



To IPS Subcommittee **Date** April 12, 2021

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Subject **Meeting Announcement**
Internet Protocol Suite (IPS) Subcommittee

Chairmen Luc Emberger, Airbus
Greg Saccone, Boeing

Host ARINC Industry Activities

When June 21-23, 2021
Web conference schedule:

Meeting Times	US Pacific	US Eastern	Central European
Start	0700	1000	1600
Break	0900	1200	1800
Re-Convene	1000	1300	1900
Adjourn	1200	1500	2100

ICAO WG-I, EUROCAE WG-108, and RTCA SC-223 participants are encouraged to attend this meeting.

Where This meeting will be conducted as six online sessions. Details to be provided.

Instructions Please notify the ARINC Industry Activities staff of your intention to attend by registering online at: <https://www.aviation-ia.com/events>.

This meeting is open to all interested parties. Individuals requesting time on the agenda should contact Paul Prisaznuk before June 12, 2021.

**Activity
Scope**

The IPS Subcommittee is leading the development of industry standards for the Internet Protocol Suite for aeronautical safety services. This includes airborne, ground-based, and space-based communication systems.

This activity coordinates ATN/IPS development activities among international Standards Development Organizations (SDOs) namely ICAO, EUROCAE, and RTCA.

**Meeting
Objectives**

IPS Subcommittee Meeting

The IPS Subcommittee will initiate the development of three documents as follows:

- **Supplement 1 to ARINC Specification 858:** *Internet Protocol Suite (IPS) for Aeronautical Safety Services, Part 1, Airborne IPS System Technical Requirements*
- **Supplement 1 to ARINC Specification 858:** *Internet Protocol Suite (IPS) for Aeronautical Safety Services, Part 2, IPS Gateway Air-Ground*
- **Supplement 1 to ARINC Report 658:** *Internet Protocol Suite (IPS) for Aeronautical Safety Service, Roadmap Document*

Documents will be prepared during the course of 24 months. Mature documents are expected to be available in 2023.

Note: This activity is pending the approval of APIM 15-004B by the AEEC Executive Committee on May 11, 2021.

Attachment 1

ARINC Project Initiation/Modification (APIM)

- 1.0 Name of Proposed Project** **APIM 15-004B**
- 1) Supplement 1 to ARINC Specification 858: Internet Protocol Suite (IPS) for Aeronautical Safety Services, Part 1, Airborne IPS System Technical Requirements
 - 2) Supplement 1 to ARINC Specification 858: Internet Protocol Suite (IPS) for Aeronautical Safety Services, Part 2, IPS Gateway Air-Ground Interoperability
 - 3) Supplement 1 to ARINC Report 658: Internet Protocol Suite (IPS) for Aeronautical Safety Services - Roadmap Document
- 1.1 Name of Originator and/or Organization**
Boeing / **IPS Subcommittee**
- 2.0 Subcommittee Assignment and Project Support**
- 2.1 Suggested AEEC Group and Chairman**
Group: Internet Protocol Suite (IPS) for Aeronautical Safety Services Subcommittee
Co-Chairs: Luc Emberger (Airbus) and Greg Saccone (Boeing)
- 2.2 Support for the activity**
Airlines: AAL, DLH, SWA, UAL, UPS, USAF
Airframe Manufacturers: Boeing, Airbus
Suppliers: Airtel ATN, GE Aviation, Honeywell, Rockwell Collins, Thales, CGI
Others: ARINC (RC-IMS), BCI, EUROCONTROL, FAA, SITA, Inmarsat, Iridium, Panasonic
- 2.3 Commitment for Drafting and Meeting Participation**
Airlines: AAL, USAF
Airframe Manufacturers: Boeing, Airbus
Suppliers: Airtel ATN, GE Aviation, Honeywell, Rockwell Collins, Thales, CGI
Others: BCI, Collins IMS, EUROCONTROL, FAA, SITA, Inmarsat, Iridium, Panasonic
- 2.4 Recommended Coordination with other groups**
DLUF, DLK, NIS, SAI

3.0 Project Scope

3.1 Description

The Existing ACARS network and Aeronautical Telecommunication Network (ATN) infrastructure for aeronautical safety services is aviation-unique. Modern, off-the-shelf, efficient, and robust network infrastructure common to both air traffic services (ATS) and aeronautical operational communications (AOC) safety service applications is needed.

