



Chapter 04: Avionics Operations

03. Installation and Configuration

Install and configure avionics equipment according to manufacturer specifications and regulatory requirements while ensuring proper system integration.

Purpose

This process establishes procedures for proper installation and configuration of avionics equipment to ensure compliance with manufacturer specifications, regulatory requirements, and safe system integration. The process ensures all installations are performed using approved methods and properly integrated with existing aircraft systems.

Roles and Responsibilities

Avionics Technician:

- Conduct avionics system assessments and repairs
- Prepare detailed work scope and time estimates
- Document component requirements and procedures
- Coordinate with parts department for availability
- Ensure regulatory compliance for avionics work

A&P Mechanic:

- Execute assigned maintenance tasks per specifications
- Review work order technical requirements
- Provide technical input for work scope estimates
- Document completion status and discrepancies
- Ensure regulatory compliance in all maintenance work

Chief of Maintenance:

- Review and approve complex or high-value work orders
- Assign qualified technicians to specific maintenance tasks
- Ensure regulatory compliance for all maintenance work
- Resolve scheduling conflicts and resource allocation issues
- Oversee maintenance quality and safety standards

Process Steps

Pre-Installation Preparation Phase

- **Review approved data** - Study manufacturer installation instructions, STCs, and approved modifications for specific aircraft model
- **Prepare installation plan** - Develop step-by-step installation sequence considering aircraft systems integration and access requirements
- **Gather tools and materials** - Collect all required tools, hardware, and materials specified in installation instructions
- **Prepare aircraft** - Position aircraft in appropriate work area and remove panels or components as required for access

Physical Installation Phase

- **Install mounting hardware** - Mount equipment racks, trays, and brackets according to manufacturer specifications and structural requirements
- **Route wiring and cables** - Install wiring harnesses following approved routing and separation requirements for electromagnetic compatibility
- **Connect power and signal cables** - Make electrical connections according to wiring diagrams ensuring proper pin assignments and connection security
- **Install antennas and sensors** - Mount external antennas and sensors in approved locations with proper grounding and weather sealing

System Configuration Phase

- **Power up system** - Apply power to installed equipment and verify proper operation of power supply and protection circuits
- **Configure system parameters** - Program equipment settings according to aircraft-specific requirements and operational needs
- **Calibrate system functions** - Perform required calibration procedures for navigation, communication, and flight management systems
- **Verify system integration** - Test interaction with existing avionics systems and verify proper data sharing and compatibility

Testing and Verification Phase

- **Conduct functional testing** - Execute complete system functional tests according to manufacturer test procedures

- **Perform integration testing** - Verify proper operation with other aircraft systems and absence of interference or conflicts
- **Complete ground testing** - Conduct all required ground tests including communication checks and navigation system verification
- **Document test results** - Record all test results and configuration settings in installation documentation

Process Mapping

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Pre-Installation Planning → Physical Installation → Wiring and Connections → System Configuration → Functional Testing → Integration Verification → Documentation → Return to Service

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Tools and Resources

Installation Tools:

- Precision Torque Wrenches and Drivers
- Wire Crimping and Termination Tools
- Cable Routing and Support Hardware
- Drilling and Mounting Equipment

Test Equipment:

- Avionics System Test Sets
- Communication and Navigation Test Equipment
- Digital Multimeters and Signal Analyzers
- Antenna and RF Test Equipment

Documentation:

- Manufacturer Installation Instructions
- Aircraft Wiring Diagrams and Schematics
- STC Installation Data and Procedures
- Configuration and Calibration Procedures

Success Metrics

- **Completion Time:** Standard avionics installation completed within manufacturer estimated time plus 20% for quality assurance.
- **Quality Standard:** 100% of installations pass functional testing and quality inspection on first attempt.
- **Safety Standard:** Zero installation-related system failures or safety issues within 90 days of completion.
- **Client Satisfaction:** Client approval rating of 4.8/5 for installation quality and system performance.

Common Issues and Solutions

- **Issue:** Interference between newly installed equipment and existing avionics systems
- **Solution:** Verify proper wiring separation and shielding installation, check for ground loops or improper connections, and consult manufacturer technical support for interference mitigation techniques

Issue: Configuration parameters not properly set resulting in system malfunction

Solution: Review manufacturer configuration procedures, verify aircraft-specific settings requirements, and use manufacturer programming software or tools to ensure proper parameter settings

Issue: Physical installation conflicts with aircraft structure or existing equipment

Solution: Review installation instructions for alternate mounting locations, consult with aircraft manufacturer or STC holder for approved modifications, and consider custom brackets or adapters if approved by engineering

Safety Considerations

- **⚠ WARNING:** Verify all electrical connections are secure and properly torqued to prevent in-flight failures that could result in loss of critical avionics functions

⚡ CAUTION: Ensure proper ESD protection during installation to prevent damage to sensitive electronic components

i NOTE: All installations must comply with approved data including manufacturer instructions, STCs, or field approvals to maintain aircraft airworthiness

✅ BEST PRACTICE: Conduct thorough pre-installation planning to identify potential conflicts and ensure all required materials and tools are available before beginning work

Regulatory References

- **14 CFR Part 43** - Maintenance, Rebuilding, and Alteration requirements for avionics installation
- **14 CFR Part 145.109** - Equipment, tools, and materials requirements for installation work
- **AC 43.13-1B** - Acceptable Methods, Techniques, and Practices for avionics installation
- **AC 20-136B** - Protection of Aircraft Electrical/Electronic Systems Against Lightning Effects
- **TSO Standards** - Technical Standard Orders for installed avionics equipment certification