ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project APIM 23-xxx

Next Generation Network Technology for Avionics Communications

1.1 Name of Originator and /or Organization

Valentin KRETZSCHMAR, Airbus

2.0 Subcommittee Assignment and Project Support

New Subcommittee Activity

2.1 Suggested AEEC Group and Chairman

TBD

2.2 Support for the Activity (as verified)

Airlines:

Airframe Manufacturers: Airbus

Suppliers:

Others:

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines:

Airframe Manufacturers: Airbus

Suppliers:

Others:

2.4 Recommended Coordination with other Groups

SAI and NIS

3.0 Project Scope (why and when the standard is needed)

3.1 Description

Airborne data communication networks for the latest aircraft models rely on Ethernet-type communications (such as ARINC 664 part 7), which offer a variety of interesting features: high bandwidth, easy design, multiple services, features, and a vast market of components.

The current scope of ARINC 664 covers the integration of standard 10BaseT/100BaseTX Ethernet as well as a derivative defined for critical communication with deterministic properties (ARINC 664 Part 7).

ARINC 664 Part 7 became a real industry standard and is used on many new generation Aircraft (e.g., Airbus A220, A380, A440M, A350; Boeing 787, 777X, …)

However, it is anticipated that future airborne platforms will see the emergence of new systems and applications which will require the preparation of upgraded network solutions from the physical layer to the network services:

- Physical layers will need to support a higher data rate and support further weight reduction.

- A better coexistence between critical deterministic and best effort communications will help rationalize the footprint of communications onboard Airborne Platforms.
- New services and applications (such as video streaming and data collection) will require improved performances (throughput, latency, synchronization).

Therefore, it is necessary to standardize a new avionics bus technology to prepare for the future. This standard will need to consider the compatibility with legacy solutions (e.g., ARINC 664 Part 7) for easier transitions and the harmonization with other network technologies used or planned to be used onboard.

This standardization activity will define a common network interface, simplifying further standardization efforts on other systems using the network.

This standardization effort will leverage the latest network innovations from IT and automotive industries and verify how they can be applied on Airborne platforms. Ethernet Technology has continued evolving in the IT industry for which it was primarily developed, as well as in the automotive industry, which adopted it for high-speed in-vehicle networking. The Ethernet ecosystem currently encompasses a vast array of solutions, addressing various data rates, physical mediums, and network service

This standardization effort will gather and consolidate the needs anticipated for future Airborne platforms, investigate the latest network solutions from aerospace or other industries that could address those needs and select one or several solutions that provide appropriate performances and service. The ARINC 664 upgrade will provide a set of solutions, including Physical Layer components, Protocols, and Network Services for future airborne networks with a focus on interoperability, increment and compatibility with legacy solutions.

3.2 Planned usage of the ARINC Standard

Note: New airplane programs must be confirmed by the aircraft manufacturer prior to completing this section.

New aircraft developments planned to use this specification yes ☐ no ☒

Airbus: (aircraft & date)

Boeing (aircraft & date)

Other: (manufacturer, aircraft & date)

Modification/retrofit requirement yes ☐ no ☒

Specify: (aircraft & date)

Needed for airframe manufacturer or airline project yes ☐ no ☐

Specify: (aircraft & date)

Mandate/regulatory requirement yes ☐ no ☒

Program and date: (program & date)

Is the activity defining/changing an infrastructure standard? yes ☒ no ☐

Specify ARINC 664

When is the ARINC standard required? 12/2025

What is driving this date? Earliest date

Are 18 months (min) available for standardization work? yes ☒ no ☐

If NO, please specify the solution:

Are Patent(s) involved? yes ☒ no ☐

If YES, please describe, and identify patent holder: ARINC 664 Next Gen Gen patent (held by Airbus)

3.3 Issues to be Worked

Gather and consolidate needs for future networks

Identify and assess potential solutions from various industries

Evaluate compatibility with existing and future platforms

Complement existing standardization as required for aerospace usage

3.4 Security Scope

Is Cyber Security Impacted (if YES, check box(es) below) yes ☒ no ☐

Aircraft Control Domain yes ☒ no ☐

Airline Information Services Domain yes ☒ no ☐

PAX Information and Entertainment Systems yes ☒ no ☐

Other: yes ☐ no ☐

Security is not a primary objective of this standardization effort but shall be discussed at least to identify any security risks/opportunities brought by the selected solution(s).

4.0 Benefits

4.1 Basic Benefits

Operation enhancements yes ☒ no ☐

For equipment standards:

a) Is this a hardware characteristic? yes ☒ no ☐

b) Is this a software Characteristic: yes ☒ no ☐

c) Interchangeable interface definition? yes ☒ no ☐

d) Interchangeable function definition? yes ☒ no ☒

If not fully interchangeable, please explain:

Is this a software interface and protocol standard? yes ☒ no ☐

Specify:

Product offered by more than one supplier yes ☒ no ☐

Identify: _____

4.2 Specific Project Benefits

The standard will specify a set of network solutions for future airborne networks

4.2.1 Benefits for Airlines

The future network will enable the deployment of functions for enhanced operations, including connectivity and services. It will simplify the interface with ground infrastructure and facilitate maintenance operations thanks to the use of standardized, wide-spread technologies.

4.2.2 Benefits for Airframe Manufacturers

The future network will improve performance and interoperability, allowing for easier and faster design and certification of functions using this network.

4.2.3 Benefits for Avionics Equipment Suppliers

Using standardized network technologies will reduce the development complexity by providing a large set of components and associated resources (software, tools, framework).

5.0 Documents to be Produced and Date of Expected Result

Gather and consolidate needs - 31/03/2024

List and evaluation of candidate technologies – 31/06/24

Standards for a selected solution – 31/12/2025

5.1 Meetings and Expected Document Completion

The following table identifies the number of meetings and proposed meeting days needed to produce the documents described above.

Activity	Mtgs	Mtg-Days (Total)	Expected Start Date	Expected Completion Date
Gather and consolidate needs	*3*	*9*	*06/23*	*03/24*
List and evaluation of candidate technologies	*4*	*12*	*06/23*	*06/24*
Standards for selected solution	*6*	*18*	*06/24*	*12/25*

Web call to be held every 2-3 weeks depending on project phase

6.0 Comments

N/A

6.1 Expiration Date for the APIM

April 2026

Completed forms should be submitted to (aeec@sae-itc.org)