AEEC

Together "We Set the Standard."

To	FMS Subcommittee	**Date**	April 15, 2016
From	P. J. Prisaznuk pjp@sae-itc.org tel +1-410-212-0913	**Reference**	16-059/FMS-001 lth

Subject

Meeting Report
Flight Management System (FMS) Subcommittee
March 29-31, 2016 - Grand Rapids, Michigan

Summary

GE Aviation hosted the FMS Subcommittee meeting at their facility in Grand Rapids, Michigan.

The purpose of the meeting was to review inputs to Supplement 5 to **ARINC Characteristic 702A:** *Advanced Flight Management Computer System.*

Discussion papers were presented on the following topics:

- Magnetic variation model recommendations
- Lateral path transition containment refinement
- Fixed Radius Turn (FRT) refinements
- Crew selection of Required Navigation Performance (RNP) values for Authorization Required (AR) approach
- Lateral offset recommendations
- Temperature compensation for vertical approach guidance
- Vertical path construction
- AT and AT OR ABOVE speed constraints
- ETA min/max computation and RTA performance

Each of the respective discussion papers will be updated for additional review prior to inclusion in Supplement 5 to ARINC Characteristic 702A.

The FMS Subcommittee will have monthly web conferences to discuss specific topics. The next in-person FMS Subcommittee meeting is scheduled tentatively for July 6-8, 2016 in Annapolis, Maryland.

The goal is to produce a mature Supplement 5 at the end of 2017.

Comments and Inquiries

Comments and questions on this report may be directed to Paul Prisaznuk.

cc

DLK, SAI

Meeting Report
FMS Subcommittee Meeting
March 29-31, 2016

FMS Subcommittee Meets in Grand Rapids

Chairman Mike Bakker, GE Aviation, welcomed the FMS Subcommittee to Grand Rapids, Michigan. The purpose of the meeting was to review inputs to Supplement 5 to **ARINC Characteristic 702A:** *Advanced Flight Management Computer System.*

The meeting agenda was accepted as presented. It is reproduced as Attachment 1 to this report.

ARINC Standard Development Process and Intellectual Property

Paul Prisaznuk, ARINC Industry Activities (IA), welcomes the participants. He described the policies pertinent to the use of Intellectual Property (IP) in the development of ARINC Standards.

He noted that by signing the attendance book at an ARINC Industry Activities' meeting or by submitting material for consideration at the meeting, individuals confirm that they understand the ARINC IA policies and agree to comply with those policies.

Copies of these policies are available on the ARINC IA website (*http://www.aviation-ia.com/aeec/ip_policies/index.html*).

APIM 15-005 Review – ARINC 702A Update

Paul Prisaznuk reported that the AEEC Executive Committee has approved APIM 15-005 to initiate the development of Supplement 5 to ARINC Characteristic 702A.

Supplement 5 to ARINC Characteristic 702A will be aligned to applicable RTCA and EUROCAE standards to support Performance-Based Navigation (PBN), Trajectory Based Operations (TBO), and enhanced datalink.

Supplement 5 to ARINC Characteristic 702A is intended to reflect RTCA DO-236C Change 1 requirements and recommendations as follows:

- Magnetic variation model recommendations
- Lateral path transition containment refinement
- Fixed Radius Turn (FRT) refinements
- Crew selection of RNP values for AR approach
- Lateral offset recommendations
- Temperature compensation for vertical approach guidance
- Vertical path construction
- AT and AT OR ABOVE speed constraints
- ETA min/max computation and RTA performance

APIM 15-005 calls for a mature draft at the end of 2017. The APIM is reproduced as Attachment 2 to this report.

Review Proposed Revisions to ARINC 702A

The FMS Subcommittee discussed a number of "white papers" that were prepared prior to the meeting in Grand Rapids. Each paper proposes an addition

or a modification to ARINC 702A. The FMS Subcommittee discussed the process for achieving consensus on the changes. Once consensus is reached on the content of white papers, the material will serve as the basis for Supplement 5 and be folded into ARINC Characteristic 702A.

