ARINC Project Initiation/Modification (APIM)

1. Name of Proposed Project APIM #09-001

New Project Paper 8xx: Media Independent ACARS Messaging (MIAM)

Software specification only yes ☑ no ☐

2. Suggested Subcommittee Assignment (who acts)

2.1 Identify AEEC group

Data Link (DLK) Systems Subcommittee

2.2. Support for the activity

Organizations: Airbus, Boeing, ARINC, SITA, Rockwell Collins, Universal Avionics, Delta Air Lines

2.3. Commitment for resources (directly from participant)

Organizations: Airbus, Boeing, ARINC, SITA, Rockwell Collins (Airbus aircraft oriented).

Rockwell Collins France is willing to provide an industry editor to support strawman development. Airbus is willing to provide leadership of TWGs.

2.4. Recommended Coordination with other groups

The following activities are relevant to this topic:

- Aircraft Network and Filer Server (ANFS) developing Gatelink and Air/Ground Information Exchange (AGIE) – Note: MIAM may be a user of ARINC 830 AGIE services.
- Network Infrastructure and Security (NIS) Subcommittee
- AOC Message Subcommittee – ARINC 633 – potential user of MIAM

3. Project Scope

3.1 Description

The volume of data transmitted over ACARS data link has increased, notably on new generation aircraft, justifying the use of enhanced communication capability to handle the AOC traffic. Although AOC messages will continue to be transmitted over ACARS-dedicated subnetworks, there is a need to send ACARS messages over new subnetworks, and especially IP-based communication systems, such as GSM, or X.25 based systems such as Satcom Data 3.

There is a need for a new protocol that will allow avionics systems (necessary users of ACARS) to exchange larger volumes of data (larger than maximum ACARS message) over broadband subnets (AOA, IP, X.25, etc). These larger messages could also transit over VDL Mode 2 or traditional ACARS subnetworks

under certain conditions.

While proprietary solutions exist to handle the exchange of large volumes of data on ACARS, standardization is needed to:

- Avoid proliferation of proprietary solutions
- Focus on ACARS performance and efficient RF spectrum utilization

The definition of MIAM protocol would allow significant extension of ACARS capacities, thus extending the life of ACARS and bringing additional benefits to ACARS users at a small expense.

MIAM will take into account the adequacy of the underlying subnetworks to carry the increased volume of data. Special care must be taken on this item during the definition of MIAM and any associated ACARS systems definition.

MIAM should be consistent with ARINC 823 (ACARS security) and ARINC 830 (AGIE) and take into account ARINC 633 AOC messaging requirements.

The scope of this activity should include:

- Definition of requirements and targeted operational scenarios
- Definition of the global air-ground architecture options
- Definition of the MIAM protocols (air-ground / ground-ground)
  - This protocol will allow transmission of larger ACARS messages up to 100k characters. (Note: traditional ACARS message size is 3.3k characters maximum.) It will support compression, data encoding, flow control if needed, and manage the transport of these data over any subnet (ARINC 618 native subnet or IP based / X.25 subnet) by segmenting/reassembling, the various parts of the application message.
- Definition of the service interface with underlying communication systems
  - Specify a generic interface
  - MIAM over ARINC 620/618
  - MIAM over Satcom Data 3
  - MIAM over IP
- Definition of minimum requirements to enable subnetworks to be compatible with MIAM requirements. Definition of solutions for performances management, i.e., controlling the adequacy of subnets capacities to accommodate volume increases. This may include the development of new flow regulation functionalities.
- PICS definition for conformance testing

The main requirements for the MIAM protocol would be:

- Allow asynchronous exchanges, without flow control, of large ACARS messages in a way that is compatible with current ACARS systems constraints and performance.
- Use this service over various networks/subnetworks
- Ensure compatibility with architectures where the ground server is either DSP based, located at the airline (end-to-end) or at a third party
- Allow communication with various ground entities

Two development phases are recommended to ease incorporation into new aircraft programs development.

- Phase 1: MIAM over ARINC 618 (will include definition of solutions for performances management – or restrictions on the use of sub networks)
- Phase 2: extension to MIAM over IP and Satcom Data3

3.2. Planned usage of the envisioned specification

New aircraft developments planned to use this specification	yes ☑ no ☐
(Airbus A350 is targeted)	
New avionics equipment for major retrofit programs (schedule TBD)	yes ☑ no ☐
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 ☐
Airbus	
Is the infrastructure standard for the aircraft defined?	yes ☑ no ☐
Are 18 months (min) available for standardization work?	yes ☑ no ☐
One year for the initial mature version is an objective (end 2009)	
Patent(s) involved?	yes ☐ no ☑
If 'Yes' please describe:	

3.3. Issues to be worked

The main issues are:

- Protocol definition

- Incorporation into existing aircraft programs or applications where required
- Incorporation into applicable end-systems on the ground

4. Benefits envisioned

4.1. Basic benefits

Projects benefiting from this effort would be future production aircraft (Airbus A350 at a minimum). Major retrofit programs that utilize alternate subnetworks for ACARS transmission may also benefit. Other benefits are communication costs reduction, more efficient use of VHF/HF bandwidth versus proprietary solutions, and longer life for ACARS systems.

Operational enhancements (reduction in direct operating costs (DOC)? yes ☑ no ☐

Form, Fit, Function, (FFF) standard (HW and/or SW):

a. ARINC 600 form (only HW) yes ☐ no ☑

b. Interchangeable fit (plug, mount, SW loading interface, etc) yes ☐ no ☑

c. Interchangeable function yes ☑ no ☐

If not fully interchangeable, please explain:

Interface and protocol standard (for aircraft defined in 3 scope) yes ☑ no ☐

Please specify: Transport-layer protocol for data delivery

Product offered by more than one supplier (competitive environment) yes ☑ no ☐

Please identify: Aircraft manufacturers, CMU suppliers, ground server suppliers

4.2 Specific project benefits

Extend ACARS system lifetime.

Standardize a solution improving ACARS performances with a standard, thus reducing costs to airlines.

4.3 Project Benefit for Airlines

This standard will provide several benefits to airlines:

- Reduced communication costs
- Reduce acquisition cost (thanks to availability of a standard)
- Ensure longer life for ACARS systems / investments done so far
- Alleviate VHF/HF spectrum loading – enhance performances of these traditional sub networks

4.4 Project Benefit for Airframe Manufacturers

- Airbus has stated that this is a necessary function for new aircraft

- Multi sourcing on ground products

4.5 Project Benefit for Avionics Equipment Suppliers

- Allows for an open market place for manufacturers to supply interoperable equipment
- Open the market to all aircraft types

5. Documents to be Produced and Date of Expected Result

ARINC Specification 8xx for MIAM protocol

Phase 1:	MIAM protocol specification	end 2009
Phase 2:	MIAM over IP and Satcom data 3	end 2010

6. Meetings/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 2008	Mtg-Days 2009	Mtg-Days 2010
Prepare PP 8xx	8-10	1	4 [1]	4 [1]
TWG meetings			5 [2]	TBD

Notes:

1. Two DLK Sys Subcommittee meetings, two days each: This task will be integrated into the already scheduled work program.

2. TWG meetings and teleconferences will be conducted to ensure timely development of this document. Two TWG meetings, two days each are projected.

3. Monthly web conferences

7. Comments

Any other information deemed useful to the committee for managing this work.

For AEEC staff use only:

Date Received: AEEC staff:

Potential impact: *(Safety, Regulatory, New aircraft/system, other)*

Resolution: Date of Resolution:

(Withdrawn, Authorized, Deferred, More detail needed, Rejected)

Assigned to Subcommittee: