

2025

Avionics Technician Handbook

eBook

Regulatory Comparison Handbook



Bruce and Jennifer Bessette



Avionics Technician Handbook eBook

Bruce and Jennifer Bessette

Copyright © 2025 Bruce Bessette

All rights reserved.

No part of this work may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical, photocopying, microfilming, or otherwise, without written permission from the Publisher, with the exception of any material supply specifically for the purpose of being entered and executed on a computer system, for the exclusive use by the purchaser of the work.

Cover design Bruce Bessette

www.qualityaviationsmsaudit.com

Introduction

The field of avionics is constantly evolving, and technicians must be equipped with the right knowledge and skills to work on modern aircraft. Whether you are preparing for a career in avionics or looking to expand your expertise, understanding multiple regulatory standards is essential.

This **free eBook** introduces a **six-volume Avionics Technician Handbook series** designed to provide comprehensive training based on the three major avionics certification standards:

- **NCATT (National Center for Aerospace & Transportation Technologies)** – Industry-recognized avionics certification.
- **FAA (Federal Aviation Administration)** – U.S. regulations governing aircraft maintenance and technician certification.
- **EASA (European Union Aviation Safety Agency)** – European regulations for licensed aircraft maintenance engineers.

Each handbook is structured to align with these standards, ensuring technicians gain the foundational knowledge needed to work in different aviation environments. This eBook explains how these volumes were developed, what topics they cover, and how they can help students, instructors, and professionals bridge the gap between regulatory systems.

By combining industry best practices with real-world avionics training, this handbook series provides a **structured learning path** for those pursuing avionics certification and career advancement.

Avionics Technician Handbook- eBook

Introduction to Avionics Technician Handbooks

Thank you for downloading the 2025 Revised NCATT AET Test Study Guide eBook.

This is the **fourth edition** of this book, and with each revision, it continues to improve. As the author's expertise grows and more insights emerge about the test structure and content, this guide becomes even more effective in helping you prepare.



One of the biggest challenges in updating this book in addition to adding new material, but also refining and streamlining the content to make it more concise while maintaining all essential information. However, this is not the only way the certification has evolved.

Since the first edition was published in 2010, the NCATT AET certification and its add-on ratings have undergone significant changes. The most notable transformation was the dissolution of the original NCATT organization. While the certification is still referred to as the NCATT AET, the organization overseeing it has changed.

Today, the certification is managed by the American Society for Testing and Materials (ASTM), an internationally recognized standards organization. According to ASTM's official website:

But that was more than 10 years ago and times have changed. The rewrite of all of the books today is to better align to today's technology, and also to combine duplicate information from all of the other books I have written into a set of coherent chapters covering those subjects for a person who wished to be an Avionics Technician.

Avionics Technicians: The Experts Behind Aircraft Electronics

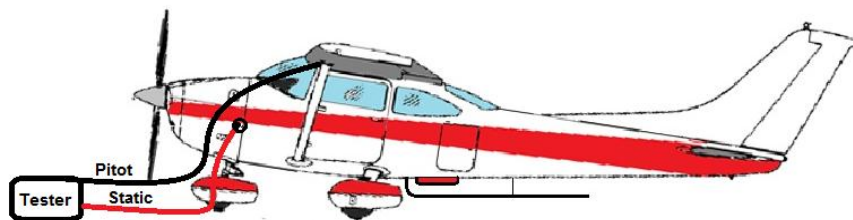
The role of avionics technicians has been critical to aviation since World War II, when aircraft were expected to fly long distances and navigate through adverse weather conditions. The evolution of aircraft electronics was driven by necessity, leading to groundbreaking innovations that have made modern aviation safer, more efficient, and more profitable. Alongside advances in airframes and powerplant systems, avionics have transformed aircraft capabilities, enabling precision navigation, automated flight control, and enhanced safety features.

One of the most significant advancements in avionics is the development of systems designed to prevent accidents by enhancing pilot situational awareness. Technologies such as the Traffic Collision Avoidance System (TCAS) and the Ground Proximity Warning System (GPWS) analyze multiple avionics inputs in real time, predicting and preventing

potential midair collisions or controlled flight into terrain. Since the mandatory implementation of these systems in commercial aviation, there have been no recorded accidents due to such causes when these systems were fully operational.

Maintaining these advanced avionics systems requires specialized knowledge and tools. Avionics technicians rely on sophisticated testing equipment to simulate and verify system functionality. Their responsibilities include:

- Selecting the appropriate test equipment for each system
- Verifying the calibration status of testing devices
- Properly setting up and connecting test equipment to the aircraft
- Accurately diagnosing system performance and identifying malfunctions
- Ensuring no testing equipment remains connected before returning the aircraft to service
- Maintaining test equipment in optimal working condition



Technicians must know the proper setup and connections for test equipment according to the aircraft manufacturer's maintenance instructions and the tester developer's recommendations. With various brands and models of test equipment available, reviewing the specific documentation for the tester used in the shop is essential. This volume provides generalized setups and testing techniques, which can be adapted to the aircraft and equipment encountered in the field.

One important aspect to remember when becoming an avionics technician is that authorization to work on aircraft requires proper training and supervision. Maintenance must be performed under the guidance of an appropriately certificated technician, such as an Airframe and Powerplant Mechanic or a Repairman Certificate holder. Federal Aviation Regulations mandate recency of experience requirements for all mechanics and technicians, ensuring that training remains ongoing. The learning process begins with these books and the schools attended, but certification marks only the beginning of a lifelong journey of continuous education and professional development.

Regardless of whether an aircraft employs analog or digital systems, is newly manufactured or decades old, avionics technicians must be adaptable and proficient with evolving technologies. They must be skilled in retrieving and interpreting maintenance manuals, wiring diagrams, and repair documentation. Additionally, they are required to work with precision and efficiency, minimizing errors and downtime.

Another critical aspect of the profession is completing the necessary return-to-service documentation to ensure regulatory compliance and facilitate timely departures. Proper

training, hands-on experience, and a dedication to craftsmanship allow avionics technicians to develop the confidence and expertise necessary to excel in this field.

With the right education and commitment, anyone can acquire the knowledge and skills needed to become an avionics technician—a profession that plays a crucial role in keeping aircraft safe, reliable, and ready for flight.

Line Maintenance vs. Bench Technician

Line Maintenance Technicians work directly on aircraft, typically in the field or at airports, and focus on the overall return to service of the aircraft after troubleshooting or repair. They usually require an A&P (Airframe and Powerplant) certificate to sign off on work and deal with issues identified during flight or pre-flight checks, such as malfunctioning Line Replaceable Units (LRUs). In the past, they might have transferred LRUs to back shops for further repair, but that is less common today as manufacturers often handle those repairs. Line techs perform more general maintenance on a variety of systems aboard the aircraft.

Bench Technicians, on the other hand, work at repair stations or manufacturers' facilities, focusing on specific LRUs rather than the entire aircraft. They do not need to understand the full aircraft system but instead specialize in repairing or servicing the particular components (LRUs) they are assigned. They may not need an A&P certificate but can be issued a Repairman Certificate by the FAA for the specific LRU or equipment they are maintaining. Bench Technicians work more on individual component repair, which is often handled by manufacturers or authorized repair stations.



The shift in responsibilities is largely due to the increasing complexity of avionics systems. As manufacturers take on more of the repair work for LRUs, the role of Line Maintenance Technicians remains crucial for aircraft readiness, while Bench Technicians focus on the specialized repair of individual units.