Magnetic Variation Model Updates

Sam Miller, MITRE, proposed a new Section 4.3.1.8, Magnetic Variation. This section will define how the FMS would incorporate a hierarchy for assigning magnetic variation (MagVar) sources. This input will support Procedure Design MagVar (PDMV) definition in **ARINC Specification 424**: *Navigation System Database (NDB).*

The FMS Subcommittee concurred that the FMS should have the capability of assigning a MagVar at any location when operations are conducted relative to Magnetic North. The MagVar value may be retrieved from the NDB, or in the absence of an NDB-specified value, computed using an internal magnetic reference. The FMS Subcommittee suggested changes to the input. Sam Miller agreed to update the material for review at the next meeting.

Lateral Path Transition Containment (bank angle limits)

Sam Miller proposed modification to Section 4.3.3.1.2, Lateral Leg Transitions, to align with the recommendations of RTCA 283B MOPS. This proposal also takes into consideration RTCA DO-236C RNP MASPS that describe transitions between flight plan legs. New material was added to address the fly-by transition and the theoretical transition area as described in the RNP MASPS. Additionally, the transition area when the course change exceeds a nominal value was defined. Text was also added to clarify the fly-over transition, the Fixed Radius Turn (FRT), and the respective operation.

The FMS Subcommittee concurred that leg-to-leg transitions should provide a continuous path between legs and the path would be determined by the course change between the legs, the type of next leg, waypoint overfly requirement, bank angle limitations, and the predicted speeds for the transition. Leg transition paths must be constructed within the airspace limitations specified in the RNP MASPS for operation within RNP airspace. The FMS Subcommittee expressed general support for this concept. This input will be updated for review at the next meeting.

Fixed Radius Turn Refinements

Sam Miller provided a proposal to add Section 4.3.3.1.2.3, Fixed Radius Transitions (FRT). The FRT defines course change transitions along airways when parallel routes are closely spaced at the transition waypoint and the fly-by turn is not compatible with separation criteria. The RTCA DO-236C RNP MASPS specify the geometry and method of computing the fixed turn radius. The FRT is defined in terms of the track change, turn radius, and lead distance. For those enroute airways using an FRT, the turn radius is coded in the ARINC 424 navigation database for the respective waypoint where the FRT is specified. The FMS Subcommittee expressed general support for this concept. This input will be updated for review at the next meeting.

Crew Selection of RNP Values for Authorization Required (AR) Approach

Sam Miller proposed changes to Section 4.3.1.3.1.1, Manually Selected RNP Values. The existing ARINC 702A-4 text addresses a manually entered value. Additional commentary will be added that describes when a manually entered

RNP value may be necessary for safe operation of an instrument approach procedure.

FAA AC 20-138D and AC 90-101A provide guidance on the entry of RNP values for instrument approach procedures. In the case of a procedure with decreasing RNP values along the path, the respective RNP value for each leg would be coded in the navigation database and the FMS would extract the applicable RNP value on each leg. In the case where the values are not coded on each leg, the flight crew is then responsible for ensuring the RNP value is entered into the FMS.

The concept of “Scalable RNP” was discussed. It is expected that the ARINC 424 Navigation Database will encode this data and the FMS will have the capability to extract the RNP values from the data. This concept will be reflected in the Navigation Database section of ARINC Characteristic 702A. This input will be updated for review at the next meeting.

Lateral Offset Recommendation

Sylvain Hamel, CMC, proposed changes to Section 4.3.3.2.4.6, Lateral Offset Construction. Recent changes to RTCA DO-236C RNP MASPS will require functional changes to the FMS, including the Parallel Offset function. The RNP MAPS provides additional requirements and guidance intended to ensure better path consistency and to enable more efficient use of parallel offset in the airspace.

In the CMC proposal, the flight planning function can create a parallel flight plan by specifying a direction (left or right of path) and distance of up to 99 nm. The initiation of the offset can either be pre-planned by defining the start and end point or be initiated at the current aircraft position.

The FMS Subcommittee concurred that Supplement 5 needs to be revised to reflect those changes. This input will be updated for review at the next meeting.

