

International Civil Aviation Organization



ICAO

**Twenty Fourth Meeting of the Communications/
Navigation and Surveillance Sub-group (CNS SG/24) of
APANPIRG**

Web-conference, 30 November – 4 December 2020

Agenda Item 2: Review outcomes of APANPIRG/RASG Chairpersons review, APANPIRG/30 meeting, 40th Session of ICAO Assembly, ATM Sub-group and other major meetings relevant to CNS Sub-group

OUTCOME OF APANPIRG/RASG CHAIRPERSONS REVIEW

(Presented by the Secretariat)

SUMMARY

This paper presents the outcomes of APANPIRG/30 and RASG-APAC/9 Midyear Review Meeting and the Seventh Regional Coordination Meeting of PIRG and RASG.

1. INTRODUCTION

1.1 The APANPIRG/30 and RASG-APAC/9 Midyear Review Meeting was held in conjunction with the Seventh Regional Coordination Meeting of PIRG and RASG via WebEx on 4 May 2020.

1.2 Chairman, First Vice-chair, Second Vice-chair of the APANPIRG, Chairman of the RASG-APAC and ICAO APAC secretariat attended the meeting

2 DISCUSSION

Progress updates on APANPIRG/30 and RASG-APAC/9 Conclusions and Decisions

APANPIRG/30

2.1 The meeting noted that the APANPIRG/30 made 15 Conclusions and four Decisions. The follow-up actions on seven Conclusions and four Decisions were completed or closed, which resulted in 57.89 % completion of the planned actions. The ongoing actions on three Outstanding Conclusions from APANPIRG/28 Action Plan (APANPIRG 28/19, 25 & 28) were reviewed.

2.2 The key outcomes/achievements of APANPIRG/30 were briefly reviewed:

- a) monitoring and tracking implementation of **Beijing Declaration**;
- b) triennial major update of the Asia/Pacific Seamless ANS Plan to incorporate the 6th Edition of the GANP;

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- c) Asia-Pacific ATM Performance Measurement Framework (new performance framework for monitoring ATM performance);
- d) Asia/Pacific Regional FIXM Extension for ATFM;
- e) States’ and APANPIRG’s actions to improve the process for State and APANPIRG to prioritise and resolve Air Navigation Deficiencies;
- f) Regional SWIM Implementation Philosophy & APAC SWIM Roadmap and SWIM Education video;
- g) successful trial of RPAS for flight inspection;
- h) APAC A-CDM Implementation Plan;
- i) implementation of IWXXM; and
- j) trial to combine the **APANPIRG** and **RASG-APAC** Plenary Meetings in 2020.

2.3 The meeting noted that the APAC is several years behind its commitments to implement the APAC Seamless ATM (now ANS) Plan. This is mainly due to a lack of whole-of government planning and associated with this, a lack of political will. Hence, the requirement for a National Air Navigation Plan (NANP) with 10 Basic Planning Elements (BPEs) was endorsed by APANPIRG/30 and entered into the RANP Vol. II. However, as a result of the COVID-19 pandemic, the meeting noted that progress was likely to be significantly affected, so the targets within the Seamless ANS Plan would probably not be met, and may need to be adjusted, although the development of NANPs should still be encouraged.

