



International Civil Aviation Organization

**SECOND SATELLITE DATA LINK OPERATIONAL CONTINUITY
MEETING TO REVIEW THE PERFORMANCE AND PROVISION OF
SATELLITE COMMUNICATIONS IN THE ASIA AND PACIFIC
REGIONS**

(Bangkok, Thailand, 8-10 February 2012)

Agenda Item 4.1: Communication and Surveillance Capability and performance Requirement

RELEVANT OUTCOME OF OPLINKP

(Prepared by the Secretariat and Presented by Chair of OPLINKP)

SUMMARY

This paper presents on SAT COM and data links related development by the ICAO Operational Data Link Panel (OPLINKP) at its recent meetings.

1. INTRODUCTION

1.1 The first meeting of OPLINK Panel-Working Group of the Whole (WG/WHL/1) was held in Montreal from 18 to 27 October 2010 after the Air Navigation Commission (ANC) approved a work program for OPLINKP in 2008.

1.2 The WG/WHL/2 meeting was held in Montreal from 9 to 13 May 2011.

1.3 The WG/WHL/3 meeting was held in Montreal from 17 to 21 October 2011.

1.4 Briefing on the outcome of these meetings is provided in Section 2 of this paper.

2. DISCUSSION

FRAMEWORK AND WORK PROGRAMME OF OPLINK Panel

- OPLINKP/WG/WHL/1 after hiatus of 5 years since OPLINKP/1 in 2005;
- The goal of near term till 2012 is identified under 8 deliverables. Further work has also been identified after 2012;

- A number of deliverables will involve close regional coordination. Specifically with the:
 - Global Operational Data link Manual (GOLD) joint regional group
 - Inter-regional SATCOM Voice Task Force
 - PAN-Regional AIDC Task Force

By May 2012 OPLINKP plan to complete following tasks:

- Draft proposals to Amend Annexes and PANS provisions for current implementation programme
 - Link2000+ and FANS1/A
 - Ensure a link between the Annexes and PANS provisions and applicable guidance material
 - Develop Global Data link Harmonization Plan
 - Define a convergence strategy with objective of a common CPDLC and ADS-C application that has global applicability
 - High level road map
 - Operational improvement blocks
 - Benefit metrics
 - Prepare for the future
 - ❖ Rationalize WG78/SC214 CPDLC application
 - ❖ Rationalize WG78/SC214 ADS-C application
 - ❖ AIDC
 - ❖ D-FIS
- Draft amendments to Doc 9869 (RCP manual)
 - Incorporate communication and surveillance performance framework that includes:
 - Specifications from the Global Operational Data link document (GOLD) including Link 2000+ material.
 - Introducing Required Surveillance Performance (RSP) for ADS-C
 - Expect ADS-B performance specifications to be included after coordination.
 - Consider need for future deployment (SESAR, Nextgen)
- Align document with Performance-based Navigation (PBN) Manual
- Develop Operational Data Link guidance material
 - Monitor progress of inter-regional activity including GOLD ad-hoc group
 - Review Appendix L of OPLINKP/1 report (CPDLC manual) and consider amendments to GOLD

- Facilitate through inter-regional amendment process a merge of Link 2000+ material, GOLD and other regional material
- Global SATCOM voice guidance material
 - monitor progress of inter-regional activity and inter-regional SATCOM voice task force
 - develop SARP's/guidance material as required
- Draft proposals to amend Doc 9694 (Manual of ATS data link applications)
 - It is possible that all material would be removed except AIDC
 - Review existing document and remove redundant material covered in other documents
 - Review residual material for currency/applicability in a global framework and where it would reside
 - Monitor progress of inter-regional activity on development of PAN-regional ICD for AIDC
- Global issues/resolution database (develop concept for global database)
 - Performance based system
 - Includes system performance per GOLD/RCP manual
 - Provide global visibility of issues/reported problems
- Review data link initiatives related to advancing safety
 - Look at 3 axis (HLSC 2010 – derived)
 - Securing access in all circumstances to flight data necessary to support accident investigation
 - Improvement of surveillance, flight monitoring, and communications of aircraft operating in oceanic remote areas and provision of timely and adequate SAR services
 - Review of existing requirements on flight deck activities, checklists, and SOP design

2.1 OUTCOME OF OPLINKP WG/WHL/1

2.1.1 The OPLINKP-WG/WHL/1 established the work practices and work allocation as mentioned above. The work programme through May 2012 has 8 deliverables, recognizing that the future work will need to continue beyond this date.

2.1.2 The 1st meeting decided to remain as one group and agreed to establish points of contact (POC) for each of the 8 deliverables. The POC would be responsible for driving the progress of the deliverable, for both current and future implementations. Each POC met with a small action team during the meeting and reported back to the whole group with details of the tasks to achieve the deliverables. The meeting agreed to have all other deliverables completed and available for presentation at the 12th Air Navigation Conference.

2.2 REVIEW OF CURRENT PLANNING AND IMPLEMENTATION PROGRAMS

2.2.1 The FAA envisions that operators will only need one upgrade cycle to equip their aircraft to benefit from the next generation data communication capabilities planned for 2015-2025 in international and domestic airspace. The intent of this policy is to encourage all Regions to agree on a convergence strategy of services and support ICAO endorsement of the RTCA SC-214 and EUROCAE WG-78 development of a common technical definition for next generation data link systems, which support applications in oceanic and continental airspace.

2.2.2 The group agreed that OPLINKP would develop a convergence strategy of services and RTCA SC-214 and EUROCAE WG-78 development and validation of a common technical definition for next generation data link systems, which support applications in oceanic and continental airspace. The OPLINKP-WG/WHL/1-SD aim is to provide a requirements framework within ICAO Annexes and PANS provisions and refer to RTCA/EUROCAE publications for technical provisions that would satisfy the operational requirements provided by the ICAO annexes and PANS provisions.

2.3 LINK 2000

2.3.1 The meeting was informed that with a report on short term data link implementation in Europe. EUROCONTROL's LINK 2000+ Programme is co-ordinating short term Datalink Implementation in Europe according to the provisions of the Datalink Services Implementing Rule published as EC Regulation No. 29/2009. LINK 2000+ is the first step in the Roadmap for Datalink proposed by the SESAR initiative.

2.3.2 Three Implementation Packages have been defined. IP1 which is short term initial ATN CPDLC via VDL Mode 2 coordinated by the LINK2000+ program and which implements ATC communications management, ATC clearances, and ATC microphone check.

2.3.3 For the medium term (2015+) and supports initial 4D operations and additional airport services. No implementation decision for data link services in IP2 has been made. Research, development, and validation for IP2 are underway using draft EUROCAE WG78/RTCA SC214 draft standards as a basis. The third roadmap step IP3 will introduce the full SESAR concept including the full management of business trajectories.

2.3.4 The Single European Sky Data Link Services Implementing Rule (DLS IR) was published as EC Regulation No. 29/2009 on 17th January 2009 and made implementation of the LINK 2000+ Services mandatory for the air and the ground by the following dates: 1st Jan 2011 – After this date all new aircraft operating above FL 285 must be delivered with a compliant system; 7th Feb 2013 – By this date all LINK Region Air Navigation Service Providers (ANSPs) must have implemented an operational compliant system; 7th Feb 2015 – By this date all aircraft operating above FL 285 must have been retrofitted with a compliant system; 7th Feb 2015 – By this date all EU Region ANSPs must have implemented an operational compliant system.

2.3.5 The biggest challenge following final system operational validation in 2000 has been to convince aircraft operators and ANSPs to synchronise investment in order to deploy for mutual benefit. Whilst regulation was always the end goal the implementation strategy was to encourage early equipage and early benefits by means of financial stimulus. A three step strategy was adopted:

- PIONEER phase -- Objective: 100+ aircraft equipped/ MAAS UAC. The EUROCONTROL budget was used to part fund airborne equipage for final operational validation of CPDLC and ATN/VDL M2 with Maastricht UAC. The phase is drawing to a close with more than 400 aircraft equipped.

- INCENTIVES phase --- Objective: accelerate airborne equipage for early benefits. After 5 years research into funding schemes EUROCONTROL successfully obtained a grant from the European Commission (TENT-EA). The application was made on behalf of the airline associations; more than 700 aircraft will be equipped in 2011-12.

- MANDATORY IMPLEMENTATION phase, Objective: more than 75% of flights in LINK airspace by 2015 by means of the Data Link Services Implementing Rule.

-LINK 2000+ —simply implements 3 basic services that automate the routine tasks that take up to 50% of Controllers' time today: ATC Communications Management – to handle repetitive frequency changes; ATC Clearances – to provide standard clearances (e.g. Climb To Flight Level 350); ATC Microphone Check – to enable communication in case of blocked frequencies. These services do not replace voice as the primary means of communication, both media will always be available thus providing mutual back up, a definite safety improvement; in case of non standard communications or emergency, —revert to voice is the procedure.

2.3.6 Microphone Check – to enable communication in case of blocked frequencies. These services do not replace voice as the primary means of communication, both media will always be available thus providing mutual back up, a definite safety improvement; in case of non standard communications or emergency, —revert to voice is the procedure.

2.3.7 The meeting was advised that no implementation decision for the next set of Datalink Service has yet been taken and that recommendations are expected at the end of 2011. The meeting was also advised that both the European legislation containing legal obligations and the Eurocontrol Specification containing technical baseline material refer out to ICAO material and Industrial standards (e.g. EUROCAE/RTCA) and do not replicate their content.

2.3.8 The meeting was provided with the current status of FANS 1/A data link in the SOPAC. A website has been developed to provide stakeholders with visibility of system performance and issues. Monitoring FANS1/A performance has driven continuous performance improvement. System availability is meeting the 99.9% availability safety requirement but not the 99.99% availability defined for traffic efficiency. FANS1/A CPDLC and ADS-C via SATCOM can meet the RCP240 and type180 latency requirements of the Oceanic SPR for the application of reduced separations.

2.3.9 The meeting was informed that the meeting with the status of data link implementation in Singapore. FANS1/A operations have been underway since 1997; FANS1/A capable aircraft are logging on in the South China Sea. There is a FANS1/A interface on South China Sea routes with Vietnam. A new ATC system LORADS III scheduled for implementation in 2012 will introduce AIDC and DCL capability.

2.3.10 ICAO documents for CDPLC, ADS-C and FIS applications in relation to the work of EUROCAE WG78/RTCA SC214 and it was proposed a way forward for handling ICAO amendments and adoption of planned WG78/SC214 products. It was also proposed no modification of Doc 4444 (PANS-ATM), Doc 9869 (RCP Manual) and Doc 9694 (Manual of ATS Datalink applications) for the existing implementations (Oceanic and European continental). The meeting concluded the work under OPLINKP deliverable #1 would assess the needs for any updates.

2.3.11 The meeting was provided with a report on the EUROCAE WG78/SC214 standardisation activities on advanced air traffic services data communications. The WG78/SC214 products result in converged aircraft and ground implementations, regardless of the airspace where the WG/SC214 services are being used. The paper gives insight into future changes required to ICAO documentation in relation to the future data link equipage.

