



**AMERICAN CHAMPION AIRCRAFT
CORPORATION**

“Dedicated to Preserving a Classic”

FLIGHT OPERATIONS MANUAL



Citabria Aurora 7ECA

**American Champion Aircraft Corp.
Rochester, Wisconsin**

<p>FAA Approved</p> <p>Supplemental Airplane Flight Manual</p> <p>Citabria Models 7ECA 7GCAA 7KCAB</p>

This Flight Manual Supplement applies only for
7ECA, 7GCAA and 7KCAB aircraft of any serial number
that have 7-1566 (wing frame) or 7-1567 (covered wing frame) wings installed.

Registration Number: N241AC

Serial Number: 1373-98

**This manual is part of the required equipment
and must remain in the airplane at all times.**

Approved: *Joseph C. Meas* Date: 11/01/00
For: Royce Prather
Manager, Chicago Aircraft Certification Office

Revisions:

Letter	By	Date	Revisions	Pages Affected
Original	JKM	10-13-2000	Includes new 1750 lbs. gross weight changes and limitations for metal spar Citabrias	All

Citabria Model 7GCAA

Flight Operations

<u>Airspeed Limitations</u>	<u>CAS (mph)</u>
Stall Speed	52
Best Rate of Climb Speed (Sea Level)	77

CAS - Calibrated airspeed is indicated airspeed corrected for installation and instrument error

Weight and Balance Limits

Consult aircraft records for weight and balance data for this aircraft.

Aircraft Weight and Center of Gravity Range (inches)

<u>Weight</u>	<u>Normal Category</u>	<u>Acrobatic Category</u>
1750 lbs. maximum	14.2 - 18.2	14.2 - 16.3
1325 lbs. or less	10.5 - 18.2	10.5 - 16.3

All measurements are aft of the datum line which is the wing leading edge. Center of gravity limits have straight line variation between these points.

Flight Load Factors (1750 lbs. normal or acrobatic category)

Positive Load Factor+ 5.0 g's maximum
 Negative Load Factor.....- 2.0 g's maximum

Do not exceed 135 mph IAS during negative g-load condition.
 Do not perform acrobatics in turbulent air.

Noise Characteristics

The noise level for the 7GCAA and 7KCAB measured in accordance with FAR 36, Appendix G is 70.522 dB(A) at full throttle. The noise level for the 7ECA measured in accordance with FAR 36, Appendix G is 67.0 dB(A) at full throttle.

No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

11/21/00



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

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 AMERICAN CHAMPION AIRCRAFT	Model 7ECA
	Serial No. 1373-98	Nationality and Registration Mark N241AC
2. Owner	Name (As shown on registration certificate) AMERICAN CHAMPION AIRCRAFT CORP	Address (As shown on registration certificate) P.O. BOX 37 ROCHESTER, WI 53167

3. For FAA Use Only

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~ (As described in Item 1 above) ~~~~~				XXX
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency	C. Certificate No.
JERRY K. MEHLHAFF PO BOX 355 ROCHESTER, WI 53167	<input checked="" type="checkbox"/> U.S. Certificated Mechanic	A&P 387426742IA
	<input type="checkbox"/> Foreign Certificated Mechanic	
	<input type="checkbox"/> Certificated Repair Station	
	<input type="checkbox"/> 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 FEBRUARY 5, 1999	Signature of Authorized Individual <i>Jerry K. Mehlhaff A&P 387426742IA</i>
---------------------------------	---

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	FAA Flt. Standards Inspector	Manufacturer	<input checked="" type="checkbox"/>	Inspection Authorization	Other (Specify)
	FAA Designee	Repair Station		Person Approved by Transport Canada Airworthiness Group	
Date of Approval or Rejection FEBRUARY 5, 1999		Certificate or Designation No. A&P 387426742 IA		Signature of Authorized Individual <i>Jerry K. Mehlhaff A&P 387426742IA</i>	

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 completed.)

ACCOMPLISHED INSTALLATION OF KING KLX135A GPS COM RECEIVER AT FUSELAGE STATION -5.84 IN THE RADIO STACK. THE KA91 GPS ANTENNA AT FUSELAGE STATION 7.50 MOUNTED AT TOP IN-BOARD END OF R.H. WING.

THIS GPS INSTALLATION COMPLIES WITH:

- * FAR 23.1301, 23.1309, AND 23.1431.
- * KING INSTALLATION MANUAL
- * AC 43.13-1A CHAPTER 11, 13, & 15 AND AC43.13-2A CHAPTER 1, 2, & 3.
- * AC20-138 PARAGRAPH 7 (C) (2) (I), (II), & (III).
- * AFTER APPROVAL FOR RETURN TO SERVICE OF THIS AIRCRAFT; REFERENCE BLOCK 7 OF THIS FORM 337, A FUNCTIONAL FLIGHT EVALUATION TO VERIFY SYSTEM ACCURACY BY (5) LOW ALTITUDE OVERFLIGHTS OF ONE OR MORE SURVEYED LOCATIONS WAS ACCOMPLISHED. REFERENCE ATTACH FLIGHT TEST AND INSPECTION PROCEDURE.

THE INSTRUMENT PANEL HAS BEEN PLACARDED IN FULL VIEW OF THE PILOT. GPS FOR VFR USE ONLY REVISED AIRCRAFT WEIGHT & BALANCE AND EQUIPMENT LIST TO REFLECT THIS INSTALLATION AND COMPLETED ENTRY IN THE AIRCRAFT MAINTENANCE RECORDS.

GPS TO BE OPERATED IN ACCORDANCE WITH KING OPERATIONS INSTRUCTIONS WHICH HAVE BEEN PROVIDED TO THE OWNER/OPERATOR.

NO ADDITIONAL INSTRUCTIONS FOR CONTINUED AIRWORTHINESS ARE REQUIRED FOR THIS INSTALLATION. APPROVED BY THE FAA BASED ON SAME INSTALLATION DATED APRIL 30, 1998.

- E N D -



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

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 AMERICAN CHAMPION AIRCRAFT	Model 7ECA
	Serial No. 1373-98	Nationality and Registration Mark N241AC
2. Owner	Name (As shown on registration certificate) AMERICAN CHAMPION AIRCRAFT CORP.	Address (As shown on registration certificate) P.O. BOX 37 ROCHESTER, WI 53167

3. For FAA Use Only

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~ (As described in Item 1 above) ~~~~~				XXX
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

6. Conformity Statement

A. Agency's Name and Address JERRY K. MEHLHAFF PO BOX 355 ROCHESTER, WI 53167	B. Kind of Agency <input checked="" type="checkbox"/> U.S. Certificated Mechanic <input type="checkbox"/> Foreign Certificated Mechanic <input type="checkbox"/> Certificated Repair Station <input type="checkbox"/> Manufacturer	C. Certificate No. A&P 387426742IA
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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 FEBRUARY 5, 1999	Signature of Authorized Individual
--	---

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	FAA Fil. Standards Inspector	Manufacturer	<input checked="" type="checkbox"/>	Inspection Authorization	Other (Specify)
	FAA Designee	Repair Station		Person Approved by Transport Canada Airworthiness Group	
Date of Approval or Rejection FEBRUARY 5, 1999		Certificate or Designation No. A&P 387426742 IA		Signature of Authorized Individual 	

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 completed.)

THE FOLLOWING ITEMS HAVE BEEN INSTALLED IN THIS AIRPLANE IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND AC43.13 PART 2A.

1. KING KT76A TRANSPONDER SERIAL NO. 120850 AND INTERCONNECTED WITH AN AMERIKING AK350 BLIND ENCODER SERIAL NO. 3528599 INSTALLED IN ACCORDANCE WITH AC43-6A APPENDIX 2 FOR COMPLIANCE WITH FAR 91.217.
 - 1A. TRANSPONDER WAS TESTED TO FAR 91.413 REQUIREMENTS IN ACCORDANCE WITH FAR 43 APPENDIX F.
 - 1B. STATIC SYSTEM, ALTITUDE REPORTING EQUIPMENT AND TRANSPONDER INTEGRATION WAS CHECKED IN ACCORDANCE WITH FAR 91.411.
 - 1C. COMPLIED WITH FAR APPENDIX E, PARAGRAPH A AND C.
 - 1D. ALL WORK IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND AC43.13-1A CHAPTERS 11, 13 AND 15.
 - 1E. INSPECTED AND TESTED BY MOBILE AVIONICS, INC. A CERTIFIED REPAIR STATION STA. CRS. NO. M5BR662J DATED 1-25-99 WORK ORDER NO. 1817.
2. INSTALLED A PSE PM 1000 II INTERCOM.

REVISED AIRCRAFT WEIGHT AND BALANCE AND EQUIPMENT LIST TO REFLECT THESE INSTALLATIONS AND COMPLETED ENTRY IN THE AIRCRAFT MAINTENANCE RECORDS. NO ADDITIONAL INSTRUCTIONS FOR CONTINUED AIRWORTHINESS ARE REQUIRED FOR THESE INSTALLATIONS.

- E N D -

Additional Sheets Are Attached

C

C

C

American Champion Aircraft Corp.
Rochester, Wisconsin

FAA Approved

Airplane Flight Manual

Citabria Aurora Model 7ECA

This manual is eligible only for 7ECA aircraft, serial numbers 1355-95 and up.

Registration Number: N241AC

Serial Number: 1373-98

**This manual is part of the required equipment
 and must remain in the airplane at all times.**

Approved: *Mark W. Anderson* Date: **FEB 20 1996**
for Royce Prather
 Manager, Chicago Aircraft Certification Office

Revisions:

Letter	By	Date	Revisions	Pages Affected
A	JKM	1/4/96	Corrected Typos, Added Revision Table, Rearranged Sections	all

Citabria Model 7ECA

Flight Operations

All 7ECA models are approved in the Normal and Acrobatic Category. Day or night flight in VFR conditions only is approved providing the aircraft is equipped with the required equipment and is in operating condition as specified under Part 91 of the Federal Air Regulations. Flight into known icing condition is prohibited

<u>Airspeed Limitations</u>	<u>CAS (mph)</u>
Never Exceed (red line)	162
Caution Range (yellow arc).....	120 - 162
Maximum Structural Cruise	120
Normal Operating Range (green arc).....	50 - 120
Maneuvering @ 1650.....	120
Stall Speed.....	50
Best Rate of Climb Speed	69

CAS - Calibrated airspeed is indicated airspeed corrected for installation and instrument error

Weight and Balance Limits

Consult aircraft records for weight and balance data for this aircraft.

Aircraft Weight and Center of Gravity Range (inches)

<u>Weight</u>	<u>Normal Category</u>	<u>Acrobatic Category</u>
1650 lbs. maximum	14.2 - 19.2	14.2 - 17.3
1325 lbs. or less	10.5 - 19.2	10.5 - 17.3

Superseded

All measurements are aft of the datum line which is the wing leading edge. Center of gravity limits have straight line variation between these points.

Flight Load Factors (1650 lbs. normal or acrobatic category)

Positive Load Factor + 5.0 g's maximum
 Negative Load Factor - 2.0 g's maximum

Do not exceed 135 mph IAS during negative g-load condition.
 Do not perform acrobatics in turbulent air.

Citabria Model 7ECA

Maneuvers

Landplane Approved For Only The Following Acrobatic Maneuvers

Maneuver	Entry Speed IAS	
	MPH	Knots
Chandelle, Lazy Eight	120	104
Barrel or Slow Roll	120	104
Immelmann	145	126
Loop or Clover Leaf	140	122
Split S	80	70
Snap Roll	85	74
Hammerhead Turn	140	122
Cuban Eight	145	126
Spin	Slow Deceleration	

Do not exceed +5.0 or -2.0 g-load factor. Do not exceed 135 mph IAS during negative g-load condition. Do not perform acrobatics in turbulent air. Caution: negative g flight will cause loss of oil and oil pressure. Use of flaps during acrobatics is prohibited. To recover from spin use full opposite rudder and neutralize elevator.

Powerplant Limitations

Engine, Lycoming	O-235-K2C
Rated Horsepower (HP / RPM)	118 / 2800 Takeoff
	115 / 2700 Max. Continuous
Fuel, Aviation Grade, Min. Octane	91 / 96
Tachometer	
Normal Range (green arc - RPM)	1800 - 2700
Takeoff (5 min) (yellow arc - RPM)	2700 - 2800
Maximum (red line - RPM)	2800
Cylinder Head Temperature	
Maximum (red line - °F)	500

Citabria Model 7ECA

Powerplant Limitations (Continued)

Oil Temperatures

Normal Range (green arc - °F)	100 - 245
Maximum (red line - °F)	245

Oil Pressure

Normal Range (green arc - psi)	60 - 100
Caution Range (yellow arc - psi)	25 - 60
Maximum (red line - psi)	100
Minimum (red line - psi)	25

Other Operating Information

Occupy front seat when flying solo.

Fuel 35 gal. useable, fuel 'on' when handle is down.

Maximum baggage - 100 lbs. Do not carry baggage during aerobatics.

Folding rear seat, seat back restrainer cable must be connected before flight unless rear control stick is removed.

Turn off strobe lights when taxiing in vicinity of other aircraft or during flight through clouds, fog, or haze. Standard position lights to be on for all night operations.

Emergency door hinge release - pull pin, pull lever

Left window may be used as an alternate emergency exit - force window outward past forward stop mechanism.

Do not open forward left side window above 130 mph, or above 90 mph if the window is full opening.

Service battery every 50 hours of normal flight. Service every 10 hours of acrobatic flight

EQUIPMENT LIST

Suffix letters on item numbers:

R: Required for FAA certification

S: Standard equipment

A: Optional equipment not required

O: Optional equipment replacing standard or required item

ITEM #	X	DESCRIPTION	WT. LB.	ARM. IN.
1R	X	Engine, Lycoming O-235-K2C	246.00	-40.00
2R		Mc Cauley Propeller 1C90CLM72-46		
3R	X	Propeller, Sensenich 72CKS8-1-52	28.00	-58.58
4S	X	Spinner Installation	3.82	-60.61
5R	X	Oil Cooler	2.95	-29.16
6R	X	Filter -- Carburetor Air	0.50	-45.00
7R	X	Tachometer -- Recording	0.66	- 5.40
8R	X	Gauge, Oil Temperature	0.57	-15.00
9R	X	Gauge, Oil Pressure	0.35	- 5.80
10R	X	Gauge, Ammeter	0.26	- 5.80
11A		Engine Hour Meter	0.80	- 5.00
12A		Cylinder Head Temperature	1.29	- 6.11
13A		Carburetor Air Temperature	0.80	- 5.00
14A		Manifold Pressure	1.19	- 8.69
15R	X	Altimeter -- Sensitive	1.40	- 5.30
16R	X	Airspeed Indicator	0.58	- 5.00
17A	X	Rate of Climb	1.00	- 5.00
18A		Turn & Bank	2.00	- 5.00
19A	X	Turn Coordinator	2.00	- 5.00
20A		Artificial Horizon Gyro	2.19	- 5.00
21A		Directional Gyro	2.63	-5.00
22A		Suction Gauge	0.22	- 4.00
23A		Vacuum Pump Installation	2.81	-28.31
24A		Accelerometer	1.00	- 5.00
25A		Quartz Clock	0.22	- 4.00
26A		Mixture Monitor	0.80	- 5.00
27A		Gauge, Outside Air Temperature	0.17	6.00
28R	X	Compass, Airpath	0.77	- 4.00
29A		Remote Indicating Compass	7.60	0.55
30R	X	Stall Warning	0.85	- 1.74
31A		Emergency Locator Transmitter	3.30	68.38

EQUIPMENT LIST

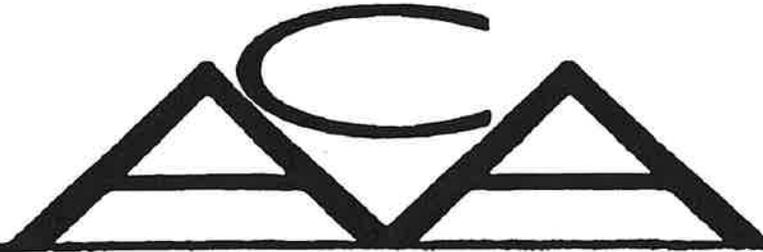
ITEM #	X	DESCRIPTION	WT. LB.	ARM IN.
32A	X	Cabin Light	0.57	24.00
33R	X	Battery: 31 AMP Gell Cell	30.81	-26.00
34R	X	Tail Light	0.41	200.80
35R		Starter – Electro Systems	17.00	-46.44
36O	X	Starter – Sky Tech	9.00	-46.44
37R	X	Alternator – Electro Systems	10.63	-50.36
38R	X	Voltage Regulator	0.65	-24.40
39R	X	Landing Light	0.47	-54.32
40R	X	Brake Cylinder Cleveland 10-54 (toe)	1.00	-21.38
41R	X	Wheel & Brake, Cleveland 40-47 30-32 (Both sides)	25.78	- 0.93
42R	X	Tire & Tube 600 x 6, Type III 4 or 6 Ply (Both sides)	37.50	0.25
43R	X	Tailwheel, Scott 3200	8.25	195.50
44A		Glider Tow	4.00	111.00
45S		Landing Gear Step L/R	1.50	1.00
46R	X	Seat Installation Front – Adjustable	15.63	16.00
47R		Seat Installation Rear	13.63	47.00
48O	X	Seat Installation Rear Wide	18.44	47.00
49A		Fire Extinguisher	5.38	- 5.30
50A	X	Rear Seat Heater	2.25	- 9.00
51A	X	Hooker Harness Front	2.81	20.00
52R	X	Hooker Harness Rear	2.81	60.00
53R		Lap Belt & Inertia Harness Front	2.13	20.00
54O		Lap Belt & Inertia Harness Rear	1.50	60.00
55S	X	Cargo Net	1.00	60.00
56R		Aileron Gap Kit	1.00	48.00
57A		Seaplane Corrosion Proofing	5.00	47.38
58O		Gauge – Combination Manifold & Fuel Pressure	1.19	- 8.69
59O	X	Aileron Spade	2.25	46.00
60A	X	Wing Tip Strobe	4.25	- 2.00
61A	X	King KT76A Transponder	3.25	- 5.84
62A		Narco AT-150 Transponder	3.25	- 5.84
63A	X	Transponder Antenna	0.50	-3.00
64A	X	Antenna, Broad Band (Spike Type)	0.50	92.00
65A	X	Cabin Speaker	1.36	33.00
66A	X	Microphone, Telex 66T Front	0.38	9.00
67A		Microphone, Telex 66T Rear	0.38	43.00
68A		Microphone, Electro Voice 602T Front	0.50	9.00

EQUIPMENT LIST

ITEM #	X	DESCRIPTION	WT. LB.	ARM. IN.
69A		Microphone, Electro Voice 602T Rear	0.50	43.00
70A		Headset Telex A610-1 Front	0.50	9.00
71A		Headset Telex A610-1 Rear	0.50	43.00
72A		King KI208 Indicator	1.00	- 5.00
73A		King KI209 Indicator	1.00	- 5.00
74A		Narco MK12E Nav Com	5.00	- 5.00
75A		Narco MK12D Nav Com	5.00	- 5.00
76A		Narco 810 Com	3.60	- 5.00
77A		Narco AT150 Transponder	3.25	- 5.00
78A		Narco ID824 Indicator	1.00	- 5.00
79A		Narco ID825 Indicator	1.00	- 5.00
80A		Narco AR 850 Blind Encoder	0.80	- 5.00
81A		Apollo Flybuddy 800 Loran	2.75	- 5.00
82A		Garmin GPS 100	2.75	- 5.00
83A		ARNAV Model R-50, Loran	2.75	-5.00
84A	X	Ameriking AK350 Encoder	0.80	- 5.00
85A	X	PSE 1000II Intercom	1.90	- 5.00
86A		Headset Flightcom, Blackhawk 50X Front	1.00	9.00
87A		Headset Flightcom, Blackhawk 50X Rear	1.00	43.00
88A		Antenna, Nav Meriden OD-1	1.19	101.00
89A		Antenna, Loran C	1.50	7.50
90A	X	Antenna, GPS	0.50	7.50
91A		King KX155 Nav Com	5.30	- 5.00
92A		King KX 165 Nav Com	5.65	- 5.00
93A		Northstar M1 Loran C	4.90	- 5.00
94A		Artificial Horizon	2.50	-5.00
95A		Smartscan SR-8	1.20	- 5.00
96A		II Morrow GPS with data base	2.75	- 5.00
97A		Seaplane Package (lift rings and vertical fins)	7.88	123.10
98A	X	King KLX135 GPS/COM	4.35	- 5.00
99A	X	ELT, ACK Technologies Inc. Model 450	3.30	-66.38
100A		Exhaust Gas Temp Gauge (only)	0.50	- 5.00
101A		Apollo 2001 GPS NMC	3.60	- 5.00
102A		Compass, Vertical Card	0.77	- 6.00
103A		Internal Belly Com Antenna	2.3 oz	93.19
104A		F200 Icebox Multi-Purpose Cooling Fan	1.20	-24.40

EQUIPMENT LIST

ITEM #	X	DESCRIPTION	WT. LB.	ARM. IN.
105A		King KI206 Indicator	1.30	- 5.00
106A		AFT25B Isolation – Speaker Amplifier	1.30	-20.00
107A	X	Wheel Pants (Cleveland Wheels)	10.00	2.00



AMERICAN CHAMPION AIRCRAFT
CORPORATION

"Dedicated to Preserving a Classic"

PILOT'S OPERATING MANUAL

CITABRIA

MODELS 7ECA, 7GCAA, 7GCBC
1994 MODELS AND NEWER

AMERICAN CHAMPION AIRCRAFT CORPORATION
P.O. BOX 37
32032 WASHINGTON AVENUE
ROCHESTER, WI 53167

* Model year is indicated by serial number suffix.

LOG OF REVISIONS

Revision	Pages Affected	Description Change	Date

FOREWORD

This manual has been prepared to inform the pilot of the features and systems incorporated in the American Champion Citabria Models. Recommended operating procedures and performance data are provided so that maximum utilization can be obtained with the utmost of safety, economy and serviceability.

It is strongly recommended that the pilot be familiar with the aircraft and this manual prior to flight.

This manual applies only to the aircraft as indicated on the cover page. Use of this manual with other aircraft is not recommended. However, the use of this manual with older Citabria models, systems, descriptions and specific operating limitations may vary slightly (eg. fuel quantity and inverted engine oil system). All placards and operating limitations in a specific aircraft **MUST** be adhered to.

This manual does not replace the FAA Approved Airplane Flight Manual. If an inconsistency exists between the manuals, the FAA Approved Airplane Flight Manual is to be the authority.

The words "WARNING", "CAUTION", and "NOTE" are used throughout the manual with the following definitions.

WARNING

An operating procedure, practice or condition, etc. which may result in injury or fatality, if not carefully observed or followed.

CAUTION

An operating procedure, practice or condition, etc. which if not strictly observed, may damage the aircraft or equipment.

NOTE

An operating procedure, practice or condition, etc. which is essential to emphasize.

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SECTION I
OPERATING LIMITATIONS

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GENERAL

This section lists all power plant and airframe operating limitations. These limitations are also indicated in the aircraft in the form of placards and instrument color markings. The aircraft placards and instrument markings are to be the authority if an inconsistency exists with this manual.

Limitations pertaining to optional equipment such as floats or external spray units must be obtained from the respective manufacturer.

WARNING

All operating limitations must be strictly adhered to for reasons of safety and serviceability.

FLIGHT OPERATIONS

All Citabria models are approved in the Normal and Acrobatic Category.

Day or night flight in VFR conditions only is approved providing the aircraft is equipped with the required equipment and is in operating condition as specified under Part 91 of the Federal Air Regulations (F.A.R.'s).

Flight into known icing conditions is prohibited.

POWER PLANT LIMITATIONS

Aircraft Model	7ECA	7GCAA,7GCBC
Engine, Lycoming	O-235-K2C	O-320-B2B
Rated Horsepower (hp/rpm)	118	160-2700
Fuel, Aviation Grade, Min. Octane Approved For Continuous Use	100/130* *(low lead)	100/130
Tachometer		
Normal Range (green arc) (rpm)	1800-2800	1800-2700
Maximum (red line) (rpm)	2800	2700
Cylinder Head Temperature		
Normal Range (green arc) (°F)	90-500	90-500
Maximum (red line) (°F)	500	500
Oil Temperatures		
Normal Range (green arc) (°F)	100-245	100-245
Maximum (red line) (°F)	245	245
Oil Pressure		
Normal Range (green arc) (psi)	60-100	60-100
Caution Range (yellow arc) (psi)	25-60	25-60
Maximum (red line) (psi)	100	100
Minimum (red line) (psi)	25	25

AIRSPEED LIMITATIONS

AIRSPEED DESIGNATION

	CAS (MPH)
Never Exceed (V_{NE} - red line)	162
Caution Range (yellow arc).	120-162
Maximum Structural Cruise (V_{NO}).	120
Normal Operating Range (green arc).	50-120
Flap Operating Range (V_{FE} - white arc).	45-90 (7GCBC)
Maneuvering (V_A - @ 1650 lbs.).	120

NOTE

- CAS - Calibrated airspeed is indicated airspeed (IAS) corrected for installation and instrument error.
- IAS - Indicated airspeed assumes zero instrument error only.
- V_{NE} - Maximum safe airspeed, not to be exceeded at any time.
- V_{NO} - Not to be exceeded except in smooth air only and then with caution.
- V_{FE} - Not to be exceeded with flaps extended.
- V_A - No full or abrupt control movements allowed above this airspeed.