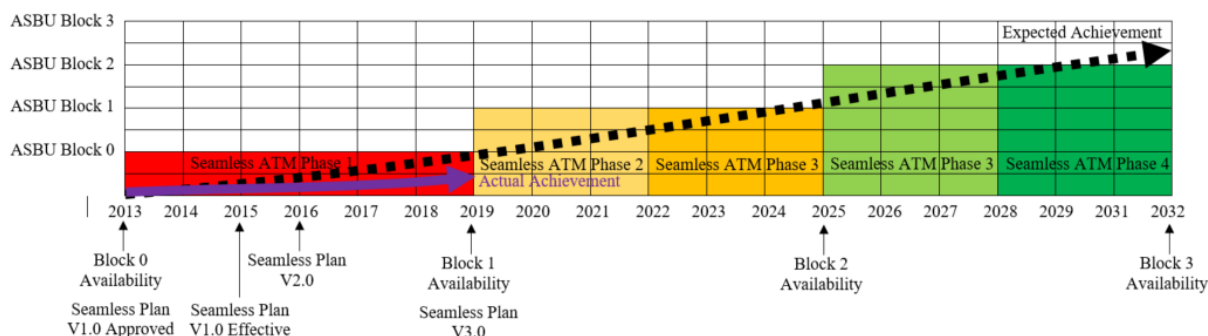


Figure 1: Gap between Planned and Actual Seamless ATM Implementation

2.4 The meeting further noted APANPIRG/30 conclusions that required HQs actions:

- a) Conclusion 30/6 – ICAO HQ Support for Regional ANS Implementation ; and
- b) Conclusion 30/13: Direct controller-pilot communication SATVOICE Trials.

2.5 The meeting noted that action plans on some APANPIRG/30 Conclusions, such as, those areas of certification of aerodromes and CNS related outstanding conclusions may not be possible to complete due to the overall impact of COVID-19. At present, the primary focus would be on COVID-19 impact and its recovery, APANPIRG Air Navigation Deficiencies, etc.

RASG-APAC/9

2.6 The meeting noted that the RASG-APAC/9 agreed to four Conclusions and eight Decisions. Updated progress on RASG-APAC/9 Conclusions/Decisions – Action Plan and RASG-APAC/9 Yearly Work Programme 2019-2020 are placed in **Attachments A** and **B** respectively.

2.7 The meeting noted that the latest accident rate for RASG-APAC is **1.74**, which is lower than the global rate.

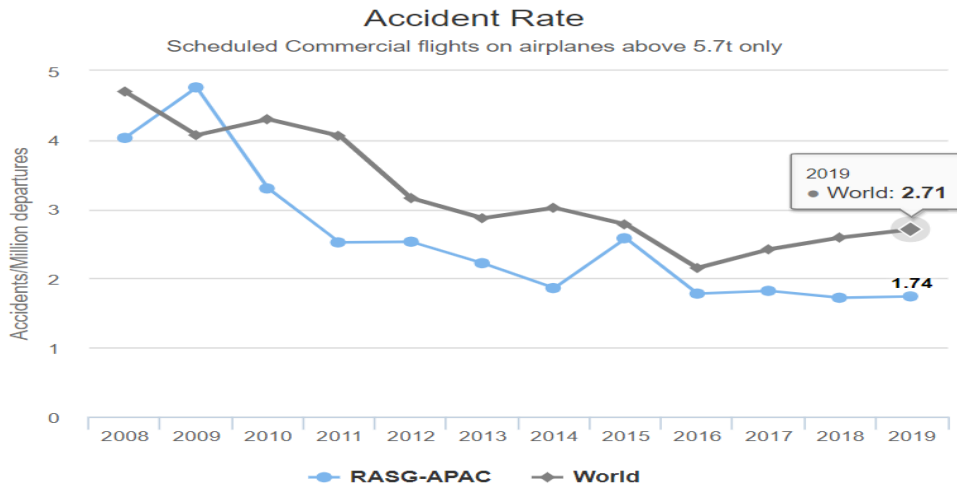


Figure 2: APAC Accidents Statistics (Source: ICAO APAC Annual Safety Report 2019)

2.8 The meeting noted the RASG-APAC key achievements in safety in 2019 as below:

- a) ten CAT Missions took place in 2019-2020 (Bhutan, Kiribati, Marshall island, Timor-Leste, Nepal, Maldives, Pakistan, Philippines, Malaysia and Vietnam);
- b) the RO prepared the RO intelligence basing on the on-site mission analysis and assist HQ to plan and prioritize the USOAP CMA and IVA activity;
- c) in 2018 end the EI was 62.41% and in 2019 end the EI is 64.59% an increase of 2.18%;
- d) sixteen SEIs related to the CFIT, LOC and RS has been approved monitoring tools have been introduced for effective implementation and monitoring;
- e) APAC Annual Safety Report (ASR) 2019 published on time; and
- f) the Beijing Declaration commitments on safety has been tasked through the yearly work programme of 2018/2019 and 2019/2020 of RASG;

2.9 The meeting noted that the APAC Regional Aviation Safety Priorities had been clearly defined in AP-RASP and approved by the RASG-APAC/9.

