AMC-Developed ARINC Standards

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ARINC organizes three committees that develop standards for the airline community:

- Airlines Electrical and Electronic Committee (AEEC)
- Avionics Maintenance Conference (AMC)
- Flight Simulator Engineering and Maintenance Conference (FSEMC)

While AEEC is best known for the development of ARINC standards, over the years, AMC has taken a lead in the development of many industry standards as well in the areas of:

Shop and Test Equipment Standards
Process Standards
Software Transmission and Management Standards
Aircraft Maintenance Standards

For the convenience of our Plane Talk readers, the AMC-developed ARINC standards are listed and described below. Persons wishing to order these standards may do so by ordering online at https://www.arinc.com/cf/store/category.cfm?prod_group_id=1. or contacting the ARINC Document Department at +1 410 266-4117, or via standards@arinc.com.

Shop and Test Equipment Standards

ARINC 602A-2: *Test Equipment Guidance* is an update of ARINC 602 following the introduction of new digital test equipment standards and the publication of ARINC 608A. This standard includes specific references to On-board Maintenance Systems (OMS) and Automatic test Equipment (ATE) used within the maintenance community.

ARINC Report 614: *Standard Firmware Loader for Avionics Shops* describes the characteristics of a standard firmware loader for avionics shops. It is capable of copying digital information into memory devices installed in circuit card assemblies, Line Replaceable Modules (LRMs) and On-Board Replaceable Modules (OBRMs). It contains the recommendations of the air transport community concerning the design and development of firmware loader equipment.

ARINC Report 606: *Guidance for Electrostatic Sensitive Device Utilization and Protection* describes the nature of Electrostatic Discharge (ESD) and its effects on digital avionics equipment. It provides information concerning methods to protect against ESD damage which could originate in many different ways.

ARINC Specification 608A: *Design Guidance for Avionics Test Equipment, Part 1 – System Definition* provides top-level guidance intended for the design of Automatic Test Equipment (ATE). It includes the definition of hardware and software needed for analog and digital signal testing using a Test Unit Adapter common interface. This standard describes the overall ATE system concept as well as the definition of the specific elements of those systems.

ARINC Report 625-2: *Industry Guide for Component Test Development and Management* defines recommended standard practices for developing Test Specifications (TS) and Technical Support and Data Packages (TSDP) to support alternate and equivalent implementations for all CMM tests. This report introduces a new term “Test Implementation Package” (TIP) which is similar to a Test Program Set (TPS) but applies to all shop testable components without regard to technology. See Figure 1.1-1 TIP TPS Relationship. The term “TPS” will be still used as a particular TIP in an ATE environment.

ARINC Specification 626: *Standard ATLAS Language for Modular Test* defines an airline-recommended subset of ATLAS intended to be used in conjunction with test systems that are compliant with ARINC 608A. ATLAS is a standard abbreviated English language used in the preparation and documentation of test procedures that can be implemented with automatic or semi-automatic test equipment.

ARINC Report 627-2: *Programmers Guide for SMART™ Systems Using ARINC 626 ATLAS* provides guidance to ATLAS test programmers for developing, writing and documenting test programs in ARINC 626 ATLAS. This is a companion standard to ARINC 608A, Design Guidance for Avionics Test Equipment. It provides guidance to managers and system integrators for standardizing test programs and their documentation.

ARINC Report 668: *Guidance for Tool and Test Equipment (TTE) Equivalency* provides guidelines for the process used to establish the equivalency of TTE and related procedures other than that recommended by the OEM. Primarily, ARINC 668 is concerned with equipment specified or recommended for the purpose of performing specific tasks concerning the airworthiness of an article (e.g., avionics, hydraulics, pneumatics, mechanical devices, etc).

Process Standards

ARINC Report 431: *No Fault Found – A Case Study* provides the final report of AMC Task Group 116 formed to discover the causes of “No Fault Found” in avionics equipment during test. This standard identifies sources and provides recommendations for improvement.

ARINC Report 640: *Resolution of Inservice Anomalies through ASAPP* defines a generalized process by which anomalies in aircraft systems can be detected. This process is intended to improve timely isolation and resolution of those anomalies. The objective is to reduce costs to the airlines, airframe manufacturers and aircraft systems suppliers by removing anomalous behavior from aircraft systems in a timely manner.

ARINC Report 662: *Strategies to Address Electronic Component Obsolescence in Commercial Aircraft* establishes guidelines that should be observed during initial design, production and maintenance of avionics LRUs, and to present short-term strategies to minimize costs and impacts associated with decreasing availability of electronic components.

ARINC Report 663: *Data Requirements for Avionics Component Maintenance* focuses on the many aspects related to component technical data and documentation including a common understanding of levels one - three maintenance (test, repair, re-certification). This includes defining the extent and format of OEM documentation to be delivered to the airline customers to support both the decision and technical requirements to accomplish level three maintenance; establishing minimum data requirements to support the airlines' decision relative to the accomplishment of level three maintenance (test solution, type of repair process, projected MTBF, modification potential, unit cost, alternative repairs, etc.); and identifying the minimum technical data requirements to support level three maintenance in airline shops for future avionics components (test, documentation).

ARINC Report 670: *Guidance for Materials, Processes, and Parts Equivalencies* states *i*ndustry rules and guidelines support/mandate equivalency, but provide very little guidance on how to realize MPP substitution. Currently, industry guidelines fail to provide adequate direction to maintenance facilities for material, process, and part equivalencies. Suitable substantiation procedures to be able to select alternate materials are demanded by the air transport industry. The purpose of ARINC Report 670 is to provide clear definitions for materials, processes, parts, substantiation requirements, decision boundaries and limitations, and a standard process for equivalency determination. This report is intended as general guidance for avionics maintenance facilities; however, this does not preclude its use for other sectors of aircraft maintenance as appropriate.

Software Transmission and Management Standards

ARINC Report 666: *Electronic Distribution of Software* describes a secure internet facility for sending all types of aviation software using the world wide web (www). Software suppliers may use this document as a starting point for the construction of a secure web server utility. It provides sufficient flexibility and is compatible with numerous software distribution models. The file management structure is consistent with other ARINC standards for loadable software, and references ARINC 665 and ARINC 667 in particular

ARINC Report 667-1: This supplement represents a complete revision to **ARINC REPORT 667**: *Guidance for the Management of Field Loadable Software*. ARINC Report 667 was originally published in 2002.

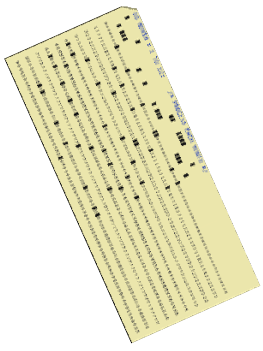
The avionics architectures and functionality have not changed significantly. The software used in avionics remains in great part the same as in 2002. However, several new developments and processes have necessitated the need for Supplement 1 to ARINC Report 667: Guidance for the Management of Field Loadable Software.

As aircraft have become more software intensive, the descriptions and definitions of the types of software have changed. This document identifies the new types and subsets of software and explains the uses and particular processes for each type.

Also, the use of mass storage devices in storage is more clearly defined. This is a direct result of the obsolescence of floppy disk media. This includes the use of mass storage in software storage, portable data loaders, airborne data loaders, and airline software repositories.
The process for improved distribution using electronic distribution throughout the life cycle of software is also defined. The concept of using a “crate” to package and ensure security through the process is introduced.

Also introduced is the use of electronic data management systems. The quantity and variations of software, coupled with the airlines’ varied aircraft fleets, has brought the need for sophisticated configuration management systems to control loadable software parts to ensure compliance with regulations and safety. Controlling software using an electronic data management system simplifies and standardizes an airline’s field loadable software processes.

In short, this document represents a comprehensive evolution of ARINC Report 667. It is the result of inputs from air transport industry experts and the experiences of the airlines in day-to-day operations.



ARINC Report 673: *Guidance for the Use of UHF Radio Frequency Identification (RFID)*

The objective of this document is to define the minimum requirements for implementation of UHF-RFID for component management within the commercial air transport industry.

The secondary objective of this document is to define the minimum data set required to allow the free interchange of information between all organizations involved in the life cycle of the component.

A third objective is to provide guidance for the implementation of UHF-RFID technology in the airframe and component supply chain and maintenance operations.

This ARINC standard will be used as an umbrella over the existing industry standards. Topics addressed in this document are:

- Provide supplemental data to existing standards
- Define minimum data set
- Define tag performance standards
- Provide benefit examples

ARINC Report 827: *Electronic Distribution of Software by Crate (EDS Crate)*

EDS describes the format for the exchange of aircraft software parts and other digital contents between business partners without requiring the use of physical media. These business partners include airlines, airframe manufacturers, avionics suppliers, modification sites, and simulation.

Analogous to the practices of packaging and distribution of physical parts, this standard applies the concept of a “crate” to offer secure packaging features for software parts and related digital content. This standard addresses:

- Design and construction of an EDS crate
- Packing an EDS crate with content
- Securing an EDS crate
- Validation of an EDS crate

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Aircraft Maintenance Standards

ARINC Report 604-1: Guidance *for Design and Use of Built-In Test Equipment (BITE)* **-**The primary purpose of BITE is to assist maintenance personnel in the proper maintenance of avionics systems in a cost-effective manner. A description of a Centralized Fault Display System (CFDS) is included in this standard. The CFDS accumulates fault data, presents this data to a maintenance operator, and assists troubleshooting by performing diagnostic tests and performing verification testing after installation of a replacement unit.

ARINC Specification 624-1: *Design Guidance for Onboard Maintenance System* enables continued improvement of avionics maintenance practices through On-Board Maintenance System (OMS) recording. This standard defines the OMS which incorporates fault monitoring fault detection, BITE, and airplane condition monitoring system.

ARINC Report 644: *Portable Maintenance Access Terminal (PMAT)* contains the electrical interface definition, and a functional description of a PMAT. The intent of this standard is to provide general and specific design guidance for the development of a PMAT primarily for airline use.

ARINC Report 644A: *Portable Multi-Purpose Access Terminal (PMAT)* is intended for use in the airplane maintenance environment allowing remote access to onboard systems. This standard describes the aircraft interface, operational capabilities and standards necessary to achieve interoperability with onboard systems, stand-alone internal or external mass memory devices, and ARINC standard printers.

ARINC Report 669: *Guidance for Lead-Based Soldering, Repair and Rework* provides guidance for using industry standards for developing a soldering program tailored to meet the specific requirements of the user. Moreover, it provides uniform guidance for maintenance facilities based on industry standards and, therefore, should be accepted throughout the air transport industry. This document is not a stand-alone document - it is intended to be used with the referenced international industry standards.

ARINC Report 671: *Guidance for the Transition to Lead-Free Soldering***,** Maintenance, and Repair provides guidance for the use of international standards for the maintenance of lead-free electronic equipment. The purpose is to assist manufacturers, maintenance facilities, and operators to define lead-free soldering requirements and to minimize the set of lead-free solders, processes, and practices to gain consistency across the industry.

ARINC Report 672: *Guidelines for the Reduction of No Fault Found (NFF)***.** Provides guidance for the removals of equipment from service for reasons that cannot be verified by the maintenance process (shop or elsewhere) are a significant burden for aircraft operators. This phenomenon is commonly referred to as No Fault Found (NFF). Many other industry guidelines have been created in the past addressing NFF. NFF is often perceived as a shop-only problem or an individual component reliability problem. This is not true. NFF solutions require an inter-disciplinary effort to identify the true causes and implement successful solutions. This document describes the most common sources of NFF and provides guidance to develop appropriate solutions. The sources of NFF are spread throughout the following four domains:

- Design/Production
- Flight operations
- Line operations
- Shop operations

This report provides a holistic view of the NFF problem based on the above domains and the following categories:

- Documentation
- Communication
- Training

- Testing
- System/Components design

Complete elimination of NFF is not a realistic expectation. However, a structured approach will help toward minimizing the effects of NFF.