WEIGHT AND BALANCE LIMITS

Aircraft Model and Weight Center of Gravity Range

		Normal Category	Acrobatic Category
7ECA	1650 lbs maximum	14.2"-19.2"	14.2"-17.3"
	1325 lbs or less	10.5"-19.2"	10.5"-17.3"
7GCAA	1650 lbs maximum	10.5"-18.2"	10.5"-16.0"
	1325 lbs or less	10.5"-18.2"	10.5"-16.0"
7GCBC	1800 lbs maximum	14.2"-19.2"	14.2"-16.3"
	1325 lbs or less	10.5"-19.2"	10.5"-16.3"

NOTE

All measurements are aft of the datum line which is the wing leading edge. Center of gravity limits between weights are straight line variations between these points. See Section V for the flight envelope and loading instructions.

FLIGHT LOAD FACTORS (Normal and Acrobatic Category)

Positive Load +5.0 G's Maximum
Negative Load -2.0 G's Maximum

MANEUVERS

The following aerobatic maneuvers and entrance speeds are approved with no baggage and the aft center of gravity (C.G.) within the limits specified for the Acrobatic Category.

Chandelle, Lazy Eights.	120 MPH CAS
Barrel or Slow Roll.	120 MPH CAS
Immelman.	145 MPH CAS
Loop or Clover Leaf.	140 MPH CAS
Split S.	80 MPH CAS
Snap Roll.	85 MPH CAS
Vertical Reverse.	85 MPH CAS
Cuban Eight.	145 MPH CAS

REQUIRED PLACARDS

In Full View Of Pilot

Operations Limitation Card
(Includes all limitations listed in this Section in addition to weight and balance information)
Aerobatic Maneuvers Limitation Card

In Baggage Compartment

"Maximum Baggage - 100 Lbs."

On Forward Left Side Window

"Do Not Open Above 130 MPH"
"Do Not Open Above 90 MPH" - (For Full Opening Side Window)

Above Fuel Shutoff Road

"Fuel 35 Gal. Usable - Down On"

On Emergency Door Release Handle

"Emergency Door Release - Pull Pin, Pull Handle"

PLACARDS (Continued)

Top Half Cabin Door - Forward (Split-type door only)

“Do Not Exceed 90 MPH With Door Open”

Right Window Sill (When folding rear seat is installed)

“Seat Back Restrainer Cable Must Be Connected Before Flight Unless Control Stick is Removed”

Adjacent To Strobe Light Switch

“Turn Off Strobe Lights When Taxiing In Vicinity Of Other Aircraft Or During Flight Through Clouds, Fog, or Haze. Standard Position Lights To Be On For All Night Operations.”

On Radio Panel (If radio installed)

“Compass Calibrated With Radio On”

On Fuel Caps

“Fuel 100LL Octane 18 Gals.”

On Instrument Panel

“Occupy Front Seat When Flying Solo”

On Battery Access Panel

“Service Battery Every 50 Hrs. of Normal Flight. Service Every 10 Hrs. of Acrobatic Flight.”

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SECTION II

EMERGENCY PROCEDURES

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GENERAL

This section covers the recommended procedures to follow during emergency and adverse flight conditions. As it is not possible to define every type of emergency that may occur, it is the pilot's responsibility to use sound judgement based on personal experience and knowledge of the aircraft to determine the best course of action.

It is considered mandatory that the pilot be familiar with this entire manual, in particular, the "Emergency Procedures" section prior to flight.

NOTE

All airspeeds in this section are indicated airspeeds (IAS) unless stated otherwise.

FIRE

ENGINE FIRE DURING START

If the fire is believed to be confined to the intake or exhaust system (result of flooding engine):

- 1) Continue cranking engine with starter
- 2) Mixture Control - IDLE CUT-OFF
- 3) Throttle - FULL OPEN
- 4) Inspect aircraft thoroughly for damage and cause prior to restart

If fire persists or is not limited to intake or exhaust system:

- 1) Mixture Control - IDLE CUT-OFF
- 2) Fuel Shut-Off Valve - OFF
- 3) Electrical and Magneto Switches - ALL OFF
- 4) Exit Aircraft
- 5) Direct fire extinguisher through the bottom of the nose cowl or through the cowl inspection door

ENGINE FIRE IN FLIGHT

- 1) Mixture Control - IDLE CUT-OFF
- 2) Fuel Shut-Off Valve - OFF
- 3) Electrical and Magneto Switches - ALL OFF
- 4) Cabin Heat - OFF front and rear
- 5) Use hand fire extinguisher if available
- 6) Land immediately using "Forced Landing Procedures"

WARNING

Do not attempt to restart engine.

ELECTRICAL FIRE

An electrical fire is usually indicated by an odor of hot or burning insulation.

- 1) Electrical Switches - ALL OFF (leave magneto switches ON)
- 2) Air Vents/Windows - OPEN if necessary for smoke removal and ventilation
- 3) Use hand fire extinguisher if available
- 4) If fire continues, land immediately

If fire/smoke stops and electrical power is required for the remainder of the flight, turn the master switch ON followed by the desired circuit switch. Allow sufficient time between turning on each switch in order that the faulty circuit may be located and switched OFF.

ALTERNATOR/ELECTRICAL FAILURE

An alternator failure is indicated by a steady discharge on the ammeter.

- 1) Master Switch - CYCLE in attempt to reset the overvoltage relay.
- 2) If excessive battery discharge continues, turn OFF all nonessential electrical equipment to conserve battery power.
- 3) Land as soon as practical as the battery will furnish electrical power for a limited time only.

If only one circuit (e.g. Radio) appears to be inoperative, remove and replace the suspected fuse with a spare of the same amperage rating. The spare fuses are located above the regular fuses in use.

NOTE

Engine operation is unaffected by a complete electrical system failure with the exception of the engine starter.

ENGINE MALFUNCTION

ENGINE FAILURE ON TAKE-OFF

If sufficient runway remains:

- 1) Throttle - CLOSED
- 2) Land using maximum braking after touchdown.

If airborne and insufficient runway remains for landing, attempt an engine restart if sufficient altitude permits:

- 1) Fuel Shut-Off Valve - CHECK ON
- 2) Mixture Control - FULL RICH
- 3) Carburetor/Alternate Air - FULL HOT
- 4) Magneto Switches - BOTH ON (Up)

If no restart is possible:

- 1) Select most favorable landing area ahead
- 2) Flaps - FULL DOWN (7GCBC)

WARNING

Maintain flying speed at all times and do not attempt to turn back toward the runway unless sufficient altitude has been achieved.

ENGINE AIR RESTART

- 1) Maintain Airspeed - 65 MPH minimum recommended
- 2) Magneto Switches - BOTH ON (Up)
- 3) Mixture - FULL RICH or as required at high altitude
- 4) Fuel Shut-Off Valve - CHECK ON
- 5) Carburetor/Alternate Air - FULL HOT
- 6) Engine Primer - CHECK OFF
- 7) If restart not possible, change throttle, mixture, primer, magneto, carburetor/alternate air heat settings, in attempt to restart.
- 8) Follow "Forced Landing Procedure" if unable to restart.

NOTE

The engine starter may be engaged in flight should the engine stop windmilling.

PARTIAL POWER LOSS/ROUGH RUNNING

- 1) Follow the engine air restart procedures
- 2) Land as soon as practical using "Precautionary Landing Approach" procedures

Carburetor icing is indicated if a gradual RPM loss is noticed. The carburetor/alternate air should be FULL HOT as long as suspected icing conditions exist.

ABNORMAL OIL PRESSURE/TEMPERATURE INDICATIONS

Oil pressure and temperature problems are usually related with one affecting the other. Before any drastic action is taken, cross check other engine instruments and control settings in an attempt to determine the source of the problem.

High oil temperature is generally a result of loss of oil, overheating (note CHT if available) or a malfunctioning oil cooler by-pass valve. If the situation remains unchecked, oil pressure usually drops resulting in possible engine damage. Power should be reduced while maintaining cruise airspeed; place mixture in FULL RICH position and land as soon as practical.

Little or no oil pressure is usually caused by a failed pressure relief valve, pump, loss of oil, clogged oil line, high oil temperature or a defective gauge. A landing should be made as soon as practical using minimum RPM changes. Plan a "Precautionary Landing Approach" as complete engine failure is possible at any time.

LANDING EMERGENCIES

PRECAUTIONARY LANDING APPROACH

A precautionary landing approach should be used whenever power is still available but a complete power failure is considered imminent. Maintain a higher and closer pattern than normal in attempt to remain in gliding distance of the intended touchdown point. Use the normal landing procedures in addition:

- 1) Airspeed - 65 MPH recommended (60 MPH minimum)
- 2) Throttle - CLOSED when in gliding distance of runway
- 3) Flaps - LOWER AS NEEDED in increase approach descent angle (7GCBC)

NOTE

Slipping the aircraft by cross controlling the rudder and ailerons will increase the rate of descent both with or without flaps. If a cross-wind exists, place the lower wing into the wind.

FORCED LANDING (Complete Power Failure)

If the engine cannot be restarted in flight, trim the aircraft to the recommended glide speed. Remain within gliding distance of the intended point of landing. Maintain a higher and closer pattern than normal making allowance for wind.

Excessive altitude can be lost by extending flaps or slipping the aircraft. Diving the aircraft in an attempt to lose altitude when flying into a headwind will only increase the required landing distance.

- 1) Airspeed - Maintain 60-65 MPH
- 2) Mixture - IDLE CUT-OFF
- 3) Fuel Shut-Off Valve - OFF
- 4) Master Switch - ON
- 5) Flaps - UP to increase glide range (7GCBC)
- 6) Radio - MAYDAY 121.5 MHz
- 7) Attempt to position the aircraft approximately 1000 feet above ground level (AGL) over the intended point of landing or 500 feet when downwind and abeam the intended point of landing.
- 8) All Electrical Switches - OFF
- 9) On Final Approach
 - a) Airspeed - 65 MPH (60 MPH minimum)
 - b) Flaps - DOWN after intended point of landing assured (7GCBC)
- 10) Touchdown with minimum airspeed (three point full stall) if landing on rough terrain.

NOTE

If necessary, after aircraft has come to a complete stop, remove and activate the emergency locator transmitter from the aircraft for increased transmitting range.

DITCHING

Should it become necessary to make a forced landing over water, follow the "Forced Landing Procedures" in addition to the following:

- 1) Cabin Side Door - JETTISON
- 2) Land into wind if high winds are evident or parallel to swells with calm winds
- 3) Flaps - UP (allows higher nose attitude at touchdown)
- 4) Contact the water with nose high attitude
- 5) DO NOT STALL prior to touchdown
- 6) After coming to complete stop - EXIT AIRCRAFT

NOTE

Aircraft cannot be depended on to provide flotation after contacting the water.

UNUSUAL FLIGHT CONDITIONS

SEVERE TURBULENCE

To prevent overstressing the aircraft do not exceed 120 MPH in rough air. To minimize personal discomfort, decrease the IAS below 80 MPH. Maintain a level flight attitude rather than flying by reference to the altimeter and airspeed indicator as the pitot-static instruments may become very erratic.

STALLS

The Citabria stall characteristics are conventional. The stall warning horn, if installed, will precede the actual stall by 5-10 MPH depending on the amount of power used. There is sufficient aerodynamic buffeting preceding the stall to provide the pilot with an adequate warning.

Aileron control response in a fully stalled condition is marginal. Large aileron deflections will aggravate a near stalled condition and their use is not recommended to maintain lateral control. The rudder is very effective and should be used for maintaining lateral control in a stalled condition with the ailerons placed in a neutral position.

To recover from a stall, proceed as follows:

- 1) Nose Attitude - LOWER with forward movement of control stick
- 2) Throttle - FULL OPEN simultaneously with control stick movement
- 3) Use rudder to maintain lateral control

SPINS

If a spin is inadvertently entered, immediate recovery should be initiated. The recovery procedure is as follows:

- 1) Throttle - CLOSED
- 2) Rudder - FULL DEFLECTION opposite direction of rotation
- 3) Elevator - SLIGHTLY FORWARD OF NEUTRAL
- 4) Ailerons - NEUTRAL POSITION

When rotation stops (1/2 - 1 turn after recovery initiated)

- 5) Rudder - NEUTRALIZE
- 6) Nose Attitude - RAISE smoothly to level flight attitude

WARNING

During the spin recovery, the airspeed will build very rapidly with a nose low attitude. Do not use full or abrupt elevator control movements.

INFLIGHT OVERSTRESS

Should an overstress occur due to exceeding the airspeed or load factor limits, aerobatics should be terminated immediately. Fly at a reduced airspeed, (60 - 70 MPH) to a suitable landing point. DO NOT under any circumstances, make large control movements or subject the aircraft to additional G loadings above that required for straight and level flight. After landing, the aircraft should be inspected by a mechanic prior to the next flight.

EMERGENCY EXIT/BAIL OUT

- 1) Throttle - CLOSED
- 2) Door - JETTISON using Emergency Jettison Handle
- 3) Use the cabin door frame for support. Dive straight out and slightly aft of wing struts.
- 4) Parachute - OPEN immediately when clear of aircraft

NOTE

Emergency ground exit is also possible through the left window.

SECTION III

NORMAL OPERATING PROCEDURES

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GENERAL

This section covers all recommended normal operating procedures using a checklist format whenever possible with additional information if further explanation is required.

NOTE

All recommended airspeeds in this section are **INDICATED AIRSPEEDS (IAS)** with the aircraft loaded to the maximum gross weight.

PREFLIGHT INSPECTION

1) Cabin

- a) Cabin Door - CHECK condition, security
- b) Flight Controls - CHECK freedom of movement
- c) Magneto and Electrical Switches - OFF (check operation of lights if required and stall warning system with respective switches ON)
- d) Fuel Quantity Gauges - CHECK quantity
- e) Fuel Shut-Off Valve - ON
- f) Seat Belts - CHECK CONDITION - SECURE rear belt and harness if not in use
- g) Emergency Locator Transmitter - ARMED

2) Right Wing

- a) Wing Root Fairing - CHECK secure
- b) Flaps - CHECK condition, freedom of movement, security (7GCBC)
- c) Aileron - CHECK condition, freedom of movement, security
- d) Wing Tip and Light - CHECK condition
- e) Wing and Struts - CHECK condition, security
- f) Tie-Down - REMOVE
- g) Pitot-Static Tube - CHECK unobstructed (visual check only)
- h) Fuel - CHECK quantity, color, cap secure

3) Right Main Gear

- a) Chocks - REMOVE
- b) Tires - CHECK condition, inflation
- c) Brakes - CHECK condition, leakage

4) Nose Section

- a) Windshield - CHECK condition, cleanliness
- b) Oil - CHECK quantity, dip stick secure
- c) Fuel - DRAIN gascolator, CHECK leakage
- d) Engine Compartment - CHECK condition, leakage, etc.
- e) Cowling and Inspection Door - CHECK condition, security
- f) Propeller and Spinner - CHECK condition, security
- g) Air Filter - CHECK condition
- h) Landing Light - CHECK condition

5) Left Main Gear

- a) Same as right main gear

PREFLIGHT INSPECTION (Continued)

6) Left Wing

- a) Same as right wing, in addition
- b) Fuel Vent - CHECK unobstructed
- c) Stall Warning Vane - CHECK freedom of movement (if installed)

7) Fuselage (Left Side)

- a) Fabric - CHECK condition, oil, battery acid leakage, etc.
- b) Windows - CHECK condition, cleanliness
- c) Fuel Belly Drain - DRAIN, CHECK leakage
- d) Radio Antenna(s) - CHECK secure

8) Empennage

- a) Horizontal Stabilizer and Brace Wires - CHECK condition, security
- b) Vertical Stabilizer and Tail Light - CHECK condition
- c) Elevator, Trim Tab and Rudder - CHECK condition, freedom of movement, security
- d) Tail Wheel - CHECK condition, inflation, security
- e) Tie-Down - REMOVE

9) Fuselage (Right Side)

- a) Same as fuselage left side (no fuel drain on right side)

BEFORE STARTING

- 1) Seat Belts/Shoulder Harness - FASTENED
- 2) Fuel Shut-Off Valve - ON
- 3) Brakes - SET
- 4) Electrical Switches - OFF
- 5) Cabin Door - CLOSED (windows as desired)

STARTING (Continued)

To clear an engine that has been flooded due to excessive priming, proceed as follows:

- 1) Mixture - IDLE CUT-OFF
- 2) Throttle - FULL OPEN
- 3) Magneto Switches - OFF
- 4) Starter - ENGAGE for several propeller revolutions
- 5) Repeat normal starting procedures using no prime

CAUTION

Limit the use of the starter to 30 seconds duration maximum with a two minute cooling off period between each starter engagement.

During cold weather operation, (below 20°F) it is recommended that the engine be pre-heated by directing warm air through the opening in the bottom or front of the engine cowl. This practice will prolong the service life of the engine and starter.

During the ground operation, the mixture should be FULL RICH and the carburetor air COLD to insure good engine cooling and filtered air. Prolonged idle below 1000 RPM is not recommended due to plug fouling and insufficient cooling air when the aircraft is not in motion.

TAXI

Taxi operations during high winds requires the conventional use of the flight controls. With a head wind or quartering head wind, place the control stick full aft and into the wind. With a tail wind or quartering tail wind, use the opposite procedures. The use of the wheel brakes in conjunction with the rudder will assist the pilot in maintaining directional control.

BEFORE TAKE-OFF

- 1) Brakes - SET
- 2) Flight Controls - CHECK freedom of movement, proper operation
- 3) Elevator Trim - SET take-off position
- 4) Flight Instruments/Radio(s) - CHECK and SET
- 5) Flaps - SET as desired (7GCBC only)
- 6) Fuel Shut-Off Valve - ON
- 7) Mixture - FULL RICH (lean as required for high altitude)
- 8) Engine Instruments - CHECK normal indications
- 9) Engine Run-Up - 1800 RPM (Elevator Control - FULL BACK)
 - a) Magnetos - CHECK (200 RPM maximum drop, 50 RPM maximum differential)
 - b) Carburetor/Alternate Air - CHECK operation then return to COLD position
 - c) Engine Instruments - CHECK normal indications
 - d) Throttle - 1000 RPM
- 10) Cabin Door and Windows - CLOSED and LATCHED
- 11) Seat Belts/Shoulder Harness - FASTENED

High power operation (above 2200 RPM) and engine run-up should be made into the wind and kept to a minimum especially during high temperature conditions. The stick should also be held full aft to prevent the possibility of the aircraft nosing over.

TAKE-OFF (Normal)

- 1) Flaps - UP (7GCBC)
- 2) Throttle - FULL OPEN applying smoothly
- 3) Engine Instruments - CHECK normal indications
- 4) Attitude - RAISE TAIL to level flight attitude
- 5) Lift-Off - 55-60 MPH
- 6) Climb - 75-80 MPH

Take-off characteristics are conventional. It is recommended to raise the tail with the elevator as soon as possible for better forward visibility and directional control.

CAUTION

In the level flight attitude, the wheel brakes are very sensitive. It is recommended that the directional control be maintained with the use of the rudder only.

TAKE-OFF (Normal) (Continued)

During crosswind conditions, place the control stick into the wind (up wind aileron UP) and assume a tail high attitude with the elevator to prevent drifting or premature lift-off.

High altitude take-offs are accomplished by using the normal take-off procedures with the addition of leaning the mixture control for smooth engine operation.

TAKE-OFF (Obstacle)

During an obstacle take-off, use the normal take-off procedures with the following exceptions:

- 1) Flaps - SET 14° (2nd notch, 7GCBC only)
- 2) Lift-Off - 50-55 MPH
- 3) Climb - 58 MPH (best angle of climb) until clear of obstacle

TAKE-OFF (Soft Field)

For soft field take-off, use the normal take-off procedures with the following exceptions:

- 1) Flaps - SET 14° (2nd notch 7GCBC only)
- 2) Attitude - TAIL LOW but clear of ground
- 3) Lift-Off - ASSIST using elevator
- 4) After Lift-Off - LEVEL FLIGHT to obtain safe margin of airspeed prior to climb
- 5) Flaps - UP (7GCBC only)

WARNING

The aircraft will lift-off at very low IAS but continued climb-out below 58 MPH immediately after take-off is not recommended.

CLIMB

- 1) Throttle - FULL OPEN
- 2) Mixture - FULL RICH below 5000 feet
- 3) Airspeed - 75-80 MPH

For maximum performance climbs, use full throttle and the following conditions:

BEST RATE OF CLIMB

- 1) Flaps - UP
- 2) Airspeed - 69 MPH

BEST ANGLE OF CLIMB

- 1) Flaps - 14° (2nd notch 7GCBC only)
- 2) Airspeed - 58 MPH

CRUISE

- 1) Level-Off - TRIM
- 2) Airspeed - ACCELERATE to desired cruise airspeed
- 3) Throttle - SET RPM to cruise power
- 4) Mixture - LEAN when below 75% power

The fuel mixture should be leaned at any altitude when below 75% of maximum power. Lean to peak EGT if equipped. If no EGT is installed, lean until engine roughness is noted then enrich until smooth.

WARNING

Range and endurance information is based on a properly leaned fuel mixture. Failure to lean the fuel mixture will increase fuel consumption appreciably.

AEROBATICS

The Citabria is certified in the Acrobatic Category. However, this desirable capability also places a much greater demand on the pilot's ability, knowledge of the aircraft and current regulations. The following information is provided to make aerobatic flying enjoyable, with the utmost emphasis on safety.

Federal Aviation Regulations (FARs) Part 9171 specify the airspace and altitudes required for aerobatic flight. The minimum altitude of 1500 FT AGL is the pilot's greatest safety factor and should not be compromised. The wearing of approved parachutes is specified in Part 91. It is strongly recommended that parachutes always be worn during aerobatic flight.

The Citabria structure is designed to withstand a maximum load factor of +5 G's and -2 G's at maximum gross weight of 1650 lbs. and below. A change in the gross weight also changes the effective load factor limit. To fly at reduced weights increases the safety factor and improves performance. To fly above gross weight is not only prohibitive, but also greatly increases the changes of a serious overstress resulting in damage or possible structural failure.

The Citabria exhibits excellent control response and stability. However, to maintain this for aerobatic flight, the rear center of gravity (C.G.) limit is critical. The rear C.G. is therefore reduced when flying in the Acrobatic Category. This limit is specified in Section I. The flight envelope in Section V also reflects this change. For this reason, baggage is NOT allowed during aerobatic flight.

AEROBATICS (Continued)

A person learning to fly must be taught how to do so safely. The same holds true for a pilot learning aerobatics. To attempt an aerobatic maneuver with no prior instruction is extremely dangerous and NOT recommended.

Aerobatic flight places a greater demand on both the pilot and the aircraft. A thorough pre-flight inspection/evaluation for both is considered essential. The pilot must know and abide by the limitations of the aircraft and his own personal limitations as well. At the completion of the flight, a post-flight inspection of the aircraft should also be conducted. If any discrepancies or doubts exist that concern the airworthiness, consult a mechanic prior to the next flight.

DESCENT

- 1) Mixture - FULL RICH
- 2) Throttle - REDUCE as desired
- 3) Airspeed - AS DESIRED

The descent should be made with enough power to maintain cylinder head and oil temperatures in green arc. If possible, avoid windmilling the engine with the propeller by reducing airspeed or increasing power.

LANDING (Normal)

- 1) Seat and Shoulder Harness - FASTENED
- 2) Mixture - RICH
- 3) Brakes - CHECK FIRM (Park Brake - OFF)
- 4) Flaps - AS DESIRED (7GCBC)
- 5) Approach Airspeed - 60-70 MPH
- 6) Throttle - AS DESIRED to control rate of descent
- 7) After Touchdown - FLAPS UP (7GCBC) - Brake as required

Aircraft landing characteristics are conventional. Either wheel landings or full stalls (3 point) are permissible. During gusty wind conditions, increase airspeed approximately 5 MPH above normal followed by a wheel landing.

Full stall (3 point) landings are recommended for soft or rough fields.

LANDING (Normal) (Continued)

Crosswind approaches can best be accomplished by using the wing down top rudder method followed by a wheel landing. Keep the lower wing into the wind after touchdown. Do not drop the tail until airspeed is well below flying speed.

CAUTION

The use of wheel brakes is not recommended until after the tail wheel is in contact with the ground. For maximum braking, the control stick should be FULL AFT.

LANDING (Obstacle)

Use of normal landing procedures in addition:

- 1) Flaps - FULL DOWN (7GCBC)
- 2) Approach Airspeed - 60 MPH
- 3) Throttle - AS DESIRED to control rate of descent
- 4) Slip aircraft as necessary to increase rate of descent

WARNING

A relatively high rate of descent is possible in this configuration when at full gross weight and the throttle closed. If airspeed is allowed to decrease below 60 MPH, level off can only be assured with an application of power.

SHUTDOWN

- 1) Brakes - SET
- 2) Electrical Equipment - OFF
- 3) Mixture - IDLE CUT-OFF
- 4) Magnetos/Master Switch - OFF after propeller stops
- 5) Controls - SECURE with lap belt around forward control stick only
- 6) Wheels - CHOCKED
- 7) Wing/Tail Tie Downs - SECURE

NOTE

If high winds are anticipated, the aircraft should be hangared. If the aircraft must be left out, park into the wind and use additional tie-down ropes for security. Place the flaps in the FULL DOWN position (7GCBC) and secure the forward control stick with the lap belt.

SECTION IV

FLIGHT PERFORMANCE

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GENERAL

This data is to inform the pilot what he can expect from the aircraft in the way of performance and to assist in preflight planning.