Temperature Compensation

The FMS Subcommittee discussed the need for temperature compensation on barometric altitude data used with VNAV approaches. During the approach phase, the FMS needs highly accurate altitude reporting. Sylvain Hamel, CMC, pointed out that the topic of temperature compensation is not addressed at all in ARINC 702A-4. Therefore, CMC proposed a new Section 4.3.3.2.2.7, Temperature Compensation.

Because this feature is described as optional in the RTCA DO-236C RNP MASPS and RTCA DO-283B RNP MOPS, CMC suggested that it be included within Supplement 5 to ARINC Characteristic 702A.

To enable baro-VNAV approach operations outside published temperature limits, it is recommended that the system corrects for the effects of temperature on the barometric altitude. Systems providing automatic temperature compensation to the baro-VNAV guidance must comply with RTCA/DO-236C Appendix H and RTCA/DO-283B Appendix H.

Randy Walter, Consultant to GE Aviation, questioned the need for the FMS to provide temperature compensation. He suggested that this is an altimetry problem that could be corrected elsewhere on the airplane. Honeywell suggested a generic definition in ARINC 702A to enable manual entry as necessary. The FMS Subcommittee recommended that this capability be defined as an option in Supplement 5. This input will be updated for review at the next meeting.

Vertical Path and Vertical Trajectory Construction

Randy Walter provided a discussion paper describing vertical path construction guidelines using vertical trajectory. Today, different FMSs apply different construction rules that can cause a significant variance in the vertical airspace utilized in VNAV operation. A key component of future airspace management is new procedures that rely on more consistent vertical control of the aircraft.

Section 4.3.3.2.1, Vertical Trajectory Construction, was proposed as a replacement and expansion of existing material. Standardization of the means to construct a vertical trajectory would enable similar vertical trajectory rules to be applied among all FMSs compliant to RTCA DO-236C.

The FMS Subcommittee recognized the need for standardized construction of the vertical trajectory provided by an FMS. They recommended that the vertical trajectory be defined independent of path prediction.

The recommended subsections would include:

1. Takeoff Segment Construction
2. Climb Segment Construction
3. Cruise Segment Construction
4. Descent Segment Construction
5. Missed Approach Segment Construction

Randy pointed out that Continuous Climb Cruise and Continuous Descent Approach are terms from **ARINC Report 660B**: *CNS/ATM Avionics Architectures Supporting NextGen/SESAR Concepts*. He suggested that they be included in Supplement 5 to ARINC Characteristic 702A. Terms may include:

- CCC – Continuous Climb Cruise
- CCD – Continuous Climb Departure
- CDA – Continuous Descent Approach
- CDO – Continuous Descent Operations

The FMS Subcommittee expressed general support for this concept. This input will be updated for review at the next meeting.

AT and AT or ABOVE Speed Constraints

Mike Bakker, GE Aviation, proposed new material on the subject of AT and AT or ABOVE Waypoint Speed Constraints. He proposed Section 4.3.3.2.2.6, Speed and Altitude Restrictions. The changes are a result of corresponding material included in the RTCA DO-236C RNP MASPS. Because DO-236C provides “minimum airspace performance standards”, the guidance provided in Supplement 5 to ARINC 702A is intended to be much more comprehensive.

At present, speed constraints defined by the navigation database are entered by the crew and treated as AT or BELOW speed constraints. Furthermore, ARINC 424 now includes a speed descriptor field with each waypoint speed constraint. While the RNP MASPS define a minimal set of requirements, they do not provide any guidance in terms of what takes precedence when an ABOVE speed constraint conflicts with the speed schedule, airport speed limit, ICAO limit, or other waypoint speed constraints. Clarification is needed to ensure sufficient understanding and standardization across aircraft when designing and flying navigation procedures with AT and AT or ABOVE speed constraints. The FMS Subcommittee concurred.

