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Summary Report AMDAR Representation

Airlines Electronic Engineering Committee (AEEC) DataLink Users Forum (DLUF)

Dublin, 19-20th Sep 2012

Prepared by: *Stewart Taylor*

To: *E-AMDAR Programme Manager, E-AMDAR TAG and WMO AMDAR Panel.*

Summary: *Summary Report from AEEC DLUF. The document provides a summary of the meeting and information on discussions with attendees.*

Action required: *Comment*

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Summary Report from the AEEC DLUF.

Introduction.

As an introduction to AEEC, I have taken the following text from the ARINC website.

“The goal of the Data Link (DLK) Users Forum is to assist aircraft operators to improve the system performance and maximize the operational and economic benefits of air/ground data link communication services through the exchange of technical information. The DLK Users Forum is a coordinating activity among airlines and cargo carriers, aircraft manufacturers, avionics manufacturers, and data link service providers on technical issues of mutual interest leading to the identification and resolution of common problems. The DLK Users Forum also provides an opportunity for coordination among airlines, civil aviation authorities, and air traffic service providers on the direction and schedule of new Air Traffic Service (ATS) datalink programs”.

The Forum has several objectives which include establishing and maintaining interoperability between the airborne users and the ground communication service providers and also provides the opportunity to discuss and resolve any issues or concerns.

Further information on the work of the AEEC DLUF can be sourced at:

http://www.aviation-ia.com/aeec/projects/users_forum/index.html

Meeting Format

The Forum is held over two days and has a structured agenda allowing status reports from DataLink Users and service providers and discussions on current and future use of datalink application.

Day 1 included updates on the European and US DataLink Programmes, Global Air Traffic Services (ATS) Harmonisation and Satcom Links.

Day 2 included further discussion on Satcom Links, Application of DataLink (this includes the meteorological discussions) and updates from the data service providers (ARINC and SITA).

A copy of the Agenda is available at the web link above.

Summary reports of Agenda Items – Day 1.

The meeting started with the usual round of announcements and administration issues followed by a review of the Agenda and acceptance of the report from the last meeting.

1. First up was Eurocontrol to update on SESAR Projects.
 - a. Discussions touched on the Future COM Infrastructure (FCI) and looking at current and new ATM services.
 - b. There was a presentation of the perceived Service & Technology Roadmap for the move of VHF ACARS to VDL Mode 2.
 - c. SESAR Project P 15.2.6 deals with Future Satellite System Development within SESAR/ESA/IRIS
 - d. All discussion indicated a need for airborne integration for new DL services and applications.
2. Eurocontrol also reported on AeroMACS which is an Airport Surface DataLink service.

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- a. This is WiMAX based application intended for use on the airport surface, operating in the 5091-5150MHz bandwidth.
 - b. Will assist with ATC and ATM operations and currently being tested by several ATC services.
 - c. AeroMACS is a high performance datalink and will be an ICAO standardised system supporting AOC and ATS applications.
 - d. Strong interest from FAA.
3. There was an update from UK NATS.
 - a. The main thrust of the update concerned move to VDLM2 coverage. NATS working closely with ARINC (similar working with SITA). Looking at a transition into operational service by growing confidence in the service with controllers and airlines.
 - b. Envisaged benefits of the move to VDLM2 are safety (reduce misunderstandings, capacity (VDLM2 will reduce R/T channel occupation) and enabling the future – key to SESAR.
 - c. Timeline – 2013.
 - d. NATS has led working group with European ANSPs reference FANS implementation.
 4. There was a presentation on Data Communications Programme by FAA in Washington via WebEX.
 - a. The presentation provided information on the portfolio of networks and avionics and the Services Strategy Roadmap.
 - b. In May 2012 – implementation of DCL service to accommodate FANS aircraft (S1P1). An analysis of 57 sites based on airport operation, weather impact operations was carried out. Further analysis also looks at cost benefit.
 - c. ICAO Flight Plan (FP) Requirements for DCL Service were discussed. The User must file ICAO 4444 flight plan, indicate whether flight plan is to get legacy PDC or DCL. FAA – support initial flight plan and amendments, FAA ground system to use 2012 FPL as primary source.
 - d. Further discussion on the ICAO FP. It was noted that ARP 5740 “Cockpit Display of Data Linked Weather Information” is now referenced by an ICAO document.
 5. The DLUF Chair presented the topic of Dual Data Link (DDL) Coverage on behalf of IATA.
 - a. The status of implementation of DDL by the ANSPs was presented.
 - b. ANSPs set up sole contracts for FANS VDLM2. These ANSPs were “educated” and informed that each ANSP would not have automatic coverage (switching from one to another – it would flip back to ACARS from FANS. IATA has taken responsibility.
 - c. AENA – Spain VDLMS system from ARINC – connected to NAVPortugal, SkyGuide – Swiss ARINC, DFS – Germany SITA contract discussions with ARINC, DSNA – France and ENAV – Italy ARINC contract discussions with SITA.
 - d. Eurocontrol have supported dual connectivity and should have implemented by 2013.
 - e. All ANSPs are providing coverage for ATN VDLM2 but not with dual connectivity. This means that when an aircraft log on via ACARS, aircraft will hear squitter for VDLM2 and switch if you are a customer of the DSP – if not you will either continue or drop back to ACARS.
 6. Airbus then provided update on FANS and SATCOM Connectivity.
 - a. There is a perceived divergence in FANS Technical Standards e.g. FANS/A over ACARS...FANS/B over ATN...not interoperable.
 - b. The GOLD manual was discussed; combine all documents into GOLD v2.
 - c. FAA DATA Comm and SESAR – future harmonisation and backward compatibility. Convergence would see FANS 3/C FANS C+ would include 4D cube etc.
 - d. FANS A will remain for oceanic flights.
 - e. AIRBUS will have FANS equipage as standard on new aircraft.