Flight performance data is included for all Citabria models. The data has been compiled from both estimated calculations and actual flight test using average piloting techniques, with an aircraft and engine in good operating conditions. All information is corrected for standard atmospheric conditions.

Performance may vary from the given data due to the many possible variables present with a specific aircraft and flight condition. The pilot is therefore encouraged to maintain a personal flight log for his aircraft. This will not only provide more accurate preflight planning information for future flights, but also can be used as an indicator in determining the general condition of a particular aircraft.

INDICATED AIR SPEED vs. CALIBRATE AIRSPEED

I.A.S., mph	T.I.A.S., mph
50	54
60	62
70	70
80	79
90	88
100	97
110	106
120	116
130	124
140	133
150	142
160	150
170	159

**TAKE-OFF DISTANCE AND RATE OF CLIMB VS. ALTITUDE AND TEMPERATURE
AMERICAN CHAMPION MODELS 7ECA, 7GCBC, 7GCAA**

MODEL		7ECA			7GCBC			7GCAA		
POWER		118 HP.			160 HP.			160 HP.		
PROP		72CKS8-O-52			74DM6S8-1-56			74DM6S8-1-56		
PRESSURE ALTITUDE FT.	TEMP %F	T.O. DIST. FT.	50 FT. OBST. FT.	R/C FT/MIN	T.O. DIST. FT.	50 FT. OBST. FT.	R/C FT/MIN	T.O. DIST. FT.	50 FT. OBST. FT.	R/C FT/MIN
S.L.	0	340	716	800	231	457	1240	289	535	1210
	20	372	763	775	254	491	1210	317	574	1180
	40	415	832	750	279	530	1170	350	618	1150
	60	455	895	725	305	567	1145	382	663	1120
	80	496	961	700	340	616	1110	417	713	1090
	100	544	1034	675	363	649	1090	453	763	1060
2000	0	407	860	695	272	536	1100	343	622	1080
	20	444	929	660	294	573	1070	376	671	1050
	40	492	1004	635	331	629	1030	414	727	1020
	60	543	1086	610	374	684	1010	452	784	990
	80	597	1174	585	397	733	980	497	846	960
	100	655	1269	560	433	777	950	538	904	930
4000	0	482	1043	575	324	635	980	401	738	950
	20	538	1147	545	360	695	930	448	806	920
	40	589	1239	520	393	746	900	479	857	890
	60	640	1329	495	458	834	870	527	925	860
	80	690	1432	470	474	870	840	573	991	830
	100	788	1580	450	522	935	820	643	1086	800
6000	0	576	1301	465	385	763	840	479	886	820
	20	640	1432	435	421	827	800	529	962	790
	40	707	1562	410	472	905	770	582	1040	760
	60	789	1716	385	522	981	740	647	1133	730
	80	858	1858	365	568	1043	720	706	1226	700
	100	968	2058	340	626	1137	690	760	1304	680
8000	0			350			700			690
	20			325			670			660
	40			300			640			630
	60			275			610			600
	80			245			530			570
	100			225			550			540

ALL FIGURES ARE MAXIMUM PERFORMANCE AT GROSS WEIGHT. TAKE-OFF IN 7GCBC MADE WITH 2 NOTCHES OF FLAP UNTIL AIRBOURNE. TAKE-OFF DISTANCE ON DRY PAVEMENT.

AIRCRAFT SPECIFICATIONS - ALL MODELS

MODEL	7ECA	7GCAA	7GCBC
STALL SPEED, (MPH)	51	51	51
STALL SPEED FLAPS, (MPH)			47
TOP SPEED, (MPH)	117	130	128
CRUISE SPEED 75% HP (MPH-ALT)	112-7500	125-3000	125-3000
RANGE 75% HP. (GALS.-MILES-HRS)	36-672-6	36-500-4	36-500-4
FUEL CONSUMPTION 75% HP (GPH)	6	9	9
BEST RATE OF CLIMB, (MPH-FPM)	69	69	78
SERVICE CEILING (FT.)	12,000	17,000	17,000
TAKE-OFF RUN (FT.)	450	375	296
TAKE-OFF OVER 50 FT. OBSTACLE (FT.)	890	630	525
LANDING ROLL (FT.)	400	400	310
LANDING DIST. OVER 50 FT. OBST. (FT.)	775	755	690

**NOTE: PERFORMANCE IF FOR GROSS WEIGHT AT SEA LEVEL UNLESS NOTED.
* AVERAGE WITH STANDARD EQUIPMENT.**

SECTION V

WEIGHT AND BALANCE

INDEX

GENERAL 5-1
LOADING PROCEDURES. 5-2
SAMPLE LOADING PROBLEM. 5-3
FLIGHT ENVELOPES. 5-4,5,6

GENERAL

It is the pilot's responsibility to insure that the aircraft is loaded properly and within the weight and balance limitations. All flight performance, procedures and characteristics are based on this prerequisite.

If the aircraft is to be used for aerobatic flight, it must be loaded within the approved flight envelope. The rear center of gravity limit is considered critical. In addition, no baggage is allowed.

Although the gross weight limit is not affected by aerobatic flight, the importance of this limit cannot be overemphasized. Subjecting the aircraft to the maximum approved load factor limits in an overgross condition may result in damage or complete structural failure of the airframe.

The actual licensed empty weight and center of gravity (C.G.) of a specific aircraft can be found on the Weight and Balance Form and the Operating Limitations Card, both of which are a permanent part of the aircraft's file. All additional changes to the aircraft's empty weight and C.G. after the time of manufacture must also be attached to or indicated on both forms. From this information and the following instructions, the pilot can easily determine the "Useful Load" and proper loading distribution for the aircraft.

NOTE

The rear center of gravity limits vary with each model Citabria. A flight envelope is provided for each model.

LOADING PROCEDURES

1. Determine from the Weight and Balance Sheet, in the aircraft file, the "Licensed Empty Weight and Moment" (in-lbs). Enter these figures under "Your Airplane" of the Sample Loading Problem, Figure 5-1.
2. Full oil capacity can be assumed for all flights. For ease of future loading computations, the new "Empty Weight and Moment with Oil" should be determined and entered in the Sample Loading Problem under "Your Airplane".
3. Using the Loading Graph, Figure 5-2, determine the weight and the moment of the following items and enter these figures on the Sample Loading Problem.
 - a) Pilot
 - b) Rear Passenger
 - c) Wing Fuel - 35 Gals. Maximum Usable @ 6 Lbs./Gal.
 - d) Baggage - 100 Lbs. Maximum (Normal Category Only)
4. Add the "Aircraft Empty Weight and Moment with Oil" and all the items in Step 3 to determine the "Gross Take-Off Weight and Moment".
5. Using the Flight Envelope, Figures 5-3, 5-4, 5-5 for the model Citabria used, determine that the gross take-off weight and moment are within limits.

WARNING

If the aircraft is not within the approved flight envelope limits, it must be reloaded. Under no circumstances should the aircraft be flown with an out of limits condition, particularly if aerobatic flight is contemplated.



AV8 Modern Avionics
 10000 Flying Cloud Drive
 Eden Prairie, MN 55347
 952-941-2783
 www.AV8modernavionics.com

Registration	N241AC
Make	American Champ
Model	7ECA
Serial No.	1373-98
Date	2/5/2026
Tach/Hobbs	T1759.8/H1926.6

Old Empty Weight	1184.750	lbs
Old Empty CG	13.24	in
Max Gross Weight	1750.00	lbs
Old Useful Load	579.25	lbs

WEIGHT & BALANCE UPDATE

Items: (Description / P/N / S/N)	Weight	Arm	Moment
	(lbs)	(in)	(in-lbs)
Empty Weight	1184.75	13.24	15686.09
REMOVED			
Stratus ESG XPDR / 153510 / 076657	-2.80	-5.00	14.00
Stratus 31 / 153510-000115 / N/A	-0.50	-5.00	2.50
GPS ANT KA92 / 071-01553-0200 / 24516	-0.50	7.50	-3.75
KLX135A GPS/COM / 069-01029-0703 / 122417	-5.00	-5.00	25.00
ACK Encoder / A-30 / 38055	-0.30	-3.00	0.90
PM1000II Intercom / 11902 / WA-10887	-0.60	-5.00	3.00
KA60 XPDR Antenna / 071-1174-06 / N/A	-0.20	-3.00	0.60
LH&RH Strobe Power Supplies / 152-0007 / J11074877/J05118792	-2.60	-2.00	5.20
INSTALLED			
GNX 375 GPS/XPDR / 011-04378-00 / 5GJ009260	4.40	-5.00	-22.00
GPS ANT GA35 / 013-00235-00 / 243237	0.50	7.50	3.75
GTR205 COM / 011-05287-00 / 70E000582	2.80	-5.00	-14.00
TA202 USB / 6430202-1 / C22-12798	0.10	-5.00	-0.50
GAE12 Encoder / 011-03080-01 / 3T6019833	0.10	-5.00	-0.50
AV74 XPDR ANT / AV74 / N/A	0.30	-3.00	-0.90
			0.00
Totals	1180.45	-	15699.39

New Empty Weight	1180.45	lbs
New Empty CG	13.30	in
New Empty Weight CG Moment	15699.39	in-lbs
Max Gross Weight	1750.00	lbs
New Useful Load	569.55	lbs

This new weight & balance information supersedes all previous weight & balance data.

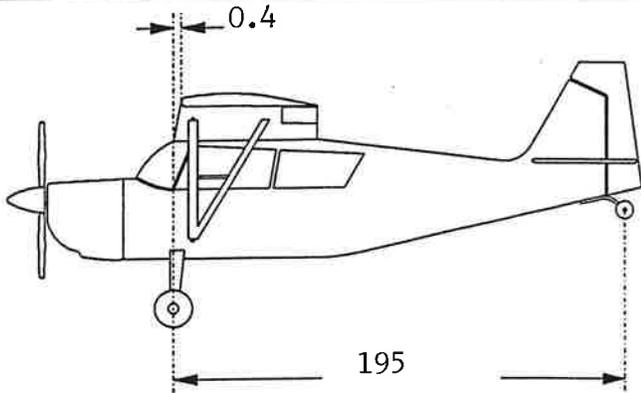
For aircraft loading, see instructions in Weight & Balance section of Aircraft Flight Manual or Pilots Operating Handbook.

Name	Signature	Date	Cert. #
Thomas Kortisses		2/5/2026	QI2R110L

Notes:

AMERICAN CHAMPION AIRCRAFT CORPORATION
ROCHESTER, WISCONSIN 53167

WEIGHT AND BALANCE WORKSHEET



MODEL NUMBER 7ECA
 SERIAL NUMBER 1373-98
 IDENTIFICATION NUMBER N241AC
 DATE JANUARY 27, 1999
 SIGNED M. Read

Aircraft Leveling Means: Drop plumb line from wing leading edge so that it is 10.18 inches forward of front face fuselage wing strut fitting.

Weight Actual 1144.5

1. Left Wheel Weight: 535.5 lbs. Right Wheel Weight: 542.5 lbs.
 2. Tail Wheel Weight 66.5 lbs.
 3. Total Aircraft Weight (Full Oil): 1144.5 lbs.

$$\text{C.G.} = \frac{(\text{195 in.}) \times (\text{66.5 lbs.})}{(\text{1144.5 lbs.})} - (\text{0.4 in.}) = \text{10.93 in. aft L.E.}$$

	WEIGHT (lbs.)	ARM (in.)	MOMENT (in. lbs.)
Aircraft Weight With Full Oil	1144.5	10.93	12509.39
Subtract Drainable Oil	-11.25	-36	+405
Add 1 Gallon Unuseable Fuel	+6	+15	+90
TOTALS	1139.25	XXXXXXXX	13004.39

Aircraft Empty C.G. 11.41 in. aft datum

Useful Load 510.75 lbs.

Datum: Wing Leading Edge

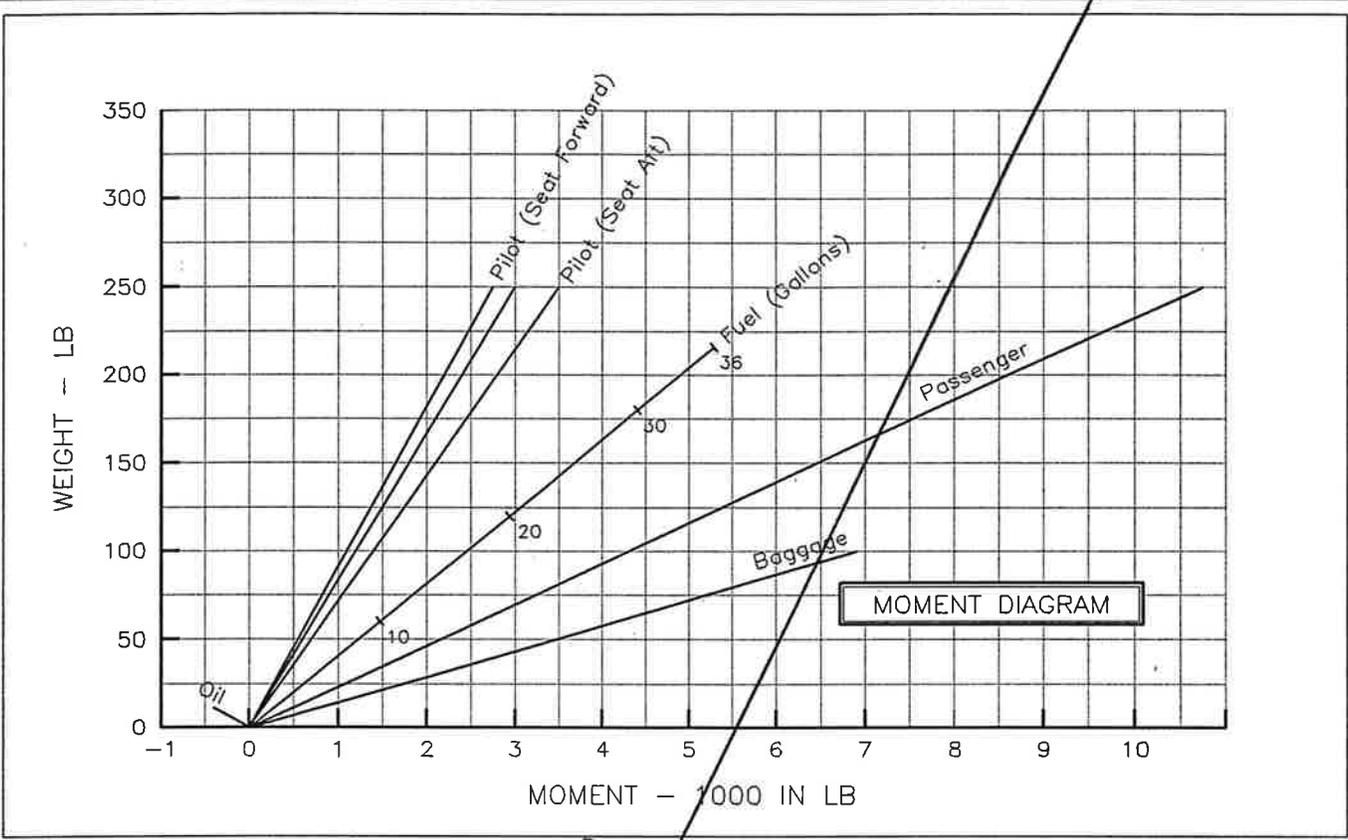
CENTER OF GRAVITY LIMITS: (+ 14.2 in.) To (+19.2 in.) At 1650 lbs.
 NORMAL CATEGORY (+ 10.5 in.) To (+19.2 in.) At 1325 lbs or less

ACROBATIC CATEGORY (+ 14.2 in.) To (+17.3 in.) At 1650 lbs. or less
 (+ 10.5 in.) To (+17.3 in.) At 1325 lbs or less

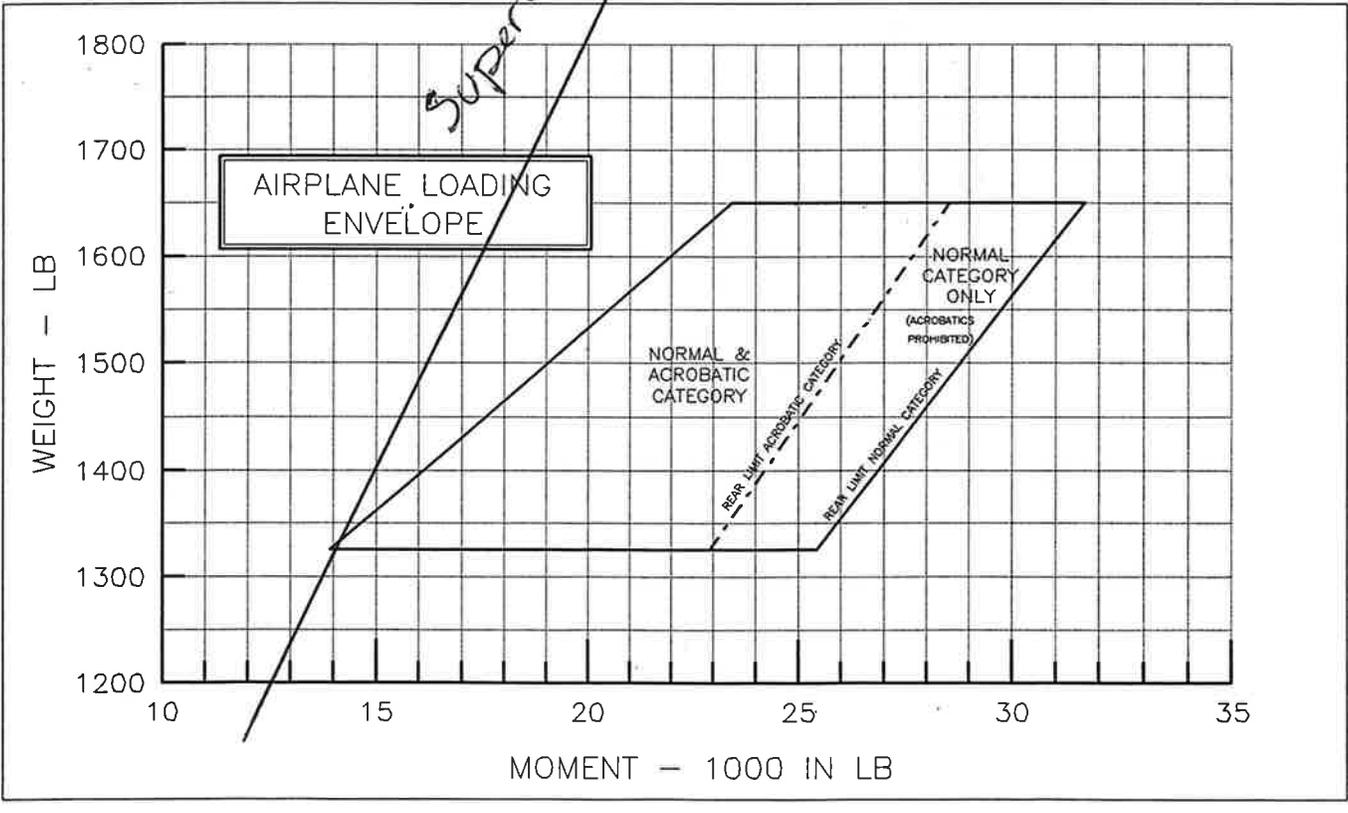
Straight line variation between points given

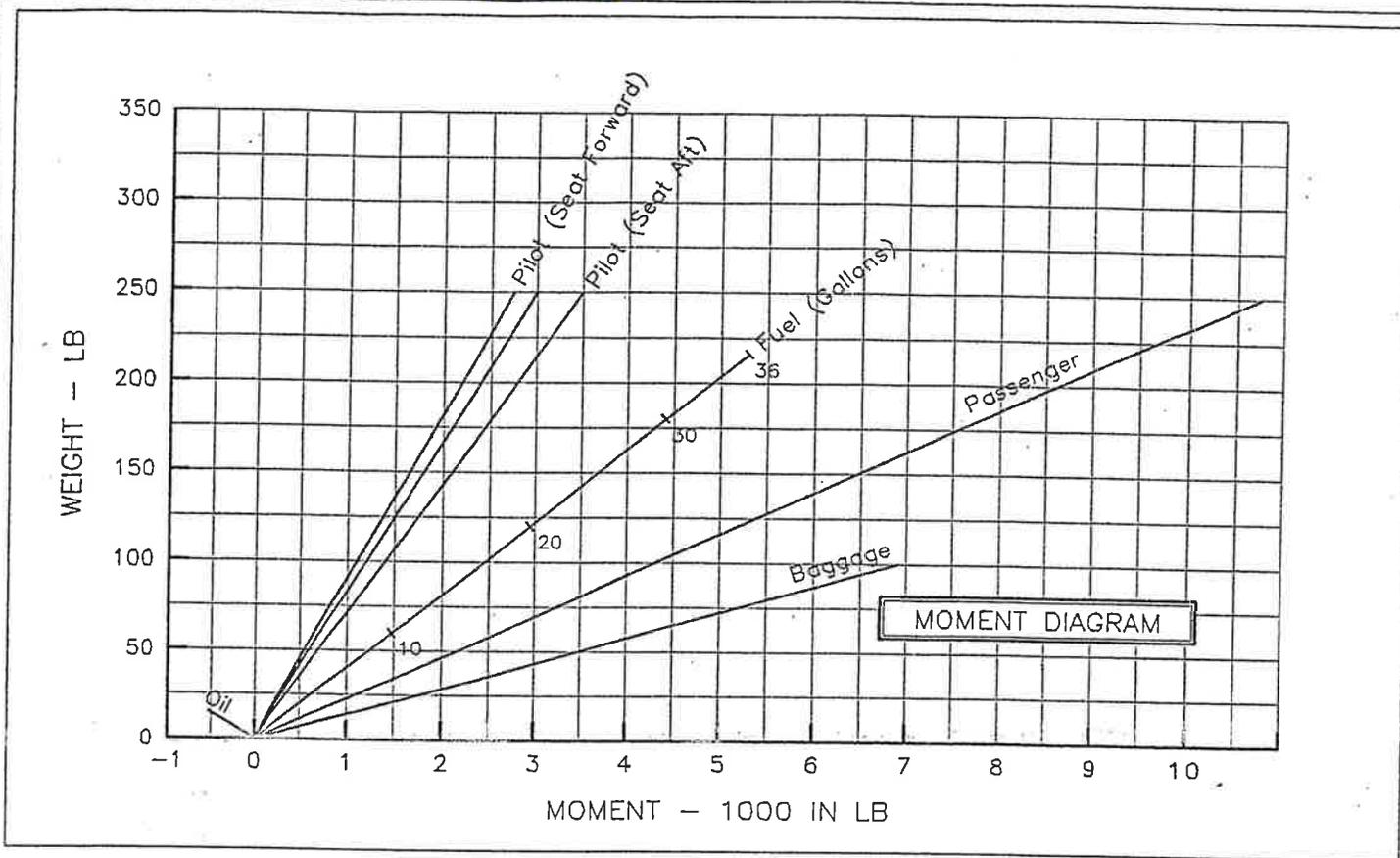
LOADING SCHEDULE 7ECA

REVISED: 3-14-96

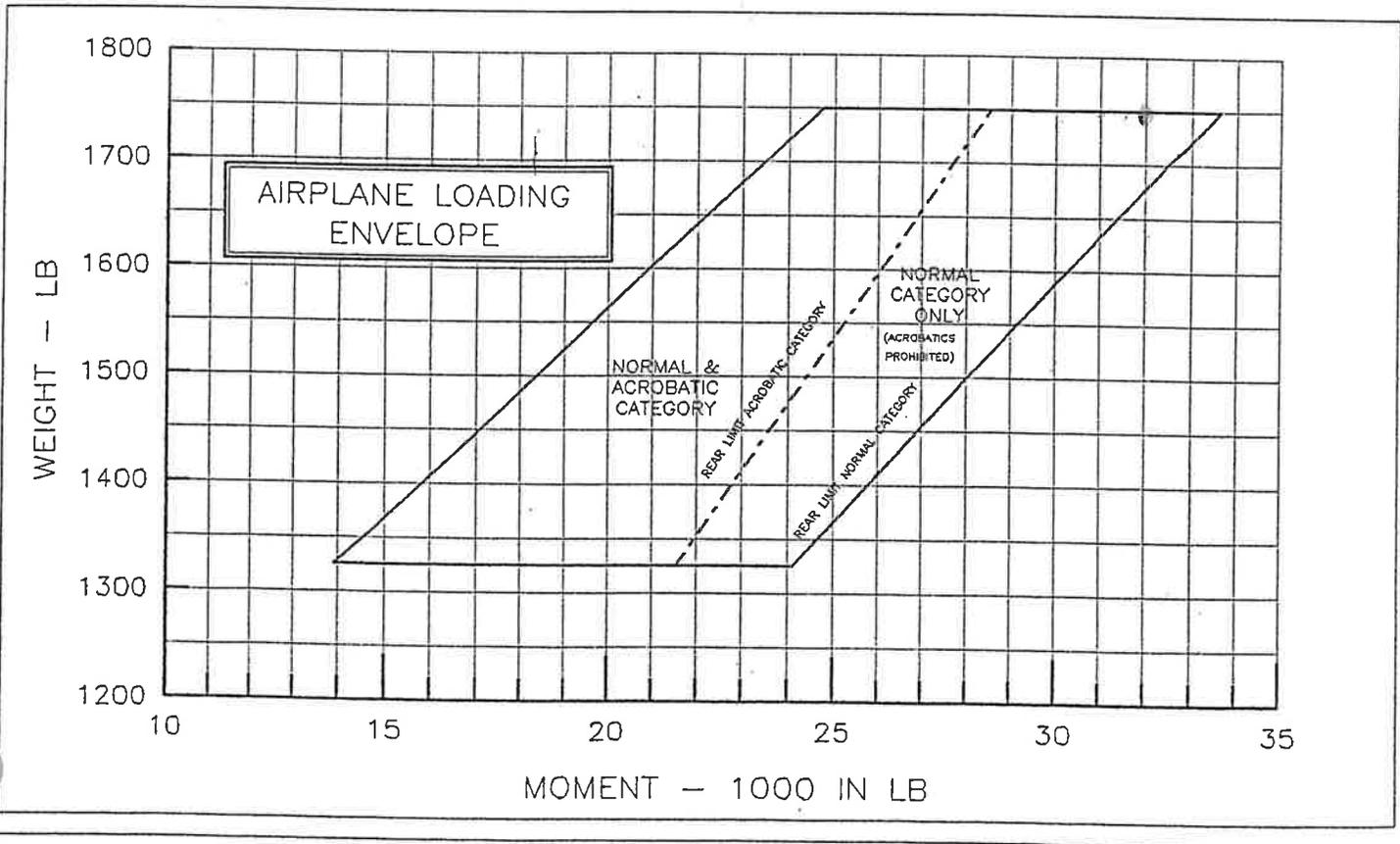


Add weights and moments of items in MOMENT DIAGRAM to airplane empty weight and moment. (negative oil moment) Locate intersection of total weight and moment on AIRPLANE LOADING ENVELOPE. Any point falling within the envelope meets all balance requirements.





