry in discrepancy report.

NOTE: If the outflow valve being removed is the RH valve, we recommend removing the aluminum tube which vents the vacuum ejector overboard through the aft pressure bulkhead, as well as the aluminum tube with the particulate trap which leads from the RH outflow valve to the ejector. Be sure to cap all fittings and plug all lines. It should not be necessary to disturb any of the nylon plumbing.

(O) FLIGHT CREW PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. Place EMER DUMP switch to ON and PRESSURIZATION switch to AUTO.
2. Place a placard stating, "OUTFLOW VALVESINOP. FLIGHT ABOVE 10,000 FEET MSL NOT AUTHORIZED", above pressurization controls.
3. Make appropriate entry in discrepancy report.

OMP 23-1

The following restrictions apply any time an airplane is flown with an item or items of communication equipment inoperative for operations.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

14 CFR REQUIREMENTS (91.511)

1. Two communication systems appropriate to the ground facilities to be used must be operative when conducting operations under the following conditions:

A. **Overwater flights more than 30 minutes flying time or 100 nautical miles from the nearest shoreline.** However, the aircraft may be operated without passengers from a place where repair or replacement cannot be made to a place where they can be made, if not more than one of each of the dual items of radio communication or navigation equipment (two transmitters, two microphones, two headsets or one headset and one speaker, two independent receivers for navigation, and two independent receivers for communications) malfunctions or becomes inoperative.

MEL Communications FAR Requirements: QUICK REFERENCE

91.511 OVERWATER	
VHF-COMM (a)(d)	2-VHF COMM TRANSMITTERS 2-VHF COMM RECEIVERS 2-MICROPHONES 2-HEADSETS OR 1 HEADSET & 1 SPEAKER EQULPPED
HF-COMM (a)(d)	1-HF TRANSMITTER (IF EQUIPPED WITH 2 VHF COMM'S) 1-HF RECEIVER (IF EQUIPPED WLTH 2 VHF COMM'S)
91.205 VFR DAY	
	NOTHING BUT FUEL
91.507 VFR NIGHT AND OVER THE TOP	
COMM	1 - VHF COMM TRANSMITTER 1 -COMM RECEIVER
91.205 IFR	
COMM (b)	1- VHF COMM TRANSMITTER 1- COMM RECEIVER

OMP 23-3

The following procedures apply when operating without the Passenger Address (PA) system operative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To ensure alternate normal and emergency procedures and/or operating restrictions are established and used.

1. A crew member will orally brief the passengers on any items he would normally use the PA system to brief.
2. During normal, abnormal, or emergency situations, a crew member shall face the passengers from the cockpit and perform such announcements and/or give instructions that are appropriate to the situation.
3. Place an "INOP" placard adjacent to the PA SELECT knob.
4. Make appropriate entry on discrepancy report.

OMP 23-4

The following procedures apply when operating without the Electronic Checklist system operative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To ensure equivalent checklists are available and used.

1. A crewmember shall verify that a hard copy of the Pilot's Abbreviated Checklist is readily available.
2. Place an "INOP" placard on the electronic checklist controller.
3. Make appropriate entry in discrepancy report.

OMP 23-5

The following restrictions apply any time an airplane is flown with cockpit voice recorder inoperative for operations.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

14 CFR REQUIREMENTS (91.609)
Flight recorders and cockpit voice recorders.

(a) No holder of an air carrier operating certificate or an operating certificate may conduct any operation under this part with an aircraft listed in the holder's operations specifications or current list of aircraft used in air transportation unless that aircraft complies with any applicable flight recorder and cockpit voice recorder requirements of the part under which its certificate is issued except that the operator may--
(1) Ferry an aircraft with an inoperative flight recorder or cockpit voice recorder from a place where repair or replacement cannot be made to a place where they can be made;
(2) Continue a flight as originally planned, if the flight recorder or cockpit voice recorder becomes inoperative after the aircraft has taken off;
(3) Conduct an airworthiness flight test during which the flight recorder or cockpit voice recorder is turned off to test it or to test any communications or electrical equipment installed in the aircraft; or
...
(b) Notwithstanding paragraphs (c) and (e) of this section, an operator other than the holder of an air carrier or a commercial operator certificate may--
(1) Ferry an aircraft with an inoperative flight recorder or cockpit voice recorder from a place where repair or replacement cannot be made to a place where they can be made;
(2) Continue a flight as originally planned if the flight recorder or cockpit voice recorder becomes inoperative after the aircraft has taken off;
(3) Conduct an airworthiness flight test during which the flight recorder or cockpit voice recorder is turned off to test it or to test any communications or electrical equipment installed in the aircraft;
(4) Ferry a newly acquired aircraft from a place where possession of it was taken to a place where the flight recorder or cockpit voice recorder is to be installed; or
(5) Operate an aircraft:
(i) For not more than 15 days while the flight recorder and/or cockpit voice recorder is inoperative and/or removed for repair provided that the aircraft maintenance records contain an entry that indicates the date of failure, and a placard is located in view of the pilot to show that the flight recorder or cockpit voice recorder is inoperative.
(ii) For not more than an additional 15 days, provided that the requirements in paragraph (b)(5)(i) are met and that a certificated pilot, or a certificated person authorized to return an aircraft to service under Sec. 43.7 of this chapter, certifies in the aircraft maintenance records that additional time is required to complete repairs or obtain a replacement unit.

OMP 23-6

The following restrictions apply any time an airplane is flown with boom microphones inoperative for operations.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

14 CFR REQUIREMENTS (91.511)
Radio equipment for overwater operations.

(a) Except as provided in paragraphs (c), (d), and (f) of this section, no person may take off an airplane for a flight over water more than 30 minutes flying time or 100 nautical miles from the nearest shore unless it has at least the following operable equipment:
[(1) Radio communication equipment appropriate to the facilities to be used and able to transmit to, and receive from, at least one communication facility from any place along the route:]
(i) Two transmitters.
(ii) Two microphones.
(iii) Two headsets or one headset and one speaker.
(iv) Two independent receivers.

OMP 23-7

The following procedures apply when operating with one Radio Management Unit inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To verify the Auxiliary Com/Nav Control Display Unit operates normally.

1. Prior to each flight a crewmember will use the Auxiliary Com/Nav Control Display Unit to tune at least one com channel and at least one navigational aid, checking for proper reception and transmission.
2. Place an "INOP" placard on the inoperative RMU.
3. Make appropriate entry in discrepancy report.

OMP 23-13

The following procedures apply when operating with High Frequency (HF) Communications Systems inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To determine SATCOM equipment is functionally checked prior to flight and sufficient coverage exists on route of flight.

1. Prior to each flight a crewmember will use the SATCOM Data Link and the ACARS systems to transmit and receive information from a ground station to ensure that both systems are operational.
2. Prior to each flight a crewmember will review SATCOM system User's Guide or Manual to ensure that coverage exists for the intended route of flight.
3. Place an "INOP" placard adjacent to radio controller.
4. Make appropriate entry in discrepancy report.

OMP 23-16

The following FARs apply when operating with the ELT inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

14 CFR 91.207 - Emergency locator transmitters.

(a) Except as provided in paragraphs (e) and (f) of this section, no person may operate a U.S.-registered civil airplane unless --

(1) There is attached to the airplane an approved automatic type emergency locator transmitter that is in operable condition for the following operations, except that after June 21, 1995, an emergency locator transmitter that meets the requirements of TSO-C91 may not be used for new installations:

(i) Those operations governed by the supplemental air carrier and commercial operator rules of parts 121 and 125;

(ii) Charter flights governed by the domestic and flag air carrier rules of part 121 of this chapter; and

(iii) Operations governed by part 135 of this chapter; or

(2) For operations other than those specified in paragraph (a)(1) of this section, there must be attached to the airplane an approved personal type or an approved automatic type emergency locator transmitter that is in operable condition, except that after June 21, 1995, an emergency locator transmitter that meets the requirements of TSO-C91 may not be used for new installations.

(b) Each emergency locator transmitter required by paragraph (a) of this section must be attached to the airplane in such a manner that the probability of damage to the transmitter in the event of crash impact is minimized. Fixed and deployable automatic type transmitters must be attached to the airplane as far aft as practicable.

(e) Notwithstanding paragraph (a) of this section, a person may --

(1) Ferry a newly acquired airplane from the place where possession of it was taken to a place where the emergency locator transmitter is to be installed; and

(2) Ferry an airplane with an inoperative emergency locator transmitter from a place where repairs or replacements cannot be made to a place where they can be made.

No person other than required crewmembers may be carried aboard an airplane being ferried under paragraph (e) of this section.

(f) Paragraph (a) of this section does not apply to --

(1) Before January 1, 2004, turbojet-powered aircraft;

(2) Aircraft while engaged in scheduled flights by scheduled air carriers;
(Cont.)

OMP 23-16 ELT (Cont.)

(3) Aircraft while engaged in training operations conducted entirely within a 50-nautical mile radius of the airport from which such local flight operations began;

(4) Aircraft while engaged in flight operations incident to design and testing;

(5) New aircraft while engaged in flight operations incident to their manufacture, preparation, and delivery;

(6) Aircraft while engaged in flight operations incident to the aerial application of chemicals and other substances for agricultural purposes;

(7) Aircraft certificated by the Administrator for research and development purposes;

(8) Aircraft while used for showing compliance with regulations, crew training, exhibition, air racing, or market surveys;

(9) Aircraft equipped to carry not more than one person.

(10) An aircraft during any period for which the transmitter has been temporarily removed for inspection, repair, modification, or replacement, subject to the following:

(i) No person may operate the aircraft unless the aircraft records contain an entry which includes the date of initial removal, the make, model, serial number, and reason for removing the transmitter, and a placard located in view of the pilot to show "ELT not installed."

(ii) No person may operate the aircraft more than 90 days after the ELT is initially removed from the aircraft; and

(11) On and after January 1, 2004, aircraft with a maximum payload capacity of more than 18,000 pounds when used in air transportation.

OMP 24-2

The following procedures apply when operating with one Avionics A.C. Power Inverter inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions to deactivate the inoperative inverter:

(M) MAINTENANCE PROCEDURES

To deactivate inoperative inverter.

1. Pull and secure the affected inverter circuit breaker.
2. Place a placard stating, "[AFFECTED INVERTER] INOP. NIGHT FLIGHT NOT AUTHORIZED. VMC OPERATIONS ONLY", adjacent to the circuit breaker panel.
3. Make appropriate entry in discrepancy report.

OMP 25-1

The following procedures apply when operating with any Flotation Equipment inoperative, under the condition no passengers or cargo is being flown for hire.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

FLIGHT CREW NOTE:
1. No units are required if flight does not include an extended over-water leg.
2. Remove defective unit(s) from their normal stowage area to prevent possible use. It is also recommended placard the equipment, so as not to have defective unit accidentally replaced in stowage area prior to its' repair. Defective unit(s) may be placed in a baggage compartment (inaccessible during flight) until reaching a facility for repair or replacement. Enough operable units must be available to service all passengers and crewmembers.

14 CFR REQUIREMENTS (91.509)
Survival equipment for overwater operations – Large or turbojet aircraft.

(a) No person may take off an airplane for a flight over water more than **50 nautical miles from the nearest shore** unless that airplane is equipped with a life preserver or an approved flotation means for each occupant of the airplane.

(b) No person may take off an airplane for a flight over water more than **30 minutes flying time or 100 nautical miles from the nearest shore** unless it has on board the following survival equipment:

(1) A life preserver, equipped with an approved survivor locator light, for each occupant of the airplane.
(2) Enough liferafts (each equipped with an approved survival locator light) of a rated capacity and buoyancy to accommodate the occupants of the airplane.
(3) At least one pyrotechnic signaling device for each liferaft.
(4) One self-buoyant, water-resistant, portable emergency radio signaling device that is capable of transmission on the appropriate emergency frequency or frequencies and not dependent upon the airplane power supply.
(5) A lifeline stored in accordance with §25.1411(g) of this chapter.

(c) The required liferafts, life preservers, and signaling devices must be installed in conspicuously marked locations and easily accessible in the event of a ditching without appreciable time for preparatory procedures.
(d) A survival kit, appropriately equipped for the route to be flown, must be attached to each required liferaft.
(e) As used in this section, the term shore means that area of the land adjacent to the water, which is above the high water mark and excludes land areas, which are intermittently under water.

91.205 (b) (12) If the aircraft is operated for hire over water and beyond power-off gliding distance from shore, approved flotation gear readily available to each occupant and, unless the aircraft is operating under part 121 of this subchapter, at least one pyrotechnic signaling device. As used in this section, "shore" means that area of the land adjacent to the water which is above the high water mark and excludes land areas which are intermittently under water.

OMP 25-8

The following regulations apply to aircraft requirements for Emergency Medical Equipment.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

-1) Automatic External Defibrillator (AED) and/or Associated Equipment

(O) FLIGHT CREW PROCEDURES –

To reseal Emergency Medical Equipment.

1. Repack unit in original container according to manufacturer's instructions.
2. Secure placard stating the condition of unit in a location readily visible.
3. A member of the crew shall brief all occupants of the operating condition of the unit.
4. Make appropriate entry in discrepancy report.

-2) Emergency Medical Kit (EMK) and/or Associated Equipment

(O) FLIGHT CREW PROCEDURES

To reseal Emergency Medical Equipment.

1. Repack unit in original container according to manufacturer's instructions.
2. Secure placard stating the condition of unit in a location readily visible.
3. A member of the crew shall brief all occupants of the operating condition of the unit.
4. Make appropriate entry in discrepancy report.

-3) First Aid Kit (FAK) and/or Associated Equipment

(O) FLIGHT CREW PROCEDURES –

To reseal Emergency Medical Equipment.

1. Repack unit in original container according to manufacturer's instructions.
2. Secure placard stating the condition of unit in a location readily visible.
3. A member of the crew shall brief all occupants of the operating condition of the unit.
4. Make appropriate entry in discrepancy report.

14 CFR REQUIREMENTS (excerpt): (91.513) - Emergency equipment.

(a) No person may operate an airplane unless it is equipped with the emergency equipment listed in this section. ...
(b) Each item of equipment -- ...
(d) First aid kits for treatment of injuries likely to occur in flight or in minor accidents must be provided....

OMP 25-12

The following procedures apply when operating with any Required Documents Holder inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To provide alternate means of securing and displaying required documents

1. Place required documents in clear plastic bag.
2. Tape documents adjacent to document holder.
3. Make appropriate entry in discrepancy report

OMP 25-13

The following procedures apply when operating with any Pilot or Copilot Eye Locator inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To ensure pilots are seated in the correct position.

1. Position the affected seat that permits the crewmember:
   a) Normal visibility.
   b) Full flight control movement
   c) Access to all necessary controls and equipment.
1. Place an "INOP" placard above the Eye Locator.
2. Make appropriate entry in discrepancy report.

OMP 26-1

The following regulations apply to Portable Fire Extinguisher required distributions.

14 CFR REQUIREMENTS (excerpt): 91.513 – Emergency equipment.

(a) No person may operate an airplane unless it is equipped with the emergency equipment listed in this section.

(b) Each item of equipment --

(1) Must be inspected in accordance with §91.409 to ensure its continued serviceability and immediate readiness for its intended purposes;

(2) Must be readily accessible to the crew;

(3) Must clearly indicate its method of operation; and

(4) When carried in a compartment or container, must have that compartment or container marked as to contents and date of last inspection.

(c) Hand fire extinguishers must be provided for use in crew, passenger, and cargo compartments in accordance with the following:

(1) The type and quantity of extinguishing agent must be suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used.

(2) At least one hand fire extinguisher must be provided and located on or near the flight deck in a place that is readily accessible to the flight crew.

(3) At least one hand fire extinguisher must be conveniently located in the passenger compartment of each airplane accommodating more than six but less than 31 passengers, and at least two hand fire extinguishers must be conveniently located in the passenger compartment of each airplane accommodating more than 30 passengers.

(4) Hand fire extinguishers must be installed and secured in such a manner that they will not interfere with the safe operation of the airplane or adversely affect the safety of the crew and passengers. They must be readily accessible and, unless the locations of the fire extinguishers are obvious

OMP 27-1

The following procedures apply when operating without the Electric Trim operative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions to deactivate the electric trim system.

(M) MAINTENANCE PROCEDURES

To deactivate Electric Trim System.

1. Pull the PITCH TRIM and AUTOPILOT circuit breakers.
2. Determine if there is any mechanical damage that would interfere with the controls and preclude dispatch.
3. Check the manual trim throughout its travel for smooth operation. The limit marks adjacent to the trim wheel can be used to confirm this, or a count of the trim wheel revolutions can be used; the wheel should turn approximately three and one quarter revolutions.
4. Place a placard stating, "ELECTRIC TRIM INOPERATIVE -AUTOPILOT DISABLED. RVSM OPERATIONS NOT AUTHORIZED", on pedestal.
5. Make appropriate entry in discrepancy report.

NOTE 1: The Autopilot shall be considered inoperative.

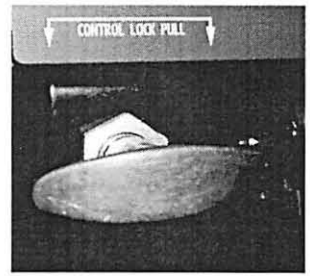
NOTE 2: If the electric trim is inoperative, it should be confirmed that the problem is not in the manual (mechanical) trim system in the airplane and that the failure is not affecting the manual trim. The manual trim should be run throughout its travel limits to check for binding and proper operation.

OMP 27-5

The following procedures apply when operating without the Control lock T-handle system operative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(M) MAINTENANCE PROCEDURES



To secure T-Handle.

1. Remove center aisle cabin floor panels to expose the control lock sliding plate/fairlead assembly (In the Model 500, expose FS225 through FS227; In the 550, S550, and 560, expose FS151 through 168 at the forward end of the dropped aisle).
2. Ensure that control lock system is unlocked. The sliding plate should be at its aft travel limit, away from the swaged balls on the control cables.
3. Using a large tie-wrap or safety wire, secure the sliding plate to the structure immediately aft. Avoid any interference with control cables. In later Citations with air-conditioning, secure the RH bellcrank rather than the sliding plate.
4. Operate controls to verify that ailerons, elevator, rudder pedals, and throttles will operate smoothly through their full travel, with no interference.
5. Reinstall the floor panel(s) with a maintenance tag stating "Control Lock Mechanism Disabled."
6. Safety wire the Control Lock T-Handle in the stowed position.
7. Place an "INOP" placard above the T-handle.
8. Make an appropriate entry on the discrepancy report.

OMP 27-7

The following procedures apply when operating without the Trim and Flap Position Indicator Tips available.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(M) MAINTENANCE PROCEDURES

To mark Indicator Tip(s) in a visible manner (consider night operations).

1. Place a small dab of white RTV, or brightly colored tape or similar material on the end of the pointer that is missing the rubber tip. Allow to dry before flight.
2. Make appropriate entry in discrepancy report.

OMP 28-1

The following procedures apply when operating without the Fuel Quantity Indicators operative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To determine and track fuel quantity.

1. Refer to AFM for Maximum Fuel Imbalance limitation.
2. First flight of the day, with aircraft parked wings-level, both wing fuel tanks will be completely filled and verified full by opening the fuel caps, visually observing the fuel level, and re-securing the fuel caps.
3. Prior to taxi, flight crew will verify that fuel quantity and fuel flows can be properly displayed on the FMS. Record the FMS LH/RH/total fuel figure for reference.
4. Crew will brief and perform periodic checks of the FMS Total Fuel and Left/Right Fuel Used Indications once every ½ hour of flight, and immediately prior to approach to ensure left/right fuel quantity (based on Fuel Used and the remaining gauge) remains within balance limits and will meet landing fuel requirements
5. Following landing and parking, and prior to shutdown, crew will access and record the FMS LH/RH/Total Fuel Quantity indication, for reference.
6. Place an "INOP" placard over the affected fuel indicator.
7. Make appropriate entry in discrepancy report.

OMP 28-6

The following procedures apply when operating without the Pressure Refueling/Defueling Adaptor (Dust Cap or Lanyard) operative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

For visual inspection

1. Place a placard stating, "SPR DUST CAP/LANYARD INOP", inside of SPR door.
2. Make appropriate entry in discrepancy report.
3. Prior to each refueling, visually inspect the Single Point Refueling receptacle.
4. After refueling, observe the receptacle for signs of excessive leaks.

OMP 29-1

The following procedures apply when operating with the Low Hydraulic fluid level light inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To ensure fluid level quantity.

1. Before the first flight of the day and for each subsequent flight, a crewmember shall visually inspect the hydraulic fluid level for servicing.
2. Place an "INOP" placard over the affected annunciator.
3. Make appropriate entry in discrepancy report.

OMP 29-2

The following procedures apply when operating with the LO HYD FLOW L/R / HYD FLOW LOW LH/RH Annunciator light inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To verify hydraulic system operates normally with only the failed side engine running.

1. Using AFM Normal Procedures, start the engine on the discrepant side only.
2. Cycle/operate speed brakes, thrust reverser on operating engine, and flaps to verify that the hydraulic system on the side with the inoperative annunciator is functional, and that this is only an indication problem. Any abnormalities in operation indicate that the problem goes beyond mere indication fault, and must be resolved.
3. If the aircraft is not to be dispatched immediately, shut down the engine using AFM Normal Procedures.
4. Place an "INOP" placard over the affected annunciator.
5. Make appropriate entry in discrepancy report.

OMP 30-10

The following procedures apply when operating with the Pitot/Static Heater Off Annunciators inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To verify Pitot/Static Systems are operative before each flight.

1. Before the first flight of the day and each subsequent flight a crewmember shall physically verify the Pitot/Static heaters are operative.
2. Place a placard stating, "[AFFECTED ANNUNCIATOR] INOP. FLIGHT INTO KNOWN OR FORECAST ICING NOT AUTHORIZED", adjacent to annunciator panel.
3. Make appropriate entry in discrepancy report.

OMP 30-13

The following procedures apply when operating with the Drain Mast Heaters inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions to ensure basins are empty and not used:

(O) FLIGHT CREW PROCEDURES

To ensure basins are empty and not used.

1. Disengage TOILET circuit breaker on right side of aft power j box.
2. Ensure all ice is removed from galley storage and the drains are cleared.
3. Place a placard stating, "DRAIN MASTER HEATERS INOP. DO NOT USE GALLEY/WASH BASIN", over effected system.
4. Make appropriate entry in discrepancy report.

OMP 31-1

The following procedures apply when operating with the Flight Data Recorder inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

14 CFR Requirements (excerpts): (91.609)
Flight data recorders and cockpit voice recorders.

(a) No holder of an air carrier operating certificate or an operating certificate may conduct any operation under this part with an aircraft listed in the holder's operations specifications or current list of aircraft used in air transportation unless that aircraft complies with any applicable flight recorder and cockpit voice recorder requirements of the part under which its certificate is issued except that the operator may—

(1) Ferry an aircraft with an inoperative flight recorder or cockpit voice recorder from a place where repair or replacement cannot be made to a place where they can be made;
(2) Continue a flight as originally planned, if the flight recorder or cockpit voice recorder becomes inoperative after the aircraft has taken off;
(3) Conduct an airworthiness flight test during which the flight recorder or cockpit voice recorder is turned off to test it or to test any communications or electrical equipment installed in the aircraft; or
(4) Ferry a newly acquired aircraft from the place where possession of it is taken to a place where the flight recorder or cockpit voice recorder is to be installed.

(b) Notwithstanding paragraphs (c) and (e) of this section, an operator other than the holder of an air carrier or a commercial operator certificate may—
(1) Ferry an aircraft with an inoperative flight recorder or cockpit voice recorder from a place where repair or replacement cannot be made to a place where they can be made;
(2) Continue a flight as originally planned if the flight recorder or cockpit voice recorder becomes inoperative after the aircraft has taken off;
(3) Conduct an airworthiness flight test during which the flight recorder or cockpit voice recorder is turned off to test it or to test any communications or electrical equipment installed in the aircraft;
(4) Ferry a newly acquired aircraft from a place where possession of it was taken to a place where the flight recorder or cockpit voice recorder is to be installed; or
(5) Operate an aircraft:

(i) For not more than 15 days while the flight recorder and/or cockpit voice recorder is inoperative and/or removed for repair provided that the aircraft maintenance records contain an entry that indicates the date of failure, and a placard is located in view of the pilot to show that the flight recorder or cockpit voice recorder is inoperative.

(ii) For not more than an additional 15 days, provided that the requirements in paragraph (b)(5)(i) are met and that a certificated pilot, or a certificated person authorized to return an aircraft to service under §43.7 of this chapter, certifies in the aircraft maintenance records that additional time is required to complete repairs or obtain a replacement unit.

(Cont'd)

OMP 31-1 Flight Data 14 CFR (Con't)

(c)(1) No person may operate a U.S. civil registered, multiengine, turbine-powered airplane or rotorcraft having a passenger seating configuration, excluding any pilot seats of 10 or more that has been manufactured after October 11, 1991, unless it is equipped with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium, that are capable of recording the data specified in appendix E to this part, for an airplane, or appendix F to this part, for a rotorcraft, of this part within the range, accuracy, and recording interval specified, and that are capable of retaining no less than 8 hours of aircraft operation.

(2) All airplanes subject to paragraph (c)(1) of this section that are manufactured before April 7, 2010, by April 7, 2012, must meet the requirements of §23.1459(a)(7) or §25.1459(a)(8) of this chapter, as applicable.

(3) All airplanes and rotorcraft subject to paragraph (c)(1) of this section that are manufactured on or after April 7, 2010, must meet the flight data recorder requirements of §23.1459, §25.1459, §27.1459, or §29.1459 of this chapter, as applicable, and retain at least the last 25 hours of recorded information using a recorder that meets the standards of TSO–C124a, or later revision.

(d) Whenever a flight recorder, required by this section, is installed, it must be operated continuously from the instant the airplane begins the takeoff roll or the rotorcraft begins lift-off until the airplane has completed the landing roll or the rotorcraft has landed at its destination.

OMP 31-2

The following procedures apply when operating with one or more Clock inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

14 CFR Requirements: (91.205)

Aircraft under IFR must have:

(6) A clock displaying hours, minutes, and seconds with a sweep-second pointer or digital presentation.

Should this not be available, the aircraft is prohibited from flying under IFR regulations.

OMP 31-3

The following procedures apply when operating with the Flight Hour Meter inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES

To record flight time.

1. Record each takeoff time and landing time (including time zone).
2. Following each flight, add flight time to the total aircraft time in the Aircraft Log to assure compliance with maintenance and/or operations requirements.
3. Place an "INOP" placard over the Flight Hour Meter.
4. Make appropriate entry on the discrepancy report.

OMP 33-7

The following procedures apply when operating with the Fasten Seatbelt/No Smoking sign inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions (excerpt from Cessna's O&M procedure manual):

(O) FLIGHTCREW PROCEDURES

Procedure to ensure that passengers are notified of seat belt and no smoking requirements.

1. A crewmember shall use the PA system to make the appropriate announcements.
2. Place an "INOP" placard adjacent to PASS SAFETY switch.
3. Make appropriate entry in discrepancy report.

OMP 33-19

The following procedures apply when operating with the Cabin Interior Lighting system partially or fully inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHTCREW PROCEDURES

To verify Cabin Emergency Lighting is operative.

1. Disconnect main ship battery.

NOTE: The main battery and emergency battery are connected in parallel for operation of the emergency lights.

2. Position the Passenger Safety Switch on the pilot's instrument panel to PASSENGER SAFETY. Cabin entry door and emergency exit door floodlights shall illuminate.
3. Select Passenger Safety Switch to OFF.
4. Reconnect main battery.
5. Place an "INOP" placard over the affected light.
6. Make appropriate entry in discrepancy report.

OMP 33-22

The following procedures apply when operating with the Windshield Ice Detection System (Glareshield Mounted) Stalk Lights inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHTCREW PROCEDURES

To monitor for possible ice accumulation.

1. During night operations, a crewmember shall inspect the windshield for ice accumulation every half an hour using a flashing with a red lens cap, filter or bulb (to prevent deterioration of night vision) .
2. Place an "INOP" placard adjacent to affected light.
3. Make appropriate entry in discrepancy report.

OMP 34-4, 6, 9, 13, 14

The following procedures and restrictions apply when operating with any single item loss, or combination of Navigational Equipment inoperative, under the condition no passengers or cargo is being flown for hire.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

FLIGHT CREW NOTE:
This equipment may be inoperative under the following FAR defined conditions, as long as the equipment is not required for approach procedures. *If not mentioned below, and not needed for arrival or approach procedures*, any navigation source may be inoperative.

14 CFR REQUIREMENTS:

Sec. 91.205 - *Flight at and above 24,000 ft. MSL (FL 240).* If VOR navigational equipment is required under paragraph (d)(2) of this section, no person may operate a U.S.-registered civil aircraft within the 50 states and the District of Columbia at or above FL 240 unless that aircraft is equipped with approved distance measuring equipment (DME). When DME required by this paragraph fails at and above FL 240, the pilot in command of the aircraft shall notify ATC immediately, and then may continue operations at and above FL 240 to the next airport of intended landing at which repairs or replacement of the equipment can be made.
(d) *Instrument flight rules.* For IFR flight, the following instruments and equipment are required:
(2) Two-way radio communications system and navigational equipment appropriate to the ground facilities to be used.