The Avionics Certification and Training Challenge

One of the biggest challenges for avionics technicians today is the lack of a federally issued certificate specific to avionics. In contrast, many colleges, universities, and private institutions offer FAA-certified Airframe and Powerplant (A&P) mechanic programs, a tradition that dates back to the original Civil Air Regulations of the 1930s. The establishment of FAA mechanic schools was relatively straightforward because, upon program completion, students could obtain an FAA-issued mechanic certificate.

As of this writing, however, the FAA has not established an avionics rating for the mechanic certificate—despite the growing need for one in modern aviation. Unlike A&P mechanics, avionics technicians lack a defined federal certification standard, leaving employers uncertain about candidates' skills and knowledge when hiring for avionics positions.

An FAA A&P certificate represents a minimum knowledge benchmark, assuring employers that the holder has mastered a regulated curriculum under FAR Part 147, covering aircraft systems, maintenance practices, and even basic tool usage. Unfortunately, when an employer seeks to hire

an avionics technician, there is no standardized expectation of what that individual knows or what skills they possess. This creates a costly challenge for airlines and repair stations, which must provide extensive training—only to potentially discover that the technician lacks the prerequisite knowledge to benefit from that training.

The Historical Gap in Avionics Certification

When the FAA first established certification requirements for mechanics and inspectors, most aircraft maintenance was mechanical in nature. Electrical and radio systems were relatively simple and were maintained by specialized personnel known as R&E (Radio & Electrical) mechanics in the airline industry.

Since 1958, the FAA A&P curriculum has remained largely unchanged, despite significant advancements in aircraft electronics and avionics systems. Although recent updates to FAR Part 147 introduced changes to aviation maintenance training, they did not address avionics-specific education. This persistent oversight has left avionics technicians without a federally recognized minimum knowledge standard, making it difficult to ensure industry-wide consistency in training and competency.

Whenever the aviation industry has petitioned the FAA to introduce an avionics rating for the mechanic certificate, the agency has declined, citing variability in training methods across military branches and airline programs. This lack of regulatory consensus has stalled progress in establishing a standardized avionics certification.

Industry-Driven Solutions

Recognizing the need for a minimum knowledge curriculum, the aviation industry itself has taken steps to develop avionics training standards. Organizations such as NCATT (National Center for Aerospace & Transportation Technologies) and EASA (European Union Aviation Safety Agency) have introduced their own certifications and guidelines, helping to bridge the gap left by the FAA's inaction.

As avionics systems continue to evolve, the need for a structured, federally recognized certification will only grow. Without it, the industry will continue to face hiring uncertainties, increased training costs, and inconsistent technician competencies—challenges that could be mitigated with an official FAA avionics certification standard.

NCATT: Establishing a Standard for Avionics Technicians

Over 25 years ago, a coalition of aviation industry representatives—including experts from airlines, the military, and aviation manufacturing—formed the National Center for Aerospace & Transportation Technologies (NCATT). Their goal was to create a consensus standard for avionics technicians, much like the FAA's Airframe and Powerplant (A&P) mechanic certification.

The NCATT-developed certification was designed to address the very gap the FAA cited as a reason for not establishing an avionics rating for mechanics. The hope was that the NCATT Aircraft Electronics Technician (AET) certification and its associated add-on ratings would eventually serve as the industry-wide standard, providing the foundation for an FAA-recognized avionics technician certification.

NCATT Certification Structure

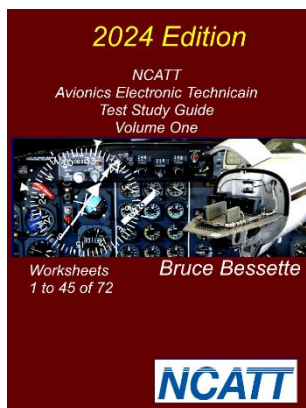
The NCATT certification process mirrors the FAA's mechanic certification process in structure:

- Aviation Electronics Technician (AET) Certification – The AET test serves as the core certification that all applicants must pass before pursuing any specialized add-on ratings. This is similar to the FAA's General Knowledge test, which mechanics must pass before taking the Airframe or Powerplant certification exams.

NCATT AET Curriculum

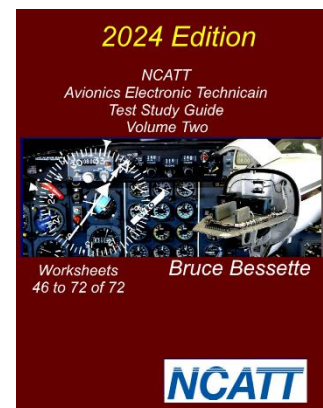
The NCATT standard for Avionics technicians, like the FAA A&P started with the Aircraft Electronics Technician test. The AET was very similar to the FAA A&P Generals subjects.

The FAA Subjects are shown in FAR 147 for mechanics schools in the old Appendix B shown at the chart at right.



Volume One – Covering subjects 1 to 45 of 72 of the original AET curriculum. This book covers three major elements of the A&P Generals Subject for the Basic electricity course.

Volume 2 will also cover of the radio based subjects to help transition to the subjects for the NCATT Radio Add-on rating subjects.



Reflecting on the evolving landscape of NCATT certifications and their integration into aviation training, especially with the shift to ASTM. The transition to ASTM, which took over the NCATT certifications, has indeed generated mixed reactions, particularly due to the introduction of charges

for the standards and the expiration dates on certificates. Many potential applicants are put off by these changes, which add complexity and cost to the process.

Furthermore, the FAA's continued hesitation to accept these new standards as an additional rating to the FAA Mechanic certificate, even after 25 years, has led to doubts about the long-term viability of the NCATT certification. This delay has likely contributed to some of the uncertainty in the industry regarding the adoption and importance of this certification.

In your 2025 NCATT AET study guide, you've kept the same structure as the previous version, aligning with the fact that the FAA has not altered the A&P Generals subject. Including enough electronics-related content to prepare students for the Avionics Systems courses is a thoughtful approach, ensuring that the guide remains relevant despite the evolving certification standards. It helps to bridge the gap for students who are preparing for both NCATT and FAA qualifications.

My commitment to keeping the NCATT AET book updated reflects the importance I place on the foundational knowledge required for a successful career in avionics. A solid understanding of the FAA General Subjects is crucial for anyone entering the civil aviation field, and these textbooks serve as a gateway to the more advanced topics in Avionics Systems. By ensuring that students are well-prepared in these fundamental areas, you will be successful in your specialized training and eventual roles in the industry.

Avionics Technician Handbooks – Volumes One Through Six

The Avionics Technician Handbooks (ATH) were developed to cover a broad range of avionics subjects, including—but not limited to—the NCATT Add-On ratings.

This section includes a listing of the ASTM NCATT endorsements, with the first five representing the current certifications published by ASTM.

However, the ATH Handbooks go beyond these standard endorsements, addressing additional key avionics topics that are not currently covered in the AET certification but are critical for avionics technicians worldwide.

Since these textbooks were designed to be inclusive of avionics certifications across different regulatory bodies worldwide, references to NCATT standards focus on general subject areas rather than precise word-for-word content.

For technicians who wish to pursue ASTM NCATT certification, accredited schools and training programs have the option to purchase the official ASTM NCATT standards for incorporation into their curriculum.