Add weights and moments of items in MOMENT DIAGRAM to airplane empty weight and moment. (negative oil moment) Locate intersection of total weight and moment on AIRPLANE LOADING ENVELOPE. Any point falling within the envelope meets all balance requirements.



aca-dmir@tds.net

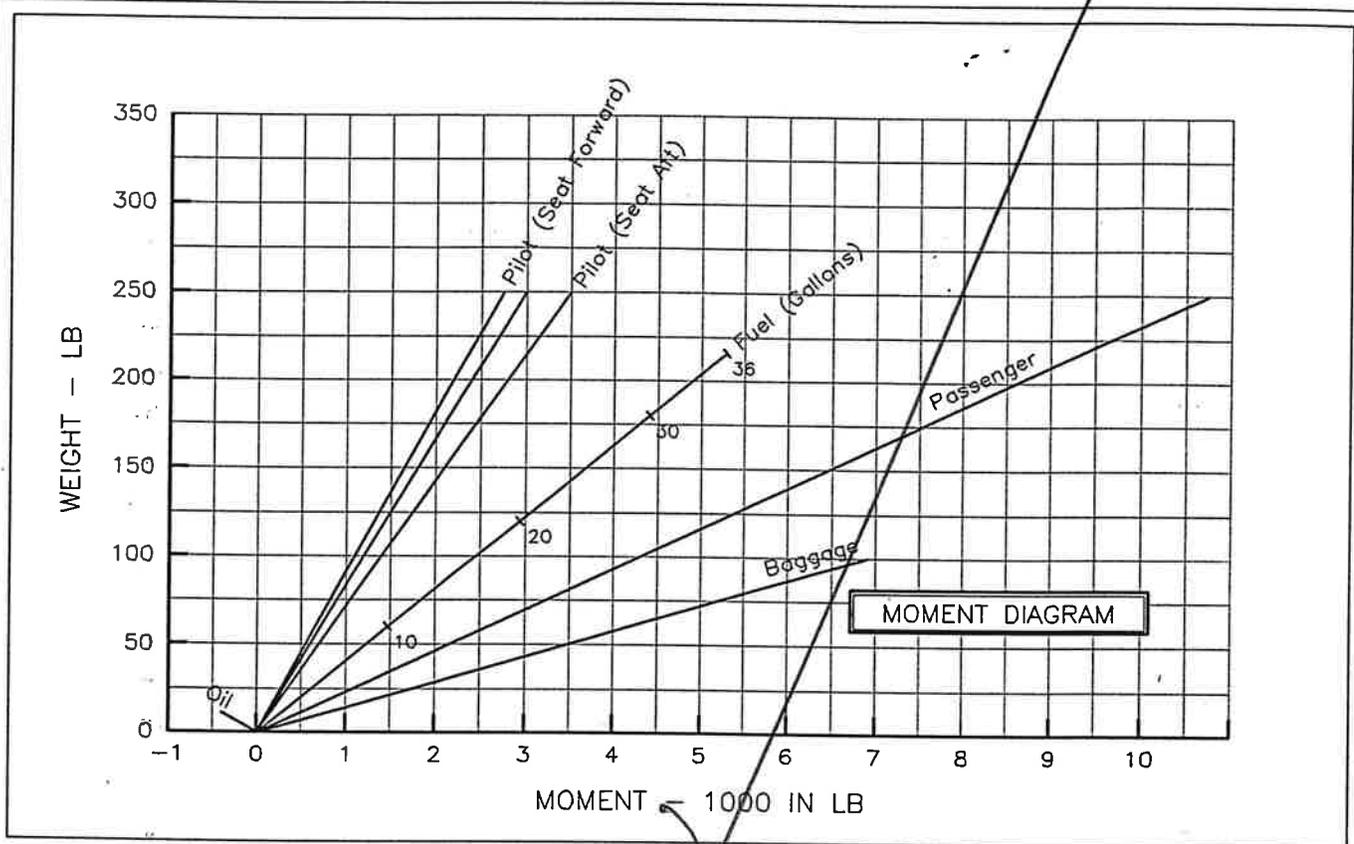
SAMPLE LOADING PROBLEM					
ITEM	ARM (in)	SAMPLE AIRPLANE		YOUR AIRPLANE	
		WEIGHT (lbs)	MOMENT (in-lbs)	WEIGHT (lbs)	MOMENT (in-lbs)
1) Licensed Empty Weight	12.2	1153	14067		
Oil-8 qts @ 7.5 lbs/gals *7ECA--6 qts	-36.0	+15 (+11*)	-540 (-396*)	+15 (+11*)	-540 (-396*)
2) Licensed Empty Weight & Moment With Oil		1168	13527		
3) Pilot	11.5	190	2185		
Rear Passenger	42.0	190	7980		
Wing Fuel - 35 Gals Max @ 6 lbs/gal	24.5	102	2499		
Baggage-100 lbs Max (Normal Category Only)	69.0	-0-	-0-		
4) Gross Take-Off Weight & Moment		1650	26191		

- NOTE: 1) * 7ECA only - 6 qts oil.
 2) To determine Take-Off Center of Gravity (inches aft of datum), divide the Gross Take-Off Moment by the Gross Take-Off Weight. Center of Gravity Limits are listed in Section I.
 3) The above sample problem is loaded for aerobatic flight conditions and assumes a 170 pound pilot and passenger with parachutes.

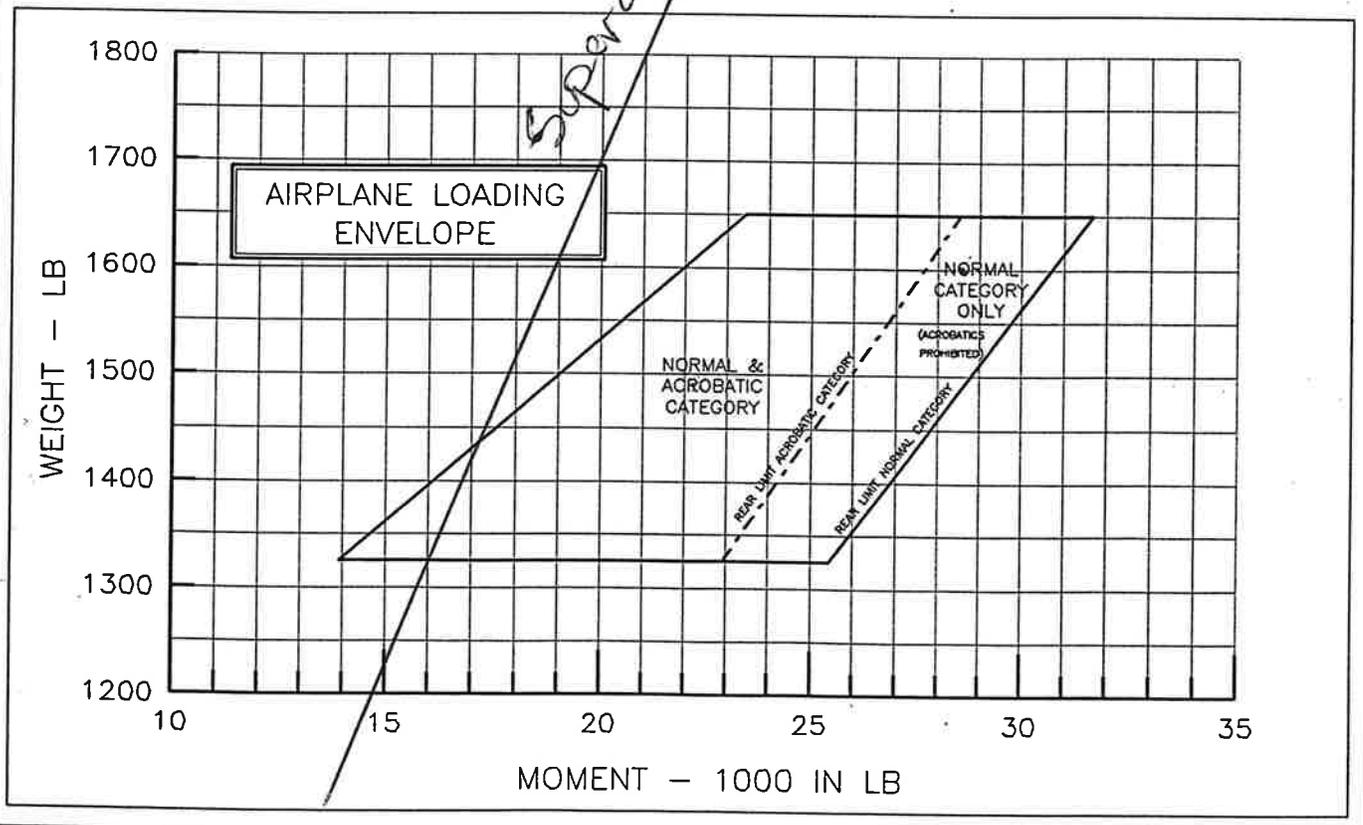
FIGURE 5-1 SAMPLE LOADING PROBLEM

LOADING SCHEDULE 7ECA

REVISED: 3-14-96

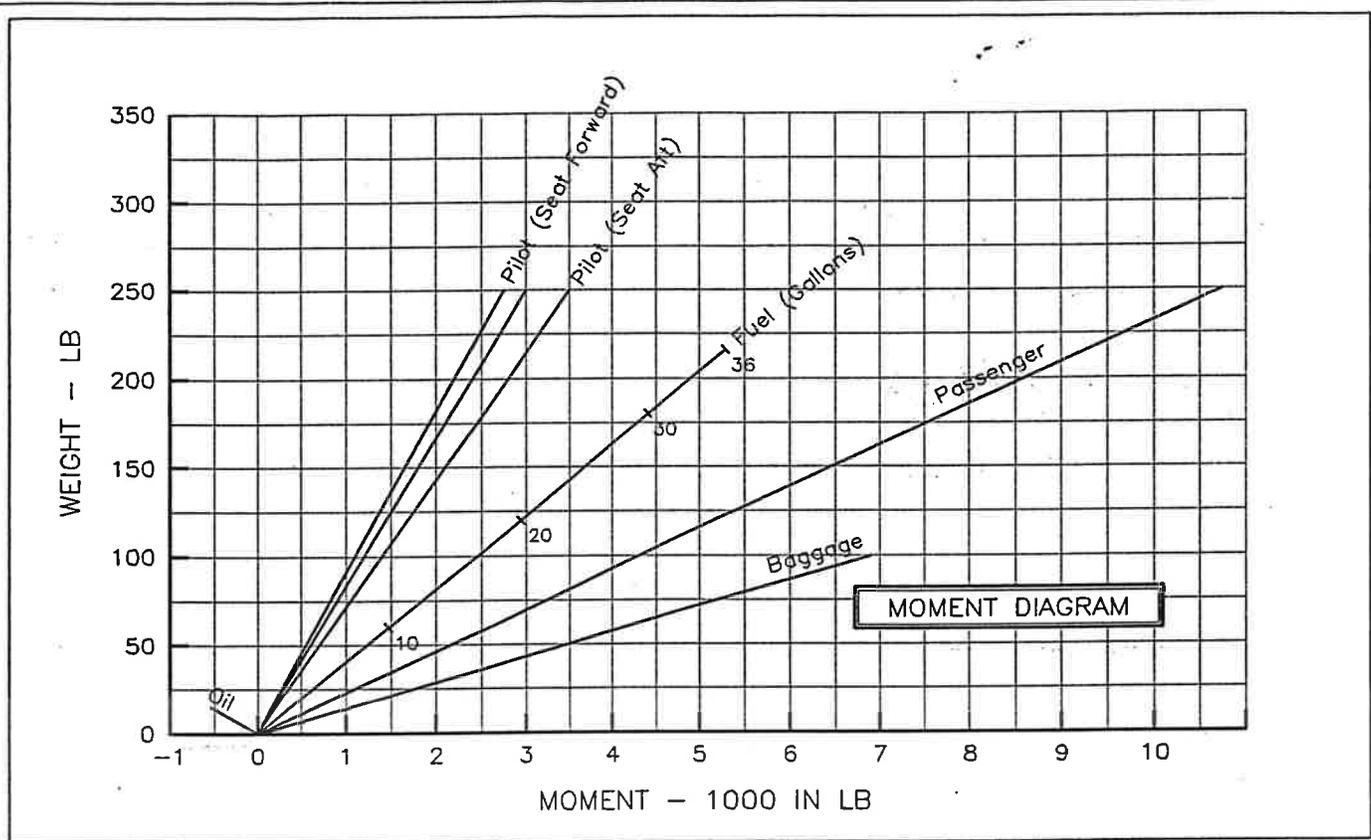


Add weights and moments of items in MOMENT DIAGRAM to airplane empty weight and moment. (negative oil moment) Locate intersection of total weight and moment on AIRPLANE LOADING ENVELOPE. Any point falling within the envelope meets all balance requirements.

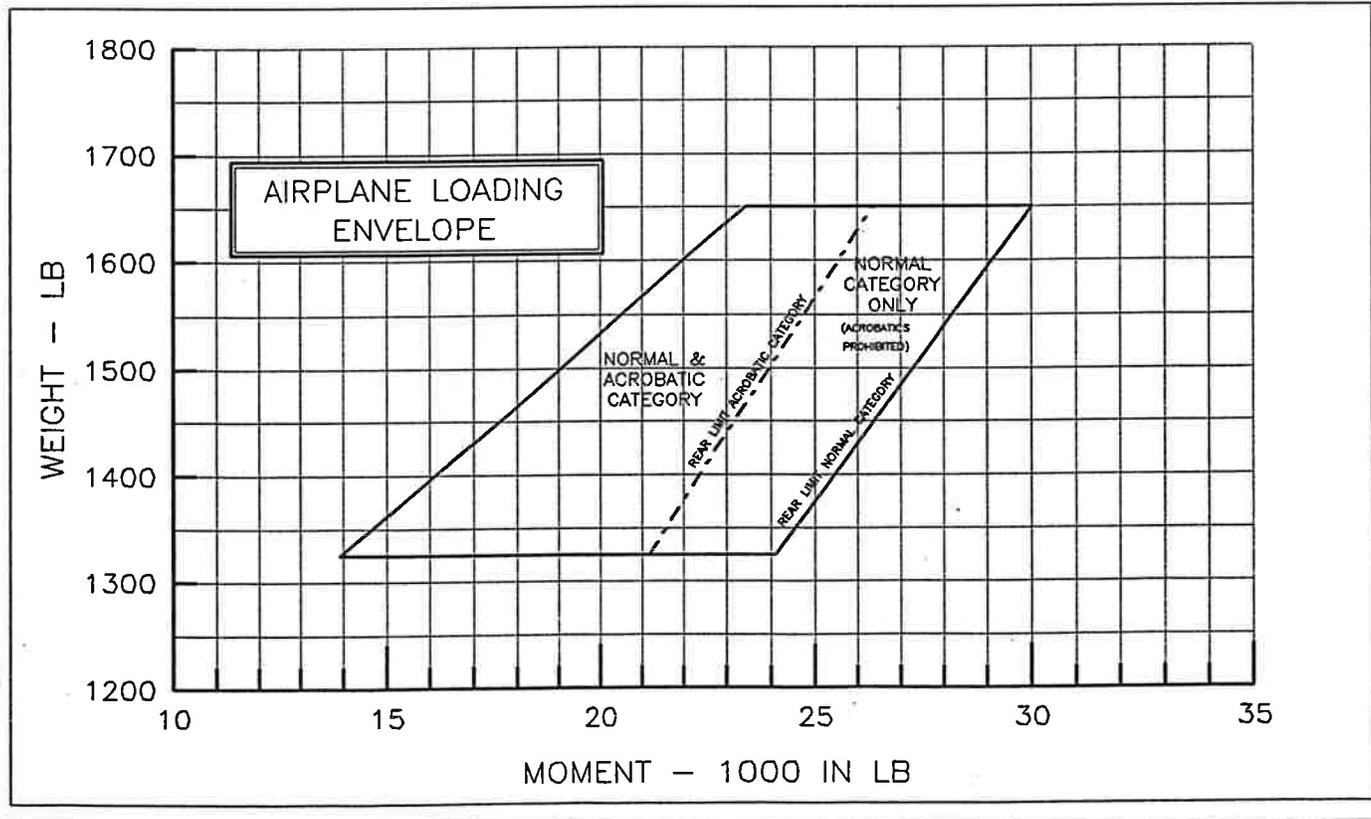


LOADING SCHEDULE 7GCAA

REVISED: 2-26-96

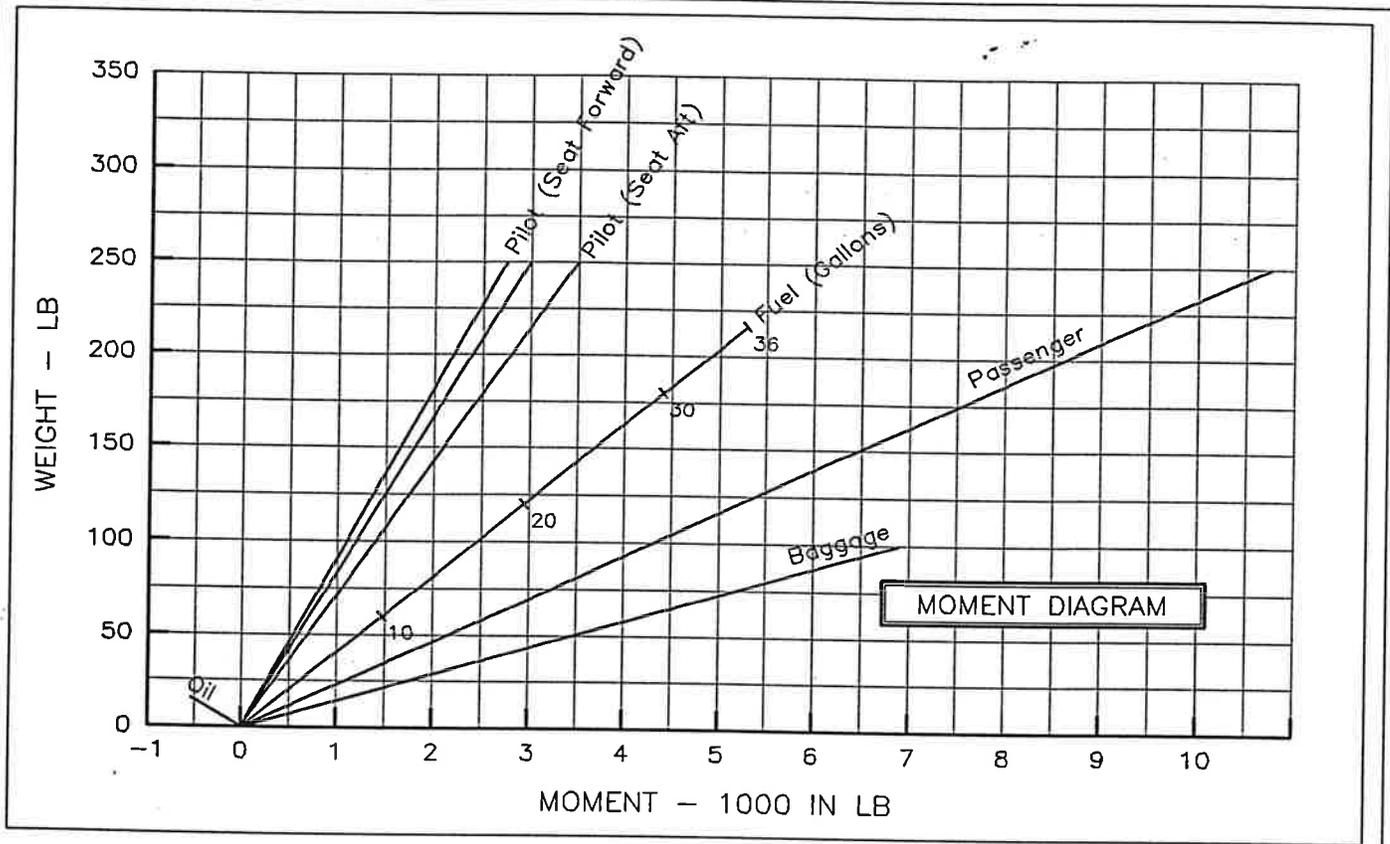


Add weights and moments of items in MOMENT DIAGRAM to airplane empty weight and moment. (negative oil moment) Locate intersection of total weight and moment on AIRPLANE LOADING ENVELOPE. Any point falling within the envelope meets all balance requirements.

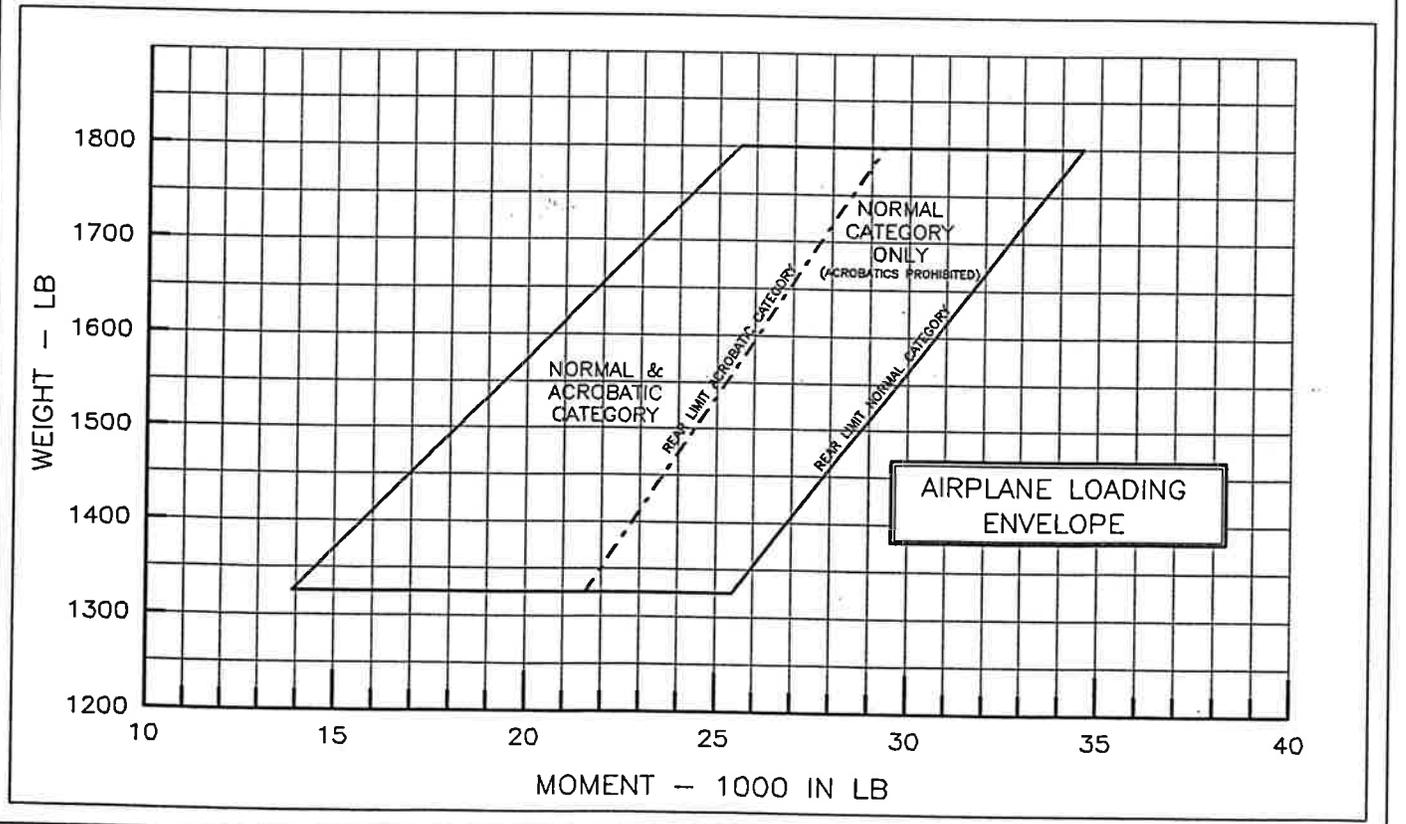


LOADING SCHEDULE 7GCBC

REVISED: 2-26-96



Add weights and moments of items in MOMENT DIAGRAM to airplane empty weight and moment. (negative oil moment) Locate intersection of total weight and moment on AIRPLANE LOADING ENVELOPE. Any point falling within the envelope meets all balance requirements.