MEL Nav FAR Requirements: QUICK REFERENCE

91 511	OVERWATER	
NAV		2- NAV RECEIVERS (appropriate for airspace)
91 205	VFR DAY	
		NO NAV RADIO REQUIREMENTS
91 507	VFR NIGHT AND OVER THE TOP	
NAV		1 -NAV RECEIVER
91 205	IFR	
NAV (d)		1 -NAV RECEIVER

(Cont'd)

Navigational Equipment FAR Requirements (CONT'D)

Sec. 91.511 - Radio equipment for overwater operations. (Appropriate sections – Large and turnojet)

(a) Except as provided in paragraphs (c), (d), and (f) of this section, no person may take off an airplane for a flight over water more than 30 minutes flying time or 100 nautical miles from the nearest shore unless it has at least the following operable equipment:

(2) Appropriate electronic navigational equipment consisting of at least two independent electronic navigation units capable of providing the pilot with the information necessary to navigate the airplane within the airspace assigned by air traffic control. However, a receiver that can receive both communications and required navigational signals may be used in place of a separate communications receiver and a separate navigational signal receiver or unit.

(c) Notwithstanding the provisions of paragraph (a) of this section, a person may operate an airplane on which no passengers are carried from a place where repairs or replacement cannot be made to a place where they can be made, if not more than one of each of the dual items of radio communication and navigational equipment specified in paragraphs (a)(1) (i) through (iv) and (a)(2) of this section malfunctions or becomes inoperative.

(1) A single long-range navigation system is installed, operational, and appropriate for the route ...

Sec. 91.507 - Equipment requirements: Over-the-top or night VFR operations. (Large and Turbojet)
No person may operate an airplane over-the-top or at night under VFR unless that airplane is equipped with the instruments and equipment required for IFR operations under §91.205(d) and one electric landing light for night operations. Each required instrument and item of equipment must be in operable condition.

Sec. 91.131 - Operations in Class B airspace. (Appropriate sections)
(a) *Operating rules.* No person may operate an aircraft within a Class B airspace area except in compliance with §91.129 and the following rules:
(c) *Communications and navigation equipment requirements.* Unless otherwise authorized by ATC, no person may operate an aircraft within a Class B airspace area unless that aircraft is equipped with --
(1) *For IFR operation.* An operable VOR or TACAN receiver.

NOTE: GPS REQUIRED FOR OPERATIONS IN RVSM AIRSPACE, RVSM STATUS MUST BE DOWN GRADED.

OMP 34-5

The following FAR excerpt applies when operating with the Radar or Lightning Detection Systems inoperative.

Aircraft may continue in service with no restrictions:

OR

The system may be inoperative provided the captain ensures that current weather reports do not indicate that thunderstorms or other potentially hazardous weather conditions that can be detected by radar, may reasonably be expected to exist along the route to be flown.

14 CFR excerpt:

NO PART 91 REQUIREMENT EXISITS.

OMP 34-8

The following procedures apply when operating with an ATC Transponder/ Altitude Encoder inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

14 CFR REQUIREMENTS: (91.215)
ATC transponder and altitude reporting equipment and use.

(a) *All airspace: U.S.-registered civil aircraft.* For operations not conducted under part 121 or 135 of this chapter, ATC transponder equipment installed must meet the performance and environmental requirements of any class of TSO-C74b (Mode A) or any class of TSO-C74c (Mode A with altitude reporting capability) as appropriate, or the appropriate class of TSO-C112 (Mode S).

(b) *All airspace.* Unless otherwise authorized or directed by ATC, no person may operate an aircraft in the airspace described in paragraphs (b)(1) through (b)(5) of this section, unless that aircraft is equipped with an operable coded radar beacon transponder having either Mode 3/A 4096 code capability, replying to Mode 3/A interrogations with the code specified by ATC, or a Mode S capability, replying to Mode 3/A interrogations with the code specified by ATC and intermode and Mode S interrogations in accordance with the applicable provisions specified in TSO C-112, and that aircraft is equipped with automatic pressure altitude reporting equipment having a Mode C capability that automatically replies to Mode C interrogations by transmitting pressure altitude information in 100-foot increments. This requirement applies --

(1) *All aircraft.* In **Class A, Class B, and Class C airspace areas;**

(2) *All aircraft.* In all airspace **within 30 nautical miles of an airport listed in** ***appendix D*****, section 1 of this part from the surface upward to 10,000 feet MSL;**

(3) Notwithstanding paragraph (b)(2) of this section, any aircraft which was not originally certificated with an engine-driven electrical system or which has not subsequently been certified with such a system installed, balloon or glider may conduct operations in the airspace within 30 nautical miles of an airport listed in appendix D, section 1 of this part provided such operations are conducted --

(i) Outside any Class A, Class B, or Class C airspace area; and

(ii) Below the altitude of the ceiling of a Class B or Class C airspace area designated for an airport or 10,000 feet MSL, whichever is lower; and

(4) All aircraft in all airspace above the ceiling and within the lateral boundaries of a Class B or Class C airspace area designated for an airport upward to 10,000 feet MSL; and

(cont'd)

ATC Transponder FAR Requirements (CONT'D)

(5) All aircraft except any aircraft which was not originally certificated with an engine-driven electrical system or which has not subsequently been certified with such a system installed, balloon, or glider -- --

(i) In all airspace of the 48 contiguous states and the District of Columbia at and above 10,000 feet MSL, excluding the airspace at and below 2,500 feet above the surface; and

(ii) In the airspace from the surface to 10,000 feet MSL within a 10-nautical-mile radius of any airport listed in appendix D, section 2 of this part, excluding the airspace below 1,200 feet outside of the lateral boundaries of the surface area of the airspace designated for that airport.

(d) *ATC authorized deviations.* Requests for ATC authorized deviations must be made to the ATC facility having jurisdiction over the concerned airspace within the time periods specified as follows:

(1) For operation of an aircraft with an operating transponder but without operating automatic pressure altitude reporting equipment having a Mode C capability, the request may be made at any time.

(2) For operation of an aircraft with an inoperative transponder to the airport of ultimate destination, including any intermediate stops, or to proceed to a place where suitable repairs can be made or both, the request may be made at any time.

(3) For operation of an aircraft that is not equipped with a transponder, the request must be made at least one hour before the proposed operation.

CFR 99.12 - Transponder-on requirements.

(a) *Aircraft transponder-on operation.* Each person operating an aircraft into or out of the United States into, within, or across an ADIZ designated in subpart B of this part, if that aircraft is equipped with an operable radar beacon transponder, shall operate the transponder, including altitude encoding equipment if installed, and shall reply on the appropriate code or as assigned by ATC.

(b) *ATC transponder equipment and use.* Effective September 7, 1990, unless otherwise authorized by ATC, no person may operate a civil aircraft into or out of the United States into, within, or across the contiguous U.S. ADIZ designated in subpart B of this part unless that aircraft is equipped with a coded radar beacon transponder.

(c) *ATC transponder and altitude reporting equipment and use.* Effective December 30, 1990, unless otherwise authorized by ATC, no person may operate a civil aircraft into or out of the United States into, within, or across the contiguous U.S. ADIZ unless that aircraft is equipped with a coded radar beacon transponder and automatic pressure altitude reporting equipment having altitude reporting capability that automatically replies to interrogations by transmitting pressure altitude information in 100-foot increments.

(d) Paragraphs (b) and (c) of this section do not apply to the operation of an aircraft which was not originally certificated with an engine-driven electrical system and which has not subsequently been certified with such a system installed, a balloon, or a glider. (CONT'D)

ATC Transponder FAR Requirements (CONT'D)

Appendix D to Part 91 - Airports/Locations: Special Operating Restrictions

Section 1. Locations at which the requirements of §91.215(b)(2) apply.

The requirements of §91.215(b)(2) apply below 10,000 feet above the surface within a 30-nautical-mile radius of each location in the following list:

Atlanta, GA (The William B. Hartsfield Atlanta International Airport)
Baltimore, MD (Baltimore Washington International Airport)
Boston, MA (General Edward Lawrence Logan International Airport)
Chantilly, VA (Washington Dulles International Airport)
Charlotte, NC (Charlotte/Douglas International Airport)
Chicago, IL Chicago-O'Hare International Airport)
Cleveland, OH (Cleveland-Hopkins International Airport)
Covington, KY (Cincinnati Northern Kentucky International Airport)
Dallas, TX (Dallas/Fort Worth Regional Airport)
Denver, CO (Denver International Airport)
Detroit, MI (Metropolitan Wayne County Airport)
Honolulu, HI (Honolulu International Airport)
Houston, TX (George Bush Intercontinental Airport/Houston)
Kansas City, KS (Mid-Continent International Airport)
Las Vegas, NV (McCarran International Airport)
Los Angeles, CA (Los Angeles International Airport)
Memphis, TN (Memphis International Airport)
Miami, FL (Miami International Airport)
Minneapolis, MN (Minneapolis-St. Paul International Airport)
Newark, NJ (Newark International Airport)
New Orleans, LA (New Orleans International Airport-Moisant Field)
New York, NY (John F. Kennedy International Airport)
New York, NY (LaGuardia Airport)
Orlando, FL (Orlando International Airport)
Philadelphia, PA (Philadelphia International Airport)
Phoenix, AZ (Phoenix Sky Harbor International Airport)
Pittsburgh, PA (Greater Pittsburgh International Airport)
St. Louis, MO (Lambert-St. Louis International Airport)
Salt Lake City, UT (Salt Lake City International Airport)
San Diego, CA (San Diego International Airport)
San Francisco, CA (San Francisco International Airport)
Seattle, WA (Seattle-Tacoma International Airport)
Tampa, FL (Tampa International Airport)
Washington, DC (Ronald Reagan Washington National Airport and Andrews Air Force Base, MD)
Section 2. Airports at which the requirements of §91.215(b)(5)(ii) apply. [Reserved]
Section 3. Locations at which fixed-wing Special VFR operations are prohibited.

(cont.)

ATC Transponder FAR Requirements (CONT'D)

The Special VFR weather minimums of §91.157 do not apply to the following airports:
Atlanta, GA (The William B. Hartsfield Atlanta International Airport)
Baltimore, MD (Baltimore/Washington International Airport)
Boston, MA (General Edward Lawrence Logan International Airport)
Buffalo, NY (Greater Buffalo International Airport)
Chicago, IL (Chicago-O'Hare International Airport)
Cleveland, OH (Cleveland-Hopkins International Airport)
Columbus, OH (Port Columbus International Airport)
Covington, KY (Cincinnati Northern Kentucky International Airport)
Dallas, TX (Dallas/Fort Worth Regional Airport)
Dallas, TX (Love Field)
Denver, CO (Denver International Airport)
Detroit, MI (Metropolitan Wayne County Airport)
Honolulu, HI (Honolulu International Airport)
Houston, TX (George Bush Intercontinental Airport/Houston)
Indianapolis, IN (Indianapolis International Airport)
Los Angeles, CA (Los Angeles International Airport)
Louisville, KY (Standiford Field)
Memphis, TN (Memphis International Airport)
Miami, FL (Miami International Airport)
Minneapolis, MN (Minneapolis-St. Paul International Airport)
Newark, NJ (Newark International Airport)
New York, NY (John F. Kennedy International Airport)
New York, NY (LaGuardia Airport)
New Orleans, LA (New Orleans International Airport-Moisant Field)
Philadelphia, PA (Philadelphia International Airport)
Pittsburgh, PA (Greater Pittsburgh International Airport)
Portland, OR (Portland International Airport)
San Francisco, CA (San Francisco International Airport)
Seattle, WA (Seattle-Tacoma International Airport)
St. Louis, MO (Lambert-St. Louis International Airport)
Tampa, FL (Tampa International Airport)
Washington, DC (Ronald Reagan Washington National Airport and Andrews Air Force Base, MD)
Section 4. Locations at which solo student pilot activity is not permitted.
Pursuant to §91.131(b)(2), solo student pilot operations are not permitted at any of the following airports.
Atlanta, GA (The William B. Hartsfield Atlanta International Airport)
Boston, MA (General Edward Lawrence Logan International Airport)
Chicago, IL (Chicago-O'Hare International Airport)
Dallas, TX (Dallas/Fort Worth Regional Airport)
Los Angeles, CA (Los Angeles International Airport)
Miami, FL (Miami International Airport)
Newark, NJ (Newark International Airport)
New York, NY (John F. Kennedy International Airport)
New York, NY (LaGuardia Airport)
San Francisco, CA (San Francisco International Airport)
Washington, DC (Washington National Airport)
Andrews Air Force Base, MD

OMP 34-12

The following procedures apply when operating with the Altitude Alerting System inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES:

For crew altitude awareness.

1. Flight plan will be made to remain outside of RVSM airspace.
2. Equipment Code used when filing the flight plan will NOT indicate RVSM capability.
3. During flight, remain outside of RVSM airspace, unless ATC authorizes a transit to the flight levels above RVSM airspace, in which case time spent within RVSM airspace will be kept to a minimum.
4. Crew briefings will include a reminder of the inoperative Altitude Alerting System.
5. Flight crew will use aural callouts pertaining to approaching target altitudes as assigned by ATC or as depicted by appropriate charts.
6. Place a placard stating, "ALTITUDE ALERTING SYSTEM INOP. FLIGHT INTO RVSM AIRSPACE NOT AUTHORIZED", adjacent to the altimeters.
7. Make appropriate entry in discrepancy report.

Additionally:

1. A Crewmember will make all callouts usually made by the Altitude Alerting system. These will include 1000' above/below, and 200' deviation from assigned altitude at a minimum.

2. Maximum use of the Autopilot altitude hold, or Flight Director altitude hold command bars shall be directed.

3. Monitor the Altimeter to ensure altitude is as desired

OMP 34-17

The following procedures apply when operating with Electronic Flight Instrument System Multifunction Display (MFD) inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) FLIGHT CREW PROCEDURES:

MFD installed with Honeywell EDZ-605 EFIS:

1. If radar is required, it should be displayed on the EHSI.
2. Place an "INOP" placard on the MFD display.
3. Make appropriate entry in discrepancy report.

Honeywell Primus 1000 EFIS System MFD:

NOTE: The Traffic Alert Display System of TCAS will be unavailable. See ATA-34 item 19-3

1. Make appropriate entry on discrepancy report.
2. Install "INOP" placard on the inoperative display unit occupying the MFD (center) position.
3. Verify both PFD's are operational.
4. If the radar is required, it should be displayed on the PFD in the 60 degree arc compass rose presentation.

OMP 34-19

(TCAS I)

The following procedures apply when operating with the Traffic Alert and Collision Avoidance (TCAS I) inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions (excerpt from Cessna's O&M procedure manual):

(M) MAINTENANCE PROCEDURES

To deactivate and secure the system.

1. Disengage and secure the TCAS circuit breaker.
2. Place a placard stating, "TCAS INOP", adjacent to the TCAS control unit.
3. Make appropriate entry in discrepancy report.

OR

1. Disengage and secure the TCAS circuit breaker.
2. Place an "INOP" placard adjacent to the TCAS control unit.
3. Make appropriate entry in discrepancy report.

(TCAS II)

To deactivate and secure the system.

1. Disengage and secure the TCAS circuit breaker.
2. Place a placard stating, "TCAS INOP", adjacent to the TCAS control unit.
3. Make appropriate entry in discrepancy report.

(Con't'd)

OMP 34-19 TCAS II (Con't)

2. Flight crew will review all appropriate enroute, approach procedure charts and NOTAMs appropriate to the flight to ensure TCAS is not required.

1) Combined TA and RA Dual Displays of the TCAS are inoperative, only.

(O) FLIGHT CREW PROCEDURES:

1. Utilizing the system self-test, crew will verify that TA and RA advisory display on flying pilot side is operational, and audio functions are operational.

2. The pilot with the operational TA and RA elements and audio functions shall conduct any subsequent maneuvering command by the RA (Resolution Advisory).

2a) One Resolution Advisory RA Display System of the TCAS is inoperative.

(O) FLIGHT CREW PROCEDURES:

1. Using test function, confirm that Traffic Alert display elements and voice command audio functions are operative.
2. Select TA ONLY mode of operation.
3. The pilot with the operational RA display shall conduct any subsequent maneuvering commanded by the RA (Resolution Advisory).
4. The non-flying pilot shall monitor the flying-pilot's vertical speed indicator/RA display during any TCAS-commanded maneuvers.

2b) Both Resolution Advisory RA Display Systems of the TCAS are inoperative.

(O) FLIGHT CREW PROCEDURES:

1. Using Test function, confirm that Traffic Alert display elements and voice command audio functions are operative.

2. Select TA only mode of operation.

3. When visual contact with traffic is made take whatever action is necessary to avoid a collision.

3) TA Display System of the TCAS is inoperative.

(O) FLIGHT CREW PROCEDURES:

1. Using Test function, confirm that RA display elements (including VSI "fly to" and "do not fly" areas) and voice command audio functions are operative.

2. Monitor VSI for RA commands.

OMP 34-21

The following procedures apply when operating with Ground Proximity Warning System (GPWS) inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(M) MAINTENANCE PROCEDURES

Should the entire system be inoperative, the following procedure will avoid nuisance erroneous warnings:

1. Pull the GPWS/TAWS circuit breaker as specified in OMP-1.
2. Make appropriate entry in discrepancy report.

CFR 91.223 Terrain awareness and warning system. (excerpt)
(a) Airplanes manufactured after March 29, 2002. Except as provided in paragraph (d) of this section, no person may operate a turbine-powered U.S.-registered airplane configured with six or more passenger seats, excluding any pilot seat, unless that airplane is equipped with an approved terrain awareness and warning system that as a minimum meets the requirements for Class B equipment in Technical Standard Order (TSO)-C151.

For entire system Inop:
PLACARD
Attach a "GPWS INOP" placard to the instrument panel.

(O) FLIGHT CREW PROCEDURES:

1. Crew briefings will include aural callouts through use of appropriate aircraft equipment to ensure obstacle and terrain clearance.
2. Place a "GPWS INOP" placard on the instrument panel.
3. Make appropriate entry in discrepancy report.

a) For Modes 1-4 inop only:
PLACARD
Attach a "GPWS MODE -- INOP" placard to the instrument panel.

(O) FLIGHT CREW PROCEDURES:

1. Crew briefings will include aural callouts through use of appropriate aircraft equipment to ensure obstacle and terrain clearance.
2. Place placard stating which specific GPWS modes are inoperative on the instrument panel.
3. Make appropriate entry in discrepancy report.

(Cont'd)

OMP 34-21 (Con't)

Ground proximity Warning System – Advisory Callouts (Cont)

d) For Advisory Callouts Inop only:
PLACARD
Attach a "GPWS ADVISORY CALLOUTS INOP" placard to the instrument panel.

(O) FLIGHT CREW PROCEDURES:

1. Crew briefings will include aural callouts through use of appropriate aircraft equipment to ensure obstacle and terrain clearance.
2. Place placard stating, "GPWS ADVISORY CALLOUTS INOP" on the instrument panel.
3. Make appropriate entry in discrepancy report.

e) For Windshear Mode Inop only:
PLACARD
Attach a "GPWS WINDSHEAR MODE INOP" placard to the instrument panel.

(O) FLIGHT CREW PROCEDURES:

1. Crew briefings will include aural callouts through use of appropriate aircraft equipment i.e., airspeed IVSI etc., and available weather reports for detection and prompt resolution of windshear encounter.
2. Prior to each takeoff and prior to each approach, crew will obtain available weather reports to ensure windshear conditions are neither reported nor forecast in the aircraft flight path.
3. Place a placard stating, "GPWS WINDSHEAR MODE INOP" on instrument panel.
4. Make appropriate entry in discrepancy report.

2) For FLTA/PDA Functions Inop only:

(O) FLIGHT CREW PROCEDURES:

1. Crew briefings will include
   a) Review of significant terrain expected to be encountered and obstacles in the airport area.
   b) Aural callouts to be used through use of appropriate air-craft equipment to ensure obstacle and terrain clearance.
   c) Review of MSA and step-down fixes of the approach, and means to verify and call out passage of these points.
2. Flight Manual and Operating Manual can be consulted for climb gradients available for the phase of flight being approached, and the ambient conditions (weight, temp, altitude). 2 engine climb is in Section VII of the Operating Manual Climb Tables and the AFM Landing Gross Climb Gradient table. For single engine climb capability, consult AFM Section IV, Second Segment Net Climb, Enroute Net Climb and Approach Gross Gradient Tables.
3. Place a placard stating, "GPWS FORWARD LOOKING TERRAIN AVOIDANCE AND PREMATURE DESCENT FUNCTIONS INOP" on instrument panel.
4. Make appropriate entry in discrepancy report.

OMP 34-27

The following procedures apply when operating with Flight Director Mode Annunciators inoperative.

May be inoperative provided the flight crew verifies that the annunciation(s) displayed on the PFD is appropriate to the function selected.

(O) FLIGHT CREW PROCEDURES:

To verify aircraft has operable Flight Director Mode displays on a PFD or EADI, and mode verification procedures.

1. During flight, crew member selecting a flight director mode will verbalize the mode selected.
2. Second crew member will respond by verbalizing the flight director mode displayed on the PFD.
3. Place an "INOP" placard on the affected annunciator.
4. Make appropriate entry on discrepancy report.

OMP 34-28

The following procedures apply when operating with Navigation Databases Inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

NOTE: Any out of date Database is considered to be inoperative.

(O) FLIGHT CREW PROCEDURES:

To verify status and suitability of Navigation Facilities used to define route of flight.

1. Crewmember shall verify the type, suitability, and operational status of each Navigational Facility to be used during route of flight, either by a current Aeronautical Chart, or Airport Facilities Directory, or verbally with FAA personnel, such as through a Flight Service Station briefer.
2. Once tuned, each Navigational Facility shall be identified using the audible signal transmitted by the Facility.
3. Place a placard stating, "NAVIGATION DATABASE IS NOT CURRENT", adjacent to FMS CDU Controller.
4. Make appropriate entry in discrepancy report.

OMP 35-3

The following procedures apply when operating with the Oxygen Tank Fill Port inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions to fill bottle and determine there are no leaks:

(M) MAINTENANCE PROCEDURES

WARNING: Do not permit smoking or open flame near airplane while maintenance or other activities are being performed on oxygen system.

WARNING: Combustible material may burn or explode spontaneously when contacted by oxygen under pressure.

WARNING: Entire oxygen system shall be free of oil, grease or other contaminates to avoid the danger of spontaneous combustion and/or explosion when in contact with oxygen under pressure.

WARNING: Do not use tape or caps which will introduce moisture.

WARNING: Entire oxygen system shall be free of foreign matter to prevent dust and debris contamination of breathing oxygen and to prevent the clogging of any mechanisms.

For nose mounted installations:

1. Open the right nose door and remove the access panel to gain access to the oxygen cylinder. Refer to Maintenance Manual Chapter 6, Access Plates and Panels Identification – Description and Operation.

WARNING: Maintenance personnel Shall adhere to the oxygen system precautions.

2. Cut safety wire and position the oxygen cylinder shutoff valve to OFF.
3. Disconnect and cap the line from the back side of the oxygen filler port to the oxygen cylinder at the neck of the cylinder slowly to allow trapped air to escape.
4. Place additional maintenance personnel inside the cockpit to monitor the oxygen pressure gauge.
5. Connect oxygen supply to the oxygen cylinder, position the oxygen cylinder shutoff valve to OPEN and slowly fill the cylinder. Refer to Maintenance Manual Chapter 12, Oxygen – Servicing.
6. When the desired pressure has been obtained, position the oxygen cylinder shutoff valve to OFF. Turn off the oxygen supply and disconnect the supply line.
7. Clean old Teflon tape from oxygen cylinder fitting and apply new tape.
8. Uncap and reconnect the oxygen filler port line to the neck of the oxygen cylinder.
9. Position the oxygen cylinder shutoff valve to ON and safety wire shutoff valve. Refer to Maintenance Manual Chapter 20, Safetying – Maintenance Practices.
10. Install access panel.
11. Close and secure nose baggage door.
12. Place an "INOP" placard adjacent to filler port.
13. Make appropriate entry in discrepancy report.

(Cont'd)

OMP 35-3 (Con't)

For tail mounted installations:

1. Remove tailcone access panel to gain access to oxygen cylinder. Refer to Maintenance Manual Chapter 6, Access Plates and Panels Identification – Description and Operation.
2. Cut safety wire and position the oxygen cylinder shutoff valve to OFF.
3. Disconnect and cap the line from the back side of the oxygen filler port to the oxygen cylinder at the neck of the cylinder slowly to allow trapped air to escape.
4. Place additional maintenance personnel inside the cockpit to monitor the oxygen pressure gauge.
5. Connect oxygen supply to the oxygen cylinder, position the oxygen cylinder shutoff valve to OPEN and slowly fill the cylinder. Refer to Maintenance Manual Chapter 12, Oxygen – Servicing.
6. When the desired pressure has been obtained, position the oxygen cylinder shutoff valve to OFF. Turn off the oxygen supply and disconnect the supply line.
7. Clean old Teflon tape from oxygen cylinder fitting and apply new tape.
8. Uncap and reconnect the oxygen filler port line to the neck of the oxygen cylinder.
9. Position the oxygen cylinder shutoff valve to ON and safety wire shutoff valve. Refer to Maintenance Manual Chapter 20, Safetying – Maintenance Practices.
10. Install access panel.
11. Place an "INOP" placard adjacent to filler port.
12. Make appropriate entry in discrepancy report.

OMP 38-1

The following procedures apply when operating with Potable Waste System inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(M) MAINTENANCE PROCEDURES

NOTE: Potable water systems in the 500-Series Citations include, but are not limited to: Water tanks in the upper aft vanity plumbed and gravity-fed to a wash basin, Water tanks with spigots in the refreshment centers, Water tanks (optional on 500's and 550's) mounted in part of the forward partition, using an electric pump to feed a wash basin, installed in conjunction with the optional forward lavatory installation.

1. Make appropriate discrepancy report entry.
2. Place an "INOP" placard near the inoperative water system (faucet or spigot).

For Aft Vanity Water Storage Tank:

1. Remove access panels from upper vanity as needed to access tank.
2. On most installations, turn the two fasteners at the top of the tank and depress the collar on the quick disconnect water line connection to release the tank.
3. Inspect tank and plumbing for leaks and dampness.
4. Drain tank, and put in place without reconnecting plumbing.
5. Reinstall access panels.

For Refreshment Center Liquid Storage Tanks:

1. Remove access panels from Refreshment Center as needed to access tank.
2. Slide tank out of its compartment, disconnect and cap any electrical connectors.
3. Inspect tank and plumbing for leaks and dampness.
4. Drain tank, and remove any plumbing lines.
5. Replace tank without reconnecting any removed electrical or plumbing connections.
6. Reinstall access panels.

OMP 38-2

The following procedures apply when operating with Lavatory Waste System inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(M) MAINTENANCE PROCEDURES

1. Make appropriate discrepancy report entry.
2. Clean all components with disinfectant.
3. Place bag over toilet seat or relief tube, as appropriate, with placard stating "TOILET IS INOP. DO NOT SERVICE", or "RELIEF TUBE IS INOP."

For flushing toilet:

1. Lift seat assembly or remove access cover to gain access to wiring.
2. Disconnect ship wiring from toilet.
3. Insulate and label all exposed wires to prevent any shorts and to facilitate future re-connection.
4. Visually inspect tank and reservoir for any leaks. Correct any leaks prior to flight.

For non-flushing toilet:

1. Dispose of receptacle bag, if needed.
2. Clean receptacle with disinfectant.

For relief tube:

No other action is needed.

ADDITIONAL OPERATOR PROCEDURES

1. Ensure passengers are briefed on proper use of the partially disabled system, should a single component be affected.

2. Ensure passengers are briefed on unavailability of Lavatory facilities, should the entire system be deactivated.

OMP 52-4

The following procedures apply when operating with the Door Key Locks inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) OPERATOR PROCEDURES

Aft Baggage door / Tailcone door:

1. Make appropriate entry in the discrepancy report.
2. Place an "INOP" placard next to the effected lock.
3. Have a member of the flight crew verify that the door is closed and latched and the lock is in the unlocked position.

Nose Baggage Door:

1. Make appropriate entry in the discrepancy report.
2. Place an "INOP" placard next to the affected lock.
3. Ensure that items stored in the nose baggage area are not blocking required inspection locations.
4. Have a member of the flight crew verify that the door is closed and latched and the lock is in the unlocked position.

Single Point Refueling Door:

1. Make appropriate entry in the discrepancy report.
2. Place an "INOP" placard next to the effected lock.
3. Have a member of the flight crew verify that the door is closed and latched and the lock is in the unlocked position.

OMP 52-5

The following procedures apply when operating with the Air Stairs Cable inoperative.

May be Inoperative provided the cable does not interfere with operation of the door. Cable must be stowed, so as to not hinder entrance or exit.

(O) OPERATOR PROCEDURES

1. Place a large placard reading "NO STEP" on each step, covering the step entirely.
2. Make appropriate discrepancy report entry.
3. During boarding and deplaning, lower the steps to prevent them from blocking the door and impeding passenger movement.
4. One member of the flight crew should be the last to board, and the first to deplane, in order to assist passengers on and off the aircraft.
5. Some form of portable steps, maintenance stand, ramp, etc. should be placed on the ground adjacent to the aircraft door, allowing passengers to move on and off the aircraft without stepping on the stairs. If necessary, place a platform or ramp on the door threshold, extending to the temporary steps or ground.
6. Ensure that all steps, ramps, and any other foreign objects are removed from the ramp area surrounding the aircraft prior to engine start.

OMP 52-6

The following procedures apply when operating with the Cabin Door Seal inoperative.

Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(O) OPERATOR PROCEDURES

To configure and operate the aircraft unpressurized at 10,000 feet MSL or below.

1. A member of the crew shall close and latch the door from the inside and outside of the aircraft to determine that the door seal does not interfere with door operation.
2. Lift red EMER DUMP toggle switch cover and activate EMER DUMP.
3. Prior to taxi, set Cain Controller above 10,000 feet MSL.
4. Turn Cabin Rate knob full clockwise.
5. Place a placard stating, "CABIN DOOR SEAL INOP. FLIGHT ABOVE 10,000 FEET MSL NOT AUTHORIZED", above pressurization controls.
6. Make appropriate entry in discrepancy report.

OMP 78-1

The following procedures apply when operating with One or Both Thrust Reverser(s) inoperative.

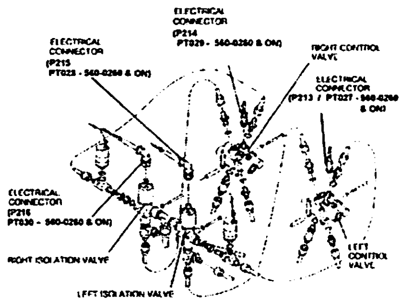
Aircraft may continue in service provided authorized personnel comply with the following procedures and/or restrictions:

(M) MAINTENANCE PROCEDURES

To secure the appropriate thrust reverser.

If only one thrust reverser is to be disabled, accomplish only those steps which are applicable to that thrust reverser. One or both thrust reversers may be disabled for flight. These procedures should be accomplished by a qualified aircraft mechanic unless a hands-on training program is included in the MEL for non-maintenance crewmembers.

Disconnect, cap and stow the following electrical connectors:



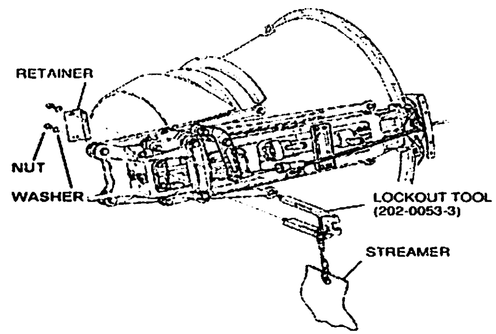
NOTE: Protect/Cover each of the disconnected electrical connectors by utilizing heat shrink tubing. Slide heat shrink tubing over end of connector leaving an excess of the tubing to be folded back and tied.

A. Electrical connector (P213); left thrust reverser control valve.
B. Electrical connector (P214); right thrust reverser control valve.
C. Electrical connector (P215); left thrust reverser isolation valve.
D. Electrical connector (P216); right thrust reverser isolation valve.
E. If both thrust reversers have been disabled, disengage both thrust reverser circuit breakers and install grommets or tie-wrap on each button to prevent inadvertent engagement of the circuit breakers. If only one thrust reverser has been disabled for flight, both thrust reverser circuit breakers must remain engaged to provide electrical power for the operational thrust reverser and annunciation for both thrust reversers.

(cont'd)

OMP 78-1 (cont'd)

**THRUST REVERSER
MECHANICAL DISABLING – Fig. 1**

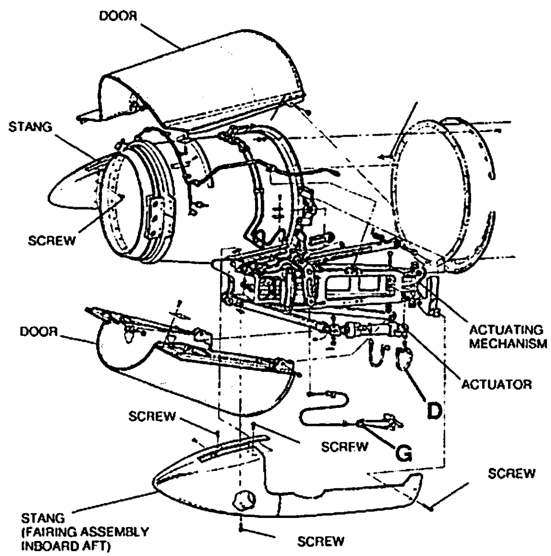


RIGHT ENGINE OUTBOARD SIDE

(cont'd)

OMP 78-1 (cont'd)

THRUST REVERSER
MECHANICAL DISABLING – Fig. 2



VII

NEF PROGRAM MANUAL

Nonessential Equipment and Furnishings (NEF) Program Manual

CESSNA CITATION 501

Operator: Two Winds Aviation, LLC

27 January 2014

ORIGINAL

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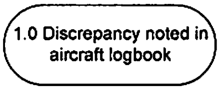
NEF DECISION MAKING PROCESS

1.0 Discrepancy noted in aircraft logbook. **The inoperative, damaged or missing item must be identified and documented in the aircraft logbook (or other approved location) by:**

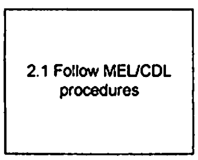


1. Pilots; or
2. Company maintenance personnel; or
3. Personnel authorized and approved to perform such function by the RVSM Responsible Person.

2.0 Can the item be deferred in accordance with (IAW) the MMEL?

1. If the inoperative, damaged, or missing item is listed in the aircraft's MMEL, then the deferral procedures listed in the MMEL for that item must be followed. If the item is a subcomponent of a primary system identified in the MMEL, where no previous relief was authorized, the subcomponent **<u>may not be deferred</u>** in accordance with the NEF procedures outlined in chapter 25 of the MMEL or MEL.

2.1 Follow MMEL procedures.



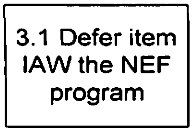
1. If the item is identified in another part of the MMEL, then the procedures approved for the deferral of such item must be followed.

3.0 Is item on the Two Winds Aviation, LLC NEF deferral list?

1. Is the item on the NEF deferral list? If yes, then follow the NEF deferral procedures in step 3.1. (Items that are not previously on the NEF list should proceed to step 4.0.)

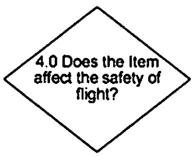
NEF DECISION MAKING PROCESS (contd)

3.1 Defer item IAW the NEF deferral program.



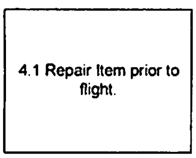
1. If the item is identified in the NEF deferral list, then the procedures approved for the deferral of such item shall be followed.

4.0 Does the item affect the safety of flight?



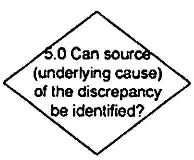
1. Is it obvious from a maintenance or operational perspective that the item, in and of itself, could have an adverse effect on the safe conduct of flight? If there is an obvious safety-of-flight issue, then the inoperative, damaged, or missing item may not be deferred and step 4.1 shall be followed.

4.1 Repair item prior to flight.



1. The item cannot be deferred and must be repaired prior to flight.

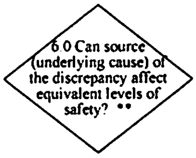
5.0 Can source (underlying cause) of the discrepancy be identified? (If applicable)



1. Can the source of the discrepancy be identified? This step may or may not apply to the item under consideration. If the source can be identified, then proceed to step 6.0, otherwise proceed to step 4.1.

NEF DECISION MAKING PROCESS (contd)

6.0 Can source (underlying cause) of discrepancy affect equivalent levels of safety?



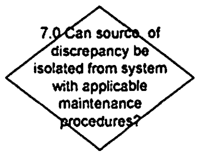
1. If the source (underlying cause) of the discrepancy affects equivalent levels of safety, then it must be determined if it can be isolated from all other systems so as to alleviate any safety concern.

** Note: **In making this determination, very close coordination between the RVSM Responsible Person, pilots, maintenance and operations personnel is required.**

2. If, after review, the source of the discrepancy could be considered a safety-of-flight concern, the item must be repaired prior to flight (step 4.1). If the source of the discrepancy is not a safety-of-flight concern then defer the item in accordance with the approved NEF procedures in step 8.0. If it cannot be determined, or is uncertain, that the source of the discrepancy is a safety-of-flight concern then proceed to 7.0.

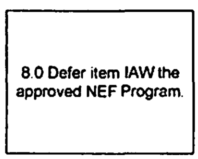
NEF DECISION MAKING PROCESS (contd)

7.0 Can source (underlying cause) of discrepancy be isolated from the system with applicable maintenance procedures?



1. If applicable, the source (underlying cause) of the discrepancy must be isolated from all other systems so as to alleviate the safety-of-flight concern.
2. If the item cannot be safely isolated then the item must be repaired prior to flight (step 4.1).
3. If isolated, the isolation of the source must pass the entire test identified in the evaluative process (steps 4.0-7.0) for the item.
4. If source can be isolated then proceed to step 8.0.

8.0 Defer Item IAW the Two Winds Aviation, LLC NEF program.



1. Defer the item if, after completing the previous 8 steps, the item can be deferred IAW the NEF program.

Note: Before an item can be deferred as an NEF item, the NEF program evaluation process for determining shall be followed if an item can be considered a NEF. Although NEF items are not safety-of-flight items, they have not been evaluated through the normal AEG review process and therefore require the concurrence of the Flight Crew, Maintenance, and Operational personnel, if applicable. NEF items are **not** deferred under the authority of an airframe and powerplant certificate but rather the item is deferred under the NEF program.

NEF DECISION MAKING PROCESS (cont'd)

The evaluation process should determine items such as:

a. Is the item required for the operational rules in which the aircraft is operated?

b. Does it create the potential for fire/smoke or other hazardous conditions?

c. Could it have an adverse effect on other required systems or components?

d. Does its condition potentially affect the safety of passengers, crew, or service personnel?

e. Could it have a negative impact on emergency or abnormal procedures?

f. Does it create additional workload for the crew at critical times of flight or flight preparation?

g. Crewmembers may need to evaluate the deferred NEF on a flight-by-flight basis.

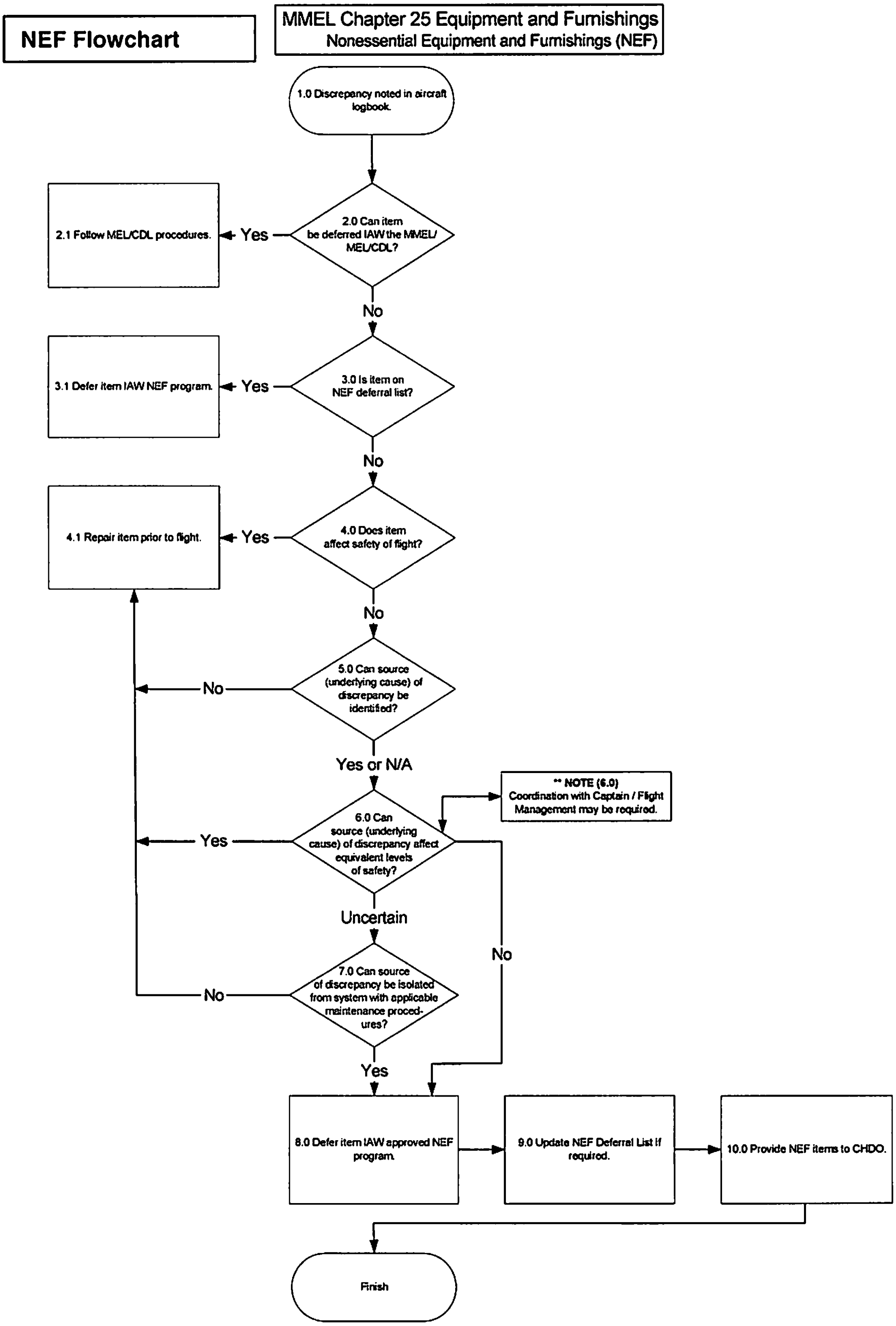
Note: The above evaluation process must be accomplished for the inoperative, damaged, or missing items at its face value, and also for the underlying cause of the discrepancy

NEF DECISION MAKING PROCESS (contd)

9.0 Update Two Winds Aviation, LLC NEF deferral list as required.

9.0 Update NEF Deferral List as required.

1. **Two Winds Aviation, LLC** will continually add items to the NEF list as they see fit.


NEF Flowchart
MMEL Chapter 25 Equipment and Furnishings
Nonessential Equipment and Furnishings (NEF)
1.0 Discrepancy noted in aircraft logbook.
2.0 Can item be deferred IAW the MMEL/ MEL/CDL?
Yes
2.1 Follow MEL/CDL procedures.
No
3.0 Is item on NEF deferral list?
Yes
3.1 Defer item IAW NEF program.
No
4.0 Does item affect safety of flight?
Yes
4.1 Repair item prior to flight.
No
5.0 Can source (underlying cause) of discrepancy be identified?
No
Yes or N/A
6.0 Can source (underlying cause) of discrepancy affect equivalent levels of safety?
** NOTE (6.0) Coordination with Captain / Flight Management may be required.
Yes
No
Uncertain
7.0 Can source of discrepancy be isolated from system with applicable maintenance proced-ures?
No
Yes
8.0 Defer item IAW approved NEF program.
9.0 Update NEF Deferral List if required.
10.0 Provide NEF items to CHDO.
Finish

COMPARTMENT AREA			REMARKS AND EXCEPTIONS
FLIGHT DECK			
1 Coat and/or Hat Hooks			May be missing or inoperative.
2 Circuit Breaker Guards			(O) May be missing or inoperative. **OPERATIONAL PROCEDURE** 1. Using zip-ties, secure the affected circuit breaker(s). 2. Make appropriate entry in discrepancy report.
3 Cup Holders			May be missing or inoperative.
4 Document Holder			(O) May be missing or inoperative. **OPERATIONAL PROCEDURE** 1. Place required documents in a clear plastic bag. 2. Tape bag adjacent to document holder. 3. Make appropriate entry in discrepancy report.
5 Eyebrow Window Visor			May be missing or inoperative.
6. Spring Clip (located left/right of document holder)			May be missing or inoperative.

COMPARTMENT AREA				**REMARKS AND EXCEPTIONS**
FLIGHT DECK				
7 Seat Belt Tidy Clip				May be missing or inoperative.
8 Spare Bulb Kit and Contents				May be missing or inoperative.
9 Yoke Chart Clip(s)				May be missing or inoperative.
10 Sunshades				May be missing or inoperative.
11 Carpet				May be missing, frayed or inoperative.
12 Foot Tread Trim				May be missing, frayed or inoperative.
13 Logbook Holder				May be missing or inoperative.

COMPARTMENT AREA				REMARKS AND EXCEPTIONS
FLIGHT DECK				
14 Power Outlet				(M) May be missing or inoperative provided is secured. **MAINTENANCE PROCEDURE** 1. Electrically isolate system from aircraft power supply. 2. Place an INOP placard on outlet. 3. Make appropriate entry in discrepancy report.
15 Second Microphone Holder				May be missing or inoperative.
16 Side Panel Door Cover				May be missing or inoperative.
17 Spare Headset				May be missing or inoperative.
18 Trim (Seat, sidewall, overhead, etc.)				May be missing, frayed or inoperative.

COMPARTMENT AREA			REMARKS AND EXCEPTIONS
CABIN GENERAL			
1 Appearance Items (Cabin Interior Trim, Carpet/Floor Coverings, Curtains/Tiebacks, Wall Coverings – including sidewall panels; excluding sidewall return air grills)			May be missing, frayed or inoperative.
2 Safety Demo Equipment (Safety Belt, Life Vest, O2 Mask)			(O) May be missing or inoperative provided alternate procedures are established and used. **OPERATIONAL PROCEDURE** 1. A member of the crew shall ensure all passengers are briefed on all applicable emergency procedures. 2. If inoperative, place an INOP placard on affected equipment. 3. Make appropriate entry in discrepancy report.
3 Coat Hanger Installation			May be missing or inoperative.
4 Cabin Lighting/Signs (Reading lights, Light Lens/Covers) **NOTE:** Only items not covered by MEL ATA 33.			May be missing loose, damaged or inoperative provided affected light functions normally.

COMPARTMENT AREA				REMARKS AND EXCEPTIONS
CABIN GENERAL				
5 Spare Life Vest				May be missing or inoperative provided operating rules do not require its use.
6 Magazine Rack/Restraint				May be missing or inoperative.
7 Cabin Mirrors				May be missing damaged or inoperative.
8 Cabin Windows (Interior Cosmetic Pane, Interior Panel, Shades and Window Trim)				May be crazed, damaged, soiled, loose, missing or inoperative. **NOTE:** Any exposed wiring must be protected.
9 Handheld Fire Extinguisher Safety Pin Restraining Device				May be missing or inoperative. **NOTE:** Safety pin must be intact and fire extinguisher fully serviceable.
10 Cabin Handset Cradle				May be damaged or soiled provided handset is fully functional.
11 Electrical Outlets				(M) May be missing or inoperative provided is secured. **MAINTENANCE PROCEDURE** 1. Electrically isolate system from aircraft power supply. 2. Place an INOP placard on outlet. 3. Make appropriate entry in discrepancy report.

COMPARTMENT AREA				REMARKS AND EXCEPTIONS
CABIN GENERAL				
12 Therapeutic Oxygen Fittings				(O) May be missing or inoperative provided alternate oxygen supply is available at each affected seat(s). **OPERATIONAL PROCEDURE** 1. Refer to applicable operating rule(s) for oxygen requirements for the intended flight. 2. Ensure adequate oxygen supply is available for each affected seat. 3. Place an INOP placard on affected equipment 4. Make appropriate entry in discrepancy report.
13 Universal Precaution Kit				May be missing or inoperative and contents used.
14 Spare Life Vest Bag				May be damaged or soiled provided vest is fully serviceable.
15 Cabin Speakers				Background static may be audible over speaker provided speaker is functional.
16 Literature Pockets (Seatback, Bulkhead, Sidewall)				May be missing, damaged or inoperative.
17 Aircraft removable Equipment (Dry Linen Storage, Waste Containers)				May be missing or inoperative.

COMPARTMENT AREA				REMARKS AND EXCEPTIONS
GALLEY				
1 Coffee Maker(s)				(M) May be missing or inoperative provided coffee maker(s) are electrically isolated. **MAINTENANCE PROCEDURE** 1. Pull and secure affected coffee maker(s) circuit breaker. 2. Place an INOP placard on the affected coffee maker(s). 3. Make appropriate entry in discrepancy report.
2 Coffee/Tea Brewing Pots				May be missing or inoperative.
3 Water Boiler(s)				(M) May be inoperative provided boiler(s) are electrically isolated **MAINTENANCE PROCEDURE** 1. Pull and secure affected boiler(s) circuit breaker. 2. Place an INOP placard on the affected boiler(s). 3. Make appropriate entry in discrepancy report.
4 Waste Containers				May be missing or inoperative.
5 Carriers				May be missing or inoperative.
6 Air Gaspers				May be failed ON.

COMPARTMENT AREA				REMARKS AND EXCEPTIONS
PASSENGER COMPARTMENT				
ENTERTAINMENT SYSTEMS(S)				
1 Projection Screen(s)				May be missing, damaged or inoperative.
2 Video Monitor(s)				May be missing, damaged or inoperative.
3 CD/DVD/Video Cassette Player(s)				(M) May be inoperative provided system(s) are electrically isolated. **MAINTENANCE PROCEDURE** 1. Pull and secure affected system(s) circuit breaker. 2. Place an INOP placard on the affected system(s). 3. Make appropriate entry in discrepancy report.
5 Headphone Jack(s)				May be missing, damaged or inoperative.

COMPARTMENT AREA				REMARKS AND EXCEPTIONS
PASSENGER COMPARTMENT				
PASSENGER SEATS				
1 Headrest(s)				May be missing, damaged, torn, soiled, frayed or inoperative.
2 Footrest(s)				May be missing, damaged, torn, soiled, frayed or inoperative.
3 Seat Trim				May be missing, damaged, torn, soiled, frayed or inoperative.
4 Seat Cushions				May be missing, damaged, torn, soiled, frayed or inoperative.
5 Seat Belt Tidy Clip(s)				May be missing, damaged, torn, soiled or inoperative.

COMPARTMENT AREA				**REMARKS AND EXCEPTIONS**
PASSENGER COMPARTMENT				
LAVATORY				
1 Door Spring(s)				May be missing or inoperative.
2 Sanitizer Dispenser				May be missing or inoperative.
3 Toilet Seat Cover Holder				May be missing, damaged, torn, soiled, frayed or inoperative.
4 Toilet Paper Roller				May be missing, damaged or inoperative.
5 Lights				May be missing or inoperative.
6 Assist Handle(s)				May be missing, damaged or inoperative.
7 Toilet Seat Lid				May be missing, damaged or inoperative.
8 Toilet Seat				May be missing, damaged or inoperative.
9 Soap Holder				May be missing, damaged or inoperative.

COMPARTMENT AREA				REMARKS AND EXCEPTIONS
SERVICE BAYS				
1 Potable Water Service Bay				
1 Hold Open Rods or Lanyards				May be missing, damaged or inoperative.
2 Dust Cover for Service Ports				May be missing, damaged or inoperative.
3 Water Quantity Indication				May be damaged or inoperative.
4 Dust Cap Chains or Lanyards				May be missing, damaged or inoperative.
2 Toilet Service Bay				
1 Hold Open Rods or Lanyards				May be missing, damaged or inoperative.
2 Dust Cover for Service Ports				May be missing, damaged or inoperative.
3 Dust Cap Chains or Lanyards				May be missing, damaged or inoperative.

COMPARTMENT AREA				REMARKS AND EXCEPTIONS
BAGGAGE AND CARGO				
1 Air Outlets				
1 Trim				May be missing, damaged, torn, soiled or frayed.
2 Vent Grill				May be damaged or soiled.
2 Cargo Compartment				
1 Floor Panel(s)				May be damaged, torn, soiled or frayed.
2 Anti Skid/Non Slip Paint and/or Tape				May be missing, damaged, torn, soiled or frayed.
3 Profile Bar				May be missing, damaged, bent or inoperative.
4 Floor Panel Screws				No more than __3__ screws may be missing from single panel. **NOTE:** Ensure missing screws do not create FOD in the aircraft.
5 Door Panel Lanyard				May be missing or damaged.
				Continued Next Page

COMPARTMENT AREA				REMARKS AND EXCEPTIONS

VIII

CREW INFORMATION

King Schools Certification

Training Completion Certificate

This is to certify that

Mark Metzger

Pilot Certificate Number: 3116809

has completed the King Schools Course

Reduced Vertical Separation Minimum
(FAR Part 91 Appendix G and ICAO Annex 6)

on

August 13, 2013

John King
John King
1979365 AIGI

Martha King
Martha King
1979366 AIGI

King Schools, Inc. • 3840 Calle Fortunada • San Diego, CA 92123 • 1-800-854-1001 • (858) 541-2200 • www.kingschools.com

KING SCHOOLS

CERTIFICATE of ACHIEVEMENT

This is to certify that

MARK METZGER

has completed the course

MNPS PROCEDURES

conducted by ATR Inc.

January 26, 2014

Valid for 24 months after the above date

Walter A. Bradshaw,
TWA Captain Ret.
AGI 1820188

Validation code: p0Vv6LAHZJ
Validate at: http://www.waltbradshaw.com/verify-cert.htm

CERTIFICATE of ACHIEVEMENT

This is to certify that

MARK METZGER

has completed the course

RNAV/RNP-10 CERTIFICATION

conducted by ATR Inc.

Walter A. Bradshaw,
TWA Captain Ret.
AGI 1820188

January 27, 2014

Valid for 24 months after the above date

Validation code: b1K27ulmPn
Validate at: http://www.waltbradshaw.com/verify-cert.htm

IX

REFERENCE MATERIALS

NOTE: The following sections (IX thru XII) are for reference only. They contain information pertinent to the RVSM systems on this aircraft and are **not** required to be updated with revisions, nor are they required to be kept in the RVSM Operations Manual onboard the aircraft.

X

AIRPLANE FLIGHT MANUAL

(Selected Pages)

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR

CESSNA

CITATION SERIES 500/501 AND 551 AIRCRAFT

EQUIPPED WITH

A SINGLE FLIGHT DIRECTOR

WITH

REDUCED VERTICAL SEPARATION MINIMUM (RVSM) CAPABILITY

Reg. No. N 2158U

S/N 0091

This supplement must be attached to the FAA Approved Flight Manual, as shown in the table below, when the aircraft is modified in accordance with Supplemental Type Certificate Number ST01639CH/SA01637CH, and the maintenance instructions for Initial and Continued Airworthiness contained therein and in accordance with the ElectroSonics Supplemental Type Certificate ST01392CH-D or SA01558CH-D, as appropriate.

AIRCRAFT	AFM DOCUMENT NO.
500	500FM
501	501FM
551	551FM

The information contained herein supplements or supersedes the basic manual only in those areas listed. For Limitations, Procedures, and Performance information not contained in this Supplement, consult the basic Airplane Flight Manual.

FAA Approved: [signature]
for Charles L. Smalley, Manager
Systems & Flight Test Branch
Chicago Aircraft Certification Office
Federal Aviation Administration
Des Plaines, IL

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

LOG OF REVISIONS

REV. NO.	EFFECTED PAGE (s)	DESCRIPTION	DATE	APPROVED BY
Orig. Issue	All	Complete supplement	MAY 0 6 2002	[signature]
A	1 2 6	Included reference to equipment STC. Updated Log of Revisions. Included reference to equipment STC, AIU P/N 9B-81040-26, and optional requirements for TAT probe installation.	JUN 0 3 2002	[signature]

NOTE: All revisions are indicated by a black vertical line along right margin.

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

TABLE OF CONTENTS

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

SECTION I – INTRODUCTION

NO CHANGE.

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

SECTION II – OPERATING LIMITATIONS

General

This aircraft has been evaluated in accordance with 14CFR, Part 91, Appendix G, "Operation in Reduced Vertical Separation Minimum (RVSM) Airspace", and FAA Memorandum 91-RVSM, Change 1, dated 30 June 1999, "Interim Guidance Material on the Approval of Operators/Aircraft for RVSM Operations" and is qualified for operation as a group aircraft in RVSM airspace. This finding does not constitute approval to conduct Reduced Vertical Separation Minimum operations.

Altitude Display Differences

The Pilot's and Copilot's displayed altitude must remain within 200 feet of each other, at all times, during RVSM operation. If the Pilot's and Copilot's displayed altitude deviates by more than 200 feet, RVSM operation is not permitted.

Air Data Computer

During RVSM operations, the same ADDU must provide input to the autopilot and the transponder.

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

SECTION II – OPERATING LIMITATIONS

Altimetry System Instrumentation

The following equipment must be installed and operational per FAA STC ST01392CH-D or SA01558CH-D to enter RVSM airspace:

Description	Manufacturer	Model	Part Number
Air Data Display Unit #1 (ADDU1)	IS&S	ADDU	9D-80130-16
Air Data Display Unit #2 (ADDU2)	IS&S	ADDU	9D-80130-16
Analog Interface Unit (AIU)	IS&S	AIU	9B-81040-15 or 9B-81040-26
Configuration Module #1 (CM1)[1]	IS&S	CM	9B-03508-15
Configuration Module #2 (CM2)[1]	IS&S	CM	9B-03508-15
Transponder #1 & #2 [2][3]	Collins or Honeywell	TDR-90 or XS-850	622-1270-001 or 7510774-901
Autopilot	Sperry/Honeywell	SP-200	4008519-941
Altitude Alerter	Intercontinental Dynamics or Honeywell	- or VN-212	540-23989-311 or 4020571-904
Standby Altimeter [4]	As noted	As noted	As Noted
Total Air Temperature (TAT) Probe[5]	Rosemount	-	102AU1AG

NOTES

1. When the IS&S Configuration Module (P/N 9B-03508-15) is correctly installed, the Air Data Display Units (ADDU) will display "CES1" at start-up. If either ADDU does not display "CES1" at start-up, RVSM operations are prohibited.
2. Any Transponder that meets or exceeds the requirements of one of the following Technical Standard Orders (TSO) may be substituted for those listed. TSO-C66a or TSO-C47c (Mode C); TSO-C112 (Class 2a; Mode S); TSO-C112a (Mode S).
3. If only one transponder is operational, it must be capable of reporting from either the pilot's or copilot's ADDU.
4. For RVSM operations, a standby altimeter that meets or exceeds the requirements of TSO-C10b must be installed.
5. For RVSM operations, the TAT Probe, (if installed), must be installed at Station 81.0 below the right hand nose baggage door.

Any deviation from this equipment list (except as noted) invalidates RVSM approval of this aircraft; however, operations outside of RVSM airspace may be conducted as required.

SECTION III – OPERATING PROCEDURES

EMERGENCY PROCEDURES

NO CHANGE.

SECTION III - OPERATING PROCEDURES

ABNORMAL PROCEDURES

1. **Failure of ADDU1 in RVSM Airspace**
   A. Determine Aircraft Altitude Using Copilot's Altimeter (ADDU2).
   B. Verify Autopilot/Altitude Hold, Altitude Alerter And Transponders Are Selected To ADDU2 (Copilot's ADDU) By Selecting The ADDU1/ADDU2 Transfer Switch To ADDU2.
   C. Cross-Check Aircraft Altitude Using Standby Altimeter- Record Each Altimeter Reading. The Difference Between The Copilot ADDU And The Standby Altimeter Readings Should Be Noted For Use In Additional Contingency Situations. Repeat Procedure Each Hour.
   D. Notify ATC Of Loss Of Redundancy Of Primary Altimetry Systems.

2. **Failure of ADDU2 in RVSM Airspace**
   A. Determine Aircraft Altitude Using Pilot's Altimeter (ADDU1).
   B. Verify Autopilot/Altitude Hold, Altitude Alerter And Transponders Are Selected To ADDU1 (Pilot's ADDU) By Selecting The ADDU1/ADDU2 Transfer Switch To ADDU1.
   C. Cross-Check Aircraft Altitude Using Standby Altimeter- Record Each Altimeter Reading. The Difference Between The Pilot ADDU And The Standby Altimeter Readings Should Be Noted For Use In Additional Contingency Situations. Repeat Procedure Each Hour.
   D. Notify ATC Of Loss Of Redundancy Of Primary Altimetry Systems.

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

SECTION III - OPERATING PROCEDURES – ABNORMAL PROCEDURES

3. Failure of The Altitude Hold Function in RVSM Airspace

A. Ensure Autopilot/Altitude Hold Function Is Disengaged.

B. If AIU Fail Is Annunciated For The Selected ADDU, Select The Other ADDU Using The ADDU1/ADDU2 Transfer Switch.

C. Re-Engage Autopilot/Altitude Hold Function.

D. If Problem Still Exists,
   1. Evaluate Capability To Maintain Altitude Within +/- 300 Feet Of Assigned Altitude Using Pilot Altimeter (ADDU1).
   2. Ensure the ADDU1/ADDU2 Transfer Switch Is Selected To ADDU1.

C. Notify ATC Of The Loss Of The Altitude Hold Capability.

D. Depart RVSM Airspace If Required By ATC.

4. Failure of Both ADDU1 And ADDU2 in RVSM Airspace

A. Ensure Autopilot Disengaged.

B. Maintain Altitude Using Standby Altimeter. [6]

C. Monitor Altitude Using Standby Altimeter.

D. Notify ATC Of Loss Of All Primary Altimetry Systems.

E. Depart RVSM Airspace If Required By ATC.

NOTES
6. Refer to basic Airplane Flight Manual: Copilot Altimeter Position Error Chart to determine correct altitude for current flight conditions.

SECTION III - OPERATING PROCEDURES - ABNORMAL PROCEDURES

5. Divergence of Primary Altimeters By More Than 200 ft in RVSM Airspace

A. Determine Defective System By Cross-Checking Each Primary Altimeter With The Standby Altimeter.

B. If Able To Determine Which Altimetry System Is Correct, Select Autopilot/Altitude Hold, Altitude Alerter and Transponders To The Correct ADDU Using The ADDU1/ADDU2 Transfer Switch.

C. If Unable To Determine Accuracy Of Either Altimetry System Proceed With The **Failure Of Both ADDU1 And ADDU2 in RVSM Airspace** Procedure.

D. Notify ATC Of Divergence Of Primary Altimeters And/Or Loss Of The Primary Altimetry Systems.

E. Depart RVSM Airspace If Required By ATC.

6. Failure of Altitude Alert in RVSM Airspace

A. Ensure Autopilot Engaged With Altitude HOLD Selected.

B. Monitor Altitude And Maintain Altitude Within +/- 300 Feet Of Assigned Altitude.

C. Notify ATC Of Loss Of Altitude Alert System.

D. Depart RVSM Airspace If Required By ATC.

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

SECTION III – OPERATING PROCEDURES

NORMAL PROCEDURES

1. EXTERIOR PREFLIGHT INSPECTION

A. Left Static Ports.................................COVER REMOVED AND WARM
   Upper and Lower Static Ports CLEAR
   Surrounding Airframe CHECK FOR DAMAGE/PAINT CHIPS [7]

B. Left Pitot Probe ....COVER REMOVED AND HOT
   CHECK FOR DAMAGE

C. Right Pitot Probe ....COVER REMOVED AND HOT
   CHECK FOR DAMAGE

D. Right Static Ports ....COVER REMOVED AND WARM
   Upper and Lower Static Ports CLEAR
   Surrounding Airframe CHECK FOR DAMAGE/PAINT CHIPS [7]

2. RVSM SERVICEABILITY CHECKS

A. BEFORE STARTING ENGINES

1. Altimeters..MAX DIFFERENCE 75 FT [8]
2. Altitude Preselect Controller .... CHECKED[9]

B. AFTER STARTING ENGINES

1. Autopilot/Altitude Hold..CHECKED

NOTES
7. No paint ridges or non-homogenous paint distribution shall be allowed near the static ports. The static ports must also be inspected for corrosion, elongation, deformation, and/or obstruction and the operator must ensure that no foreign matter is found within the port orifice.
8. Ensure matched baro settings.
9. See RVSM serviceability procedures.

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

SECTION III – OPERATING PROCEDURES - NORMAL PROCEDURES

C. CRUISE

1. Cross-check Altimeters .... MAX DIFFERENCE 200 FT [(10)]
2. Altimeters .... RECORD ALTIMETERS SETTINGS [(11)]
3. Altitude Hold performance .... ±65 FT [(12)]

NOTES
10. Ensure matched baro settings (29.92in Hg or 1013mb) and record setting in the flight plan master log.
11. Record Pilot, Copilot and Standby altimeter readings in flight plan Master Log upon entering RVSM airspace for contingency situations.
12. Tolerance is ±65 FT of altitude set in the altitude preselect controller.

3. RVSM SERVICEABILITY PROCEDURES

Altitude Preselect Controller

1. Select Pilot ADDU (ADDU1).
2. Set Altimeters To The Closest 100 feet.
3. Match Preselect Altitude To Indicated Altitude.
4. Using The Pilot's ADDU BARO Knob Increase/Decrease Indicated Altitude Until The Altitude Deviation Alerts Occurs. Altitude Deviation Alert Tolerance Is 300 feet ± 50 feet.
5. Select Copilot ADDU (ADDU2) And Repeat Items 2-4 Using The Copilot's Altimeter.

SECTION IV – PERFORMANCE

NO CHANGE.

SECTION V – APPENDIX

NO CHANGE.

SECTION VI – SUPPLEMENTS

NO CHANGE.

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

SECTION VII – WEIGHT & BALANCE, DATA & AIRPLANE EQUIPMENT LIST

NO CHANGE.

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

SECTION VIII – ADVISORY INFORMATION

NO CHANGE.

ElectroSonics
4391 International Gateway
Columbus, Ohio 43219
CRS: AE1R005K

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT FOR

CESSNA

501, 551

SERIAL NUMBER: 501-0091

REGISTRATION NUMBER: N2158U

This supplement must be attached to the FAA Approved Airplane Flight Manual. The information contained herein supplements or supersedes the basic Flight Manual only in those areas listed, when the aircraft is modified by STC SA01558CH-D for dual Innovative Solutions and Support Air Data Systems. For limitations, procedures and performance data not contained in this supplement, consult the basic Airplane Flight Manual.

FAA Approved: [signature]
Tim Winiesdorffer
DAS Administrator, DAS 3 CH
ElectroSonics
Columbus, OH

LOG OF REVISIONS

REVISION NO.	REVISED PAGES	DESCRIPTION OF REVISION	FAA APPROVAL
I.R.	ALL	Initial Release	05-03-2002 Tim Winiesdorffer
B	9 thru 13	Added the 501 with FJ44-2A engines	08-08-2003 Tim Winiesdorffer

SECTION I - INTRODUCTION

The Innovative Solutions and Support (IS&S) Air Data System is designed to replace existing air data equipment that has been factory installed in Cessna Citation 501, 551 aircraft. The factory system consists of a single air data computer that outputs analog signals to drive the pilot's altimeter, the vertical modes of the flight director system and other equipment that requires analog air data. The only other altimetry system is a stand-alone altimeter installed on the copilot's instrument panel.

Installed for the purpose of meeting Reduced Vertical Separation Minimums (RVSM) requirements, the IS&S air data system utilizes dual Air Data Display Units (ADDU) to acquire and process the necessary air data information required for the aircraft. The ADDU is a combination air data computer and altimeter and is panel mounted in place of the original altimeter for both pilot and copilot. In addition to driving each altimeter, the ADDU outputs digital data to a single aircraft interface unit (AIU) designed to convert the digital information to analog signals required by the remaining analog aircraft equipment. In addition, the ADDU's have dual ARINC 429 outputs available to provide air data information to accessory equipment such as flight management systems and cabin information systems if desired. A panel-mounted switch allows the pilot to select ADDU No.1 or ADDU No. 2 as the air data source for the single AIU, adding a level of redundancy not previously available.

This installation has an optional dual-element temperature probe to allow derivation of temperature corrected air data.

With the installation of the dual, electric ADDU's, a standby altimeter, directly plumbed to the number two aircraft static source is added to meet the requirements of 14 CFR Part 25.1309. The altimeter incorporates internal lighting plus a vibrator. The altimeter receives power from the aircraft main bus during normal operations and from the standby battery (Jet Pak) during emergency operations. The Standby Altimeter operates with the Standby Attitude indicator. The Standby Attitude switch must be ON for both the standby attitude and standby altimeter lights and a vibrator to function,

SECTION II - OPERATING LIMITATIONS

1. The equipment installed under this approval meets the requirements of FAA Interim Guidance 91-RVSM. This approval, however, does not constitute an airworthiness or operating approval for RVSM operation. RVSM airworthiness approval is a separate certification and must be obtained prior to obtaining RVSM operating approval. RVSM airworthiness approval may be obtained concurrent with this installation approval or subsequent to this approval.

SECTION III - OPERATING PROCEDURES (continued)

B. ABNORMAL PROCEDURES (continued)

2. LOSS OF ALTITUDE REPORTING INFORMATION

If altitude reporting information is lost:

- ensure Transponder Control is selected to Altitude Reporting ON
- Select another altitude source using the **ADDU 1 / ADDU 2** transfer switch

NOTE

The **ADDU 1 / ADDU 2** switch has two functions:

a. Selects ADDU source for the AIU (i.e. flight director and autopilot interface)
b. Selects altitude source for the transponders

3. AUTOPILOT/FLIGHT DIRECTOR WILL NOT FLY VERTICAL MODES

The autopilot/flight director will not fly Altitude Hold, Altitude Preselect, Indicated Airspeed, Vertical Speed or VNAV:

- If **AIU FAIL** Annunciated, select the other ADDU using the **ADDU 1 / ADDU 2** transfer switch
- If problem still exists, cycle the AIU circuit breaker
- If problem still exists, consult the aircraft flight manual and operating manual for autopilot/flight director procedures

C. NORMAL PROCEDURES

1. GENERAL

The IS&S Air Data System consists of the following equipment:

- Pilot and Copilot Air Data Display Units (ADDU) (combination altimeter and air data computer)
- Analog Interface Unit (AIU) – translates digital information from either ADDU to analog information for use by the flight director/autopilot system and other accessories
- Standby Altimeter – required to meet FAA reliability requirements
- Dual Element Temperature Probe – allows for temperature corrected air data information used by accessory systems

SECTION III - OPERATING PROCEDURES (continued)

C. NORMAL PROCEDURES (continued)

2. SYSTEM CONTROL

The following circuit breakers provide protection for the IS&S Air Data Equipment:

ADDU # 1	2 amp	28VDC	LH Main Crossover Bus
ADDU # 2	2 amp	28VDC	RH Main Bus
AIU # 1	1 amp	28VDC	LH Main Crossover Bus
AIU REF	1 amp	26VAC	26 VAC Main Bus
TAS HTR	15 amp	28VDC	Temp Probe Heat RH Main Bus (OPTIONAL)

3. ANNUNCIATION

ADDU 1 / ADDU 2 — The ADDU 1/ADDU 2 (green/amber) switch/annunciator selects the air data source for transponder altitude reporting and air data inputs to the Analog Interface Unit (AIU)

AIU FAIL — The AIU FAIL (amber) annunciator illuminates to advise that the Analog Interface Unit (AIU) is no longer outputting valid data.

4. SELF TEST

On power up, each ADDU will perform a diagnostic self-test. The self test will conclude with the aircraft configuration displayed on the LCD readout for 5 seconds. The aircraft configuration is the aircraft model (i.e. C 501).

Pilot initiated testing is possible but is not a pre-flight requirement. To conduct a pilot initiated test:

- Use a small, pointed instrument to depress the test button in the lower left-hand corner of the ADDU bezel.
- The ADDU will drive the altitude pointer to 0
- The LCD display will illuminate all segments and annunciations
- All numerical readings and the altitude pointer will sequentially increment from 0 to 9
- Depressing the BARO knob during the numerical incrementing will cause any fault codes to display on the LCD display. Each time the baro knob is depressed, the fault codes will advance to the next code if multiple faults are present
- The test concludes when the aircraft configuration is displayed on the LCD.

SECTION IV - PERFORMANCE

Cessna Citation 501 (JT15D-1/1A/1B engines).
Altimeter Position Correction Chart (Figure 4-5) of the Basic Flight Manual is no longer valid. The Altimeter Position Correction Chart for the Standby System is presented in Figure 4.1. The Altimeter Position Correction Chart for the Pilot's and Copilot's Systems is presented in Figure 4.2.

The following document was created using the Citation 501 Airplane Flight Manual 501FM, Original Release as a reference. These corrections are based on the utilization of the IS&S Configuration Module 9B-03508-15.

Cessna Citation 501 (FJ44-2A engines-STC ST09559AC).
Altimeter Position Correction Chart (Figure 4-5) of the Basic Flight Manual is no longer valid. The Altimeter Position Correction Chart for the Standby System is presented in Figure 4.3. The Altimeter Position Correction Chart for the Pilot's and Copilot's Systems is presented in Figure 4.4.

The following document was created using the Citation 501 Airplane Flight Manual 501FM, Original Release as a reference. These corrections are based on the utilization of the IS&S Configuration Module 9B-03508-15.

Cessna Citation 551.
Altimeter Position Correction Chart (Figure 4-4) of the Basic Flight Manual is no longer valid. The Altimeter Position Correction Chart for the Standby System is presented in Figure 4.3. The Altimeter Position Correction Chart for the Pilot's and Copilot's Systems is presented in Figure 4.4.

The following document was created using the Citation 551 Airplane Flight Manual 551FM-30 as a reference. These corrections are based on the utilization of the IS&S Configuration Module 9B-03508-15.

ALTIMETER POSITION CORRECTION – FEET (CESSNA 501-JT-15D-1/1A/1B engines only)

STANDBY ALTIMETER CONDITIONS: ALL FLIGHT CONFIGURATIONS EXAMPLE

AIRSPEED	INDICATED PRESSURE ALTITUDE	ALTIMETER POSITION CORRECTION	ACTUAL PRESSURE ALTITUDE
200 KIAS	20,000 FEET	-69 FEET	19,931 FEET

ALT FT	AIRSPEED - KIAS																		
	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
0	-17	-19	-21	-23	-25	-27	-29	-31	-33	-35	-37	-39	-41	-43	-45	-47	-49	-51	-54
1000	-18	-20	-22	-24	-26	-28	-30	-32	-34	-36	-38	-40	-42	-44	-46	-48	-51	-53	-55
2000	-18	-20	-22	-24	-26	-28	-30	-32	-35	-37	-39	-41	-43	-45	-48	-50	-52	-55	-57
3000	-19	-21	-23	-25	-27	-29	-31	-33	-36	-38	-40	-42	-44	-47	-49	-51	-54	-56	-59
4000	-20	-22	-24	-26	-28	-30	-32	-35	-37	-39	-41	-44	-46	-48	-51	-53	-55	-58	-60
5000	-20	-22	-25	-27	-29	-31	-33	-36	-38	-40	-43	-45	-47	-50	-52	-55	-57	-60	-62
6000	-21	-23	-25	-28	-30	-32	-34	-37	-39	-41	-44	-46	-49	-51	-54	-56	-59	-62	-64
7000	-22	-24	-26	-28	-31	-33	-36	-38	-40	-43	-45	-48	-50	-53	-55	-58	-61	-64	-66
8000	-22	-25	-27	-29	-32	-34	-37	-39	-42	-44	-47	-49	-52	-55	-57	-60	-63	-66	-68
9000	-23	-25	-28	-30	-33	-35	-38	-40	-43	-46	-48	-51	-54	-56	-59	-62	-65	-68	-71
10000	-24	-26	-29	-31	-34	-36	-39	-42	-44	-47	-50	-52	-55	-58	-61	-64	-67	-70	-73
11000	-25	-27	-30	-32	-35	-38	-40	-43	-46	-48	-51	-54	-57	-60	-63	-66	-69	-72	-75
12000	-25	-28	-31	-33	-36	-39	-42	-44	-47	-50	-53	-56	-59	-62	-65	-68	-71	-74	-78
13000	-26	-29	-32	-34	-37	-40	-43	-46	-49	-52	-55	-58	-61	-64	-67	-70	-73	-77	-80
14000	-27	-30	-33	-36	-38	-41	-44	-47	-50	-53	-56	-60	-63	-66	-69	-73	-76	-79	-83
15000	-28	-31	-34	-37	-40	-43	-46	-49	-52	-55	-58	-62	-65	-68	-72	-75	-78	-82	-85
16000	-29	-32	-35	-38	-41	-44	-47	-51	-54	-57	-60	-64	-67	-70	-74	-77	-81	-85	-88
17000	-30	-33	-36	-39	-42	-46	-49	-52	-56	-59	-62	-66	-69	-73	-76	-80	-84	-87	-91
18000	-31	-34	-37	-41	-44	-47	-51	-54	-57	-61	-64	-68	-72	-75	-79	-83	-87	-90	-94
19000	-32	-35	-39	-42	-45	-49	-52	-56	-59	-63	-67	-70	-74	-78	-82	-86	-89	-93	-98
20000	-33	-36	-40	-43	-47	-51	-54	-58	-61	-65	-69	-73	-77	-80	-84	-88	-93	-97	-101
21000	-34	-38	-41	-45	-49	-52	-56	-60	-64	-67	-71	-75	-79	-83	-87	-92	-96	-100	-104
22000	-35	-39	-43	-47	-50	-54	-58	-62	-66	-70	-74	-78	-82	-86	-90	-95	-99	-104	-108
23000	-37	-40	-44	-48	-52	-56	-60	-64	-68	-72	-76	-81	-85	-89	-94	-98	-103	-107	-112
24000	-38	-42	-46	-50	-54	-58	-62	-66	-71	-75	-79	-83	-88	-92	-97	-102	-106	-111	-116
25000	-39	-43	-48	-52	-56	-60	-64	-69	-73	-77	-82	-86	-91	-96	-100	-105	-110	-115	-120
26000	-41	-45	-49	-54	-58	-62	-67	-71	-76	-80	-85	-90	-94	-99	-104	-109	-114	-119	-124
27000	-42	-47	-51	-56	-60	-65	-69	-74	-78	-83	-88	-93	-98	-103	-108	-113	-118	-123	-129
28000	-44	-48	-53	-58	-62	-67	-72	-77	-81	-86	-91	-96	-101	-107	-112	-117	-123	-128	-134
29000	-46	-50	-55	-60	-65	-70	-74	-79	-84	-90	-95	-100	-105	-111	-116	-122	-127	-133	-139
30000	-47	-52	-57	-62	-67	-72	-77	-82	-88	-93	-98	-104	-109	-115	-120	-126	-132	-138	-144
31000	-49	-54	-59	-65	-70	-75	-80	-86	-91	-97	-102	-108	-114	-119	-125	-131	-137	-143	-150
32000	-51	-56	-62	-67	-72	-78	-83	-89	-95	-100	-106	-112	-118	-124	-130	-136	-143	-149	-155
33000	-53	-59	-64	-70	-75	-81	-87	-93	-99	-104	-110	-117	-123	-129	-135	-142	-148	-155	-162
34000	-55	-61	-67	-73	-79	-84	-90	-96	-103	-109	-115	-121	-128	-134	-141	-148	-154	-161	-168
35000	-58	-64	-70	-76	-82	-88	-94	-100	-107	-113	-120	-126	-133	-140	-147	-154	-161	-168	-175
36000	-60	-66	-73	-79	-85	-92	-98	-105	-111	-118	-125	-132	-139	-146	-153	-160	-168	-175	-183
37000	-63	-69	-76	-82	-89	-96	-102	-109	-116	-123	-130	-138	-145	-152	-160	-167	-175	-183	-191
38000	-66	-72	-79	-86	-93	-100	-107	-114	-121	-129	-136	-144	-151	-159	-167	-175	-183	-191	-199
39000	-69	-76	-83	-90	-97	-105	-112	-119	-127	-135	-142	-150	-158	-166	-174	-183	-191	-200	-208
40000	-72	-79	-87	-94	-102	-110	-117	-125	-133	-141	-149	-157	-166	-174	-183	-191	-200	-209	-218
41000	-75	-83	-91	-99	-107	-115	-123	-131	-140	-148	-156	-165	-174	-183	-192	-201	-210	-219	-229

Figure 4.1

ALTIMETER POSITION CORRECTION – FEET (CESSNA 501-JT-15D-1/1A/1B engines only)

PILOT'S AND COPILOT'S ALTIMETER SYSTEMS CONDITIONS: ALL FLIGHT CONDITIONS

EXAMPLE:

AIRSPEED	INDICATED PRESSURE ALTITUDE	ALTIMETER POSITION CORRECTION	ACTUAL PRESSURE ALTITUDE
160 KIAS	10,000 FEET	-39 FEET	9,961 FEET

ALT FT	AIRSPEED - KIAS																	
	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
0	-17	-19	-21	-23	-25	-27	-29	-31	-33	-35	-37	-39	-41	-27	-11	0	0	0	0
1000	-18	-20	-22	-24	-26	-28	-30	-32	-34	-36	-38	-40	-37	-21	-3	0	0	0	0
2000	-18	-20	-22	-24	-26	-28	-30	-32	-35	-37	-39	-41	-31	-14	0	0	0	0	0
3000	-19	-21	-23	-25	-27	-29	-31	-33	-36	-38	-40	-40	-25	-6	0	0	0	0	0
4000	-20	-22	-24	-26	-28	-30	-32	-35	-37	-39	-41	-36	-18	0	0	0	0	0	0
5000	-20	-22	-25	-27	-29	-31	-33	-36	-38	-40	-43	-29	-10	0	0	0	0	0	0
6000	-21	-23	-25	-28	-30	-32	-34	-37	-39	-41	-40	-22	-2	0	0	0	0	0	0
7000	-22	-24	-26	-28	-31	-33	-36	-38	-40	-43	-34	-15	0	0	0	0	0	0	0
8000	-22	-25	-27	-29	-32	-34	-37	-39	-42	-44	-28	-6	0	0	0	0	0	0	0
9000	-23	-25	-28	-30	-33	-35	-38	-40	-43	-40	-20	0	0	0	0	0	0	0	0
10000	-24	-26	-29	-31	-34	-36	-39	-42	-44	-34	-12	0	0	0	0	0	0	0	0
11000	-25	-27	-30	-32	-35	-38	-40	-43	-46	-26	-3	0	0	0	0	0	0	0	0
12000	-25	-28	-31	-33	-36	-39	-42	-44	-40	-18	0	0	0	0	0	0	0	0	0
13000	-26	-29	-32	-34	-37	-40	-43	-46	-33	-9	0	0	0	0	0	0	0	0	0
14000	-27	-30	-33	-36	-38	-41	-44	-47	-25	0	0	0	0	0	0	0	0	0	0
15000	-28	-31	-34	-37	-40	-43	-46	-41	-17	0	0	0	0	0	0	0	0	0	0
16000	-29	-32	-35	-38	-41	-44	-47	-34	-7	0	0	0	0	0	0	0	0	0	0
17000	-30	-33	-36	-39	-42	-46	-49	-25	0	0	0	0	0	0	0	0	0	0	0
18000	-31	-34	-37	-41	-44	-47	-43	-16	0	0	0	0	0	0	0	0	0	0	0
19000	-32	-35	-39	-42	-45	-49	-34	-5	0	0	0	0	0	0	0	0	0	0	0
20000	-33	-36	-40	-43	-47	-51	-26	0	0	0	0	0	0	0	0	0	0	0	0
21000	-34	-38	-41	-45	-49	-45	-16	0	0	0	0	0	0	0	0	0	0	0	0
22000	-35	-39	-43	-47	-50	-37	-5	0	0	0	0	0	0	0	0	0	0	0	0
23000	-37	-40	-44	-48	-52	-28	0	0	0	0	0	0	0	0	0	0	0	0	0
24000	-38	-42	-46	-50	-49	-17	0	0	0	0	0	0	0	0	0	0	0	0	0
25000	-39	-43	-48	-52	-41	-5	0	0	0	0	0	0	0	0	0	0	0	0	0
26000	-41	-45	-49	-54	-31	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27000	-42	-47	-51	-55	-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0.
28000	-44	-48	-53	-46	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29000	-46	-50	-55	-36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30000	-47	-52	-57	-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31000	-49	-54	-53	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32000	-51	-56	-44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33000	-53	-59	-33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34000	-55	-61	-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35000	-58	-55	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36000	-60	-43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37000	-63	-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38000	-66	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39000	-59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40000	-47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41000	-33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 4.2

ALTIMETER POSITION CORRECTION – FEET (CESSNA 551-All/501-FJ44-2A Engines only)

STANDBY ALTIMETER CONDITIONS: ALL FLIGHT CONFIGURATIONS

EXAMPLE:

AIRSPEED	INDICATED PRESSURE ALTITUDE	ALTIMETER POSITION CORRECTION	ACTUAL PRESSURE ALTITUDE
200 KIAS	20,000 FEET	-69 FEET	19,931 FEET

