

ARINC Project Initiation/Modification (APIM)

- 1.0 Name of Proposed Project** **APIM 15-004A**
ARINC Project Paper 858: Internet Protocol Suite (IPS) for Aeronautical Safety Services - Technical Requirements (working title)
- 1.1 Name of Originator and/or Organization**
Boeing
- 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 (TBC)**
Airlines: AAL, DLH, HAL, 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 (TBC)**
Airlines: AAL, HAL, 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
- 2.4 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 a new AEEC subcommittee prepare a detailed technical definition of IPS for aeronautical safety services in a new ARINC Standard. This 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 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.

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? 2019

What is driving this date? 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:

- **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).**
- **Maintain the IPS standardization roadmap (including updates to the gap analysis and standardization activity timing), contained in Section 5 of ARINC 658. If necessary, prepare Supplement 1 to ARINC 658.**
- **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 Project Paper 658: Internet Protocol Suite \(IPS\) for Aeronautical Safety Services - Roadmap Document \(mature document, October 2017\)](#)

[ARINC Project Paper 858: Internet Protocol Suite \(IPS\) for Aeronautical Safety Services - Technical Requirements \(working title, due in 2019\)](#)

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

6.0 Comments

6.1 Authorization for Step 2

[This APIM authorizes the activity proposed for Step 2.](#)

6.2 Expiration Date for the APIM

[June 2020](#)