INTERNATIONAL CIVIL AVIATION ORGANIZATION

**TWENTY FIFTH MEETING OF THE
ASIA/PACIFIC AIR NAVIGATION PLANNING AND
IMPLEMENTATION REGIONAL GROUP (APANPIRG/25)**

Kuala Lumpur, Malaysia, 8 - 11 September 2014

Agenda Item 3: **Performance Framework for Regional air navigation planning and implementation**

3.4 **CNS**

APAC FOLLOW-UP TO AN CONF/12 RECOMMENDATIONS

(Presented by the Secretariat)

Follow-up to AN Conf/12 Recommendations by CNS SG/18 meeting

1.   The Twelfth Air Navigation Conference (AN-Conf/12) held in Montréal from 19 to 30 November 2012 made fifty-six recommendations under its six agenda items covering a variety of air navigation subjects. On 28 January 2013, APANPIRG/24 formulated Conclusion 24/4 requesting States and International Organizations, on the basis of analysis to take follow-up action as appropriate on the applicable recommendations of AN-Conf/12 and made Decision 24/5 asking the subgroups of APANPIRG to study the recommendations of the AN-Conf/12, initiate appropriate follow-up actions and submit a report on the outcomes of these actions to APANPIRG/25.

2.   The meeting noted that in this connection, follow-up State Letter issued by the ICAO Regional Office dated 2 August 2013 invited States/Administrations and international organizations to initiate action as appropriate on the applicable AN-Conf/12 Recommendations and submit the action planned by 31 January 2014. Australia, Hong Kong China, Japan, New Zealand, Singapore, Thailand and USA submitted their action plans which were compiled in the Attachment to WP/03. Philippines and Malaysia confirmed that they would follow up with the recommendations of AN Conf/12.

3.   ADS-B SITF/13 meeting held in April 2014 proposed to take action on 16 of the 56 recommendations and formulated a draft Conclusion that its response to these 16 recommendations be adopted as guidance for consideration by States. Similarly, ACSICG/1 meeting held in May 2014 identified Recommendations 1/6, 3/2, 3/3, 3/4 and 3/5 as relevant to the work of ACSICG and recommendations 3/9 and 6/13 are indirectly linked to ACSICG activity.

4.   The responses from States, ADS-B SITF/13 and ACSICG/1 meetings were consolidated into a single recommended action by an ad hoc working group during the meeting (this ad hoc group was led by Hong Kong China, with members from Australia, Japan, Singapore and USA). The meeting further reviewed the consolidated response and formulated following Draft Conclusion:

Draft Conclusion 18/1 - Response to AN-Conf/12 Recommendations

That, the regional response to the Recommendations of AN-Conf/12, as proposed in **Appendix A** to the Report be adopted as guidance for consideration by States.

Follow-up to AN Conf/12 Recommendations by ATM SG/2 meeting

5. The ATM SG/2 meeting held in August 2014 reviewed the outcome of CNS SG/18 meeting with some comments.

Consolidated response for the region

6. This flimsy presents the consolidated response from the APAC Region to the ANC/12 recommendations at **Attachment A**.

FOLLOW UP TO AN-CONF/12 RECOMMENDATIONS

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
Recommendation 1/1 – The draft Fourth Edition of the Global Air Navigation Plan (Doc 9750, GANP) That States: a) agree in-principle, with the replacement of the introduction by the high level policy principles as shown in the appendix and inclusion of other proposed improvements made at this Conference, into the updated draft Fourth Edition of the GANP; b) should have the opportunity to provide any final comments on the updated draft GANP to ICAO before it is considered by the ICAO Assembly in 2013; That ICAO: c) include the key air navigation policy principles presented in the appendix under "Global Air Navigation Plan" into the Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP); d) develop financial policies which support efficient acquisition and implementation of global air navigation services infrastructure and aircraft equipage; e) taking a total systems and performance-based approach, create a Standards and Recommended Practices development plan for the aviation system block upgrades including the establishment of agreed global priorities between the different blocks and modules; f) define a stable and efficient process for endorsement by the 38th Session of the ICAO Assembly, for updating the GANP that ensures stability in module timelines for any future updates; and g) ensure that the nature and status of the planning information in the various documents pertaining to the GANP are consistent and complete and allow due account to be taken of the inputs from ATM research, development and deployment programmes.	ICAO HQs	Completed by ICAO HQs Fourth Edition of the Global Air Navigation Plan (Doc 9750, GANP) was issued in Feb 2013.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
Recommendation 1/2 – Implementation That ICAO: a) through its regional offices, provide guidance and practical assistance to States and regions and subregions when they decide to implement individual blocks or modules of the aviation system block upgrades; b) establish a group and improved mechanism for interregional cooperation to ensure harmonization of air traffic management; and c) assist States and regions in training and capacity-building towards implementation of the relevant modules of the aviation system block upgrades.	APANPIRG	APANPIRG has already, and will continue, to provide guidance and practical assistance to States in APAC region regarding planning and implementation of ASBU modules. APANPIRG and its contributory bodies have established various Task Forces/Working Groups and organized relevant seminars/workshops in assisting States on setting priorities and targets on implementing ASBU modules in the Asia Pacific Region.
Recommendation 1/3 – Guidance on business cases That ICAO complete the development of guidance material on business case analysis, adopting such appropriate guidance material that may be already available or under development.	ICAO/RO	ICAO Regional Office has formulated Air Navigation Report Form (ANRF) on prioritized ASBU modules for reference by States. APANPIRG to endorse these forms and keep track of the implementation progress.
Recommendation 1/4 – Architecture That ICAO: a) develop, for inclusion in the first update of the GANP after the 38th Session of the ICAO Assembly, a global ATM logical architecture representation in support of the GANP and planning work by States and regions; and b) develop a breakdown of the logical architecture of the ground system to the level needed to best address the global interoperability issues.	ICAO HQs	
Recommendation 1/5 – Time reference accuracy That ICAO define the accuracy requirements for the future use of a time reference and to prepare the necessary amendments to Standards and Recommended Practices.	ICAO HQs	
Recommendation 1/6 – Data communications issues That ICAO: a) organize a multidisciplinary review of air traffic control communication requirements and issues; and b) review the operation, management and modernization of a regional digital network technical cooperation project and other similar regional experiences with the aim that this efficient practice can be adapted for use in other ICAO regions;	ICAO HQs and States	CNS SG: a) ATNICG completed this task and concluded that the current infrastructure based on International Private Line (IPL) arrangement between ANSPs is time consuming, increasingly obsolete and infrastructure is limited to support growth in traffic b) CRV TF has conducted a benchmark on operation, management, and modernization of other ICAO regional network such as Pan-European Network Service (PENS), MEVA in Caribbean region to develop an Asia/Pacific Common Regional Virtual Private Network (CRV) c) APANPIRG is being studying the opportunity and feasibility to deploy a Common Regional network through the CRV Task Force established in June 2013. Benchmarking was done regarding other regional initiatives such as PENS,

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That States: c) explore multi-modal solutions when appropriate to overcome transition issues; and d) anticipate and accelerate the migration of air traffic management communication systems towards more efficient technologies to timely service the aviation system block upgrade modules.		MEVA and REDDIG. It is anticipated in APAC Region that to support B0-FICE, enable B1-SWIM and the sharing of surveillance and support the transition to VoIP communications, a modern and cost effective network needs to be implemented. The Cost Benefit Analysis developed Q1 2014 by the CRV Task Force shows solutions like IP MPLS-based networks would prove to be an efficient technology. Its feasibility in APAC will be confirmed through a Request For Information towards Industry. In 2016 APANPIRG plans to establish a regional group called OOG (CRV Operations Oversight Group) to coordinate and monitor the transition from legacy communication networks to the CRV network. The safety issues that may be linked to the transition will be studied in the preliminary safety case of CRV project. If confirmed by APANPIRG the CRV network operations should start late 2016/early 2017. (from ACSICG/1) States: c) States to provide support to CRV TF to perform market survey, develop Operational Concept, Users requirements and Document of Agreement to support a procurement of CRV d) As of July2014, 11 (Ten) States/Administrations have intended to join the CRV. The CRV is expected to provide performant services based on dynamic network backbone, large bandwidth, and a common equipment standard to support the ASBU modules like B0-FICE, enable B1-SWIM and the sharing of surveillance and support the transition to VoIP communications Recommendation: APANPIRG/25 to give a GO to stage 1(procurement) based on the CRV concept of operations, the Cost Benefit analysis, the MSA and CRV planning. APANPIRG/26 or APANPIRG//27 to accelerate the migration to CRV by giving a GO to stage 2 (implementation) based on the Sealed Tender outcome and matured concept of operations for OOG.
Recommendation 1/7 – Automatic dependent surveillance — broadcast That States: a) recognize the effective use of automatic dependent surveillance — broadcast (ADS-B) and associated communication technologies in bridging surveillance gaps and its role in supporting future trajectory-based air traffic management operating concepts, noting that the full potential of ADS-B has yet to be fully realized; and b) recognize that cooperation between States is key towards improving flight efficiency and enhancing safety involving the use of automatic dependent surveillance — broadcast technology; That ICAO: c) urge States to share automatic dependent surveillance — broadcast (ADS-B) data to enhance safety, increase efficiency and achieve seamless surveillance and to work closely together to harmonize their ADS-B plans to optimize benefits.	ICAO HQs and States	ICAO RO: APANPIRG has already proposed early implementation of ADS-B OUT technology, and will continue to do so. APANPIRG has encouraged ADS-B data sharing among States. Conclusions have been adopted under APANPIRG to urge States to share their ADS-B data and DCPC facilities. ADS-B data sharing is already operational in the region and further deployments are being planned. Besides, APANPIRG has also encouraged harmonized ADS-B implementation among States. Templates for harmonized ADS-B implementation, promulgation of harmonized ADS-B avionics equipage requirements, and guidelines for airworthiness and operational approval, have been developed and published. The dates of ADS-B mandates in many sub-regions were also aligned to take effect from 12 December 2013. APANPIRG has developed and published guidance materials on ADS-B data sharing and harmonized ADS-B implementation, and will continue to promote it at each APANPIRG and its contributory bodies' meetings. (from ADS-B SITF/13) States: The Seamless ATM Plan Phase 1 for ADS-B data sharing with neighbouring ATC units within high density FIRs has progressed well for the Asia Pacific region, with ADS-B data sharing among states already implemented and further sharing being planned for other areas.

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		In Phase 2, sharing of ADS-B data will be expanded to all neighbouring ATC units. States will put in place programmes to advocate ADS-B data sharing. States had adhered to ICAO recommendations to share its ADS-B data and working closely to harmonize their ADS-B plans. In the future, CRV would enable a secured and performant sharing of surveillance data across APAC Region.
Recommendation 1/8 – Rationalization of radio systems That ICAO and other stakeholders to explore strategies for the decommissioning of some navigation aids and ground stations, and the rationalization of the on-board communications, navigation and surveillance systems while maintaining safety and coordinating the need for sufficient system redundancy.	APANPIRG	APANPIRG/24 has endorsed the Navigation Strategy for the APAC Region which requires States/Administrations to: (i) Convert from terrestrial-based instrument flight procedures to PBN operations in accordance with the Asia/Pacific Seamless ATM Plan ; (ii) Develop PBN implementation roadmap to rationalize terrestrial navigation aids, retaining a minimum network of terrestrial aids necessary to maintain safety of aircraft operations. Efforts will be made to decommission some of the terrestrial navigation aids and ground stations, rationalise the on-board CNS systems, and retain essential terrestrial navigation aids in order to mitigate the potential loss of GNSS service for maintaining safety.
Recommendation 1/9 – Space-based automatic dependent surveillance — broadcast That ICAO: a) support the inclusion in the Global Air Navigation Plan, development and adoption of space-based automatic dependent surveillance — broadcast surveillance as a surveillance enabler; b) develop Standards and Recommended Practices and guidance material to support space-based automatic dependent surveillance — broadcast as appropriate; and c) facilitate needed interactions among stakeholders, if necessary, to support this technology.	ICAO HQs	CNS SG: APANPIRG noted the development of space-based ADS-B. APANPIRG suggests that the highest cost benefit for this technology will be in the NAT region. The technology may also be cost effective in oceanic regions where installation of ground surveillance equipment/systems are technically infeasible. In this case, the cost benefit from reduced separation standards competes against FANS ADS-C and with ADS-B IN technology. It is noted that the cost to ANSPs and the applicable lateral separations are not yet clear and that the technology is, as yet, unproven. However, APANPIRG sees enormous potential for space-based ADS-B across the oceans of the region. The strategy being adopted by the region is to keep an eye on its development until there is clarity about technical success and about the cost of the services before committing to this technology. (from ADS-B SITF/13) Asia/Pacific Seamless ATM Planning meeting has identified space-based ADS-B as one of the key technology the holds great promise and is being considered for acceptance in the pursuit of seamless ATM beyond ASBU Block 0 implementations, and with global interoperability. There is potential for development of space-based ADS-B to cover the airspace over the oceanic regions of Asia Pacific region. ICAO should facilitate, especially on proving the technical and economic viability to States for their buy-in.
Recommendation 1/10 – Automatic dependent surveillance — self-organizing wireless data networks That ICAO consider the use of self-organizing wireless data networks based on VDL Mode-4 technology taking into account: a) possible technical advantages; b) whether it satisfies any unmet operational need; and c) its impact of forward and retro-fit on the global air transport fleet.	ICAO HQs	CNS SG supports ICAO's consideration.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION

Recommendation 1/11 – Automation roadmap
 	
That ICAO:
 	
a) develop a global roadmap for the evolution of ground air traffic management automation systems in line with aviation system block upgrade implementation; and
 	
b) develop performance-based system requirements for air traffic management automation systems so that:
 	
   1) where necessary these systems are interoperable across States and regions; and
 	
   2) the function and operation of these systems will result in consistent and predictable air traffic management system performance across States and regions.
	ICAO HQs	CNS SG:
		
		Some of the newly deployed air traffic management automation systems being adopted by States includes ICAO adopted surveillance technologies such as ADS-B / MLAT and Mode S DAPS (Mode S Enhanced Surveillance).
		
		Depending on whether there will be operational benefits to States and the region, a time line of expected ADS-B / MLAT / Mode S DAPS capabilities in respective States air traffic management automation systems is recommended to be promulgated as in line with the "Preferred ATM Service Levels" PASL Phase II in Asia/Pacific Seamless ATM Plan.
		
		The PBCS framework will allocate performance-based requirements to the ATM systems as part of the global performance budget.
		
		States should deign and/or procure ATM systems based on their expected performance.

Recommendation 1/12 – Development of the aeronautical frequency spectrum resource That States and stakeholders: a) recognize that a prerequisite for the deployment of systems and technologies is the availability of adequate and appropriate radio spectrum to support aeronautical safety services; b) work together to deliver efficient aeronautical frequency management and "best practices" to demonstrate the effectiveness and relevance of the industry in spectrum management; c) support ICAO activities relating to the aviation spectrum strategy and policy through relevant expert group meetings and regional planning groups; and d) support Assembly Resolution A36-25 and the requirement for sufficient State representation of aviation interests at World Radiocommunication Conferences (WRCs) and relevant International Telecommunication Union WRC preparatory meetings; That ICAO: e) develop and implement a comprehensive aviation frequency spectrum strategy to be referenced to the Global Air Navigation Plan (GANP), which includes the following objectives:	ICAO HQs and States	CNS SG: With the deployment of ADS-B consideration should be given to the decommissioning of radars to reduce frequency spectrum utilization. The sharing of DCPC facilities to support ADS-B operations could also lead to decommissioning of certain HF stations and thus releasing the associated HF frequencies. High ADS-B fitment rates may lead to the removal of primary radars in some states. The Regional Surveillance Strategy has encouraged States to reduce dependence on primary radars for area surveillance. (from ADS-B SITF/13) The Spectrum Review Working Group propose improvements to the existing regional VHF frequency assignment process based on the new tool, *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies* (Doc 9718) provisions and enhanced coordination, aiming at avoiding introduction of 8.33 kHz spacing in the APAC Region in the near future. The direction to avoid introducing 8.33 kHz spacing in APAC Region as long as practicable with improvements in regional VHF frequency assignment based on new tool (e.g. the ICAO Global Database) and enhanced coordination, while closely monitoring the regional needs through Spectrum Review Working Group is supported. (from SRWG/1) States: a-d) In General, the States actively support the overview of aeronautical frequency spectrum resource, as well as the relevant

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1) timely availability and appropriate protection of adequate spectrum to create a sustainable environment for growth and technology development to support safety and operational effectiveness for current and future operational systems and allow for the transition between present and next generation technologies;		ICAO and ITU activities, including the WRC-2015. For many states, the frequency resources are centrally regulated by governmental bodies which the spectrum is shared not only aeronautical but also use in other domains.
2) demonstrate efficient use of the spectrum allocated through efficient frequency management and use of best practises; and		
3) clearly state in the strategy the need for aeronautical systems to operate in spectrum allocated to an appropriate aeronautical safety service;		
f) establish timelines and methodologies to complement the GANP planning objectives with a frequency spectrum strategy;		
g) continue to allocate adequate resources with a far-sighted approach to its work programmes regarding aviation spectrum challenges;		
h) consider a methodology to enable ATM stakeholders to effectively share ICAO material on aviation frequency spectrum as a common guidance for securing the aviation position at World Radiocommunication Conferences; and		
i) consider structuring the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies* (Doc 9718) by using a web-based platform as appropriate, to further support States in their implementation of the spectrum strategy.		
Recommendation 1/13 – Potential use of fixed satellite service spectrum allocations to support the safe operation of remotely piloted aircraft systems That ICAO support studies in the International Telecommunication Union Radio Communication Sector (ITU-R) to determine what ITU regulatory actions are required to enable use of frequency bands allocated to the fixed satellite service for remotely piloted aircraft system command and control (C2) links to ensure consistency with ICAO technical and regulatory requirements for a safety service.	ICAO HQs	CNS SG supports ICAO's position and actions.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
Recommendation 1/14 – Long-term very small aperture terminal spectrum availability and protection That: a) ICAO and Member States not support additional international mobile telecommunications spectrum allocations in the fixed satellite service C-band spectrum at the expense of the current or future aeronautical very small aperture terminal networks; and b) ICAO and Member States pursue this matter in the International Telecommunication Union Radio Communication Sector (ITU-R) and during the World Radiocommunication Conference (WRC-15), with a coordinated proposal to promote a solution where the international mobile telecommunications spectrum allocation does not compromise the availability of the aeronautical very small aperture terminal networks.	ICAO HQs and States	States: Majority of states have declared their support to this recommendation for a long-term VSAT spectrum availability and protection, as well as ICAO 's action in ITU-R and WRC-2015 on the topic. In addition, CNS SG supports ICAO's actions.
Recommendation 1/15 – Performance monitoring and measurement of air navigation systems That ICAO: a) establish a set of common air navigation service performance metrics supported by guidance material, building on existing ICAO documentation (e.g. Manual on Global Performance of the Air Navigation System (Doc 9883) and the Manual on Air Navigation Services Economics (Doc 9161)); b) promote the development and use of "leading safety indicators" to complement existing "lagging safety indicators" as an integral and key component to drive improvement in performance and in the achieved management of risk; and c) encourage the early and close involvement of the regulator and oversight bodies in the development, proving of concepts and implementation of the aviation system block upgrades and regional programmes.	ICAO HQs	CNS SG supports ICAO's actions.
Recommendation 1/16 – Access and equity considerations That States: a) ensure, as part of the aviation system block upgrade implementation, the principles of access and equity are included in all airspace modernization and redesign efforts; and b) detail how they will monitor the service providers to ensure that they are providing fair, equitable, and efficient access to all aviation services including general aviation.	States	ICAO RO: CNS SG to develop a tracking mechanism for all systems and services identified in ASBU Blocks 0 and 1 for up to date report. Access and equity is included in many States' airspace management. States to provide update in annual CNS SG meeting. Recommendation: APANPIRG to task CNS SG to maintain the progress tracking of ASBU Blocks 0 and 1 of the States in the region.
Recommendation 2/1 – ICAO aviation system block upgrades relating to airport capacity That the Conference: a) endorse the aviation system block upgrade modules relating to airport capacity included in Block 1 and recommend that	ICAO HQs and States	CNS SG: airport capacity is part of the Regional Seamless ATM items. Regarding e) APANPIRG Conclusion 24/13 – Air Traffic Flow Management Capacity Assessments That States be urged to establish capacity assessment and adjustment mechanisms, and