ALT	AIRSPEED - KIAS																		
FT	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
0	-17	-19	-21	-23	-25	-27	-29	-31	-33	-35	-37	-39	-41	-43	-45	-47	-49	-51	-54
1000	-18	-20	-22	-24	-26	-28	-30	-32	-34	-36	-38	-40	-42	-44	-46	-48	-51	-53	-55
2000	-18	-20	-22	-24	-26	-28	-30	-32	-35	-37	-39	-41	-43	-45	-48	-50	-52	-55	-57
3000	-19	-21	-23	-25	-27	-29	-31	-33	-36	-38	-40	-42	-44	-47	-49	-51	-54	-56	-59
4000	-20	-22	-24	-26	-28	-30	-32	-35	-37	-39	-41	-44	-46	-48	-51	-53	-55	-58	-60
5000	-20	-22	-25	-27	-29	-31	-33	-36	-38	-40	-43	-45	-47	-50	-52	-55	-57	-60	-62
6000	-21	-23	-25	-28	-30	-32	-34	-37	-39	-41	-44	-46	-49	-51	-54	-56	-59	-62	-64
7000	-22	-24	-26	-28	-31	-33	-36	-38	-40	-43	-45	-48	-50	-53	-55	-58	-81	-64	-66
8000	-22	-25	-27	-29	-32	-34	-37	-39	-42	-44	-47	-49	-52	-55	-57	-60	-63	-66	-68
9000	-23	-25	-28	-30	-33	-35	-38	-40	-43	-46	-48	-51	-54	-56	-59	-62	-65	-68	-71
10000	-24	-26	-29	-31	-34	-36	-39	-42	-44	-47	-50	-52	-55	-58	-61	-64	-67	-70	-73
11000	-25	-27	-30	-32	-35	-38	-40	-43	-46	-48	-51	-54	-57	-60	-63	-66	-69	-72	-75
12000	-25	-28	-31	-33	-36	-39	-42	-44	-47	-50	-53	-56	-59	-62	-65	-68	-71	-74	-78
13000	-26	-29	-32	-34	-37	-40	-43	-46	-49	-52	-55	-58	-61	-64	-67	-70	-73	-77	-80
14000	-27	-30	-33	-36	-38	-41	-44	-47	-50	-53	-56	-60	-63	-66	-69	-73	-76	-79	-83
15000	-28	-31	-34	-37	-40	-43	-46	-49	-52	-55	-58	-62	-65	-68	-72	-75	-78	-82	-85
16000	-29	-32	-35	-38	-41	-44	-47	-51	-54	-57	-60	-64	-67	-70	-74	-77	-81	-85	-88
17000	-30	-33	-36	-39	-42	-46	-49	-52	-56	-59	-62	-66	-69	-73	-76	-80	-84	-87	-91
18000	-31	-34	-37	-41	-44	-47	-51	-54	-57	-61	-64	-68	-72	-75	-79	-83	-87	-90	-94
19000	-32	-35	-39	-42	-45	-49	-52	-56	-59	-63	-67	-70	-74	-78	-82	-86	-89	-93	-98
20000	-33	-36	-40	-43	-47	-51	-54	-58	-61	-65	-69	-73	-77	-80	-84	-88	-93	-97	-101
21000	-34	-38	-41	-45	-49	-52	-56	-60	-64	-67	-71	-75	-79	-83	-87	-92	-98	-100	-104
22000	-35	-39	-43	-47	-50	-54	-58	-62	-66	-70	-74	-78	-82	-86	-90	-95	-99	-104	-108
23000	-37	-40	-44	-48	-52	-56	-60	-64	-68	-72	-76	-81	-85	-89	-94	-98	-103	-107	-112
24000	-38	-42	-46	-50	-54	-58	-62	-66	-71	-75	-79	-83	-88	-92	-97	-102	-106	-111	-116
25000	-39	-43	-48	-52	-56	-60	-64	-69	-73	-77	-82	-86	-91	-96	-100	-105	-110	-115	-120
26000	-41	-45	-49	-54	-58	-62	-67	-71	-76	-80	-85	-90	-94	-99	-104	-109	-114	-119	-124
27000	-42	-47	-51	-56	-60	-65	-69	-74	-78	-83	-88	-93	-98	-103	-108	-113	-118	-123	-129
28000	-44	-48	-53	-58	-62	-67	-72	-77	-81	-86	-91	-96	-101	-107	-112	-117	-123	-128	-134
29000	-46	-50	-55	-60	-65	-70	-74	-79	-84	-90	-95	-100	-105	-111	-116	-122	-127	-133	-139
30000	-47	-52	-57	-62	-67	-72	-77	-82	-88	-93	-98	-104	-109	-115	-120	-126	-132	-138	-144
31000	-49	-54	-59	-65	-70	-75	-80	-86	-91	-97	-102	-108	-114	-119	-125	-131	-137	-143	-150
32000	-51	-56	-62	-67	-72	-78	-83	-89	-95	-100	-106	-112	-118	-124	-130	-136	-143	-149	-155
33000	-53	-59	-64	-70	-75	-81	-87	-93	-99	-104	-110	-117	-123	-129	-135	-142	-148	-155	-162
34000	-55	-61	-67	-73	-79	-84	-90	-96	-103	-109	-115	-121	-128	-134	-141	-148	-154	-161	-168
35000	-58	-64	-70	-76	-82	-88	-94	-100	-107	-113	-120	-126	-133	-140	-147	-154	-161	-168	-175
36000	-60	-66	-73	-79	-85	-92	-98	-105	-111	-118	-125	-132	-139	-146	-153	-160	-168	-175	-183
37000	-63	-69	-76	-82	-89	-96	-102	-109	-116	-123	-130	-138	-145	-152	-160	-167	-175	-183	-191
38000	-66	-72	-79	-86	-93	-100	-107	-114	-121	-129	-136	-144	-151	-159	-167	-175	-183	-191	-199
39000	-69	-76	-83	-90	-97	-105	-112	-119	-127	-135	-142	-150	-158	-166	-174	-183	-191	-200	-208
40000	-72	-79	-87	-94	-102	-110	-117	-125	-133	-141	-149	-157	-166	-174	-183	-191	-200	-209	-218
41000	-75	-83	-91	-99	-107	-115	-123	-131	-140	-148	-156	-165	-174	-183	-192	-201	-210	-219	-229
42000	-79	-87	-96	-104	-112	-121	-129	-138	-147	-155	-164	-173	-183	-192	-201	-211	-220	-230	-240
43000	-83	-92	-101	-109	-118	-127	-136	-145	-154	-164	-173	-182	-192	-202	-212	-222	-232	-242	-253

Figure 4.3

4391 International Gateway
Columbus, Ohio 43219
CRS: AE1R005K

ALTIMETER POSITION CORRECTION – FEET (CESSNA 551-AII/501-FJ44-2A Engines only)

PILOT'S AND COPILOT'S ALTIMETER SYSTEMS CONDITIONS: ALL FLIGHT CONFIGURATIONS

EXAMPLE:

AIRSPEED	INDICATED PRESSURE ALTITUDE	ALTIMETER POSITION CORRECTION	ACTUAL PRESSURE ALTITUDE
160 KIAS	10,000 FEET	-39 FEET	9,961 FEET

ALT	AIRSPEED - KIAS																		
FT	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
0	-17	-19	-21	-23	-25	-27	-29	-31	-33	-35	-37	-39	-41	-27	-11	0	0	0	0
1000	-18	-20	-22	-24	-26	-28	-30	-32	-34	-36	-38	-40	-37	-21	-3	0	0	0	0
2000	-18	-20	-22	-24	-26	-28	-30	-32	-35	-37	-39	-41	-31	-14	0	0	0	0	0
3000	-19	-21	-23	-25	-27	-29	-31	-33	-36	-38	-40	-40	-25	-6	0	0	0	0	0
4000	-20	-22	-24	-26	-28	-30	-32	-35	-37	-39	-41	-36	-18	0	0	0	0	0	0
5000	-20	-22	-25	-27	-29	-31	-33	-36	-38	-40	-43	-29	-10	0	0	0	0	0	0
6000	-21	-23	-25	-28	-30	-32	-34	-37	-39	-41	-40	-22	-2	0	0	0	0	0	0
7000	-22	-24	-26	-28	-31	-33	-36	-38	-40	-43	-34	-15	0	0	0	0	0	0	0
8000	-22	-25	-27	-29	-32	-34	-37	-39	-42	-44	-28	-6	0	0	0	0	0	0	0
9000	-23	-25	-28	-30	-33	-35	-38	-40	-43	-40	-20	0	0	0	0	0	0	0	0
10000	-24	-26	-29	-31	-34	-36	-39	-42	-44	-34	-12	0	0	0	0	0	0	0	0
11000	-25	-27	-30	-32	-35	-38	-40	-43	-46	-26	-3	0	0	0	0	0	0	0	0
12000	-25	-28	-31	-33	-36	-39	-42	-44	-40	-18	0	0	0	0	0	0	0	0	0
13000	-26	-29	-32	-34	-37	-40	-43	-46	-33	-9	0	0	0	0	0	0	0	0	0
14000	-27	-30	-33	-36	-38	-41	-44	-47	-25	0	0	0	0	0	0	0	0	0	0
15000	-28	-31	-34	-37	-40	-43	-46	-41	-17	0	0	0	0	0	0	0	0	0	0
16000	-29	-32	-35	-38	-41	-44	-47	-34	-7	0	0	0	0	0	0	0	0	0	0
17000	-30	-33	-36	-39	-42	-46	-49	-25	0	0	0	0	0	0	0	0	0	0	0
18000	-31	-34	-37	-41	-44	-47	-43	-16	0	0	0	0	0	0	0	0	0	0	0
19000	-32	-35	-39	-42	-45	-49	-34	-5	0	0	0	0	0	0	0	0	0	0	0
20000	-33	-36	-40	-43	-47	-51	-26	0	0	0	0	0	0	0	0	0	0	0	0
21000	-34	-38	-41	-45	-49	-45	-16	0	0	0	0	0	0	0	0	0	0	0	0
22000	-35	-39	-43	-47	-50	-37	-5	0	0	0	0	0	0	0	0	0	0	0	0
23000	-37	-40	-44	-48	-52	-28	0	0	0	0	0	0	0	0	0	0	0	0	0
24000	-38	-42	-46	-50	-49	-17	0	0	0	0	0	0	0	0	0	0	0	0	0
25000	-39	-43	-48	-52	-41	-5	0	0	0	0	0	0	0	0	0	0	0	0	0
26000	-41	-45	-49	-54	-31	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27000	-42	-47	-51	-55	-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28000	-44	-48	-53	-46	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29000	-46	-50	-55	-36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30000	-47	-52	-57	-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31000	-49	-54	-53	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32000	-51	-56	-44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33000	-53	-59	-33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34000	-55	-61	-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35000	-58	-55	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36000	-60	-43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37000	-63	-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38000	-66	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39000	-59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40000	-47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41000	-33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42000	-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 4.4

ElectroSonics
4391 International Gateway
Columbus, Ohio 43219
CRS: AE1R005K

FAA APPROVED

AIRPLANE MAINTENANCE MANUAL SUPPLEMENT

CESSNA

501, 551

SERIAL NUMBER: 501-0091

REGISTRATION NUMBER: N2158U

This supplement must be attached to the Airplane Maintenance Manuals. The information contained herein supplements the basic Maintenance Manuals only in those areas listed, when the aircraft is modified by STC **SA01558CH-D** installation of a Innovative Solutions & Support (ISS) Air Data Computer System. For limitations and procedures not contained in this supplement, consult the basic Airplane Maintenance Manuals.

The inspections and airworthiness limitations specified in this section are FAA approved. This section specifies inspections and other maintenance required under sections 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

FAA APPROVED: Tim Winiesdorffer
Tim Winiesdorffer
DAS Administrator, DAS 3CH
ElectroSonics
Columbus, Ohio

FAA Approved Date: April 25, 2002

LOG OF REVISIONS

REVISION NO.	REVISED PAGES	DESCRIPTION OF REVISION	FAA APPROVAL
I.R.	ALL	Initial Release	Tim Winiesdorffer

CHAPTER 5 - TIME LIMITS / MAINTENANCE CHECKS

5.1 SCHEDULED MAINTENANCE CHECKS

Forward Pressure Bulkhead Penetration

Initial Inspection:	**4,216** pressurization cycles
Subsequent Inspection:	Each additional **4,216** pressurization cycles

*** Note: One pressurization cycle is defined as 1 flight.**

CHAPTER 53 - FUSELAGE

MAINTENANCE PRACTICES -GENERAL

EXTERIOR FUSELAGE

1. Inspect the following:

   The exterior fuselage in the vicinity of the forward pressure bulkhead in the vicinity of the cable feed-thru connector (see ElectroSonics drawing ES551-120028-12 or ES551-120028-22).

   - Specifically, the area under and around the connector, including the doublers.

SECTION 53-0 - EXTERIOR FUSELAGE

BULKHEAD PENETRATION

1. Manufacture templates from 2024-T3/0.050, drawings provided at the end of this supplement.

2. Using eddy current inspection techniques, inspect rivets, cable feed-thru connector hole for cracks using the manufactured templates.

3. Using the appropriate template, start with the smallest diameter inspection guide and increase the circular search pattern progressively by one size until each hole has been inspected out to the third inspection guide.

4. If any cracks are detected, an approved repair must be accomplished

SECTION 53-0 - EXTERIOR FUSELAGE – (continued)

BULKHEAD FEED-THRU REMOVAL

1. Remove sealant from around base of feed-thru.

2. Remove hardware securing feed-thru to bulkhead.

3. Lift feed-thru clear of bulkhead.

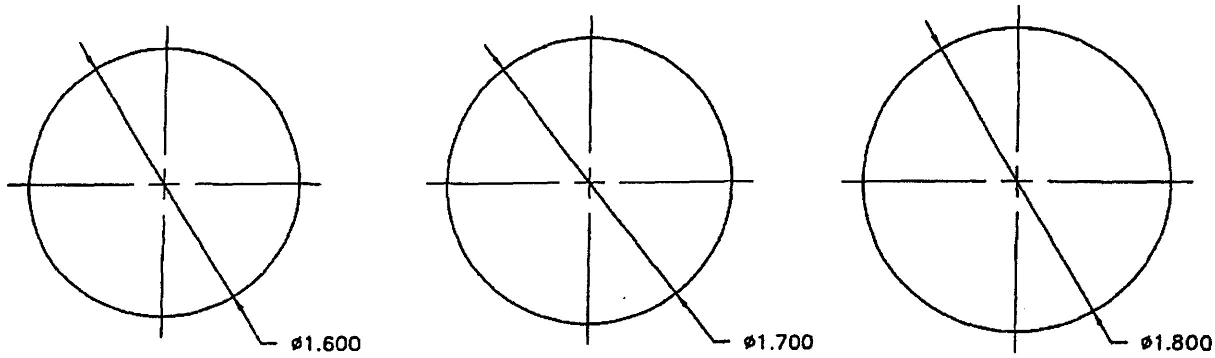
BULKHEAD FEED-THRU INSTALLATION

1. Ensure area has been cleaned and properly treated for corrosion prevention in accordance with manufacturer's instructions.

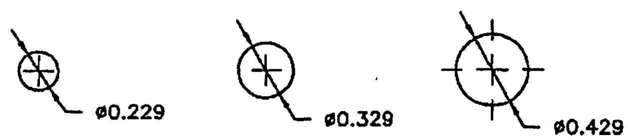
2. Secure feed-thru to bulkhead as applicable.

3. Seal feed-thru with Mil-S-8802F, Type 2, Class B sealant.

EDDY CURRENT CIRCLE TEMPLATES FOR FORWARD BULKHEAD PENETRATION



ø1.500 CONNECTOR FEED-THRU HOLE



ø0.129 AD4 RIVET HOLES

ELECTROSONICS		EDDY CURRENT TEMPLATES			
		FAA APPROVED DATE 04/25/02	DWG NO. ES551-120028-200		REV IR
DRAWN BY SP	SCALE 1:1	W.O. 105653	S/N	PAGE 5	OF 5
FILE NAME FWDBLKHD_EDDY		USE OR DISCLOSURE OF THE DATA ON THIS SHEET PAGE OR IMAGE IS SUBJECT TO THE RESTRICTIONS NOTED ON THE FIRST OR TITLE PAGE.			

GARMIN Ltd. or its subsidiaries
c/o Garmin International
1200 E. 151st Street, Olathe, KS 66062 USA

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for
GARMIN 400W SERIES GPS-WAAS NAVIGATION SYSTEM
as installed in

Cessna 501
Make and Model Airplane

Reg. No. N21580 S/N 501-0091

This document serves as an Airplane Flight Manual Supplement or as a Supplemental Airplane Flight Manual when the aircraft is equipped with the Garmin 400W Series unit. This document must be carried in the airplane at all times when the Garmin 400W Series unit is installed in accordance with STC SA01933LA-D.

The information contained herein supplements or supersedes the information made available to the operator by the manufacturer in the form of clearly stated placards, markings, or manuals or in the form of an FAA approved Airplane Flight Manual, only in those areas listed herein. For limitations, procedures and performance information not contained in this document, consult the basic placards, markings, or manuals or the basic FAA approved Airplane Flight Manual.

FAA Approved By: David G Armstrong

David G Armstrong
ODA STC Unit Administrator
Garmin International, Inc.
ODA-240087-CE

Date: 7/31/09

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1200 E. 151st Street, Olathe, KS 66062 USA

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for a Garmin 400W Series Navigation System

LOG OF REVISIONS				
	Page			
Rev. No.	No.	Date	Description	FAA Approved
A Original	All	11-20-07	Complete Supplement	Seyed-Youssef Hashemi Mgr. Flt. Test Br., ANM-160L FAA, Los Angeles ACO Transport Airplane Directorate Date Nov. 20, 2007
B	All	7/31/09	Added '-D' to STC number, added LP approach type	ODA STC Unit Administrator ODA-240087-CE Garmin International, Inc.

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AIRPLANE FLIGHT MANUAL SUPPLEMENT
or SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for a Garmin 400W Series Navigation System

Table of Contents

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AIRPLANE FLIGHT MANUAL SUPPLEMENT
or SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for a Garmin 400W Series Navigation System

Section 1. GENERAL

1.1 Garmin 400W Series GPS/WAAS Nav Com

The Garmin 400W Series GPS/WAAS Navigator is a panel-mounted product that contains a GPS/WAAS receiver for GPS approved primary navigation, under TSO C146a (plus optional VHF Com and VHF Nav radios) in an integrated unit with a moving map and color display. The 400W Series unit features a graphical display which may also be used to depict traffic, weather, or terrain data.

The navigation functions are operated by dedicated keys and graphical menus which are controlled by the buttons and the dual concentric rotary knob along the bottom and right side of the display.

Optional VHF Com and VHF Nav radio functions are controlled via dedicated buttons and knobs on the left side of the display and adjacent to frequencies they are controlling.

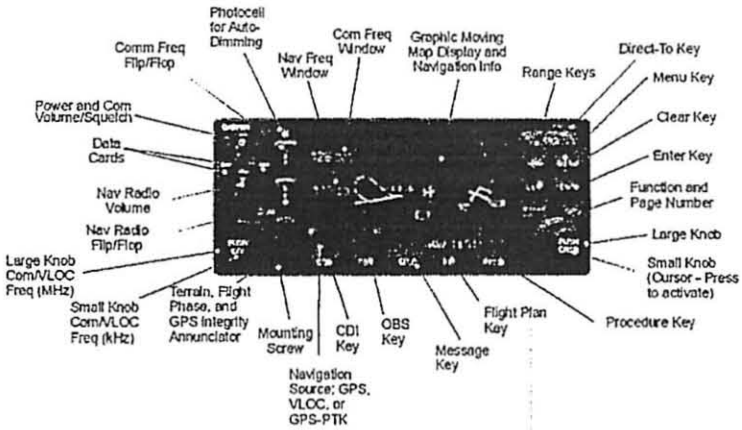

Figure 1 - 400W Series Control and Display Layout

1.2 Operation

GPS/WAAS TSO-C146a Class 3 Operation: The Garmin 400W Series unit, when installed in accordance with STC SA01933LA-D, uses GPS and WAAS (within the coverage of a Space-Based Augmentation System complying with ICAO Annex 10) for enroute, terminal area, non-precision approach operations (including "GPS", "or GPS", "RNAV", "LNAV", and "LP" approaches), and approach procedures with vertical guidance (including "LNAV/VNAV" and "LPV").

Navigation is accomplished using the WGS-84 (NAD-83) coordinate reference datum. GPS navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States of America.

1.3 Class II Oceanic, Remote, and other Operations:

The Garmin 400W Series, as installed, has been found to comply with the requirements for GPS primary means of Class II navigation in oceanic and remote airspace, when used in conjunction with WAAS Garmin Prediction Program part number 006-A0154-03. Oceanic operations are supported when the 400W Series unit annunciates OCN. This provides an alarm limit of four NMI and a mask angle of five degrees. The 400W series unit also has the ability to predict RAIM availability at any waypoint in the database or if WAAS corrections are expected to be absent or disabled. This AFMS does not constitute an operational approval for Oceanic or Remote area operations. Additional equipment installations or operational approvals may be required.

a) Oceanic navigation requires an additional approved long range oceanic and/or remote area navigation system with independent display, sensors, antenna, and power source. (It may be a second 400W/500W Series unit.)
b) Redundant VHF Com and VHF Nav systems may be required for other than U.S. 14 CFR Part 91 operations. Check foreign regulation requirements as applicable. (It may be a second 400W/500W Series unit.)
c) Operations approval *may* be granted for the use of the 400W Series unit RAIM prediction function in lieu of the Prediction Program for operators requiring this capability. Refer to your appropriate civil aviation authorities for these authorizations.

Section 2. LIMITATIONS

2.1 Pilot's Guide

The GARMIN 400W Series Pilot's Guide, part number and revision listed below (or later applicable revisions), must be immediately available for the flight crew whenever navigation is predicated on the use of the 400W Series unit.

- 400W Series Pilot's Guide & Reference P/N 190-00356-00 Rev E
- 400W/500W Series Optional Displays P/N 190-00356-30 Rev F
- 400W/500W Series Display Interfaces P/N 190-00356-31 Rev B

This AFM supplement does not grant approval for IFR operations to aircraft limited to VFR operations. Additional aircraft systems may be required for IFR operational approval. Systems limited to VFR shall be placarded in close proximity to the 400W Series unit
"GPS LIMITED TO VFR USE ONLY".

2.2 System Software:

The system must utilize the Main and GPS software versions listed below (or later FAA approved versions). The software versions are displayed on the self-test page immediately after turn-on for approximately 5 seconds or they can be accessed in the AUX pages.

Subsequent software versions may support different functions. Check the 400W Series Pilot's Guide for further information.

Table 1 - Approved Software Versions

Software Item	**Approved Software Version** *(or later FAA approved versions for this STC)*	
	SW version	As displayed on unit
Main SW Version	3.30	3.30
GPS SW Version	3.2	3.2

2.3 Navigation Database

The 400W Series unit database card must be installed. (IAW the TSO deviations granted to Garmin for the 400W unit, navigation database cards may not be marked with the part number. The software automatically precludes invalid databases for use by the 400W)

a) IFR enroute and terminal navigation is prohibited unless the pilot verifies the currency of the database or verifies each selected waypoint for accuracy by reference to current approved data.

b) GPS instrument approaches using the 400W Series units are prohibited, unless the 400W Series unit's approach data is verified by the pilot or crew to be current. Instrument approaches must be accomplished in accordance with an approved instrument approach procedure that is loaded from the 400W Series unit database.

c) Installations with dual 400W/500W Series units will only crossfill between units when they contain the same database cycle. Updating of each database must be accomplished on the ground prior to flight.

2.4 Terrain Database

The 400W Series unit supports Terrain and requires a Terrain database card to be installed in order for the feature to operate. The table below lists compatible database cards for the 400W series. Each of the data base cards contains the following data:

a) The Terrain Database has an area of coverage from North 75° Latitude to South 60° Latitude in all longitudes.

b) The Airport Terrain Database has an area of coverage that includes the United States, Canada, Mexico, Latin America, and South America.

c) The Obstacle Database has an area of coverage that includes the United States, and is updated as frequently as every 56 days.

NOTE: The area of coverage may be modified as additional terrain data sources become available.

Table 2 – Approved Terrain Database Cards

Part Number	Description
010-10201-20	Data Card, TAWS / Terrain, 128MB
010-10201-21	Data Card, TAWS / Terrain, 256MB

2.5 Navigation

No navigation is authorized north of 89° (degrees) north latitude or south of 89° (degrees) south latitude.

2.6 Approaches

a) During GPS approaches, the pilot must verify the 400W Series unit is operating in the approach mode. (LNAV, LNAV+V, L/VNAV, LP, or LPV)
b) When conducting approaches referenced to true North, the heading selection on the AUX pages must be adjusted to TRUE.
c) Accomplishment of an ILS, LOC, LOC-BC, LDA, SDF, MLS, VOR approach, or any other type of approach not approved for GPS overlay, is not authorized with GPS navigation guidance.
d) Use of the GNS 430W VOR/LOC/GS receiver to fly approaches not approved for GPS requires VOR/LOC/GS navigation data to be present on the external indicator (i.e. proper CDI source selection).
e) For aircraft with remote source selection annunciation or remote GPS navigation annunciations installed, conducting IFR approaches is prohibited if the remote annunciation is found to be inoperative during pre-flight. (This limitation does not prohibit the conduct of an IFR approach if the required remote annunciation fails during flight. The indications provided on the 400W Series unit display may be used as a backup).
f) Except in emergency conditions, IFR approaches are prohibited whenever any physical or visual obstruction (such as a throw-over yoke) restricts pilot view or access to the 400W Series unit or the affected CDI.

2.7 Autopilot Coupling

IFR installations of a Garmin 400W Series unit allow the operator to fly all phases of flight based on the navigation information presented to the pilot; however, not all modes may be coupled to the autopilot. All autopilots may be coupled in Oceanic (OCN), Enroute (ENR), and Terminal (TERM) modes; however, the FAA requires that vertical coupling of an autopilot for approaches be demonstrated to meet their intended function and provide safe and proper operation to published minimums. This installation is limited to:

- ☒ No limitations for autopilot coupling.
- ☐ Lateral GPS coupling (LNAV only). For 430W units: The GS of an ILS (VLOC) may be coupled to the autopilot without any limitations.

This limitation may be removed after an FAA Flight Test demonstration. Contact Garmin International, Tech Support for additional information.

2.8 Terrain Display

Terrain refers to the display of terrain information. Pilots are NOT authorized to deviate from their current ATC clearance to comply with terrain/obstacle alerts. Terrain unit alerts are advisory only and are not equivalent to warnings provided by TAWS. Navigation must not be predicated upon the use of the terrain display.

The terrain display is intended to serve as a situational awareness tool only. By itself, it may not provide either the accuracy or the fidelity on which to base decisions and plan maneuvers to avoid terrain or obstacles.

2.9 VNAV

VNAV information may be utilized for advisory information only. Use of VNAV information for Instrument Approach Procedures does not guarantee Step-Down Fix altitude protection, or arrival at approach minimums in a normal position to land.

2.10 Weather Display

If an optional weather receiver is interfaced to the 400W Series unit, the weather information displayed is limited to supplemental use only and may not be used in lieu of an official weather data source.

2.11 Traffic Display

Traffic may be displayed on the 400W Series unit when connected to an approved optional TCAS, TAS, or TIS traffic device. These systems are capable of providing traffic monitoring and alerting to the pilot. Traffic shown on the display may or may not have traffic alerting available. The display of traffic is an aid to visual acquisition and may not be utilized for aircraft maneuvering. Display of this traffic data and related operations are described in the 400W Series unit Pilot's Guide.

Section 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures
No change.

3.2 Abnormal Procedures
a) If the Garmin 400W Series unit GPS navigation information is not available, or is invalid, utilize other remaining operational navigation equipment installed in the airplane as appropriate. If the 400W Series unit loses GPS position and reverts to Dead Reckoning mode (indicated by the annunciation of "DR" in the lower left of the display), the moving map will continue to be displayed. Aircraft position will be based upon the last valid GPS position and estimated by Dead Reckoning methods. Changes in airspeed or winds aloft can affect the estimated position substantially. Dead Reckoning is only available in Enroute mode; Terminal and Approach modes do not support DR.

b) If a "Loss of Integrity" (INTEG) message is displayed during:
- Enroute/Terminal: continue to navigate using GPS equipment and periodically cross-check the GPS guidance to other approved means of navigation.
- GPS Approach: GPS approaches are not authorized under INTEG - Execute missed approach or revert to alternate navigation.

c) During a GPS LPV precision approach or GPS LNAV/VNAV approach, the 400W Series unit will downgrade the approach if the Vertical alarm limits are exceeded. This will cause the vertical guidance to flag as unavailable. The procedure may be continued using the LNAV only minimums.

d) During a GPS LP approach, the 400W Series may downgrade the approach prior to the Final Approach Fix if alarm limits are exceeded. If this occurs, a message will be displayed advising the pilot to use LNAV minimums. If alarm limits are exceeded after the Final Approach Fix, the 400W Series unit will flag the lateral guidance and generate a system message "ABORT APPROACH loss of navigation". Immediately upon viewing the message the unit will revert to Terminal alarm limits. If the position integrity is within these limits lateral guidance will be restored and the GPS may be used to execute the missed approach, otherwise alternate means of navigation should be utilized.

e) During any GPS approach in which precision and non-precision alarm limits are exceeded, the 400W Series unit will flag the lateral guidance and generate a system message "ABORT APPROACH loss of navigation". Immediately upon viewing the message the unit will revert to Terminal alarm limits. If the position integrity is within these limits lateral guidance will be restored and the GPS may be used to execute the missed approach, otherwise alternate means of navigation should be utilized.

Section 4. NORMAL PROCEDURES

Refer to the 400W Series unit Pilot's Guide defined in paragraph 2.1 on page 6 of this document for normal operating procedures. This includes all GPS operations, VHF COM and NAV, and Multi-Function Display information. For information on TIS traffic, or data linked weather see the Pilot's Guide addendum for optional displays. For information on active traffic sensor or Stormscope operation and displays see the Pilot's Guide addendum for display interfaces.

Although intuitive and user friendly the 400W Series unit requires a reasonable degree of familiarity to prevent operations without becoming too engrossed at the expense of basic instrument flying in IMC and basic see-and-avoid in VMC. Pilot workload will be higher for pilots with limited familiarity in using the unit in an IFR environment, particularly without the autopilot engaged. Garmin provides excellent training tools with the Pilot's Guide and PC based simulator. Pilots should take full advantage of these training tools to enhance system familiarization. Use of an autopilot is strongly encouraged when using the 400W Series unit in IMC conditions

4.1 Approaches with Vertical Guidance

The 400W Series unit supports three types of GPS approaches with vertical guidance: LPV approaches, LNAV/VNAV (annunciated as L/VNAV) approaches, and LNAV approaches with advisory vertical guidance (annunciated as LNAV+V). For LNAV approaches with advisory vertical guidance, the 400W Series will annunciate LNAV+V indicating vertical guidance is available. LNAV minimums will be controlling in this case.

NOTE:

> If flying an LPV or LNAV/VNAV approach, be prepared to fly the LNAV only approach prior to reaching the final approach fix (FAF). If the GPS integrity is not within vertical approach limits, the system will flag the vertical guidance. This may be annunciated by a downgrade to LNAV message.

For additional information on approaches with vertical guidance refer to the 400W Series unit Pilot's Guide.

4.2 Approaches without Vertical Guidance
The 400W Series unit supports Localizer Performance approaches (annunciated as LP). Published LP minimums will be controlling in this case.

NOTE:

If flying an LP approach, be prepared to fly the LNAV only approach prior to reaching the final approach fix (FAF). If the GPS integrity is not within LP approach limits, the system will notify the pilot by a downgrade to LNAV message.

For additional information on LP approaches refer to the 400W Series unit Pilot's Guide.