These handbooks serve as a comprehensive educational resource, supporting technicians in developing the knowledge and skills necessary for global avionics certification and professional success.

ASTM AET Endorsements (Published January 2024)

The ASTM Aircraft Electronics Technician (AET) certification is the foundation for avionics professionals. After passing the AET core exam, technicians can pursue endorsements in specialized areas of aircraft electronics, navigation, communication, and installation.

These endorsements help technicians demonstrate expertise in specific systems, improving job opportunities in airlines, repair stations, OEMs (Original Equipment Manufacturers), and MRO (Maintenance, Repair, and Overhaul) facilities.

1. Autonomous Navigation Systems (ANS)

This endorsement covers self-contained navigation systems that do not require external signals to function. These systems rely on internal sensors and gyroscopic references to determine an aircraft's position and movement.

Key Topics Covered:

- **Primary Flight Instruments:** Airspeed indicators, altimeters, and gyroscopic instruments.
- **Attitude Heading Reference Systems (AHRS):** Replacing older gyroscopic instruments, AHRS uses accelerometers and magnetometers to provide accurate attitude and heading data.
- **Inertial Reference Systems (IRS):** Advanced navigation using accelerometers and gyroscopes to calculate aircraft position without external input.
- **Automatic Flight Control Systems:** Autopilot and flight director systems that integrate with navigation systems.
- **Compass Systems:** Flux gate compasses and magnetometers used for accurate directional heading.

Industry Applications:

- Used in **commercial, military, and business aviation** for **navigation redundancy**.
- Essential for **long-haul and oceanic flights** where GPS signals may be unavailable.

2. Dependent Navigation Systems (DNS)

This endorsement focuses on navigation systems that rely on external signals such as radio beacons and satellite data.

Key Topics Covered:

- **Automatic Direction-Finding (ADF):** Uses ground-based radio beacons for directional navigation.
- **VHF Omni-Directional Range (VOR):** The most widely used short-range navigation system.
- **Instrument Landing System (ILS):** Provides precise approach guidance during landing.
- **Global Positioning System (GPS):** Satellite-based navigation for worldwide operations.
- **DME (Distance Measuring Equipment):** Calculates distance from ground stations.
- **Area Navigation (RNAV) & Required Navigation Performance (RNP):** Advanced navigation procedures using GPS and ground-based navigation aids.

Industry Applications:

- Standard in **commercial aviation, military aircraft, and business jets.**
- Critical for **precision landings and low-visibility approaches.**

Recommended Prerequisite:

- **Radio Communication Systems (RCS)** – since all dependent navigation systems use **radio frequency principles.**

3. Radio Communication Systems (RCS)

This endorsement builds on the **radio frequency (RF) principles** introduced in the AET core exam. It focuses on the transmission and reception of radio signals used in **aircraft communication and navigation systems.**

Key Topics Covered:

- **Radio Frequency (RF) Theory:** Understanding impedance, reactance, resonance, and signal modulation.
- **AM & FM Modulation:** Used in aviation radios and navigation aids.
- **Antenna Systems & Coaxial Cabling:** Proper installation and testing of antennas for optimal performance.
- **HF, VHF, and UHF Communications:** Frequencies used for aircraft radios and satellite communication.
- **Transponders & ADS-B Systems:** Air traffic surveillance and collision avoidance systems.

Industry Applications:

- Essential knowledge for **avionics installers and repair technicians** working with aircraft communication equipment.
- Required for **technicians working with radar, weather detection, and air traffic control systems.**

4. Onboard Communications and Safety Systems (OCS)

This endorsement covers **internal aircraft communication and safety systems** that ensure effective crew-to-crew and passenger communication.

Key Topics Covered:

- **Audio Control Systems:** Routing and selection of communication channels.
- **Interphone Systems:** Internal crew communication, including flight deck and cabin crew operations.
- **Passenger Address (PA) Systems:** Used for announcements and emergency instructions.
- **Emergency Locator Transmitters (ELT):** Transmit distress signals in the event of a crash or forced landing.

- **Cockpit Voice Recorders (CVR):** Records cockpit conversations for accident investigation.

Industry Applications:

- Required for **airline avionics technicians and MRO (Maintenance, Repair, and Overhaul) professionals.**
- Compliance with **FAA, EASA, and ICAO safety regulations.**

5. Aircraft Electronics Installation (AEIT)

This **newly introduced endorsement** covers the skills required to **install, modify, and test avionics systems** in aircraft. It is ideal for technicians specializing in **aircraft modifications, upgrades, and custom avionics installations.**

Key Topics Covered:

- **Reading and Interpreting Wiring Diagrams:** How to follow manufacturer instructions for installations.
- **Supplemental Type Certificates (STCs):** Understanding how modifications are approved by regulatory authorities.
- **Installation Techniques:** Proper routing and securing of wires, use of connectors, and termination methods.
- **System Testing Procedures:** How to verify proper installation and troubleshoot malfunctions.
- **Electromagnetic Interference (EMI) & Radio Frequency Interference (RFI) Prevention:** Best practices for shielding and grounding avionics systems.

Industry Applications:

- **Avionics modification centers, repair stations, and corporate aircraft upgrades.**
- Required knowledge for **technicians working on ADS-B, flight management systems (FMS), and Wi-Fi installations.**

Why These Endorsements Matter

- Standardizes avionics training, helping employers identify qualified technicians.
- Ensures that technicians possess key competencies required by airlines, MROs, and aerospace manufacturers.
- Provides career advancement opportunities, especially for technicians working toward supervisory or engineering roles.

– Expanded Subject Areas

To better prepare avionics technicians for real-world challenges in line maintenance and heavy check operations, additional key subjects have been integrated into this book series. Many of these topics were initially developed to support FAA A&P Intermediate courses, while others have been added to align with EASA B2, and B3 avionics engineer training requirements.

Aircraft Electrical Systems- (ELE)

- The Aircraft Electrical Systems subject was originally developed for the FAA A&P Intermediate course. This includes aircraft motors, generators, alternators, inverters, power conversion systems, voltage regulation, and electrical distribution.

Pulsed Navigation Systems (PNS)

- Pulsed Radio Principles covers avionics systems that operate using radio signal pulses, where a transmitted pulse is sent and a reply is received. Key systems include weather radar, transponders, Mode S systems, and Distance Measuring Equipment (DME). This topic was initially based on the FAA FAR 145 Repair Station Rating system. Under FAA Radio Repair Station Classifications, pulsed radio systems are generally categorized under Radio Class 3 equipment.

Aircraft Indicating Systems (AIS)

- Aircraft Indicating Systems was specifically developed to cover a wide range of aircraft indication and monitoring systems, which are critical to safe operations but do not fit neatly into existing NCATT categories. This includes fuel quantity indication systems, engine parameter monitoring and indications, and cabin environmental control and pressurization systems.

Federal Air Regulations (FAR)

- Federal Aviation Regulations provide avionics technicians with a strong understanding of regulatory requirements. This section covers the legal responsibilities of maintenance personnel, compliance with FAA airworthiness standards, and adherence to manufacturer instructions and approved maintenance procedures. Since all work performed on civil aircraft must comply with regulatory standards, this section provides the necessary knowledge to ensure compliance with FAA, EASA, and other global aviation authorities.

Aircraft Electronics Installation (AEIT)

This **newly introduced endorsement** covers the skills required to **install, modify, and test avionics systems** in aircraft. It is ideal for technicians specializing in **aircraft modifications, upgrades, and custom avionics installations**.

Key Topics Covered:

- **Reading and Interpreting Wiring Diagrams:** How to follow manufacturer instructions for installations.
- **Supplemental Type Certificates (STCs):** Understanding how modifications are approved by regulatory authorities.
- **Installation Techniques:** Proper routing and securing of wires, use of connectors, and termination methods.
- **System Testing Procedures:** How to verify proper installation and troubleshoot malfunctions.
- **Electromagnetic Interference (EMI) & Radio Frequency Interference (RFI) Prevention:** Best practices for shielding and grounding avionics systems.

ATA Specification 100

When aircraft are being certificated by the FAA, whether under FAR 21 or based on the specific type of aircraft, there are requirements for manufacturers to create Instructions for Continued Airworthiness (ICA). These ICAs are critical maintenance instructions that must be followed to ensure the safe continued operation of the aircraft. For aircraft certificated under FAR Part 25, which covers transport-category aircraft, the volume of documentation required is extensive.

To streamline the process of maintaining and accessing these important documents, the aviation industry created the Air Transport Association (ATA), which developed a standardized catalog system for aviation maintenance. This catalog uses a number system to assign unique identifiers to major systems and processes within an aircraft. This system helps technicians and maintenance personnel to quickly locate and reference the correct maintenance instructions.

The ATA numbering system covers various categories, with the first section of numbers designated for general aircraft maintenance tasks. This cataloging system is an essential tool for ensuring that all maintenance tasks are accurately documented and easily accessible, contributing to the continued airworthiness and safety of aircraft.

For a comprehensive listing of these ATA numbers and further details on how they correspond to maintenance tasks, refer to Appendix 2 of this volume

(a) Aircraft General

- Chapter 05 Time Limits/Maintenance Checks
- Chapter 06 Dimensions and Areas
- Chapter 07 Lifting and Shoring
- Chapter 08 Leveling and Weighing
- Chapter 09 Towing and Taxiing
- Chapter 10 Parking, Mooring, Storage and Return to Service
- Chapter 11 Placards and Markings
- Chapter 12 Servicing.

General tasks include service schedules, placards and markings and servicing.

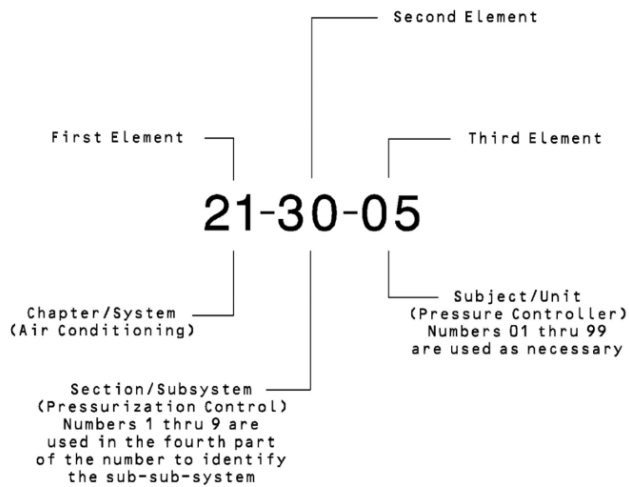
Systems

The second section in the ATA 100 Spec is the airframe systems group. ATA 20 will have a all of the wiring practices information that all Avionics Technicians will need to know. Chapter 20 covers wire selection and installation, connectors and terminal board repair and replacement.

- Chapter 20 Standard Practices - Airframe
- Chapter 21 Air Conditioning
- Chapter 22 Auto Flight -
- Chapter 23 Communications
- Chapter 24 Electrical Power
- Chapter 25 Equipment/Furnishings
- Chapter 26 Fire Protection
- Chapter 27 Flight Controls
- Chapter 28 Fuel
- Chapter 29 Hydraulic Power
- Chapter 30 Ice and Rain Protection
- Chapter 31 Indication/Recording Systems
- Chapter 32 Landing Gear
- Chapter 33 Lights
- Chapter 34 Navigation
- Chapter 35 Oxygen
- Chapter 38 Water/Waste.

Today's Avionics Technician working on modern aircraft will work in every system shown here. As you progress in the books, you will become familiar with these system number in particular.

ATA Number Structure

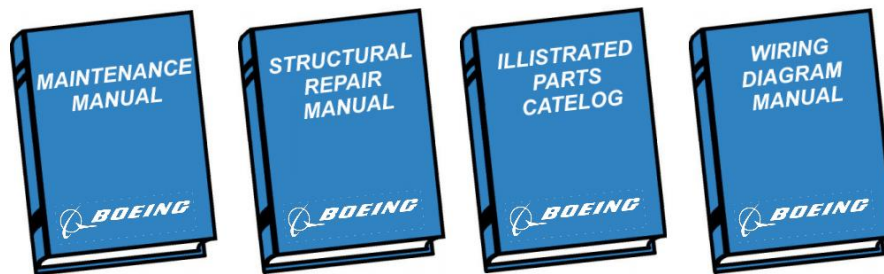


This system will have three elements. The first element indicates the main chapter or system. Over time a technician will have this number learned. Knowing the system numbers helps find the correct manual faster.

The second element is to identify the section or subsystem of the chapter. For example this first element is for the Air Conditioning System. The subsystem of air conditioning is the pressure controller. Another sub system would be the outflow valve.

The third element is reserved for either a separate subject in the system or process. For example the number 05 can be used for functional test while another number for disassembly and another for installation.

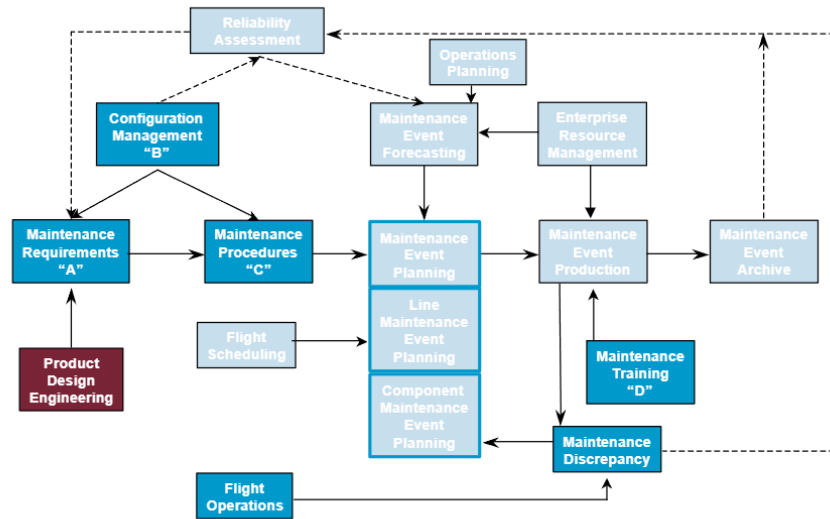
The benefit of this number system is that it will carry through all of the difference maintenance manuals and operations flight manual system. ICAs for aircraft include, maintenance manuals, (MM), Structural Repair Manual (SRM), Illustrated Parts Catalog (IPC) and Wiring Diagram Manual (WDM).



Other manuals that can be included in the maintenance documents include a Minimum Equipment List (MEL) and the Component Maintenance Manuals (CMM). CMM would be used to repair aircraft component either an airline back shop or a FAA 145 Maintenance Repair Organization (MRO) or Repair Station.

iSpec 2200

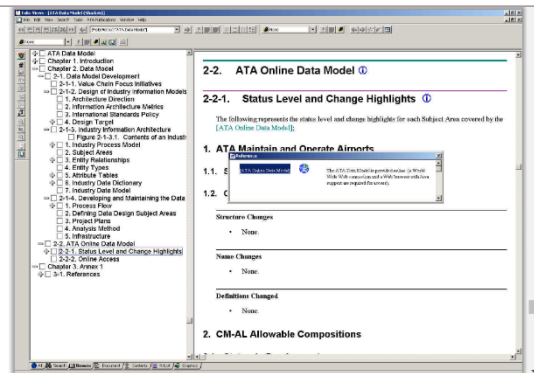
Today the specification has been renamed to iSpec 2200 and is controlled by the new Airlines for America (A4A). This new system is fully electronic and designed to work with the electronic maintenance data.



ATA /Spec 2200 Overview

28 October 2004 Page 28

Since the iSpec 2200 is based on the basic ATA 100 and the numbers system is basically the same, these textbooks will utilize the older standard.



Aircraft Mechanic Licensing: FAA vs. EASA

Aircraft mechanics, also known as engineers in some parts of the world, must be certified to work on civil aircraft. This includes general aviation, corporate aviation, and air carriers. Certification ensures that mechanics meet safety and competency standards to maintain and repair aircraft effectively.

Different regulatory bodies govern aviation maintenance certifications. In the **United States**, the **Federal Aviation Administration (FAA)** issues the **Mechanic Certificate with Airframe and Powerplant (A&P) ratings** under **FAR Part 65**. In contrast, **Europe** follows the **European Union Aviation Safety Agency (EASA)** regulations under **Part 66**, which categorizes mechanics into different levels of responsibility.

FAA Aircraft Mechanic Certification (A&P License)

In the United States, an individual can obtain an **A&P mechanic certificate** through one of three pathways:

1. **Military Experience** – Serving in the armed forces in an aircraft maintenance role.
2. **On-the-Job Training** – Gaining **36 months of practical experience** at a certified maintenance facility.
3. **FAA-Approved Schools** – Completing an **FAA Part 147 aviation maintenance school program**.

After meeting one of these requirements, the applicant must pass a series of FAA exams:

- **Written Tests** – Three exams covering **General, Airframe, and Powerplant** subjects.
- **Oral and Practical Exams** – Hands-on assessments conducted by a **Designated Mechanic Examiner (DME)**.

Once certified, A&P mechanics are subject to **recency of experience requirements** under **FAR 65.83**. This means they cannot perform maintenance on an aircraft unless they have completed a similar task within the last **24 months** or have received supervision.

EASA Aircraft Maintenance Licensing (Part 66)

Unlike the FAA system, **EASA certification is more structured** and requires applicants to be **sponsored by an approved organization**. EASA divides mechanics into specific **categories** based on their roles:

- **Category A** – Line maintenance technicians authorized for simple repairs and servicing.
- **Category B** – More advanced technicians responsible for **mechanical (B1) or avionics (B2)** systems.
- **Category C** – Base maintenance engineers, equivalent to **heavy maintenance inspectors** in the U.S.

EASA Category B Breakdown

EASA further divides **Category B** licenses based on aircraft types:

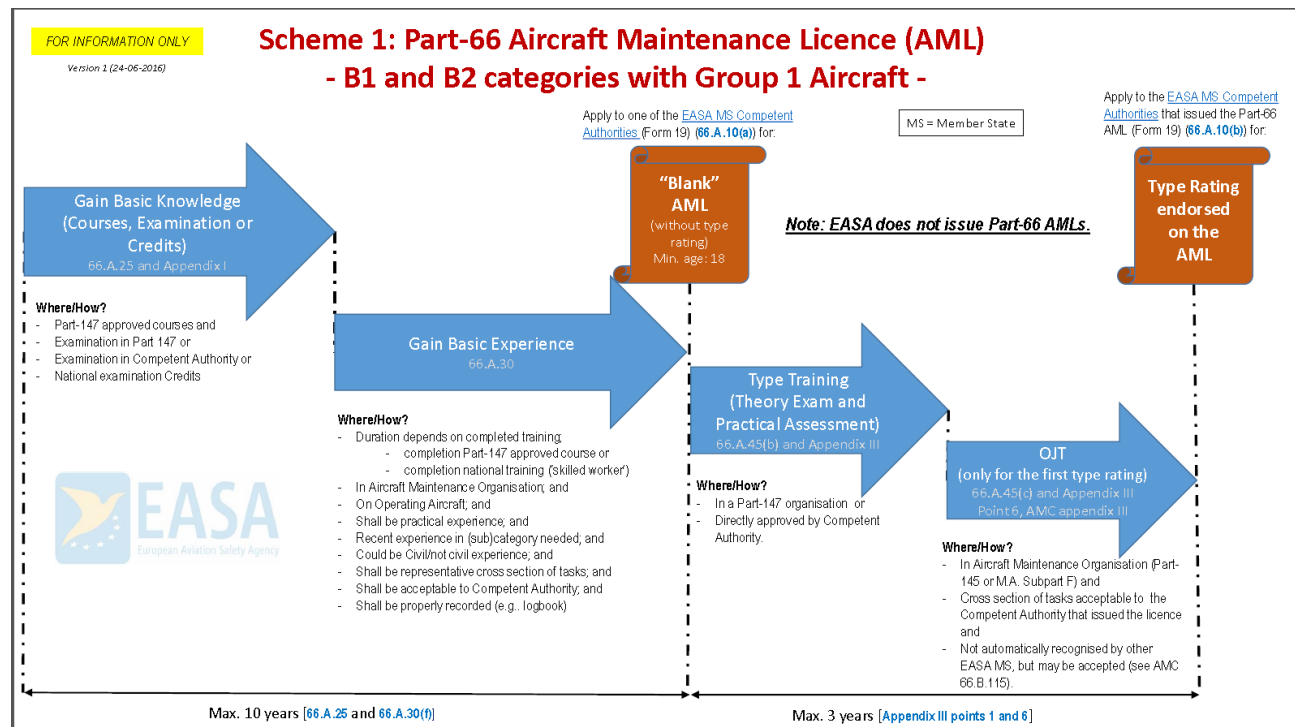
- **B1 (Mechanical Technician)** – Similar to the FAA A&P, covering airframe and powerplant.
- **B2 (Avionics Technician)** – Specializes in electrical, navigation, and communication systems (FAA does not have an equivalent).
- **B3 (Small Aircraft Technician)** – Focused on light aircraft, similar to General Aviation mechanics in the U.S., but with avionics training.

Each **EASA license** includes a **third-digit classification** indicating the aircraft type:

- “.1” – Turbine-powered Aircraft
- “.2” – Piston-engine aircraft
- “.3” – Turbine powered Helicopter
- “.4” – Piston powered Helicopter

For example, a **B2.1** license authorizes an avionics technician to work on turbine-powered aircraft.

Possible methods to obtain the EASA Mechanic License.



Scheme 1: EASA Part 147 Approved Training Program

The first pathway is **formal education** through an **EASA Part 147-approved training program**. This is similar to **FAA-certified A&P schools** in the United States.