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ICAO use them as the basis of its standards work programme on the subject; b) agree in principle to the aviation system block upgrade modules relating to airport capacity included in Blocks 2 and 3 as the strategic direction for this subject; c) recommend that the ICAO Council supports the implementation of the APEX in Safety Programme and asks the Secretary General to continue ICAO participation in safety reviews and sharing of relevant safety information, as provided for in the Memorandum of Cooperation between ACI and ICAO; That ICAO: d) include, following further development and editorial review, the aviation system block upgrade modules relating to airport capacity in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP); e) States and service providers ensure that airport capacity, including relevant airport planning and operational issues, are addressed and accounted for when planning for air traffic management capacity and system performance; f) work with the Airports Council International (ACI) and other interested parties on guidance material to promote the globally-harmonized implementation of airport collaborative decision-making, including best practices and global technical standards; and That States: g) according to their operational needs, implement the aviation system block upgrade modules relating to airport capacity included in Block 0.		regular review for all aerodromes and ATC sectors where traffic demand is expected to reach capacity, or is experiencing traffic congestion, and to report the assessment outcomes to the Asia/Pacific Regional Office prior to 1 May 2014 (however, as at 11 July 2014 only Hong Kong, China, Japan and Thailand had responded). ATFM is also an established expectation in the Seamless ATM Plan. States: g) Many states have already started their planning on implementing ASBU Block 0 for increasing airport capacity. With the endorsement of regional priorities and targets in CNS SG and APANPIRG, we foresee that more aligned targets could be achieved in APAC states by November 2015. (For ICAO items, they belong to ICAO HQ Not applicable to ICAO Regional Office. Tracking of ASBU Block 0 has been included in Recommendation 1/16)
Recommendation 2/2 – Development of ICAO provisions for remotely operated air traffic services That ICAO provide: a) updates on additional guidelines for surveillance and air and ground communications systems; b) requirements for the use of sensors and display technologies to replace visual observation to air traffic in the provision of air traffic services; and c) requirements for air traffic services (ATS) personnel and flight crew training, ATS personnel licensing and related procedures for remotely operated air traffic services.	ICAO HQs	ICAO RO: Due to the high Mode-S and ADS-B fitment and usage in the APAC region, trials of remotely operated ATS may be practical within the region earlier than other regions. APAC states should be encouraged to support these activities. (from ADS-B SITF/13) Furthermore, CNS SG supports ICAO's actions.
Recommendation 2/3 – Security of air navigation systems That ICAO: a) seek the support of States and stakeholders to complete its work in developing a robust, secure aeronautical telecommunication network; and	ICAO HQs	CNS SG supports ICAO's actions. Security requirements will be included in the procurement of services from a common service provider of common regional VPN network; CRV Network Security will be monitored by the OOG. Security guidelines from ICAO EUR region will be reviewed and adopted by ACSICG as part of its work programme.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
b) establish, as a matter of urgency, an appropriate mechanism including States and industry to evaluate the extent of the cyber security issues and develop a global air traffic management architecture taking care of cyber security issues.		
Recommendation 2/4 – Optimized management of wake turbulence That ICAO: a) accelerate the implementation of new ICAO wake turbulence categorization systems and to pursue development of dynamic wake turbulence separation provisions with supporting implementation guidance; b) support the continuation of the cooperative work on-going addressing the static pair wise separation, with a view to having revised global provisions in place in advance of Block 1 timescales; and c) develop the wake vortex flight safety system (WVSS) concept description along with a proposed system architecture with the possibility for WVSS to be included in the aviation system block upgrade Modules B1-70, B2-70, B1-85 and B2-85.	PBN/TF (disbanded) ICAO HQs	APAC States to submit PBN implementation plan. ICAO HQs to develop WVSS concept for Block 1 and Block 2 modules. APANPIRG to KIV of the regional development.
Recommendation 2/5 – Performance-based navigation for terminal and approach operations implementation That States and stakeholders: a) urgently implement, where appropriate, performance-based navigation for terminal and approach operations in accordance with Assembly Resolution A37-11; b) urgently adopt efficient operations approval procedures and support the mutual recognition of other States' operational approvals; c) share their best practices including required navigation performance authorization required implementation initiatives as well as relevant flight operational safety assessment documentation with other States; d) determine operational requirements in support of their airspace concept in accordance with the processes described in the *Performance-based Navigation (PBN) Manual* in order to select the appropriate PBN specification; e) including regulators, airport authorities, air navigation service providers, commercial operators, General Aviation and the military, work together at all levels and in close coordination to ensure successful performance-based navigation implementation; f) international organizations and industry continue to provide resources to support ICAO with the development of provisions, guidance and training material in support of performance-based navigation implementation; and g) States, when considering performance-based navigation routes arriving at and departing from airports, should ensure that	CNS/SG PBN/TF (disbanded)	PBN Terminal is a regional priority 1 in APAC. States developed PBN Implementation Roadmap and submitted to the ICAO/RO. a) States and IOs urgently implement, where appropriate, PBN for terminal and approach operations in accordance with Assembly Resolution A37-11; b) States and IOs urgently adopt efficient operations approval procedures and support the mutual recognition of other States' operational approvals; c) States and IOs share their best practices d) States and IOs determine operational requirements in support of their airspace concept in accordance with the processes described in the *PBN Manual* e) States and IOs work together at all levels and in close coordination to ensure successful PBN implementation; f) IOs provide resources to support ICAO with the development of provisions, guidance and training material in support of PBN implementation g) States, when considering PBN routes arriving at and departing from airports, should ensure that air navigation service providers and aircraft operators involve airport operators from the outset so that they may consult fully with local communities in order to avoid adverse noise impact on those communities.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
air navigation service providers and aircraft operators involve airport operators from the outset so that they may consult fully with local communities in order to avoid adverse noise impact on those communities.		Establishment of APVs is part of the Seamless ATM Plan. A PBN ICG is proposed to be established by APANPIRG/25 to assist States in their implementation
Recommendation 2/6 – Development of ICAO provisions for performance-based navigation for en route terminal and approach operations That ICAO study and make appropriate additions where required to the ICAO provisions, including: a) required navigation performance authorization-required departure navigation specification; b) the application of performance-based navigation standard terminal arrival routes for en route independent simultaneous approaches; c) assessment of the need for ICAO provisions on the use of ground-based augmentation system to append standard instrument arrival and standard instrument departure procedures to approach and landing trajectory; d) development of separation minima to support all performance-based navigation specifications and which will also allow for operations where mixed performance requirements are in effect; e) advanced use of performance-based navigation to support aviation system block upgrade modules; f) continued development of provisions, guidance and training material in support of performance-based navigation implementation; and g) develop and make available the minimum qualification requirements for personnel to attend performance-based navigation procedure design training.	CNS/SG PBN/TF (disbanded)	States put in place PBN Implementation Roadmap and submitted to the ICAO/RO. Establishment of APVs is part of the Seamless ATM Plan. A PBN ICG is proposed to be established by APANPIRG/25 to assist States in their implementation
Recommendation 3/1 – ICAO aviation system block upgrades relating to performance improvement through the application of system-wide information management That the Conference: a) endorse the aviation system block upgrade module relating to performance improvement through the application of system-wide information management included in Block 1, and recommend that ICAO use it as the basis of its work programme on the subject; b) agree in principle with the aviation system block upgrade module relating to performance improvement through the application of system-wide information management included in Block 2, as the strategic direction for this subject; That ICAO: c) include, following further development and editorial review, the aviation system block upgrade modules relating to	ICAO HQs	Action to be completed by ICAO HQ for updating the Draft Edition of the Global Air Navigation Plan (Doc. 9750 GANP), Not Applicable to ICAO region

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
performance improvement through the application of system-wide information management for inclusion in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP).		
Recommendation 3/2 – Development of a global system-wide information management concept That ICAO: a) undertake further work to develop a global system-wide information management concept for air traffic management operations and related ICAO provisions that may be necessary; b) at the appropriate time coordinate information management principles and performance-based information management; c) perform additional work on the global implementation of those principles and framework for all air traffic management information through the development of appropriate information management/system-wide information management concepts to be ready in 2014 for subsequent system development work in Block 1 and to include in its work programme, specific activities tailored at coordinating system-wide information management deployment at a local, regional and global level; d) update the information management/system-wide information management (IM/SWIM) working arrangements; That States and stakeholders: e) work together to demonstrate how system-wide information management capabilities and functions will meet the needs of the future air traffic management system.	ICAO HQs	ICAO HQs: 1) ICAO ATMRPP plans to publish two documents, which are SWIM Operation Concept Manual and FF-ICE/1 provision Manual. APANPIRG CNS-SG will review these documents, develop the regional implementation concept, and request regional requirement APAC. 2) ICAO ATMRPP plans to publish SWIM Operation Concept Manual (include the Information Management) APRX the last of 2014. In addition, ICAO HQ is preparing to establish Information Management Panel in 2014 for further considerations. CNS SG: 1) As a follow-up to the global level activities, APANPIRG CNS-SG assigned the tasks of performing SWIM to ACSICG. 2) APANPIRG CNS-SG supports the aspect of the principal for the technical and security issues while coordinating with the related groups to perform performance-based information management. 3) APANPIRG CNS-SG prepares the environment needed, for example common regional virtual private network, while grasping the local characteristic. Furthermore, the integrated nature of SWIM may need to identify dependencies with ATM and MET SGs. 4) From ACSICG/1: APANPIRG has reviewed the SWIM CONOPS. APANPIRG through ATNICG has studied and A cost-benefit analysis for CRV was developed. A cost-benefit analysis for IMS/SWIM at regional level is planned to be developed. (Conclusion C 23/21). Action proposed: expedite the cost-benefit analysis for IMS/SWIM Action proposed: APANPIRG to initiate a Task "Develop SWIM APAC implementation framework". While this task can initially report to APANPIRG through ACSICG and CNS/SG, the integrated nature of SWIM may need to integrate ATM and MET SG States through CNS SG and ACSICG to: 1) Evaluate SWIM service to support ATM evolution. 2) Coordinate among States and IOs to demonstrate how SWIM capabilities and functions could meet the needs of the future ATM. 3) Participate as an active member of the Task Force set up under APANPIRG Decision 24/32 to collaborate with States and IOs to study the development of a common Regional Virtual Private Network (VPN) for aeronautical information exchange, which provides a backbone infrastructure for future implementation of SWIM, and demonstrates how SWIM capabilities and functions can support the future ATM. 4) Participate actively in the development of ICAO Meteorological Information Exchange Model (IWXXM) by ICAO and World Meteorological Organization (WMO). 5) Address by the National Airspace and Air Navigation Plan, and the Aeronautical Information Service to Aeronautical Information Management (AIS-AIM) Plan. 6) Establish the System Wide Information Management (SWIM) Program to implement a set of Information Technology (IT) principles in the NAS and provide users with relevant and commonly understandable information. 7) Develop the ICAO SWIM Operational Procedure adhering to the SWIM Concept Document developed by the ICAO ATMRPP. 8) Conduct a mini-global demonstration beginning in later 2014 which includes demonstration of SWIM service to international community.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
Recommendation 3/3 – Development of ICAO provisions relating to system-wide information management That: a) under the leadership of ICAO, develop detailed technical specifications for system-wide information management in close collaboration with the aviation community; b) detailed technical specifications for system-wide information management should be open and rely on generic international standards to the extent possible; and c) ICAO undertake work to identify the security standards and bandwidth requirements for system-wide information management.	APANPIRG	ICAO RO: a) APANPIRG CNS-SG is recognizing that the definition of aviation community depends on regional characteristic, therefore APANPIRG CNS-SG conduct the leadership in order to achieve the agreement in whole member States, such as the CRV project. b) APANPIRG CNS-SG assigned the tasks for performing SWIM to ACSICG that have the responsibility for the implementation of current aeronautical communications (AFTN/AMHS). ACSICG develops the detailed technical specification for SWIM under the opened discussion and using SWIM technical specification (Concept Document and/or Technical manual) developed by ATMRPP. The Regional SWIM Technical Guideline and implementation plan is subjected for APANPIRG adoption through CNS-SG. c) The bandwidth is already considered through the CRV project as the issue should be improved. Concerning to the security issue, APANPIRG CNS-SG assigned it as one of the tasks for ACSICG. From ACSICG/1: The Task "Generate User Requirements" of CRV project is expected to address security standards and bandwidth requirements for all data conveyed, including SWIM data. Yet this will be early requirements as not all the provisions and guidance about SWIM will be available in 2014-2015. Action proposed: APANPIRG to include identification of security standards and bandwidth requirements for SWIM in the Statement of Work of the Task "Develop SWIM APAC implementation framework".
Recommendation 3/4 – State and industry and industry support of system-wide information management a) industry support the transition towards system-wide information management by providing appropriate systems supporting automation and the exchange of all relevant air traffic management data in a globally standardized manner; and b) States and all relevant stakeholders contribute to further development and harmonization of performance-based information management.	ACSICG	CNS SG: a) ACSICG utilizes the System Oriented Architecture (SOA) to ensure the globally standardized environment to corroborate with any stakeholders in SWIM including industries by developing the regional SWIM concept. From ACSICG/1: Action proposed: APANPIRG to include performance-based information management for SWIM in the Statement of Work of the Task "Develop SWIM APAC implementation framework". STATES: b) - support the transition to SWIM and is working in ICAO and other for to develop SWIM. - support of SWIM under the ICAO ASBU Block 1 initiatives, and will contribute to further development and harmonization of performance- based information management. - procured a new Aeronautical Information Management System supporting exchange of air traffic management data based on AIXM 4.5 standards. The system is planned to be put into operational use towards end 2014. - developed a roadmap for AIS- AIM transition harmonized with the ICAO roadmap on AIS- AIM transition to provide foundation for future implementation of SWIM. - participated actively in the development of IWXXM by ICAO and World Meteorological Organization. - To prepare for the transition to SWIM, the local MET authority is arranging trial offline exchange of OPMET data in XML code form with other MET authorities. - participated actively in the Expert Team on Meteorological Services to ATM and Meteorological Information Exchange (ET-M&M) of WMO. - host the website on behalf of the Commission for Aeronautical Meteorology (CAeM) of WMO showcasing demonstration projects to facilitate further development and harmonization of performance- based information management. - support toward standardizing the air traffic management data by the research and development with industries. - will be conducted for the performance- based information management.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
		- Addressed by the National Airspace and Air Navigation Plan, and the Aeronautical Information Service to Aeronautical Information Management (AIS-AIM) Plan. - support the transition towards SWIM. - will participate in appropriate forums and contribute to further development and harmonization of performance- based information management. - working with ICAO and other international organizations to support international transition to SWIM.
Recommendation 3/5 – Operational performance through flight and flow – information for a collaborative environment That the Conference: a) endorse the aviation system block upgrade module relating to flight and flow – information for a collaborative environment included in Block 1, and recommend that ICAO use it as the basis of its work programme on the subject; b) agree in principle with the aviation system block upgrade module relating to flight and flow – information for a collaborative environment included in Blocks 2 and 3, as the strategic direction for this subject; That ICAO: c) include, following further development and editorial review, the aviation system block upgrade modules relating to flight and flow – information for a collaborative environment for inclusion in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP); d) investigate, as part of the post-implementation review of the FPL2012, proposals for the implementation of all performance-based navigation codes and other capabilities into the flight plan, having regard to an impact assessment including cost benefit analysis and other factors; e) convene a symposium, as soon as possible, where interested partners would develop an end-to-end advanced system demonstrations of new air traffic management concepts to support a common understanding of concepts such as SWIM, FF-ICE trajectory-based operations and collaborative decision-making; That States: f) and industry work through ICAO to mature the flight and flow – information for a collaborative environment concept; g) support the development of a flight information exchange model;	ICAO HQs	Not Applicable to ICAO RO Most of the Tasks related to this recommendation is covered in Recommendation 3/4 From ACSICG/1: Action proposed: APANPIRG to include the refinement of a regional CONOPS for FICE in the Statement of Work of the Task "Develop SWIM APAC implementation framework"

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
h) according to their operational needs, implement the aviation system block upgrade modules relating to improved operational performance through flight and flow – information for a collaborative environment included in Block 0.		
Recommendation 3/6 – ICAO aviation system block upgrades relating to service improvement through aeronautical information management as well as digital air traffic management information That the Conference: a) endorse the aviation system block upgrade module relating to service improvement through the integration of digital air traffic management information included in Block 1 and recommend that ICAO use it as the basis of its work programme on the subject; That ICAO: b) include, following further development and editorial review, the aviation system block upgrade modules relating to service improvement through digital aeronautical information management as well as integration of digital air traffic management information in the draft in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP); That States: c) according to their operational needs, implement the aviation system block upgrade module relating to service improvement through digital aeronautical information management included in Block 0.	ICAO HQs	Not Applicable to ICAO RO Most of the Tasks related to this recommendation is covered in Recommendations 3/3 and 3/4 Regarding c), the Seamless ATM Plan states for Phase 1 (NOV 15): ATM systems should be supported by digitally-based AIM systems (using Aeronautical Information Exchange Model version 5.1 or later) through implementation of Phase 1 and 2 of the AIS-AIM Roadmap in adherence with ICAO and regional AIM planning and guidance material, and Phase 2 (NOV 18): ATM systems should be supported by complete implementation of AIM Phase 3.
Recommendation 3/7 – ICAO provisions relating to service improvement through aeronautical information management as well as digital air traffic management information That ICAO: a) expedite the development of relevant Standards facilitating the transition of aeronautical information service to aeronautical information management and the implementation of system-wide information management taking into account the work accomplished in State programmes; and b) as a matter of urgency, to translate and make available the necessary Standards and guidance material to facilitate the global transition from aeronautical information service to aeronautical information management.	ICAO HQs	Not Applicable to ICAO RO

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
Recommendation 3/8 – State actions relating to service improvement through aeronautical information management as well as digital air traffic management information That States: a) accelerate transition from aeronautical information service to aeronautical information management by implementing a fully automated digital aeronautical data chain; b) implement necessary processes to ensure the quality of aeronautical data and information from the origin to the end users; c) engage in intraregional and interregional cooperation for an expeditious transition from aeronautical information service (AIS) to aeronautical information management (AIM) in a harmonized manner and to using digital data exchange and consider regional or subregional AIS databases as an enabler for the transition from AIS to AIM; and d) review their NOTAM publication procedures, provide appropriate guidance to NOTAM originators and ensure adequate oversight of the NOTAM publication process is conducted.	ATM/SG Seamless ATM Planning Group (disbanded)	Relevant actions have been included in the APAC Seamless ATM Plan. The Seamless ATM Plan states for Phase 1 (NOV 15): ATM systems should be supported by digitally-based AIM systems (using Aeronautical Information Exchange Model version 5.1 or later) through implementation of Phase 1 and 2 of the AIS-AIM Roadmap in adherence with ICAO and regional AIM planning and guidance material, and Phase 2 (NOV 18): ATM systems should be supported by complete implementation of AIM Phase 3.
Recommendation 3/9 – Review of NOTAM system and development of options for replacement That ICAO initiate a review of the current NOTAM system, building further on the digital NOTAM activities, including the development of options for a replacement system that would enable web-based applications and compliant with the system-wide information management principles that are being developed for the air traffic management system.	ICAO HQs	Not Applicable to ICAO RO This task is under IMP. From ACSICG/1: This recommendation has an indirect impact. NOTAM may be conveyed upon SWIM in the future. NOTAM have to be considered by the Task "Develop SWIM APAC implementation framework".
Recommendation 4/1 – Efficient management of airspace and improved flow performance through collaborative decision-making That the Conference: a) endorse the aviation system block upgrade modules relating to network operations included in Block 1 and recommend that ICAO use them as the basis of its work programme on the subject; b) agree in principle with the aviation system block upgrade modules relating to network operations included in Blocks 2 and 3 as the strategic direction for this subject;	AN-CONF	CNS SG: With our previous effort in putting CDM as one of the regional priorities and targets, which is endorsed in the WP/05, we have put CDM as an essential element for ATFM which to be achieved by November 2015. CDM in some environments may be improved by separate organisations having a common view of the traffic. ADS-B data sharing between organisations may support better CDM. (From ADS-B SITF/13) The Seamless ATM Plan states for Phase 1 (NOV 15): High density FIRs supporting the busiest Asia/Pacific traffic flows and high density aerodromes should implement ATFM incorporating CDM to enhance capacity, using bi-lateral and multi-lateral agreements and Phase 2 (NOV 18): All FIRs supporting Major Traffic Flows should implement ATFM

