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PR-C206IR-120M

Continued Maintenance Instructions

Cessna Model 206 Airplanes*

***For models TU206G, 206H, and T206H**

REVISION HISTORY

Revision	Date	Detail of Changes	By
1	05/29/2014	Original	LS
2	11/04/2014	Updated format	LS

Revision Control Procedure

Current revisions to this document are available at www.paravion.com. Before using, ensure this manual is current. **Do not use this manual if later FAA approved revisions are available.**

LIST OF EFFECTIVE PAGES

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1 INTRODUCTION; INFRARED CAMERA INSTALLATION, GENERAL

This installation includes removable mounting provisions and permanent basic electrical wiring for an infrared imaging system. This may be referred to as thermal or forward looking infrared (FLIR), and may have visible light (Color Daylight) capability. The system is powered from the aircraft non-essential avionics buss. Operation of the system is via a hand controller and monitor installation to assist the observer in pointing the imager. Features and functions of the imaging system are fully described by the manufacturer's product data.

1.1 MAJOR COMPONENTS DESCRIPTION

- 1.1.1 Installation Configuration (drawing C206IR-100-(X)) showing general configuration and location of major components.
- 1.1.2 Support Installation (drawing C206IR-101-(X)), showing support extending through the baggage compartment door at F.S. 98.5,
- 1.1.3 Equipment Cabinet Installation (drawing C206IR-201-(X)), showing mounting hardware for electronic equipment.
- 1.1.4 Equipment Installation (drawing C206IR-251-(X)) showing monitor and ECU mounting.
- 1.1.5 Electrical Installation (drawing C1206R-301-(X)) showing schematic representation of installed electrical wiring to operate the imaging system from the avionics non-essential buss.
- 1.1.6 Gimbal Adaptor (drawings IR-400-(X), IR-420-(X)) for mounting the imaging gimbal to the support.
- 1.1.7 A handheld control unit for the Imaging Gimbal functions (ref. manufacturer's operations data).

Note: The Imaging unit (Gimbal), Electronic Control Unit, Hand Held Control Unit and Monitor are Line Replaceable Units. The appearance and electrical interface of these units may vary. Maintenance in the field is limited to removal and replacement of the units only. Maintenance personnel are advised to contact the system manufacturer for current information on these items.

2 INSPECTION AND MAINTENANCE

It is the objective of this inspection and maintenance procedure to ensure that component installations are secure and that the electrical system is airworthy. See Troubleshooting Procedures table for most likely problems which may be encountered, as it outlines the appropriate corrective actions. Use torque values for specific fasteners as described on the installation drawings or imager manufacturers manual and standardized values shown in Table 4 for all other loose or replaced fasteners.

NOTE: Please refer to the applicable troubleshooting chapter in the latest revision of the imager manufacturer's manual for any imager system troubleshooting procedures.

2.1 TOOLS, EQUIPMENT AND CONSUMABLES

Servicing of the infrared camera provisions system requires the use of certain tools.

2.1.1 TOOLS AND EQUIPMENT

- A. Multi-meter that reads in volts DC, Ohms
- B. Calibrated torque wrench as applicable
- C. Standard hand tools

2.1.2 CONSUMABLES

- A. Anti-Seize Technology “Molly-Spray”, P/N 12014 (Recommended). Refer to installation drawings for other needed consumables.

2.2 RECOMMENDED INSPECTION & TROUBLESHOOTING PROCEDURES

It is the objective of this inspection and troubleshooting procedure to ensure that component installations are secure and that the mechanical and electrical system(s) are airworthy.