Mike suggested the following set of altitude constraints by flight phase:

Altitude Constraint Type	Altitude Constraint Phase/Applicability	
	CLIMB	**DESCENT**
AT or BELOW	Must remain AT or BELOW until waypoint sequence	Must remain AT or BELOW upon waypoint sequence
AT or ABOVE	Must remain AT or ABOVE upon waypoint sequence	Must remain AT or ABOVE until waypoint sequence
AT	Must remain AT or BELOW until waypoint sequence; Must remain AT or ABOVE upon waypoint sequence; Must sequence AT altitude.	Must remain AT or BELOW upon waypoint sequence; Must remain AT or ABOVE until waypoint sequence; Must sequence AT altitude.
WINDOW	Must remain AT or BELOW upper bound until waypoint sequence; Must remain AT or ABOVE lower bound upon waypoint sequence	Must remain AT or BELOW upper bound upon waypoint sequence; Must remain AT or ABOVE lower bound until waypoint sequence

Mike suggested the following set of speed constraints by flight phase:

Speed Constraint Type	Speed Constraint Phase/Applicability	
	CLIMB	**DESCENT**
AT or BELOW	Must remain AT or BELOW until waypoint sequence	Must remain AT or BELOW upon waypoint sequence
AT or ABOVE	Must remain AT or ABOVE upon waypoint sequence	Must remain AT or ABOVE until waypoint sequence
AT	Must remain AT or BELOW until waypoint sequence; Must remain AT or ABOVE upon waypoint sequence; Must sequence AT altitude.	Must remain AT or BELOW upon waypoint sequence; Must remain AT or ABOVE until waypoint sequence; Must sequence AT altitude.

The FMS Subcommittee expressed general support for the concepts and the need to elaborate the guidance provided in RTCA DO-236C. This input will be updated for review at the next meeting.

ACARS Interface Extensions

Jendrick Westphal, Jeppesen, provided an input that was discussed in absentia. The FMS Subcommittee discussed a proposal to revise Section 4.3.6, AOC Function, to support the evolution of the Electronic Flight Bag (EFB). EFB suppliers have requested access to aircraft parameters.

The Jeppesen input reports that the existing ARINC 702A-4 text describes the AOC function for use on the ground. The description could be updated to include an onboard use of this interface. The Jeppesen input requested that the AOC interface be expanded to include onboard usage through an interface to onboard electronic devices (e.g., EFBs).

The FMS Subcommittee expressed concern with this input on the grounds that the desired capability is not clear. The FMS resides in the Aircraft Control Domain (ACD) and it is unlikely that it will connect directly to an EFB. Jeppesen will be invited to attend the next meeting and clarify their proposal.

Boeing provided comments on this section. They recommended that the existing Commentary in Section 4.3.6 be deleted from ARINC 702A on the grounds that it is inaccurate. The FMS Subcommittee concurred.

Additional Topics for Consideration

The FMS Subcommittee discussed the possibility of including additional guidance in ARINC Characteristic 702A. Several topics were identified and where there is sufficient interest a discussion paper will be prepared for review at the next meeting.

FAS Data Block Interface

The FMS Subcommittee discussed Final Approach Segment (FAS) data block. Sylvain Hamel, CMC, volunteered to provide a discussion paper for review at the next meeting.

ETA Windows and TOA Control

The FMS Subcommittee discussed Estimated Time of Arrival (ETA) Windows and Time of Arrival (TOA) Control. Sam Miller volunteered to provide a discussion paper for review at the next meeting.

Backup Navigation

The FMS Subcommittee discussed backup navigation capabilities. This capability may involve other equipment (e.g., MCDU or display). This material would be a summary of current industry practices and provide guidance as necessary. This was viewed to be a low priority topic.

FLS/IAN Interface

The FMS Subcommittee discussed the need for a standardize interface for FMS Landing System and Instrument Approach Navigation (FLS/IAN). Boeing expressed the view that IAN is a flight deck integration issue. Boeing is opposed to standardizing this particular interface. The FMS Subcommittee concurred.

The FMS Landing System interface may be defined independent of IAN. Mike Bakker volunteered to prepare a discussion paper for review at the next meeting.

Datalink Requirements

The FMS Subcommittee discussed emerging datalink requirements. This involves the emerging datalink standards in Europe and the USA. There are differences that need to be identified. Interfaces to FANS 1/A and ATN Baseline 2 will be included in Section 4.3.7.1, CNS/ATM Datalinks.

