ARINC Project Initiation/Modification (APIM)

- 1.0
 Name of Proposed Project
 APIM 17-008
 - Line of Sight (LOS) Cellular Broadband Communication System Provisions
- 1.1 Name of Originator and/or Organization

Airbus

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

AEEC Ku band subcommittee Peter Lemme. Totaport

2.2 Support for the activity (as verified)

Airlines:

Airframe Manufacturers: Airbus, Boeing (to be confirmed) Suppliers: Thales, Inmarsat, Gogo Others: Totaport

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines:

Airframe Manufacturers: Airbus Suppliers: Thales, Inmarsat, Gogo Others: Totaport

2.4 Recommended Coordination with other groups

Cabin Systems Subcommittee (CSS)

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

3.1 Description

Line-of-Sight (LOS) cellular broadband networks offer regional Internet access to passengers on aircraft flying as far as 200 miles from each ground station. LOS systems utilize one of three frequency assignments:

- 1) Dedicated, licensed spectrum (EAN, Gogo ATG)
- 2) Shared, licensed spectrum (14GHz, public LTE cellular)
- 3) Shared, unlicensed spectrum (SmartSky, Gogo ATG)

Aircraft provisions for LOS sytems include one or more radio sytems that each include an antenna, transmitter, and receiver. Typically, each antenna is mounted on the belly of the aircraft and the associated avionics installed nearby.

While each LOS service provider is developing a proprietary airborne system, the components from each are similar in size, power, and interwiring. A common

provision for LOS could include structural, space, power, cooling, interwiring, and aircraft system interface (cabin wireless access points, IRS, administrative and non-safety supplemental data link).

LOS airborne equipment may be much lighter, smaller, and introduce less drag than an equivalent Ku/Ka satcom system. LOS airborne equipment may be more suitable for smaller or regional aircraft applications than Ku/Ka satcom systems.

LOS and Ku/Ka satcom systems share similar requirements for aircraft system interfaces, and issues related to antenna and coaxial radio interfaces. LOS provisions and functional interfaces can be developed into a common framework as Ku/Ka satcom systems, creating a consistency across diverse broadband aviation radio networks (BARN).

This APIM authorizes a new ARINC standard (7XX) to define for an LOS airborne terminal.

3.2 Planned usage of the envisioned specification

3.3

| New aircraf | New aircraft developments planned to use this specification yes 🗵 no | | | | | | |
|---|--|-------------------------------------|---------------------------------|------------------|---------|------|--|
| Airb | us: | all new | | | | | |
| Boe | ing: | tbd | | | | | |
| Modification | | yes 🗆 | no 🗵 | | | | |
| Needed for | airframe r | nanufacturer o | r airline project | | yes 🗵 | no | |
| Specify: driven by the need to provide common definitions for the airplane programs and retrofit programs | | | | | | | |
| Mandate/re | gulatory re | equirement | | | yes 🗆 i | no 🗵 | |
| Prog | gram and | date: No mand | ate | | | | |
| ls the activi Spe | ty defining cify: new a | /changing an i air to ground lir | nfrastructure stank for pax use | andard? | yes 🗵 | no | |
| When is the | ARINC S | tandard requir | ed? Per aircraf | t program | | | |
| What is driv | ing this da | ate? Aircraft D | evelopment Sch | nedules | | | |
| Are 18 mon | ths (min) | available for st | andardization w | ork? | yes 🗵 | no | |
| lf NO | D, please | specify solution | n: Not applicable | е | | | |
| Are Patent(| s) involve | d? | | | yes | no 🗵 | |
| lf ye | ES please | describe, iden | tify patent holde | er: Not applicat | ole | | |
| Issues to | be worke | ed | | | | | |
| Stille activity defining/changing an infrastructure standard? Specify: new air to ground link for pax use When is the ARINC Standard required? Per aircraft program What is driving this date? Aircraft Development Schedules 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 Issues to be worked Common LOS onboard system architecture Mechanical interfaces (LRU sizes, max weight, attachments, antennas) | | | | | | | |
| • Mechanical interfaces (LRU sizes, max weight, attachments, antennas) | | | | | | | |

- Electrical interfaces (connectors, interwiring, power)
- Interfaces to aircraft systems (e.g. IRS) (leveraging ARINC 791 Part 2)

- Interfaces to the onboard distribution systems for passenger connectivity (e.g. 3G/4G Cabin Distribution System, Wireless Distribution System, CWAPs) (leveraging ARINC 791 Part 2)
- Network security considerations (leveraging PP848)

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: | |
| Is this a software interface and protocol standard? | yes 🗆 no 🖂 |
| Product offered by more than one supplier | yes 🛛 no 🗆 |
| Identify: Gogo, Inmarsat, SmartSky | |

4.2 Specific project benefits (Describe overall project benefits.)

Common aircraft physical and logical provisions will enable LOS system installation line-fit, ease integration.

4.2.1 Benefits for Airlines

- Equipment interoperability between suppliers
- Reduction in development cost, improved reliability, and therefore reduced cost for the airlines
- System easy replaceable to regional system
- Reduced lead time

4.2.2 Benefits for Airframe Manufacturers

- Common platform provisions for different suppliers reduce development and installation cost and time
- Flexibility and reduced costs by working from the same set of guidelines
- Time and cost reduction for new developments due to reuse of proven solutions

4.2.3 Benefits for Avionics Equipment Suppliers

- Eliminates the need to design custom equipment for each aircaft type
- Time and cost reduction for new developments due to reuse of proven solutions

5.0 Documents to be Produced and Date of Expected Result

- Project Paper 7XX
- ARINC 791 Part 2 revised if necessary

- Project Paper 848 revised if necessary
- Adaptation of Cabin Distribution Networks and Peripherals (ARINC 628P1, ARINC 808, ARINC 832, PP820)

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 |
|----------------------------|------|----------------------|------------------------|-----------------------------|
| ARINC Project Paper 7XX | 6 | 24 | 4/17 | 10/18 |

* Meeting days reflect Ku/Ka Band subcommittee meetings responsible for multiple ARINC Standards. In addition to the in-person meetings identified above, web conferences will be called to support specific project goals.

6.0 Comments

6.1 Expiration Date for this APIM

April 2019

Completed forms should be submitted to the AEEC Executive Secretary.