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
That ICAO: c) include, following further development and editorial review, the aviation system block upgrade modules relating to network operations in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP); d) include in its work programme the future standardization of all elements to support the collaborative decision-making process underlying the air traffic control (ATC)-air traffic flow management (ATFM) integration as well as of the technical exchanges between ATFM and ATC; e) develop and incorporate into the ICAO *Manual on Collaborative Air Traffic Flow Management* (Doc 9971) implementation guidance on Airport-CDM and provisions on air traffic flow management data exchange format including trajectory information; f) develop and execute global communications, roll-out and training plan for the ICAO *Manual on Collaborative Air Traffic Flow Management* (Doc 9971); and g) develop further provisions and guidance on flexible use of airspace principles for future use and in preparation for future 4D trajectory-based airspace management. That States: h) accelerate the implementation of collaborative decision-making processes in the provision of services at the regional level, being guided by the principles set forth in the *Manual on Collaborative Air Traffic Flow Management* (Doc 9971) and the *Manual on Flight and Flow – Information for a Collaborative Environment* (Doc 9965); i) according to their operational needs, implement the aviation system block upgrade modules relating to network operations included in Block 0.	ICAO HQ States	**incorporating CDM to enhance capacity, using bi-lateral and multi-lateral agreements. The ATFM/SG is developing an ATFM Framework to facilitate the implementation of A-CDM and ATFM.**
Recommendation 4/2 – ICAO aviation system block upgrades relating to ground surveillance using automatic dependent surveillance – broadcast/multilateration, air traffic situational awareness, interval management and airborne separation. That the Conference: a) endorse the aviation system block upgrade modules relating to interval management included in Block 1 and recommend that ICAO use them as the basis of its work programme on the subject;	AN-CONF	CNS SG: From ADS-B SITF/13: APANPIRG supports and prioritizes deployment of ASBU B0-ASUR (Initial Capability for Ground Surveillance) using ADS-B OUT technology. Initially, this serves the needs of ground surveillance but will place the region in a good position for ADS-B IN applications listed in Block 0, 1 and 2. APANPIRG may consider to enhance safety & efficiency in the region by supporting further deployment of ADS-B IN capabilities available in Block 0, including :- -B0-ASEP Air Traffic Situational Awareness (ATSA) -B0-OPFL Improved Access to Optimum Flight Levels Through Climb/Descent Procedures Using ADS-B (ITP)

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
b) agree in principle to the aviation system block upgrade modules relating to airborne separation included in Block 2 as the strategic direction for this subject; That ICAO: c) include, following further development and editorial review, the aviation system block upgrade modules relating to airborne separation in the Appendices to the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP); d) agree in principle to review the concepts and terminology of the "airborne separation" concepts involving controllers assigning tasks to flight crews, with controllers able to apply different, risk-based separation minima for properly equipped ADS-B IN aircraft; e) in the development of provisions, acknowledge the relationship between airborne separation and airborne collision avoidance system; f) modify aviation system block upgrade (ASBU) Module B2-85 to reflect d) and e), modify ASBU Module B2-101 to reflect f); and g) agree in principle to review the concepts and terminology supporting B2-85 "airborne separation" and amend the module accordingly. That States: h) according to their operational needs, to implement the aviation system block upgrade modules relating to ground surveillance, improved air traffic situational awareness and improved access to optimum flight levels included in Block 0.	ICAO HQ STATES	The Seamless ATM Plan recognises that B0-ASUR is a priority 1 element States: Most states has adopted ADS-B and MLAT on airport surface to enhance safety and efficiency of airport operations. States were also requested to consider the cost effectiveness of using forward fit mandates (requiring new airframes to be equipped) when planning the transition to ADS-B. The Seamless ATM Plan recognises that B0-ASUR is a priority 1 element.
Recommendation 4/3 – ICAO aviation system block upgrades relating to airborne collision avoidance systems and ground-based safety nets That the Conference: a) endorse the aviation system block upgrade module relating to ground-based safety nets included in Block 1 and recommend that ICAO use it as the basis of its work programme on the subject;	APANPIRG	CNS SG: From ADS-B SITF/13: Depending on whether there will be operational benefits for States and the region, APANPIRG could further improve safety in the region by encouraging States in the region to implement: - B0-SNET Increased Effectiveness of Ground Based Safety Nets. States in the region could agree, based on ALARP principles, to replace / upgrade their ATC systems to include Short-term conflict alert (STCA) using data from available surveillance sensors such as Radar, WAM and ADS-B - Area proximity warning (APW) - Minimum safe altitude warning (MSAW)

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
b) agree in principle to the aviation system block upgrade module relating to airborne collision avoidance systems included in Block 2, as the basis of the strategic direction for this subject; That ICAO: c) include, following further development and editorial review, the aviation system block upgrade modules relating to airborne collision avoidance systems and ground-based safety nets in the Appendices to the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP); d) adopt a coordinated approach towards reviewing and developing as necessary Standards and Recommended Practices, Procedures for Air Navigation Services and guidance material for ground-based and airborne safety nets, taking into account careful evaluation and validations of the effects on safety and performance of downlinking airborne collision avoidance system (ACAS) Resolution Advisories (RAs) to controllers; e) when considering Standards and Recommended Practices for airborne collision avoidance system (ACAS) downlink, to emphasize the significant amount of training material already existing and the importance of increased pilot and air traffic controller training on the responsibilities and requirements to reacting correctly to ACAS RA events and then communicating; f) develop an ICAO Manual for Ground-based Safety Nets, which includes provision for tools for validation and certification of these; g) incorporate the new generation of airborne collision avoidance system (ACAS X) into its work programme; h) encourage the Federal Aviation Administration to work with other States with the capacity and capability to do so, in the development of new generation of airborne collision avoidance system (ACAS X); That States: i) according to their operational needs, to implement the aviation system block upgrade modules relating to airborne collision avoidance systems and ground based safety nets included in Block 0.		- Route adherence monitoring (RAM) - Cleared level adherence monitoring (CLAM) - Selected level mismatch (using Mode C, Mode S and ADS-B data). The Asia/Pacific Seamless ATM Plan has set target date for implementation of the ground-based safety nets by PASL Phase II (expected implementation by November 2018). This could be done at the same time as upgrading the ATC system to support ADS-B. This recommendation supports ACAS-X which uses ADS-B to improve ACAS performance. An ADS-B fitment mandate across the APAC region would improve the effectiveness of these ACAS-X capabilities. The Seamless ATM recognises B0-SNET as a priority 2 element and also B0-ACAS as a priority 2 element, noting the requirement for forward fit from 01 January 2014 and retrofit by 01 January 2017 of aircraft ACAS installations with an upgraded collision avoidance logic known as TCAS V7.1
Recommendation 4/4 – Positioning and tracking over oceanic and remote areas, and flight data triggered transmission That ICAO: a) continue the evaluation of the necessary changes in the field of transmission of flight data, bearing in mind the cost associated with any of these changes as well as the need to improve search and rescue operations; and b) develop suitable proposals for the amendment of ICAO documents, as necessary.	CNS/SG ADS-B-SITF	N.A

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Recommendation 4/5 – Civil/military coordination / cooperation and sharing of airspace
 	
That States:
 	
a) planning and implementation regional groups, and ICAO to analyse the benefits that could be achieved through improved civil/military cooperation and sharing of the airspace serving international traffic flows and express the results of this analysis in terms of:
 	
   1) capacity increases and reduction in routine delays as measured by traffic volumes on major traffic flows;
 	
   2) document fuel savings and emission reductions through the use of the fuel savings estimation tools; and
 	
   3) other additional benefits;
 	
b) based on the analysis made by States, planning and implementation regional groups, and ICAO, urge States to develop plans to implement improvements for the cooperative use of airspace related to the top areas of opportunity and establish concrete targets using tools already available for this purpose;
 	
c) in relation to international traffic flows, for each ICAO region urge the planning and implementation regional groups and their associated States to identify the top areas of opportunity that could benefit the most from improvements in civil/military cooperation and sharing of the airspace and develop concrete targets for improvement;
 	
That ICAO:
 	
d) develop a set of criteria or metrics to enable objective measurement of progress in civil/military cooperation; and
 	
e) continue to develop guidance material for States on the flexible use of their airspace, airspace design, interoperability and integration of humanitarian assistance flights in crisis response scenarios in their airspaces to facilitate integrated use of the airspace.
	STATES
	
	ICAO HQs
		CNS SG:
		From ADS-B SITF/13: APAC could consider encouraging the sharing of ADS-B data between civilian and military authorities, including those from neighbouring States, to support a common view of the airspace. Engagement of the military in ADS-B could lead to improved co-ordination and increased airspace sharing. Use of ADS-B data provided by the civilian authority could fill surveillance gaps in the military system (at least as far as civilian traffic is concerned). Guidance materials on advice to military authorities regarding ADS-B data sharing has been developed and published.
		
		States:
		Reported states have established measures to promulgate civil/military coordination on optimising the sharing use of airspace.
		
		The Asia/Pacific Seamless ATM Planning Group has already conducted analysis on civil/military cooperation and recognised this aspect as one of the most important parts of the Seamless ATM Plan, which has already CIVMIL elements. In addition, the Asia/Pacific Regional Sub-Office is actively studying proposals to implement improved ATS structures using civil/military cooperation.