Step 1: Meeting Basic Knowledge Requirements

To qualify for an AML, applicants must demonstrate competency in subject areas outlined in **Appendix 1 of EASA 66.A.25**. This knowledge can be obtained through:

- An **EASA Part 147-approved school** that follows the prescribed curriculum.
- A **national training program** that provides recognized examination credits.
- Passing an exam administered by a **competent authority approved by EASA**.

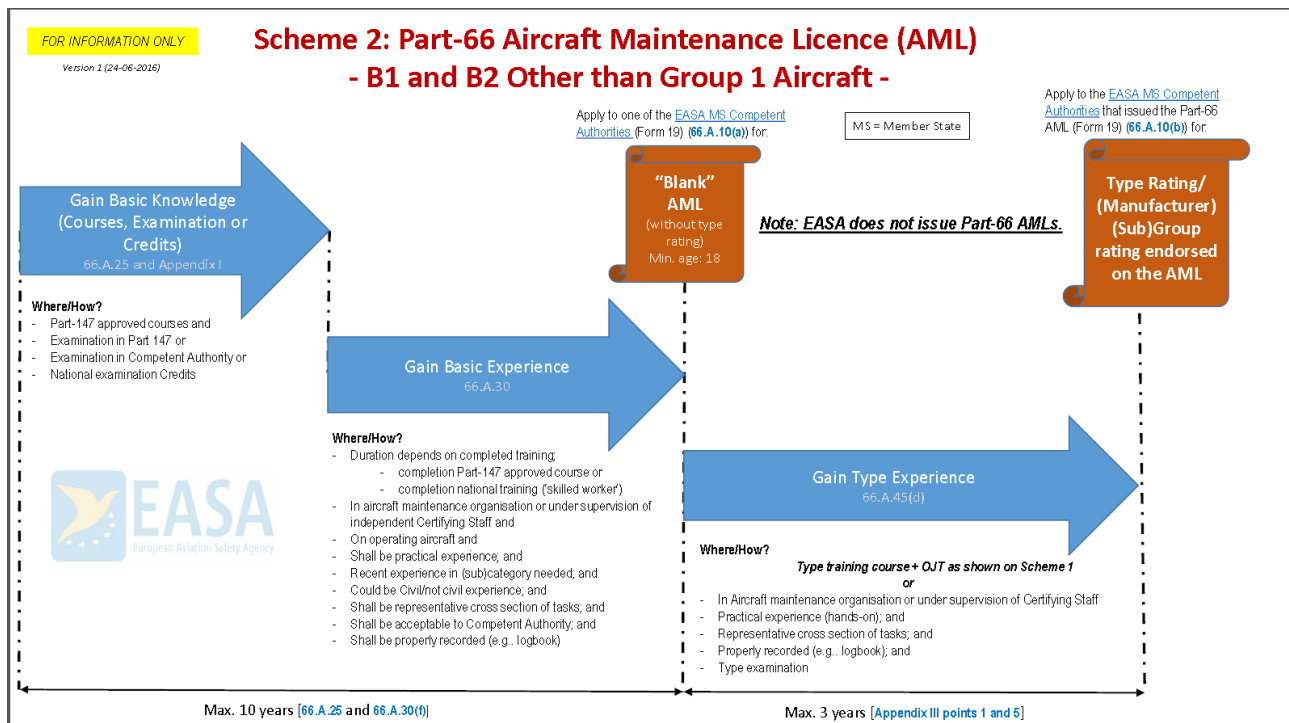
Step 2: Gaining Practical Experience

Once the basic knowledge requirements are met, the applicant must **acquire hands-on experience**. This is where the process becomes more complex:

- If the applicant has completed an **approved school or training program**, they must still gain practical experience in a **certified aircraft maintenance organization (AMO)**.
- The experience must cover a **representative cross-section of tasks**, ensuring exposure to essential maintenance activities.
- The applicant must demonstrate **competency in real-world aircraft maintenance**, either through civilian or military experience.

Step 3: Issuance of a Blank AML Certificate

After completing the required training and practical experience, the applicant receives a **blank AML certificate**—a **B-rating without a specific aircraft type rating**. This is equivalent to passing the **General Subject requirements of the FAA A&P certification**.



Scheme 2: On-the-Job Training (OJT) Through an Approved Organization

For technicians who do not attend an **EASA Part 147 school**, there is an alternative path through **direct employment with an approved maintenance provider**.

Step 1: Practical Experience Under an Approved AMO

- The technician must work under an **approved maintenance organization (AMO)** that operates aircraft.

- The experience gained must be relevant to the **subcategory of certification being sought (B1 or B2)**.
- The applicant must maintain a detailed **log of tasks performed**, which must be reviewed and verified by the competent authority.

Step 2: Completing Type Ratings and Practical Assessments

To obtain full licensing privileges, the technician must complete **aircraft type training and practical assessments**:

- The first **type rating** must be obtained through **on-the-job training (OJT)**.
- Training must be conducted by an **EASA-approved school or maintenance organization** (such as an airline or MRO).
- The OJT process must include a **comprehensive range of maintenance tasks**, similar to the **General Subject requirements of the FAA A&P certification**.
- The experience must be **validated by the competent authority** that issues the license.

Step 3: License Completion and Recognition

- Once all requirements are met, the applicant is awarded the **B1 or B2 AML with a type rating**.
- Unlike FAA certifications, an **EASA license is not automatically recognized across different member states** and may require additional approvals.
- The **entire process must be completed within three years**.

Conclusion

EASA's aircraft maintenance licensing system is a **structured, multi-step process** that ensures mechanics possess both **technical knowledge and practical experience**. Compared to the **FAA A&P certification**, EASA's system:

- Requires **formal training or extensive on-the-job experience**.
- Categorizes mechanics into **B1 (Mechanical) and B2 (Avionics) licenses**.
- Mandates **type ratings for specific aircraft** before granting full privileges.

The **EASA licensing model** aims to create a **highly skilled workforce** by enforcing strict **knowledge, experience, and assessment standards**, ensuring mechanics are **well-qualified** to maintain complex aircraft.

Key Differences Between FAA and EASA Certifications

- **Training Pathway** – FAA allows self-study and work experience, while EASA requires formal training and company sponsorship.
- **Avionics Certification** – FAA does not have a specific avionics license, whereas EASA offers the B2 rating.
- **Aircraft Type Ratings** – EASA requires mechanics to obtain specific aircraft endorsements, while FAA A&P mechanics can work on a broad range of aircraft after gaining experience.

Repairman Certificate

In the United States, the **Federal Aviation Administration (FAA)** does not issue a standalone **avionics mechanic certification** comparable to those found in other aviation regulatory systems worldwide, such as **EASA's B2 rating**. However, this does not mean that avionics technicians are entirely unregulated. The **FAA Repairman Certificate**, issued under **FAR Part 65**, serves as an alternative qualification for avionics professionals working in specific environments.

This chapter examines the structure of the FAA's repairman certification, its limitations, and ongoing efforts to establish a standardized avionics technician qualification.

The FAA Repairman Certificate for Avionics Work

The **FAR Part 65 Repairman Certificate** can be issued to individuals performing avionics maintenance in specialized aviation environments. Unlike the **A&P Mechanic Certificate**, which is broadly applicable, the repairman certificate is tied to specific employment conditions.