2.3.12 The WG78/SC214 activities focus on new CPDLC, ADS-C and D-FIS applications and, where applicable, amend the already standardised services. Activities include: context management (CM) application, controller pilot data link communications (CPDLC) application, automatic data link surveillance contract (ADS-C) application, data link flight Information (D-FIS) application, and harmonisation of continental and oceanic SPR for data link standards.

2.3.13 Integration of existing material from DO-306/ED-122 (Oceanic SPR Standard) into one single ‘WG78/SC214’ SPR for continental and oceanic data link communications in support of ATS is seen as a crucial step to achieve convergence.

2.3.14 The PARC CWG has been evaluating FANS 1/A using the Iridium short burst data (SBD) and surveillance type 180 specifications, provided at Appendix B and Appendix C, respectively, of the GOLD; and monitor and analyze the data, in accordance with guidelines provided at Appendix D of the GOLD.

2.4 SATCOM VOICE

2.4.1 FAA provided with an overview of the satellite communications (SATCOM) voice project administered by the FAA-sponsored Performance-Based Operations Aviation Rulemaking Committee’s Communications Working Group (PARC CWG). The PARC CWG is cooperating with the ICAO Inter-Regional SATCOM Voice Task Force to develop globally-applicable guidance material for the use of SATCOM voice systems for air traffic services (ATS) communications.

2.4.2 The goal of the PARC CWG SATCOM project is to conclude on the recommendations to the FAA that would allow one high frequency (HF) radio system to be permanently replaced with a SATCOM voice system. If SATCOM voice can be FAA-approved as a LRCS, the Minimum Equipment.

2.5 CHANGES IN MESSAGE SET

2.5.1 It was proposed to revise the Controller-Pilot data link communications (CDPLC) message set in Appendix 5 of ICAO Document 4444 based on the GOLD and a human factor analysis of the SC-214 message set. In addition, explanatory notes on the message set from Appendix A of the Global Operational Data Link Document (GOLD) were incorporated.

2.5.1 The proposed changes are intended to reduce the chances of miscommunication and provide information to both pilots and controllers regarding the use/intent of particular messages.

2.6 DEVELOP GUIDANCE MATERIAL AND MEANS TO REFERENCERE INDUSTRY STANDARDS RELATING TO THE USE OF DATA LINK APPLICATIONS IN THE PROVISION OF AIR TRAFFIC SERVICES

2.6.1 The meeting was provided with a comparison of ADS-C from Doc 9694 versus the current definition in SC-214/WG-78 material. After the conclusion of OPLINKP/1, a follow-on activity was initiated in 2006 as a response to the initiation of rulemaking activity for the LINK2000+ program in Europe.

2.6.2 The main changes for the ADS-C capabilities as introduced by SC-214/WG-78 as compared with Doc 9694 are: The capability for the ground to request the maximum and minimum ETA values for a specified waypoint. This ETA data is used by the ground system to figure a reasonable RTA in the context of 4D Trajectory management.

2.6.3 A new event type, Airspeed Range Deviation was developed to support oceanic operations. It is a complementary event type to the Airspeed change. The Airspeed Range Deviation event is triggered when the aircraft's airspeed is higher than the maximum airspeed value or lower than the minimum airspeed value as specified in the event contract request. New parameter (EPP) etc. were also discussed.

2.6.4 An overview of the RCP framework and the existing performance specifications for communications and surveillance capability supporting the controller-pilot data link communications (CPDLC), automatic dependent surveillance – contract (ADS-C), and flight management computer waypoint position reporting (FMC WPR) applications. The meeting agreed to modify Doc 9869 to provide the following:

Extract the communication and surveillance specifications (RCP 240, RCP 400, RSP 180, RSP 400) from GOLD and place them within Doc 9869;

2.6.5 The meeting also agreed to establish global performance specifications for communication and surveillance needed to support Next Generation Air Transport System (NextGen), Single European Sky ATM Research (SESAR) and other performance based operations as necessary. The specification should include —end-to-end|| parameter values, monitoring and alerting criteria and allocations to ATSP, CSP, aircraft and operator, consistent with current specifications.

2.7 THE IMPLEMENTATION OF PERFORMANCE-BASED FRAMEWORK FOR COMMUNICATIONS AND SURVEILLANCE

2.7.1 The meeting was provided with a proposal to revise ICAO Document 9869, Manual on Required Communication Performance so that it is structured similar to, and complements, ICAO Doc 9613, Performance-based Navigation (PBN) Manual. The paper also suggested a title change, Performance-based Communications and Surveillance (PBCS) Manual, to reflect an expanded scope that would include required communication performance (RCP) and surveillance performance specifications currently maintained in the GOLD, at Appendix B and C, respectively, and also the guidance material for post-implementation monitoring, currently maintained in the GOLD, Appendix D.

2.7.2 The GOLD includes surveillance performance specifications that can be applied to flight management computer waypoint position reporting and ADS-C, currently implemented in oceanic airspace, i.e., type 180 and type 400, but would be referred to in the revised manual as required surveillance performance (RSP) specifications, i.e., RSP 180 and RSP 400.

2.7.3 It is envisaged that new RSP specifications could be developed for ADS-B applications within a common performance-based framework, but would require coordination with other panels. Also, new RCP specifications would be identified, as suggested.

2.7.4 To be consistent with Doc 9613 and to align more with the intent, the concept of —RCP type has been removed and the manual refers to —performance-based specifications, i.e., RNP or RNAV specifications by ICAO Doc 9613 and RCP or RSP specifications by ICAO Doc 9869, which would be applied by airspace planners to specify CNS requirements for a particular performance based operations in a standard, and prescribed when implemented in an applicable airspace.