2.10 The APANPIRG/30 and RASG-APAC/9 Meeting Reports were reviewed by the ANC Working Group of the Whole for Strategic Review and Planning on 4 March 2020 (please refer to AN-WP/9399 placed in **Attachment D to WP02**).

Progress updates on the outcomes of the 6th APANPIRG & RASG-APAC Regional Coordination Meeting

2.11 Consolidated Annual Report on APANPIRG/30 and RASG-APAC/9 (April 2019 - March 2020) was submitted to ANB on 17 April 2020 (**Attachment C**).

Lead Regional Group – Responsibilities

2.12 The meeting reviewed the lead regional group responsibilities assigned and agreed at previous coordination meeting, and added one responsibility on “Proactive action to minimize the effect of public health crisis, such as, COVID - 19 to air transport”, which requires coordination among PIRG, RASG, CAPSCA in accordance with guidance from ICAO HQ.

Coordination item	RASG-APAC	APANPIRG
SSP	√	
Controlled Flight into Terrain (CFIT)	√	
Fatigue Risk Management (FRM)	√	
Laser Attack	√	
A-CDM(Aerodrome Collaborative Decision Making		√
RPAS (Remotely Piloted Aviation system)	√ (ROC, PEL)	√ (AN)
Safety management, safety oversight system and flight operations safety aspects	√	
Air navigation facilities and services implementation aspects		√
AGA and ANS safety areas	Required coordination	
Airspace Contingency, Natural disaster/Crisis, Conflict		√
Runway Safety		√
English Language Proficiency	√	
Proactive action to minimize the effect of public health crisis, such as, COVID - 19 to air transport	Required coordination + HQ Guidance + CAPSCA	

The trial of the combined APANPIRG/RASG-APAC Meeting

2.13 The meeting reviewed the format of the Combined APANPIRG and RASG-APAC Meeting to be held in 2020 and the initial draft agenda of the combined meeting.

Day 1	Day 2 & 3 [Parallel Sessions]	Day 4
Plenary [APANPIRG/31 + RASG-APAC/10]	APANPIRG/31	Plenary [APANPIRG/31 + RASG-APAC/10]
	RASG-APAC/10	

2.14 The meeting proposed to finalize the details of the meeting agenda, once the dates for the joint Meeting is finalized.

3. ACTION BY THE MEETING

3.1 The meeting is invited to

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.



RASG/9 Meeting - Overview

- 9th RASG Meeting was held in Bangkok, Thailand from 7 to 8 November 2019;
- 84 participants attended from 19 Member States and 10 International Organizations;
- Meeting adopted 04 Conclusions and 08 Decisions.
- The RASG/9 Meeting Report is available at

<https://www.icao.int/APAC/Meetings/2019%20RASGAPAC9/RASG-APAC9%20-%20Final%20Report.pdf>



RASG/9 Decisions and Conclusions Update

PROGRESS

**Decision RASG-APAC 9/1 —
Terms of Reference (ToRs)
of PIRGs and RASGs –
WP/19**

That, Secretariat to incorporate the Generic ToRs in the RASG-APAC Procedure Handbook and revise the other ToRs wherever necessary to align with the Generic ToRs.

- Received the approved TORs from HQ.
- All the ToRs will be completed including AIG and placed in APRAST 15. Work in Progress.