Recommendation 4/6 – ICAO aviation system block upgrades relating to integration of remotely piloted aircraft into non-segregated airspace That the Conference:	AN-CONF	CNS SG: From ADS-B SITF/13: According to ICAO Annex 2 – Rules of the Air, "remotely piloted aircraft" is defined as "an unmanned aircraft which is piloted

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a) endorse the aviation system block upgrade module relating to remotely piloted aircraft included in Block 1 and recommend that ICAO use it as the basis of its work programme on the subject; b) agree in principle to the aviation system block upgrade modules relating to remotely piloted aircraft included in Blocks 2 and 3 as the strategic direction for this subject; That ICAO: c) as a matter of urgency, develop the necessary regulatory framework in its entirety to support the integration of remotely piloted aircraft into non-segregated airspace and at aerodromes including and clearly showing the scope of such regulation; d) investigate the need for and scope of oversight of datalinks related to command, control and air traffic control communications for remotely piloted aircraft systems; e) include, following further development and editorial review, the aviation system block upgrade modules relating to the integration of remotely piloted aircraft into non segregated airspace in the Appendices to the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP); That States: f) be cognizant of the recent amendments to Annexes 2 — *Rules of the Air* and 7 — *Aircraft Nationality and Registration Marks* related to remotely piloted aircraft systems and to support the continuation of this work at ICAO; g) work closely with ICAO and each other to ensure harmonization of provisions if they have an urgent need to accommodate remotely piloted aircraft system operations.	ICAO HQs STATES	from a remote pilot station". A key to the support of remotely piloted aircraft in civilian airspace is surveillance. It could be appropriate to insist that all new registered remotely piloted aircraft operating in civilian airspace are required to have appropriate ADS-B OUT or MODE-S capability. The APANPIRG publication of such a rule could avoid the costs of an expensive retrofit in the future. The time is right for ADS-Bf SITF to deliberate such a strategic move. States: Many of the reported states have been actively participating into ICAO Unmanned Aerial Systems Study Group and supporting the ICAO 's work for a harmonised scheme for RPAS operations. The Asia/Pacific Seamless ATM Plan recognises the need for Consistent Operating Practices and Procedures for all provisions, including UAS, aligned with Seamless ATM Principle 3 (Harmonised regional or sub-regional rules and guidelines) and 4 (Shared ATM operational standards, procedures, guidance materials through common manuals and templates). To date no harmonised provisions for remotely piloted aircraft systems have been proposed for the region.
Recommendation 4/7 – ICAO aviation system block upgrades relating to meteorological information That the Conference: a) endorse the aviation system block upgrade module relating to meteorological information included in Block 1, including the addition of the provision of information on space weather, and recommend that ICAO uses it as the basis of its work programme on the subject; b) agree in principle the aviation system block upgrade module relating to meteorological information included in Block 3 as the strategic direction for this subject; That ICAO:	MET/SG	N/A for CNS SG. The recommendation should be under MET SG to consider.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
c) include, following further development and editorial review, the aviation system block upgrade modules relating to meteorological information in the draft Fourth edition of the *Global Air Navigation Plan* (Doc 9750, GANP); d) undertake the development of the air traffic management meteorological information integration plan and an associated roadmap by a cross-disciplinary group of experts; e) work on defining the meteorological information exchange model as an enabler for system-wide information management; f) invite the next Meteorology Divisional Meeting, held in coordination with the World Meteorological Organization, to develop initial provisions in Annex 3 — *Meteorological Service for International Air Navigation* relating to the aviation system block upgrade modules concerning meteorological information and f) above, and to develop a long-term strategy to support their further development and full implementation; That States: g) according to their operational needs, to implement the aviation system block upgrade module relating to meteorological information included in Block 0, including the addition of the provision of OPMET information; h) work together in the implementation of the aviation system block upgrades relating to meteorological information and to increase investment in education and training.		
Recommendation 4/8 – Crisis coordination arrangements and contingency plans That ICAO: a) consider how crisis coordination arrangements for potentially disruptive events, similar to that used for volcanic eruptions, could be established on a regional basis; and b) and regional offices continue to support the development, promulgation, maintenance of contingency plans, including the holding of practical exercises, in preparedness for potentially disruptive events, including those events that may adversely impact aviation safety.	ICAO HQs	N/A for CNS SG. The recommendation should be under ATM SG to consider.
Recommendation 5/1 – Improved operations through enhanced airspace organization and routing Considering that performance-based navigation (PBN) is one of ICAO's highest air navigation priorities and the potential benefits achievable through creation of additional capacity with PBN: That States:	CNS/SG PBN/TF (disbanded)	a) States implement PBN in the en-route environment. PBN ICG is planned to be established by APANPIRG/25 to support and keep promoting en route PBN. b) States fully assess the operational, safety, performance and cost implications of a harmonization of transition altitude and, if the benefits are proven to be appropriate, undertake further action on a national and (sub) regional basis a first step towards a globally harmonized transition altitude;

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
a) implement performance-based navigation in the en-route environment; b) fully assess the operational, safety, performance and cost implications of a harmonization of transition altitude and, if the benefits are proven to be appropriate, undertake further action on a national and (sub) regional basis a first step towards a globally harmonized transition altitude; c) take advantage of improved models for inter-regional coordination and collaboration to achieve seamless air traffic management and more optimum routes through the airspace; d) through the planning and implementation regional groups improve their methods of coordination to increase implementation of en-route performance-based navigation in order to achieve more optimum routes through the airspace; That ICAO: e) encourage the planning and implementation regional groups to support the early deployment of performance-based navigation in accordance with Assembly Resolution 37-11; f) support, through development of a framework that capitalizes, builds on, and promotes demonstration activities which confirm the benefits of performance-based navigation as an enabler of more efficient operations in the en-route phase of flight; and g) that avionics incorporate fixed radius transition functionality to support closer spacing of performance-based navigation routes and improve airspace capacity.		c) States and PIRGs take advantage of improved models for inter-regional coordination and collaboration to achieve seamless air traffic management and more optimum routes through the airspace; d) States and PIRGs improve their methods of coordination to increase implementation of en-route performance-based navigation in order to achieve more optimum routes through the airspace; e) and f) Note. g) Note e/ and f/ The Asia/Pacific Seamless ATM Plan contains extensive expectations to implement PBN based and performance-based airspace within the Asia/Pacific (incorporating the Asia/Pacific Regional PBN Plan). The Asia/Pacific Regional Sub-Office is actively studying proposals to implement improved ATS structures using PBN as a key enabler.
Recommendation 5/2 – ICAO aviation system block upgrades relating to trajectory based operations That the Conference: a) endorse the aviation system block upgrade module relating to trajectory-based operations included in Block 1 and ICAO use it as the basis of its work programme on the subject; b) agree in principle with the aviation system block upgrade module relating to 4D trajectory-based operations included in Block 3 as the strategic direction for this subject; That ICAO: c) include, following further development and editorial review, the aviation system block upgrade module relating to 4D trajectory-based operations in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP); That States:		CNS SG: support development of SARPs and guidance material related to TBO States: Implement, according to their operational needs, the ASBU module relating to TBO included in Block 0. The Asia/Pacific Seamless ATM Plan has recognised B0-TBO as a priority 1 element for implementation, so the Preferred ATM Service Levels (PASL) has an expectation that within Category R airspace, ADS-C surveillance and CPDLC should be enabled to support PBN-based separations, as well as UPR and DARP, target 12 November 2015.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
d) support development by ICAO of Standards and Recommended Practices and guidance material related to trajectory-based operations; and e) implement, according to their operational needs, the aviation system block upgrade module relating to trajectory-based operations included in Block 0.		
Recommendation 5/3 – Increased flexibility and efficiency in descent and departure profiles That the Conference: a) endorse the aviation system block upgrade module relating to continuous descent operations included in Block 1; b) agree in principle to the aviation system block upgrade module relating to continuous descent operations included in Block 2; That ICAO: c) include, following further development and editorial review, the aviation system block upgrade modules relating to continuous climb operations and continuous descent operations in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP); d) incorporate the point merge technique as an interim continuous descent operations measure in Block B0-05; That States: e) as supported by their operational requirements and a positive business case, implement according to their operational needs as a matter of urgency, the aviation system block upgrade modules relating to continuous climb operations and continuous descent operations included in Blocks 0 and 1; and f) as supported by their operational requirements and a positive business case, use point merge technique as an application towards achieving full continuous descent operations, when developing performance-based navigation standard instrument arrivals (STARs).		CNS SG: Support c) and d) as specified. States: e) supported by their operational requirements and a positive business case, implement according to their operational needs as a matter of urgency, the ASBU modules relating to CCO and CDO included in Blocks 0 and 1. f) States, as supported by their operational requirements and a positive business case, use point merge technique as an application towards achieving full continuous descent operations, when developing PBN STARs. The Asia/Pacific Seamless ATM Planning Group and APANPIRG did not agree that CCO and CDO was a priority 1 item, as these techniques were dependent on the limitations of the local operating environment (CCO and CDO were given priority 2 status). Point Merge technique was highlighted in the Asia/Pacific Seamless ATM Plan but given the technique's limitations (i.e.: space required, possible CDO incompatibility), it was not specifically recommended.
Recommendation 6/1 – Regional performance framework – planning methodologies and tools That States and PIRGs: a) finalize the alignment of regional air navigation plans with the Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP) by May 2014; b) focus on implementing aviation system block upgrade Block 0 Modules according to their operational needs, recognizing that these modules are ready for deployment;		CNS SG: From ADS-B SITF/13: APANPIRG should focus on implementing ASBU Block 0 Modules according to States' operational needs. ADS-B related ASBU Block 0 modules are ready for deployment including : - B0-ASUR (Initial capability for ground surveillance) using ADS-B/MLAT - B0-SNET Increased Effectiveness of Ground Based Safety Nets - B0-ASEP Air Traffic Situational Awareness (ATSA) - B0-OPFL Improved Access to Optimum Flight Levels Through Climb/Descent Procedures Using ADS-B (ITP) The Asia/Pacific Seamless ATM Plan has set the priorities and timeline in implementing the above modules.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
c) use the electronic regional air navigation plans as the primary tool to assist in the implementation of the agreed regional planning framework for air navigation services and facilities; d) involve regulatory and industry personnel during all stages of planning and implementation of aviation system block upgrade modules; e) develop action plans to address the identified impediments to air traffic management modernization as part of aviation system block upgrade planning and implementation activities; That ICAO: f) considers how the continuous monitoring approach to safety oversight maps to the evaluation of Member States' safety oversight capabilities concerning aviation system block upgrades g) review the current amendment process to the Regional Air Navigation Plans (ANPs) and recommend improvements to increase efficiencies related to the approval and maintenance of the data in the regional ANPs; h) develop guidance material, on the basis of best practices employed worldwide, for the regional/local deployment of new ATM technologies, required procedures, operational approvals and continue to support States in the implementation of the aviation system block upgrades; i) identify the issues, funding, training and resource requirements necessary to support a safety framework that would lay the foundation for successful implementation the aviation system block upgrades; j) develop, together with industry and stakeholders, an engagement strategy to address the economic and institutional impediments to implementation of the aviation system block upgrades; k) develop a mechanism for sharing of best practices for the aviation system block upgrade implementation; and l) define a methodology to ensure interregional and global harmonization of air navigation services through ANRF reporting in an effective and timely manner, and consider the employment of interregional and multi-regional fora.		States: a): States through APANPIRG and its sub groups to finalize the alignment of regional air navigation plans with the Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP) by May 2014; b): States through APANPIRG and its sub groups to focus on implementing ASBU Block 0 Modules according to their operational needs. c) States through APANPIRG and its sub groups to use the electronic regional air navigation plans as the primary tool to assist in the implementation of the agreed regional planning framework for air navigation services and facilities; d) States through APANPIRG and its sub groups to involve regulatory and industry personnel during all stages of planning and implementation of ASBU modules; e) States through APANPIRG and its sub groups to develop action plans to address the identified impediments to air traffic management modernization as part of aviation system block upgrade planning and implementation activities; ATM/SG/2-WP07 regarding Seamless ATM Reporting and Monitoring, and WP08 regarding the actual changes proposed for the Regional ANP detail the regional expectations of monitoring, and integration with the e-ANP being developed. The monitoring provides a mechanism for identifying implementation issues and improvements. ANRF are being developed for all key ASBU elements, plus Search and Rescue, which is not currently an ASBU element.
Recommendation 6/2 – Guidelines on service priority That: a) ICAO develop an appropriate set of operational and economic incentive principles to allow early benefits of new technologies and procedures, as described in the aviation system block upgrade modules, to support operational improvements, while maximizing safety, capacity and overall system efficiency; and b) States and international organizations contribute to this work.		Not Applicable to ICAO RO. The intention of this recommendation is covered by specific recommendations and projects (CRV, STARS, SWIM, etc.).The priority of each specific task/project has been identified. Yet, from ADS-B SITF/13: APANPIRG could obtain some quick wins by promulgating a view that aircraft equipped with ADS-B have service priority over those that don't (i.e. better equipped, better served). This will increase the business case for equipage. The above has already been reflected in the ADS-B mandate published by States (e.g. non-ADS-B equipped aircraft is required to fly outside the ADS-B airspace)

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
Recommendation 6/3 – Assessment of economic, financial and social implications of air traffic management modernization and aviation system block upgrades deployment That ICAO: a) undertake work toward developing a network-wide operational improvement level assessment for global use, which should include the development of standard values and processes for economic evaluations; b) take the relevant conclusions from the AN-Conf/12, regarding economic, financial and social aspects of the aviation system block upgrades, to the Sixth Air Transport Conference with the aim of developing solutions which would support a safe and sustainable air navigation system; That States: c) conduct their economic, financial and social analyses in a closely coordinated manner with relevant ATM stakeholders in view of their diverse position of involvement in the implementation of aeronautical systems.	ICAO HQs	CNS SG supports ICAO's actions. The Asia/Pacific Seamless ATM Plan contains an IATA initial economic analysis of ASBU elements based in part on a study of the Manila FIR. The Asia/Pacific Seamless ATM Plan contains extensive expectations to implement elements related to human performance, such as a) human performance training for all ANSP managers, including: • assessment and management of risks related to human capabilities and limitations; • effective participation in a team and team management • effective safety reporting systems; • human factors in air safety investigation; • fatigue management approaches; b) enhancement and improved application of ATC simulators; c) safety teams comprising multidisciplinary operational staff and managers which review safety performance and assess significant proposals for change to ATM systems; d) human performance-based training and procedures for staff providing ATS, including: • the application of tactical, surveillance-based ATC separation; • control techniques near minimum ATC separation; • responses to ATM contingency operations and safety net alerts; and • the importance of an effective safety reporting culture. In addition, a new Draft Conclusion on human performance issues was drafted at the ATM/SG/2.
Recommendation 6/4 – Human performance That ICAO: a) integrate human performance as an essential element for the implementation of ASBU modules for considerations in the planning and design phase of new systems and technologies, as well as at the implementation phase, as part of a safety management approach. This includes a strategy for change management and the clarification of the roles, responsibilities	APANPIRG	CNS SG: Through APANPIRG and its sub groups a) – f) Address in general terms the various processes for the integration of human factors analysis in training, system development operational performance and safety. States generally concur and will consider recommended implementation. States:

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
and accountabilities of the aviation professionals involved; b) develop guidance principles, guidance material and provisions, including SARPs as necessary, on ATM personnel training and licensing including instructors and assessors, and on the use of synthetic training devices, with a view to promoting harmonization, and consider leading this effort with the support of States and industry; c) develop guidance material on using field experience and scientific knowledge in human performance approaches through the identification of human-centred operational and regulatory processes to address both current safety priorities and the challenges of future systems and technologies; d) assess the impact of new technologies on competencies of existing aviation personnel, and prioritize and develop competency-based provisions for training and licensing to attain global harmonization; e) establish provisions for fatigue risk management for safety within air traffic services operations; f) develop guidance material on different categories of synthetic training devices and their respective usage; That States: g) provide human performance data, information and examples of operational and regulatory developments to ICAO for the benefit of the global aviation community; h) support all ICAO activities in the human performance field through the contribution of human performance expertise and resources; i) adopt airspace procedures, aircraft systems, and space-based/ground-based systems that take into account human capabilities and limitations and that identify when human intervention is required to maintain optimum safety and efficiency; and j) investigate methods to encourage adequate numbers of high quality aviation professionals of the future and ensure training programmes are in line with the skills and knowledge necessary to undertake their roles within a changing industry.		g) States will supply human factors data. Some data already available on line concerning flight deck operations and fatigue. h) States will support. Some examples given. i) States advise that they currently take into account human factors and limitations is systems and operational developments. Some examples of guidance material were given. j) States concur with the need to recruit and maintain highly trained and proficient aviation professionals. Several alternative approaches were identified to recruit new personnel. A common theme is to promote the aviation profession to upcoming generations during formative years.
Recommendation 6/5 – ICAO work programme to support global navigation satellite system evolution That ICAO undertake a work programme to address: a) interoperability of existing and future global navigation satellite system constellations and augmentation systems, with particular regard to the technical and operational issues associated with the use of multiple constellations; b) identification of operational benefits to enable air navigation service providers and aircraft operators to quantify these benefits for their specific operational environment; and	ICAO HQs	CNS SG supports ICAO's actions. States: a)-c) These recommendations require ICAO actions only. Contributions to these actions can be done at a global level of ICAO. States are contributing to the groups/panels at a global level of ICAO. States that operate SBAS systems in this region (India, Japan, and USA) participate in the SBAS Interoperability Working Group to ensure the interoperability between SBAS systems.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
c) continued development of Standards and Recommended Practices and guidance material for existing and future global navigation satellite system elements and encouraging the development of industry standards for avionics.		
Recommendation 6/6 – Use of multiple constellations That States, when defining their air navigation strategic plans and introducing new operations: a) take advantage of the improved robustness and availability made possible by the existence of multiple global navigation satellite system constellations and associated augmentation systems; b) publish information specifying the global navigation satellite system elements that are approved for use in their airspace; c) adopt a performance-based approach with regard to the use of global navigation satellite system (GNSS), and avoid prohibiting the use of GNSS elements that are compliant with applicable ICAO Standards and Recommended Practices; d) carefully consider and assess if mandates for equipage or use of any particular global navigation satellite system core constellation or augmentation system are necessary or appropriate; That aircraft operators: e) consider equipage with GNSS receivers able to process more than one constellation in order to gain the benefits associated with the support of more demanding operations.	States AIRCRAFT OPERATORS	Summaries from States: a) ADS-B Study and Implementation Task Force (ADS-B SITF) of APANPIRG finds that ADS-B robustness would be improved if multiple constellations could be used. Some of States/Administrations in APAC region note/consider the use of multi constellation GNSS. The United States will continue to provide GPS and its augmentations free of direct charges to all users for the foreseeable future. b) ADS-B SITF could develop guidance materials for use of multiple constellations to support ADS-B in APAC region, when aviation standard multi constellation GNSS equipment/systems become available, c) Some of States/Administrations in APAC region adopt performance based approach with multi constellation GNSS based on availability of Standards and Recommended Practices and related guidance materials. One of the States is looking at the new Medium Earth Orbit Search and Rescue (MEOSAR) as well as SATCOM voice which make use of multiple constellations. d) ADS-B SITF is in an opinion that APANPIRG could request states to ensure that future ADS-B and GNSS mandates do not rely on a single constellation. States/Administrations in APAC region will carefully consider and assess if mandates for equipage or use of any particular global navigation satellite system core constellation or augmentation system are necessary or appropriate. From ADS-B SITF/13: ADS-B robustness would be improved if multiple constellations could be used. APANPIRG could consider to request states to ensure that future ADS-B and GNSS mandates do not rely on a single constellation. When aviation standard multi constellation GNSS equipment/systems become available, ADS-B SITF could then develop guidance materials for use of multiple constellations to support ADS-B in APAC region
Recommendation 6/7 – Assistance to States in mitigating global navigation satellite system vulnerabilities That ICAO: a) continue technical evaluation of known threats to the global navigation satellite system, including space weather issues, and make the information available to States; b) compile and publish more detailed guidance for States to use in the assessment of global navigation satellite system vulnerabilities;	ICAO HQs	CNS SG supports ICAO's actions.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
c) develop a formal mechanism with the International Telecommunication Union and other appropriate UN bodies to address specific cases of harmful interference to the global navigation satellite system reported by States to ICAO; and d) assess the need for, and feasibility of, an alternative position, navigation and timing system.		
Recommendation 6/8 – Planning for mitigation of global navigation satellite system vulnerabilities That States: a) assess the likelihood and effects of global navigation satellite system vulnerabilities in their airspace and apply, as necessary, recognized and available mitigation methods; b) provide effective spectrum management and protection of global navigation satellite system (GNSS) frequencies to reduce the likelihood of unintentional interference or degradation of GNSS performance; c) report to ICAO cases of harmful interference to global navigation satellite system that may have an impact on international civil aviation operations; d) develop and enforce a strong regulatory framework governing the use of global navigation satellite system repeaters, pseudolites, spoofers and jammers; e) allow for realization of the full advantages of on-board mitigation techniques, particularly inertial navigation systems; and f) where it is determined that terrestrial aids are needed as part of a mitigation strategy, give priority to retention of distance measuring equipment (DME) in support of inertial navigation system (INS)/DME or DME/DME area navigation, and of instrument landing system at selected runways.	States	States: a) States/Administrations in APAC region consider and support assessment of the likelihood and effects of global navigation satellite system vulnerabilities in their airspace. One of the States has developed a dedicated team to study GNSS interference impacts to its airspace System as well as current and potential mitigations. Another State assesses the GNSS vulnerabilities In the equatorial region. The Ionospheric Studies Task Force (ISTF) the CNS subgroup of APANPIRG studies the impacts of ionospheric scintillation on GNSS. b) Some of the States/Administrations of APAC region study on the GNSS interference from technical and regulatory aspects including the interference monitoring system and arrangements to ensure effective spectrum management. c) States/Administrations of APAC region will report to ICAO cases of harmful interference to global navigation satellite system that may have an impact on international civil aviation operations based on the process that will be developed by ICAO. One of the States has worked with, and will continue to collaborate with, International air navigation service provider partners on reporting to ICAO incidents of GNSS interference. d) Some States/Administrations of APAC region have authorities managing the frequency spectrum and regulating framework governing the use of global navigation satellite system repeaters, pseudolites, spoofers and jammers. e) On-board mitigation techniques to mitigate risks in the potential loss of GNSS service including inertial navigation systems and aircraft-based augmentation system (ABAS) are allowed in some of States/Administrations in APAC region. Equipage of inertial systems is encouraged in one of the States in APAC region. On-board aircraft systems, as well as external systems are explored by one of the States to address identified issues. f) DME and ILS are retained as backup to GNSS in Some of States/Administrations in APAC region. However, DME-DME is not considered a viable solution in some States due topographic constraints, and VOR and ILS will be retained. ADF and NDB could also be alternate means of navigation. Alternative Position, Navigation, and Timing (PNT) systems are studied by States/Administrations in APAC region.
Recommendation 6/9 – Ionosphere and space weather information for future global navigation satellite system implementation That ICAO: a) coordinate regional and global activities on ionosphere characterization for global navigation satellite system implementation;		States: a) - c) The Ionospheric Studies Task Force (ISTF) that has been established under the CNS subgroup of APANPIRG since 2011 to resolve ionospheric and space weather issues by characterizing the ionosphere for regionally suitable global navigation satellite system. This will form a part of globally applicable utilization of space weather information. ISTF is assessing the need of regional ionospheric models for SBAS and GBAS, and if the need is identified, will develop them. ISTF also studies the use of Space Weather information in the regional context in response to a decision by APANPIRG/23 to review the impact of Space Weather on CNS.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
b) continue its effort to address the global navigation satellite system (GNSS) vulnerability to space weather to assist States in GNSS implementation taking into account of long-term GNSS evolution as well as projected space weather phenomena; c) study the optimum use of space weather information that is globally applicable from low to high magnetic latitude regions for enhanced global navigation satellite system performance at a global context; That States: d) consider a collaborative approach to resolve ionospheric issues including ionospheric characterization for cost-effective, harmonized and regionally suitable global navigation satellite system implementation.		d) States are contributing the Ionospheric Studies Task Force as well as other groups at a global level of ICAO (such as International Airways Volcano Watch Operations Group that is developing the Space Weather Concept of Operations, and Navigation Systems Panel).