SECTION VI

AIRCRAFT AND SYSTEMS DESCRIPTION

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GENERAL

This section describes the aircraft, systems and equipment. Because of the many optional items available, this section may not be typical for all aircraft. However, the more popular options available from the factory will be described. Consult the Aircraft Equipment list to determine what equipment is installed on a specific aircraft.

MODEL NUMBER	7ECA	7GCAA	7GCBC
FAA TYPE CERTIFICATE	A-759	A-759	A-759
ENGINE, LYCOMING	O-235-K2C	O-320-B2B	O-320-B2B
HORSEPOWER (HP/RPM)	118/2800	160/2700	160/2700
PROPELLER DIAMETER (IN)	72	73	73
GROSS WEIGHT (LBS)	1650	1650	1800
POWER LOADING (LB/HP)	14.3	10.3	11.25
BASIC EMPTY WEIGHT (LBS)	1060	1110	1200
USEFUL LOAD (LBS)	590	540	600
WING AIRFOIL (NACA)	4412	4412	4412
WING SPAN (FT)	33.38	33.38	34.45
CHORD (IN)	60	60	60
WING AREA (SQ-FT)	165	165	170
WING LOADING (LBS/SQ-FT)	10.0	10.0	10.59
ASPECT RATIO	6.7	6.7	6.9
DIHEDRAL	2°	2°	2°
ANGLE OF INCIDENCE	1°	1°	1°
LENGTH (FT)	22.77	22.77	22.77
HEIGHT (3 POINT) (FT)	7.75	7.75	7.75
WHEEL TREAD WIDTH (IN)	78	78	78
WHEEL BASE (FT)	16.19	16.19	16.19
FUEL CAPACITY (USEABLE-GALS)	35	35	35
OIL CAPACITY (QTS)	6	8	8

FIGURE 6-1 AIRCRAFT SPECIFICATIONS

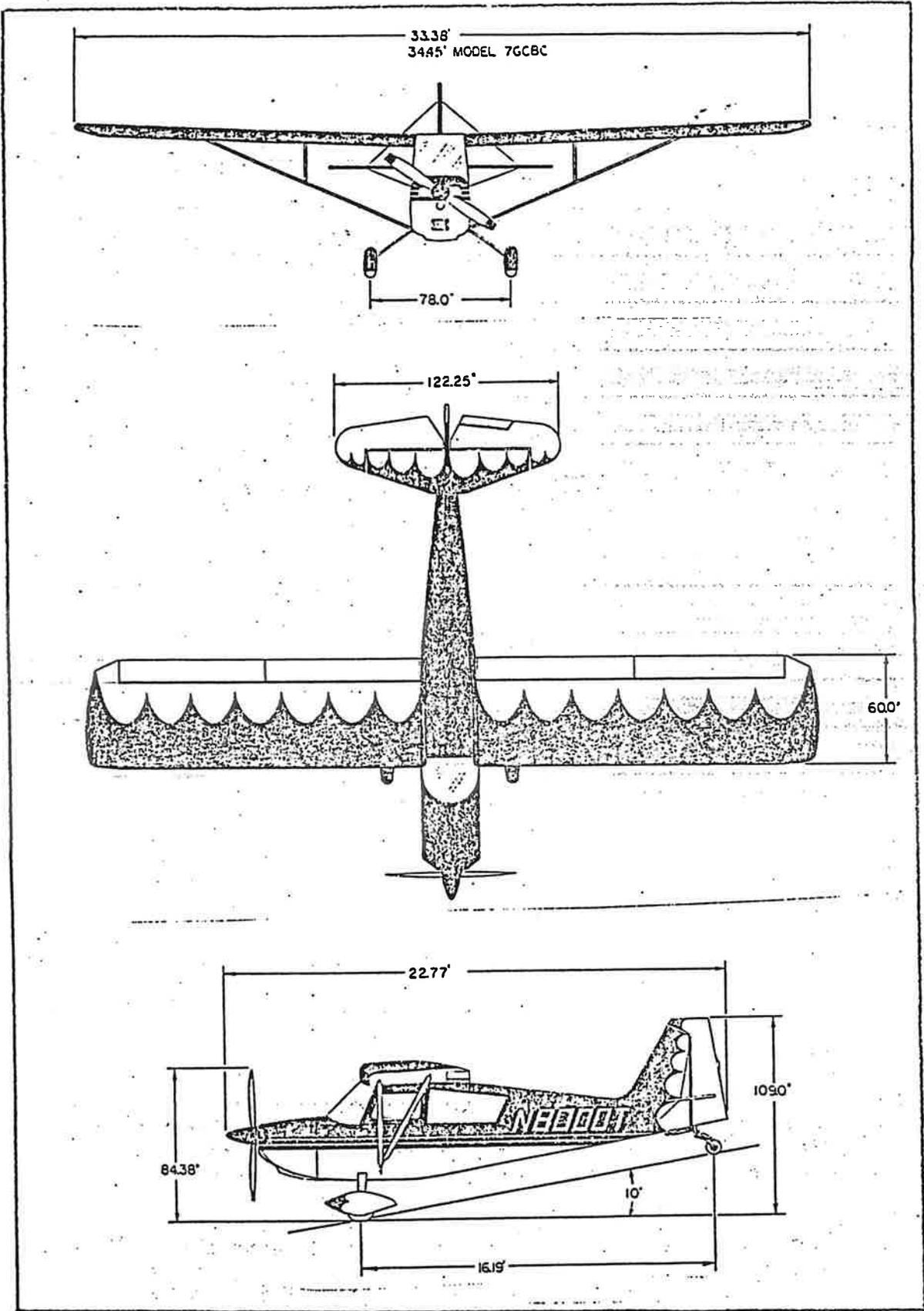


FIGURE 6-2 CITABRIA THREE-VIEW

AIRCRAFT FILE

The aircraft file includes the required paperwork that must be in the aircraft or available upon request. These items will reference the aircraft by serial number, model number and registration number. The aircraft identification plate, which also contains this information, is located on the cabin floor to the left and forward of the rear seat. The file consists of the following items:

These items must be displayed inside the aircraft.

- 1) Airworthiness Certificate
- 2) Aircraft Registration
- 3) Aircraft Radio License (if radio installed)
- 4) Operating Limitations Placards and Markings

These items must be in the aircraft but need not be displayed.

- 1) Aircraft Equipment List
- 2) Weight and Balance Sheet

These items need not be carried in the aircraft but must be available upon request.

- 1) Engine Log Book
- 2) Aircraft Log Book

NOTE

The Pilot's Operating Manual should always be carried in the aircraft readily available to the pilot during flight but is not legally required.

AIRFRAME STRUCTURE

The Citabria is a two place, tandem seating, high wing aircraft with conventional landing gear. See Figures 6-1 and 6-2 respectively for the principal dimensions and specifications and an external three-view of the aircraft. All components are designed to meet or exceed the requirements set forth by the Federal Aviation Administration.

The fuselage and empennage are constructed of welded tubular steel providing high strength and pilot protection under all conditions. The entire assembly is protected by an epoxy primer and covered with a heavy fire resistant dacron fabric. The life-time dacron is finished with several coats of pigmented dope which is durable, long lasting and easy to care for. The streamlined fiberglass engine cowl is a two piece, split type for easy removal providing complete access to the engine for servicing.

The wing structure includes two metal spars, each supported by struts, providing a high strength to weight ratio. The wing ribs and the leading edge are aluminum and covered with dacron. The finish is identical to the fuselage.

ENGINE

The Citabria is powered by a carbureted Lycoming four cylinder, horizontally opposed, direct drive engine. The all metal, fixed pitch propeller is designed to give good take-off and cruise performance.

The wet sump oil system is conventional with the pressure and temperature automatically controlled by an internal engine driven gear pump and external oil cooler.

Oil temperature and pressure gauges are the direct reading type requiring no electric power. Oil quantity is determined by a dip stick with access through the inspection door on the right side of the engine cowl.

Ignition is provided by two engine magnetos which are independent of the aircraft electrical system and each other. Separate magneto switches are located on the electrical panel mounted on the upper left side of the cabin between the two seats.

Starting is accomplished by an electric geared cranking motor using the aircraft battery. The starter button is located in the lower center of the instrument panel.

Dual throttle controls are located on the left side of the cabin for both the front and rear seats.

The red (push-pull) mixture control is located on the left side of the instrument panel and is used for fuel leaning and engine shutdown. Idle cut-off is accomplished by pulling the control full out.

The air induction system is equipped with a large heavy duty air filter mounted in front of the engine cowl. Carburetor heat is available from the exhaust manifold if carburetor icing exists. The carburetor heat control is located below the throttles. Maximum heat is applied with the control in the aft position. The aft position also by-passes the air filter should it become obstructed with ice or dirt.

NOTE

With the carburetor heat in the HOT position, the induction air to the engine is unfiltered. To prevent damage to the engine, it should not be used during ground operations except for an operational check of system prior to flight.

Engine RPM is indicated by a mechanical tachometer using a flexible drive cable. An hour meter, based on cruise RPM, is incorporated in the tachometer. The electrical hour meter (Hobbs meter) indicates the actual running time of the engine and is activated by engine oil pressure.

FLIGHT CONTROLS

Dual controls are provided for the ailerons, elevator and rudder. The balanced control surfaces are conventional in design and are mechanically connected to a control stick and rudder pedals using cables and/or push-pull rods. Low friction bearings are used extensively throughout the system to reduce control pressures.

An elevator trim tab is mounted on the left elevator. The trim control is located on the left side of the cabin between the two seats. Take-off position is indicated by a white dot on the control quadrant.

Rudder trim is provided by ground adjustable tab located on the rudder control surface.

FLAPS (7GCBC ONLY)

Wing flaps are mechanically operated by cables and interconnected by a torque tube. The flap handle is located to the left of the pilot. Flap settings of 0°, 7°, 14°, 21°, 27° and 35° are available by pulling the handle for retraction. No UP lock is provided.

LANDING GEAR AND BRAKES

The heavy duty spring steel conventional landing gear allows routine operations on rough landing strips. The steerable Scott tail wheel allows excellent directional control during taxi operations with the use of wheel springs which are attached to the rudder control surface. The tail wheel also provides free swiveling of 360° allowing the aircraft to be turned within its own wing span.

Hydraulic disc brakes are mounted to each main wheel. The brakes can be operated separately from either seat by applying heel pressure on the brake pedals or toe pressure on the top of the rudder pedals if toe brakes are installed.

The brake hydraulic reservoir is mounted to the aft side of the firewall for easy access. A clear plastic line between the reservoir and the master cylinders is visible from the pilot's seat indicating a low fluid condition.

The park brake control is located to the right and under the instrument panel. To set the brakes, pull the park brake control out and apply brake pressure. To release the brakes, push the park brake control in.

ELECTRICAL SYSTEM

The electrical system is 12 volts, direct current, using the airframe as a negative ground. See Figure 6-4. All electrical circuits are protected by replaceable fuses.

A 60 ampere, self-exciting, engine driven alternator provides electrical power during normal operations and is capable of operating all electrical components simultaneously. The voltage regulator maintains a system voltage of $14 \pm .5$ volts.

The 7KCAB only has a gravity sensitive mercury switch which disconnects the alternator from the battery during inverted or negative G flight maneuvers. This prevents pressure buildup in the battery which could result in damage to the battery or acid spillage.

A lead-acid battery supplies power for starting and stand-by use for a limited time only should the alternator fail in flight.

An ammeter on the instrument panel indicates a charge or discharge condition of the battery. With the alternator functioning normally, a slight charge condition should exist depending on the condition of the battery. A discharge indicates that an alternator malfunction exists and the battery is carrying the electrical load.

NOTE

A discharge is normal at low idle RPM during operation of high current items such as the landing light.

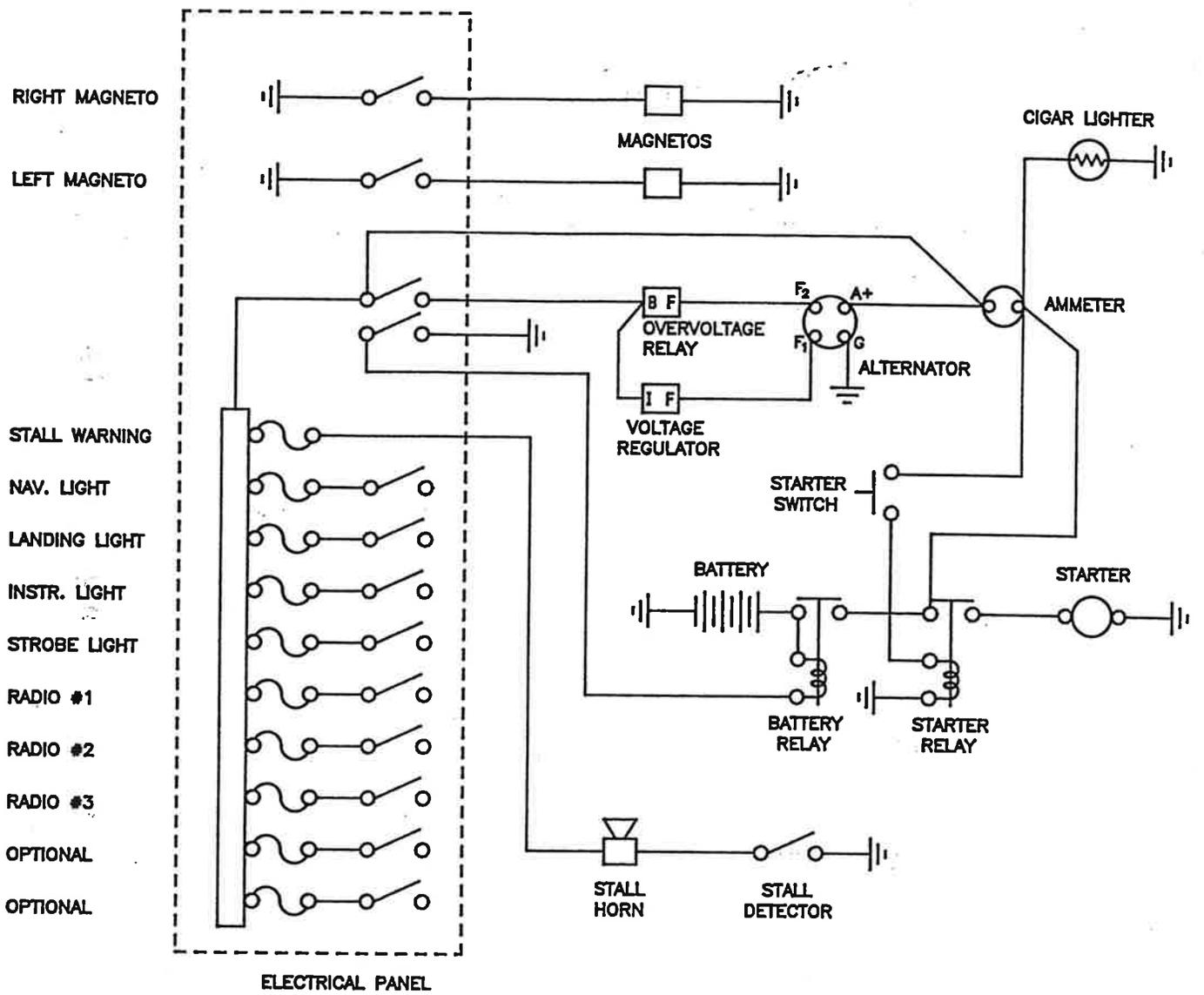


FIGURE 6-4 ELECTRICAL SYSTEM SCHEMATIC

All electrical switches and fuses are located on the electrical panel which is installed on the upper left side of the cabin. Additional spare fuses are also provided in the panel and can be used for replacement during flight if necessary.

A red master switch controls all electrical power from the battery and alternator to the distribution bus with the exception of the engine magnetos.

NOTE

Failure to turn the master switch OFF after securing the aircraft will result in a complete discharge of the battery.

The alternator circuit includes an overvoltage relay which automatically removes it from the circuit to prevent damage to the alternator or the radio equipment should an overvoltage condition occur. Cycling the master switch will reset the overvoltage relay should it drop the alternator off the circuit due to an overvoltage condition. This is indicated by a discharge on the ammeter. After resetting, if the overvoltage condition was temporary, the alternator will continue to operate normally.

FUEL SYSTEM

The Citabria fuel system is completely independent from the other aircraft systems and due to its simplicity is virtually trouble free. See Figure 6-5.

Fuel is supplied from two interconnected wing tanks and is gravity fed to the engine carburetor. Fuel quantity is registered by two direct reading float-type gauges, one for each tank. They are located in each wing root area of the cabin.

NOTE

Correct fuel indication is only provided with the aircraft in level flight attitude.

The fuel shut-off valve is located on the lower left side of the cabin forward of the pilot. Two positions are available, ON or OFF. A gascolator is mounted to the firewall with a quick drain feature provided. The quick drain control knob is located through the inspection door on the engine cowl. An additional drain is located under the fuselage aft of the baggage compartment and is easily accessible during the preflight inspection.

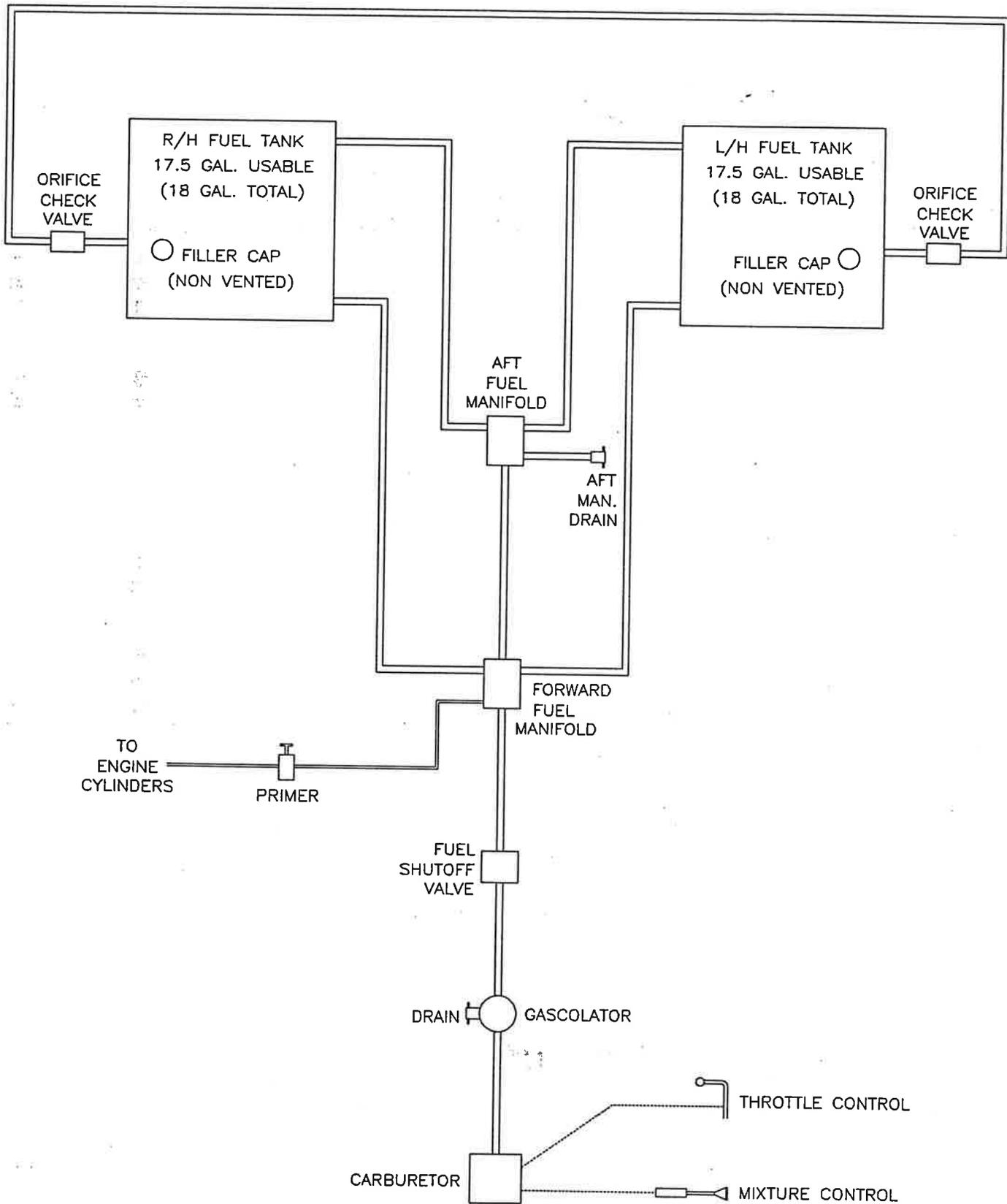


FIGURE 6-5 FUEL SCHEMATIC

The fuel tanks are vented together with the vent located on the left wing. An orificed one-way check valve allows a minimum of fuel to be vented overboard during negative G aerobatic maneuvers. An ice deflector is provided to aid in preventing vent obstruction should the aircraft inadvertently encounter icing conditions.

WARNING

The fuel caps are the non-vented type. Failure to properly secure the caps will result in fuel leakage and unequal fuel feed between the two tanks during flight.

An engine fuel primer is located on the instrument panel to facilitate starting. Turn the knob to release the plunger then pump the desired amount.

WARNING

After using the primer, insure that the knob is locked in place to prevent additional fuel from entering the engine cylinders.

The 7KCAB only, is fuel injected and has additional provisions for limited inverted flight. See Figure 6-5. This includes an engine driven fuel pump and an electric boost pump, which is used for starting and for emergency use should the engine driven pump fail. The switch is located on the electrical panel. A direct reading fuel pressure gauge is installed in the instrument panel.

A 1.5 gallon header tank is mounted aft of the firewall. A standpipe in the tank allows .75 gallons to be used for inverted flight which is approximately 2-3 minutes depending on power settings. During positive G conditions, the tank automatically refills by gravity from the main wing tanks.

WARNING

Continuous inverted flight is limited to 2 minutes. Approximately 3.5 minutes of flight under positive G conditions is required to completely refill the header tank. Temporary fuel starvation may result during an extended series of aerobatic maneuvers involving a majority of negative G conditions.

NOTE

Should fuel starvation result during inverted flight, return to positive G conditions. The engine will restart within 10 seconds.

HEATING AND VENTILATION

Heat is obtained from a heat muff attached to the engine exhaust manifold. Both the front and rear seat control knobs are located on the lower left side of the instrument panel. The front seat heat outlet is on the left side of the firewall and the rear seat outlet is mounted to the cabin floor between the two seats.

Fresh air is obtained by two rotatable air scoops on both sides of the cabin forward of the pilot. Adjust the scoop forward for fresh air intake and rearward for air exhaust.

Additional fresh air vents are located in the left and right wing roots. Air flow is adjusted by rotating the valve as desired.

AIRCRAFT LIGHTING

All light switches are located on the electrical panel. The interior light is located on the upper left side of the cabin. It is detachable and equipped with a long coiled chord for mobility. The light has both a clear and a red lense with an adjustable beam. The intensity is controlled by a rheostat which is located on the back of the light fixture.

The exterior lights include the standard navigation lights on the wing tips and rudder. High intensity wing tip strobe lights are optional.

NOTE

The strobe lights should not be used during ground operations due to the high intensity having a blinding effect on other aircraft and personnel in the area. This also holds true during flight in haze or fog due to possible distraction to the pilot.

The high intensity landing/taxi light is mounted in the engine cowling below the propeller.

FLIGHT INSTRUMENTS

The flight instruments are conventional in design and are mounted in either the low or the high type panel. The high panel has ample space for a variety of gyro instruments and avionics.

The airspeed, sensitive altimeter and the vertical speed indicator are all pressure sensitive instruments operating off the pitot-static system. The pitot-static openings are attached to the right wing jury strut.

The artificial horizon and directional gyro are vacuum operated using an engine driven vacuum pump with a vacuum gauge to indicate system pressure.

The turn coordinator is electrically driven with the ON-OFF switch located on the electrical panel.

The magnetic compass, clock, outside air temperature gauge and accelerometer are all independent units requiring no external power source.

A stall warning horn, if installed, activated by a vane type switch on the leading edge of the wing is provided to warn the pilot of an approaching stall. It is pre-set for 5 to 10 MPH above the actual stalling speed with engine power at idle. The master switch must be ON for operation.

AVIONICS

The Citabria is available with a variety of navigation and communication equipment. Each radio is equipped with a separate switch on the electrical panel in addition to the switch that is an integral part of the radio. A radio speaker is mounted in the right wing root of the cabin with microphone and headset jacks on the left side of the instrument panel. Consult the respective manufacturer for specific operating instructions.

An emergency locator transmitter (ELT) is located on the right side of the baggage compartment. It is self-contained and is automatically activated to transmit a homing signal on 121.5 MHz and 243.0 MHz should the aircraft be subjected to rapid or abrupt deceleration.

For automatic activation, the switch on top of the ELT must be in the "ARM" position. The radio can be manually activated and checked by switching to the "ON" position and tuning the communication receiver to 121.5 MHz. A variable pitch tone indicates normal operation. To re-set or deactivate the ELT, place the switch in the "OFF" position then return to the "ARM" position for automatic activation.

