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| AVIONICS OPERATIONAL TEST STANDARDS FOR CONTRACT-REQUIRED EQUIPMENT |
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December 1, 1998

The following operational test standards shall be applied to all contractually required avionics equipment.

| ITEM | STANDARD |
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| 1. <u>INSTALLATIONS, MAINTENANCE AND OTHER ITEMS:</u> | |
| A. Visual Inspection: | Inspect for obvious damage, inoperative displays, missing or incorrect parts, and proper labeling. |
| B. Antennas, Mounting & Installation: | Forward:reverse ratio of 2.5:1 or better, broadband, aircraft type, rigidity, doubling plates, proper bonding, RF cable (RG-58 A/U or equivalent), security, proper wire size. |
| C. Schematics/wiring Diagrams: | Presence, coverage of required systems. |
| D. Accessory Power Source: | |
| 1. Connector: | Installed, proper location, polarity, voltage at correct pins. |
| 2. Circuit Breaker: | Size, operation. |
| 2. <u>COMMUNICATIONS SYSTEMS:</u> | |
| A. ELT: | |
| 1. Type: | TSO-C91, TSO-C91a or TSO-126. |
| 2. Mounting: | Per TSO (i.e. if TSO-C91a/C126 to structure, per Manufacturer instructions). |
| 3. Antenna: | External, proper mounting, correct location, portable antenna available (AP type). |
| 4. G-Switch: | Subject ELT to a quick jerking motion. |
| 5. Battery Date: | ELT and remote (if applicable) dates not expired, matching dates on ELT and in logbook. |
| 6. Operation: | Manually operates, PRF acceptable, remote function and indication. |
| 7. Remote Location: | Visible & accessible to pilot. |
| B. VHF-AM Transceiver: | |
| 1. Type: | Selectable frequencies in 25 kHz increments. |
| 2. Operation: | To & from service monitor. |
| a. Receiver: | Squelch breaks at an acceptable level. |
| b. Transmitter: | Modulation from 15% to 85%, frequency within 4 kHz. |
| C. VHF-FM Transceiver: | |
| 1. Type: | Meets AERONAUTICAL VHF-FM RADIO TRANSCEIVER SPECIFICATIONS. |
| 2. Power Output: 10 watts nominal value. | |
| 3. VSWR: | Forward:reverse ratio of 2.5:1 or better @ 150, 160 & 170 MHz. |
| 4. Antenna: | Comant CI-177 or equivalent, installation & mounting. |
| 5. CTCSS Tone Encoder: | 39 TIA/EIA-603 standard tones, 600 to 700 Hz level, frequency within 1.5 Hz. |
| 6. Guard Receiver: | Squelch breaks @ 1 to 2 uV with direct connection at 168.625 MHz, audio output of at least 100 mV, less than 10% distortion. |
| 7. Guard Transmitter: | Quickly selectable, operates @ 168.625 MHz. |

8. Main Receiver: Squelch breaks @ 1 to 2 uV with direct connection at 150, 160 and 170 MHz, audio output of at least 100 mV, less than 10% distortion.
9. Main Transmitter: Frequency within 750 Hz, wideband deviation 3 to 5 kHz, narrowband deviation 1.5 to 2.5 kHz.
10. Mounting: Meeting AC 43.13-2A, controls equally convenient to pilot and observer/co-pilot.

D. AUX-FM Provisions:

1. Operation: Check RX & TX functions through audio system(s), sidetone available.
2. VSWR: Forward:reverse ratio of 2.5:1 or better @ 150, 160 & 170 MHz.
3. Antenna: Comant CI-177 or equivalent, installation & mounting.
4. Mounting Facilities: Available meeting AC 43.13-2A, within 18" of AUX-FM connectors, controls convenient to observer/co-pilot.
5. Connectors: MS3112E-12-10S and female BNC bulkhead mounted.

