Chapter 04: Avionics Operations

09. Test Equipment Calibration

Maintain and calibrate avionics test equipment to ensure accurate measurements and reliable test results for all avionics operations.

Purpose

This process establishes procedures for maintaining and calibrating avionics test equipment to ensure accurate measurements and reliable test results for all avionics operations. The process ensures all test equipment meets accuracy requirements and maintains traceability to national standards to support regulatory compliance and quality assurance.

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

Calibration Planning and Scheduling Phase

- **Establish calibration schedules** - Determine calibration intervals based on manufacturer recommendations and usage requirements
- **Identify calibration requirements** - Review equipment specifications and determine required calibration parameters and tolerances
- **Select calibration providers** - Choose qualified calibration laboratories with appropriate certifications and capabilities
- **Schedule calibration services** - Coordinate calibration timing to minimize operational impact while maintaining compliance

Pre-Calibration Preparation Phase

- **Review equipment condition** - Inspect equipment for damage or conditions that might affect calibration accuracy
- **Gather calibration history** - Review previous calibration records and identify any recurring issues or trends
- **Prepare equipment for shipment** - Package equipment properly for transport to calibration facility
- **Document equipment status** - Record equipment condition and last use before calibration service

Calibration Service Coordination Phase

- **Ship equipment for calibration** - Coordinate with calibration laboratory for equipment receipt and service scheduling
- **Monitor calibration progress** - Track calibration status and coordinate with laboratory for any issues or delays
- **Review calibration results** - Examine calibration certificates and test results for compliance and accuracy
- **Process out-of-tolerance conditions** - Evaluate impact of any out-of-tolerance conditions on previous measurements

Post-Calibration Processing Phase

- **Update calibration records** - Enter calibration data into equipment tracking system and update calibration status
- **Apply calibration labels** - Attach current calibration labels showing calibration date and next due date
- **Return equipment to service** - Make calibrated equipment available for operational use with updated

status
- **Document calibration completion** - Complete calibration records and file certificates in equipment documentation

Process Mapping

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Calibration Planning → Schedule Coordination → Equipment Preparation → Calibration Service → Results Review → Record Updates → Equipment Return → Documentation

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Tools and Resources

Calibration Management:

- Equipment Inventory and Tracking System
- Calibration Schedule Management Software
- Calibration Certificate Filing System
- Equipment Performance Monitoring Tools

Service Providers:

- Accredited Calibration Laboratories
- Manufacturer Calibration Services
- Portable Calibration Service Providers
- Equipment Repair and Calibration Specialists

Documentation:

- Calibration Procedures and Standards
- Equipment Specifications and Requirements
- Calibration Certificates and Records
- Traceability Documentation Requirements

Success Metrics

- **Completion Time:** Equipment calibration completed within scheduled intervals with zero overdue items.
- **Quality Standard:** 98% of equipment passes calibration within specifications on first attempt.

- **Safety Standard:** All test equipment maintains required accuracy for safety-critical measurements.
- **Client Satisfaction:** Zero measurement errors or quality issues due to equipment calibration problems.

Common Issues and Solutions

- **Issue:** Test equipment fails calibration or shows out-of-tolerance conditions
- **Solution:** Evaluate impact on previous measurements and work performed, implement corrective actions for affected work if required, and consider equipment replacement if recurring calibration failures occur

Issue: Calibration schedules not maintained resulting in overdue equipment

Solution: Implement automated calibration reminder systems, establish backup equipment for critical functions, and coordinate calibration schedules with operational requirements to prevent disruptions

Issue: High calibration costs affecting budget and operational efficiency

Solution: Evaluate equipment utilization and consider consolidating similar capabilities, negotiate volume discounts with calibration providers, and implement preventive maintenance to extend calibration intervals

Safety Considerations

- ⚠️ **WARNING**: Never use test equipment that is overdue for calibration or shows questionable accuracy as inaccurate measurements may result in unsafe aircraft conditions

⚡ **CAUTION**: Handle calibration equipment carefully during transport and storage to prevent damage that could affect accuracy

ℹ️ **NOTE**: All test equipment must maintain traceability to national standards through accredited calibration laboratories

✅ **BEST PRACTICE**: Maintain backup equipment for critical functions to ensure continuous operations during calibration periods

Regulatory References

- **14 CFR Part 145.109** - Equipment, tools, and materials requirements including calibration
- **ISO/IEC 17025** - General requirements for the competence of testing and calibration laboratories
- **ANSI/NCSL Z540** - Calibration requirements for measuring and test equipment
- **AC 43.13-1B** - Acceptable Methods, Techniques, and Practices for test equipment requirements
- **FAA Order 8900.1** - Flight Standards Information Management System calibration guidance