2.7.5 The meeting saw benefit in the proposal and agreed that the proposed revision to Doc 9869 would provide the baseline to progress the work for amendment to the Manual, ready for approval at the 12th Air Navigation Conference.

2.8 OUTCOME OF OPLINKP WG/WHL/2

2.8.1 The second meeting of the whole held in Montreal from 9 to 13 May 2011.

2.8.1.1 **REVIEW OF CURRENT PLANNING AND IMPLEMENTATION PROGRAMS**
Several papers were presented under this agenda item. The proposed messages set changes were updated based on the development by RTCA SC-214/EUROCAE WG-78.

2.8.1.2 It was proposed to get a consistent set of guidance material on data link services, independent from the airspace characteristics and the supporting technology.

- A Convergent Data link Manual shall provide ANSPs with support for the provision of air traffic data link services in their airspace, provide operators with support for the operational approval to use air traffic data link services, and be easy to use for any type of operators (FANS 1/A, ATN B1, or both); and
- The GOLD contains guidance material for ANSPs to provide data link services and for operators to ensure proper equipage and crew training. It also includes guidelines for controller and flight crew procedures, as well as technical criteria such as required communication performance (RCP) and surveillance performance (RSP). Finally the GOLD also includes guidance material for post implementation monitoring, analysis and corrective action to ensured operational safety. GOLD is currently used only in regions providing data link services over oceanic and remote airspace.

2.8.1.3 ATC Data Link Operational Guidance for LINK 2000+ Services covers the implementation and the use of data link services derived from CM and CPDLC applications, defined by the LINK 2000+ Programme. The main objective of this document is to use CPDLC in a harmonized way.

2.8.1.4 Only ANSPs providing data link services over European airspace have validated LINK 2000+ Operational Guidance, and as a direct consequence these documents are closely linked with the supporting technology (such as VDL2 and ATN B1) and some part are inherently focused on domestic operations.

2.8.1.5 From a global standpoint, there is an obvious need to get a consistent set of Guidance Material for data link services, as far as practicable independent from the airspace characteristics and the supporting technology. It is therefore suggested that a converged data link operations manual be developed, with Appendices dealing with specific oceanic and remote airspace issues on one side, and domestic issues on the other. The group agreed on the need for a merge of the 2 documents dealing with data link services and that European participation to the next GOLD ad-hoc meeting, scheduled for September 2011, would facilitate early progress on the merge.

2.8.1.6 FAA provided the meeting with an update on GOLD implementation and amendments.

2.8.1.7 The GOLD Ad hoc Working Group processes amendments to the First Edition of the GOLD using similar methods used prior to the First Edition. The GOLD coordinator will continue to use a master comment matrix to track proposed amendments. Coordination and comments will be done mainly via Emails, and teleconference sessions and meetings will be arranged as needed.

2.8.1.8 Follow-on work includes soliciting proposals for amendments, coordinating amendments across the regions, providing interpretation and clarification on GOLD guidelines, facilitating implementation, post-implementation monitoring and corrective actions, as well as the development of proposal for ICAO on a global configuration management process.

2.8.1.9 A new edition of GOLD is intended to be published every two years, with the next edition planned for the first quarter of 2013.

2.8.1.10 FAA and Eurocontrol provided the meeting with a Global Data link Harmonisation Plan. Given the complexity of the different regional and national ATM modernization Programmes, the Global ATM concept requires a strategy, a roadmap, made up of deployable packages or capabilities (called blocks) and understandable performance benefits. One of the block needed in the global ATM concept is the implementation of data communications applications which allows trajectory based operations.

2.8.1.11 The Global Data Link Harmonisation Plan further expands the evolution scheme of both continental and oceanic operational needs in the context of SESAR and NextGen Programmes and explains how the convergence approach will allow optimizing the ATS data link solutions to answer these needs in the future.

2.8.1.12 Oceanic and Continental data link implementations today are based on different standards, technology and operational procedures. An important goal of the global ATM concept is to harmonize the regional implementations and to come to a common technical and operational definition, applicable to all flight regions in the world.

2.8.1.13 There was general consensus from States that a common operational and technical definition for both ADS-C and CPDLC applications was considered the correct approach to harmonization, and that such a definition should be based on requirements determined by bodies such as RTCA and EUROCAE.

2.8.1.14 The proposed high level roadmap depicted the transition from existing implementations to initial trajectories and ultimately to a state where the full 4D trajectory information is shared (SWIM) and is integrated gate-to-gate. Full harmonization will also require agreement on the technology roadmap being prepared by the Aeronautical Communications Panel (ACP). For the short term there will be a need to accommodate 2 data link services, namely FANS 1/A and ATN B1. These 2 packages do not share the same technology but there are many similarities.

2.8.1.15 From the mid-term onwards, a transition to the use of initial trajectories between air and ground system is foreseen, which requires initial ground-ground SWIM. The more complex exchange of trajectory information requires FMS-data link integrated aircraft.

2.8.1.16 The long-term plan is formed around 4D trajectory as the core of the System. This will require changes to the ICAO Flight Plan with a common definition and exchange format.

2.8.1.17 Eurocontrol, provided the meeting with a high level view of the European Medium Term Datalink Implementation Plan. The European medium term implementation plan is based on the initial 4D application (4DTRAD) and airport services including D-OTIS, DCL and D-TAXI. Other SC214/WG78 services may also be included in the final package to be implemented in Continental Europe.