Eligibility and Scope

A repairman certificate may be issued to a technician who:

- Works for an FAA-certificated repair station (Part 145) performing avionics work.
- Is employed by an air carrier (Part 121) and performs avionics maintenance tasks.
- Performs specialized aircraft or component maintenance that does not require an A&P certificate.

This certificate allows an avionics technician to sign off on their own work within the scope of their employer's operations. However, in airline operations, an **A&P-certified mechanic** is still required to perform **inspections** and **maintenance tasks** outside the avionics scope.

Limitations of the Repairman Certificate

Despite offering a pathway for avionics technicians, the repairman certificate has significant limitations:

- **No Standardized Knowledge Requirement**
Unlike A&P mechanics, avionics repairmen do not have a minimum training or testing standard set by the FAA. While an A&P mechanic must pass written, oral, and practical exams to demonstrate competency, an avionics technician's qualifications depend largely on employer evaluation.
- **Employer-Specific Certification**
The repairman certificate is only valid while employed by the sponsoring repair station or airline. If the technician leaves their job, the certificate is no longer valid and cannot be transferred to another employer.
- **Lack of Recognition in General Aviation**
For general aviation aircraft, there is no specific avionics certification required for maintenance. Any certified mechanic, even without avionics training, can perform avionics work. The only exception is for home-built aircraft, where the FAA may issue a **Repairman Certificate** allowing the builder to maintain their own aircraft.

The NCATT Certification and Industry Efforts

Recognizing the need for **standardized avionics training**, the industry has developed certifications such as the **NCATT (National Center for Aerospace & Transportation Technologies) avionics certification**.

- The **ASTM NCATT** certification ensures that avionics technicians have a basic knowledge of both mechanical and avionics systems.
- It provides employers with a measurable standard of competency.
- It aligns with **ASTM standards** to support future FAA regulatory adoption.

Industry advocates hope that the FAA will eventually accept NCATT certification as an official avionics rating within the FAA mechanic certificate system. This would create a more structured and recognized pathway for avionics technicians, similar to the EASA B2 rating.

While the FAA does not currently offer a **dedicated avionics mechanic certification**, the **repairman certificate** serves as a temporary solution for avionics professionals working in **Part 121 and Part 145 environments**. However, the **lack of standardized training requirements and certificate portability** creates challenges for both technicians and employers.

The **NCATT certification** represents a step toward a more structured system, and industry efforts continue to push for FAA recognition of avionics-specific qualifications. Until then, the certification gap in avionics training remains a notable difference between the FAA and international regulatory systems.

Both FAA and EASA certification systems ensure aircraft mechanics are highly skilled and qualified. The FAA's A&P license offers flexibility but requires ongoing experience, while the EASA Part 66 system is more structured with defined categories and type ratings. Understanding these differences is crucial for mechanics working internationally or transitioning between regulatory systems.

Summary of an EASA Aircraft Mechanic License

The **European Union Aviation Safety Agency (EASA)** issues aircraft maintenance licenses under **Part-66**, which defines the qualifications and privileges of aircraft mechanics and certifying staff. The EASA license is recognized across Europe and many other countries that follow EASA regulations.

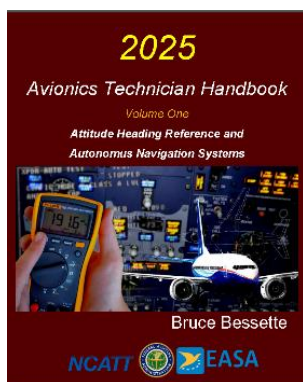
About the Avionics Technician Handbooks

The 2025 Avionics Technician Handbooks are meticulously organized into a six-volume set, designed to provide a comprehensive and structured learning experience for students in avionics training. The content of these textbooks is derived from over 650 hours of classroom material that Bruce Bessette created during his tenure teaching at Pima College from 2000 to 2018, which covers essential topics in avionics systems and maintenance. Each volume focuses on a specific set of subjects, categorized according to their corresponding ATA 100 chapters, and organized in a way that facilitates a logical progression through the material.

Each chapter not only adheres to the ATA 100 guidelines but also incorporates an NCATT rating column, indicating which subjects correspond to the NCATT AET and add-on ratings covered in the chapter. This ensures that students can easily identify the relevant certifications for each topic they study. To further enhance the educational value, the textbooks reference the **EASA Appendix One** curriculum for B3 and B4 avionics and general aviation technicians. This provides students with a cross-reference to understand international standards and prepares them for a global career in avionics maintenance. By incorporating both domestic (FAA) and international (EASA) standards, the textbooks give students a well-rounded foundation in avionics that aligns with the industry's best practices worldwide.

The six volumes of the Avionics Technician Handbooks are organized based on chapter numbers to create a clear and structured flow for students. Each volume is assigned specific chapter numbers to ensure logical progression throughout the material. For example, **Volume 1** contains all chapters that begin with the number 1, such as Chapter 10, Chapter 11, and so on. Similarly, **Volume 4** includes all chapters starting with the number 4, like Chapter 40, Chapter 41, etc. This numbering system allows students to easily navigate the textbooks and find the corresponding chapters based on their subject matter, ensuring a seamless learning experience from volume to volume.

This organization not only keeps the material systematic but also allows instructors and students to follow a clear structure that aligns with the topics being taught and the progression of the curriculum. The consistent breakdown by chapter number makes it easier to focus on specific subjects while maintaining the overarching continuity of the avionics training program.



Avionics Technician Handbooks Volumes

Avionics Technician Handbook Vol 1 Attitude Heading Reference and Autonomous Navigation Systems

Table of contents	ATA	NCATT	EASA
Chapter 10 EASA vs American Standards	00-00	AET	---
Chapter 11 Introduction to Avionics	20-00	AET	13.8
Chapter 12 GA Aircraft Cockpit	31-10	ANS	13.8
Chapter 13 Air Carrier Cockpit	31-10	ANS	13.8
Chapter 14 Attitude and Heading	31-20	ANS	13.8
Chapter 15 Compass Systems	31-20	ANS	13.8
Chapter 16 Airspeed and Altimeters	34-21	ANS	11.5.1
Chapter 17 Connecting the PS Test	31-20	ANS	13.8
Chapter 18 Autopilot System Overview	22-10	ANS	13.3
Chapter 19 Flight Director Systems	34-10	ANS	13.4

Appendix 1 – Acronyms

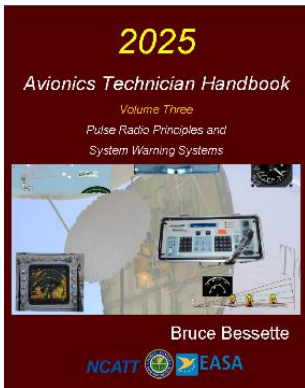
Appendix 2 – ATA Spec 100 Chapters

Appendix 3 – EASA License Requirements



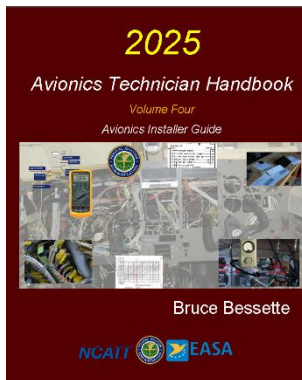
Avionics Technician Handbook Vol 2 Radio-Based Communications Systems

Table of contents	ATA	NCATT	EASA
Chapter 20 Introduction to Radio	23-00	RCS	13.4
Chapter 21 Radio Antenna	30-50	RCS	13.4
Chapter 22 HF/VHF Radio	23-10	RCS	13.4
Chapter 23 Onboard Communications	23-40	OCS	13.21
Chapter 24 Progression of Navigation	34-00	DNS	11.5.2
Chapter 25 ADF Systems	34-50	DNS	13.4
Chapter 26 VOR and ILS Systems	34-30	DNS	13.4
Chapter 27 GPS Systems	34-50	DNS	13.4
Chapter 28 Onboard GPS Systems	34-50	DNS	13.4
Chapter 29 Emergency Locator Trans	25-60	OCS	13.4



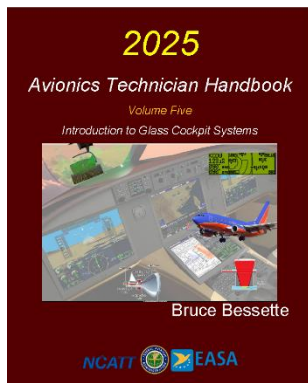
Avionics Technician Handbook Vol 3 Pulse Radio Principles and System Warning Systems

Table of contents	ATA	NCATT	EASA
Chapter 30 Weather Radar	34-43	PNS	13.4
Chapter 31 Transponder System	34-53	PNS	13.4
Chapter 32 ATCRBS Mode S / ADS-B	34-53	PNS	13.4
Chapter 33 DME	34-55	DNS	13.4
Chapter 34 Radio Altimeter	34-50	PNS	13.4
Chapter 35 Aural Warning System	31-51	RCS	13.4
Chapter 36 GPWS/TCAS	34-46	PNS	13.4
Chapter 37 CVR and DFDR	31-31	OCS	13.4



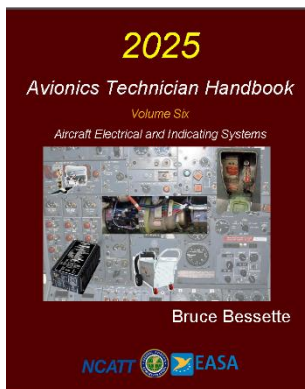
Avionics Technician Handbook Vol 4 Avionics Installer Guide

Table of Contents	ATA	NCATT	EASA
Chapter 40 Avionics Installation Intro	20-00	AEIT	7.7
Chapter 41 Airworthiness and Parts	20-00	AEIT	10.5
Chapter 42 Major Alterations of Aircraft	20-00	FAA	NA
Chapter 43 Wiring Diagrams	20-00	AEIT	7.7
Chapter 44 Aircraft Wire	20-00	AEIT	7.7
Chapter 45 Electrical Connectors	20-00	AEIT	7.7
Chapter 46 TS with a Multimeter	20-00	AEIT	7.18
Chapter 47 Aircraft Manuals MM and WDM	20-00	AEIT	7.5
Chapter 48 Aircraft Documents	FAA	AEIT	10.1
Chapter 49 Avionics Troubleshooting	ALL	ALL	7.18



Avionics Technician Handbook Vol 5 Introduction to Glass Cockpit Systems

Table of Contents	ATA	NCATT	EASA
Chapter 50 History of Modern Cockpit	31-00	ANS	12.7
Chapter 51 Cathode Ray Tube	31-00	ANS	12.7
Chapter 52 Modern Display Media	31-00	ANS	12.7
Chapter 53 Creating Digital Data	45-40	ANS	13.10
Chapter 54 Avionics Information Systems	45-40	ANS	13.10
Chapter 55 General Aviation Cockpits	31-00	ANS	13.8
Chapter 56 Air Carrier Glass Cockpits	31-60	ANS	13.8
Chapter 57 Next Gen Cockpits	31-60	ANS	13.8
Chapter 58 Heads Up Displays	31-00	ANS	13.8
Chapter 59 IR and Night Vision Systems	31-00	ANS	13.8



Avionics Technician Handbook Vol 6 Aircraft Electrical and Indicating Systems

Table of Contents	ATA	NCATT	EASA
Chapter 60 Electrical Power Systems	24-00	AET	3.1+
Chapter 61 DC Power Generation	24-30	AET	3.5+
Chapter 62 AC Power Generation	24-20	AET	3.13+
Chapter 63 Voltage Regulation and Control	24-50	AET	12.8
Chapter 64 Engine Indications Systems	77-00	ANS	14.2
Chapter 65 Modern EICAS Systems	77-40	ANS	5.15
Chapter 66 Fuel Quantity Systems	28-40	AET	11.10
Chapter 67 Miscellaneous Avionics Systems		Various	

Benefits of Comparing Different Aviation Standards

Comparing the **NCATT AET and Add-On Ratings**, the **FAA Mechanic Certificate**, and the **EASA Mechanic Basic Knowledge for B2 and B2L avionics mechanics** helps technicians understand the similarities and differences between these systems. This comparison is useful for training, certification, and career development.

1. More Job Opportunities

Aviation is an international industry, and technicians often work on aircraft that operate under different regulatory systems. Understanding multiple certification standards makes it easier to qualify for jobs in different regions.

For example:

- A technician trained under FAA regulations can work for a company that follows EASA standards with some additional training.
- An EASA-certified mechanic can apply their knowledge in an FAA-regulated environment by learning key differences in regulations.

Technicians who are familiar with multiple systems have more flexibility when looking for work.

2. A Broader and More Complete Education

Each certification focuses on different aspects of avionics maintenance. Comparing them helps identify missing knowledge areas and ensures a well-rounded education.

For example:

- The **NCATT AET** focuses on avionics fundamentals, while **EASA B2** mechanics also need to understand mechanical systems that interact with avionics.
- The **FAA A&P Certificate** includes basic electronics training, but the **NCATT Add-On Ratings** cover advanced avionics troubleshooting.

By studying multiple standards, technicians gain a deeper understanding of aircraft systems.

3. Understanding Different Regulatory Requirements

Each aviation authority has its own rules for maintaining and repairing aircraft:

- FAA: **FAR Part 65 & Part 145** govern technician certification and repair stations.
- EASA: **Part 66 & Part 147** define requirements for mechanics and training organizations.
- NCATT: Provides an industry-recognized avionics certification.

Knowing these differences helps technicians and employers stay compliant when working with aircraft in different regions.

4. Stronger Troubleshooting Skills

Modern aircraft use complex avionics systems that require knowledge of electrical and mechanical components. Learning from multiple certification systems helps technicians develop better troubleshooting techniques.

For example:

- **EASA B2 mechanics** are trained in both avionics and electromechanical systems, giving them a wider approach to problem-solving.
- **NCATT-certified technicians** specialize in avionics troubleshooting but may not receive as much training in broader aircraft systems.

Technicians who understand different approaches can diagnose and repair aircraft more effectively.

5. Better Training for Schools and Employers

Aviation schools and companies benefit from comparing standards because it helps them:

- Develop training programs that prepare students for different certifications.
- Offer courses that allow technicians to transition from one system to another.
- Train employees to meet multiple regulatory requirements.

Employers can also use these comparisons to provide more targeted training based on their operational needs.

Conclusion

By studying **NCATT, FAA, and EASA avionics knowledge requirements**, technicians and students can expand their skills, qualify for more jobs, and improve their ability to troubleshoot aircraft systems. Comparing these standards helps create better training programs and ensures that technicians are prepared for work in different aviation environments.