**Decision RASG-APAC 9/2 —
Review of Decisions and
Conclusions adopted at
APRAST/13 and APRAST/14
and its Progress (WP/4)**

**That, the Decisions and Conclusions adopted at APRAST/13 and APRAST/14 as described in Attachments A and B be endorsed.
On Decision 14/9, the assessment of the inclusion of mid-air collision risk and wildlife hazards in the AP-RASP will be undertaken by APRAST.**

- A pre-coordination meeting will be held in May 2020 and AP-RASP Adhock WG will continue on the inclusion of MAC and Wild Life.

**Decision RASG-APAC 9/3 —
Review of progress of
RASG-APAC/8 Decisions
and Conclusions (WP/5)**

That, the Meeting endorsed the recommendations of the 14 Decisions and 02 Conclusions of RASG-APAC/8 presented in Attachment A to WP/5.

- Closed.



RASG/9 Decisions and Conclusions Update

PROGRESS

Decision RASG-APAC 9/4 — Progress of development of Annual Safety Report (WP/26)

That, RASG-APAC/9 endorsed the timeline considering the data integrity for Annual Safety Report 2019 and agreed the timeline of the Annual Safety Report 2020 as discussed in WP/26.

- ASR 2019 Published and Promulgated.

Decision RASG-APAC 9/5 — APrAST sub groups empowerment to adopt Conclusions and Decisions (WP/28)

That, APrAST Co-Chairs to work out a detailed framework for the empowerment of APrAST and its Working Groups to adopt Conclusions and Decisions, on mainly technical/operational matters, in their future meetings to enhance the efficiency and effectiveness of APrAST processes and table it in RASG/10 for approval.

- APrAST Co-Chairs to present a WP in APrAST-15 ascertaining the empowerment.
- The same will be discussed in Sub Group Meetings to be held in May 20.

Decision RASG-APAC 9/6 — Asia-Pacific Regional Aviation Safety Plan (AP-RASP) 2020-2022 (WP/7)

That, RASG-APAC/9 endorsed the contents of the AP-RASP and its associated implementation arrangements and approved the AP-RASP for the 2020-2022 triennium; and allowed the ICAO APAC Regional Office and AP-RASP ad-hoc WG to further refine the details of the document prior to publication by early 2020; and urged the administrator, custodians and all stakeholders to act upon their respective roles and adhere to the prescribed timelines in the AP-RASP.

- AP RASP was further refined and published in January 2020.



RASG/9 Decisions and Conclusions Update

PROGRESS

Decision RASG-APAC 9/7 — RASG-APAC Yearly/Standing Work Programme 2019-2020 (proposed) [WP/29]

That, the proposed RASG-APAC 2019/2020 Yearly and Standing Work Programme is approved, as in Attachment 4 of the RASG/9 Report.

- Yearly Work Programme 2019/20 includes 05 major tasks.

Decision RASG-APAC 9/8 — Way Forward for APANPIRG and RASG-APAC – WP/22

That, the Chairperson decided that an assessment of the trial should be conducted by the Chairpersons and Vice-chairpersons of the two Groups after the first combined meeting, so as to determine the success of the combined meeting and whether it should continue from 2021 onwards.

- Decision finalized and work in progress.

Conclusion RASG-APAC 9/1 — Identification and Reporting of Common Challenges Experiences at the Regional Level (WP/20)

That, RASG-APAC and Subgroups to use the suggested template (as attached in Appendix A) of reporting the regional challenges.

- TEMPLATE adopted.
- Challenges 2019.

RASG/9 Decisions and Conclusions Update

PROGRESS

Conclusion RASG-APAC 9/2 — Safety Information Monitoring System (SIMS) Ramp Inspections Data Sharing Project (WP/2)

That, Secretariat to follow up;

- issuing State Letter to encourage States/ Administration to subscribe for SIMS.
- with States/administration for the nomination/update of focal points.

- Requested HQ for a sample State Letter.

Conclusion RASG-APAC 9/3 — PIRGs and RASGs Global Symposium – Innovation (WP/23)

Needs to be reconfirmed due COVID-19 impact whether the Global Symposium and Innovation Fair to be held in Montreal in the 3rd Quarter.

That, given the rapid pace of innovation in aviation and the important role that PIRGs and RASGs play in facilitating proper planning and facilitate the implementation of the relevant innovations in a coordinated and timely manner, it is imperative that:

- APAC States identify and propose innovation activities to ICAO that they are aware of in their State or Region that may be of global interest to facilitate planning by March 2020;
- Propose topics for discussion during PIRG/RASG Symposium related to innovation by March 2020;
- States plan participation in the PIRG/RASG Global Symposium and Second ICAO Innovation Fair to be held in Montréal tentatively from 26 to 30 October 2020; and
- The Chairpersons of RASG-APAC plan attendance of the first meeting of the ICAO PIRG/RASG Global Coordination Group, tentatively scheduled for 25 October 2020.



RASG/9 Decisions and Conclusions Update

**Conclusion RASG-APAC 9/4 —
ADREP Reporting (WP/14)**

That, the Meeting request ICAO to consider the need to:

- update the ADREP reporting system and address the lack of ADREP Data as reported by States;**
- provide States with necessary guidance material and online tools to simplify ADREP reporting to ICAO; and**
- provide guidance to States related to the use of media sources due to the lack of the availability of the ADREP data.**

**Following up with HQ
for any further
progress.**



RASG/9 Annual Work Programme 2019/2020 Update

TASK-1

RASG–APAC to prepare the report on the progress/achievements of Beijing Declaration safety aspects to be tabled in next Ministerial Conference in 2020 to be held at India.

---- in progress

TASK-2

Revise Plan of AP-RASP:

- Inclusion of Mid-Air Collision (MAC) in AP-RASP with data to be aligned with the GASP priorities.
- Better coordination with Air Navigation Capacity Building counterparts for ATM and Aerodromes and set out the risks and actions with targets integrating focal points from APANPIRG sub-groups.

---- in progress

TASK-3

Finalizing the ToRs for RASG-APAC and APANPIRG in line with the guidance given by ICAO HQ.

---- in progress



RASG/9 Annual Work Programme 2019/2020 Update

TASK-4

Addressing the safety issues arising from GANP/Seamless ATM plan/APANPIRG and develop a coordination mechanism to introduce and implement related SEIs. (SEIs are generally developed by the WG under APRAST and it seems safety issues from ATM or Aerodromes are not being addressed. SEI WG under APRAST can have a look into the matter and report back to RASG how to improve the gap).

----- will be coordinated for all future SEI Developments, Discussion pending for coordination mechanism.

TASK-5

Conduct of a periodic review of SEI outputs by SEI Review Group

-----Recent Survey done



ASSEMBLY — 40TH SESSION

TECHNICAL COMMISSION

Agenda Item 30: Other issues to be considered by the Technical Commission

AN URGENT NEED TO ADDRESS HARMFUL INTERFERENCES TO GNSS

(Presented by the International Federation of Air Traffic Controllers' Association (IFATCA), the International Federation of Air Line Pilots' Associations (IFALPA) and the International Air Transport Association (IATA))

EXECUTIVE SUMMARY

The global navigation satellite system (GNSS) provides essential position and timing information supporting flight and air traffic management (ATM) operations. A significant number of reports have been received on harmful interference to GNSS. Under their obligations to ICAO, the International Telecommunication Union (ITU) and the international aviation community, States are invited to adopt and implement measures to manage and reduce the operational impact from harmful interference to GNSS, as it can adversely affect the safety and efficiency of aircraft and ATM operations.