The FMS Subcommittee may have to harmonize this input with RTCA and other AEEC Subcommittees. Randy Walter and Sam Miller offered to prepare an outline for this section that will be reviewed at the next meeting.

Intent Bus

The FMS Subcommittee discussed the aircraft state and intent bus definition currently provided as Section 4.3.7.2.4, Position/Intent Broadcast (ADS-B) of ARINC 702A and the need to align this definition with the latest RTCA Standards. This will be discussed after the EPP Frame is defined.

EPP Frame

The FMS Subcommittee discussed Extended Projected Profile (EPP) and how it may contribute to 4D trajectory. The FMS Subcommittee expressed the desire to include this definition in Supplement 5. This topic will be discussed at the next meeting.

FMS Datalink Interfaces for AOC and the Role of EFB

The FMS Subcommittee discussed Airline Operational Communications (AOC)

and supported the need for guidance on this topic. This topic will be discussed at the next meeting.

Other Business

A Glossary of Terms will be added as Appendix C to ARINC Characteristic 702A.

Future Work Program

Each of the respective discussion papers will be updated for review and discussion at the next meeting. The FMS Subcommittee identified the desire for monthly web conferences starting with a tentative May 4 conference.

Future meetings were planned as follows:

- **FMS Subcommittee** – July 6-8, 2016
- **FMS Subcommittee** – November 29 to December 1, 2016

The goal is to produce a mature Supplement 5 at the end of 2017.

Comments and questions about these activities should be directed to Paul Prisaznuk at ARINC Industry Activities at pjp@sae-itc.org.

Attendees

Bakker, Mike	GE Aviation
Colburn, Matthew	The Boeing Company
Deker, Guy	Thales
Hamel, Sylvain	Esterline CMC Electronics
Jaeger, Tom	American Airlines
Miller, Sam	Mitre Corporation
Paricaud, Erwan	Honeywell, Inc.
Prisaznuk, Paul	SAE ITC, ARINC IA
Walter, Randy	GE Aviation

Attachment 1

Attachment 1

AEEC

Together "We Set the Standard."

FMS Subcommittee
March 29-31, 2016
GE Aviation – Grand Rapids, Michigan
Agenda – draft

1. Welcome and Introductions
    a. GE Aviation Facility Notes
2. Review of Agenda
3. ARINC Standard Development Process and IP Policies
4. APIM 15-005 Review – Supplement 5 to ARINC 702A
5. Review use of GE Box for collaboration
6. Review Proposed Revisions – Mature Drafts
    a. Magnetic Variation Model Updates – MITRE
    b. Lateral Path Transition Containment (bank angle limits) – MITRE
    c. Fixed Radius Turn Refinements – MITRE
    d. Crew selection of RNP Values for AR Approach – MITRE
7. Review Proposed Revisions – Initial Drafts
    a. Lateral Offset Recommendations – CMC
    b. Temperature Compensation – CMC
    c. Vertical Path Construction – GE/MITRE
    d. AT, AT or ABOVE Speed Constraints – GE
    e. ACARS Interface Extensions – Jeppesen
8. Discuss Remaining Items – Scope, Alignment, and Way Forward
    a. Minimal level of effort (material already available)
        i. FAS Data Block Interface
    b. Medium level of effort
        i. ETA Windows and TOA Control
        ii. Backup Navigation
        iii. FLS/IAN Interface
    c. Higher level of effort
        i. Datalink Requirements
        ii. Intent Bus (Need to decide on elimination or alignment).
        iii. EPP Frame
        iv. FMS Datalink Interfaces for AOC and role of EFB (proposed item)
9. PPT Report to AEEC General Session
10. Action Items
11. Future Meetings
12. Web Conferences – May 5, 2016
13. Next FMS Subcommittee Meeting
    a. Dates / location TBD
14. Adjourn

Attachment 2

Attachment 2

ARINC Project Initiation/Modification (APIM)