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- f. Airbus objectives include validation of 4D/advanced TBO operational concept. Synchronise convergence of upcoming operational concepts aligning with SESAR/NextGen.
7. Eurocontrol provided update on VDL Standards Update/Spectrum Frequency usage (EUROCAE WG-92/RTCA SC214 – VDLSG).
 - a. Ensure compliance with ARINC631-6.
 - b. Close to saturation on one VDLM2 channel – need for multi-frequency. Airlines need to provide the feedback.
 - c. Allocation of sub layers: 2nd channel for ground, 3rd channel for secondary enroute data. Deployment of 2nd frequency at major hubs 2013-14.
 - d. ICAO FMG EUR - need for DSP exchange of data link performance monitoring data with Eurocontrol and ICAO FMG using harmonized formats.
8. Eurocontrol continued the presentations with a status report on LINK2000+.
 - a. 400 aircraft committed (target was 100) – with incentives in place for retrofit.
 - b. SES target of 75% aircraft in LINK airspace by 2015.
 - c. 11% capacity gain, reduced controller workload, fewer misunderstandings (increased safety).
 - d. Infringement procedure if member state does not comply with Implementation Rule (IR) under the EC constitution. Letter of formal notice, reasoned opinion with comment from member state – then review to the Court of Justice, Luxembourg.
 - e. Challenges – VDLM2 multi frequency deployment, meeting the dates of EC29/2009 and resource shortages – loss of experience.
 - f. A380 do not have dual stack for ATN/FANS-A architecture. It was quoted that no more temporary exemptions to EC 29/2009 will be accommodated.
 - g. RTCA SC-214/EUROCAE WG-78 DLK. Programmes involved (PU-10 SPR, PU-20 INTEROP, PU-30 FANS-ATN) available on FAA website.
 - h. Co-ordination with ICAO – proposed evolutions of CPDLC, ADS-C (ICAO documents 9880 and 9776).
9. Honeywell provided an update on their DataLink Programmes.
 - a. R&D focussed in two areas: Improving ATM – solutions for the future and Interoperability with Honeywell applications e.g. 4D trajectories.
 - b. Improving Data-Comms. Current ATC needs: FANS – expansion due to NA operations. Technology in place – FMS, CMU, VHF radios and SATCOM systems for majority of 100+seat aircraft.
 - c. Europe DLS Mandate – solutions that support new and legacy aircraft. Working solutions that enable combined FANS and PM-CPDLC and transition from/to each service.
 - d. CMU 965-0758-05 new upgrade -06. Airlines return old version for upgrade to Honeywell.
 - e. Next generation of Flight Recorders.
 - f. Long term vision for ATC Datalink: FMS integration required, automatic hand offs, in Europe ATSU could be backward compatible but move quickly to BaseLine 2. Move to TCP/IP or Broadband messaging within ATM.
10. Rockwell Collins followed with their update.
 - a. Over 30 air transport, regional and corporate aircraft types have RC avionics.
 - b. CMU hardware platforms with a variety of software configurations for federated architectures.
 - c. Portable software applications.
 - d. Most OEMs are delivering new aircraft with PM-CPLDC from the factory.
 - e. Multiple retrofit projects, ARINC and SITA collaboration on updates.
 - f. Several STCs in place with some more ongoing.
 - g. Thinking out of the box: Dynamic EFBs, in-flight linking to tablets, changing paradigm on data link communications, shift of complex calculations to the ground and advanced data link security.
11. ARINC provided an update on Satcom and Swift Broadband.
 - a. Committed to ensuring customers have a full portfolio to satcom data options (Inmarsat and Iridium).

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- b. Tremendous growth in Swift BB, Cathay announced as launch customer.
 - c. Cabin Connect, wi-fi hotspot for passenger internet access.
 - d. eEnablement, whole set of wi-fi applications in cockpit.
12. Following the presentations, there was discussion on the next meeting.
- a. The proposal is for the next meeting to take place Tue 5th-Wed 6th Feb 2013 – in Phoenix (hosted by Honeywell).
 - b. The Airline only meeting will be held after the DLUF on the 7th. It was suggested that email/webex pre discussions to provide questions to appropriate bodies be held.
 - c. Topics suggested for discussion: Need to attract more airlines to attend, refresher on standards and how they affect DL users.
 - d. I suggested that DataLink Applications Agenda Item should not only be Met topics but how ACARS can benefit airlines – I gave the example of SITA BC for ACARS implementation showing benefits to airlines – fuel savings etc.

*Need to co-ordinate with NOAA regarding AMDAR attendance at the Phoenix Meeting.
Outreach to aviation industry.
Discuss at WMO AMDAR Panel Meeting, Boulder.*

Close of Day 1. A reception, sponsored by Airtel, was held in the hotel.

Summary reports of Agenda Items – Day 2.

13. Day 2 started with update On Satcom Links by Iridium.
- a. Growth in aviation users – 30+ airlines contracted.
 - b. LEO constellation – lower altitude means less power required for airline usage.
 - c. Global footprint.
 - d. Iridium Broadband – OpenPort Aero.
 - e. Iridium NEXT – fully replacing current constellation. 66 new operational satellites and 6 orbiting spares (constellation consists of 6 belts of 11 satellites). 2015-17 start and completion of launch – 10 satellites per quarter. Iridium NEXT will provide 32-128kb/s possibly 256kb/s. End to end broadband on demand. Space Based ADS-B.
 - f. Aireon – Iridium NEXT/NavCAN collaboration will provide a fully global surveillance service using ADS-B technology – delivering ADS-B information to ANSPs in near real time. Aireon has the potential to close safety and efficiency gaps between developed and developing countries.
 - g. L band for connectivity between satellites. Ka band for satellite to ground – susceptible to weather conditions e.g. thunderstorm/heavy rain, fog. This can affect Gateway operations. Looking to implement a Gateway backup with satellites contacting and being redirected to back up if operational gateway affected by weather.
14. Inmarsat provided an update on Satcom (I3/I4) status.
- a. 10 L band satellites in GEO orbit – commercial life to 2023. Thinking of Inmarsat 2 for 2020+. 3 x Ka band satellites 2013-14 launch
 - b. Update of constellation – available in Annual Report on website.
 - c. Aero H – voice and data. AEA/IATA WG to discuss sunset notification of this service. Most users have switched to Aero H+. Aero I – successful trials on I4, global beam. Aero H+ - available to at least EOL of I4 ~2023.
 - d. Classic Aero I4 GES upgrades – enhanced operator and monitoring tools.
 - e. I3/I4 GES harmonisation. Efficiencies in spectrum and operations. New I3 GES locations Perth (Aus) and Burum (NL). Consistent network architecture for continued ICAO GOLD performance monitoring.
 - f. GOLD Datalink performance. NATS also monitoring performance. Satisfactory performance against GOLD RCP240.