Action: The Assembly is invited to:

- a) to implement appropriate mitigation measures as contained in the *Global Navigation Satellite System (GNSS) Manual* (Doc 9849) as a matter of high priority and to report progress and any difficulties to ICAO;
- b) to recognize the unintended impact of harmful interference to civil flight operations and to exercise caution to the maximum extent possible to protect the safety of civil aircraft during military exercises and operations;
- c) to establish and ensure appropriate frequency regulations are in place and maintained to protect allocated GNSS frequencies from harmful interference in line with ITU Radio Regulations;
- d) to ensure that contingency procedures are established in coordination with air navigation service providers and airspace users and that essential conventional navigation infrastructure, such as Instrument Landing System (ILS), are retained when operationally beneficial; and
- e) to support the multi-disciplinary development of alternative positioning, navigation and timing (APNT) strategy and solutions to complement the use of GNSS in aviation in coordination with ICAO and airspace users.

<i>Strategic Objectives:</i>	This working paper relates to the Safety and Economic Development of Air Transport Strategic Objectives.
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¹ Arabic, Chinese, English, French, Russian and Spanish versions provided by IATA.

<i>Financial implications:</i>	Failure to mitigate effectively the harmful interference to GNSS would prevent the full continuation of safety and efficiency benefits of GNSS-based services. The cost impact of implementing the mitigation measures being suggested by ICAO would be minimal for all stakeholders as compared to the cost of accidents or significant disruption of flight and ATM operations.
<i>References:</i>	Annex 10 — <i>Aeronautical Telecommunications, Volume I — Radio Navigation Aids</i> Doc 9849: <i>Global Navigation Satellite System (GNSS) Manual</i> Doc 10007, <i>Report of the Twelfth Air Navigation Conference (AN-Conf/12)</i> , Recommendations 6/7, 6/8 Doc 10022, <i>Assembly Resolutions in Force (as of 4 October 2013)</i> , Resolution A37-11 Doc 10115, <i>Report of the Thirteenth Air Navigation Conference (AN-Conf/13)</i> , Recommendations 2.2/1 <i>Assembly/39-WP/118 – Impact to Flight & ATM Operations from Harmful Interference to GNSS</i> <i>Radio Regulations, Edition of 2016</i> , International Telecommunication Union

1. INTRODUCTION

1.1 The global navigation satellite system (GNSS) includes satellite constellations, infrastructures and augmentations which provide position and timing information for aircraft and air traffic management systems. GNSS constellations which are recognized by ICAO include the US. Global Positioning System (GPS), the Russian GLONASS, the European Galileo and the Chinese BeiDou.

1.2 Flight and ATM operations utilizing GNSS have resulted in substantial efficiency and safety benefits. On safety, GNSS is a main technical enabler for approach with vertical guidance in line with *Assembly Resolution A37/11* effectively mitigating the risk of controlled-flight into terrain (CFIT). For efficiency, GNSS contributes to the United Nations' Sustainable Development Goals by making it possible for aircraft to navigate and fly enhanced, more efficient air routes. Regarding capacity, GNSS is also the primary technology supporting performance-based navigation (PBN) operations which enhance airspace capacity through enabling safe reductions of aircraft separation minima.

1.3 With its proven benefits, GNSS has its vulnerabilities. AN-Conf/12 in 2012 recognized that very low strength of GNSS signals received from satellites makes GNSS vulnerable to interference and other effects that have the potential to affect multiple aircraft over a wide area. The sources of GNSS vulnerabilities include unintentional interference, intentional interference, effects of the ionosphere, solar activity (space weather) and others.

1.4 The concern over harmful interference to GNSS has also been documented by *AN-Conf/12 Recommendation 6/8* where, in planning for mitigation of GNSS vulnerabilities, States were recommended to:

- 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 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; and
- d) develop and enforce a strong regulatory framework governing the use of global navigation satellite system repeaters, pseudolites, spoofers and jammers.

1.5 The 2012 ICAO High-level Conference on Aviation Security also recognized the significance of this issue and recommended that ICAO intensify efforts to develop guidelines on the prevention and appropriate response to aviation security threats such as GNSS jamming and spoofing.