- Initial 4D operations can be broken down into two steps; the first is the synchronization between air and ground of the flight plan or Reference Business trajectory. The second step is imposing a time constraint and allowing the aircraft to fly its profile in the most optimal way to meet that constraint;
- Trajectory synchronisation and Monitoring is essential and is achieved when the trajectory in the Flight Management System (FMS) is the same as that held on the ground in the Flight Data Processing System (FDPS) and the wider network systems;
- Improved consistency between air and ground trajectory enables better performance from the decision support tools providing a better anticipation of congestion by allowing early detection of traffic bunching and reduced inefficient radar based tactical intervention;
- The avionics function —Required Time of Arrival can be exploited by both en-route and TMA controllers for demand/capacity balancing, metering of flows and sequencing for arrival management. This should lead to reduced need for aircraft to hold, inefficiently burning fuel with the associated environmental impact;
- Data Link Operational Terminal Information Services (D-OTIS) enables the flight crew to request meteorological and operational flight information and NOTAMs of the departure and destination aerodrome using a single datalink service;
- Departure Clearance (DCL) uses on-board and ground-based systems for the relaying and acceptance of clearances. This process eliminates read-back hear-back errors, and also reduces frequency congestion and controller workload;
- Data link TAXI (DTAXI) provides automated assistance and additional means of communication to controllers and pilots when performing routine exchanges during ground movement OPLINKP-WG/WHL/2-SD;

- operations. DTAXI provides flight crew with graphical information on routes to be followed and supports the aircraft's runway incursion alert system;
- The European deployment plan comprises several iterative and parallel steps with key milestones in order to achieve full scale deployment. Validation, verification and preparation is scheduled to continue until 2015, followed by a pre-operational phase scheduled between 2015 and 2017, to meet the 2018 to 2020 deployment phase timeline;
- FAA provided the meeting with an update on Inter-Regional Satellite Communications (SATCOM) Voice Task Force.

2.9 REVIEW DATA LINK INITIATIVES RELATED TO ADVANCING SAFETY IN AIR TRANSPORTATION

2.9.1 The Secretariat provided the meeting with a series of draft recommendations that could be presented to the Air Navigation Commission (ANC) in June 2011, based on the High Level Safety Conference (HLSC) Agenda Item 3.2 on safety initiatives related to recent accidents.

2.9.2 The deliverable 7 was created for this issue. Elements such as Surveillance, Flight Monitoring, Flight Data recovery and Communications needed to be addressed.

2.9.3 ADS-C reporting rate, mandatory event contracts, ADS-C emergency mode and ADS-C without log-on were discussed during the meeting. The Group was of the opinion that reporting rate should only be driven by separation requirement, not by surveillance requirements. The group supported the concept of provisions for mandatory event contracts to improve safety. The group also supported the establishment of guidelines for ANSPs to properly react to failed log-on attempts.

2.9.4 Flight monitoring by airline operators was discussed. The group is of the opinion that clear definitions of responsibilities between ANSPs and airline operators would be necessary in order to avoid duplication of efforts.

- The group expressed concerns about the capacity of the network with the increasing use of datalink. It was suggested that the ACP be assign to task to help in any future development

2.10 DEVELOP GUIDANCE MATERIAL AND MEANS TO REFERENCE INDUSTRY STANDARDS RELATING TO THE USE OF DATA LINK APPLICATIONS IN THE PROVISION OF AIR TRAFFIC SERVICES

2.10.1 Eurocontrol provided the meeting with a draft of the Global Operational Guidance agreed at the OPLINKP meeting of October 2010. This is the first draft of the operationally oriented guidelines to use CPDLC in a harmonized way in the en-route European Continental, Oceanic and Remote regions.

- Existing FANS and ATN data link implementation have been constructed based on different standards, performance requirements and technologies. In support of the ground and aircraft implementations, different technical and operational guidance material has been developed, satisfying specific needs of users and implementers.

- FANS 1/A based ADS-C and CPDLS operations in different Oceanic and Remote regions have been harmonized through the development of GOLD. To support the implementation of CPDLC/ATN and VDL M2 within dense en-route European Continental Airspace above FL285, the EUROCONTROL LINK 2000+ has produced a set of technical and operational Guidance Documents.

2.10.2 In European continental airspace some ANSPs will accommodate FANS 1/A capability operating over VDL M2 depending on their local business case. FANS 2/B (Dual stack) aircraft types will provide FANS 1/A capability as well as ATN B1 capability to allow seamless transfer between ANSPs at the boundary of the North Atlantic and Continental Europe.

2.10.3 In recognition of the need to provide globally harmonized guidance on data link operations, the draft OPLINK Operational Data Link Guidance Document provides operationally oriented guidelines to use CPDLS in an harmonized way. This document also provides a specific set of recommended procedures to support the use of CPDLC operations in either Oceanic/Remote (OCR) airspace or European Continental Airspace.

2.11 REVIEW AND REVISE SARPS AND GUIDANCE MATERIAL RELATED TO THE IMPLEMENTATION OF PERFORMANCE-BASED FRAMEWORK FOR COMMUNICATIONS AND SURVEILLANCE

2.11.1 FAA provided the meeting with a slight modification to the plan agreed at OPLINKP/WG/WHL/1 for revising ICAO Doc 9869, Manual on Required Communication Performance (RCP).

- The alternative proposed in this paper is intended to provide more efficient management of changes during development of the new edition and improve usability of the document without losing the complementary relationship between ICAO Doc 9869 and ICAO Doc 9613; and
- ICAO Doc 9613 contains two volumes. Each volume contains introductory material, parts, attachments and one appendix. Each part contains chapters. This document is basically four different documents with chapters. The structure between ICAO Doc 9613 and the current ICAO Doc 9869 were reviewed. Based on the review, it was proposed to develop a structure for the new ICAO Doc 9869 around a performance-based framework and specifications for each of the components of CNS.

