



ICAO

*International Civil Aviation Organization***Seventh Meeting of Aeronautical Communication Service  
Implementation Co-ordination Group of APANPIRG  
(ACSICG/7)**

Web-conference, 21 – 23 July 2020

**Agenda Item 6:** Update the regional strategies on AMS and datalink communication**REVIEW AND UPDATE APAC REGIONAL AMS STRATEGY AND STRATEGY FOR  
IMPLEMENTATION OF THE AIR-GROUND DATA LINK**

(Presented by the China, USA, Australia and Japan)

**SUMMARY**

This paper presents the revised Asia/Pacific Regional AMS Strategy and Strategy for Implementation of the Air-Ground Data Link for review and actions by the meeting.

**1. INTRODUCTION**

1.1 The CNS SG/23 meeting raised a proposal and agreed after discussion to review and update the regional AMS strategy adopted by APANPIRG in 2013 and the Datalink strategy adopted by APANPIRG in 2005. China offered to take a lead with support from USA, Australia and Japan to jointly develop a draft of revised regional AMS strategy and Datalink strategy.

1.2 China has delivered a draft to the ad hoc group formed by China, USA, Australia and Japan for a preliminary review. The draft has been discussed and adopted by the ad hoc group meeting on 1<sup>st</sup> July 2020. The ad hoc group agreed to submit the revision to the ACSICG/7 for review and update.

**2. DISCUSSION**

2.1 The progress of ATN/IPS and ATN/OSI raised an issue of whether the region needs to go directly for implementation of ATN/IPS as specified in ICAO Doc9896 or to follow the path of ATN/OSI as specified in ICAO Doc9880.

2.2 The concept of the PBCS should be considered in both strategies on AMS and datalink as it provides a framework for managing communication and surveillance performance in accordance with globally accepted RCP and RSP specifications which have been globally implemented since 29th March 2018.

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**3. ACTION BY THE MEETING**

3.1 The meeting is invited to review **Attachment 1** – Revised AMS Strategy for APAC Region and **Attachment 2** – Revised Strategy for Implementation of the Air-Ground Data Link in the ASIA-PAC Region;

3.2 The meeting is expected to discuss those initial proposals for amendment received from experts/members of the group and consolidated in **Attachment 3 and Attachment 4**;

3.3 The meeting is expected to develop a revised version of the AMS strategy for APAC region and the strategy for implementation of the air-ground data link in the APAC Region for CNS/SG consideration.

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## **AERONAUTICAL MOBILE SERVICE (AMS) STRATEGY FOR THE ASIA/PAC REGION**

### **The AMS strategy for the Asia/Pac Region is to:**

- a) Ensure that all communications are provided within the Aeronautical Mobile (R) Service AM(R)S and the Aeronautical Mobile Satellite (R) Service -AMS(R)S, and protect the use of all radio frequency bands allocated for AM(R)S and AMS(R)S;
- b) Retain the VHF voice service as the primary medium for air-ground communication;
- c) Supplement voice communication with data-link Flight Information Service (DFIS) applications including D-VOLMET, D-ATIS, DCL and other new applications related to the safety and regularity of flight to reduce congestion of the VHF spectrum, reduce workload, and enhance safety;
- d) Retain 25 kHz as the minimum channel spacing in the band 118 – 136 MHz by 2025;
- e) Use the frequency band 136 – 137 MHz exclusively for the air-ground VHF data-link applications;
- f) Use PBCS approved CPDLC to provide DCPC (Direct controller pilot communications) for more efficient communication and enhanced ATM, especially to improve the capability of Trajectory Based Operation and enhance en-route situation awareness;
- g) Retain HF voice for communication in areas where VHF coverage is not available;
- h) Provide satellite voice (SATVOICE) where appropriate. States providing SATVOICE service should publish relevant details in their AIP;
- i) Enhance AM(R)S and AMS(R)S applications within a performance-based communication and surveillance (PBCS) framework;
- j) Strengthen the PBCS monitoring and improve its specifications as well as relevant safety assessments on emerging technologies for communication and surveillance supporting ATM operations in accordance with ICAO DOC 9869 and DOC 10037;
- k) Encourage applying Satellite Communications (SATCOM) with the performance of class A, B, and C on safety data or voice applications in accordance with ICAO Annex 10 and DOC 10037;
- l) Conform to the regional implementation priorities of ASBU, plan and implement new ATS communication services to meet the demands of aviation in the ASIA/PAC Region with the involvement of all stakeholders and taking account of costs and benefits. Taking Trajectory Based Operation (TBO) as thread, promote the ASBU operational concept and technology at the regional level.