2. IMPACTS ON FLIGHT AND ATM OPERATIONS

2.1 GNSS is the main source of aircraft position information driving the aircraft navigation system and is important for safety and efficiency of flight. GNSS provides aircraft position input to pilot navigation display (ND), an important function during reduced visibility conditions.

2.2 *GNSS beyond Navigation:* In addition to aircraft navigation, GNSS is a main component of various essential communication, navigation and surveillance (CNS) and flight safety/control systems. GNSS is used to provide timing signal to some satellite communications avionics which are essential for operations in oceanic and remote airspaces. It is the sole aircraft position source to automatic dependent surveillance – broadcast (ADS-B). Some business aircraft are using GNSS as a reference source for aircraft flight control and stability systems. Particularly noteworthy, GNSS is a necessary component of an aircraft terrain awareness and warning system (TAWS) - a mandatory aircraft safety system implemented to alert pilots of upcoming terrain.

2.3 *GNSS in ATM/ATC Operations:* With on-going worldwide deployments of ADS-B, harmful interference to GNSS will adversely impact ATM and air traffic control (ATC) operations. Once GNSS signals are compromised, a degradation or complete interruption of ADS-B surveillance service will consequentially occur as ADS-B requires aircraft position input from GNSS.

2.4 Since the last ICAO Assembly, IATA has received from various airlines and airspace users an increasing number of reports of harmful interference to GNSS. During one recent incident, it was reported that a passenger aircraft flew off course during a period of GNSS jamming and nearly crashed into a mountain. Fortunately, an alert RADAR controller intervened, and the accident was averted.

3. SOURCES OF HARMFUL INTERFERENCE TO GNSS

3.1 Unintentional interference to GNSS signals can arise from several sources. A non-exhaustive list would include very high frequency (VHF) communications, television signals, certain RADARs, mobile satellite communications, military systems, microwave links, GNSS repeaters and certain systems on-board aircraft.

3.2 However, more concerning cases of recent harmful interference to GNSS being reported are likely caused by intentional interference sources, such as “GNSS jammers or spoofers”. Some equipment being used in some military operations and activities has been reported to interfere with specific GNSS signals and have the coverage radius of more than 300 NM. While some of these military activities were well coordinated with relevant aviation authorities, there have been a significant number of cases where the coordination was less successful - resulting in civil flight operations being interrupted without airspace users being appropriately notified.

3.3 The airline industry welcomes the efforts by some States and air navigation services providers (ANSPs) in informing airspace users regarding the use of GNSS jammers during military operations and exercises. Nevertheless, States are strongly urged to recognize the unintended impact of such interference and to exercise caution in order to minimize their effect on civil aviation. Recognizing the importance of national security needs, IATA stands ready to support coordination efforts with States.

4. GNSS RADIO FREQUENCY INTERFERENCE (RFI) MITIGATION PLAN

4.1 ICAO has developed a GNSS RFI mitigation plan as a part of the *GNSS Manual* (ICAO Doc 9849). The mitigation plan describes a list of preventive and reactive measures aimed at mitigating the interference risk as far as practicable. The framework recommended by the mitigation plan includes a continuous three-step process of 1) monitoring threats; 2) assessing risks; and 3) deploying mitigation measures. The plan also explains the need to inform airmen in the event of GNSS outages and the necessity to train airspace users and air traffic controllers to be able to recognize interference events and to react appropriately.

5. PROTECTION OF GNSS THROUGH EFFECTIVE SPECTRUM MANAGEMENT AND REGULATIONS

5.1 ICAO AN-Conf/12 recommends that States provide effective spectrum management and protection of GNSS frequencies to reduce the likelihood of unintentional interference or degradation of GNSS performance. The following ICAO Air Navigation Conference in 2018 also reemphasized this critical issue in *AN-Conf/13 Recommendation 2.2/1* recommending that States engage in the spectrum regulatory process to ensure the continued necessary access to and protection of safety-critical aeronautical communications, navigation, and surveillance (CNS) systems.