Recommendation 6/10 – Rationalization of terrestrial navigation aids
 	
 That, in planning for the implementation of performance-based navigation, States should:
 	
 a) assess the opportunity for realizing economic benefits by reducing the number of navigation aids through the implementation of performance-based navigation;
 	
 b) ensure that an adequate terrestrial navigation and air traffic management infrastructure remains available to mitigate the potential loss of global navigation satellite system service in their airspace; and
 	
 c) align performance-based navigation implementation plans with navigation aid replacement cycles, where feasible, to maximize cost savings by avoiding unnecessary infrastructure investment.
	APANPIRG	APANPIRG/24 has endorsed the Navigation Strategy for the APAC Region which requires States/Administrations to:
		
		 (i) Convert from terrestrial-based instrument flight procedures to PBN operations in accordance with the Asia/Pacific Seamless ATM Plan ;
		 (ii) Develop PBN implementation roadmap to rationalize terrestrial navigation aids, retaining a minimum network of terrestrial aids necessary to maintain safety of aircraft operations. Efforts will be made to decommission some of the terrestrial navigation aids and ground stations, rationalise the on-board CNS systems, and retain essential terrestrial navigation aids in order to mitigate the potential loss of GNSS service for maintaining safety.
		
		 From ADS-B SITF/13:
		 APANPIRG could consider to:
		    a) publish a list of the approvals available to operators in different States. Eg: GNSS NPA approvals without requiring a conventional alternate. This could encourage other states to increase the usability of GNSS systems
		    b) APANPIRG could promote the synergy between ADS-B and GNSS equipage. ADS-B requires a high performance GNSS system. The business case of ADS-B and GNSS combined is better than for either alone. ADS-B SITF could consider developing guidance materials on this subject.
		
		 The Asia/Pacific Seamless ATM Plan contains reference (paragraph 5.42) to matters that States need to take into account when planning to migrate from terrestrial to space-based navigation aids.

Recommendation 6/11 – Regional performance framework – alignment of air navigation plans and regional supplementary procedures That ICAO initiate a formal amendment process in accordance with normal procedures to align the areas of applicability of the air navigation plans and the regional supplementary procedures, observing the following principles: 1) there will be no change to the current accreditation of the ICAO regional offices to Contracting States; 2) there will be no change to the obligation of individual States to provide services in accordance with ICAO Annex 11 — *Air*	ICAO HQs	CNS SG supports ICAO's actions.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
Traffic Services, 2.1; 3) there will be no change to the governance responsibilities of the ICAO Council, including approval of amendments to air navigation plans and regional supplementary procedures; 4) there will be no change to the current requirements for services and facilities and or to the current supplementary procedures for a given airspace as listed in current air navigation plans and regional supplementary procedures; 5) there will be no change to the principle that a planning and implementation regional group is composed of the Contracting States providing air navigation service in the air navigation region and that other Contracting States can participate in the activities with observer status; 6) there will be no change to ICAO's assistance to planning and implementation regional groups from the regional offices; 7) the responsibilities of the performance framework management for an air navigation region will now be integrated and will rest with the planning and implementation regional group established for the region; and 8) to the extent possible, the main traffic flows will be accommodated within homogeneous airspaces in order to minimize changes between different air navigation systems and different operational procedures during flight.		
Recommendation 6/12 – Prioritization and categorization of block upgrade modules That States and PIRGs: a) continue to take a coordinated approach among air traffic management stakeholders to encourage effective investment into airborne equipment and ground facilities; b) take a considerate approach when mandating avionics equipage in its own jurisdiction of air navigation service provision, taking into account of burdens on operators including foreign registry and the need for consequential regional/global harmonization; That ICAO: c) continue to work on guidance material for the categorization of block upgrade modules for implementation priority and provide guidance as necessary to planning and implementation regional groups and States; d) modify the block upgrade module naming and numbering system using, as a basis, the intuitive samples agreed by the Conference; and e) identify modules in Block 1 considered to be essential for implementation at a global level in terms of the minimum path to global interoperability and safety with due regard to regional diversity for further consideration by States.		ICAO RO through APANPIRG and its sub groups a) States concur that a collaborative approach is necessary in prioritizing and implementing ASBU modules. All are working with stakeholders in developing integrated approaches for matching implementation of new technologies and procedures throughout all components of the system. b) States acknowledged the importance of a considerate approach and many gave examples of successful cooperative implementation of new procedures/standards coupled with equipage requirements. c-e) Noted ATM/SG/2 WP15 provides information on a Doc 7030 (Regional Supplementary Procedures) proposed amendment for airspace mandates that ensures a coordinated regional approach, appropriate consultation, and a service improvement. The Asia/Pacific Seamless ATM Plan contains extensive expectations on the implementation of a coordinated performance-based airspace and specific avionic upgrade requirements.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
Recommendation 6/13 – Development of Standards and Recommended Practices, procedures and guidance material That ICAO: a) improve its project management and coordination of contributing ICAO panels, study groups and other expert groups, including task forces and other specialized teams tasked with the development of ICAO provisions and related work, through: 1) consistent application of the *Directives for Panels of the Air Navigation Commission* (Doc 7984); 2) receiving regular reports from the expert groups against agreed terms of reference and work programmes; 3) mandating strong coordination between all expert groups developing ICAO provisions to ensure efficient management of issues and avoidance of duplication; 4) application of the principles of accountability, geographical representation, focus, efficiency, consistency, transparency and integrated planning to the operation of all the expert groups; 5) developing documented procedures for other expert groups, including task forces and other specialized teams as well; and 6) better use of today's communication media and internet to facilitate virtual meetings, thereby increasing participation and reducing costs to States and ICAO; b) continue to coordinate with the other recognized standards-making organizations (Assembly Resolution A37-15 refers) in order to make the best use of the capabilities of these other recognized standards-making organizations and to make reference to their material, where appropriate; c) initiate studies to improve the verification and validation process required within ICAO before material developed by recognized standards-making organizations can be referenced in ICAO documentation; and d) consider a methodology by which ICAO can capture the regional implementation and challenges, and to reflect them in a standardized process to effectively support the aviation system block upgrade deployment.	ICAO HQs	ICAO HQ: a) Recommendation that ICAO to expedite its panel restructuring to insure timely response to current issues. a-6) One committee noted that it had begun practice of virtual meetings to increase level of coordination From ACSICG/1: APANPIRG has already structured its CRV project based on tasks and progresses its work mainly through use of portal and web conferences. Action proposed: APANPIRG to use virtual meetings as the main vector of progress for its tasks: ☐ Develop SWIM APAC implementation framework" ☐ Implement AIDC ☐ Develop an IP address plan APANPIRG has developed an ANRF for B0-FICE in which regional implementation and challenges are captured. Action proposed APANPIRG to include the development of B1-SWIM ANRF in the Statement of Work of the Task "Develop SWIM APAC implementation framework.
Recommendation 6/14 – Guidelines for conducting aeronautical studies to assess permissible penetration of obstacle limitation surfaces	ICAO HQs	

RECOMMENDATIONS ADOPTED BY AN-CONF/12	FOLLOW-UP PARTIES	RESPONSE FROM APAC REGION
That ICAO develop comprehensive guidelines for States in the uniform application in conducting aeronautical studies to assess the permissible penetration of obstacle limitation surfaces (OLS).		

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