Revising Airman Certification Standards

Recommendations to Improve Maintenance Education

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Who is the ACS Work Group?

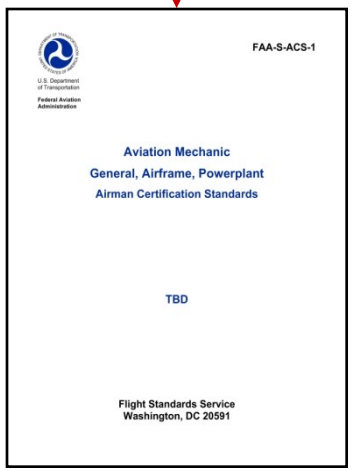
ACS arises from extensive FAA/industry collaboration

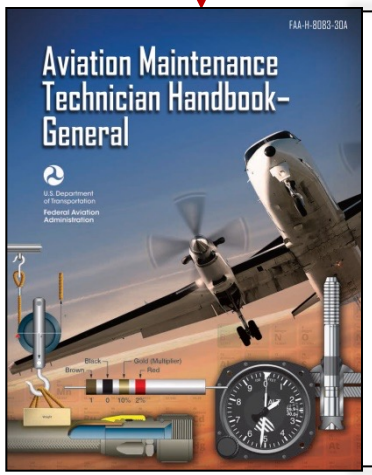
- Industry-led development – the ACS has been developed, refined, and tested through three consecutive aviation training industry groups with diverse representation including pilots, mechanics, evaluators, manufacturers, schools, instructors, associations, labor unions, airlines and more.
- Agency collaboration – Representatives from a variety of FAA offices.
- Public comment - the FAA established several dockets for the industry groups to receive public comments on the ACS.

What is the ACS?

Airman Certification System is largest lever to impact training

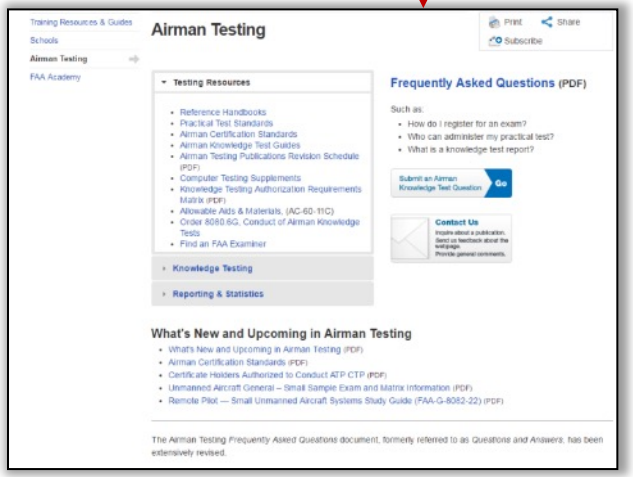
Changes: Regulations, Policies, Procedures, Feedback





Knowledge exam questions are meaningful, relevant, aligned with standards and guidance.

Oral and practical tests are more focused and more efficient.



A C S c o d e s e n a b l e c o n t i n u o u s a l i g n m e n t

Standards

Combined certification standards for knowledge, risk management, and skill

Guidance

Rules, H-series handbooks, Advisory Circulars, other FAA information sources

Testing

Knowledge exam, oral and practical tests for issuance of certificate or rating

Change Management

Awareness, Desire, Knowledge, Ability, Reinforcement via disciplined change management plan with associated communications strategy

Alignment as appropriate with other Certificates / Ratings

Development of ACS and Work Group Tasking

Provide recommendations regarding standards, training guidance, test management, and reference materials for airman certification purposes.

- Data analysis subgroup to continue to develop reports needed for training, testing and safety improvements.
- Continuation of Pilot, Instructor, and Aircraft Mechanic certificates and Ratings.
  - Prioritized list for PTS to ACS conversion and ACS revisions
  - Ongoing review of Mechanic ACS in light of workforce pipeline needs
- Added additional aircraft categories – Rotorcraft, powered lift, lighter-than-air, glider.
- Guidance Handbooks - reviewing draft documents, publishing ETA TBD
  - Aviation Maintenance Technician – General Handbook (FAA-H-8083-30C).
  - Aviation Maintenance Technician – Airframe Handbook (FAA-H-8083-31B).
  - Aviation Maintenance Technician – Powerplant Handbook (FAA-H-8083-32B).

