



| ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY



OVERVIEW ON ONGOING DEVELOPMENT IN THE SURVEILLANCE PANEL (SP)



Isaiah Kofi TEFUTOR
Technical Officer - CNS and Spectrum, ICAO HQ



SURVEILLANCE PANEL (SP)

The Surveillance Panel (SP) was tasked by the ICAO Air Navigation Commission to undertake specific studies and to **develop technical and operational ICAO provisions** for aeronautical surveillance systems, collision avoidance systems and their applications as outlined in the Global Air Navigation Plan.



TOR OF THE SP

[...]

Objectives

1) Develop and maintain SARPS and guidance materials covering the procedural and technical aspects of:

- a) airborne and ground based aeronautical surveillance systems
- b) airborne collision avoidance systems (ACAS)
- c) related facilities and systems
- d) airborne surveillance capabilities (e.g., AIRB, VSA and SURF)
- e) advanced airborne surveillance applications (e.g., interval management and airborne separation)
- f) ground-based safety nets

2) Develop provisions for detect and avoid capability for Remotely Piloted Aircraft (RPA) in coordination with the RPASP

[...]

SARPS/Manuals SP is responsible for

Annex 10 – AERONAUTICAL TELECOMMUNICATIONS

Volume IV – Surveillance and Collision Avoidance Systems

SP + subWGs

Coming Soon!

Part I – Surveillance & Collision Avoidance Systems

Part II – Detect and Avoid (DAA) systems

SARPS/Manuals SP is responsible for

Existing Manuals (SUR) :

- *Doc 8071 Volume III Testing of Surveillance Radar Systems
- *Doc 9871 Technical Provisions for Mode S Services and Extended Squitter
- *Doc 9863 Airborne Collision Avoidance System (ACAS) Manual
- *Doc 9924 Aeronautical Surveillance Manual
- *Doc 9994 Manual on Airborne Surveillance Applications

Manuals Under Development:

- *New manual to succeed Cir 326 Assessment of ADS-B and Multilateration Surveillance to Support Air Traffic Services and Guidelines for Implementation

Membership

The SP comprises technical specialists

Nominated by:

- Australia
- Brazil
- Canada
- China
- France
- Germany
- India
- Italy
- Japan
- Kenya
- Nigeria
- Russian Federation
- Saudi Arabia
- Singapore
- South Africa
- Sweden
- Thailand
- United Kingdom
- United States

also nominated from

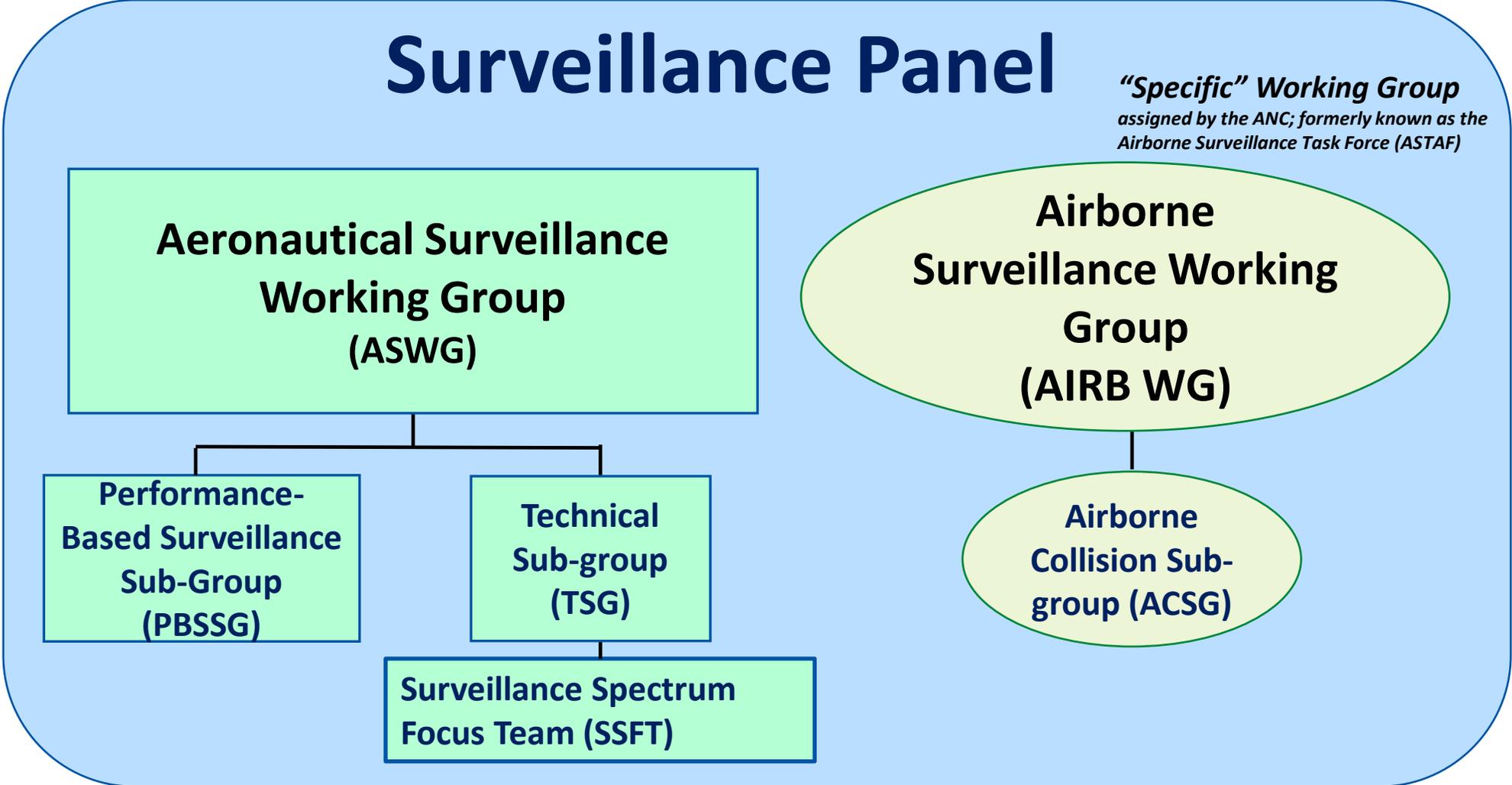
- CANSO
- EUROCONTROL
- IATA
- ICCAIA
- IFALPA
- IFATCA

- 19 States

- 6 International Organizations

+ An observer nominated from RTCA

Panel Structure



UPDATE on the Fourth meeting of the Surveillance Panel (SP/4) held in April 2022

Proposal for Amendment (PfA) to Annex 10 *Aeronautical Telecommunications, Volume III —Communication Systems PART I —DIGITAL DATA COMMUNICATION SYSTEMS relating to 24-bit aircraft address, including:*

- a) refinement of provisions related to aircraft address assignment;
- b) increasing State allocation of aircraft addresses; and
- c) deletion of unused registers F1 and F2.

UPDATE on the Fourth meeting of the Surveillance Panel (SP/4) held in April 2022 (Cont.)

10

- Air Navigation Commission (221-6) considered a preliminary review (AN-WP/9617) of a proposal for the amendment of Annex 10 — Aeronautical Telecommunications, Volume III — Communication Systems.
- State letter AN7/1.3.95-22/106, dated 22 December 2022, was sent with a due date for replies on 22 June 2023.
- By 22 June 2023, fifty-five (55) replies had been received from fifty-one (51) States, including eighteen (18) Council Member States, and four international organizations.
- By 25 August 2023, eight (8) additional replies had been received from seven (7) States including four (4) Council Member States and one (1) international organization
- *Most of the comments received from States and international organizations indicated broad support for the proposed amendment.*
- Final review was held on 3rd October 2023 and draft report of council will be held Q1 2024.
- An applicability date of **28 November 2024** is envisaged for the proposed amendment to Annex 10, Volume III.

The Fifth Meeting of the Surveillance Panel (SP/5) was held in September 2023

JOB CARD	SP ASWG Tasks	Target date	WP/IPs discussed after SP/4 (Mar 2022)	Approved PfA/CPs at SP/5
SP.008.03	Ensure performance of aeronautical surveillance systems	2023 (Annex) 2025 (other guidance materials)	More than 95 WPs/IPs	1 PfA5 CPs

JOB CARD	SP AIRB WG Tasks	Target date	WP/IPs discussed after SP/4	PfA /CPs at SP/5
SP.009.03	Develop provisions on ACAS-X	2023/ 2024/ 2026	More than 20 WP/IP (Also, entire review on - ACAS III PfA - DAA PfA - Doc 9863)	1 PfA to A10V4 (+ 6 consequential amendments)
SP.010.03	Interval Management	2025	More than 20 WP/IP (Also entire review of - Doc 9994)	1 PfA (+ CP to Doc 9994)
SP.012.03	ADS-B based pilot alerting on or near airport runways	2025	No papers discussed	

SP/5 OUTCOMES (1 of 6)

Proposal for Amendment to Annex 10 *Aeronautical Telecommunications, Volume IV —Surveillance and Collision Avoidance Systems*, addressing:

- 1) Updates to transponder requirements for compatibility with new 1090 MHz extended squitter ADS-B version 3**
- 2) Introduction of ACAS III technical provisions; and**
- 3) Updates of technical provisions of airborne surveillance applications**

*Consequential amendments to Annex 2, Annex 11, PANS-ATM (Doc 4444), PANS-OPS (Doc 9168) Volume I and Volume III were also agreed due to modification of the ACAS definition
An Annex 6 amendment is proposed based on discovery of duplicative requirements in SARPs*

SP/5 OUTCOMES (2 of 6)

Initial Proposal 1 (Updates and additional provisions related to transponder/ADS-B)

- ADS-B version 3 & Mode S subnetwork 6, providing new capabilities that include:
 - 1) autonomous distress tracking support (ADS-B);
 - 2) information to support future interval management operations;
 - 3) broadcast of aircraft-based weather data;
 - 4) Lost C2 link state for UAS/RPAS;
 - 5) broadcast of 1030/1090 MHz spectrum monitoring data; and
 - 6) functionality to support commercial space and hypersonic aircraft operations

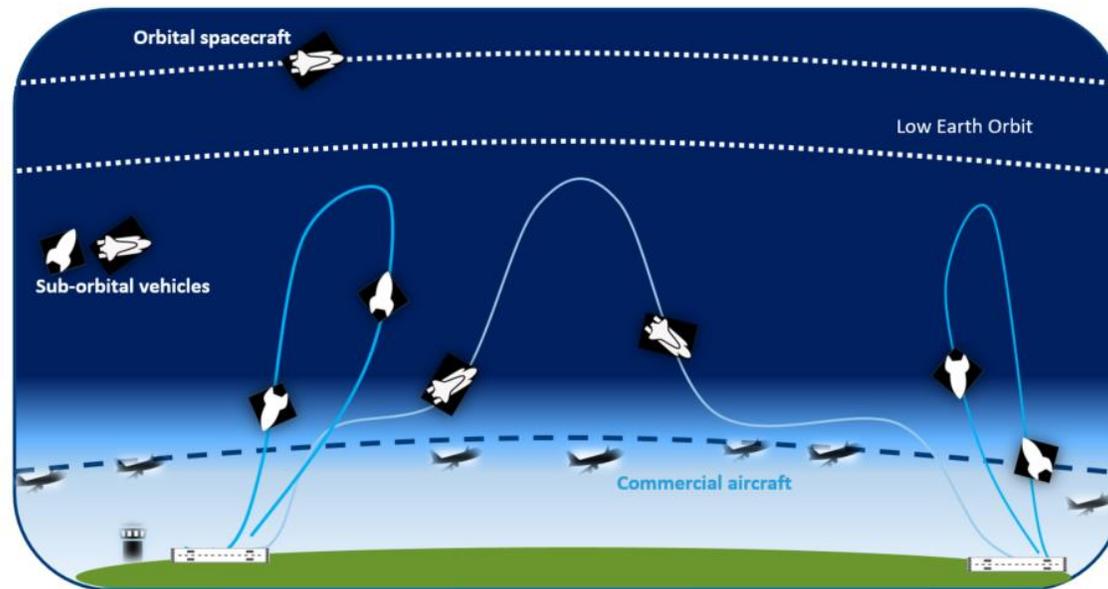
Improved existing capabilities to correct anomalies experienced during operations

These capabilities allow for enhancements in areas such as safety, equipment performance, airspace efficiency, and data reporting

- Technical provisions for *the efficient use of the 1 030 / 1 090 MHz radio frequencies*
- Introduction of *Interference Tolerance Criterion (define how much interference from other radio frequency systems can be tolerated by surveillance and airborne collision avoidance systems)*

New 1090 MHz Extended Squitter ADS-B Version 3 Format

ADS-B version 3 will provide new capabilities including :



Free images of spacecraft from Pixabay

**WRC-23 Agenda Item 1.6:
Spectrum use by sub-orbital vehicles**

- autonomous distress tracking support;
 - Related to **WRC-19 Agenda item 1.10**
- Lost C2 link state for UAS/RPAS;
 - Related to **WRC-23 Agenda item 1.8**
- functionality to support sub-orbital vehicle operations.
 - Related to **WRC-23 Agenda item 1.6**

SP/5 OUTCOMES (3 of 6)

Initial Proposal 2 (ACAS III technical provisions)

This proposal introduces ACAS III technical provisions, based on ACAS Xu (Unmanned Aircraft System) avionics standards. ACAS Xu:

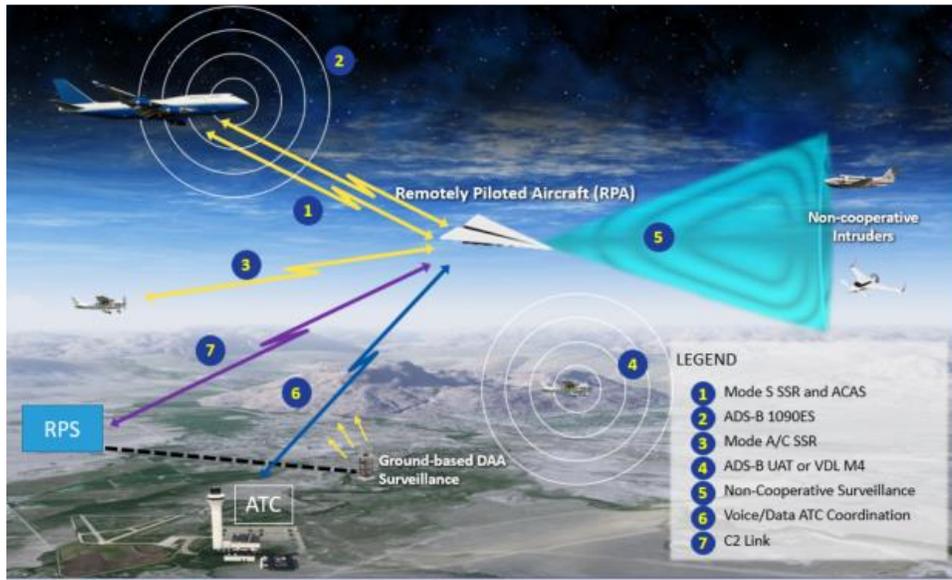
- provides RPAS with a Detect and Avoid (DAA) capability including a Collision Avoidance (CA) function that will be the first implementation of an ACAS III;
- builds on ACAS Xa collision resolution optimization technology to overcome vertical maneuvering limitations by also issuing horizontal advisories; and
- can also use non-cooperative sensors to detect and avoid traffic

In addition to enabling safe integration of a new class of aircraft, this proposal (ACAS III SARPs) will improve safety performance of all ACAS, especially for operations in uncontrolled airspace

Detect and Avoid (DAA) Systems and

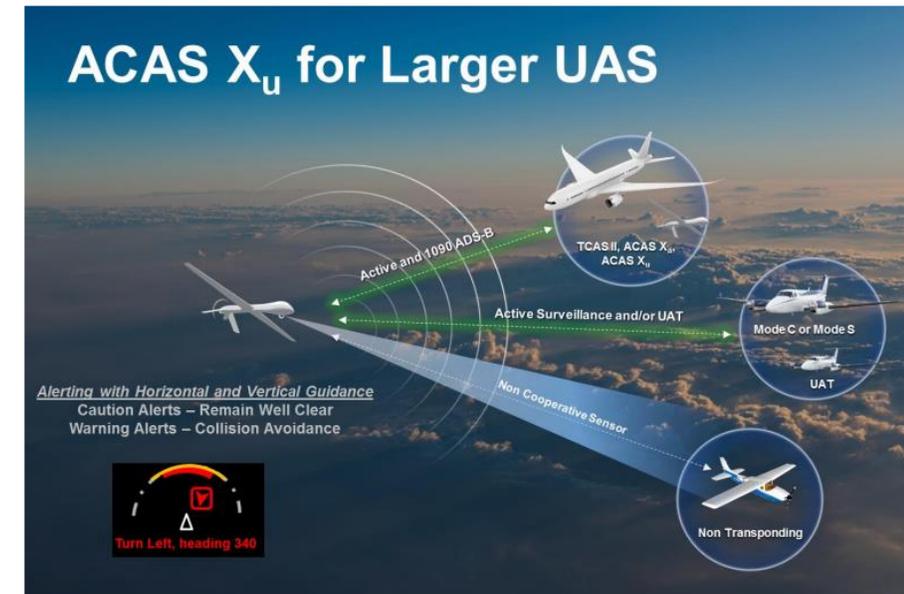
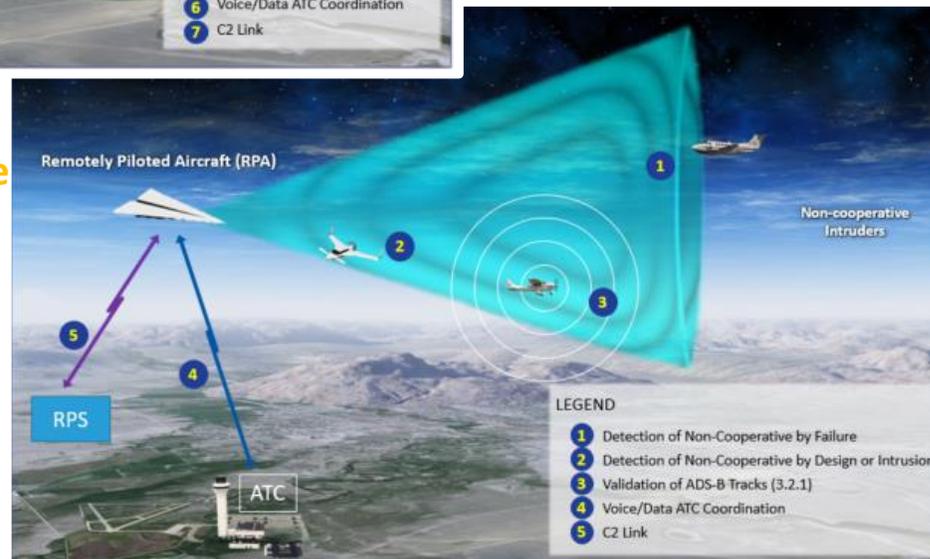
Airborne Collision Avoidance System-unmanned aircraft (ACAS-Xu)