NOTE

Maximum range of the ELT is best achieved by removing the unit from the aircraft and placing the antenna in the upright position and as high as possible.

CABIN FEATURES

The main door (two piece split-type optional) can be jettisoned in flight by removing the door pivot pins. The jettison handle is located next to the forward edge of the door and has a safety pin to prevent inadvertent jettison. To jettison the door, remove the safety pin and pull the handle UP.

Both (if equipped with split-type door) the front side windows can be opened on the ground or in flight for additional ventilation and/or aerial photography. Although a bracket is provided to secure the window in the open position during ground operation, it is recommended to let the window fly free to minimize flutter in flight.

CAUTION

Do not open the windows in flight above the approved airspeed limits as indicated on the window placards.

An overhead tinted plexiglass window is provided for improved visibility of ground references by both the pilot and passenger during aerobatic maneuvers.

The seats are equipped with folding backs and thick foam cushions. The cushions are removable to facilitate the wearing of a parachute if desired. Both seats are equipped with seat belts and shoulder harnesses.

The baggage area is located behind the rear seat and is limited to 100 lbs.

WARNING

No baggage is allowed during aerobatic flight.

The fire extinguisher, if installed, is mounted to the floor under the pilot's seat and is equipped with a quick disconnect latch. It is a dry chemical type approved for electrical and fuel fires.

UTILITY OPTIONS

CORROSION PROOFING

For improved protection against salt-water spray and most agriculture chemicals, a special corrosion proofing is available. This is in addition to the epoxy primer and external paint used on the fuselage frame.

Included in this corrosion proofing are additional primer coatings to all structural steel tubing fittings with the inside tubing surfaces oil coated. All structural aluminum is also primed with epoxy. All control cables are stainless steel.

CAUTION

If the aircraft is to be converted to floats or used for aerial chemical applications, the corrosion proofing must be applied at the time of manufacture if a normal airframe life is expected.

SEAPLANE KIT

The Citabria is certified for floats. Included in the kit is the special corrosion proofing and two additional tail fins for improved stability.

GLIDER/BANNER TOW

A glider tow is mounted on the tail wheel assembly. The positive release handle is under the front seat. To release the tow, pull the handle aft.

SECTION VII

SERVICING

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GENERAL

This section describes ground handling, routine servicing, cleaning and storage procedures. No information is provided for making mechanical adjustments, repairs or replacement components. Consult your nearest Service Center for full maintenance and servicing as they have the latest factory service recommendations, experience and qualified personnel. See Figure 7-1 for all service specifications.

The FAA requires that the aircraft undergo an annual inspection performed by a properly designated individual or repair station. If the aircraft is flown for commercial reasons, as specified by FAR's, an additional inspection is required every 100 hours of operation. This must be performed by an appropriately rated mechanic. Both inspections are identical in scope.

American Champion Aircraft Corporation recommends the 100 hour inspection interval to provide the owners with the highest degree of utilization and safety.

NOTE

This is in addition to daily preflight inspections and routine servicing (e.g. oil change, etc.)

FUEL

Type - Aviation Grade 80/87 Minimum Octane, or 100/130 Octane
Quantity - 36 Gals. (18 gals, in each tank)
- 35 Gals. Usable (17.5 gals, in each tank)

OIL

Type - Aviation Grade (See engine manufacturer's specifications)
Quantity - 8 Qts. (6 qts. - 7ECA)
- 6 Qts. Aerobatic Minimum

Viscosity

AVERAGE AMBIENT AIR TEMPERATURE	GRADE
Above 60 ⁰ F	SAE 40 or 50
30 ⁰ - 90 ⁰ F	SAE 40
0 - 70 ⁰ F	SAE 30 or 40
Below 10 ⁰ F	SAE 30

BRAKES

Type - Fluid MIL-H-5606 (red)

TIRES

Type - Mains - 6.00 x 6 (4 ply rating)
Tail - 2.80 x 2.50 (4 ply rating)

Pressure - Mains - 24 ± 4 psi
Tail - 40 ± 10 psi

LUBRICATION

Type - General Purpose Grease (zerke fittings)
Machine Oil or Engine Oil (pulleys, hinges, etc.)
High Temperature Wheel Bearing Grease (wheel bearings)

FIGURE 7-1 SERVICE SPECIFICATIONS

GROUND HANDLING

The Citabria can be easily maneuvered by one man when on firm level ground. A hand hold is provided on the right side of the fuselage forward of the tail. The tail can be lifted completely off the ground or the tail wheel steering can be disengaged with a sufficient side load for free castering. If additional manpower is required, use the forward wing strut applying force close to the fuselage attach fitting.

JACKING

The tail can be lifted by hand with a suitable support placed under the tail wheel spring at the fuselage attach point.

The main wheels can be raised by lifting one wing at a time at the wing struts next to the wing attach fittings. Place a suitable support under or just outboard of the U bolt on the upper gear leg.

CAUTION

Do not lift on the rear spar alone or near the jury struts. Avoid metal to metal contact on the gear leg and U bolt.

The aircraft may also be hoisted by a spreader bar type sling attached to the front spar attach fittings. The wing root fairing must be removed for access to the fittings.

MOORING

In the event of high winds, the aircraft should be properly secured.

- 1) Head aircraft into the wind if possible
- 2) Attach tie-down chains or ropes to the tail wheel assembly and tie down fittings at the end of the wing struts
- 3) Set parking brakes
- 4) Secure the control stick aft with the forward seat belt
- 5) Install control surface blocks for the rudder and flaps
- 6) Install pitot tube cover

INSPECTION AND SERVICING ACCESS

The Citabria is designed to keep maintenance and inspection time to a minimum.

The two piece engine cowl is easily removed for engine servicing. Remove the top half first. When removing the lower half, disconnect the light wire using the quick disconnect below the inspection door on the top cowl. The air induction hose connected to the air filter must also be disconnected. Replace the cowl in the reverse order. Do not tighten fasteners until the cowl is completely in place.

CAUTION

When installing lower cowl, insure that the air filter inlet hose is properly mated to the carburetor heat box. It is recommended that the air filter be removed for inspection of proper positioning of the air filter inlet hose.

The flexible engine baffle seals should be facing up and forward prior to replacing the top cowl for proper engine cooling.

Additional inspection plates are provided on the wings and fuselage to gain access to control cables, fuel lines, wiring, etc. The cabin headliner also permits easy access to the overhead control cables and fuel lines.

FUEL SYSTEM

Use 100LL minimum octane or 100/130 (100/130 low lead for 7ECA) octane aviation fuel. Observe all required precautions when fueling the aircraft. Fill each wing tank through the respective filler neck on the top surface of the wings. The caps are non-vented type and must be properly secured or fuel will siphon out and feed unevenly during flight.

NOTE

Because of crossfeeding between the two tanks, they should be retopped during refueling to assure maximum capacity.

A quick drain is provided on the gascolator with access to the control knob through the inspection cover on the engine cowl. This should be used during the preflight inspection to check for fuel contamination.

The system low point drain is located externally on the fuselage belly aft of the rear seat and should be used during unusually high moisture conditions or if water is present in the gascolator.

Each tank also has a drain plugh to remove fuel from the tank if necessary.

WARNING

After using drains, insure that no leakage is evident.

BATTERY

The battery is located behind the baggage compartment (7ECA, battery located in engine compartment) and sealed in a container. To gain access, remove the aft baggage compartment panel. The battery should be checked every 50 hours (10 hours for aerobatic flight) or 30 days for proper electrolyte level and evidence of spilled acid.

If the battery is to be removed, disconnect the ground cable (negative) first and install last.

BRAKES

The brake fluid reservoir is mounted to the aft side of the firewall. A filling port is on top of the reservoir and the overfill vent is located at the upper right main gear leg.

The reservoir can also be replenished under pressure by using the brake bleed fittings on the bottom of the wheel brake assembly.

CAUTION

Use only MIL-H-5606 hydraulic fluid (red).

TIRES

Tire condition should be checked during preflight. If the tire tread is no longer visible, it should be replaced. Inflate tires with compressed air.

Main Wheels - 24 ± 2 psi
Tail Wheel - 40 ± 10 psi

ENGINE LUBRICATION

Access to the oil filler port and dip stick is through the inspection door on the engine cowl. The oil level should be checked prior to flight and oil added if below six quarts (5 quarts - 7ECA).

Under normal operating conditions, the oil should be changed every 25 hours of operation (50 hours if a full flow oil filter is installed). A quick drain is provided on the engine sump with access through the cooling duct below the engine cowl.

Use aviation grade oil with the proper viscosity as listed in Figure 7-1.

ENGINE AIR FILTER

The engine air filter should be inspected every 50 hours of normal operating or every 10 hours under extremely dusty conditions. Clean with compressed air or replace as necessary.

CLEANING

EXTERIOR SURFACE

Wash with mild soap and water. Avoid the use of harsh abrasives or detergents. Remove grease and oil with solvent or non-leaded gas. The aircraft may be waxed if desired with a good quality automotive wax.

Ice may be removed from the wings using a 50/50 solution of isopropyl alcohol and water. Do not allow solution to come in contact with the plexiglass windows.

WINDSHIELD

The windshield and side windows should be cleaned with an aircraft windshield cleaner following the manufacturer's recommendations. If dust or dirt is present, rinse with water prior to cleaning. The windshield can be waxed and polished with a soft cloth to fill minor scratches and help protect against further scratching.

CAUTION

Do not use gasoline, benzine, alcohol, octane, carbon tetrachloride, lacquer thinner or glass cleaner on the plexiglass as crazing will result. Never rub with a dry cloth as the surface can be easily scratched.

ENGINE

The engine can be washed down with a commercial engine solvent or kerosene base solvent. Avoid excessive contact of solvents on the electrical components such as the magnetos, starter, etc.

INTERIOR

The vinyl interior can be washed with mild soap and water. The carpet should be cleaned with any commercial or household upholstery or carpet cleanser approved for nylon type material.

STORAGE

Aircraft placed in non-operational storage for long periods of time should be given a thorough cleaning. Every ten days the propeller should be pulled through several revolutions to reactivate the oil film and prevent corrosion.

WARNING

Check that all engine switches and controls are OFF prior to rotating the propeller and stay clear of the propeller area.

To insure long engine life, the aircraft should be flown at least once a month to reduce excessive moisture buildup. Excessive ground running to bring engine to operating temperature is not recommended. Consult the engine manual for further recommendations if this is not possible.

The fuel tanks should be kept full to prevent moisture buildup due to condensation.

Insure that the battery is kept fully charged or the electrolyte will freeze and damage the battery in cold weather.

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Olathe, Kansas 66062 U.S.A.

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
Garmin GPS 175/GNX 375/GNC 355 GPS/XPDR/COM Navigation System

as installed in

AMERICAN CHAMP 7ECA
Make and Model Airplane

Registration Number: N241AC Serial Number: 1373-98

This document serves as an Airplane Flight Manual Supplement or as a Supplemental Airplane Flight Manual when the aircraft is equipped in accordance with Supplemental Type Certificate SA02636SE for the installation and operation of the Garmin GPS 175, GNC 355, or GNX 375 GPS/COM/XPDR Navigation System. This document must be incorporated into the FAA Approved Airplane Flight Manual or provided as an FAA Approved Supplemental Airplane Flight Manual.

The information contained herein supplements the information in the FAA Approved Airplane Flight Manual. For limitations, procedures, loading and performance information not contained in this document, refer to the FAA Approved Airplane Flight Manual, markings, or placards.

FAA approved sections of the AFMS are labeled "FAA APPROVED". Sections not labeled "FAA APPROVED" are for guidance only.

FAA Approved by: JR Brownell

JR Brownell
ODA STC Unit Administrator
Garmin International, Inc.
ODA-240087-CE

Date: 3/1/2023

AFMS, Garmin GPS/GNC/GNX System
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190-02207-A3 Rev. 4
Page i

LOG OF REVISIONS				
Revision Number	Page		Description	FAA Approved
	Date	Number		
1	03/22/19	All	Complete Supplement	<i>JR Brownell</i> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date : <u>03/22/2019</u>
2	07/25/19	Through out Page 20 Page 34 Page 36 Page 37	Added information for GNC 355. Updated Software Versions Removed Narco 4 and 5 Indicators. Updated Pilot Guide references Added circuit breaker label for GNC 355	<i>JR Brownell</i> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date : <u>07/25/2019</u>
3	03/03/20	Page 3 Page 19 Page 21 Page 25 Page 37 Page 46	Added new FIS-B Weather Products Updated RAIM check wording. Updated software versions table Added Database Sync Exception to Database Updates Updated revision of Pilot's Guide Added Database Sync Discussion	<i>JR Brownell</i> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date : <u>03/03/2020</u>
4	03/01/23	Page 45 Page 5	Added for Software Version 3.20: • Added Section 7.29 for crossfill description Updates for RNP 0.3: • Added Section 1.3.7 for RNP 0.3 capability	<u>See page i</u>

LOG OF REVISIONS					
Revision Number	Date	Page		Description	FAA Approved
			Number		
			Page 10	<ul style="list-style-type: none"> • Added RNP 0.3 to Section 1.4 GNSS Navigation System Equipment Approvals 	
			Page 44	<ul style="list-style-type: none"> • Added Section 7.25.2 for RNP 0.3 capability 	
			Various	<p>AFMS Restructure based on recent FAA Guidance</p> <ul style="list-style-type: none"> • Reorganized Section 1 to include appropriate content previously included in Section 2. • Moved all checkboxes in the flight manual supplement to Section 1.3, System Capabilities • Reworked all of Section 2, rewording limitations and moving appropriate content to Sections 1, 3, and 7. • Removed Section 2.21, Portable Electronic Devices • Added Table of Contents to Section 3, Emergency Procedures. • Moved and reworded appropriate content previously included in Section 2 to Section 3. • Added Table of Contents to Section 4, Normal Procedures. • Moved and reworded appropriate content previously included in Section 2 to Section 7. 	

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Section 1. General

1.1 Garmin GPS 175/GNC 355/GNX 375 Navigators

The Garmin GPS 175/GNC 355/GNX 375 navigation system is a GPS system with a Satellite Based Augmentation System (SBAS) and optional transponder, comprised of a Garmin TSO-C146e navigator and a Garmin approved GPS/SBAS antenna(s). The GPS 175/GNC 355/GNX 375 navigation system is installed in accordance with AC 20-138D.

The GNX 375 also contains an ADS-B In/Out transponder capable of 1090ES out and UAT/1090 In. The transponder is a radio transmitter/receiver that operates on radar frequencies, receiving ground radar or TCAS interrogations at 1030 MHz and transmitting a coded response of pulses to ground-based radar on a frequency of 1090 MHz. Each unit is equipped with IDENT capability to initiate the SPI (special position identification) pulse for 18 seconds and will reply to ATCRBS Mode A, Mode C, and Mode S All-Call interrogation.

The GNC 355(A) is a GPS 175 with an integrated com radio with either 8.33 or 25 kHz spacing.

	GPS 175	GNC 355	GNC 355A	GNX 375
GPS SBAS Navigation: <ul style="list-style-type: none"> • Oceanic, enroute, terminal, and non-precision approach guidance • Precision approach guidance (LP, LPV) 	X	X	X	X
Moving map including topographic, terrain, aviation, and geopolitical data	X	X	X	X
Display of FIS-B weather products (optional for GPS 175 / GNC 355)	X	X	X	X
Display of ADS-B traffic data (optional for GPS 175 / GNC 355)	X	X	X	X
Built in transponder with 1090ES out, and 1090/UAT In				X
Visual Terrain Alerting	X	X	X	X
Supplemental calculators and timers	X	X	X	X
Control of Flight Stream 510 (optional)	X	X	X	X
25 kHz Com Radio		X		
8.33 kHz Com Radio			X	

Table 1 – GPS 175/GNC 355/GNX 375 Functions

The GPS navigation functions and optional transponder and navigation radio functions are operated by dedicated hard keys, a dual concentric rotary knob, or the touchscreen.

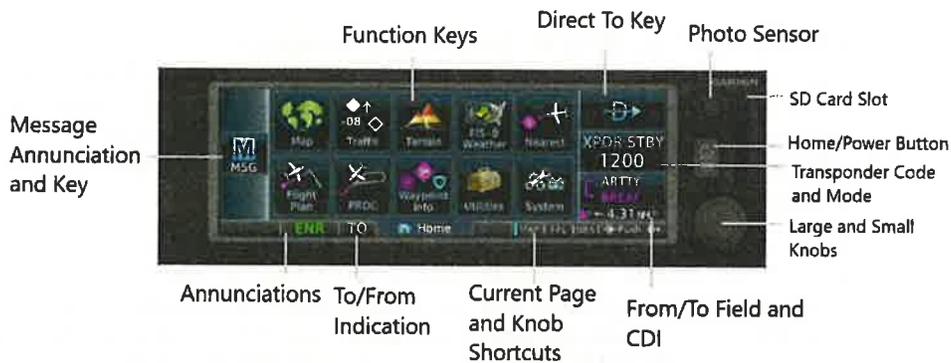


Figure 1 - GNX 375 Control and Display Layout

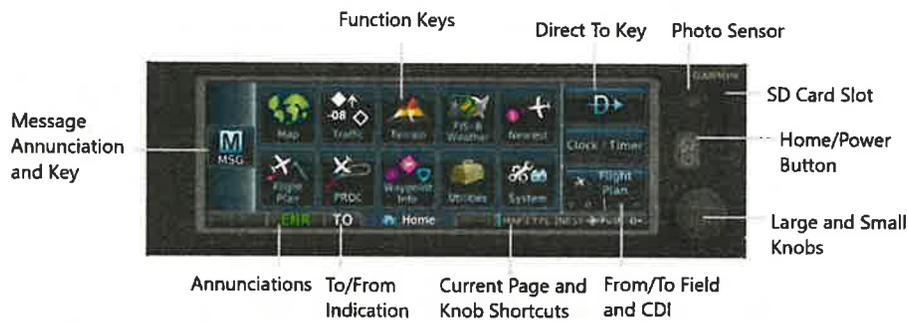


Figure 2 – GPS 175 Control and Display Layout



Figure 3 – GNC 355 Control and Display Layout

The GNX 375 transponder transmits ADS-B Out data on 1090 extended squitter (1090 MHz). It integrates data from internal and external sources to transmit the following data per 14 CFR 91.227:

- GPS Position, Altitude, and Position Integrity
- Ground Track and/or Heading, Ground Speed, and Velocity Integrity
- Air Ground Status
- Flight ID, Call Sign, ICAO Registration Number
- Capability and Status Information
- Transponder Squawk Codes between 0000-7777.
- Emergency Status
- IDENT - initiates SPI (special position identification) pulse for 18 seconds

The transponder also receives ADS-B In data on 1090 MHz, including ADS-B and ADS-R Data. ADS-B is data directly from another transmitting aircraft, and the ADS-R data which is rebroadcasted ADS-B data from a ground station. The transponder also includes ADS-B In data on UAT (978 MHz). UAT In data includes ADS-B, ADS-R, TIS-B, and FIS-B data. TIS-B Data is a broadcast of secondary surveillance radar (SSR) derived traffic information from ground stations, and FIS-B data is broadcast of aviation data from a ground station. FIS-B data includes the following products:

- Graphical and textual weather products
 - NEXRAD
 - PIREPs
 - G AIRMETs
 - METARs
 - TAFs
 - Winds Aloft
 - Lightning
 - Icing
 - Turbulence
 - Center Weather Advisories
- Aviation Data
 - TFRs
 - NOTAMs

The transponder provides ADS-B traffic information and alerting to the pilot. The alerting includes aural and visual traffic alerting information on the display, as well as on interfaced displays where supported.

1.2 Applicable System Software

The Main and GPS software versions are displayed on the start-up page immediately after power-on. All software versions displayed in Table 2 can be viewed on the System – System Status or Connex Setup pages.

The following or later software versions must be installed for this AFMS revision to be applicable to the installation.

Software Item	Software Version
Main SW Version	3.20
Flight Stream 510	2.70

Table 2 - Software Versions

1.3 System Capabilities

This Flight Manual Supplement documents the installed capabilities of the GPS 175/GNC 355/GNX 375 specific to the aircraft for which this manual is created.

The following describes the GPS 175/GNC 355/GNX 375 installation and configuration for this aircraft. Reference this section when using the Normal or Emergency Procedures in Sections 3 and 4. A function or installed feature is applicable to this aircraft only when the corresponding box is checked.

NOTE

In sections which contain a square checkbox () the installer will have placed an "X" in the boxes next to the capabilities applicable to the installation.

1.3.1 System Functions

The GPS 175/GNC 355/GNX 375 system and associated navigation interface in this aircraft have the following capabilities, in addition to the core multifunction display capability:

- Primary GPS Navigation (Enroute) and Approach Capability (LP/LNAV) – See below
- Primary GPS Approach Capability with Vertical Guidance (LNAV/VNAV, LPV) – See below
- Built in ADS-B In/Out Transponder (GNX 375)

1.3.2 Kinds of Operation

This AFM supplement does not grant approval for IFR operations to aircraft limited to VFR operations. The following checkboxes indicate only if the navigator installation meets all STC requirements for VFR or IFR flight per the STC Installation Manual section 3.3.1.

- This GPS 175/GNC 355/GNX 375 navigator installation meets the STC requirements for VFR flight only
- This GPS 175/GNC 355/GNX 375 navigator installation meets the requirements for IFR flight

1.3.3 Placards (Section 2.17)

This installation includes the following placards

- A placard for composite indicators is installed.
- A placard for VFR only operations is installed.
- No placards are installed as a result of this STC.

1.3.4 GPS Coupling

This installation is limited to:

- Lateral coupling only for GPS approaches. Coupling to the vertical path for GPS approaches is not authorized.

1.3.5 Autopilot Interface (Section 4.4)

- N/A
- This installation *has* a heading source. The GPS 175/GNC 355/GNX 375 will provide roll steering on heading legs for the autopilot.
 - This installation *does not have* a heading source. The crew cannot use the GPS 175/GNC 355/GNX 375 roll steering to fly heading legs with the autopilot.

1.3.6 Autopilot Coupling (Section 4.5)

- N/A
- This installation prompts the flight crew and requires the pilot to enable the approach outputs just prior to engaging the autopilot in APR mode. See section 4.5.1
 - This installation supports coupling to the autopilot in approach mode once vertical guidance is available. See section 4.5.2.
 - The installation *does not* support any vertical capture or vertical tracking.

1.3.7 Navigation Capabilities (Section 2.7)

The GPS 175/GNC 355/GNX 375 allows for the utilization of IFR procedures that include RF (Radius to Fix) legs as part of RNP 1.0 capabilities.

- This installation is equipped to support coupled RF leg navigation up to RNP 1.0.
- This installation is equipped to support *un-coupled* RF leg navigation up to RNP 1.0.
- This installation is equipped to support autopilot coupled RF leg navigation at RNP 0.3 and has received required installer approval for such procedures
- This installation *does not* support RF leg navigation.

1.3.8 Composite Indicators (Section 4.6)

- This installation is interfaced to a composite navigation indicator and the TO/FROM flag on the indicator *will not* function correctly.
- This installation *is not* interfaced to a composite nav indicator.

1.3.9 Altitude Input (Section 7.2)

- This installation *has* a barometric corrected altitude source. The GPS 175/GNC 355/GNX 375 will automatically sequence altitude legs.
- This installation *does not have* a barometric corrected altitude source. The flight crew will be prompted to manually sequence altitude legs.

1.3.10 Traffic System (Section 7.4)

- GPS 175/GNC 355 with no external traffic source.
- GPS 175/GNC 355 with external ADS-B In Source.
- GNX 375 including built in ADS-B In Source.

1.4 GNSS (GPS/SBAS) Navigation system Equipment approvals

The Garmin GPS 175/GNC 355/GNX 375 navigator installed in this aircraft is a TSO-C145c Class 3 approved GPS navigator that complies with AC 20-138D. The Garmin GPS 175/GNC 355/GNX 375 system as installed in this aircraft is approved for navigation using GPS and GPS/SBAS (within the coverage of a Satellite Based Augmentation System complying with ICAO Annex 10) for IFR en route, terminal area, non-precision approach, and approach procedures with vertical guidance operations.