4.3 Autopilot Operation
The Garmin 400W Series may be coupled to an optional autopilot if installed in the aircraft when operating as prescribed in the LIMITATIONS section of this manual. For lateral guidance, some installations may utilize GPSS or GPS Roll Steering in lieu of the analog deviation information. If an HSI is used with GPSS engaged, the pilot should rotate the course pointer as prompted on the 400W Series unit to prevent loss of situational awareness and to prevent the aircraft from turning inappropriately if the autopilot is switched from digital (GPSS) to analog mode. For autopilot operational instructions, refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

4.4 Coupling the Autopilot during approaches
The Garmin 400W Series supports analog and digital (GPSS) control interfaces to an optionally installed autopilot. Some autopilots revert to ROLL mode (wings level) and/or flag a NAV failure if the digital data becomes unavailable or is inhibited. The CDI selection of VLOC should inhibit the digital control interface. When switching between GPS and VLOC the pilot should be aware that the autopilot may need to be re-engaged into APR or NAV mode after changing the CDI source.

Autopilot coupling to GPS vertical guidance requires that the autopilot be engaged in an analog APR mode identical to coupling to an ILS. Some autopilots may revert to ROLL mode when the navigation outputs of the 400W Series unit sequence to the final approach fix. In these installations the unit will be configured to PROMPT the pilot to "Enable the autopilot approach outputs" in order to prevent the autopilot from entering ROLL mode without the pilot being aware of the transition.

☐ This installation prompts the pilot and requires the pilot to enable the A/P outputs just prior to engaging the autopilot in APR mode.

☐ This installation supports a seamless transition from digital (GPSS) to analog guidance for the autopilot. To capture the vertical guidance, the pilot may engage the autopilot in APR mode at any time when the GPS Glide Slope (VDI) becomes valid (displayed without a FLAG).

☒ This installation interfaces to the autopilot in analog mode only. To capture the vertical guidance, the pilot may engage the autopilot in APR mode at any time when the GPS Glide Slope (VDI) becomes valid.

☐ The autopilot does not support any vertical capture or tracking in this installation.

Analog only autopilots should use APR mode for coupling to LNAV approaches. Autopilots which support digital roll steering commands (GPSS) may utilize NAV mode and take advantage of the digital tracking during LNAV only approaches.

4.5 WFDE Prediction Program

The Garmin WAAS Fault Detection and Exclusion (WFDE) Prediction Program is required for Remote/Oceanic operations.

The Prediction Program should be used in conjunction with the Garmin 400W/500W Simulator. After entering the intended route of flight in the Simulator flight plan the pilot selects the FDE Prediction Program under the Options menu of the Simulator program.

For detailed information refer to the WFDE prediction program instructions (190-00643-01). The availability of FDE is only required for Oceanic or Remote operations.

Section 5. PERFORMANCE

No change.

Section 6. WEIGHT AND BALANCE

See current weight and balance data.

Section 7. SYSTEM DESCRIPTIONS

See Garmin 400W Series unit Pilot's Guide for a complete description of the 400W Series unit.

XI

SERVICE DOCUMENTS

United States of America
Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SA01637CH

This certificate issued to Landmark Aviation
1200 North Airport Drive
Springfield, Illinois 62707

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 23 of the Federal Aviation *Regulations.* *See Type Certificate Data Sheet A27CE for complete certification basis.*

Original Product - Type Certificate Number A27CE

Make: Cessna Aircraft Company

Model: 501; 551

Description of Type Design Change:
Certification of Reduced Vertical Separation Minimum (RVSM) operational capability initiated in accordance with FAA Approved Master Data List, Garrett Aviation Services Document 1009092, Revision F, dated April 10, 2008, or later FAA approved revision.

Limitations and Conditions:
1) Compatibility of this design change with previously approved modifications must be determined by the installer.
2) The installation is only valid when the aircraft is also modified in accordance with either STC No. SA01558CH-D or SA02076CH-D with eligibility as shown on the applicable installation STC.
3) FAA Approved Airplane Flight Manual Supplement, Garrett Aviation Services Doc. No. 50-8008-001, Revision B, approved March 17, 2006, or later FAA approved revision; or FAA Approved Airplane Flight Manual Supplement, Garrett Aviation Services Doc. No. 50-8008-003, Revision C, approved June 28, 2006, or later FAA approved revision; or FAA Approved Airplane Flight Manual Supplement, Garrett Aviation Services Doc. No. 1009093, Revision C, approved June 30, 2006, or later FAA approved revision;

(See Continuation Sheet 3)

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: May 6, 2002

Date of issuance: May 6, 2002

Date reissued: April 5, 2007

Date amended: July 27, 2005; April 10, 2008

By direction of the Administrator

FEDERAL AVIATION ADMINISTRATION

(Signature)
Charles L. Smalley
Manager, Systems and Flight Test Branch
Chicago Aircraft Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

 This certificate may be transferred in accordance with FAR 21.47.

United States of America
Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate
(Continuation Sheet)

Number SA01637CH

Date amended: April 10, 2008

Limitations and Conditions: (Continued from Page 1 of 3)

3) continued -
or FAA Approved Airplane Flight Manual Supplement, Landmark Aviation Doc. No. 1013508, Revision A, approved April 10, 2008, or later FAA approved revision is required on board the modified aircraft.
4) Instructions for Initial and Continued Airworthiness, Landmark Aviation Doc. No. 50-8008-004, Revision N, dated January 28, 2008, or later FAA accepted revision, should be incorporated into the aircraft maintenance program.
5) If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

-----END----

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SA01558CH-D

This certificate issued to

Landmark Aviation
1200 North Airport Drive
Springfield, IL 62707

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 25 of the Federal Aviation Regulations.
See Type Certificate Data Sheet A27CE as amended by Special Condition No. 25-199-SC, dated April 17, 2002, Docket No. NM216 for complete certification.

Original Product - Type Certificate Number: *A27CE*

Make: *Cessna Aircraft Company*

Model: *Cessna 501/551*

Description of Type Design Change:
Installation of a Innovative Solutions & Support Air Data Computer. Installed per ElectroSonics Top Drawing ES551-120028-01, Rev (F), dated June 05, 2007 or later FAA approved revision.

Limitations and Conditions:

1. *Compatibility of this design change with previously approved modifications must be determined by the installer.*
2. *FAA Approved Flight Manual Supplement, ElectroSonics document ES551-120028-100, Rev. IR, dated May 03, 2002 or later FAA Approved revision for Option 1 & 2, FAA Approved Flight Manual Supplement, ElectroSonics document number ES551-120028-101, Rev. IR, dated May 03, 2002 or later FAA Approved revision for Option 3 & 4, Flight Manual Supplement, Landmark Aviation document number 1012945, Rev. A dated June 05, 2007 or later FAA Approved revision for Option 5 is a required part of this STC.*
3. *Airworthiness Limitations requirements specified in ElectroSonics document ES551-120028-200, Revision IR, dated April 25, 2002 or later FAA Approved revision, must be complied with in addition to the basic airplane maintenance manuals.*
4. *If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.*

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: *March 20, 2002*

Date of issuance: *May 3, 2002*

Date reissued: *June 05, 2002 January 19, 2007*

Date amended: *June, 05, 2007*

By direction of the Administrator

____

(Signature)
Tim Winiesdorffer, DAS Administrator
Landmark Aviation, Springfield, IL
FAA DAS-100079-CE

____

(Title)

FEDERAL AVIATION ADMINISTRATION

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

 This certificate may be transferred in accordance with FAR 21.47.

INSTRUCTIONS: The transfer endorsement below may be used to notify the appropriate FAA Regional Office of the transfer of this Supplemental Type Certificate.

The FAA will reissue the certificate in the name of the transferee and forward it to him.

TRANSFER ENDORSEMENT

Transfer the ownership of Supplemental Type Certificate Number ____________________

to *(Name of transferee)* ____________________

(Address of transferee) ____________________

(Number and street)

____

(City, State, and Zip code)

from *(Name of grantor) (Print or type)* ____________________

(Address of grantor) ____________________

(Number and street)

____

(City, State, and Zip code)

Extent of Authority (if licensing agreement): ____________________

____

____

____

Date of Transfer: ____________________

Signature of grantor (In ink): ____________________

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

 this certificate may be transferred in accordance with FAR 21.47.

INSTRUCTIONS FOR INITIAL AND CONTINUED AIRWORTHINESS FOR CESSNA MODEL 500/501 AND 550/551 SERIES AIRCRAFT QUALIFIED FOR OPERATIONS IN REDUCED VERTICAL SEPARATION MINIMUM (RVSM) AIRSPACE

Prepared For

Garrett Aviation Services
1200 North Airport Drive - Capital Airport
Springfield, IL

Prepared By

Kohlman Systems Research, Inc
319 Perry Street
Lawrence, KS 66044

Supplemental Type Certificate No. ST01636CH/SA01637CH
Garrett Aviation Services Doc. No. 50-8008-004

Revision L, 28 June 2006

Signature Page{tc \l1 "Signature Page}

Document:
Garrett Aviation Services Doc. No. 50-8008-004

Revision L, 28 June 2006

INSTRUCTIONS FOR INITIAL AND CONTINUED AIRWORTHINESS FOR CESSNA MODEL 500/501 AND 550/551 SERIES AIRCRAFT QUALIFIED FOR OPERATIONS IN REDUCED VERTICAL SEPARATION MINIMUM (RVSM) AIRSPACE

Approved By Tim Winiesdorffer
Tim Winiesdorffer
Garrett Aviation Services

Accepted By Marker W. Anderson
Federal Aviation Administration
Chicago Aircraft Certification Office

Log Of Revisions

{tc \l1 "Log Of Revisions}

Rev	Date	Affected Pages	Initial
	March 19, 02	Original Release	RTM
A	Apr 23, 02	Title page - vi, 1.1-1.2, 2.2-2.7, 3.1-3.2, 4.1-4.2 Inserted documentation to allow for dual AIU installation, TAT probe location definition, additional transponder requirements and other miscellaneous corrections.	RTM
B	May 22, 02	Title page - iv, vi, 1.2, 2.1 - 2.5, 2.7, 3.1 - 3.4 Made corrections based on AEG Review, Added note and correction to Tables 2.2 & 3.1. Included reference to equipment STC, TAT probe installation requirements and aircraft exterior modifications related to RVSM compliance. Modified Figure 3.1 and added Figure 3.2	RTM
C	June 10, 02	Title page - iv, 2.7 Corrected skin overlay change in thickness tolerances and allowance for skin overlay thickness minimums.	RTM
D	Oct. 1, 02	Title page - iv, 2.3 Included Honeywell/Sperry SP-200, P/N 4008519-811 & 4008519-911 to Table 2.1.	RTM
E	July 16, 03	- All Pages: Reformatted entire document to Garrett Aviation Services format including the removal of the Document Control Page (page ii). Removed "change bars" for all previous revisions. Changed "Cessna Citation" to "Cessna Model" in the entire document. - Pages iii, 1.1 – 1.3: Removed FAA signature blocks and outline of initial and continued air-worthiness tasks from section 1.2. - Pages iv – v: Updated Table of Contents and List of Tables. - Page 2.1: Changed "will be granted" to "may be granted". Added text to address airplanes equipped with Williams FJ44 engines. - Page 2.4: Updated component information. - Pages 2.5 & 2.6: Divided Section 2.4.1 into airworthiness and operational approval sections. Updated Revision level of Skin Mapping Document. - Page 2.7: Divided Section 2.4.2 into 12 and 24 month titled sections. All required tasks completely written out. - Page 2.8: Section 2.4.3 All required tasks completely written out. - Page 2.9: Updated Rev level for Skin Map document. - Page 3.1: Removed requirement to file copy of results with Garrett Aviation Services. - Page 3.5: Changed flight segment length from "1 hour" to "at least 30 minutes".	BW

Log Of Revisions

{tc \l1 "Log Of Revisions}

Rev	Date	Affected Pages	Initial
F	8 Sept., 2003	- Page v, Table of Contents: Updated to reflect previous revisions to the document. - Page vi, List of Tables: Updated page numbers for Tables 2.1 and 2.2	BW
G	15 February 2005	Page 2.2 & 2.3 added additional temperature probe part numbers. Page 2.3 added the VN212 (-901) part number and SP-200 (-920) part number to table 2.1.	TW
H	27 July 2005	Add use of STC SA02076CH-D using the Collins IDS-3000 in the 501 aircraft only.	TW
J	17 March 2006	Revised table 2.1a on page 6 to add the ADDU and config module, added note 6 on page 6 to include the ADDU and configuration module when the aircraft only has 1 AFD-3010 Display.	TW
K	14 April 2006	Revised Note 1 on page 5. The note defines the # of AIU's required when you have dual flight directors in the aircraft.	TW
L	28 June 2006	Removed previous revision dates from page i and ii. Revised table 2.1a on page 6 to include the -002 DIU.	TW

Table Of Contents{tc \l1 "Table Of Contents} **Page**

List Of Tables{tc \l1 "List Of Tables} **Page**

List Of Figures{tc \l1 "List Of Figures} **Page**

1.0 Airworthiness Limitations{tc \l1 "1.0 Airworthiness Limitations}

1.1 General Requirements{tc \l2 "1.1 General Requirements}

The Cessna Model 500, 501, 550 and 551 aircraft have been shown to qualify for operation in Reduced Vertical Separation Minimum (RVSM) airspace as group airplanes in accordance with Title 14 of the Code of Federal Regulations (14CFR), Part 91, Appendix G, "Operation in Reduced Vertical Separation Minimum (RVSM) Airspace", and FAA Memorandum 91-RVSM, Change 1, dated 30 June 1999, "Interim Guidance for Approval of Aircraft for Reduced Vertical Separation Minimum (RVSM) Flight". This qualification is based on analysis of the configuration and performance of the air data, automatic altitude control, altitude alerting, and altitude reporting systems. These systems must be maintained in accordance with the inspections and tests specified in this document and other current maintenance practices, to guarantee initial and continued compliance to RVSM specifications.

The owner/operator of the airplane seeking approval for operations in RVSM airspace must add the initial and continued airworthiness inspection and test instructions contained in this document to their existing maintenance and flight operations programs for the airplane to conduct operations in RVSM airspace. Any deviation from these procedures must be coordinated through Garrett Aviation Services and the responsible airworthiness authority prior to operation in RVSM airspace.

The information presented in this document supplements or supersedes the existing maintenance requirements only in those areas specified. Refer to the manufacturer's requirements and procedures for maintenance procedures pertaining to the airplane's systems and specific avionics equipment not covered in these instructions.

1.2 Initial and Continued Airworthiness Requirements{tc \l2 "1.2 Initial and Continued Airworthiness Requirements}

The Airworthiness Limitations section is FAA-approved and specifies maintenance required under §§43.16 and 91.403 of the Federal Aviation Regulations, unless an alternative program has been FAA approved. Both the Pilot's and Copilot's altimetry systems must be inspected and verified to the tolerances presented in this document. It is noted that there are no Airworthiness Limitations associated with the RVSM airworthiness compliance of the Cessna Model 500, 501, 550 or 551 aircraft.

2.0 Airplane Maintenance{tc \l1 "2.0 Airplane Maintenance}

2.1 Introduction{tc \l2 "2.1 Introduction}

The Cessna Model 500, 501, 550 and 551 aircraft have been shown to qualify for operation in RVSM airspace as group airplanes based on analysis of the configuration and performance of the air data, automatic altitude control, altitude alerting, and altitude reporting systems. These systems must be maintained in accordance with this document and other current maintenance practices, to guarantee initial and continued compliance to RVSM specifications. Revisions/changes to the Instructions for Continued Airworthiness will be distributed in accordance with Garrett Aviation Services Policies & Procedures System (GAPPS) procedure number QP 04-007, "Customer and Regulatory Notification Process for Garrett Products".

Prior to applying for RVSM operational approval, the operator of each Cessna Model 500, 501, 550 or 551 aircraft must first conduct the inspections, tests, and all other requirements for initial airworthiness compliance as presented in Section 2.4.1 of this document. The operator should coordinate with the appropriate FAA Flight Standards District Office (FSDO) to determine what documentation must be provided to prove compliance with the requirements for initial airworthiness. When compliance with the initial airworthiness tasks has been demonstrated, RVSM operational approval may be granted by the FSDO. After initial airworthiness has been granted, the airplane must be maintained in accordance with the continued airworthiness requirements presented in Section 2.4.2 of this document.

2.2 Aircraft Configuration{tc \l2 "2.2 Aircraft Configuration}

The Cessna Model 500, 501, 550 and 551 aircraft are equipped with two independent air data systems comprised of independent, cross-coupled static sources, air data computers, and altimeters. The aircraft are also equipped with single autopilot and altitude alerting installations and two altitude-reporting transponders. The installation and operation of these systems have been shown to meet RVSM requirements.

The Cessna Model 500 aircraft is equipped with either two JT15D-1, JT15D-1A, or JT15D-1B engines, and is certified to operate up to FL410 and M_{MO}=0.70.

The Cessna Model 501 aircraft is equipped with either two:

> JT15D-1, JT15D-1A, or JT15D-1B engines, and is certified to operate up to FL410 and M_{MO}=0.70.
>
> **OR**
>
> Williams FJ44-2A engines (STC number ST09559AC) and is certified to operate up to FL430 and M_{MO}=0.70.

2.2 Aircraft Configuration(Continued)

The Cessna Model 550 and 551 aircraft are equipped with two JT15D-4 engines, and are certified to operate up to FL430 and M_{MO}=0.70.

Any future engine changes/modification, including hush kits, may affect RVSM performance, and hence, these instructions. Contact Garrett Aviation Services if such engine changes/modifications are, or shall be, conducted.
The Cessna Model 500 and 501 equipped with "Longwing" and "Eagle" STC modifications have been shown to have no affect on the RVSM qualification or performance of these airplanes, and may be incorporated without changing the RVSM qualification of the airplane.

The Cessna Model 500, 501, 550, and 551 aircraft can have a Total Air Temperature (TAT) probe (P/N 102AU1AG, 102DB1CK, 102AU1AF) located at station 81.0 below the right hand nose baggage door as a part of the STC ST01392CH-D, SA01558CH-D or SA02076CH-D relocation of this probe (if installed) may invalidate the defined SSEC for this aircraft and the associated RVSM approval/compliance for this aircraft. Removal of this probe and operation of this aircraft with this probe removed will not affect the RVSM approval/compliance for this aircraft.

2.3 Aircraft System Description{tc \l2 "2.3 Aircraft System Description}

Static pressure information is provided to the air data display unit (ADDU) or Air data Computer (ADC) through cross-coupled static sources located on the left and right sides of the fuselage. The (ADDU or ADC), through a static source error correction, provide corrected altitude information to the altimeters for display. The autopilot and altitude alerter receives altitude deviation data from the Pilot's or the Copilot's altimeter. Each altimeter provides altitude data to their respective transponders for altitude reporting. The aircraft system components approved for RVSM operations on the Cessna Model 500, 501, 550 or 551 aircraft are presented in Table 2.1 or Table 2.1a.

The components listed in Table 2.1 or Table 2.1a must be maintained in accordance with approved maintenance practices, and the Initial and Continued Airworthiness instructions presented in this document. RVSM compliance was demonstrated with the following antennas installed on the test aircraft:

1. A flight phone antenna (typically 7.0 inches tall or less) located at FS 62.0 on the right hand side of the aircraft,
2. An L-Band antenna (typically 3.5 inches tall or less) located at FS 76.5 on the left hand side of the aircraft, and
3. An L-Band antenna (typically 3.5 inches tall or less) located at FS 58.0 on the left hand side of the aircraft.

Contact Garrett Aviation Services prior to the installation of any additional antennas forward of the static ports as installation of additional antennas may invalidate the RVSM certification for these aircraft.

TABLE 2.1 Required Avionics and Air Data Components for RVSM Operation Cessna Model 500, 501, 550 or 551 Aircraft

Description	Manufacturer	Model	Part Number
Air Data Display Unit #1 (ADDU1)	IS&S	ADDU	9D-80130-16
Air Data Display Unit #2 (ADDU2)	IS&S	ADDU	9D-80130-16
Analog Interface Unit (AIU1)	IS&S	AIU	9B-81040-15 or 9B-81040-26
Analog Interface Unit (AIU2)[1]	IS&S	AIU	9B-81040-15 or 9B-81040-26
Configuration Module #1 & #2 [2] (CM1 & CM2)	IS&S	CM	9B-03508-15
Transponder #1 & #2 [3][4]	Collins or Honeywell	TDR-90 or XS-850	622-1270-001 or 7510774-901
Autopilot	Sperry/Honeywell	SPZ-500	550/551 Airplanes: 4008519-(920 or 941)
			500/501 Airplanes: 4008519-811 4008519-911
Altitude Alerter	Intercontinental Dynamics or Honeywell	~ or VN-212	540-23989-311 or 4020571-(901 or 904)
Standby Altimeter [5]	As Noted	As Noted	As Noted
Total Air Temperature (TAT) Probe[6]	Rosemount	~	102AU1AG, 102DB1CK, 102AU1AF

Note:
1. If the aircraft is equipped with dual flight directors & both flight directors are capable of controlling the aircraft in RVSM airspace 2 AIU's are required. If the aircraft is equipped with dual flight directors and the #2 flight director is not capable of controlling the aircraft in RVSM airspace then ONLY 1 AIU is required.
2. When the IS&S Configuration Module (P/N 9B-03508-15) is correctly installed, the Air Data Display Units (ADDU) will display "CES1" at start-up. If either ADDU does not display "CES1" at start-up, RVSM operations are prohibited.
3. Any transponder that meets or exceeds the requirements of one of the following Technical Standard Orders (TSO) may be substituted for those listed. TSO-C74b or TSO-C74c (Mode C); TSO-C112 (Class 2a; Mode S); TSO-C112a (Mode S).
4. Only one transponder is required to be operational for operations in RVSM airspace and it must be capable of reporting altitude information from either the Pilot or Copilot's ADDU.
5. Any standby altimeter that meets or exceeds the requirements of TSO-C10b may be substituted for the unit listed.
6. For RVSM operations, the TAT probe, (if installed), must be installed on Station 81 below the right hand nose baggage door. Relocation of this probe may invalidate the defined SSEC for this aircraft and the associated RVSM approval/compliance for this aircraft.

This document does not constitute approval for installation of the components listed in Table 2.1. This document is invalid unless these components have been installed per ElectroSonics Supplemental Type Certificate ST01392CH-D or SA01558CH-D and approved by the appropriate Certifying Authority as a separate, independent approval. Replacement of the listed equipment must be accomplished with units of identical part number. If alternate avionics equipment is to be or intended to be installed, a re-evaluation of the configuration for equivalent RVSM performance must be conducted and approved.

TABLE 2.1a Required Avionics and Air Data Components for RVSM Operation Cessna Model 501 Aircraft

Description	Manufacturer	Model	Part Number	QTY
Adaptive Flight Display[6]	Collins	AFD-3010	822-1084-460	1 or 2
Adaptive Flight Display	Collins	AFD-3010E	822-1753-460	1
Display Control Panel	Collins	DCP-3030	822-1828-062	2
Display Interface Unit	Collins	DIU-3010	822-2063-001 or 822-2063-002	1 or 2
J2/Kollsman Air Data Computer[6]	Kollsman	J2/Kollsman	24471	1 or 2
Configuration Module	Kollsman		20718-0015	2
Air Data Display Unit (ADDU)[6]	IS&S	ADDU	9D-80130-32	1
Configuration Module [5] [6]	IS&S	CM	9B-03508-15	1
Analog Interface Unit	IS&S	AIU	9B-81040-26	1
Transponder #1 & #2 [1] [2]	As noted	As Noted	As Noted	2
Autopilot	Sperry/Honeywell	SP-200	4008519-811 or 4008519-911	1
Standby Altimeter [3]	As noted	As noted	As Noted	1
Total Air Temperature (TAT) Probe[4]	Rosemount	~	102AU1AG,102DB1CK, 102AU1AF	1

NOTES

1. Any Transponder that meets or exceeds the requirements of one of the following Technical Standard Orders (TSO) may be used. TSO-C66a or TSO-C47c (Mode C); TSO-C112 (Class 2a; Mode S); TSO-C112a (Mode S).
2. If only one transponder is operational, it must be capable of reporting from either the pilot's or copilot's ADC.
3. For RVSM operations, a standby altimeter that meets or exceeds the requirements of TSO-C10b must be installed.
4. For RVSM operations, the TAT Probe, (if installed), must be installed at Station 81.0 below the right hand nose baggage door.
5. When the IS&S Configuration Module (P/N 9B-03508-15) is correctly installed, the Air Data Display Unit (ADDU) will display "CES1" at start-up. If the ADDU does not display "CES1" at start-up, RVSM operations are prohibited.
6. If the aircraft has 2 AFD-3010 displays then the ADDU and configuration module are not required. If the aircraft has 1 AFD-3010, only 1 Kollsman ADC and a ADDU and configuration module are required.

This document does not constitute approval for installation of the components listed in Table 2.1a. This document is invalid unless these components have been installed per Supplemental Type Certificate SA02076CH-D and approved by the appropriate Certifying Authority as a separate, independent approval. Replacement of the listed equipment must be accomplished with units of identical part number. If alternate avionics equipment is to be or intended to be installed, a re-evaluation of the configuration for equivalent RVSM performance must be conducted and approved.

2.4 Requirements For RVSM Initial And Continued Airworthiness{tc \l2 "2.4 Requirements For RVSM Initial And Continued Airworthiness}

The following inspections, tests, and/or procedures must be included in the basic maintenance plan for the Cessna Model 500, 501, 550 or 551 aircraft seeking approval for operations in RVSM airspace to ensure initial and continued airworthiness for RVSM operation. Both systems (Pilot/Copilot) must be maintained in accordance with these instructions. The information presented in this Section supplements or supersedes the basic airplane manuals only in those areas specified. Normal air data system maintenance specified in the maintenance manual must still be followed as required. For maintenance procedures pertaining to the airplane's systems and specific avionics equipment not covered in these instructions, see the manufacturer's requirements and procedures.

2.4.1 Servicing Information For Initial Airworthiness{tc \l3 "2.4.1 Servicing Information For Initial Airworthiness}

1. The following inspections/tests are required for RVSM initial airworthiness approval:

   a. Verify the correct avionics components are installed in accordance with Section 2.3 Table 2.1 or Table 2.1a.

   b. Implement the static port refinishing process specified in Garrett Doc. No. 48-8408-001, "Citation RVSM Port Preparation Procedure for Initial and Continued Airworthiness", Revision NC, dated January 18, 2002, which is presented in Appendix A of this document.

   c. Conduct the air data system accuracy check presented in Section 3.1.1 using accurate ground test equipment, and verify the air data system errors are within specified RVSM tolerances.

   d. Conduct the following inspections for the RVSM Critical Region.

      1. Conduct a visual inspection of the RVSM Critical Region and mark the RVSM Critical Region defined by defined in Section 3.1.2 and Figure 3.1. Place the RVSM modification compliance Placard on the aircraft as defined in Section 3.1.2 and Figures 3.1 and 3.2.

      2. Verify the absence of skin waviness, scratches, damage, and prior repairs in this region.

      3. Verify entire inspection area meets any criteria found in the Cessna Model 500 Series Structural Repair Manual, Chapter 51-00-03, Aerodynamic Surfaces - Description. Repair any discrepancies found using standard procedures found in the Structural Repair Manual. If any repairs are made, complete the tasks required in Section 2.4.3.

2.4.1 Servicing Information For Initial Airworthiness{tc \l3 "2.4.1 Servicing Information For Initial Airworthiness} Continued.

4. Visually inspect the area around each static heater port to ensure that it complies with Figure 1 in Appendix A, including the transition from painted to unpainted surface.

5 Verify that any placards or stencils are located outside of the RVSM Critical Area defined in Figure 3.1.

e. Map the skin of the aircraft in the RVSM Critical Region as specified in Garrett Aviation Services Doc. No. 50-8432-001, Reduced Vertical Separation Minimum Skin Waviness Inspection Procedures For The Cessna Model 500/501, 550/551, S550 And 560 Citation Aircraft, Revision C, dated 1 July 2003. Once the skin is mapped the results should be compared with the tolerances in Table 2.2. If the aircraft exceeds the allowances in Table 2.2, contact Garrett Aviation Services.

f. Conduct the in-flight autopilot altitude hold check described in Section 3.1.3 and verify that the airplane can maintain the specified tolerance.

Inspections 1.c, 1.d and 1.e must be conducted at ambient temperature (50^0 to 95^0F). The aircraft does not need to be jacked or leveled to conduct these inspections and tests. No access or inspection panels are required to be opened in order to conduct these inspections and tests.

2. The following items must be accomplished by the owner/operator in order to achieve RVSM operational approval:

a. Revise the Minimum Equipment List (MEL) or a suitable alternative method to specify minimum equipment requirements for RVSM operation (see Section 4.1).

b. Verify that all flight crews are familiar with operational conditions and procedures presented in the Airplane Flight Manual Supplement (AFMS) and all other contingencies necessary for the safe operation of the Cessna Model 500, 501, 550 or 551 aircraft in RVSM airspace. Note that RVSM-specific airspace procedures (contingencies and other such protocols) may differ from region to region (i.e. Europe, North Atlantic, Pacific).

2.4.2 Servicing Information For Continued Airworthiness{tc \l3 "2.4.2 Servicing Information For Continued Airworthiness}

2.4.2.1 Twelve (12) Month Inspection Requirements

After initial airworthiness approval has been granted, the following tasks must be conducted every 12 months in service:

1. Verify the correct avionics components are installed in accordance with Section 2.3 Table 2.1, or Table 2.1a.

2. Conduct the air data system accuracy check presented in Section 3.1.1 using accurate ground test equipment, and verify the air data system errors are within specified RVSM tolerances.