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Maintenance Training Network (MTN) Mission

To provide guidelines for industry standardization to improve maintenance training quality and reduce training costs by developing guidelines to standardize training programs, processes, procedures, methods, and media.

Membership

Consists of member and non-member airlines, academia, commercial space, FAA, OEMs & MROs.

Top Issues

- Lack of transport category skill and knowledge in newly-certificated mechanics
- Identifying new and emerging training issues and concerns
- Maintaining ATA Spec 104 “Guidelines for Aircraft Maintenance Training”

2024 Initiative: Review Mechanic ACS and Offer Recommendations

- MTN members expressed serious concerns regarding a lack of knowledge and skill that generally exists in those seeking employment at their organizations.
- The goal of the effort was to enhance the transport category aircraft knowledge, skill, and risk management elements to ensure that a newly certificated AMT is fully prepared to enter the commercial aviation industry.
- A group consisting of SMEs from all MTN stakeholders met each Friday over the summer and went line-by-line through the ACS.
- Considerations were made to ensure the ACS remained similar in size.
- The recommendations covered General, Airframe, Powerplant, and Appendices.
- FAA received the recommendations in November 2024.

General

- Emphasis on understanding and using multimeters for basic electrical system troubleshooting
- Demonstrating electrical system safety, including lockout, tagout & handling FOD
- Addressing poor or improper safety-wiring
- Safe movement of aircraft
- Understanding and adhering to various CFR parts and ACs
- Use and interpretation of maintenance documentation such as AMM, FIM & SRM
- Awareness of procedural noncompliance.
- Demonstrating sound troubleshooting procedures
- Awareness of Required Inspection Items (RII)
- Introduction to Safety Management Systems (SMS) and Voluntary Disclosure Reporting Program (VDRP)

Airframe

- Identification, valuation, mapping, and classification of types of defects, such as dent, crease, scratch, gouge, static burn vs. lightning strike, erosion vs. corrosion.
- More focus on composites
- Advanced Aircraft Systems
  - Fly-by-wire & Electronic Flight Instrument System (EFIS)
- Regulatory Compliance and Documentation
- Electronic Systems and Cybersecurity
- Operational Procedures and Safety
  - Differences between general aviation and transport category aircraft
- Airspace and Low Visibility Operations
  - CAT III
  - Reduced Vertical Separation Minimums (RVSM)

Powerplant

- Engine and APU Operations
  - Awareness of engine and APU ingestion and exhaust zones
  - Ground operation of aircraft engines following approved instructions
- Inspections and Maintenance:
  - Inspections specific to 14 CFR Parts 121, 135, and 145
  - Borescope inspections
  - Maintenance damage to instruments or indicating systems
  - Troubleshooting aircraft electrical generating systems using a multimeter
- Advanced Engine Systems:
  - Engine Indication and Crew Alerting System (EICAS) and Electronic Centralized Aircraft Monitoring (ECAM)
- Procedures and considerations for rigging

Appendix 2

- Reinforcing safety as a priority
- Adherence to Safety Recommendations
- Project Approach and Preparation
  - Gathering the right information and tools
- Skill in handling tools, thoroughness, and maintaining cleanliness
- Use of Publications and Procedures
- Application of Rules and Risk Management
- Application of appropriate rules, risk management, and safety assessments
- Attitude toward safety, adherence to manufacturer's recommendations, and acceptable industry practices
- Consequences of Disregarding Safety
  - Any disregard for safety or failure to follow procedures will result in failure.

Other Recommendations

- Revise handbooks as necessary
- Additionally, the MTN recommended that FAA determine how to revise ACS codes relative to airmen knowledge test reports (AKTR) to ensure training and testing stay correlated, especially with the retraining and retesting required by the airman certification system, even as the ACS evolves to stay current and relevant.