There may be a time when the system does not operate and/or perform in accordance with information contained herein. Therefore, it is necessary for the service personnel to diagnose the discrepancy by troubleshooting the system and its components. The following checklist describes the most likely problem sources which may be encountered:

Table 1 - Trouble Shooting Procedures

TROUBLESHOOTING PROCEDURES		
PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
A. No system power	1. Gnd. power not connected. 2. Aircraft power switch off 3. Wiring installation inoperative	1. Plug in gnd. power cart 2. Energize power switch 3. Inspect/Repair elect. wiring
B. Power on but system will not operate	1. I/R circuit breaker off 2. I/R circuit breaker failed 3. I/R power switch failed	1. Energize circuit breaker 2. Replace 3. Replace
C. System operates but has no image	1. Monitor off 2. Imager inoperative 3. ECU inoperative 4. Power/signal cable disconnected or cut.	1. Activate monitor 2. Remove for servicing* 3. Remove for servicing* 4. Connect or replace cable
D. Gimbal control failure	1. Control Circuits inoperative 2. Hand controller inoperative 3. Signal loss	1. Remove for servicing* 2. Replace hand controller* 3. Remove for servicing*
E. Monitor Failure	1. Monitor inoperative	Remove and Replace Unit*

*Refer to Camera System Manufacturer's Instructions. Remove and replace as necessary.

3 COMPONENT REMOVAL AND REPLACEMENT

Gain Access to component location. Refer to the appropriate Cessna 206 maintenance manual per aircraft model as applicable and Paravion Technology Inc. Installation Drawings and Installation Instructions PR-C206IR-900M.

NOTE: When mounting components are removed, and replaced, follow specific torque recommendations given on the installation drawings and Table 4 of this document. System operation must be tested before return to service when new or repaired components are installed, or repairs to the onboard electrical installation are made.

3.1 Gimbal Installation

- 3.1.1 Reference drawing C206IR-100, C206IR-101, remove safety clip and unscrew and slide out the locking knob located at the open end of the mount assembly. Slide the support plate fully into the mount assembly rails.
- 3.1.2 Reinstall the locking knob, hand-tighten to remove all play between the imager support plate and mount assembly. Assure full engagement of threads in nutplate, install the safety clip.
- 3.1.3 Assure that the aircraft battery switch is OFF. Install power supply/control cables to their proper receptacles. **NOTE:** Cable connector ends are normally matched to mating receptacles. Refer to the camera system manufacturer's technical data to insure proper cables installation.

3.2 Gimbal Removal

- 3.2.1 Assure that the aircraft battery switch is OFF, before removing electrical cables from the gimbal installation.
- 3.2.2 Remove the safety clip, unscrew and slide out the locking knob out of the way. Slide the support plate out of the mount assembly rails.
- 3.2.3 Remove and stow connecting cables, reinstall locking knob and safety clip.

3.3 Hand Held Control Unit Installation

- 3.3.1 Assure that the aircraft battery switch is OFF.
- 3.3.2 Connect control cable to9 proper electronics unit receptacle.

3.4 Hand Held Control Unit Removal

- 3.4.1 Assure that the aircraft battery switch is OFF.
- 3.4.2 Remove and stow the control and connecting cable(s).

3.5 Equipment Removal

When aircraft mission requirements are revised, or to facilitate inspection, it may be necessary also to remove the electronic control unit (ECU), the equipment cabinet/monitor installation, and the (gimbal/ECU) mount assembly. The order in which these units should be removed is not defined.

- 3.5.1 When removing or installing the ECU, assure battery/external power is OFF. Disconnect and remove electrical cables at ECU. Remove safety clip, loosen the locking knobs and move the sliding locks away from the keyways in the rail assembly. Slide ECU out of keyways and remove. Cables must be properly stowed or completely removed when not in use.
- 3.5.2 When removing or installing the mount inner tube assembly, disconnect cables and remove gimbal and ECU as applicable. Remove the through bolt, end caps and inner tube assembly with electrical cables. Install end cover plug, hand tighten. Assure security of cover plug and install safety clip per drawing. To remove remaining support assembly for aircraft inspection or maintenance, remove fasteners attaching support legs to aircraft floor.
- 3.5.3 When removing equipment cabinet/monitor installation, disconnect monitor cables and remove monitor from mount, stow cables not in use. Disconnect cabinet electrical cables, remove safety bolt from bottom of cabinet and slide cabinet aft to disengage keyway slots, remove cabinet. Remove or stow cables and equipment when not in use. Loosen clamp screws to facilitate ease of plate removal, remove aft safety clips and slide plate off seat rails.