5.2 Through several State Letters and Electronic Bulletins, ICAO has continued to highlight the essential role of States in ensuring protection of GNSS signals from interference, which can be achieved through cooperation of national aviation and telecommunication authorities in the introduction and enforcement of appropriate regulations controlling the use of the radio spectrum.

5.3 Noting the importance of safety-of-life applications using GNSS, radio frequency spectrum allocations for GNSS signals are globally harmonized and legally protected under the Radio Regulation of the International Telecommunication Union (ITU). Article 4.10 of the Radio Regulations states that ITU member States recognize that the safety aspects of radio navigation and other safety services require special measures to ensure their freedom from harmful interference and that “it is necessary therefore to take this factor into account in the assignment and use of frequencies.”

5.4 As radio frequency spectrum is a very limited resource with competing demands and interests, it is essential that State aviation and telecommunication authorities work closely together to ensure that aviation and the travelling public are well served by effective spectrum management and State regulations. In coordination with ICAO, IATA will continue engaging in this important strategic topic at global, regional and national levels to provide a necessary foundation for sustainable air transport growth while balancing other societal demands and public interests.

6. ROLES OF CONVENTIONAL NAVIGATION AIDS AND PROGRESS FOR ALTERNATIVE POSITION, NAVIGATION AND TIMING (APNT) SOLUTIONS

6.1 *Need for Contingency Procedures and Infrastructures:* Whilst today many aircraft navigate primarily using GNSS in all phases of flight, some conventional navigation aids still play a

major role supporting flight operations, particularly when GNSS signals are compromised. Interruptions of GNSS services often result in operational disruptions and have recently led to cancellation of flights.

6.2 During critical operations like approach and landing, it is very important that alternative navigation aids are readily available to flight crews to continue the operations while maintaining the safety of flight. Lessons learned from interference cases at major airports, including those servicing capital cities, have shown that instrument landing system (ILS) will be preferred and often required by flight crews whenever they perceive that the performance of GNSS shown in the cockpit is in question.

6.3 From these lessons learned, ANSPs are therefore invited to assess carefully the possible impacts of harmful interference to GNSS in coordination with State safety regulators and airspace users while developing their rationalization strategy for conventional navigation aids. The *Strategy for Introduction and Application of Non-Visual Aids to Approach and Landing* attached to ICAO Annex 10 suggests the continuation of ILS operations at the highest level of service.

6.4 *Global Strategy for Future APNT*: In the longer term, acknowledging the fundamental limitations of satellite navigation systems (e.g., low strength signals) and the economic consequences of interrupted airline operations for the travelling public and the global supply chain, States are invited to provide more robust support for the development of a global strategy for Alternative Position, Navigation and Timing (APNT) solutions and infrastructures in coordination with ICAO and the aviation community as requested by *AN-Conf /12 Recommendation 6/7d*. This APNT strategy should aim to maintain flight safety and an acceptable level of efficiency of air navigation services to the maximum extent possible in the event of prolonged GNSS signal outages or interferences. Noting the ubiquitous use of GNSS in various CNS/ATM applications and increasing challenges in the global frequency spectrum environment, an integrated, multi-disciplinary CNS approach - taking into account frequency spectrum efficiency and existing and potential avionics capabilities - should be used when defining this APNT strategy.

7. CONCLUSION

7.1 GNSS has resulted in substantial safety, efficiency and capacity benefits and is a necessary cornerstone of daily flight and ATM operations. Effective mitigations of harmful interference to GNSS will ensure that these benefits continue, and will help prevent interruptions of flights - resulting in better punctuality of global trade and enhanced satisfaction of the travelling public.

7.2 IATA commends ICAO for its on-going efforts on this critical issue, including the establishment of the GNSS RFI mitigation plan, and reiterates a strong concern regarding on-going harmful interference to GNSS. On behalf of the global community of airlines, IATA respectfully invites the Assembly to urge States to adopt and implement measures to manage and reduce causes and impacts of the interference.

— END —