3. Conduct the following inspections for the RVSM critical region:

   a. Conduct a visual inspection of the RVSM Critical Region and verify that the RVSM Critical Region corner markings as defined in Section 3.1.2 and Figure 3.1 are discernable and in good condition. Verify that the RVSM modification compliance Placard as defined in Section 3.1.2 and Figures 3.1 and 3.2 is in place and readable.

   b. Verify the absence of waviness, scratches, damage, and prior repairs.

   c. Verify that the entire inspection area meets any criteria found in the Cessna Model 500 Series Structural Repair Manual, Chapter 51-00-03, Aerodynamic Surfaces - Description. Repair any discrepancies found using standard procedures found in the Structural Repair Manual. If any repairs are made, complete the tasks required in Section 2.4.3.

   d. Verify that all placards or stencils are located outside of the RVSM Critical Area defined in Figure 3.1.

2.4.2.2 Twenty Four (24) Month Inspection Requirements

In addition to the Tasks required every 12 months in service, the following additional task must be completed every 24 months in service:

- Conduct the in-flight autopilot altitude hold check described in Section 3.1.3. Verify the airplane can maintain the specified tolerance.

2.4.3 Damage Within The RVSM Critical Region {tc \l3 "2.4.3 General Static System Servicing Information}

If damage is sustained within the RVSM Critical Region (defined in Figure 3.1) that results in any defect greater than 10 % of the sheet thickness (Cessna Model 500 Series Structural Repair Manual, Chapter 51-10-01, Section 2.A.(1)) repair as specified. After the repair is completed, the following tasks must be completed:

1. Implement the static port refinishing process specified in Garrett Doc. No. 48-84080-001, "Citation RVSM Port Preparation Procedure for Initial and Continued Airworthiness", Revision NC, dated January 18, 2002, which is presented in Appendix A of this document.

2. Conduct the air data system accuracy check presented in Section 3.1.1 using accurate ground test equipment, and verify the air data system errors are within specified RVSM tolerances.

3. Conduct the following inspections for the RVSM critical region:

   a. Conduct a visual inspection of the RVSM Critical Region and mark the RVSM Critical Region defined by defined in Section 3.1.2 and Figure 3.1. Place the RVSM modification compliance Placard on the aircraft as defined in Section 3.1.2 and Figures 3.1 and 3.2.

   b. Verify the absence of skin waviness, scratches, damage in this region.

   c. Verify that the entire inspection area meets any criteria found in the Cessna Model 500 Series Structural Repair Manual, Chapter 51-00-03, Aerodynamic Surfaces - Description. If any discrepancies are found, repair the discrepancy using standard procedures found in the Structural Repair Manual and repeat the Tasks outlined in this section.

   d. Visually inspect the area around each static heater port to ensure that it complies with Figure 1 in Appendix A, including the transition from painted to unpainted surface.

   e. Verify that any placards or stencils are located outside of the RVSM Critical Area defined in Figure 3.1.

4. Map the skin of the aircraft in the RVSM Critical Region as specified in Garrett Aviation Services Doc. No. 50-8432-001, Reduced Vertical Separation Minimum Skin Waviness Inspection Procedures For The Cessna Model 500/501, 550/551, S550 And 560 Citation Aircraft, Revision C, dated 1 July 2003. Once the skin is mapped the results should be compared with the tolerances in Table 2.2. If the aircraft exceeds the allowances in Table 2.2, contact Garrett Aviation Services.

2.4.4 Skin Contour Requirements

Garrett Aviation Services Doc. No. 50-8432-001, Rev C, dated 1July 2003, defines the skin mapping procedures and the skin locations at which the skin contour measurements will be taken for the Cessna Model 500, 501, 550 and 551 aircraft. Table 2.2 defines the minimum and maximum allowable thickness for each horizontal skin line and the skin overlap. The data collected during the skin mapping procedure must fall within the tolerances specified in Table 2.2. There is a pair of columns that give the minimum and maximum allowable thickness if 2 flexible rules are placed on each frame and a second pair of columns that give the values if 3 flexible rules are placed on each frame. The minimum and maximum allowable changes in the thickness for adjacent locations along the rigid rule are given in Table 2.2 as well. These values are unaffected by the number of flexible rules used.

The change in thickness is defined in Equation 1.

$$\Delta \text{Thickness} = \text{Thickness}_{\text{forward}} - \text{Thickness}_{\text{aft}} \qquad (1)$$

The smaller location numbers are defined as forward. An example of this calculation is shown in Equation 2.

$$\Delta \text{Thickness}_1 = \text{Thickness}_1 - \text{Thickness}_2 \qquad (2)$$

Table 2.2 Skin Waviness and Skin Overlay Inspection Tolerances

Flexible Rule Graduation	Aircraft Side	Thickness (in)				Change in Thickness (in)	
		2 Flexible Rules		3 Flexible Rules			
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
11.0	Left	0.031	0.050	0.051	0.070	-0.007	0.010
	Right	0.032	0.050	0.052	0.070	-0.007	0.010
10.0	Left	0.011	0.052	0.031	0.072	-0.016	0.015
	Right	0.005	0.054	0.025	0.074	-0.018	0.016
9.0	Left	0.024	0.065	0.044	0.085	-0.017	0.018
	Right	0.005	0.052	0.025	0.072	-0.017	0.013
8.0	Left	0.017	0.071	0.037	0.091	-0.018	0.024
	Right	0.005	0.045	0.025	0.065	-0.018	0.017
7.0	Left	0.012	0.063	0.032	0.083	-0.024	0.022
	Right	0.005	0.058	0.025	0.078	-0.021	0.024
6.0	Left	0.005	0.060	0.025	0.080	-0.020	0.016
	Right	0.005	0.090	0.025	0.110	-0.029	0.020
5.0	Left	0.000	0.070	0.020	0.090	-0.035	0.026
	Right	0.010	0.085	0.030	0.105	-0.030	0.028
4.0	Left	0.016	0.057	0.036	0.077	-0.014	0.013
	Right	0.032	0.062	0.052	0.082	-0.014	0.022
3.0	Left	0.024	0.049	0.044	0.069	-0.012	0.015
	Right	0.026	0.053	0.046	0.073	-0.014	0.012
Skin Overlay (See Note 1)	Left	0.033	0.051	0.033	0.051	-0.012	0.008
	Right	0.031	0.057	0.031	0.057	-0.012	0.009
2.0	Left	0.023	0.048	0.043	0.068	-0.009	0.011
	Right	0.030	0.055	0.050	0.075	-0.013	0.016
1.0	Left	0.023	0.058	0.043	0.078	-0.014	0.022
	Right	0.024	0.057	0.044	0.077	-0.013	0.011

Note 1: The Skin Overlay measurement does not utilize flexible rules so its tolerances are unaffected by the number of flexible rules specified in Table 2.2. Skin Overlay thickness measurements less than the indicated minimum specified in Table 2.2 should be acceptable as long as the corresponding changes in thickness tolerances are still maintained.

3.0 Maintenance Instructions{tc \l1 "3.0 Maintenance Instructions}

3.1 Maintenance Schedule and Required Inspections/Tests{tc \l2 "3.1 Maintenance Schedule and Required Inspections/Tests}

The Cessna Model 500, 501, 550 or 551 aircraft seeking approval for operations in the RVSM airspace must be maintained in accordance with the instructions provided in this Section to ensure initial and continued compliance to RVSM systems and performance requirements. These inspections/tests include an air data system accuracy check, visual inspection of the static ports and surrounding region and an in-flight autopilot (altitude hold) performance test. The maintenance intervals and required tasks are summarized in Sections 2.4.1, 2.4.2 and Section 4. All air data system maintenance requirements specified in the approved maintenance manual must also be followed.

3.1.1 Air Data System Maintenance Procedures{tc \l3 "3.1.1 Air Data System Maintenance Procedures}

The altimeters must be maintained in accordance with the manufacturer's maintenance manual, airplane maintenance manual and appropriate regulations. However, these components must also meet the accuracy tolerances shown in Table 3.1, when wired together as a system.

Test Procedure
Equipment Required:
Calibrated Digital Air Data Test Equipment with a combined accuracy/repeatability specification of less than ±20 ft for the test altitude range shown in Table 3.1.

This test must be performed on the aircraft using a calibrated digital air data test equipment, and is to be performed for both Pilot's and Copilot's air data systems.

1. Perform a pitot-static system leak check as described in the Maintenance Manual. For the static leak check, set the air data test unit at 30,000 feet and an indicated airspeed of 200 knots. Leak rate is not to exceed 300 feet/min.
2. Verify that the altitude indicator baro is set to 29.92 in Hg (1013.25 mb).
3. Apply the reference altitude and Mach (or airspeed) for the test condition.
4. Record the altitude displayed by the Pilot's and Copilot's altimeters.
5. Verify that the indicated altitudes are within allowable tolerances.
6. Repeat steps 3 through 5 for all test conditions listed in Table 3.1.
7. File the results with the aircraft maintenance records.

TABLE 3.1 Altimeter Functional Test Specification for Cessna Model 500, 501, 550 or 551 Aircraft

Leak Rate [1]:

Condition Number	Test Set Mach Number	Test Set Airspeed (kt)	Test Set Altitude (ft)	Pilot Altitude (ft)	Copilot Altitude (ft)	Nominal Altitude (ft)	Min Allowable Altitude	Max Allowable Altitude
1	0.400	149	29,000			28,906	28,854	28,958
2	0.500	188	29,000			28,847	28,795	28,899
3	0.600	228	29,000			28,763	28,711	28,815
4	0.700	268	29,000			28,714	28,662	28,766
5	0.400	130	35,000			34,911	34,859	34,962
6	0.500	164	35,000			34,855	34,803	34,907
7	0.600	199	35,000			34,775	34,723	34,827
8	0.700	235	35,000			34,728	34,676	34,780
9	0.400	119	40,000			39,912	39,860	39,964
10	0.500	146	40,000			39,857	39,805	39,909
11	0.600	177	40,000			39,777	39,725	39,829
12	0.700	209	40,000			39,731	39,679	39,783

Air Data Test Set Information	
Manufacturer:	Model:
Serial Number:	Date of Calibration:
Accuracy Specification:	

Note 1: For leak test, set the air data test unit at 30,000 feet and an indicated airspeed of 200 knots. Leak rate is not to exceed 300 ft/min.

3.1.2 Visual Inspection Of The Region Surrounding The Static Ports (RVSM Critical Region){tc \l3 "3.1.2 Visual Inspection Of The Region Surrounding The Static Ports (RVSM Critical Region)}

Inspection Procedure
Equipment Required: None.

Small markings must be applied to the corners of the RVSM Critical Region to allow for easy identification. These markings may be ANY shape or color; with the only requirement that they are visible to an individual conducting an inspection.

Figure 3.1 defines the RVSM Critical Region which extends from the skin abutment on Frame 117 to a line 16 inches forward of the skin abutment, and from a line 10 inches above the skin overlay to a line 3 inches below the skin overlay.

A placard, as shown in Figure 3.2, with the following wording must be installed on the aircraft as shown in Figure 3.1.

Modifications To The Exterior Of The
Aircraft May Affect RVSM Certification.
Refer To Garrett Aviation Services
Doc. No. 50-8008-004 For Requirements

Prior to all flights in RVSM airspace, the operator (flight crew) must visually inspect the RVSM Critical Region for obvious damage or deformation, such as paint chips, creases, dents or bulges in the skin or non-flush or missing fasteners due to foreign object damage, service vehicles, etc. The static port orifices must also be inspected for corrosion, elongation, deformation, and/or obstruction and the operator (flight crew) must ensure that no foreign matter is found within the port orifice. If damage or surface irregularities are found, repair the damage in accordance with the maintenance manual and/or structural repair manual. See Section 2.4.3.

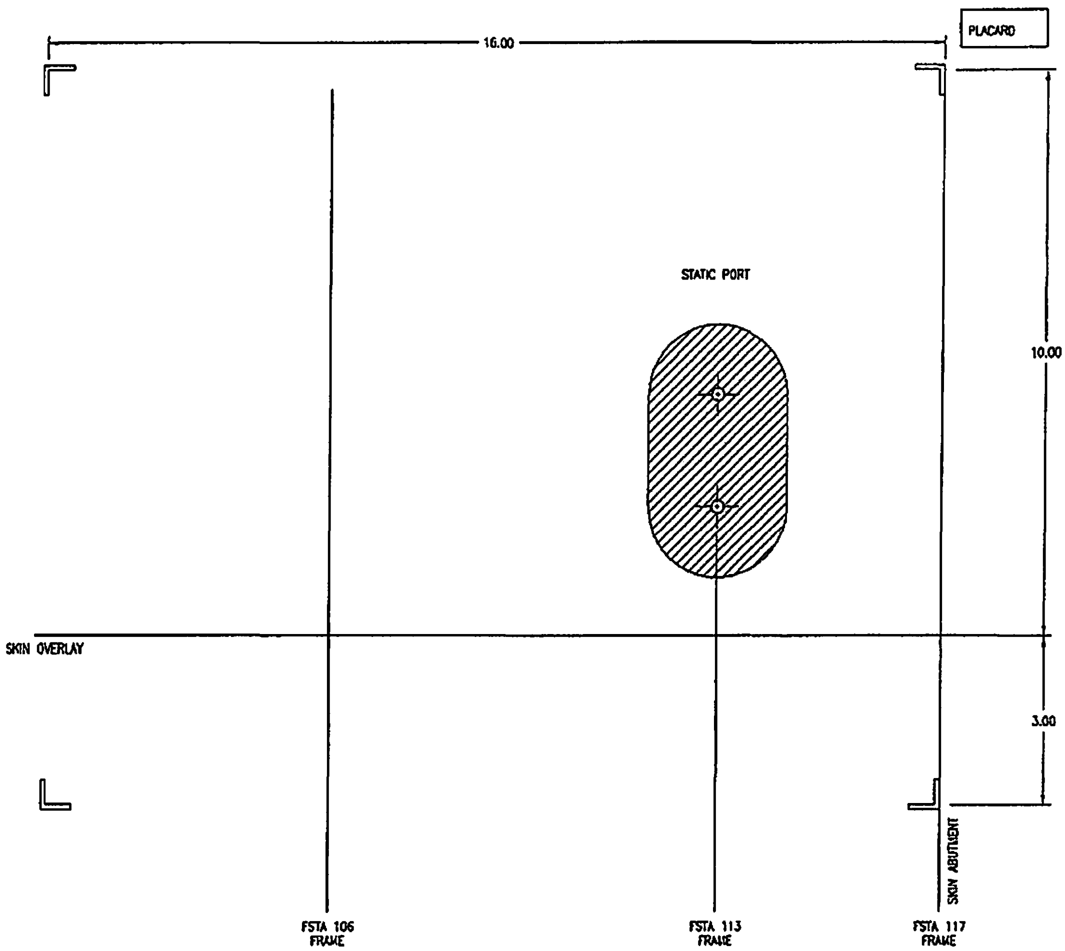

FIGURE 3.1 RVSM Critical Region Definition, Left Side Shown

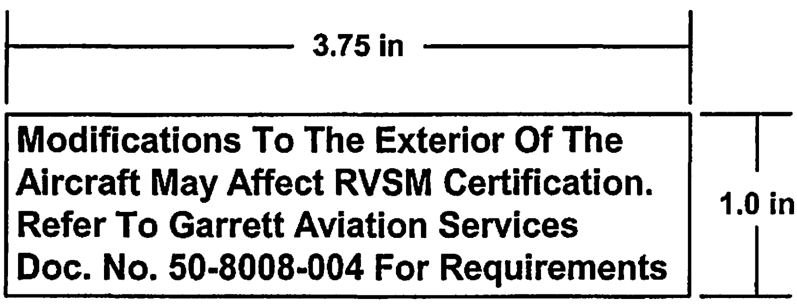

FIGURE 3.2 RVSM Critical Region Placard

3.1.3 Autopilot (Altitude Hold) Performance Test{tc \l3 "3.1.3 Autopilot (Altitude Hold) Performance Test}

RVSM operation requires that the autopilot system accurately maintains selected altitude during non-turbulent, non-gusty cruise flight. Perform required autopilot checks and/or maintenance in accordance with the component and airplane maintenance manuals. Also perform the following in-flight altitude hold performance test every 24 months.

<u>Test Procedure</u>
Equipment Required: None.

During normal RVSM cruise flight (at an altitude between FL290 and FL410, Baro settings of 29.92 in Hg or 1013 mb and non-turbulent, non-gusty conditions) and with the autopilot/altitude hold engaged, record the data from the primary displays (using Table 3.2) every 5 minutes for a flight segment at least 30 minutes length. The maximum altitude deviation shown on the display should not exceed +/-65 ft.

TABLE 3.2 RVSM Autopilot Performance Check Table, Cessna Model 500, 501, 550 or 551 Cruise Conditions

Airplane:				Date:		
Enroute To:				Pilot:		
Time (Minutes)	Pilot's Altimeter	Copilot's Altimeter	Pilot's Mach	Copilot's Mach	Pilot's KCAS	Copilot's KCAS
0:00						
0:05						
0:10						
0:15						
0:20						
0:25						
0:30						
0:35						
0:40						
0:45						
0:50						
0:55						
1:00						

3.2 Troubleshooting Information{tc \l2 "3.2 Troubleshooting Information}

The following information provides instructions for corrective action upon failure of the inspections/tests presented in Section 3.1.

3.2.1 Air Data System{tc \l3 "3.2.1 Air Data System}

If the air data system is found to exceed the requirements of Table 3.1, service the Pitot-static system in accordance with the maintenance manual. Check and drain the Pitot-static lines, conduct a leak check, and repeat the RVSM air data ground test in accordance with the procedures provided in Section 3.1.1. If the requirements of Table 3.1 are again exceeded, service the altimeters per the manufacturer's service requirements. The serviced units must be re-tested upon re-installation in the airplane per the requirements of Section 3.1.1.

3.2.2 RVSM Critical Region Inspection And Static Port Integrity{tc \l3 "3.2.2 RVSM Critical Region Inspection And Static Port Integrity}

If a visual inspection of the RVSM Critical Region, defined in Figure 3.1, indicates that damage, deformation, repairs, etc. exists that may impact air data system accuracy, then the operator should conduct inspection/repairs per the maintenance and/or structural repair Manuals. All repairs within the RVSM Critical Region must remain internal. If internal repairs are not possible, the inspection and tests presented in Section 2.4.3 must be conducted.

3.2.3 Autopilot (Altitude Hold) Check{tc \l3 "3.2.3 Autopilot (Altitude Hold) Check}

If the autopilot cannot maintain altitude to within ±65 feet from the selected cruise altitude, repeat the autopilot check per Section 3.1.3 ensuring the Mach number remains constant and the air remains stable during the entire check. If the check still fails, conduct autopilot component and/or servicing checks as specified in the component and airplane maintenance manuals. Repeat the test presented in Section 3.1.3, as required, to ensure that the altitude hold accuracy is maintained.

3.3 Installation/Removal Of RVSM-Relevant Components{tc \l2 "3.3 Installation/Removal Of RVSM-Relevant Components}

Installation and/or removal of all avionics equipment should be conducted in accordance with current maintenance practices. The air data system accuracy check outlined in Section 3.1.1 shall be conducted upon removal and/or installation of an air data unit.

4.0 Summary Of Operational Requirements And Conditions{tc \l1 "4.0 SummaryOf Operational Requirements And Conditions}

To ensure compliance with RVSM altimetry system accuracy and integrity requirements during RVSM operations, the Citation Cessna 500, 501, 550 or 551 aircraft must incorporate the Minimum Equipment List (MEL) changes, required operational conditions, and special flight crew training.

4.1 Minimum Equipment List (MEL) Revision{tc \l2 "4.1 Minimum Equipment List (MEL) Revision}

The Cessna Model 500, 501, 550 or 551 aircraft qualified for operations in the RVSM airspace must have their MEL revised to require that the equipment listed in table 2.1 or 2.1a must be operational for dispatch into RVSM airspace:

In lieu of an MEL change, the AFM supplement may serve as the vehicle for identifying the minimum equipment requirements for RVSM operation. This should be coordinated through the FSDO when applying for Operational Approval.

4.2 Operational Conditions{tc \l2 "4.2 Operational Conditions}

4.2.1 Pre-Flight Inspection Of The RVSM Critical Region{tc \l3 "4.2.1 Pre-Flight Inspection Of The RVSM Critical Region}

A pre-flight inspection of the RVSM Critical Region is required prior to operation in RVSM airspace.

4.2.2 ADDU1 Or ADDU2 Failure{tc \l3 "4.2.2 ADDU1 Or ADDU2 Failure}

In case of ADDU1 or ADDU2 failure, a series of steps must be taken by the Pilot to ensure the airplane can appropriately maintain altitude for the remainder of the RVSM operation. These steps are summarized in the AFM supplement. For aircraft equipped with the equipment in Table 2.1a refer to the AFM supplement from STC SA02076CH-D.

4.2.3 Detection Of Dual Altitude Display Fault{tc \l3 "4.2.3 Detection Of Dual Altitude Display Fault}

To ensure a dual display fault in the air data system remains detectable, the Pilot shall note the difference between the primary altimeters, and the difference between each primary altimeter and the standby altimeter, prior to entry into RVSM airspace. Pilot should also note airspeed and Mach number.

In addition to the hourly (required) cross-cockpit checks during RVSM operations, an additional check will be made between the primary altimeters and the standby altimeter. The differences between the altitude displayed on each of the primary altimeters and the standby altimeter should remain constant at a constant Mach number. Some small variation can be expected, but both primary altitude indicator displays should not diverge significantly throughout RVSM cruise flight, relative to the standby altimeter display at a constant Mach number. In all cases, the two primary altimeters must agree to within +/-200 feet, otherwise, ATC must be notified and contingency procedures executed. Table 4.1 may be used to record these altitude comparison data.

TABLE 4.1 Altimeter Display Tracking Form

Date:	Pilot:
Departing From:	Copilot:
Destination:	

Time (Interval)	Time (GMT)	Pilot Mach	Pilot Alt	Copilot Mach	Copilot Alt	Standby Alt
Prior to ATC Clearance						
+1 hour						
+2 hours						
+3 hours						
+4 hours						
+5 hours						
+6 hours						

4.3 Flight Crew Training{tc \l2 "4.3 Flight Crew Training}

All flight crews must have knowledge and understanding of standard RVSM operating practices and Air Traffic Control contingencies. In addition, all flight crews must have knowledge and understanding of the information contained in this document. The operations manual should be revised to include these RVSM-specific limitations and/or procedures, if necessary.

The Flight Crew should be familiar with the specific operational guidelines and contingency procedures that may be unique from one region of RVSM airspace to another (i.e. North Atlantic, European, Pacific, West Atlantic Route System, etc.).

NOTES{tc \l1 "NOTES}

APPENDIX A
CITATION RVSM PORT PREPARATION PROCEDURE FOR INITIAL AND CONTINUED AIRWORTHINESS

GARRETT AVIATION

SPRINGFIELD, ILLINOIS

Document Number: 48-8408-001

Document Title: Citation RVSM Port Preparation Procedure for Initial and Continued Airworthiness

Written By: Roger Huneycutt, KSR

Checked By: Gary Shroyer, Garrett SPI

Approval: Terry Marshall, KSR

Approval:

Approval:

Approval: Terry Marshall

Date: January 18, 2002		Document No.: 48-8408-001
Prepared By: R.H.		Revision: -
Approved By: GES	Section: Static Port Skin Preparation	Page: 2 of 3

1.0 INTRODUCTION

This procedure establishes the static port refinishing process for the Cessna Model 500/501/550/551 RVSM group.

2.0 REFERENCES

MATERIALS: The following materials or equivalent are acceptable:

Purpose	Material	Company	Address
Strip Paint	Oakite 157	Oakite Products, Inc.	50 Valley Rd. Berkley Heights, NJ 07922
Strip Paint	Strypeeze	Savegran Company	259 Lenox P.O. Box 130 Norwood, MA 02062
Strip Paint	Turco T-6776 LO	ELF Atochem Turco Division	Commercially available
Polish Aluminum to Mirror Finish	Tripoli T-41 Polishing Compound	Commercially available	Commercially available
Protect Paint During Mask & Strip Procedure	UUP268 Amd. 1, Grade B	Kraft Paper	Commercially available
Barrier Material, Water & Grease Proof	MIL-B-121C Grade A, Type 2 Class 1	Commercially available	Commercially available
Tape Masking	P-703	Johnson&Johnson Permacel Division	U.S.Hwy 1 P.O. Box 671 New Brunswick, NJ 08903
Protect Area during stripping	Tape, Polyethylene Coated Paper # 6223	Borden, Inc.	Borden Chemical Division 1700 Winnetka Ave. Northfield, Il 60093
Protect Area during stripping	Polyethylene Plastic 0.004 inch thick	Commercially available	Commercially available
Feather Paint Edge Smooth	ScotchBrite Roloc Type A Fine	3M Company	3M St. Paul MN 55144
Cleaning	Wiping Cloth (White, Oil Free)	Commercially available	Commercially available
Cleaning	Isopropyl Alcohol TT-I-735	Commercially available	Commercially available

3.0 PROCEDURE

Caution: Observe Safety Precautions Listed in Cessna 500 Series Maintenance Manual, Section 20-31-00

1. Protect static ports from any residue generated by the paint removal and aluminum polishing process.
2. Remove any placards within the shaded area defined by Figure 1 and within a zone that extends from the top to the bottom and ten (10) inches forward from the center of this area.
3. Thoroughly clean airplane surface to remove all grease and other dirt, which might keep the stripping agent from attacking paint.
4. Mask the area to be stripped to correspond to the shaded area defined by Figure 1.
5. Strip paint from aircraft within masked area (2.50 X 4.00 +/- 0.0125 in. , Ref. Figure 1). Paint and existing primer should be removed down to bare aluminum. Clean area and allow drying.

NOTE: Ensure mechanical methods used do not scratch or in other ways damage the surface area being stripped

6. Remove masking material.
7. "Feather" paint edge around static ports to produce a smooth transition to the area of bare aluminum surrounding the Static Ports using Fine ScotchBrite as listed.
8. Polish the bare aluminum area around the static ports using Tripoli T-41 Polishing Compound..
9. Replace any removed placards in a location that is either above or aft of the static port critical area.

Date: January 18, 2002		**Document No.:** 48-8408-001
Prepared By: R.H.		**Revision:** -
Approved By: GES	**Section:** Static Port Skin Preparation	**Page:** 3 of 3

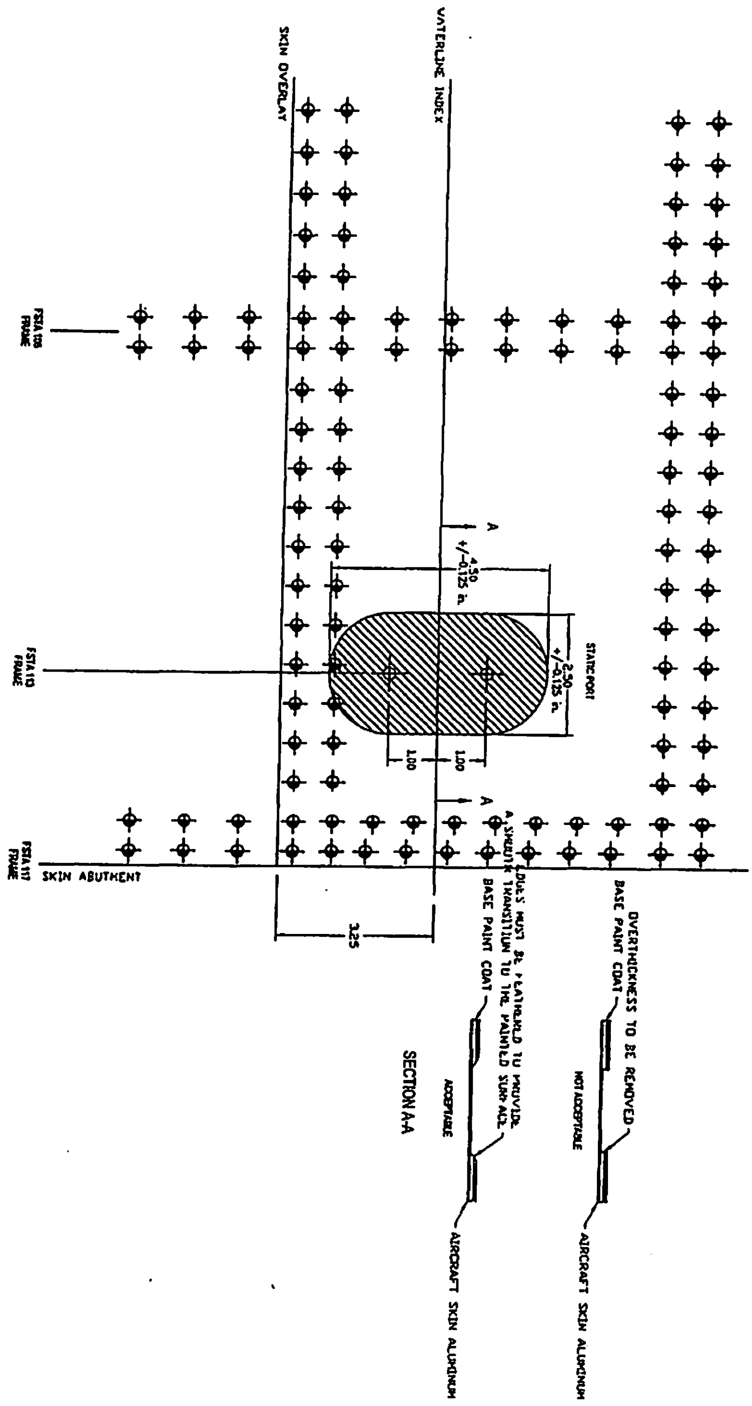

Figure 1:
Static Port Preparation Area

FAA ACCEPTED

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

CESSNA

501, 551

SERIAL NUMBER: 501-0091

REGISTRATION NUMBER: N2158U

This document must be attached to the Airplane Instructions for Continued Airworthiness (Maintenance Manuals). The information contained herein supplements the basic Instructions for Continued Airworthiness only in those areas listed, when the aircraft is modified by FAA STC **SA01558CH-D** for the installation of the Innovative Solutions & Support Air Data System. For limitations and procedures not contained in this document, consult the basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

The inspections specified in this document are FAA accepted. If applicable, the referenced airworthiness limitations are FAA approved. This section specifies inspections and other maintenance required under sections 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

FAA ACCEPTED: Tim Winiesdorffer

Tim Winiesdorffer, DAS Administrator
DAS 3CH
ElectroSonics
Columbus, Ohio

LOG OF REVISIONS

REVISION NO.	REVISED PAGES	DESCRIPTION OF REVISION	FAA APPROVAL
IR	ALL	Initial Release	05-03-2002 Tim Winiesdorffer

CHAPTER 1
INTRODUCTION

1.1 Scope/Purpose/Applicability/Distribution

The Instructions for Continued Airworthiness (ICA) described herein are applicable only to those aircraft modified by the FAA STC identified on the cover page. These ICA describe the recommended and required maintenance procedures for the Innovative Solutions & Support Air Data System, and are to be distributed only to applicable certifying authorities and aircraft operators.