The Garmin GPS 175/GNC 355/GNX 375 system as installed in this airplane complies with the equipment, performance, and functional requirements to conduct RNAV operations in accordance with the following table. This table is accurate at the time it was published. However, changes to operational rules, FAA advisory circulars, flight plan formats, etc., are possible. The pilot is responsible to ensure compliance with current operational requirements.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNAV 10 RNP 10 Oceanic and Remote Areas of Operation (Class II Navigation)	GNSS FDE availability must be verified prior to flight. Maximum predicted FDE unavailability is 34 minutes. ¹ Two GNSS systems required to be operational, (one GNSS system for those routes requiring only one long range navigation system). No time limit using GNSS as the primary navigation sensor. Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-105A, FAA AC 91-70B, EASA AMC 20-12	R	A1	The GPS equipment as installed requires a second GNSS system for Class II navigation in oceanic and remote airspace. When installed with a second GNSS system, the GPS 175/GNC 355/GNX 375 equipment complies with the requirements for GPS primary means of Class II navigation in oceanic and remote airspace, when used in conjunction with an FDE prediction tool that satisfies the guidance of FAA AC 20-138D and AC 90-105A (or later revision). ¹ Additional equipment may be required to obtain operational approval to utilize RNP-10 performance.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
B-RNAV / RNAV 5 (Europe)	This does not constitute an operational approval.	FAA AC 90-96A CHG 1, EASA AMC 20-4A	R	B2	
RNP 4 Oceanic and Remote Areas of Operation (Class II Navigation)	GNSS FDE availability must be verified prior to flight. Maximum predicted FDE unavailability is 25 minutes. ¹ Two operational long-range nav systems required, (or one navigation system and one GNSS sensor for those routes requiring only one long-range navigation sensor). No time limit using GNSS as the primary navigation sensor. Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-105A, FAA AC 91-70B	R	LJ	The GPS equipment as installed requires a second GNSS system for Class II navigation in oceanic and remote airspace. Additional equipment may be required to obtain operational approval to utilize RNP-4 performance.
RNAV 2	The GNSS RNAV system is installed and meets the performance and functional requirements of AC 90-100A. In accordance with AC 90-100A, CHG 2, Part 91 operators (except subpart K)	FAA AC 20-138D CHG 2, FAA AC 90-100A CHG 2	R	C2	Includes RNAV Q and T routes.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
	<p>following the aircraft and training guidance in AC 90-100A are authorized to fly RNAV 2 procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>				
RNAV 1	<p>The GNSS RNAV system is installed and meets the performance and functional requirements of AC 90-100A.</p> <p>In accordance with AC 90-100A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-100A are authorized to fly RNAV 1 procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG 2, FAA AC 90-100A CHG 2</p>	R	D2	Includes RNAV terminal departure, arrival procedures, and approach procedures up to the Final Approach Fix.
P-RNAV (Europe)	<p>This does not constitute an operational approval.</p>	<p>FAA AC 90-96A CHG 1, JAA TGL 10 Rev 1</p>	R	D2	ICAO flight plan code for P-RNAV no longer exists. P-RNAV utilizes RNAV 1 flight plan codes.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP-0.3	<p>Includes RNP terminal departure and arrival procedures. When flying a RNP procedure with a radius-to fix (RF) leg, the AFCS must be operational and coupled.</p> <p>In accordance with AC 90-105A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-105A are authorized to fly RNP 1 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	FAA AC90-105A	R	TBD	<p>Includes RNP terminal departure and arrival procedures, including procedures with radius-to-fix (RF) legs. Also includes approach procedures to the Final Approach Fix.</p> <p>AC 90-105A states that procedures with RF legs must be flown using either a flight director or coupled to the autopilot.</p> <p>Item 18 PBN flight plan code is still to-be-determined at time of publication of this AFMS.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for coupled procedures with RF legs when the installation complies with limitation set forth in Section 2.7 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 1.3.7 of this manual to determine if this capability is supported in this installation.</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP 1	<p>When flying a RNP procedure containing an RF leg, the AFCS must be operational.</p> <p>At a minimum, the flight director must be displayed and utilized when conducting procedures containing radius-to-fix (RF) legs.</p> <p>In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP 1 procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG 2,</p> <p>FAA AC 90-105A</p>	R	O2	<p>Includes RNP terminal departure and arrival procedures, including procedures with radius-to-fix (RF) legs. Also includes approach procedures to the Final Approach Fix.</p> <p>AC 90-105A states that procedures with RF legs must be flown using either a flight director or coupled to the autopilot.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.7 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 1.3.7 of this manual to determine if this capability is supported in this installation.</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP-2 (Oceanic / Remote)	<p>GNSS FDE availability must be verified prior to flight. Maximum predicted FDE unavailability is 5 minutes.¹</p> <p>Two operational long-range nav systems required, (or one navigation system and one GNSS sensor for those routes requiring only one long-range navigation sensor).</p> <p>No time limit using GNSS as the primary navigation sensor.</p> <p>Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG2, FAA AC 90-105A FAA AC 91-70B</p>	R	TBD	<p>The GPS equipment as installed requires a second GNSS system for Class II navigation in oceanic and remote airspace. Additional equipment may be required to obtain operational approval to utilize RNP-2 performance.</p> <p>Item 18 PBN flight plan code is still to-be-determined at time of publication of this AFMS.</p>
RNP-2 (Domestic / Offshore En route)	<p>In accordance with AC 90-105A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-105A are authorized to fly RNP-2 domestic and offshore routes.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG 2, FAA AC 90-105A FAA AC 91-70B</p>	R	TBD	<p>Includes RNP-2 domestic and offshore routes. Item 18 PBN flight plan code is still to-be-determined at time of publication of this AFMS.</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP APCH LNAV minima	<p>When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs.</p> <p>In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP APCH LNAV minima procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG 2, FAA AC 90-105A,</p> <p>EASA AMC 20-27A</p>	R	S1	<p>Includes non-precision approaches based on conventional navigation aids with "or GPS" in the title and area navigation approaches titled "GPS", "RNAV-(GPS)", and "RNAV (GNSS)". This includes procedures with radius-to-fix (RF) legs.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.7 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 1.3.7 of this manual to determine if this capability is supported in this installation.</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP APCH LNAV/VN AV minima	<p>When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs.</p> <p>In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP APCH LNAV/VNAV minima procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG 2, FAA AC 90-105A,</p> <p>EASA AMC 20-27A with CM-AS-002</p>	R	S2	<p>Includes area navigation approaches titled "RNAV (GPS)" and "RNAV (GNSS)." This includes procedures with radius-to-fix (RF) legs.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.7 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 1.3.7 of this manual to determine if this capability is supported in this installation.</p>
RNP APCH LP minima	<p>When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs</p> <p>In accordance with AC 90-107, Part 91 operators (except subpart K), following the</p>	<p>FAA AC 20-138D CHG 2, FAA AC 90-107</p>	N/A	N/A	<p>Includes area navigation approaches titled "RNAV (GPS)" and "RNAV (GNSS)" including procedures with radius-to-fix (RF) legs.</p> <p>LP minima are available only when within SBAS coverage.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.7 of this</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
	<p>aircraft and training guidance in AC 90-107 are authorized to fly RNP APCH LP minima procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>				document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 1.3.7 of this manual to determine if this capability is supported in this installation.
RNP APCH LPV minima	<p>When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs.</p> <p>In accordance with AC 90-107, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-107 are authorized to fly RNP APCH LPV minima procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG 2,</p> <p>FAA AC 90-107,</p> <p>EASA AMC 20-28</p>	B	N/A	<p>Includes area navigation approaches titled "RNAV (GPS)" and "RNAV (GNSS)", including procedures with radius-to-fix (RF) legs.</p> <p>LPV minima are available only when within SBAS coverage.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.7 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 1.3.7 of this manual to determine if this capability is supported in this installation.</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
Advanced RNP See Notes for specific Advanced RNP functions.	This does not constitute an operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-105A	N/A	N/A	<ul style="list-style-type: none"> • <u>RNAV Holding:</u> Supported. • <u>RF Legs:</u> Supported. • <u>Parallel Offsets:</u> RNP-4 parallel offsets as defined by AC 20-138D Chapter 10 are supported. • <u>Advanced RNP parallel offsets as defined by AC20-138D Appendix 3</u> are supported. • <u>Higher Continuity:</u> Supported only when a second GNSS system is installed and operating. • <u>Scalable RNP:</u> Not supported. • <u>Fixed Radius Transitions (FRT):</u> Not Supported • <u>Time of Arrival Control (TOAC):</u> Not supported.

1. FDE/RAIM availability worldwide can be determined via the following:

- An FDE prediction tool that satisfies the guidance of FAA AC 20-138D and AC 90-105A (or later revision), such as the Garmin WFDE Prediction program, part number 006-A0154-01 or later approved version with GPS SW >= 3.0 selected

Also, within the United States:

- Via the FAA's RAIM Service Availability Prediction Tool (SAPT) website:
<http://sapt.faa.gov>.
- Contacting a Flight Service Station (not DUATS) to obtain non-precision approach RAIM.

Within Europe,

- Using the Garmin WFDE Prediction program,
- An FDE prediction tool that satisfies the guidance of FAA AC 20-138D and AC 90-105A (or later revision)
- Europe's AUGER GPS RAIM Prediction Tool at <http://augur.ecacnav.com/augur/app/home>.

This requirement is not necessary if SBAS coverage is confirmed to be available along the entire route of flight. The route planning and WFDE prediction program may be downloaded from the Fly-Garmin website on the internet (fly.garmin.com/fly-garmin/support/). For information on using the WFDE Prediction Program, refer to GARMIN WAAS FDE Prediction Program, part number 190-00643-01, 'WFDE Prediction Program Instructions'.

Garmin International holds an FAA Type 2 Letter of Acceptance (LOA) in accordance with AC 20-153A for database integrity, quality, and database management practices for the Navigation database. Flight crews and operators can view the LOA status at FlyGarmin.com then select "Aviation Database Declarations".

Navigation information is referenced to the WGS-84 reference system.

1.5 Flight Planning

An acceptable means of compliance for FDE prediction programs is to use a certified service which meets the requirements of FAA AC 20-138D and FAA AC 90-105A for prediction.

The following table describes some of the available RAIM prediction programs.

Prediction Program	Internet address or program details	Coverage Area
Garmin RAIM Prediction Tool	https://fly.garmin.com/fly-garmin/support/raim/	Worldwide
FAA Service Availability Prediction Tool	http://sapt.faa.gov	US Only
Flight Service Station	1-800-WXBRIEF https://www.1800wxbrief.com	US Only
AUGER GPS RAIM Prediction Tool	http://augur.ecacnav.com/augur/app/home	ECAC Airspace Only

Table 3 - RAIM Prediction Sources

This RAIM availability requirement is not necessary if SBAS coverage is confirmed to be available along the entire route of flight.

For flight planning purposes, for operations within the U.S. National Airspace System on RNP and RNAV procedures when SBAS signals are not available, the availability of GPS RAIM shall be confirmed for the intended route of flight. In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended route of flight, the flight shall be delayed, canceled,

or rerouted on a track where RAIM requirements can be met. The flight may also be re-planned using non-GPS based navigational capabilities.

For flight planning purposes for operations within European B-RNAV/RNAV-5 and P-RNAV airspace, if more than one satellite is scheduled to be out of service, then the availability of GPS RAIM shall be confirmed for the intended flight (route and time). In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended flight, the flight shall be delayed, canceled, or rerouted on a track where RAIM requirements can be met.

Applicable to dual installations consisting of two Garmin GNSS units:

For flight planning purposes, for operations where the route requires Class II navigation the aircraft's operator or flight crew must use the Garmin RAIM Prediction program to demonstrate that there are no outages on the specified route that would prevent the Garmin GNSS navigation system to provide GPS Class II navigation in oceanic and remote areas of operation that requires RNP-10, RNP-4, or RNP-2 oceanic/remote capability. If the Garmin RAIM Prediction program indicates fault exclusion (FDE) will be unavailable for more than 34 minutes in accordance with FAA Order 8400.12A for RNP-10 requirements, 25 minutes in accordance with FAA Order 8400.33 for RNP-4 requirements, or 5 minutes in accordance with FAA Order 8400.33 for RNP-2 oceanic/remote then the operation must be rescheduled when FDE is available.

Both Garmin GPS navigation receivers must be operating and providing GPS navigation guidance for operations requiring RNP-4, RNP-10, or RNP-2 oceanic/remote performance.

Whenever possible, RNP and RNAV routes including Standard Instrument Departures (SIDs), Standard Terminal Arrival (STAR), and enroute RNAV "Q" and RNAV "T" routes should be loaded into the flight plan from the database in their entirety, rather than loading route waypoints from the database into the flight plan individually. Selecting and inserting individual named fixes from the database is permitted, provided all fixes along the published route to be flown are inserted. Manual entry of waypoints using latitude/longitude or place/bearing is prohibited.

Navigation information is referenced to the WGS-84 reference system, and should only be used where the Aeronautical Information Publication (including electronic data and aeronautical charts) conform to WGS-84 or equivalent.

1.6 Definitions

The following terminology is used within this document:

ADF:	Automatic Direction Finder
ADS-B:	Automatic Dependent Surveillance Broadcast
APR:	Approach
APPR:	Approach
CDI:	Course Deviation Indicator
DME:	Distance Measuring Equipment
ECAC:	European Civil Aviation Conference
EHSI:	Electronic Horizontal Situation Indicator
FIS-B:	Flight Information Services Broadcast
GNSS:	Global Navigation Satellite System
GPA:	Glidepath Angle
GPS:	Global Positioning System
GPSS:	GPS Roll Steering
HOT:	Hazardous Obstacle Transmission wires
HSI:	Horizontal Situation Indicator
IAP:	Instrument Approach Procedure
IFR:	Instrument Flight Rules
ILS:	Instrument Landing System
IMC:	Instrument Meteorological Conditions
LDA:	Localizer Directional Aid
LNAV:	Lateral Navigation
LNAV +V:	Lateral Navigation with advisory Vertical Guidance
L/VNAV:	Lateral/Vertical Navigation
LOC:	Localizer
LOC-BC:	Localizer Backcourse
LP:	Localizer Performance
LPV:	Localizer Performance with Vertical Guidance
LP +V:	Localizer Performance with Advisory Vertical Guidance
MLS:	Microwave Landing System
MMC:	Multi-Media Card
NOTAM:	Notice to Airmen
OBS:	Omni Bearing Selector
PED:	Portable Electronic Device
RAIM:	Receiver Autonomous Integrity Monitoring
RF Leg:	Radius-To-Fix Leg of a Charted Instrument Procedure
RNAV:	Area Navigation

RNP: Required Navigational Performance
SBAS: Satellite Based Augmentation System
SD: Secure Digital
SDF: Simplified Directional Facility
SUSP: Suspend
TACAN: Tactical Air Navigation System
TAWS: Terrain Awareness and Warning System
TCH: Threshold Crossing Height
TFR: Temporary Flight Restriction
TIS: Traffic Information Service
VFR: Visual Flight Rules
VGSI: Visual Glide-Slope Indicator
VLOC: VOR/Localizer
VMC: Visual Meteorological Conditions
VOR: VHF Omnidirectional Range
VRP: Visual Reporting Point
WAAS: Wide Area Augmentation System
WFDE: WAAS Fault Data Exclusion

Section 2. LIMITATIONS

2.1 Kinds of Operation

AFM supplement does not grant approval for IFR operations to aircraft limited to VFR operations.

2.2 Minimum Equipment

The GPS 175/GNC 355/GNX 375 must have the following system interfaces fully functional in order to be used for primary navigation during IFR operations:

Interfaced Equipment	Number installed	Number Required for IFR
External HSI/CDI/EHSI	1 or more	1
External APPR and LOI Annunciator	See Note 1	1

Table 4 – Required Equipment

Note 1: Certain installations require an external APPR and LOI annunciator light. If installed, these annunciators must be fully functional to use the GPS 175/GNC 355/GNX 375 GPS navigation for IFR operations.

Single engine piston aircraft under 6,000 lbs. maximum takeoff weight:

Required Equipment for IFR operations utilizing GPS navigation: Single GPS 175/GNC 355/GNX 375 Navigator

All other aircraft:

Required Equipment for IFR operations utilizing GPS navigation: Single GPS 175/GNC 355/GNX 375 Navigator plus a second source of TSO-C146 approved GPS navigation or a separate source of VHF navigation.

Operation in remote or oceanic operation requires two sources of GPS navigation.

The GNX 375 must have the following system interfaces fully functional in order to be compliant with the requirements for 14 CFR 91.227 ADS-B Out operations:

Interfaced Equipment	Number Installed	Number Required
Uncorrected Pressure Altitude Source	1	1

Table 5 – Required Equipment

2.3 Flight Planning

For flight planning purposes, in areas where SBAS coverage is not available, the flight crew must check RAIM availability.

2.4 System Use

The moving map and CDI depiction on the GPS 175/GNC 355/GNX 375 display must not be used for course guidance.

2.5 Navigation Database

GPS/SBAS based IFR operations are prohibited unless the flight crew verifies and uses a valid, compatible, and current navigation database or verifies each waypoint for accuracy by reference to current approved data.

2.6 Ground Operations

Using SafeTaxi functions as the sole basis for ground maneuvering is prohibited.

2.7 RNP Operations

Instrument flight procedures must be loaded from the navigation database.

When conducting instrument approaches referenced to true North, the NAV Angle on the System -Units page must be set to True.

When using advisory vertical guidance, the flight crew must use the primary barometric altimeter to ensure compliance with all altitude restrictions.

Pilots are prohibited from flying any approach path that contains manually entered waypoints.

IFR approaches are prohibited whenever any physical or visual obstruction (such as a throw-over yoke) restricts pilot view or access to the GPS 175/GNC 355/GNX 375 and/or the CDI.

2.7.1 RF Legs

The following limitations apply to RNP 1 procedures with RF legs:

- Aircraft is limited to 180 KIAS while on the RF leg
- Hand Flown RF legs are limited to RNP 1 procedures. RNP AR is not approved
- Primary navigation guidance on RF legs must be shown on an EHSI indicator with auto-slew capability turned ON
- GPS 175/GNC 355/GNX 375 Moving Map, EHSI Map, or Distance to Next Waypoint information must be displayed to the pilot during the RF leg when flying without the aid of the autopilot or flight director.
- The active waypoint must be displayed in the pilot's primary field of view.

The following limitations apply to RNP 0.3 procedures with RF legs:

- Two RF leg RNP 0.3 capable navigators are required and must be crossfilled
- Two installed ADAHRS (or ADC/AHRS combination) sources are required
- The aircraft must have a Garmin GFC 500 or GFC 600 autopilot installed and in use during RNP 0.3 operations
- CDI scaling must be manually set to 0.3NM during RNP 0.3 operations

- Primary navigation guidance on RF legs must be shown on an EHSI indicator with auto-slew capability turned ON
- RNP 0.3 is only approved on RF legs prior to the FAF
- Operational approval is limited to FAA AC 90-105 A-RNP NavSpec only. RNP-AR not allowed.
- Installation must be approved for coupled RF capability by installer
- The operator must obtain the necessary LOA or OpSpec approval from the appropriate regulatory agency

2.8 Terrain Alerting Function

Maneuvers and navigation must not be based solely on the display of terrain, obstacles, or wires on the moving map or terrain displays.

2.9 Polar Operations

Use of the GPS 175/GNC 355/GNX 375 for primary navigation for latitudes above 89.00° N and below 89.00° S is prohibited.

2.10 ADS-B Weather (Optional for GPS 175/GNC355)

Use of datalink weather information as the sole means for maneuvering in, near, or around areas of hazardous weather is prohibited.

Use of datalink services as the primary means to provide Temporary Flight Restriction (TFR) or Notice to Airmen (NOTAM) information is prohibited.

2.11 Traffic Display (Optional for GPS 175/GNC355)

Use of traffic display as the sole basis for maneuvering to avoid traffic is prohibited.

2.12 Demo Mode

Demo mode is prohibited in flight.

2.13 Wire Obstacle Database

Use of the "Obstacle/Wire" database is prohibited.

2.14 Database Updates

In-flight database transfers or updates are prohibited.

2.15 OBS Mode

Use of OBS mode for flight plan segments greater than 250_{NM} is prohibited.

2.16 Advisory Visual Approaches

Use of advisory visual approaches in IMC is prohibited.

2.17 Placards

The GPS 175/GNC 355/GNX 375 STC adds placards if required per STC Installation Manual. The wording and locations of the placards are listed in the table below.

Placard	Location (If installed)
“TO/FROM FLAG WILL NOT FUNCTION CORRECTLY WHEN DISPLAYING GPS DEVIATION. USE TO/FROM INDICATION ON GPS”	Immediately adjacent to the composite CDI indicator.
“GPS LIMITED TO VFR USE ONLY”	Immediately adjacent to the GPS 175/GNC 355/GNX 375.

Table 6 - STC Placards

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3.1 Emergency Procedures

3.1.1 Terrain WARNING

Red annunciator “PULL UP”:

Autopilot **DISCONNECT**
Aircraft Controls **INITIATE MAXIMUM POWER CLIMB**
Airspeed **BEST ANGLE OF CLIMB SPEED**

After Warning Ceases:

Altitude **CLIMB AND MAINTAIN SAFE ALTITUDE**
Advise ATC of Altitude Deviation, if appropriate.

NOTE

Only vertical maneuvers are recommended, unless either operating in visual meteorological conditions (VMC), or the flight crew determines, based on all available information, that turning in addition to the vertical escape maneuver is the safest course of action, or both.

NOTE

Terrain annunciators external to the GPS 175/GNC 355/GNX 375 may not indicate the exact threat causing the alert. Example: WIRE alerts may be annunciated as TERR or OBSTACLE on external devices.

3.2 Abnormal Procedures

3.2.1 LOSS OF GPS/SBAS NAVIGATION DATA

When the GPS/SBAS receiver is inoperative or GPS navigation information is not available or invalid, the GPS 175/GNC 355/GNX 375 will enter one of two modes: Dead Reckoning mode (DR) or Loss Of Integrity mode (LOI). The mode is indicated on the GPS 175/GNC 355/GNX 375 by an amber “DR” and/or “LOI”.

If the LOI annunciation is displayed, revert to an alternate means of navigation appropriate to the route and phase of flight. If LOI occurs while the GPS 175/GNC 355/GNX 375 is in the ENR or OCN phase of flight, it may also display DR.

If the DR annunciation is displayed, the map will continue to be displayed with an amber “DR” overwriting the ownship icon. Course guidance will be removed on the CDI. Aircraft position will be based upon the last valid GPS position, then estimated by Dead Reckoning methods. Changes in true airspeed, altitude, heading, or winds aloft can affect the estimated position substantially.

With a GNX 375, loss of GPS will result in the loss of ADS-B Out transmissions.

If Alternate Navigation Sources (ILS, LOC, VOR, DME, ADF) Are Available:

Navigation **USE ALTERNATE SOURCES**

If No Alternate Navigation Sources Are Available:

DEAD RECKONING (DR) MODE:

Navigation **USE GPS 175/GNC 355/GNX 375**

NOTE

All information normally derived from GPS will become less accurate over time.

LOSS OF INTEGRITY (LOI) MODE (no DR annunciated on the GPS 175/GNC 355/GNX 375):

Navigation **FLY TOWARDS KNOWN VISUAL CONDITIONS**

NOTE

All information derived from GPS will be removed.

NOTE

The airplane symbol is removed from all maps. The map will remain centered at the last known position. “NO GPS POSITION” will be annunciated in the center of the map.

3.2.2 GPS APPROACH DOWNGRADE

During a LPV, LP +V, LNAV/VNAV, or LNAV +V approach, if GPS accuracy requirements cannot be met by the GPS receiver, the GPS 175/GNC 355/GNX 375 will downgrade the approach. The downgrade will remove vertical deviation indication from the VDI and change the approach annunciation to LNAV. The approach may be continued using the LNAV only minimums. If the VISUAL approach is downgraded, the GPS 175/GNC 355/GNX 375 will remove the vertical deviation indication from the VDI, but continue to annunciate VISUAL in amber.

During a GPS approach in which GPS accuracy requirements cannot be met by the GPS receiver for any GPS approach type, the GPS 175/GNC 355/GNX 375 will flag all CDI guidance and display a system message “ABORT APPROACH-GPS approach no longer available”. Immediately upon viewing the message, the unit will revert to Terminal navigation mode 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 must be utilized.

3.2.3 Terrain CAUTION

(Terrain or Obstacle Ahead, Sink Rate, Don't Sink)

When a terrain CAUTION occurs, take corrective action until the alert ceases. Stop descending or initiate either a climb or a turn, or both as necessary, based on analysis of all available instruments and information.

NOTE

Terrain annunciators external to the GPS 175/GNC 355/GNX 375 may not indicate the exact threat causing the alert. Example: WIRE alerts may be annunciated as TERR or OBSTACLE on external devices.

3.2.4 Terrain INHIBIT

The Forward Looking Terrain Avoidance (FLTA) and Premature Descent Alerts (PDA) functions may be inhibited to prevent alerting, if desired. Refer to GPS 175/GNC 355/GNX 375 Pilot's Guide for additional information.

To Inhibit Terrain Alerting:

Home Hardkey **PRESS**
Terrain Button **PRESS**
Menu Button **PRESS**
Terrain Inhibit Button **PRESS TO ACTIVATE**

3.2.5 TER N/A and TER FAIL

If the amber **TER N/A** or **TER FAIL** status annunciator is displayed, the system will no longer provide terrain alerting or display relative terrain and obstacle elevations. The crew must maintain compliance with procedures that ensure minimum terrain and obstacle separation.

3.2.6 DATA SOURCE - HEADING SOURCE INOPERATIVE OR CONNECTION LOST MESSAGE

Without a heading source to the GPS 175/GNC 355/GNX 375, the following limitations apply:

- Roll steering will not be provided to the autopilot for heading legs. The autopilot must be placed in HDG mode for heading legs.
- Map cannot be oriented to Heading Up.
- Overlaying traffic data from Garmin ADS-B-IN unit will not be displayed on the main map display. The flight crew must use the dedicated traffic page on the GPS 175/GNC 355/GNX 375 system to display ADS-B-IN traffic data.

3.2.7 DATA SOURCE – PRESSURE ALTITUDE SOURCE INOPERATIVE OR CONNECTION TO GNX 375 LOST MESSAGE

The GNX 375 will not be receiving pressure altitude while that message is present.

3.2.8 UNRECOVERABLE LOSS OF ALL ELECTRICAL GENERATORS OR ALTERNATORS

Remove power from all equipment which is not necessary for flight.

3.2.9 IN-AIR RESTART OF GPS 175/GNC 355/GNX 375

In the event of a GPS 175/GNC 355/GNX 375 restart in the air, the crew should utilize the Back button if presented with the database update screen after the GPS 175/GNC 355/GNX 375 is restarted. This will ensure restoration of the navigation functions as soon as possible.