Note: The ITU Radio Regulations define “safety service” as any “radiocommunication service used... for the safeguarding of human life and property” and ICAO Annex 10 refines that definition to a “service reserved for communications relating to safety and regularity of flights”, specifically ATS and AOC “safety communications” as defined in ICAO Doc 9718.

New network infrastructure for safety services based on the modern Internet Protocol Suite (IPS) will meet this need. Accordingly, it is proposed that an AEEC Subcommittee prepare a detailed technical definition of IPS for aeronautical safety services in a new ARINC Standard. The IPS subcommittee will base the specification on the ICAO Doc 9896 IPS definition and on prevalent commercial IP network technology (e.g., IETF RFC 2460 for IPv6) with the modifications necessary to support aeronautical safety services. It is anticipated that IPS will use multiple line-of-sight and beyond-line-of-sight subnetworks that operate in ‘protected’ spectrum allocated by ITU and ICAO for safety services, including Inmarsat SwiftBroadband, Iridium Certus, AeroMACS, future Satcom and LDACS systems, and VDL Mode 2. It is expected that IPS will support ACARS ATS (e.g., FANS) and AOC (e.g., ARINC 702A flight plans) as well as B2 and future applications. This activity represents a planned continuation of IPS Subcommittee work.

The IPS Subcommittee is preparing documents in **several** ~~two~~ steps. Step 1 was a roadmap activity, which defines the perimeter which needs to be standardized for IPS (air-to-ground and end-to-end) as well as the timeframes within respective standardization development organizations (SDOs) such as ICAO, RTCA, EUROCAE and AEEC. The output of Step 1 is ARINC Project Paper 658 (~~to be~~ completed in October 2017).

Step 2 will be an ARINC Standard containing the specification of IPS functions, implementation options, and constraints as well as higher level details regarding the accommodation of different applications.

Step 3 is proposed to ensure alignment with related ICAO, EUROCAE, and RTCA standards presently in development.

The IPS subcommittee will also maintain specific sections of ARINC 658 (e.g., identifying gaps and which SDOs are working which areas) and provide coordination across IPS standardization activities as appropriate.

3.2 Planned usage of the envisioned specification

New aircraft developments planned to use this specification yes no

Specify: TBD

Modification/retrofit requirement yes no

Specify: If airlines want to take advantage of IPS for aeronautical safety services, then they must retrofit the capability via CMU (or equivalent) avionics

Needed for airframe manufacturer or airline project yes no

Specify: Boeing TBD airplane programs

Mandate/regulatory requirement yes no

Program and date: No mandate

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

Specify: IPS is envisioned to eventually replace ACARS and ATN in the long term

When is the ARINC Standard required? **2022**~~2019~~

What is driving this date? **ICAO WG-I activities are driving the schedule for Supplement 1.** Pull from airlines due to their needs/wants to prepare for the future with modern, efficient, and robust data communications network infrastructure for safety services that leverages the increasing availability of IP links to their airplanes (e.g., Inmarsat SwiftBroadband, Iridium Certus, AeroMACS). Additionally, the normal long lead time for development of aviation specifications means that key areas need to start being investigated and developed now to meet longer term targets in the mid-2020s.

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

If NO, please specify solution: Not applicable

Are Patent(s) involved? yes no

If YES please describe, identify patent holder: Not applicable

3.3 Issues to be worked

Issues to be worked in Step 2 include the following (**completed May 2021**):

- Organize and execute IPS standards development efforts to address the work scope allocated to the IPS Subcommittee, initially outlined as described in Section 5.4.1.1 of ARINC 658.
 - Prepare ARINC Project Paper 858: Internet Protocol Suite (IPS) for Aeronautical Safety Services - Technical Requirements (working title) - (pending approval of the AEEC Executive Committee).

Issues to be worked in Step 3 include the following:

- **Supplement 1 to ARINC 858 Part 1 to align with the related ICAO, EUROCAE, and RTCA standards, in particular security, key management, IPv6 addressing, and mobility.**
- **Supplement 1 to ARINC 858 Part 2 to update IPS Gateway Interface**
- Maintain the IPS standardization roadmap, **Supplement 1 to ARINC Report 658**, (including updates to the gap analysis and standardization activity timing), contained in Section 5 of ARINC 658. If necessary

- Serve as the coordination focal for all AEEC IPS-related activities, including:
 - Coordinate with industry stakeholders and other AEEC subcommittees to ensure that the timing and scope of IPS-related project proposals consider the “need-by” dates of specific industry programs as well as dependencies on other AEEC Subcommittees and/or other standards development organizations.
 - Address questions from other AEEC Subcommittees regarding interpretations of ARINC 658.
 - Monitor AEEC IPS-related developments and standardization work.
- Coordinate with other IPS standardization development organizations, including:
 - Engage AEEC IPS industry participants, particularly those who support multiple SDOs, to develop and present working papers to other SDOs regarding the status of AEEC IPS efforts.
 - Leverage the IPS standardization roadmap as a communication tool for inter-organization coordination, particularly where there may be dependencies.
 - Based on updates to the gap analysis, provide recommendations for potential additional work to be considered by the other SDOs.

4.0 Benefits

4.1 Basic benefits

Operational 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: Not applicable

Is this a software interface and protocol standard? yes no

Specify: IPS will provide a third set of network protocols (in addition to ACARS and ATN)

Product offered by more than one supplier yes no

Identify: TBD

4.2 Specific project benefits (Describe overall project benefits.)

4.2.1 Benefits for Airlines

Airline benefits are expected to accrue in the form of greater data communications performance compared to ACARS and ATN. IPS will be designed to support both ATS and AOC applications, provide backward

compatibility with traditional ACARS ATS (e.g., FANS) and AOC (e.g., ARINC 702A flight plans) applications, and use both line-of-sight and beyond-line-of-sight subnetworks, all of which will further increase its effectiveness and applicability. IPS will support a wide range of future applications and enable a transition to high-speed links for safety services.

4.2.2 Benefits for Airframe Manufacturers

It is expected that airframe manufacturers' benefits will accrue in the form of moving towards future datalink technologies providing more bandwidth and capabilities. IPS protocols (IP, TCP, and UDP) have been exhaustively tested in the commercial domain and are widely available for adaptation for aeronautical use.

4.2.3 Benefits for Avionics Equipment Suppliers

Avionics equipment supplier benefits will accrue in the form of moving towards future datalink technologies providing more bandwidth and capabilities. IPS protocols (IP, TCP, and UDP) have been exhaustively tested in the commercial domain and are widely available for adaptation for aeronautical use.

5.0 Documents to be Produced and Date of Expected Result

ARINC 658: Internet Protocol Suite (IPS) for Aeronautical Safety Services - Roadmap Document (mature document, October 2017)

ARINC 858: Internet Protocol Suite (IPS) for Aeronautical Safety Services - Technical Requirements (**May 2019 due date**)

Supplement 1 to ARINC 658 (October 2022 due date)

Supplement 1 to ARINC 858 (October 2022 due date)

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
Step 1: ARINC Report 658 Standardization Roadmap for IPS, (Develop plan and work program, identify deliverables pertaining to IPS) - published	5	15	September 2015	Completed October 2017
Step 2: ARINC Project Paper 858: Internet Protocol Suite (IPS) for Aeronautical Safety Services - Technical Requirements	6	18	October 2017	December 2019 Completed May 2021

Activity	Mtgs	Mtg-Days (Total)	Expected Start Date	Expected Completion Date
Step 3 Supplement 1 to ARINC Specification 858: Internet Protocol Suite (IPS) for Aeronautical Safety Services, Part 1, Airborne IPS System Technical Requirements	monthly*	TBD*	May 2021	October 2022
Step 3 Supplement 1 to ARINC Specification 858: Internet Protocol Suite (IPS) for Aeronautical Safety Services, Part 2, IPS Gateway Air-Ground Interoperability	monthly*	TBD*	May 2021	October 2022
Step 3 Supplement 1 to ARINC 658: Internet Protocol Suite (IPS) for Aeronautical Safety Services - Roadmap Document	monthly*	TBD*	May 2021	May 2023

6.0

Comments

The schedule proposed is dependent on several factors, namely ICAO WG-I, and Doc 9896, Doc 10090, Doc 10094, Doc 10095, Doc 10145 development schedules, EUROCAE WG-108 and RTCA SC-223 schedules.

*Monthly check-in meetings online, 3-day online meetings every 4 months, in-person meetings when possible.

6.1

Authorization for Step 3

This APIM authorizes the activity proposed for Step 3.

6.2

Expiration Date for the APIM

December 2023