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- g. SwiftBB. Will be preferred communications path – supported by Classic Aero on I4 (and on I3). Up to 432kbps. ARINC 781 6-MCU (2 x voice and 1 x ACARS and channels 2, 3, 4 for SBB). ACARS Air Ground Gateway (AGGW) – delivered at both sites. Benefits: Reduced operating costs over Classic Aero – 30%, smaller and lighter hardware, prioritised IP services supporting EFB etc and allows transition to new technology.
 - h. Four classes of terminal HGA, IGA, ELGA and HGA with Classic back up.
 - i. Value of satcom for aviation safety and more efficient use of airspace.
15. SITA provided information on Satellite Services.
- a. AIRCOM was presented in a flow diagram from Aircraft to Ground – also included SWIM type diagram.
 - b. Services offered by SITA using I3 and I4. SITA funded GES/ACSE upgrades in system and channel capacity to ensure I3 ground connectivity.
 - c. Classic on I4 900+ registered tails and SwiftBB 300+ activated SIM cards.
 - d. WiMAX trials included in the e-Aircraft Portfolio.
 - e. Iridium - 360 aircraft from 22 airlines.
 - f. MTSAT – approx 300 aircraft using the service regularly.
 - g. SITA will start integrating Cobham sitcom hardware in the test facilities.
 - h. MIAM over ACARS working and MIAM over IP in trial with one carrier.
16. Following on from the SITA presentation, Cobham provided an overview of their company.
- a. Aerospace company specialising in products, services and subsystems.
 - b. Thrane & Thrane – world's leading manufacturer of equipment for global mobile communication based on satellite and radio technology. Acquired by Cobham in June 2012. SBU also includes Omnipless, Seatel, and Trackstar.
 - c. Core technology in Inmarsat C, M GAN and BGAN services (more than 60k BGAN terminals delivered).
 - d. Aviator Series of hardware. HGA-7001 antenna becoming the new standard – selected by 25 airlines so far. OEM and Integration Partners listed.
 - e. System offers voice, fax, positioning and data. Cabin provision of high bandwidth at lower costs.
 - f. TODAY: ACARS is the only available DL to ATC – also used for AOC. Not designed for high throughput applications. FUTURE: we are in an IP based communications environment – broadband required on the aircraft.
 - g. SwiftBB can provide this service. ARINC 781-5 defines a new compact SwiftBB sitcom system. 25-50kg saving on using SATCOM instead of VHF.
 - h. AGGW will allow ACARS over IP.
 - i. FANS evaluation (ACARS over IP), 3 or more airlines, 10-15 aircraft, and 5-75k messages. Starting May 2013.
 - j. Summary: SwiftBB new generation Satcom Safety Service including DL. ACARS over SwiftBB and IP data.
17. AMDAR Presentation – update on the following.
- a. E-AMDAR, news since last DLUF (network performance, developments, European collaboration).
 - b. WMO AMDAR Activities,
 - c. MDCRS and WVSS in the US,
 - d. Collaboration with FAA EDR Workgroup and RTCA SC-206.
18. TAMDAR Presentation – update.
- a. Information on Data Quality implemented on TAMDAR data – Airdat intervention and monitoring, only contact airline if sensor contamination.
 - b. FlyBe – European installation delayed (EASA input to be ratified) expect in next few weeks 60+ aircraft by 2013.
 - c. Possible inclusion of Teledyne dosimeters (measures exposure to ionizing radiation).
 - d. Ducting study (EM propagation) in San Diego.
19. AVICOM presented an update on their network.
- a. ACARS renewal completed Jul 2011. 24/7 monitoring. Linked to both ARINC and SITA.

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- b. Airlines using AVICOM = 112 over 3000 aircraft. Traffic volume of B787 increased on ACARS volume.
 - c. The Forum asked if this increase to volume will have an impact on new aircraft types. JAL and ANA see 15% data volume increase – but not using all applications.
20. ARINC provided news and updates on their GLOBALink Service.
- a. Presentation of the current service statistics.
 - b. Agreements with NATS, DFS and Skyguide for implementation of ATN/CPDLC services via ARINC.
 - c. ATN Development and Test Support: Test Cloud in Annapolis – 2 x POA/AOA/ATN stations, 2 x ATN/CPDLC end systems and 1 x FANS end system.
 - d. VDL RF Management and VDL enhancements – performance analysis tools. Customer enhancements – greater customer visibility of their traffic (Customer Portal).
 - e. SATCOM – important media for ARINC services.
 - f. VHF coverage maps – current and planned.
 - g. VDL traffic increasing 11%, ACARS 5%.
 - h. VHF coverage not available to ARINC customers over Brazil.
 - i. ARINC focusing on Africa deployment.
21. SITA then provided their news and updates.
- a. Activity Report: Approx 10000 aircraft using SITA services. 2M uplinks daily. Performance charts for I3/VDL, Iridium. VHF coverage maps – current and planned.
 - b. Brazil coverage completed 2016.
 - c. PENS – a joint EUROCONTROL ANSP project.
 - d. Satellite Update: More communication pipes available onboard, applications need some level of abstraction from these media. Challenge moving from ACARS to multi protocol – MIAM. MIAM client resides on board – talking to the ground client.
 - e. AGIE is the future IP messaging system – supporting all applications on board. MIAM aims at using ACARS and IP messaging systems.
 - f. MAGIC – Manager of Air ground Interface Communications. Aircom connect allows any application to use MIAM.
 - g. e-Aircraft AirportLink, there are 53 airports wifi and WiMAX ready. WiMAX SANDRA Project.
 - h. ATI Cloud allows (Ethiopian and Scoot) SITA to provide ACARS switch.
22. The final presentation was regarding the DataLink Systems SC Report.
- a. A618 APIM 11-003. Improve ACARS air ground link, adds EFB as source of potential downlink messages.
 - b. A620-7 APIM11-004A. Addition of MET downlink data parameters and MIAM.
 - c. A620 APIM 12-008. Support A841 – MIAM.
 - d. AA631 APIM 10-013 (supp 6 and 7). VDLM2 ICAO Doc 776.
 - e. Supp 7 – SESAR IR accommodates this specification. NextGen avionics expected to be A631 compliant.
 - f. A841 APIM 09-001A (Supp 1 and 2). MIAM over ACARS (Supp 1). MIAM over IP (Supp 2).
 - g. AOC Systems Sub Committee. A633 Supp 2. New XML Schemes were added for NOTAMS etc.