2.12 REVIEW AND REVISE SARPS AND GUIDANCE MATERIAL RELATED TO THE USE OF SATCOM VOICE FOR ATS COMMUNICATIONS

2.12.1 FAA provided the meeting with an update on Inter-Regional Satellite Communications (SATCOM) Voice Task Force.

2.12.2 FAA provided the meeting with a recommendation that standards for written aviation English proficiency be examined, developed, and implemented by ICAO. Requirements for an operational level of written aviation English proficiency for those using CPDLC should be established. POCs for each deliverable will organize teleconferences and Webex events as required to progress their deliverables.

2.13 OUTCOME OF OPLINKP WG/WHL/3

2.13.1 The WG/WHL/3 meeting was held in Montreal from 17 to 21 October 2011

2.13.2 REVIEW OF CURRENT PLANNING AND IMPLEMENTATION PROGRAMS

2.13.3 FAA provided an update on the work and status of activities related to the proposed message set for Controller Pilot Data Link Communication (CPDLC) within RTCA SC-214/EUROCAE WG-78.

2.13.4 The Configuration Subgroup (CSG) of WG-78/SC-214 initiated a survey sent to user-groups and experts to gather input on the current message set. The data provided resulted in a two-step assessment; first the deletion of messages identified as not necessary and second a list of messages that should be added to the current list.

2.13.5 The final product is expected to see the addition of new messages, the revision of existing messages, as well as the deletion of some messages. Input has been received from oceanic and continental controllers from at least 7 different States. It is expected that a final proposed message set from SC214/WG-78 will be submitted to OPLINKP approval in March 2012.

2.13.6 India provided an update on the progress of data link implementation in India.

2.14 REVIEW DATA LINK INITIATIVES RELATED TO ADVANCING SAFETY IN AIR TRANSPORTATION

2.14.1 Discussions took place during the meeting to identify the best possible initiatives, from an OPLINKP perspective, to advance safety in air transportation.

2.14.2 The panel agreed to introduce new procedures first into the GOLD, and ultimately into PANS-ATM or ICAO Annexes as appropriate. The points to be addressed were procedures in the event of log-on failures, mandatory event contracts, as well as ATC and crew training related to these items.

2.15 DEVELOP AMENDMENTS TO STANDARDS AND RECOMMENDED PRACTICES (SARPS) AND PROCEDURES RELATING TO THE USE OF DATA LINK APPLICATIONS IN THE PROVISION OF AIR TRAFFIC SERVICES

2.15.1 FAA proposed revisions to specific ICAO SARPs and Procedures.

2.15.1.2 Annexes 2, 3, 6, 8, 10, 11, 15, PANS-ATM, PANS-OPS and PANS-ABC were reviewed. The meeting was made aware of the progress on the new version of GOLD, as well as some areas of GOLD which needed to be aligned with Doc 4444 PANS-ATM.

2.16 DEVELOP GUIDANCE MATERIAL AND MEANS TO REFERENCE INDUSTRY STANDARDS RELATING TO THE USE OF DATA LINK APPLICATIONS IN THE PROVISION OF AIR TRAFFIC SERVICES

2.16.1 Following a briefing on GANIS and the 12th Air navigation Conference scheduled for November 2012, a sub-group worked on this issue and produced the OPLINKP portion of the Communications Roadmap.

2.16.2 ICAO has designed a Global Air Navigation Plan and a Global ATM concept that should achieve the performance levels required by society and the airspace users. Given the complexity, the global ATM concept requires a transition strategy, a roadmap, made up of deployable packages or capabilities (called ‘blocks’) and understandable performance benefits.

2.16.3 This Global Data Link Harmonisation Plan further expands the evolution scheme of both continental and oceanic operational needs in the context of SESAR and NextGen Programmes and explains how the convergence approach will allow optimizing the ATS data link solutions to answer these needs in the future.

2.16.4 Oceanic (FANS1/A) and Continental (ICAO ATN based) data link implementations today are based on different standards, technology and operational procedures although there are many similarities. An important goal of the Global ATM concept within the area of data link is to harmonise the regional implementations and to come to a common technical and operational definition, applicable to all flight regions in the world.

2.16.5 There was general consensus from States that a common operational and technical definition to be determined for both CPDLC & ADS-C application was considered the correct approach to harmonization. Such a definition should be based on a coordinated requirements determination process through bodies such as RTCA & EUROCAE who are developing safety, performance and interoperability specifications supporting developments associated with the U.S. Next Generation Air Transportation System (NextGen) and the European Single European Sky Air Traffic Management Research (SESAR) initiatives.

2.16.7 Preparatory work for harmonization has begun in the short term and is realised in the medium term by implementation based on converged/harmonized international standards, this then is carried forward into the long term. Full harmonization will also require agreement on the technology roadmap being prepared by the Aeronautical Communications Panel (ACP).

2.17 REVIEW AND REVISE SARPS AND GUIDANCE MATERIAL RELATED TO THE IMPLEMENTATION OF PERFORMANCE-BASED FRAMEWORK FOR COMMUNICATIONS AND SURVEILLANCE

2.17.1 New Zealand proposed to allocate values to the RCP designators currently reserved in Field 10 Equipment of the 2012 FPL and discussed the application of RSP values using the Field 18 SUR/ designator. Amendment 1 reserves letters P1 to P9 for RCP but does not allocate the letters to the RCP values defined in the Manual of RCP. Furthermore Amendment 1 does not specify any RSP values in Field 10b but notes that additional surveillance application should be listed in Field 18 following the indicator SUR/. Again consistent global application is needed.