### **Note:**

*Doc 10037: Global Operational Data Link (GOLD) Manual*

*Doc 9869: Performance-Based Communication and Surveillance (PBCS) Manual*

*Doc 9750: Global Air Navigation Plan*

**STRATEGY FOR IMPLEMENTATION OF THE AIR-GROUND DATA LINK IN THE ASIA/PAC REGION**

**Considering that:**

- a) The benefit of data communications to improve safety, efficiency and capacity through the reduction of voice communications and process automation to meet the operational requirement and consistent with the Air Traffic Management Operational Concept;
- b) Current operation application of data link to support CPDLC, ADS-C, Data link Flight Information Service (DFIS) including D-VOLMET, D-ATIS and DCL, the need to maintain the functional service of these applications;
- c) Current technology such as Satellite data link, HF data link, AeroMACS being acceptable for operations and standardized in SARPs and/or industry standards;
- d) Ongoing implementation of VHF ACARS, VDL-Mode 2 AoA (ACARS over Aviation VHF Link Control), VDL-Mode 2 ATN and the need to improve data link communication coverage and capacity;
- e) The need for PBCS implementation is prescribed in the Performance-Based Communication and Surveillance (PBCS) Manual (Doc 9869) to ensure that data communications operations are carried out in a safe and efficient manner;
- f) The Global Operational Data Link (GOLD) Manual (Doc 10037) provides the globally harmonized guidance on data link service, CPDLC and ADS-C implementation, PBCS specifications and post-implementation monitoring and analysis;
- g) Trajectory-Based Operations is fundamental for realizing the ICAO Global ATM Operational Concept and the evolution towards TBO is expected to align with the deployment of Aviation System Block Upgrades (ASBU) as described in the *Global Air Navigation Plan*, (ICAO Doc. 9750);
- h) Development of standardized LDACS (L-Band Digital Aerospace Communication System);
- i) The future growth of data communications to improve operations and the exchange of information including graphical meteorological information; and
- j) The need to assure global interoperability and harmonization.

**THE GENERAL STRATEGY FOR THE IMPLEMENTATION OF THE AIR-GROUND DATA LINK INFRASTRUCTURE IN THE ASIA/PAC REGION SHOULD BE AS FOLLOWS:**

- a) Maintain or ensure compatibility of existing data links to support all current ATM and meteorological applications without change to the application or application specific system.
- b) New deployment of VHF data link ground systems should be capable of supporting VDL-Mode 2 based on ASBU Block Implementation.

- c) In the near term there is no intent to implement VDL-Mode 3, VDL-Mode 4.
- d) States are encouraged to work co-operatively to assist each other on a multinational basis to implement the air-ground ATN/IPS based on their operational requirements while maintaining service to support ATN/OSI during the transition period. Among ATN systems utilizing both OSI and IPS (Internet Protocol Suite) dual stack allows for a high level of interoperability. States should be encouraged to develop dual stack functionality;
- e) HF voice services used in remote continental and oceanic areas should be transitioned to datalink communications.
- f) Deploy new applications on aerodrome surface, terminal and full stage of flight which related flight safety and security based on current and new datalink technology in accordance with ICAO Annex10 and Doc 10037 to reduce congestion of the VHF spectrum, reduce workload, and enhance safety.
- g) Apply an RCP specification related to the data link systems for relevant airspace complying with Doc 9869, and establish PBCS monitoring programs to assess against the RCP specification.
- h) Encourage states to provide the service of VHF ACARS, VDL-Mode 2 AoA, VDL-Mode 2 ATN and the deployment of class A, B, and C Satellite communications (SATCOM) on safety data or voice applications in accordance with ICAO Annex 10 and Doc 10037.
- i) Undertake and monitor research and development of communications technology for the future evolution of data link services in line with ICAO Global Air Navigation Plan (GANP).