1. Name of Proposed Project APIM 15-005

ARINC 702A-5: Advanced Flight Management Functional Definition

Software specification only yes☐ no ☑

1.1 Name of Originator & Organization

Mike Bakker, GE Aviation Systems LLC

2. Suggested Subcommittee Assignment and Project Support

2.1 Suggested AEEC group

FMS Subcommittee

2.2 Support for the Activity (as verified)

Airlines:
American Airlines
Delta Air Lines
FedEx
Lufthansa
Southwest
TAP Portugal
United Airlines
US Air Force
UPS

Airframers:
Airbus

Suppliers:
Esterline CMC Electronics
GE Aviation
Rockwell Collins
Thales

Others:
The MITRE Corp
SABRE

2.3 Commitment for Drafting and Meeting Participation (as verified)

Organizations: GE Aviation, MITRE

2.4 Recommended Coordination with other Industry Groups

The following AEEC Subcommittee activities are relevant to this topic:

- SAI Subcommittee (ARINC Report 660B)

The following RTCA/EUROCAE activities are relevant to this topic:

- RTCA SC-227/EUROCAE WG-85 (DO-236C - Change 1 / ED-75D)
- RTCA SC-214/EUROCAE WG-78 (DO-350 / ED-228)

3. Project Scope

3.1 Description

A number of key technologies have emerged and evolved in a manner different than that envisioned at the time ARINC 702A was written. Many of these evolutions are discussed in ARINC 660B and part of the larger CNS/ATM initiatives of NextGen and SESAR to increase the capacity and efficiency of the airspace. These evolutions include enhanced datalink, satellite-based approach procedures, airport moving map and guidance, and electronic flight bags. Other evolutions include graphical user interfaces (ARINC 661) and software partitioning (ARINC 653).

The project proposed will prepare Supplement 5 to ARINC 702A to take the aforementioned evolutions into account and thus align the standard with the current and future avionics architectures as detailed in ARINC 660B. The standard will also be updated to align with and point to applicable RTCA/EUROCAE standards in support of NextGEN and SESAR initiatives such as Performance-Based Navigation (PBN), Trajectory Based Operations (TBO), and enhanced datalink.

The resultant ARINC 702A-5 will be used for new airplane development programs as well as retrofit programs to better equip aircraft for operation in the NextGen and SESAR airspaces. It is recognized that some existing sections of ARINC 702A may not directly apply to some newer avionics architectures. It is hoped that a future project will address this issue and the other evolutions identified earlier (i.e. graphical user interfaces, software partitioning) as part of a future ARINC Project Paper 702B. In any case, it should be recognized that: (a) the proposed changes are applicable to both older and newer avionics architectures and (b) many older aircraft will operate in the NextGEN and SESAR airspaces and will benefit from an updated ARINC Standard.

3.2 Planned usage of the envisioned specification

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

TBD

New avionics equipment for major retrofit programs yes ☑ no ☐

TBD

Mandate/regulatory requirement yes ☐ no ☑

Please specify program and date: N/A

Modification/retrofit requirement yes☐ no ☑

Please specify:

TBD

Airframer and/or airline projects to use this specification yes ☑ no ☐

TBD

Is the infrastructure standard for the aircraft defined? yes ☑ no ☐

When is the ARINC standard required?

GE envisions a few programs with target certifications in the 2020 time frame which could benefit from an update to the standard. An update to the standard in the 2018 time frame would allow the standard to influence those programs.

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

If 'No' please specify solution:

Patent(s) involved? yes ☑ no ☐

If 'Yes' please describe:

Airbus has a patent related to the SESAR I4D (RTA) functionality. This patent has been discussed as part of the RTCA DO-236C – Change 1 ratification. A similar discussion may be necessary as part of ARINC 702A-5.

3.3 Issues to be worked

Start with ARINC 702A-4 and update the document as follows:

Update Flight Management Function description to reflect DO-236C - Change 1 requirements and recommendations. The FMS subcommittee could be used as a forum to debate a few of these recommendations (if necessary).