2.17.2 The RCP and RSP performance applicable for each individual aircraft is needed to enable ground systems to automatically determine the appropriate separation standards to apply to eligible aircraft pairs. Without this automation, controllers will be unable to determine the separation standards that can be applied to a specific aircraft.

The meeting agreed with the recommendations to define P1 as the RCP400 identifier and P2 as the RCP240 identifier in the 2012 FPL.

2.17.3 The meeting also agreed that an aircraft indicates its RSP capability by inserting the capability in field 18 SUR/. The capability would be inserted by using the letters RSP and the numeric RSP value e.g. SUR/RSP400 or SUR/RSP180.

2.18 REVIEW AND REVISE SARPS AND GUIDANCE MATERIAL RELATED TO THE USE OF SATCOM VOICE FOR ATS COMMUNICATIONS

2.18.1 The meeting was informed that the work of the SATCOM Voice Task Force was progressing normally and that the first edition of the SATCOM VOICE Guidance Material was expected to be ready for further action in early 2012.

2.19 FUTURE MEETINGS

2.19.1 It was felt that in order to progress the work, there was a need for two (2) meetings per year, of no more than one week duration. The meeting location was agreed as Montreal, on the following dates: a) 19-23 MARCH 2012 and b) 17-21 SEPTEMBER 2012.

2.19.2 The list of deliverables is at Appendix C to this paper. The status progress of the deliverables is provided in the power point presentation by the Chair of OPLINKP to ANC on the outcome of OPLINKP WG/WHL/3 which is reproduced at Appendix D to this paper.

2.20 ACP RELATED ACTIVITIES ON SATCOM RELATED MATTERS

2.20.1 There is a potential future work package, validating Inmarsat SwiftBroadband (SBB) against the AMS(R)S SARPs and developing/publishing an additional section to the AMS(R)S Manual if this validation proves successful. It is likely that this work would start later 2012. The technical COM roadmap is being prepared by ACP for AN Conf/12.

3. ACTION BY THE MEETING

- 3.1 The meeting is invited to
 - a) note the information provided in this paper; and
 - b) The whole reports of these meetings are available on the OPLINKP webpage through ICAO Portal Access.

APPENDIX C

LIST OF DELIVERABLES

| No. | Deliverable | Task | POC |
|------------|--|---|---|
| 1 | Proposals to amend: Annexes and PANS provisions for current implementation (current = Europe +OCR) | <p>Ensure that a framework exists to provide a link between the Annexes and PANS provisions and applicable guidance material.</p> <p>The GOLD contains guidance material that may eventually become Standards and Recommended Practices (SARPs), or PANS provisions when it has reached the maturity and stability necessary for adoption or approval. It also comprise material prepared as an amplification of the basic principles in the corresponding SARPs, and designed particularly to assist the user in the application of the SARPs and PANS.</p> <p>Review Doc 4444 against GOLD guidelines and determine which SARP or PANS provision supports the guideline. Consider new SARP or PANS provision for those guidelines for which there is no supporting requirement.</p> <p>a) Review Chapters 3, 4, 5, 6, and 7 of GOLD and review against: Doc 4444 - Chapter 13 – ADS-C Doc 4444 – Chapter 14 – CPDLC Doc 4444 – Appendix 5 – CPDLC Message set Doc 4444 – Chapter 15 – Emergency, communication failure and contingencies.</p> <p>b) Consider other Chapters of Doc 4444, c) Consider other Annex material (ie Annex 10 Vol 2) and identify where amendments are needed.</p> <p>Identify where reference to industry standards or ICAO guidance material is needed.</p> <p>Review references to ICAO doc 9613 and determine if equivalent reference to ICAO doc 9869 is needed, e.g., separation standards in chapter 5 that are dependent in communication and surveillance capability and performance.</p> | <p>D. Cherry</p> <p>C. Couchman K. Cardosi E. Harrell G. Anderson C. Cirilo C. Roberts T. Lennertz A. Krebber S. Arnold C. Yeo</p> |

| | | | |
|---|---|---|---|
| 2 | Global Communications Harmonization Plan | <p>Future Convergence strategy High Level Road Map Operational improvement blocks Development of benefit metrics Prepare for the future. Rationalise: CPDLC application ADS-C application AIDC application D-FIS application</p> <p>Consider also where the global data link plan and other deliverable material would reside</p> <p>Note: when looking at applications, this includes feedback to SC214/WG78, and is wider than just the message sets and the plan. Also includes HMI considerations and procedures.</p> | <p>G. Anderson M. Adnams</p> <p>J. Condis R. Mead A. Krebber D. Nguyen D.Cherry</p> |
| 3 | Propose amendments to RCP Manual 9869 | <p>Start with WP08 as a baseline Put in manageable format, ie WORD Use comment matrix, and mark-ups to support comment matrix</p> | <p>T. Kraft W. Brondsema</p> <p>N. Dwyer</p> |
| 4 | Operational Data Link guidance material. Merge GOLD and L2K+ | <p>a) Monitor progress of inter-regional activity including EANPG and GOLD Ad Hoc Working Group b) Review CPDLC Guidance material (Appendix L of the OPLINKP Report, Sep 2005) against GOLD and consider potential amendments to GOLD. c) Merge L2K+ and GOLD material as basis for the Operational Guidance.</p> | <p>P. Radford A. Krebber</p> <p>T. Kraft C. Kwek W. Brondsema</p> |
| 5 | Global SATCOM voice guidance material | <p>a) Identify need for SARPs and where in ICAO Annex or PANS provisions b) Monitor progress of inter-regional activity and inter-regional SATCOM voice task force.</p> | <p>S. Arnold</p> <p>T. Kraft E. Harrell C. Yeo</p> |
| 6 | Proposed amendments to amend Doc 9694 Proposal is to remove obsolete material (All except AIDC material) | <p>a) Monitor progress of inter-regional activity on development of PAN-Regional ICD for AIDC. b) Refer to the future WP deliverables for GLOBAL AIDC c) Check for cross references in ICAO material</p> | <p>P. Radford</p> <p>N. Dwyer</p> |
| 7 | Report to ANC - response to High Level Safety Conference. | <p>Data link initiatives relating to advancing safety in air navigation Prepare WP for ANC review planned for June 2011 Consider other chapters of doc 4444, such</p> | <p>O. Teyssandier</p> <p>C. Cirilo J. Roustan</p> |