**Note:**

*Near-Term: now to 10 years*

*Long-Term: 15+*

*Doc 10037: Global Operational Data Link (GOLD) Manual*

*Doc 9869: Performance-Based Communication and Surveillance (PBCS) Manual*

*Doc 9750: Global Air Navigation Plan*

*Doc 7030: Regional Supplementary Procedures*

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**Presentation of the initial proposal:**

1. The *Background* and *Comments* are provided in *italic text*.

2. The text of the proposed amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

- |   |                                   |
|---|-----------------------------------|
| a) <del>Text to be deleted is shown with a line through it.</del>   | text to be deleted                |
| b) New text to be inserted is highlighted with grey shading.  | new text to be inserted           |
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**AERONAUTICAL MOBILE SERVICE (AMS) STRATEGY FOR THE ASIA/PAC REGION**

**The AMS strategy for the Asia/Pac Region is to:**

- a) Ensure that all communications are provided within the Aeronautical Mobile (R) Service AM(R)S and the Aeronautical Mobile Satellite (R) Service -AMS(R)S, and protect the use of all radio frequency bands allocated for AM(R)S and AMS(R)S;

- b) Retain the VHF voice service as the primary medium for air-ground communication;

*(Comment: According to Doc 9750 Global Air Navigation Plan COMI concept of operations block 1 and block 2, a major shift toward greater use of Data link in the en-route and surface domains is envisioned in the next five to ten year. Actually, the shift is happening in some countries and areas, such as the USA and Europe.)*

- c) Supplement voice communication with data-link Flight Information Service (DFIS) applications including D-VOLMET, D-ATIS ~~and~~, DCL and other new applications related to the safety and regularity of flight to reduce congestion of the VHF spectrum, reduce workload, and enhance safety;

*(Comment: The DFIS applications have been widely used in areas of ASIA/PAC region. For example, data-link CDM service trial based on D-VOLMET has been conducted in 133 airports in China.)*

- d) Retain 25 kHz as the minimum channel spacing in the band 118 – 136 MHz by 2025;

*(Comment: The simulation of VHF COM frequency requirements by SR/WG of APAC indicated that 25kHz could fulfill the needs of VHF COM in APAC at least by 2025.)*

e) Use the frequency band 136 – 137 MHz exclusively for the air-ground VHF data-link applications;

f) Use ~~CPDLC~~ PBCS approved CPDLC to provide DCPC (Direct controller pilot communications) for more efficient communication and enhanced ATM, especially to improve the capability of Trajectory Based Operation and enhance en-route situation awareness;

*(Comment: According to Doc9750 Global Air Navigation Plan COMS concept of operations block 0, block 1, block 2 and TBO Tree.)*

g) Retain HF voice for communication in areas where VHF coverage is not available;

*(Comment: Where VHF coverage is not available, we could not only retain HF voice but also satellite voice for communication.)*

h) Provide satellite voice (SATVOICE) where appropriate. States providing SATVOICE service should publish relevant details in their AIP;

i) ~~plan for~~ Enhance AM(R)S and AMS(R)S applications within a performance-based communication and surveillance (PBCS) framework;

*(Comment: PBCS specifications have already been implemented globally since March 29, 2018. It is necessary to make efforts to enhance the AM(R)S and AMS(R)S applications.)*

~~j) plan and implement new communication technologies and applications to meet the demands of aviation in the ASIA/PAC Region with the involvement of all stakeholders and taking account of costs and benefits; and~~

~~k) protect all radio frequency bands allocated for AM(R)S and AMS(R)S.~~

j) Strengthen the PBCS monitoring and improve its specifications as well as relevant safety assessments on emerging technologies for communication and surveillance supporting ATM operations in accordance with ICAO DOC 9869 and DOC 10037;

*(Comment: PBCS specifications have been implemented globally since March 29, 2018. Considering the development and applications of the data-link-based technologies facilitating the ATM operation, stakeholders should work on the improvement of PBCS specifications and strengthen the safety assessments and monitoring.)*

k) Encourage applying Satellite Communications (SATCOM) with the performance of class A, B, and C on safety data or voice applications in accordance with ICAO Annex 10 and DOC 10037;

*(Comment: According to Doc9750 Global Air Navigation Plan COMS concepts of operation block 1 and block 2.)*

l) Conform to the regional implementation priorities of ASBU, plan and implement new ATS communication services to meet the demands of aviation in the ASIA/PAC Region with the involvement of all stakeholders and taking account of costs and benefits. Taking Trajectory Based Operation (TBO) as thread, promote the ASBU operational concept and technology at the regional level.

*(Comment: According to Doc9750 Global Air Navigation Plan Aviation System Block Upgrade (ASBU) framework and TBO Tree.)*

**Note:**

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**STRATEGY FOR IMPLEMENTATION OF THE AIR-GROUND DATA LINK IN THE ASIA/PAC REGION**

**Considering that:**

- a) The benefit of data communications to improve safety, efficiency and capacity through the reduction of voice communications and process automation to meet the operational requirement and consistent with the Air Traffic Management Operational Concept;
- b) Current operation application of data link to support CPDLC, ADS-C, ~~PDC and D-FIS~~, Data link Flight Information Service (DFIS) including D-VOLMET, D-ATIS and DCL, the need to maintain the functional service of these applications;

*(Comment: extend some other ATC applications)*

- c) Current technology such as ~~VHF ACARS, VDL Mode 2 AoA (ACARS over Aviation VHF Link Control), VDL Mode 2 ATN~~, Satellite data link, HF data link, AeroMACS being acceptable for operations and standardized in SARPs and/or industry standards;

*(Comment: include AeroMACS)*

- d) ~~availability of standardized VDL Mode 3, VDL Mode 4, Mode S data links and future standardized technology such as Universal Access Transceiver (UAT);~~ Ongoing implementation of VHF ACARS, VDL-Mode 2 AoA (ACARS over Aviation VHF Link Control), VDL-Mode 2 ATN and the need to improve data link communication coverage and capacity;

*(Comment: VHF data link is still important in ATC COM, VDL M2 has 2 protocols, AoA and ATN)*

- e) The need for PBCS implementation is prescribed in the Performance-Based Communication and Surveillance (PBCS) Manual (Doc 9869) to ensure that data communications operations are carried out in a safe and efficient manner;

*(Comment: The PBCS has been globally implemented from 29th March 2018. The PBCS concept provides a framework for managing communication and surveillance performance in accordance with globally accepted RCP and RSP specifications. Doc 9869 provides guidance and information concerning PBCS operations and is intended to facilitate the uniform application of the SARPs contained in Annex 6, Annex 11, Annex 15, PANS-ATM, PANS-ABC and, when necessary, the Regional Supplementary Procedures (Doc 7030). All the stakeholders should follow the uniform standard in this manual to improve operational safety and efficiency.)*

- f) The Global Operational Data Link (GOLD) Manual (Doc 10037) provides the globally harmonized guidance on data link service, CPDLC and ADS-C implementation, PBCS specifications and post-implementation monitoring and analysis;

*(Comment: The GOLD Manual provides guidance on ATS data link services, namely data link initiation capability (DLIC), automatic dependent surveillance – contract (ADS-C) and controller-pilot data link communications (CPDLC). It is intended to improve safety and maximize operational benefits by promoting seamless and interoperable data link operations throughout the world.)*

- g) Trajectory-Based Operations is fundamental for realizing the ICAO Global ATM Operational Concept and the evolution towards TBO is expected to align with the deployment of Aviation System Block Upgrades (ASBU) as described in the *Global Air Navigation Plan*, (ICAO Doc. 9750);

*(Comment: emphasize concept on TBO)*

- h) Development of standardized LDACS (L-Band Digital Aerospace Communication System);

*(Comment: ICAO PT-T is working on the standard of LDACS)*

- i) e) The future growth of data communications to improve operations and the exchange of information including graphical meteorological information; and

- j) f) The need to assure global interoperability and harmonization.