DAA Surveillance



➤ Related to ITU-R WP 5B activities

DAA Non-Cooperative Surveillance



SP/5 OUTCOMES (4 of 6)

Initial Proposal 3 (Updates of airborne surveillance applications technical provisions)

Recognizing that **ADS-B data can provide substantial benefit when integrated in the flight deck**, the proposal included:

- a clarification of requirements for ADS-B IN situational awareness; and
- new requirements with technical specifications supporting a range of applications, including minimum functionalities for Airborne Surveillance Applications (based on ADS-B) and the Flight-deck Interval Management (FIM) airborne capability

ADS-B-In Capability: Interval Management (IM)

- IM consists of a set of ground and flight-deck capabilities used in combination by air traffic controllers and flight crews to more efficiently achieve a precise interval between aircraft in a stream of traffic
- Reducing inter-aircraft spacing variance will yield more efficient use of runway capacity, while also enabling aircraft to remain on their Performance-based Navigation (PBN) procedures more frequently
- IM functionality requires ADS-B Out (all versions) and ADS-B In equipage



Operational Concept

- Controller instructs flight crew to achieve / maintain an assigned spacing goal (time or distance) relative to another aircraft
- Flight crew uses FIM avionics to manage aircraft speed to achieve instructed ATC objective.
- FIM stands for Flight deck IM and refers to IM equipment on board.

To see the IM storyboard animation, go to https://www.faa.gov/about/office_org/headquarters_offices/ang/offices/tc/library/Storyboard/detailedwebpages/im.html

SP/5 OUTCOMES (5 of 6)

The following Change Proposals were also agreed:

- 1) Doc 8071 - Manual on Testing of Radio Navigation Aids, Volume III - Testing of Surveillance Radar Systems
- 2) Doc 9871, Technical Provisions for Mode S Services and Extended Squitter
- 3) Doc 9924, the Aeronautical Surveillance Manual
- 4) Doc 9994, Manual on Airborne Surveillance Applications
- 5) SP Job cards SP.008.03 and SP.009.03

SP/5 OUTCOMES (6 of 6)

SP/5 is also replying to two requests from the 41st Assembly which may be of interest to the ANC:

Recommendation 2/2 — Amendment to Volume III, *Testing of Surveillance Radar Systems*, Doc 8071, *Manual on Testing of Radio Navigation Aids*.

Recognizing conflicting provisions on frequency of SSR flight inspections in Volume III of Doc 8071, SP investigated the issue; the proposed CP resolves the conflicting provisions and aligns with current practices of flight inspection.

Recommendation 6/1 — Submit the report on positive and negative aspects of public availability of surveillance system information

SP has prepared a report, agreed to by SP/5, describing the positive and negative aspects of current ICAO surveillance systems from the expert group's perspective, replying to the concerns and measures described in A41-WP162 regarding aviation surveillance security and privacy.





Thank You!