3.6 Equipment Installation

- 3.6.1 Install equipment in reverse order of removal,
NOTE: See section 4, "System Servicing" for lubrication instructions.
Torque mount inner tube through bolt and all other fasteners as specified on drawing C206IR-101 and Table 4 of this document.

3.7 Components Service

NOTE: System functional testing should be conducted per imager manufacturer's instructions only in low light intensity areas. Do not view high intensity light such as direct sunlight, searchlights, strobes etc.

Repairs are limited to removal and replacement of the infrared camera system components and wiring harness with the exception of repairs to the aircraft wiring from the aircraft power source to the ECU power receptacle. Contact Paravion Technology Inc. or imager

manufacturer for correct replacement parts of special instructions. Adjust the aircraft Weight and Balance records accordingly (reference Table 2) when operating the aircraft with equipment removed.

3.8 Electrical Circuits & Wiring

Replace electrical components with equivalent units obtained from or approved by Paravion Technology Inc., Cessna Aircraft Corp., or the imaging equipment manufacturer as applicable. Refer to current manufacturer's instructions and AC43.13-1B for acceptable practices during electrical repair procedures.

4 SYSTEM SERVICING

Special servicing instructions: Lubricate mount through bolt threads with a dry film molybdenum disulfide compound such as Anti-Seize Technology "Molly-Spray", P/N 12014 per manufacturer's instructions prior to installation.

NOTE: Consult imaging system manufacturer for imaging system servicing information.

Table 2 Weight and Balance Data

C206IR-100 Weight and Balance Data					
Item	Longitudinal			Lateral	
	Weight	F.S.	Moment	B.L.	Moment
	(lb)	(in)	(in-lbs)	(in)	(in-lbs)
Standard Gimbal Adapter	4.0	135	540	-24.9	
-3 Isolated Gimbal Adapter	8.2	135	1107	-24.9	
†MK-I or MK-II Gimbal	28	135	3780	-24.9	
†U7000 Gimbal	26.0	135	3510	-24.9	
†U7500 Gimbal	26.4	135	3564	-24.9	
†U8000 or U8500 Gimbal	29.0	135	3915	-24.9	
‡POP 200 Gimbal	36.4	135	4914	-24.9	
†MK-I or MK-II ECU	11.0	135	1485	-2.8	
†U7000 or U7500 ECU	8.5	135	1148	-2.8	
†U8000 ECU	14.9	135	2012	-2.8	
†U8500 ECU	15.5	135	2093	-2.8	
Equipment Cabinet Installation	(7.7)*	(75)**	(577.5)**		

*Carbon Fiber Cabinet P/N C182IR-2010-2, if P/N C182IR-2010-1 Aluminum Cabinet is installed, 15 lb.

**Fuselage Station may vary. Moment must be calculated for actual weight and C.G. location.

†FLIR© Corp. imager

‡IAI © imager

This data is generally applicable, actual aircraft weight and center-of-gravity must be verified by weighing after system installation. Refer to the appropriate Cessna maintenance or flight manual as applicable.

Table 3. Annual/100 Hour Inspection Checklist

INSPECTION (Infrared Camera System)	COMMENTS	INITIALS
1. Visually inspect Mount fasteners for security. Inspect Mount Assembly, adjacent aircraft structure for condition. Replace damaged, worn and /or corroded components and fasteners as needed.		
2. Visually check Gimbal Adapter Assembly for condition, security of components. Replace damaged/worn/ corroded components and fasteners as needed.		
3. Visually check Gimbal Assembly for condition, security of components. Refer to IR system manufacturer's data for component serviceable use limits.		
4. Check Electronics Unit Installation for security, operation of safety locking hardware. Replace damaged/worn/ corroded components and fasteners as needed. Refer to IR system manufacturer's data for Electronics Unit serviceable use limits.		
5. Check Monitor, Equipment Cabinet Assembly and installation for condition, security of components, and attachment to seat rails, safety hardware and affected cabin floor. Replace or repair damaged or corroded components and fasteners as needed.		