| | | | |
|---|---|---|------------------------|
| | | as chapter 9 – FIS and alerting service, i.e., to address conclusions of HLSC (see separate deliverable). | S. Arnold J. Condis |
| 8 | Global issues/resolutions database Plan for CRA Europe Current CRA & databases (ISPACG/NAT DLMA, Japan + ???) | a) Develop overview of global issues/resolution data base. Consider regional implementations of data link operations. Include procedures for provisions, administration, maintenance and inter-regional exchange of information. Consider as a separate task for material eventually for the GOLD | P. Radford |

- END -



International Civil Aviation Organization

MEETING OF OPERATIONAL DATA LINK PANEL WG/WHL

BRIEFING TO THE AIR NAVIGATION COMMISSION

Paul Radford
Rapporteur

ADMINISTRATIVE DETAILS

- OPLINKP/WG/WHL/3 from 17-20 Oct 2011
- Last meeting held in May 2011
- 4/5 day meeting
- 25 participants from 9 States, 8 International Organizations
- 4 working papers presented and discussed

Deliverables

- #1 - Draft proposals to Amend Annexes and PANS provisions for current implementation
 - By May 2012 – On Track
 - Current implementation = Link2000+ and FANS1/A
 - Ensure a link between the Annexes and PANS provisions and applicable guidance material
 - Message Set review is part of this deliverable
 - Panel received update on work completed to date

Deliverables

- #2 – Develop Global Data Link Harmonization Plan
 - By May 2012 – On Track
 - Define a convergence strategy with objective of a common CPDLC and ADS-C application that has global applicability
 - Version 10 completed.
 - Part of this Plan will be used in the development of the Communications Roadmap for the 12th AN Conf
 - Text identified; will be sent to ICAO lead on COMM roadmap.

Deliverables

- #3 – Draft amendments to Doc 9869 (RCP manual)
 - By May 2012 – Not on Track (tbd)
 - Required data in GOLD for performance and monitoring
 - Structure agreed to incorporate communication and surveillance performance framework that includes:
 - Specifications from the Global Operational Data Link document (GOLD) including Link 2000+ material.
 - Introducing Required Surveillance Performance (RSP) for ADS-C
 - Expect ADS-B performance specifications to be included after coordination.
 - Consider need for future deployment (SESAR, Nextgen)

Deliverables

- #4 – Develop Operational Data Link guidance material
 - Monitor progress of inter-regional activity including GOLD ad-hoc group
 - Review Appendix L of OPLINKP/1 report (CPDLC manual) and consider amendments to GOLD.
 - Facilitate through inter-regional amendment process a merge of Link 2000+ material, GOLD and other regional material. Merge process commenced 10-15 October 2011.
 - Edition 2 GOLD scheduled 13 March 2013 – On Track.

Deliverables

- #5– Global SATCOM voice guidance material
 - By May 2012
 - monitor progress of inter-regional activity and inter-regional SATCOM voice task force
 - develop SARPs/guidance material as required
 - Received update on SATCOM voice task force
 - February 2012 – SVGM, 1st Edition – On Track

Deliverables

- #6– Draft proposals to amend Doc 9694
(Manual of ATS data link applications)
 - By May 2012 – On Track
 - Review existing document and remove redundant material covered in other documents.
 - Review residual material for currency/applicability in a global framework and where it would reside.
 - Monitor progress of inter-regional activity on development of PAN-regional ICD for AIDC.
 - Incorporating relevant Doc 9694 AIDC material into PAN-regional ICD for AIDC.

Deliverables

- #7– Review data link initiatives related to advancing safety (HLSC 2010-derived)
 - By March 2012 – On Track
 - Draft amendment to GOLD completed.
 - Additional guidance/procedures developed for
 - Failed logon
 - Use of event contracts to provide conformance
 - Review of PANS-ATM in progress
 - Discussion regarding use of event contracts and alerting service
 - Emergency mode without logon to be addressed

Deliverables

- #8– Global issues/resolution database
 - By May 2012 – On Track
 - Develop concept for global database
 - Performance-based system
 - Includes system performance per GOLD/RCP manual
 - Provide global visibility of issues/reported problems
 - Guidance material will reside in GOLD.
 - Guidance is based on existing website in use by ISPACG CRA/NAT Data Link Monitoring Agency
 - Coordination required with Eurocontrol Central Reporting Office.

Other Work – This Meeting

- Review of ADS-B ITP draft Circular
 - Reviewing Annex 10 Vol 2 on use of freetext
- Discussions on input from OPLINKP to GANP
- Received briefing on Aviation System Block Upgrade development
- Receive briefing on 12th AN Conference
- Defined values for RCP designators currently reserved in ICAO 2012 FPL.
- Reviewed proposed CPDLC message set from SC214/WG78



Next Meeting

- Next meetings planned for 19-23 March 2012 and 17-21 September 2012.