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AMDAR discussions with the Forum.

During the two days, there were several opportunities to discuss AMDAR with attendees.

23. I discussed QC and QM of ADS data with UKNATS representatives.
 - a. There is no QC of the data in place at NATS and not aware of any need for this at other European ANSPs.
 - b. From an airline point of view, SAS also not aware of any QC of ADS data.
 - c. The view from Honeywell was that, apart from range checks in the avionics, not aware of any "sanity checks" downstream in the data routing (e.g. temp of +20 at FL390 would still be transmitted). Similar comments from Rockwell Collins.
24. Discussion with Honeywell regarding weather uplinking to cockpit.
 - a. There is interest in developing cockpit applications for uplinks of weather data. In this instance, the Met Office Aviation Team is looking to collaborate with avionic vendors to see what can be achieved. Issues would be data size and available bandwidth.
25. I also had some informal discussions with Rockwell Collins regarding the CLEARFLIGHT application developed by the Met Office – and its integration into the Rockwell Collins HERMES applications.
26. Discussion with ARINC regarding SATA development.
 - a. On the issue of data costs, ARINC suggested that the cost would be comparative to our data costs for DLH. I have since calculated a cost proposal and discussed with E-AMDAR PM.
 - b. Regarding integration of SATA to ARINC OpCenter, the monthly running costs have now been provided.
 - c. A cost/benefit analysis of optimised versus non-optimised fleet configuration will be carried out (this will be discussed in November with the E-AMDAR Management Team).
27. Discussion with FLYHT (Dublin Office).
 - a. In May 2012, a company name change from AeroMechanical Services to FLYHT was approved.
 - b. The company has become one of the world's leading providers of real-time data communications for the aerospace industry providing automated data collection and delivery service for commercial aviation.
 - c. FLYHT utilises AFIRS applications and holds certification for over 30 aircraft types. This is of interest in regional development with airlines with ATR/Q400/CRJ fleets – see list at <http://flyht.com/company/certifications/>
 - d. It should be noted that STC for EMB fleets in progress with FAA.
 - e. The company has several applications (e.g. Aircraft Engine Monitoring) running in real time and would be a candidate for addition of AMDAR parameters for downlink messaging.
 - f. The company currently has customers in Africa, Middle East, Caribbean, Papua New Guinea and other regions of interest to WMO AMDAR development.
 - g. Further information on website <http://flyht.com/company/corporate-profile/>
28. I also discussed AMDAR with Aer Lingus representative.
 - a. Our E-AMDAR Focal Point at SAS had discussed informally the MET module in ARINC620 with Aer Lingus.
 - b. After initial discussions, Aer Lingus took the step of checking their A320/A330 fleet software and the MET reporting could be activated.
 - c. This would need Pilot Union approval (we had similar issues with AFR a few years ago). A telecon exchange with the Chief Pilot of A330 fleets resulted in "approval" to proceed as long as no reference to Aircraft Tail transmitted. I confirmed that this is the case - with the generic EU Identifier providing anonymity.

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- d. It was suggested that Aer Lingus could strip out the required MET parameters and ftp to E-ADAS (or ARINC MET Server). This would only involve a small software development project to the airline operations staff.
- e. There would also be a necessity to agree data communications costs. This will be discussed with E-AMDAR Management Team in November.