- Magnetic variation model recommendations
- Lateral offset recommendations (30 degree intercept, FRT and RF offsets)
- Lateral path transition containment refinement (bank angle limits)
- Fixed Radius Turn refinements
- Temperature compensation
- AT and AT OR ABOVE speed constraints
- Vertical path construction rules
- ETA min/max computation and RTA performance (Supplement 1)
- Crew selection of preplanned RNP values for RNP AR approach
- Others, per the consensus of the Subcommittee

Update Flight Management Function description to reflect industry guidance and lessons learned on design of FLS/IAN for use flying non-precision approaches. Update attachment 4 for this interface.

Update Flight Management Function description for FAS Data Block interface to the GNSS/MMR receiver in support of LPV approaches. Add/update attachment for this interface.

Update Flight Management Function description to reflect the role of the FMS in supporting and supplying the data necessary to support Airport Surface Guidance. Add/update attachment for this interface.

Update Flight Management Function datalink description(s) to reflect evolutions in the industry for SESAR and NextGEN. Align the EPP frame definition and ARINC 702A intent bus definition.

Other editorial changes as needed for clarification and/or alignment with RTCA DO-236C – Change 1 and RTCA DO-350.

Address MCDU, EFIS, and Cursor Control Device references to, at a minimum, recognize emergence of graphical user interfaces (ARINC 661) and the various other control/display devices.

Provide recommendation for Backup Navigation function and the corresponding interface. Backup Navigation has traditionally been implemented in the MCDU but may be hosted on other hardware devices.

Discuss and possibly extend the ACARS interface to support EFB applications, airline applications, and airframer applications.

4. Benefits envisioned

4.1 Basic benefits

Operational enhancements (reduction in DOC?)	yes ☑ no ☐
Form, Fit, Function, (FFF) standard (HW and/or SW):	
a. ARINC 600 form (only HW)	yes ☐ no ☑
b. Software specification only	yes ☐ no ☑
c. Interchangeable fit (plug, mount, SW loading interface, etc)	yes ☑ no ☐
d. Interchangeable function	yes ☑ no ☐
If not fully interchangeable, please explain:	
Interface and protocol standard (for aircraft defined in section 3 scope)	yes ☑ no ☐

Please specify: FMC/Data Link Interface

Product offerable from more than one supplier (competitive environment) yes ☑ no ☐

Please identify: Aircraft manufacturers, avionics manufacturers

4.2 Specific Project Benefits

This project will bring ARINC 702A into alignment with industry initiatives and activities that have transpired since the last major update. It provides a forum to advance and shape those initiatives from an airline and manufacturer perspective. In many ways, it is an extension of the concepts and requirements outlined in ARINC 660B. It will advance the NextGen and SESAR operational concepts which, in turn, provide a number of benefits to airlines, airframe manufacturers, and avionics suppliers.

4.2.1 Project Benefit for Airlines

Airlines will benefit from increased standardization and clarification of the Flight Management Computer functionality and its role in bringing about the future airspace. Airlines could also benefit from more clarity relative to the datalink interface and an enhanced ACARS interface.

4.2.2 Project Benefit for Airframe Manufacturers

Airframe Manufacturers will also benefit from increased standardization and clarification of the Flight Management Computer functionality and its role in bringing about the future airspace. Manufacturers could also benefit from more clarity relative to the datalink interface and may derive benefits from an enhanced ACARS interface.

4.2.2.3 Project Benefit for Avionics Equipment Suppliers

Avionics Suppliers will benefit from increased standardization and clarification of the Flight Management Computer functionality and its role in the evolving airspace. Suppliers will also benefit from more clarity relative to the datalink interface. A clear picture of both airline and airframe manufacturer needs and preferences relative to the evolving airspace will help guide research, investment, and implementation.

5. Documents to be Produced and Date of Expected Result

ARINC 702A-5: Advanced Flight Management Computer System Standard

6. Meetings/Expected Document Completion

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

This activity to be completed within the approved work program and meeting schedule for the FMS Subcommittee:

Activity	Mtgs	Mtg-Days 2016	Mtg-Days 2017
ARINC 702A-5	6 meetings (3 per year)	9	9

In-person meetings will be augmented with monthly web conferences as needed.

6.1 Expiration Date for this APIM

December 2017

7. Comments

Send this document to the AEEC Executive Secretary and please include any other information deemed useful for managing this work.