Chapter 04: Avionics Operations

05. Modification and STC Implementation

Execute avionics modifications and Supplemental Type Certificate (STC) installations ensuring regulatory compliance and proper documentation.

Purpose

This process establishes procedures for implementing avionics modifications and Supplemental Type Certificate (STC) installations to ensure full regulatory compliance, proper documentation, and safe integration with existing aircraft systems. The process ensures all modifications are performed according to approved data and maintain aircraft airworthiness certification.

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

STC Research and Approval Phase

- **Research applicable STCs** - Identify appropriate STCs for desired modification and verify applicability to specific aircraft model
- **Verify STC validity** - Confirm STC is current and valid with no superseding modifications or regulatory changes
- **Review regulatory requirements** - Study all applicable regulations and compliance requirements for proposed modification
- **Obtain STC documentation** - Acquire complete STC package including instructions, drawings, and compliance documentation

Pre-Modification Planning Phase

- **Develop modification plan** - Create detailed implementation plan following STC instructions and identifying required resources
- **Assess aircraft compatibility** - Verify aircraft configuration matches STC applicability and identify any conflicts with existing modifications
- **Coordinate parts procurement** - Order all required parts and materials specified in STC instructions with proper traceability
- **Schedule modification work** - Plan modification timeline considering aircraft availability and complexity of work required

Modification Implementation Phase

- **Prepare aircraft** - Position aircraft and remove required panels or components for modification access
- **Execute modification procedures** - Perform modification work strictly according to STC instructions and approved procedures
- **Install modification components** - Mount new equipment and make required electrical and mechanical connections per STC requirements
- **Conduct intermediate inspections** - Perform required inspections at critical points during modification process

Testing and Compliance Verification Phase

- **Perform functional testing** - Execute all required tests specified in STC instructions to verify proper modification operation
- **Conduct compliance testing** - Verify modification meets all regulatory requirements and performance

standards

- **Complete integration testing -** Test interaction with existing aircraft systems and verify no adverse effects
- **Document test results -** Record all test data and compliance verification results in modification records

Process Mapping

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STC Research → Regulatory Review → Modification Planning → Parts Procurement → Implementation → Testing → Compliance Verification → Documentation → Airworthiness Certification

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Tools and Resources

Regulatory Documentation:

- Current STC Instructions and Drawings
- FAA Type Certificate Data Sheets
- Applicable Airworthiness Directives
- Regulatory Compliance Checklists

Technical Resources:

- Aircraft Maintenance Manuals
- Wiring Diagrams and Schematics
- Manufacturer Technical Support
- Specialized Modification Tools

Testing Equipment:

- System-Specific Test Equipment
- Performance Verification Tools
- Compliance Testing Instruments
- Documentation and Recording Systems

Success Metrics

- **Completion Time:** STC modifications completed within STC estimated time plus 30% for regulatory

compliance verification.
- **Quality Standard:** 100% of modifications pass regulatory compliance inspection on first attempt.
- **Safety Standard:** All modifications maintain or improve aircraft safety with zero modification-related incidents.
- **Client Satisfaction:** Client approval rating of 4.9/5 for modification quality and regulatory compliance.

Common Issues and Solutions

- **Issue:** STC instructions unclear or incomplete for specific aircraft configuration
- **Solution:** Contact STC holder for clarification and additional guidance, consult with FAA engineering for interpretation, and document any approved deviations or alternate methods

Issue: Modification conflicts with existing aircraft equipment or previous modifications

Solution: Review aircraft modification history and equipment lists, consult with STC holder and aircraft manufacturer for compatibility guidance, and consider alternate modification approaches if approved

Issue: Required compliance testing cannot be completed due to equipment or facility limitations

Solution: Coordinate with authorized testing facilities or laboratories, consider outsourcing specialized testing requirements, and ensure all testing meets STC requirements before completion

Safety Considerations

- ⚠️ **WARNING**: All modifications must be completed exactly according to STC instructions as deviations may void airworthiness certification and create unsafe conditions

⚡ **CAUTION**: Verify modification compatibility with all existing aircraft systems to prevent adverse interactions that could affect flight safety

ℹ️ **NOTE**: Maintain complete documentation of all modification work as required for regulatory compliance and future maintenance reference

✅ **BEST PRACTICE**: Conduct thorough pre-modification planning and coordination to identify potential issues before beginning modification work

Regulatory References

- **14 CFR Part 21** - Certification Procedures for Products and Parts including STC requirements
- **14 CFR Part 43** - Maintenance, Rebuilding, and Alteration standards for modifications
- **14 CFR Part 145** - Repair Station Operating Certificate requirements for modifications

- **AC 21-40** - Guide for Obtaining a Supplemental Type Certificate
- **FAA Order 8110.4** - Type Certification including STC processing procedures