**THE GENERAL STRATEGY FOR THE IMPLEMENTATION OF THE AIR-GROUND DATA LINK INFRASTRUCTURE IN THE ASIA/PAC REGION SHOULD BE AS FOLLOWS:**

- a) a) Maintain or ensure compatibility of existing data links to support all current ATM and meteorological applications without change to the application or application specific system.
- b) b) New ~~installation~~ deployment of VHF data link ~~ground~~ systems should be capable of supporting VDL-Mode 2 and as an interim step provide the bridging application of AoA based on ASBU Block Implementation.

*(Comment: VDL mode 2 should be considered in priority)*

- e) ~~c) In the near term there is no intent to implement VDL-Mode 3, VDL-Mode 4 or Mode S.~~

*(Comment: There is no demand to promote VDL mode 3 and mode 4, but the promotion and application of mode S is conducted in APAC area.)*

- ~~d) undertake and monitor research and development of communications technology for the future evolution of data link services.~~

- e) d) States are encouraged to work co-operatively to assist each other on a multinational basis to implement the air-ground ATN/IPS based on their operational requirements while maintaining service to support ATN/OSI during the transition period. Among ATN systems utilizing both OSI and IPS (Internet Protocol Suite) dual stack allows for a high level of interoperability. States should be encouraged to develop dual stack functionality; ~~compliant VDL Mode 2 service and ensure system inter-operability.~~

*(Comment: ATN/OSI is compliant with VDL mode 2, recommend to develop ATN/OSI and ATN/IPS dual stack system. States have the responsibility to ensure all the systems inter-operability.)*

- ~~f) e) HF voice services used in remote continental and oceanic areas should be transitioned to datalink communications.~~

*(Comment: Encourage states to use datalink communications in remote continental and oceanic areas outside the range of VHF coverage)*

- ~~g) f) Deploy new applications on aerodrome surface, terminal and full stage of flight which related flight safety and security based on current and new datalink technology in accordance with ICAO Annex10 and Doc 10037 to reduce congestion of the VHF spectrum, reduce workload, and enhance safety.~~

*(Comment: Data link communication reduces the workload of the controller and flight crew by supporting automatically transmitted reports. It is a great benefit to reduce human error during the ATC service and increase the operational efficiency.)*

- ~~h) g) Apply an RCP specification related to the data link systems for relevant airspace complying with Doc 9869, and establish PBCS monitoring programs to assess against the RCP specification.~~

*(Comment: The RCP specification provides subsystem allocations to support the initial compliance processes, ANSPs should establish local and regional PBCS monitoring programs to monitor actual performance against the operational criteria provided in Doc 9869, and take any necessary action to resolve unacceptable performance.)*

- ~~i) h) Encourage states to provide the service of VHF ACARS, VDL-Mode 2 AoA, VDL-Mode 2 ATN and the deployment of class A, B, and C Satellite communications (SATCOM) on safety data or voice applications in accordance with ICAO Annex 10 and Doc 10037.~~

*(Comment: VHF ACARS, VDL-Mode 2 AoA, VDL-Mode 2 ATN and the performance class A, B, and C Satellite communications need to be considered in priority.)*

- ⌋ i) undertake and monitor the research and development of communications technology for the future evolution of data link services in line with ICAO Global Air Navigation Plan (GANP).

*(Comment: According to GANP, pay attention to the new data link technology.)*

**Note:**

*Near-Term: now to 10 years*

*Long-Term: 15+*

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