E. Public Address System: Acceptable operation.

F. IFR Aircraft (or individually required systems):

1. VHF-AM Transceivers: See above.
2. VOR's: Maximum bearing error of plus or minus 4 degrees, maximum variation between dual systems of 4 degrees, logbook entry for IFR 30 day check.
3. ILS: Maximum error of Mounting Facilities: Available meeting AC 43.13-2A, within 18" or minus 2 degrees
5. Marker Beacon: Indicator operation, acceptable sensitivity.
6. DME: Proper distance to ground station.
7. Weather Radar: Acceptable operation.
8. Radar Altimeter: Acceptable operation.

G. Fuel Service Vehicle VHF-FM Mobile Radio:

1. Operational Check: Proper RX & TX operation.
2. Power Output: 30 watts minimum.
3. VSWR: Forward:reverse ratio of 2.5:1 or better @ 150, 160 & 170 MHz.
4. Antenna: Antenna Specialists ASP-1495, Maxrad MWB-5803, or equivalent, installation & mounting.
5. CTCSS Tone Encoder: 39 TIA/EIA-603 standard tones, 600 to 700 Hz level, frequency within 1.5 Hz.
6. Receiver: Squelch breaks @ .25 to .5 uV with direct connection at 150, 160 and 170 MHz, audio output of at least 100 mV, less than 10% distortion.
7. Transmitter: Frequency within 750 Hz, wideband deviation 3 to 5 kHz, narrowband deviation 1.5 to 2.5 kHz.
8. Field Programmability: Contractor demonstration.

H. Ground Proximity Warning System: Installed.

I. Cockpit Voice Recorder: Installed, proper mic & audio system operation

J. Flight Data Recorder: Installed.

3. NAVIGATION SYSTEMS:

A. GPS:

1. Type: Panel mounted, aviation type.

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| 2. Installation & approval: | Convenient to both pilot and observer/co-pilot, FAA approval or FAA approval pending. |
| 3. Operation: | Correct present position or lock-on. If database over 2 years old, suggest update. |
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| B. GPS Data Connector: | Proper installation of 9 pin "D" connector. |
| C. GPS Additional Antenna: | Proper installation and contractually required connector. |
| D. Transponder, Altitude Encoder, and Pitot-Static Systems : | 14 CFR 91.411 & 91.413 logbook entries not expired. |

4. AUDIO SYSTEMS:

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| A. Audio Control System: | |
| 1. Required controls: | TX selectors, individual RX select switches, separate RX & ICS audio level controls. |
| 2. Location: | Convenient to pilot and observer/co-pilot. |
| 3. Labeling: | Legible, understandable, permanent. |
| 4. Operation: | |
| a. TX Select: | Selects proper radio & companion receiver. |
| b. RX Select: | Selects proper radio. |
| c. ICS & RX Volume: | Proper operation. |
| d. Sidetone: | Present for each transmitter. |
| 5. Specifications: | |
| a. Hum, Noise & Crosstalk: | 40 db below specified audio output. |
| b. Specified Audio Output: | 100 mW with an input of 250 mV, both @ 600 ohms. |
| c. Distortion: | Less than 10%. |
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| B. Rappel Audio Control System Requirements: | |
| 1. Additional Audio Control System: | Installed at spotter's location & meets above specifications. |
| 2. Hot Mic for Spotter: | Proper operation. |

5. INTERCOMMUNICATIONS SYSTEM (ICS)

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| A. Available at required positions: | Per contractually required locations. |
| B. Operation: | Proper audio & mic operation at each required position. |
| C. Hot Mic/Vox: | Presence per contract requirements, and proper operation. |
| D. PTT & Volume controls: | Presence per contract requirements, and protocol System Requirements |
| 1. Additional Audio & Crosstalk: | Installed at spotpecified audio output. |
| 2. Specified Audio Output: | 100 mW with an input of 250 mV, both @ 600 ohms. |
| 3. Distortion: | Less than 10%. |