1.2 References

ElectroSonics Top Drawing, Dwg. No. ES551-120028-01.
Innovative Solutions & Support Air Data System –
Operation and Installation Manual, Analog Interface Unit 1D-81040-15.
Operation and Installation Manual, Air Data Display Unit 1D-81030-16.
Operation and Installation Manual, Analog Interface Unit 1D-81040-26.
Rosemount Aerospace Inc., Dwg. No. 102AU1AG

1.3 Definitions/Abbreviations/Acronyms/Symbolization

ICA	Instructions for Continued Airworthiness
IS&S	Innovative Solutions & Support
RAI	Rosemount Aerospace Inc.

CHAPTER 2
INSPECTION REQUIREMENTS AND OVERHAUL SCHEDULE

2.1 Inspection Requirements

None of the components installed for this modification require periodic maintenance.

If the Innovative Solutions & Support Air Data System indicates a failure of the system, isolate the failure using the Innovative Solutions & Support Air Data System, using the Operation and Installation Manual, Analog Interface Unit 1D-81040-15, the Operation and Installation Manual, Air Data Display Unit 1D-81030-16, the Operation and Installation Manual, Analog Interface Unit 1D-81040-26, and the Rosemount Aerospace Inc. Sensor, Total Temperature Dwg. No. 102AU1AG.

2.2 Component Overhaul Schedule

None of the components installed for this modification require scheduled overhaul.

CHAPTER 3
DIMENSIONS AND ACCESS

3.1 Aircraft Features
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

3.2 Location of Access Panels
Gaining access to the following will provide access to the Innovative Solutions & Support Air Data System, associated controls, and wire harnessing:

- Nose Avionics Bay.
- Instrument Panel.
- Co-pilots Arm Rest

ElectroSonics Top Drawing, Dwg No ES551-120028-01, for equipment locations.

CHAPTER 4
LIFTING AND SHORING

4.1 Jacking Information
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

4.2 Lifting Instructions
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

4.3 Shoring Instructions
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

CHAPTER 5
LEVELING AND WEIGHING

5.1 Leveling Information
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

5.2 Weighing and Determination of Center of Gravity Instructions
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

CHAPTER 6
TOWING AND TAXIING

6.1 Tow Instructions
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

6.2 Taxiing Instructions
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

CHAPTER 7
PARKING AND MOORING

7.1 Mooring Information
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

7.2 Parking Information
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

7.3 Storage Limitations
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

CHAPTER 8
PLACARDS AND MARKINGS

8.1 Placard and Marking Information
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

CHAPTER 9
SERVICING

9.1 Servicing Information
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

9.2 Lubrication Information
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

9.3 Equipment Required for Servicing
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

9.4 Consumable Materials
No change to basic Airplane Instructions for Continued Airworthiness (Maintenance Manuals).

CHAPTER 10
AIRWORTHINESS LIMITATIONS

10.1 Airworthiness Limitations Information
Refer to ElectroSonics Maintenance Manual Supplement ES551-120028-200 for the inspection of the forward pressure bulkhead penetration.

XII

AIRCRAFT DOCUMENTATION

SIERRACOM

Sierra Industries Ltd.

Garner Field Muncipal Airport

122 Howard Langford Dr. / Uvalde Texas 78001

Fax: 866-465-9994/Ph: 830 278 4381/sierra@sijet.com

sierra INDUSTRIES LTD

Maintenance Transaction Report

This Maintenance Transaction Report Is To Be Solely For (Check One)

Airframe (•) Eng1 ( ) Serial No. Eng2. ( ) Serial No. APU ( ) Serial No. PROP1 ( ) Serial No. PROP2. ( ) Serial No.

Aircraft Identification and Status

A/C Serial No.	A/C Unit No.	A/C Registration	DATE	City Identifier	A/C Hours	A/C Landings	Total Engine Hours	Total Engine Cycles	APU Hours	PROP Hours
501-0091		N2158U	Oct 21, 2013	UVA	8821.3	9868	#1 1958.5 #2 1958.5	#1 1268 #2 1268		#1 #2

Component Changes, Inspections, Service Bulletins, or Airworthiness Directives Accomplished

Item Code	Transaction No.	Type	Item Name	Position	Installed Vendor Part Number	Mod Level	Installed Serial Number	Removal Reason	Installed Part Status	TBO (Enter # Change Desired)	Installed Part	Material Costs	Man Hours
	1		Phase 20										
	2		91.411 leak ck	Right									
	3		91.411 leak ck	Left									
	4		91.411 leak ck	Stdby									
	5		91.411 airspeed cal.	Right									
	6		91.411 airspeed cal	Left									
	7		91.411 Altimeter Cal.	Right									
	8		91.411 Altimeter Cal.	Left									

Type Transaction
1. Component Change
2. Inspection Accomplished
3. Service Bulletin Accomplished
4. Airworthiness Directive Accomplished

Detail Method Of Compliance Under Comments Below

Enter One:
W - Worn To Limits
S - Scheduled
U - Unscheduled
C - Convenience
N - Other(note below)

Installed Part Status
N - New
R - Repaired
S - Serviceable
O - Overhauled

Ref No	This Space For Other Maintenance Comments Including, Test Or Calibration Dates, Removed Serial Numbers, Etc.
1-8	Completed phase 20 inspection in accordance with Cessna 500 maintenance manual chapter 5 and Garrett Aviation RVSM document No. 50-8008-004.
	24 month Autopilot altitude hold performance check will be completed by pilot and documented separately.

Repair Facility: Sierra Industries, Ltd. Certificate Repair Sta. SI6R285J Work Order No. 4837-10-2013

Work Performed By: Antonio Solorzano [signature] Certificate No. SI6R285J Date 10/21/2013 Scheduled Removal Due (TAT)

I certify that the above stated maintenance and/or inspection was performed in accordance with the current regulations of the

[X] Federal Aviation Administration

[ ] Other (Specify) and the aircraft idenified above is presently airworthy and approved for return to service

Maintenance Log Page

Work Inspected By: Alejandro Salinas [signature: Alejandro Salinas] Certificate No. SI6R285J Date 10/21/2013

Permanent Aircraft Record - File In Maintenance Log

SIERRACOM

sierra INDUSTRIES LTD

Sierra Industries Ltd.
Garner Field Muncipal Airport
122 Howard Langford Dr. / Uvalde Texas 78801
Fax: 866-465-9994/Ph: 830 278 4381/sierra@sijet.com

Maintenance Transaction Report

This Maintenance Transaction Report Is To Be Solely For (Check One)

Airframe (•) Eng1 ( ) Serial No. ____ Eng2 ( ) Serial No. ____ APU ( ) Serial No. ____ PROP1 ( ) Serial No. ____ PROP2 ( ) Serial No. ____

Aircraft Identification and Status

A/C Serial No.	A/C Unit No.	A/C Registration	DATE	City Identifier	A/C Hours	A/C Landings	Total Engine Hours	Total Engine Cycles	APU Hours	PROP Hours
501-0091		N2158U	Oct 21, 2013	UVA	8821.3	9868	#1 1958.5 #2 1958.5	#1 1268 #2 1268		#1 #2

Component Changes, Inspections, Service Bulletins, or Airworthiness Directives Accomplished

Item Code	Transaction No.	Type	Item Name	Position	Installed Vendor Part Number	Mod Level	Installed Serial Number	Removal Reason	Installed Part Status	TBO (Enter # Change Desired)	Installed Part	Material Costs	Man Hours
	1		Phase 20										
	2		91.413 XPDR CK	Right									
	3		91.413 XPDR CK	Left									
	4		RVSM annual										
	5												
	6												
	7												
	8												

Type Transaction
1. Component Change
2. Inspection Accomplished
3. Service Bulletin Accomplished
4. Airworthiness Directive Accomplished

Detail Method Of Compliance Under Comments Below

W - Worn To Limits
S - Scheduled
U - Unscheduled
C - Convenience
N - Other(note below)

Enter One

Installed Part Status
N - New
R - Repaired
S - Serviceable
O - Overhauled

Ref No	This Space For Other Maintenance Comments Including, Test Or Calibration Dates, Removed Serial Numbers, Etc.
1-4	Completed phase 20 inspection in accordance with Cessna 500 maintenance manual chapter 5 and Garrett Aviation RVSM document No. 50-8008-004.

Repair Facility: Sierra Industries, Ltd. Certificate Repair Sta. SI6R285J Work Order No. 4837-10-2013

Work Performed By: Antonio Solorzano *[signature]* Certificate No. SI6R285J Date 10/21/2013

Scheduled Removal Due (TAT)

I certify that the above stated maintenance and/or inspection was performed in accordance with the current regulations of the

[X] Federal Aviation Administration
[ ] Other (Specify)

and the aircraft idenified above is presently airworthy and approved for return to service

Maintenance Log Page

Work Inspected By: Alejandro Salinas *Alejandro Salinas* Certificate No. SI6R285J Date 10/21/2013

Permanent Aircraft Record - File In Maintenance Log

3.1.3 Autopilot (Altitude Hold) Performance Test

RVSM operation requires that the autopilot system accurately maintains selected altitude during non-turbulent, non-gusty cruise flight. Perform required autopilot checks and/or maintenance in accordance with the component and airplane maintenance manuals. Also perform the following in-flight altitude hold performance test every 24 months.

Test Procedure
Equipment Required: None.

During normal RVSM cruise flight (at an altitude between FL290 and FL410, Baro settings of 29.92 in Hg or 1013 mb and non-turbulent, non-gusty conditions) and with the autopilot/altitude hold engaged, record the data from the primary displays (using Table 3.2) every 5 minutes for a flight segment at least 30 minutes length. The maximum altitude deviation shown on the display should not exceed +/-65 ft.

TABLE 3.2 RVSM Autopilot Performance Check Table, Cessna Model 500, 501, 550 or 551 Cruise Conditions

Airplane: 501-0091				Date: 10/22/2013		
Enroute To: KSDL				Pilot: M. Cirincione		
Time (Minutes)	Pilot's Altimeter	Copilot's Altimeter	Pilot's Mach	Copilot's Mach	Pilot's KCAS	Copilot's KCAS
0:00	40000	40000	.65	.65	187	188
0:05	40000	40000	.65	.65	188	189
0:10	40000	40000	.65	.65	188	189
0:15	40000	40000	.65	.65	189	189
0:20	40000	40000	.65	.65	189	189
0:25	40000	40000	.65	.65	190	190
0:30	40000	40000	.66	.66	190	191
0:35	40000	40000	.66	.66	190	191
0:40	40000	40000	.66	.66	191	191
0:45						
0:50						
0:55						
1:00						

US Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approval
ONB No: 2120-0020

For FAA Use Only

Office Identification

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed $1,000 for each such violation (Section 901 Federal Aviation Act of 1958).

1. Aircraft	Make: Cessna	Model: 501
	Serial No.: 501-0091	Nationality and Registration Mark: USA N2158U
2. Owner	Name *(As shown on registration certificate)*: RBK Aviation, Inc.	Address *(As shown on registration certificate)*: 595 State Highway 434, Ten Sleep, WY 82442-8856

3. For FAA Use Only

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	*(As described in item 1 above)*				x
POWERPLANT					
PROPELLER					
APPLIANCE	Type / Manufacturer				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency		C. Certificate No.
Mayday Avionics, Inc.		U.S. Certificated Mechanic	YXXR387Y
5500 44th Street SE		Foreign Certificated Mechanic	Radio 1,2,3
Grand Rapids, MI 49512	X	Certificated Repair Station	Instrument 3
		Manufacturer	Ltd. Airframe

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments here to have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation regulations and that the information furnished herein is true and correct to the best of my knowledge.

Date	Signature of Authorized Individual
2-2-07	Edmund Ensaint

7. Approval for Return To Service

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒☒ APPROVED ☐☐ REJECTED

BY						Other *(Specify)*
		FAA Flt. Standards Inspector		Manufacturer	Inspection Authorization	
		FAA Designee	x	Repair Station	Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
2-2-07	YXXR387Y	Edmund Ensaint

Form 337

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished
(If more space is required, attach additional sheets. Identify aircraft nationality and registration mark and date work completed.)

Cessna, 501, S/N: 501-0091, USA N2158U

Approved the Dual Garmin GNS430W GPS-WAAS Navigation System as installed in accordance with the FAA form 337 dated 2-1-07, the Garmin 400W Series Installation Manual, AC 43-13-1B Chapter 11, AC 43-13-2A Chapter 2, and AC 20-138A Paragraph 8c for IFR En Route, Terminal, and Non-Precision Approach. This is a follow-on approval based on Garmin AT STC SA01933LA.

The #1 GNS 430W is located in the left avionics stack below the #1 EX500 MFD. The GNS 430W utilizes a newly installed Garmin GAD 42 to display its steering information on the pilot's RD 600 HSI and the 332C-10 #2 RMI. The RD 600 HSI is interfaced with the existing Sperry SPZ-500 Flight Guidance System. The CDI navigation source select switch (VLOC/GPS annunciate), OBS select switch (OBS annunciate), and the GPS alert annunciators; INTG, MSG, WPT, TERM, and APR are located within the GNS430W display.

The #2 GNS 430W is located in the right avionics stack below the #2 EX500 MFD. The GNS 430W utilizes a newly installed Garmin GAD 42 to display its steering information on the RD 44 #2 HSI and 332C-10 #2 RMI. The RD 44 is interfaced with the existing Sperry SPZ-500 Flight Guidance System. The CDI navigation source select switch (VLOC/GPS annunciate), OBS select switch (OBS annunciate), and the GPS alert annunciators; INTG, MSG, WPT, TERM, and APR are located within the GNS430W display.

The GNS 430W GPS-WAAS Navigation System was ground and flight checked in accordance with the Mayday Avionics, Inc. GPS Non-Precision Approach Flight Test Plan. The GNS430W GPS meets the minimum accuracy requirements of AC 20-138A Paragraphs 22 and 23 for GPS IFR En Route, Terminal, and Non-Precision Approach.

Vertical coupling of the autopilot for approaches has been demonstrated to meet its intended function and provides safe and proper operation in accordance with AC 20-138A, Paragraph 23 (4)(vi)(A).

The Mayday Avionics, Inc. Airplane Flight Manual Supplement for the GNS430W, Document No.: GNS430W:AFMS.N2158U, Rev IR, with embedded FAA form 8110-3 dated 2-1-07 (or later) is required and was placed in the Airplane Flight Manual.

The Dual GNS430W GPS-WAAS Navigation Systsem is approved for IFR En Route, Terminal, and Non-Precision Approach only and the "GPS #1 LIMITED TO VFR USE ONLY" and "GPS #2 LIMITED TO VFR USE ONLY" placards may be removed.

END

☑ Additional Sheets Are Attached

N21580 #1

GPS - IFR GROUND AND OPERATIONAL FLIGHT CHECK PROCEDURES / REPORT FORM

The following outlines the test procedures to approve a GPS system for IFR enroute and non-precision approaches, IAW requirements described in FAA advisory Circular AC 20-138A. Other tests may be performed in accordance With manufacturers procedures described appropriate installation manuals.

	Fail	Pass
1). Perform VHF comm interference tests on the following frequencies, testing for GPS signal degradation for a period of 35 seconds each. 121.150, 121.175, 121.200, 131.250, 131.275, 131.300 radios with 8.33 kHz spacing, 121.185, 121.190, 130.285, 131.2900		X
2). Assure continuity of navigation during normal aircraft maneuvering (e.g., bank angles of 30 degrees, 360 turns both left and right, and normal pitch angles associated with approaches, missed approaches, and departures.		✓
3). Verify operation of overall system including, *waypoint hold and sequencing, direct to, intercept and track to, turn anticipation, and overall operations on all types of procedures including S turns.*		✓
4). Verify that all interfaced equipment operates properly, and displays correct information. I.e., Encoder, Fuel Flow, Annunciators, Maps, related switching and dimming.		✓
5). Verify GPS operation has no adverse affect on all other systems and equipment, including EMI / RFI interference.		✓
6). Evaluate all modes of Flight Guidance System and verify proper operations of interface during each mode of operations while coupled to the GPS. Verify and evaluate steering response during a variety of track and mode changes, including transitions between enroute and approach.		✓
7). Using the interfaced navigation display, verify Flight Technical Error (FTE) can be maintained at less than 1.0 NM enroute and 0.25 NM non-precision approach. Ref. AC 20-138A par. 23, b. (3).		X
8). Fly at least one "coupled approach" plus two others, and record the accuracy of the GPS receiver by comparing GPS coordinates to published coordinates.		X

AIRPORT KLAN RUNWAY # 28L

	LAT	LON	ERROR	Fail	Pass
PUBLISHED	N 42° 46.68	W 084° 34.44			
GPS	N 42° 46.68	W084° 34.49	222.5		X
GPS	N 42° 46.68	W 084° 34.50	267		X
GPS	N 42° 46.68	W084° 34.50	267		X

GPS : model GNS430W s/n 23400460

GPS : sw levels: main 2.00 | GPS 2.4 | Com 7.00 | VLoc 5.02 | GS 4.0

IO 2.2
Stage 1 2.01
Stage 2 2.00

I CERTIFY THAT THE DATA CONTAINED HERIN ACCURATLY REFLECTS THE INFORMATION OBTAINED DURING THE PERFORMANCE OF AN OPERATIONAL FLIGHT CHECK

SIGNATURE OF PILOT [signature] CERTIFICATE No. 3118770 ATP

SIGNATURE OF TECHNICIAN [signature]

DATE 2-1-07 MAKE / MODEL Cessna 501 A/C REG. N21580

N 2158U #2

GPS - IFR GROUND AND OPERATIONAL FLIGHT CHECK PROCEDURES / REPORT FORM

The following outlines the test procedures to approve a GPS system for IFR enroute and non-precision approaches, IAW requirements described in FAA advisory Circular AC 20-138A. Other tests may be performed in accordance With manufacturers procedures described appropriate installation manuals.

Procedure	Fail	Pass
1). Perform VHF comm interference tests on the following frequencies, testing for GPS signal degradation for a period of 35 seconds each. 121.150, 121.175, 121.200, 131.250, 131.275, 131.300 radios with 8.33 kHz spacing, 121.185, 121.190, 130.285, 131.2900	☐	X
2). Assure continuity of navigation during normal aircraft maneuvering (e.g., bank angles of 30 degrees, 360 turns both left and right, and normal pitch angles associated with approaches, missed approaches, and departures.	☐	X
3). Verify operation of overall system including, *waypoint hold and sequencing, direct to, intercept and track to, turn anticipation, and overall operations on all types of procedures including S turns.*	☐	X
4). Verify that all interfaced equipment operates properly, and displays correct information. I.e., Encoder, Fuel Flow, Annunciators, Maps, related switching and dimming.	☐	✓
5). Verify GPS operation has no adverse affect on all other systems and equipment, including EMI / RFI interference.	☐	✓
6). Evaluate all modes of Flight Guidance System and verify proper operations of interface during each mode of operations while coupled to the GPS. Verify and evaluate steering response during a variety of track and mode changes, including transitions between enroute and approach.	☐	X
7). Using the interfaced navigation display, verify Flight Technical Error (FTE) can be maintained at less than 1.0 NM enroute and 0.25 NM non-precision approach. Ref. AC 20-138A par. 23, b. (3).	☐	X
8). Fly at least one "coupled approach" plus two others, and record the accuracy of the GPS receiver by comparing GPS coordinates to published coordinates.	☐	X

AIRPORT KLAN RUNWAY # 28L

	LAT	LON	ERROR	Fail	Pass
PUBLISHED	N 42° 46.68	W 084° 34.44			
GPS	N 42° 46.68	W 084° 34.49	222.5	☐	X
GPS	N 42° 46.68	W 084° 34.50	267	☐	X
GPS	N 42° 46.68	W 084° 34.50	267	☐	X

GPS : model GNS 430W s/n 23400470

GPS : sw levels: main 2.00 | GPS 2.4 | Com 7.00 | VLoc 5.02 | G/S 4.00

IO 2.2
Stage 1 2.01
Stage 2 2.00

I CERTIFY THAT THE DATA CONTAINED HERIN ACCURATLY REFLECTS THE INFORMATION OBTAINED DURING THE PERFORMANCE OF AN OPERATIONAL FLIGHT CHECK

SIGNATURE OF PILOT [signature] CERTIFICATE No. 3118720 ATP

SIGNATURE OF TECHNICIAN Edward Emick

DATE 2-1-07 MAKE / MODEL Cessna 501 A/C REG. N2158U

US Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved
OMB No. 2120-0020

For FAA Use Only
Office Identification
SPIZ GL-19 FAL

INSTRUCTIONS: Print or type all entries. See FAR 43.9 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed $1,000 for each such violation (Section 901 Federal Aviation Act of 1958).

1. Aircraft	Make: Cessna Aircraft Co.	Model: C501
	Serial No.: 501-0091	Nationality and Registration Mark: N2158U
2. Owner	Name (*As shown on registration certificate*): RBK Aviation, Inc.	Address (*As shown on registration certificate*): Red Reflet Ranch 357 Road 58 Ten Sleep, WY 82442-8854

3. For FAA Use Only

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	---------- (*As described in Item 1 above*) ----------				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type Manufacturer				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency		C. Certificate No.
ElectroSonics 4391 International Gateway Columbus, OH 43219		U.S. Certified Mechanic	UO22221L Accessory Class 2, & 3 Limited Airframe Instrument Class 1, and 3, Radio Class 1, 2, & 3
		Foreign Certified Mechanic	
	X	Certificated Repair Station	
		Manufacturer	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Date	Signature of Authorized Individual
October 30, 2004	[signature] Inspector

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED

BY							Other (*Specify*)
		FAA Flt. Standards Inspector		Manufacturer		Inspection Authorization	
		FAA Designee	X	Repair Station		Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
October 30, 2004	UO22221L	[signature] Inspector

FAA Form 337 (12-88)

NOV - 2 2004

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished
(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work accomplished.)

Cessna Citation 501 N2158U s/n 501-0091

The aircraft was inspected and found to conform with Garrett Aviation Services Supplemental Type Certificate **ST01637CH** *Certification of Reduced Vertical Minimums* (RVSM) operational capability dated May 06, 2002. The "FAA Approved Airplane Flight Manual Supplement (AFMS) for Cessna Citation Model 500/501 and 551 Series Aircraft Equipped with a Single Flight Director with Reduced Vertical Separation Minimum (RVSM) Capability" document 50-8008-003 Rev. (A) dated June 03, 2002 was inserted into the Airplane Flight Manual. "Instructions for Initial and Continued Airworthiness for Cessna Citation Model 500/501 and 550/551 Series Aircraft Qualified for Operations in Reduced Vertical Separation Minimum (RVSM) Airspace", Garrett Aviation Services Doc. No. 50-8008-004 Rev. (F) was provided to the owner/operator.

This installation unto itself does not constitute RVSM operational approval; the owner/operator must obtain a valid letter of authorization from its FAA FSDO for flight operations in special use airspace.

No change to electrical loading.

No change to weight and balance.

This alteration was accomplished and recorded under ElectroSonics work order No.183692.

An entry for this alteration and the Instructions for Continued Airworthiness have been made in the aircraft's maintenance records as required by 14 CFR 43, section 43.9 as referenced on this FAA form 337.

-- end --

☒ Additional Sheets Are Attached

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

US Department of Transportation
Federal Aviation Administration

Form Approved
OMB No. 2120-0020

For FAA Use Only
Office Identification 61-19

INSTRUCTIONS: Print or type all entries. See FAR 43.9 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed $1,000 for each such violation (Section 901 Federal Aviation Act of 1958).

1. Aircraft	Make: Cessna Aircraft Co.	Model: C501
	Serial No.: 501-0091	Nationality and Registration Mark: N2158U
2. Owner	Name *(As shown on registration certificate)*: RBK Aviation, Inc.	Address *(As shown on registration certificate)*: Red Reflet Ranch, 357 Road 58, Ten Sleep, WY 82442-8854

3. For FAA Use Only

4. Unit Identification / **5. Type**

Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	---------- *(As described in Item 1 above)* ----------				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type Manufacturer				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency	C. Certificate No.
ElectroSonics **4391 International Gateway** **Columbus, OH 43219**	[ ] U.S. Certified Mechanic [ ] Foreign Certified Mechanic [X] Certificated Repair Station [ ] Manufacturer	**UO22221L** Accessory Class 2, & 3 Limited Airframe Instrument Class 1, and 3, Radio Class 1, 2, & 3

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Date	Signature of Authorized Individual
October 30, 2004	[signature] Inspector

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED

BY						Other *(Specify)*
		FAA Flt. Standards Inspector		Manufacturer		Inspection Authorization	
		FAA Designee	X	Repair Station		Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
October 30, 2004	UO22221L	[signature] Inspector

FAA Form 337 (12-88)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished
(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work accomplished.)

Cessna Citation 501 N2158U s/n 501-0091

Removed the existing Honeywell altitude Indicator, Honeywell Air Data Computer and Barry Controls Air Data Computer Mounting Tray. Installed an IS&S Analog Interface Unit (AIU), 2 each Air Data Display Units (ADDU), 2 each Configuration Modules, in accordance with option -01 of ElectroSonics Top drawing No.ES551-120028-01 Rev.(C), dated August 08, 2003 and approved by ElectroSonics Supplemental Type Certificate **ST01558CH-D**, "Installation of a Innovation Solutions & Support Air Data Computer..." dated June 05, 2002.

Minor deviations were made in the installation mounting of the AIU in accordance with ElectroSonics drawing ES501-120091-11 rev (A); modification of the left side instrument panel to allow the mounting of the Standby Altimeter were performed in accordance with ElectroSonics drawing ES501-120091-13, rev (A) and the mounting of the relay box assembly was performed in accordance with ElectroSonics drawing ES501-120091-12, rev (A) all of which was approved by DERT-410167-CE and documented on FAA form 8110-3 dated 10/25/04. Minor deviations in electrical integration were made in accordance with ElectroSonics drawings 1005076, rev (A), 1005077, rev (A), 1005078, rev (A) and 1005079, rev (A), approved by DERY-405201-CE and documented on FAA form 8110-3 dated 10/28/04. Wires not used were caped and stowed in accordance with AC43.13-1B Chapter 11, Section 11 Clamping, para. 11-146 thru 11-147, Section 12 Wire Insulation and Lacing String Tie, para. 11-155 through 11-159, Section 15 Grounding and Bonding para. 11-186, 11-187, 11-193, 11-194, Section 16 Wire Marking para. 11-205, 11-206, 11-207, 11-214 and Section 19 Unused Connectors and Unused Wires para. 11-260.

Relocated the Sandel Fuel Flow Indicator/Counter from the lower outboard left side instrument panel, to the lower outboard right side instrument panel, this work was performed in accordance with ElectroSonics drawing ES501-120091-13, rev (A) approved by DERT-410167-CE and documented on FAA form 8110-3 dated 10/25/04.

The Airplane Flight Manual Supplement for the Air Data Sensor System ElectroSonics document No. ES551-120028-100 Rev.(B) dated August 08, 2003 was inserted into the Airplane Flight Manual.

The Maintenance Manual Supplement for the Air Data System ElectroSonics document No. ES551-120028-200 Rev.(IR) and the "Instructions for Continued Airworthiness for Cessna 501, 551" ElectroSonics document No. ES551-120028-201 Rev. (IR) were provided to the owner/operator.

Operational authority for flights in RVSM environments must be obtained by the owner/operator through their local FAA FSDO office.

The owner/operator must comply with the equipment manufacturer's and the above maintenance manual supplement to ensure continued airworthiness any time the equipment is removed and / or repaired and reinstalled.

Revised the Aircraft Weight and Balance and Aircraft Equipment List.

Ground tests prove satisfactory and show no electrical or radio interference between existing and installed systems. Revised supplemental electrical loading report. Refer to revised weight and balance / supplemental equipment list for part number and serial number changes.

This modification was accomplished and recorded under ElectroSonics work order No. 183692.

The Instructions for Continued Airworthiness are part of the aircraft's inspection and/or maintenance program for this aircraft operated under this chapter. An entry for this alteration has been made in the aircraft's maintenance records as required by 14 CFR 43, Section 43.9 as referenced on this FAA form 337.

------------------------------End------------------------------

☒ Additional Sheets Are Attached