3.2.10 ADS-B Out Transmit Failure

When the system is not operational, ADS-B Out transmit failure messages will be present on the display interface. The GNX 375 only complies with 14 CFR 91.227 for ADS-B Out when all required functions are operational.

3.2.11 Pressure Altitude Broadcast Inhibit (PABI)

ADS-B Out compliance requires the GNX 375 to be in ALT mode. If requested by Air Traffic Control to turn off altitude reporting on the transponder, select the GNX transponder mode to ON.

Section 4. NORMAL PROCEDURES

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Refer to the GPS 175/GNC 355/GNX 375 Pilot's Guide defined in Section 7.1 of this document for normal operating procedures and a complete list of system messages and associated flight crew actions. This includes all GPS operations, navigation, traffic, weather, and Multi-Function Display information.

The GPS 175/GNC 355/GNX 375 requires a reasonable degree of familiarity to avoid becoming too engrossed at the expense of basic instrument flying in IMC and basic see-and-avoid in VMC. Garmin provides training tools with the Pilot's Guide and PC based simulator. Pilots should take full advantage of these training tools to enhance system familiarization.

4.1 Unit Power On

Databases **REVIEW DATES**
Self-Test..... **VERIFY OUTPUTS TO NAV INDICATORS**
Self-Test - GPS Remote Annunciator:
LOI **ILLUMINATED**
APPR **ILLUMINATED**

For GNX 375:

Transponder Mode..... **VERIFY ALT**

4.2 Before Takeoff

System Messages and Annunciators **CONSIDERED**

4.3 HSI and EHSI Operation

If an HSI is used to display navigation data from the GPS 175/GNC 355/GNX 375 the pilot should rotate the course pointer as prompted on the GPS 175/GNC 355/GNX 375.

If an EHSI is used to display navigation data from the GPS 175/GNC 355/GNX 375 the course pointer may autoslew to the correct course when using GPS navigation. For detailed information about the functionality of the EHSI system, refer to the FAA approved Flight Manual or Flight Manual Supplement for that system.

CAUTION

The pilot must verify the active course and waypoint for each flight plan leg. The pilot must verify proper course selection each time the CDI source is changed from GPS to VLOC.

See Section 2.7 for RF leg capabilities related to EHSI.

4.4 Autopilot Operation

The GPS 175/GNC 355/GNX 375 may be coupled to an optional autopilot, if installed in the aircraft, when operating as prescribed in the LIMITATIONS section of this manual.

Autopilots coupled to the GPS 175/GNC 355/GNX 375 system in an analog (NAV) mode will follow GPS navigation guidance as they would with existing VOR receivers.

Autopilots that support GPSS or GPS Roll Steering in addition to the analog course guidance will lead course changes, fly arcing procedures, procedure turns, and holding patterns if coupled in a roll steering mode.

The GPS 175/GNC 355/GNX 375 supports autopilot roll steering for heading legs when an approved heading source is interfaced to the GPS 175/GNC 355/GNX 375. This heading interface can also provide map orientation, traffic heading data, and wind calculations.

CAUTION

The GPS 175/GNC 355/GNX 375 does not provide course deviation to the autopilot for heading legs. Some autopilots do not allow the use of roll steering when course deviation is not provided.

For autopilot operating instructions, refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

4.5 Coupling the Autopilot during approaches

CAUTION

When the CDI source is changed on the GPS 175/GNC 355/GNX 375, autopilot mode may change. Confirm autopilot mode selection after CDI source change on the GPS 175/GNC 355/GNX 375. Refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

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.

4.5.1 To couple an approach:

Once established on the final approach course with the final approach fix as the active waypoint, the GPS 175/GNC 355/GNX 375 will issue a flashing message indication.

Flashing Message Button **PRESS**
"Enable APR Output" Button..... **PRESS**

If coupled, Autopilot will revert to ROL mode at this time.

Autopilot..... **ENGAGE APPROACH MODE**

4.5.2 To couple an approach:

Once established on the final approach course with the final approach fix as the active waypoint, the GPS 175/GNC 355/GNX 375 will enable vertical guidance.

Vertical Guidance **CONFIRM AVAILABLE**
Autopilot..... **ENGAGE APPROACH MODE**

4.6 Composite Indicators

When the GPS 175/GNC 355/GNX 375 is interfaced to an existing composite CDI indicator, the TO/From Flag will not function on the indicator. A placard must be installed immediately adjacent to the indicator. The placard must read: "TO/FROM FLAG WILL NOT FUNCTION CORRECTLY WHEN DISPLAYING GPS DEVIATION. USE TO/FROM INDICATION ON GPS."

The following navigation indicators require the placard:

- Narco VOA 50M
- Narco VOA 9
- Narco VOA 8
- ARC (Cessna) IN-386A
- ARC (Cessna) IN-481AC
- ARC (Cessna) IN-385AC
- Honeywell (Bendix King) KI 204
- Honeywell (Bendix King) KI 209
- Honeywell (Bendix King) KI 209A
- Bendix King KI 203
- Bendix King KI 208
- Bendix King KI 208A

These indicators will either show no To/From indication at all, or will only show the "TO" indication. Pilots must use the on screen TO/FROM indications when interfaced to these CDIs.

Pilot should set the selected course on the CDI to the desired track.

Section 5. PERFORMANCE

No change.

Section 6. WEIGHT AND BALANCE

See current weight and balance data.

Section 7. SYSTEM DESCRIPTIONS

7.1 Pilot's Guide

The Garmin GPS 175/GNC 355/GNX 375 Pilot's Guides, part number and revision listed below, contain additional information regarding GPS 175/GNC 355/GNX 375 system description, control and function.

- GPS175/GNX375 Pilot's Guide P/N 190-02207-02 Rev B or later
- GPS175/GNC 355/GNX375 Pilot's Guide P/N 190-02488-01 Rev B or later

7.2 Leg Sequencing

The GPS 175/GNC 355/GNX 375 supports all ARINC 424 leg types. Certain leg types require altitude input in order to sequence (course to altitude, for example). If a barometric corrected altitude source is not interfaced to the GPS 175/GNC 355/GNX 375, a popup will appear prompting the flight crew to manually sequence the leg once the altitude prescribed in the procedure is reached.

It is possible to create flight plan waypoint sequences, which exceed the autopilot's bank angle capabilities. The pilot shall monitor autopilot performance with regard to flight path deviation.

7.3 Terrain Alerting

Terrain, point obstacle, and wire obstacle information appears on the map and terrain display pages as red and amber terrain, obstacles, or wires and is depicted for advisory use only. Aircraft maneuvers and navigation must not be predicated upon the use of the terrain display. Terrain, obstacle and wire information is advisory only and is not equivalent to warnings provided by TAWS.

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.

CAUTION

Not all obstacles and wires are contained in the Obstacle/HOT Line database. The system provides depiction and alerts only for obstacles and wires contained in the database.

NOTE

The area of coverage may be modified as additional terrain data sources become available.

The GPS 175/GNC 355/GNX 375 supports Terrain Alerting. Visual alerts are provided. Terrain Alerting *does not* satisfy the TAWS requirement of 91.223.

Terrain on the dedicated terrain page or main map overlay is depicted in the following manner:

- Terrain more than 1,000 feet below the aircraft is not depicted or depicted as black.
- Terrain between 1,000 feet and 100 feet below the aircraft is depicted as amber.
- Terrain within 100 feet below the aircraft, or above the aircraft, is depicted as red.

Obstacles and wires on the dedicated terrain page or main map are depicted in the following manner:

- Obstacles and wires more than 2,000 feet below the aircraft are not depicted.
- Obstacles and wires between 2,000 feet and 1,000 feet below the aircraft are depicted as white.
- Obstacles and wires between 1,000 feet and 100 feet below the aircraft are depicted as amber.
- Obstacles and wires within 100 feet below the aircraft, or above the aircraft, are depicted as red.

Multiple obstacles may be depicted using a single obstacle icon and an asterisk to indicate obstacle grouping is occurring. The color of the asterisk indicates the relative altitude of the tallest obstacle in the group. The asterisk does not indicate any information about the relative altitude or number of obstacles not being displayed in the obstacle group.

The Garmin GPS 175/GNC 355/GNX 375 Pilot's Guide provides additional information regarding terrain and obstacle colors and grouped obstacle icons.

The terrain alerting is inhibited in the vicinity of airports in the navigation database. If an airport is not in the database, terrain alerting will still occur. Airports not in the database will not be viewable as airports in the unit. If flying into an airport that is not in the database, the inhibit terrain feature can be used to prevent alerting. The terrain inhibit option is in the menu on the terrain page, and provides a means to prevent all terrain alerts while inhibited. The bottom status bar of the GPS 175/GNC 355/GNX 375 will display TER INHB, and a message will persist in the message window indicating that the terrain alerts are inhibited.

7.4 Traffic System (Optional for GPS 175/GNC355)

Traffic is displayed on the GNX 375, and may be displayed on the GPS 175 when connected to an approved optional ADS-B traffic device. These systems are capable of providing traffic monitoring and alerting to the flight crew. 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.

Traffic is displayed in feet regardless of the unit settings.

This system is configured for the following type of traffic system. The Garmin GPS 175/GNC 355/GNX 375 Pilot's Guide provides additional information regarding the functionality of the traffic device.

7.5 Power

- Power to the GPS 175 or GNC 355 is provided through a circuit breaker labeled GPS or GPS 2.
- Power to the GNX 375 is provided through a circuit breaker labeled GPS/XPDR or GPS/XPDR 2.
- Power to the COM radio in a GNC 355 is provided through a circuit breaker labeled COM or COM2.
- Power to the optional Flight Stream 510 is provided through the GPS 175/GNC 355/GNX 375 MMC/SD card slot and protected via the GPS 175/GNC 355/GNX 375 circuit breaker.

7.6 Databases and Flight Plan Waypoints/Procedures

Database versions (or cycles) and effective dates are displayed on the start-up database verification page immediately after power-on for those databases with an effective or expiration date. Databases with no effective or expiration date (e.g. - terrain database) are considered effective upon installation in the GPS 175/GNC 355/GNX 375. Database information can also be viewed on the System – System Status page.

The Obstacle Database has an area of coverage that includes the United States and Europe and is updated as frequently as every 56 days. The HOT Line wire database only includes the continental United States and portions of Canada/Mexico.

Only the Obstacle/HOT Line wire database may be used in accordance with the limitation found in Section 2.13.

If a stored flight plan contains a waypoint or procedure that does not correspond to a waypoint or procedure in the navigation database in use, the waypoint or procedure will become locked (depicted as “lockd”) in the flight plan. Flight plans with locked waypoints may be placed in the active flight plan portion of the system but no navigation will be provided. The locked waypoint/procedure must be resolved by removing or replacing it with the correct waypoint/procedures in the flight plan before the system will provide navigation.

7.7 External Switches

External switches may be installed and interfaced to the GPS 175/GNC 355/GNX 375. Table 7 lists the switches and function they perform:

Switch Label	Function
TFC MUTE	Mutes the traffic alert audio (GNX 375 only)
GA	Remote Go Around
IDENT	Transponder IDENT

Table 7 – External Switches

7.8 Airspace Depiction and Alerts

The GPS 175/GNC 355/GNX 375 aides the flight crew in avoiding certain airspaces with Smart Airspace and airspace alerts. Smart Airspace de-emphasizes depicted airspace that is not near the aircraft's current altitude. Airspace Alerts provide a message indication to the flight crew when the aircraft's current ground track will intercept an airspace type that has been selected for alerting.

NOTE

Smart Airspace and Airspace Alerts are separate features. Turning on/off Smart Airspace does not affect Airspace Alerts, and vice versa.

7.9 ADS-B Traffic (Optional for GPS 175/GNC355)

The GNX 375 has a built in ADS-B In traffic system. A Garmin ADS-B traffic system may be interfaced to the GPS 175/GNC 355/GNX 375. The *nose* of the ownship symbol on the GPS 175/GNC 355/GNX 375 main map page and dedicated traffic page serves as the actual location of your aircraft. The *center* of the traffic target icon serves as the reported location for the target aircraft. Motion vectors for traffic may be displayed in either absolute or relative motion. The location of the traffic targets relative to the ownship are the same, regardless of the selected motion vector.

Absolute motion vectors are colored either cyan or white, depending on unit configuration. Absolute motion vectors depict the reported track of the traffic target referenced to the ground. An absolute motion vector pointed towards your ownship symbol *does not* necessarily mean the traffic target is getting closer to your aircraft.

Relative motion vectors are always colored green and depict the motion of the traffic target relative to your ownship symbol. The direction the traffic target is pointed may vary greatly from the motion vector and a target may be getting closer to your aircraft independent of the direction the target is pointed. A green relative motion vector pointed towards your ownship indicates that the traffic target *is* converging on your aircraft.

Traffic grouping can be enabled or disabled in the traffic page menu. If grouping is enabled, and more than one target is occupying the same area of the screen, the GPS 175/GNC 355/GNX 375 will combine the two or more traffic targets into one traffic group. The presence of an asterisk to the left of a target indicates that traffic has been grouped. The highest priority traffic target in the group is displayed to the pilot. When applied to airborne targets the asterisk will be displayed in white or cyan depending on the traffic depiction color used in the installation. The asterisk will be brown for grouped ground targets. The asterisk will not turn amber, even if an alerted target is included in the group. If traffic grouping is disabled, the traffic targets will draw on top of one another.

An alerted target may be placed in the same group as non-alerted targets. In this case, the alerted target will be displayed. Two alerted targets will not be placed in the same group. All alerted targets will be displayed on the screen.

Traffic targets displayed on the dedicated traffic page may be selected in order to obtain additional information about a traffic target or to view all targets in a grouped target. When a grouped target is selected, the “Next” button on the dedicated traffic page will cycle through all targets located in close proximity to where the screen has been touched.

7.10 Transponder Control (GNX 375 Only)

The GNX 375 has a built in transponder with on screen controls for squawk code, mode, and additional transponder functions. The transponder is a 1090ES out, and 1090/UAT In device.

7.11 Depiction of Obstacles and Wires

7.11.1 Dedicated Terrain Page

The dedicated Terrain page will always depict point obstacles at zoom scales of 10 nm or less and depict wire obstacles at zoom scales of 5 nm or less. The obstacle or wire overlay icon (see Figure 4) will be shown near the bottom of the display when the obstacle or wire depiction is active based on the zoom scale.

NOTE

Only obstacles and wires within 2,000 feet vertically of the aircraft will be drawn on the Terrain page. It is therefore possible to have an obstacle or wire overlay icon displayed with no obstacles or wires being depicted on the display.

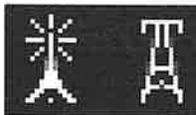


Figure 4 – Obstacle Overlay Icon (Left), Wire Overlay Icon (Right)

7.11.2 Map Page

The Map page may be configured to depict point obstacles and wire obstacles at various zoom scales by the pilot by using the Map page menu. The obstacle or wire overlay icon (see Figure 5) will be shown near the bottom of the display when the obstacle or wire overlay is active based on the current zoom scale and setting selected by the pilot.

The settings chosen by the pilot on the Map page menu (including obstacle and wire display ranges) are saved over a power cycle.

NOTE

Only obstacles and wires within 2,000 feet vertically of the aircraft will be drawn on the Map page. It is therefore possible to have an obstacle or wire overlay icon displayed with no obstacles or wires being depicted on the display.

NOTE

The Map page may be configured by the pilot to not show any obstacles or wires at any zoom scale.

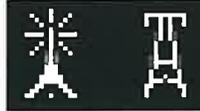


Figure 5 – Obstacle Overlay Icon (Left), Wire Overlay Icon (Right)

7.12 Flight Stream 510 (Optional)

The Flight Stream 510 is mounted in the GPS 175/GNC 355/GNX 375 SD card slot and includes a Wi-Fi transceiver. The Flight Stream product line uses a wireless transceiver to allow databases to be loaded onto the GPS 175/GNC 355/GNX 375 from a personal electronic devices (PEDs). Limitations regarding database operations are found in Section 2.14.

Garmin provides a list of tested and compatible devices that can be used with the Flight Stream. Connection to the Flight Stream may be possible with devices other than those on the supported device list, but Wi-Fi stability and wireless data integrity cannot be guaranteed.

For details about the Garmin supported devices and apps for use with the Flight Stream product line, please visit: http://garmin.com/connext/supported_devices

7.13 Built in Bluetooth

The GPS 175/GNC 355/GNX 375 have built in Bluetooth transceivers to allow PEDs to connect to the certified avionics. Data such as traffic, flight plan, datalink weather, and attitude information is sent from the GPS 175/GNC 355/GNX 375 to the PED. The PED is capable of sending flight plans to the GPS 175/GNC 355/GNX 375.

Garmin provides a list of tested and compatible devices that can be used with the GPS 175/GNC 355/GNX 375. Connection to the GPS 175/GNC 355/GNX 375 may be possible with devices other than those on the supported device list, but Bluetooth® stability and wireless data integrity cannot be guaranteed.

For details about the Garmin supported devices and apps for use with GPS 175/GNC 355/GNX 375 product line, please visit:

<https://fly.garmin.com/fly-garmin/support/>

7.14 Map Page

7.14.1 Configuration

The moving map and weather pages are capable of displaying a large quantity and variety of data. Map data is layered to ensure that data which is typically more critical is drawn above less critical data, however at some zoom scales and configurations the map may be cluttered with large amounts of data. Controls are provided on the Map and Weather pages for the pilot to select which data displayed, the declutter level, and the zoom scales at which data is added to or removed from the display. It is the responsibility of the pilot to select settings for the map page that will provide the display of data most appropriate to the operation being conducted.

7.15 Flight Plan Depiction

The map page depicts the current active flight plan. When an off-route Direct To is active the flight plan will no longer be depicted on the map.

7.16 User Defined Waypoints

When a User Defined Waypoint is created, a default name will automatically be provided, and the pilot is given the option to enter a different name for the waypoint. Pages which have the autofill function will prevent some waypoint names from being used. If it is desired to name the waypoint with a subset of the name of an existing waypoint in the database then this must be accomplished on the Waypoint Info / User Waypoints page.

7.17 Times and Distances

Time and Distance data to the next waypoint is always calculated from the present position to that waypoint and does not account for the path which may be flown (such as intercepting a course) to reach the waypoint.

When navigating using GPS guidance most legs are TO type legs where distance to the next waypoint decreases along the route. However, some procedures include FROM type legs. When navigating on a leg that is a FROM leg indications that it is a FROM leg include the TO/FROM flag indicating FROM and distances increasing in distance fields.

7.18 Direct-To Operations

When conducting Direct-To operations the Flight Plan tab provides a list of waypoints in the flight plan for which Direct-To is available. Some entries in the flight plan such as Holds and Course Reversals are not eligible for Direct-To and the pilot must instead select the associated waypoint if Direct-To operation is desired.

7.19 European Visual Reporting Points

If the GPS 175/GNC 355/GNX 375 is interfaced with a G500/600 PFD/MFD, and a flight plan in the GPS 175/GNC 355/GNX 375 contains a VRP, the G500/600 must have a database that contains the VRP in order to appropriately display the VRP on the MFD map. If the database on the PFD/MFD does not contain the VRP, the VRP will display on the MFD map as an intersection.

7.20 Advisory Visual Approaches

The GPS 175/GNC 355/GNX 375 will provide advisory visual approaches to many runways in the aviation database. Lateral guidance for the visual approach is aligned with the runway bearing. Vertical guidance is provided for those runways with VGSI information for distances up to 4.0NM from the runway. If a terrain database is installed in the GPS 175/GNC 355/GNX 375, the GPS 175/GNC 355/GNX 375 provides vertical guidance up to 28NM from the runway end unless the computed glideslope would impact terrain or obstacles from the database. If the projected impact point is under 28NM and greater than 4NM, the flight plan line for the approach is shortened to indicate where vertical guidance is active for the approach. If the terrain impact point is less than 4NM from the runway and there is no VGSI data available, vertical guidance is not provided for that approach. Lateral guidance is still available when vertical guidance is removed.

CDI and VDI indications are equivalent to those of other GPS-based approaches (e.g.- LPV or LNAV+V). The GPS 175/GNC 355/GNX 375 annunciates “VISUAL” in the annunciator bar to indicate a visual approach is active.

When loading, or activating the approach, the GPA and TCH information for that approach will be displayed on a popup. If there is no vertical guidance available, the popup will display “(NO VERTICAL GUIDANCE)”.

Visual approaches are intended to be used as an aid to situational awareness in VMC conditions. Visual approaches are advisory in nature and do not guarantee terrain and obstacle clearance for the approach runway.

7.21 Composite CDIs

When the GPS 175/GNC 355/GNX 375 is interfaced to a composite CDI indicator, the TO/From Flag will not function on the indicator, and a placard must be installed adjacent to the indicator. The placard must read: “TO/FROM FLAG WILL NOT FUNCTION CORRECTLY WHEN DISPLAYING GPS DEVIATION. USE TO/FROM INDICATION ON GPS.” and follow all placard guidelines in the Installation Manual.

These indicators will either show no To/From indication at all, or will only show the “TO” indication. Pilots must use the on screen TO/FROM indications when interfaced to these CDIs.



To/From Indication

Figure 6 - To/From Indication Location

7.22 Database Sync Compatibility

The GPS 175/GNC 355/GNX 375 units are capable of utilizing database sync completely between other GPS 175/GNC 355/GNX 375 units, as well as GI275 units. The GPS 175/GNC 355/GNX 375 are capable of a limited database sync from a G500 TXi and G600 TXi. Sync from the GPS 175/GNC 355/GNX 375 to the G500 TXi and G600 TXi is not supported.

7.23 Navigation Database

Discrepancies that invalidate a procedure should be reported to Garmin International. Navigation database discrepancies can be reported at FlyGarmin.com by selecting "Aviation Data Error Report." Flight crew and operators can view navigation database alerts at FlyGarmin.com then select "NavData Alerts."

If the navigation database cycle will change during flight, the flight crew must ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight.

7.24 Safetaxi

SafeTaxi functions do not comply with the requirements of AC 120-76D and are not qualified to be used as an airport moving map display (AMMD). SafeTaxi is to be used by the flight crew to orient themselves on the airport surface to improve flight crew situational awareness during ground operations.

7.25 RF Legs Types

7.25.1 RNP 1.0 RF Leg Types

This STC does not grant operational approval for RF leg navigation for those operators requiring operational approval. Additional FAA approval may be required for those aircraft intending to use the GPS 175/GNC 355/GNX 375 as a means to provide RNP 1 navigation in accordance with FAA Advisory Circular AC 90-105A.

AC 90-105A states that procedures with RF legs must be flown using either a flight director or coupled to the autopilot.

Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.7.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See Section 1.3.7 of this manual to determine if this capability is supported in this installation.

7.25.2 RNP 0.3 RF Leg Types

Garmin has demonstrated acceptable crew workload and Flight Technical Error for coupled procedures with RF legs when the GPS 175/GNC 355/GNX 375 installation complies with the limitations set forth in section 2.7 of this document. It is required to couple the autopilot for RNP 0.3 RF procedures. See section 1.3.7 of this manual to determine if this capability is supported in this installation.

7.26 Datalink Weather

Information provided by data link weather products may not accurately depict current weather conditions.

Due to time delays inherent in gathering and processing weather data for data link transmission, the weather information shown by the data link weather product may be significantly older than the indicated weather product age.

Not all TFRs and NOTAMS can be depicted on the GPS 175/GNC 355/GNX 375.

Datalink text weather is decoded for the convenience of the pilot, however it is possible that the decoding may be affected by anomalies in the data or differences in the units of measure between the decoding system and the text weather source. All text weather displayed on the GPS 175/GNC 355/GNX 375 also includes the raw weather text for pilot review.

7.27 Flight Planner/Calculator Functions

The Fuel Planning page uses Fuel on Board as entered by the pilot when on the Fuel Planning page. This *is not* a direct indication of actual aircraft fuel on board and those values are only used for the Fuel Planning page. The fuel required to destination is only a calculated and predicted value based on the data entered into the planner. It is not a direct indication of how much fuel the aircraft will have upon reaching the destination.

7.28 Glove Use / Covered Fingers

No device may be used to cover fingers used to operate the GPS 175/GNC 355/GNX 375 touchscreen unless the Glove Qualification Procedure located in the Pilot's Guide has been successfully completed. The Glove Qualification Procedure is specific to a pilot / glove / GPS 175/GNC 355/GNX 375 combinations.

7.29 GPS 175/GNC 355/GNX 375 Crossfill

Specific data will sync between GPS 175/GNC 355/GNX 375 units when installed in a dual navigator configuration. The following data will crossfill between the two GPS 175/GNC 355/GNX 375 units with CROSSFILL ON or OFF:

- User Waypoints
- FPL Catalog
- Traffic Alerts
- Missed Approach Popups
- Altitude Leg Popups
- Time Offset
- CDI Scale

The following unit changes will crossfill:

- Temperature
- NAV Angle
- Fuel

The following items are crossfilled only when the navigators are set to CROSSFILL ON:

- User Holds
- Approaches
- Flight Plan Changes
- Direct-To
- Selected OBS Course Changes

If data is not included in this list, it is not crossfilled. When the GPS 175/GNC 355/GNX 375 is interfaced with other non-GPS 175/GNC 355/GNX 375 Garmin navigators, there will likely be minor differences in the flight plan and course depictions based on the differences in the two navigators, even when crossfill is enabled. If the discrepancy is such that the pilot workload is affected, crossfill should be turned off, and operate using one navigator only.