Table 3. Annual/100 Hour Inspection Checklist (continued)

6. Visually inspect circuit breaker, switch installation, connectors for function, security, electrical cabling wiring for insulation damage and operation. Evaluate cable routing; any sign of arcing/damage must be addressed, by replacement or repair.		
7. Torque all reinstalled or loose fasteners in accordance with installation drawing recommendations and Table 4.		

5 TORQUE VALUES

Table 4 - Torque Values (in-lbs)

CAUTION THE FOLLOWING TORQUE VALUES ARE DERIVED FROM OIL FREE CADMIUM PLATED THREADS.					
		TORQUE LIMITS RECOMMENDED FOR INSTALLATION (BOLTS LOADED PRIMARILY IN SHEAR)		MAXIMUM TORQUE LIMITS	ALLOWABLE TIGHTENING
Thread Size	Tension type nuts MS20365 and AN310 (40,000 psi in bolts)	Shear type nuts MS20364 and AN320 (24,000 psi in bolts)	Nuts MS20365 and AN310 (90,000 psi in bolts)	Nuts MS20364 and AN320 (54,000 psi in bolts)	
FINE THREAD SERIES					
8-36	12-15	7-9	20	12	
10-32	20-25	12-15	40	25	
1/4-28	50-70	30-40	100	60	
5/16-24	100-140	60-85	225	140	
3/8-24	160-190	95-110	390	240	
7/16-20	450-500	270-300	840	500	
1/2-20	480-690	290-410	1100	660	
9/16-18	800-1000	480-600	1600	960	
5/8-18	1100-1300	600-780	2400	1400	
3/4-16	2300-2500	1300-1500	5000	3000	
7/8-14	2500-3000	1500-1800	7000	4200	
1-14	3700-5500	2200-3300*	10,000	6000	
1-1/8-12	5000-7000	3000-4200*	15,000	9000	
1-1/4-12	9000-11,000	5400-6600*	25,000	15,000	
COARSE THREAD SERIES					
8-32	12-15	7-9	20	12	
10-24	20-25	12-15	35	21	
1/4-20	40-50	25-30	75	45	
5/16-18	80-90	48-55	160	100	
3/8-16	160-185	95-100	275	170	
7/16-14	235-255	140-155	475	280	
1/2-13	400-480	240-290	880	520	
9/16-12	500-700	300-420	1100	650	
5/8-11	700-900	420-540	1500	900	
3/4-10	1150-1600	700-950	2500	1500	
7/8-9	2200-3000	1300-1800	4600	2700	
<p>The above torque values may be used for all cadmium-plated steel nuts of the fine or coarse thread series which have approximately equal number of threads and equal face bearing areas. * Estimated corresponding values.</p>					

Reference AC43.13-1B Table 7-1 Recommended Torque Values

6 REFERENCES

FAA publication AC43.13-1B Acceptable Methods, Techniques and Practices, Aircraft Inspection & Repair

FAA publication AC43.13-2B Acceptable Methods, Techniques and Practices, Aircraft Alterations

Cessna 206(X) Maintenance Manual(s) and service information

The following Paravion Technology Inc. Documents:

Drawing C206IR-100-(X) System Configuration

Drawing C206IR-101-(X) Support Installation

Drawing C206IR-201-(X) Equipment Cabinet Installation

Drawing C206IR-251-(X) Equipment Installation

Drawing C206IR-301-(X) Electrical Installation

Drawing IR-400-(X) Gimbal Adaptor Assembly

Drawing IR-420-(X) Isolated Gimbal Adaptor Assembly

PR-C206IR-900M Installation Instructions

PR-C206IR-100M Flight Manual Supplement