Bridging the Gap in Aviation Maintenance Education

Identifying Workforce Needs and Opportunities

CLEMSON UNIVERSITY

Source: https://images.app.goo.gl/bEiFxLHAeR5QJmvM6

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Project Overview

- The aviation maintenance industry faces **challenges** in keeping pace with current in-service aircraft technologies and for future **advanced technology aircraft (ATA)**
- The **competencies** outlined in the Part 147 **Airman Certification Standards (ACS)** are **insufficient** for maintaining ATA, posing **risks to safety** and **hindering industry advancement**
- The main aim is to ensure the **aerospace maintenance workforce** is equipped to meet **evolving industry demands** by developing and implementing a **workforce plan** for maintaining the current ATA

Source: https://images.app.goo.gl/GhgKYf6z23nCHzgT9

Objective 1- The "First Delta"

- Identify the current education and workforce needs based on the technologies used in current in-service aircraft that are not covered in the ACS
- Understand the aircraft technologies in-service and the skills required to maintain them
- Understand the gaps in the ACS by engaging with industry stakeholders through interviews and conduct an importance survey to gather insights

Source: https://images.app.goo.gl/dbLFjscHR4caE8pV6; https://images.app.goo.gl/NanwCnMeB7vfFz7D7

Current in-service & emerging aircraft technologies and required competencies to maintain them

In-service/Emerging Technology	Required Competencies
Electric and Hybrid Propulsion	High-voltage safety protocols, battery maintenance, troubleshooting hybrid-electric propulsion systems, and power management systems
Software & Integrated Aircraft Systems	Proficiency in integrated on-board computer systems and interconnectivity of aircraft systems, advanced troubleshooting of integrated software/hardware systems faults
Composite Materials and Advanced Manufacturing	Inspecting and repairing composites, understanding advanced repair techniques, and familiarity with advanced manufacturing techniques involving aircraft composite material structures
Advanced Avionics and Digital Systems	Troubleshooting digital avionics, use of analog, digital, and PC based diagnostic equipment, interpreting diagnostic outputs, understanding digital system data and communication protocols
Advanced Diagnostics and Self-Monitoring Systems	Interpreting automated fault detection and performance data flight deck displays and reports, understanding fault detection logic, and use of predictive maintenance tools and diagnostic equipment
Data Systems Management	Understanding of digital systems, proficiency in cybersecurity and troubleshooting real-time data links, upload and validation of aircraft system software revisions as well as operational testing post software upload to ensure whole system compatibility and functionality

Adapting training programs to equip technicians

Updates in curriculum & instructional delivery

- FAA to remove outdated topics and replace with relevant technologies in-service or near entry
- FAA to have an increased focus on purpose of maintenance practices, safety and regulatory compliance
- Integrate technologies such as on-line instruction, VR and AR to allow students to engage with complex aircraft systems

Addressing Technician Shortages

- Expand training programs and introduce aviation education in earlier stages, such as high schools
- Implement apprenticeship models for affordable, hands-on training aligned with industry needs
- Establish periodic training programs to update technicians on evolving technologies and maintenance practices/standards
- FAA to lead & incentivize career pathway programs, lower barriers to entry and enable new program development, create an FAA Academy for core/baseline A&P curriculum

Industry Collaboration

- Foster partnerships with OEMs to enhance training quality through shared expertise
- Collaborate with aviation operators and businesses to access updated equipment and resources
- Address legal and intellectual property barriers to streamline data sharing and industry collaboration & partnerships
- FAA to incentivize industry partnerships & collaboration with 147 schools

Practical Application and Evaluation

- Prioritize application of hands-on skills and critical thinking over traditional rote learning to better address real-world maintenance challenges
- Combine digital learning tools and practical training to build essential technical competencies
- Integrate human factors training to enhance risk assessment and adherence to established practices
- FAA to improve DME certification and make A&P testing assessment standards more transparent

ATEC's ACS and Guidance Working Group

- Reviewing ACS line by line, including A4A's MTN groups recommendations.
- Goals:
  - Revise elements for clarity
  - Add new elements to bring content up-to-date
  - Remove old out-of-date elements

ATEC's ACS and Guidance Working Group

- Goals Continued:
  - Compare knowledge and skill elements for alignment
  - Compare elements to guidance materials for alignment in depth and breadth of content
  - Review guidance handbooks for depth, breadth, and accuracy of content

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Questions?