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CNSS 2026

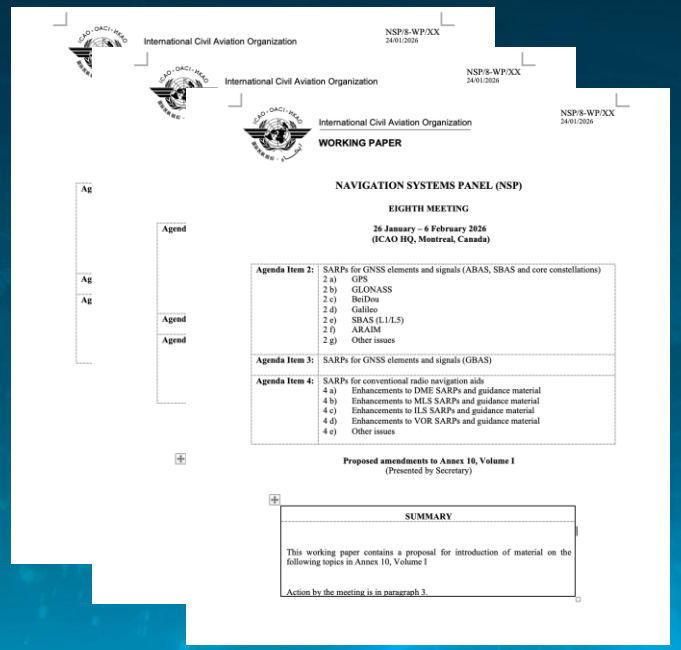
12 - 15 October | Kotor, Montenegro

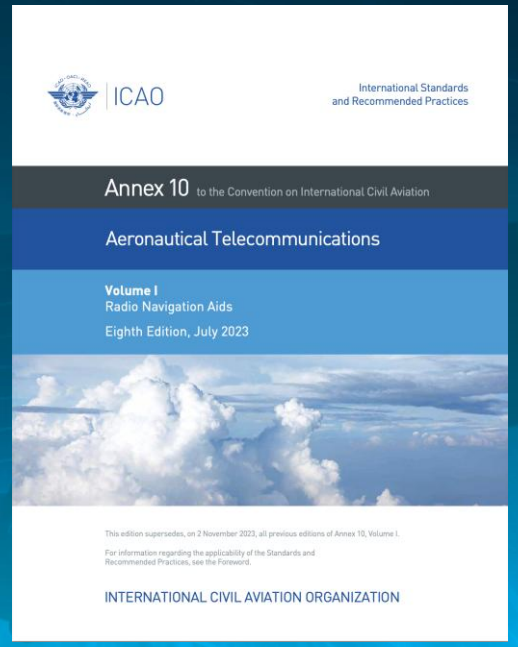
Session 12

Validating SARPs: from Draft to Implementation

Validating SARPs: from Draft to implementation

Susumu Saito*, Principal Researcher,
Electronic Navigation Research Institute,
National Institute of Maritime, Port and Aviation Technology, Japan





*Rapporteur, Validation Working Group, Navigation Systems Panel

Outline

1 **NSP Structure**

NSP structure and the role of the validation working group

2 **SARPs Development**

Two-step approach for SARPs development in NSP

3 **SARPs Development Example**

Development of GBAS Approach Service Type D (GAST D) SARPs

4 **Ongoing SARPs Validation**

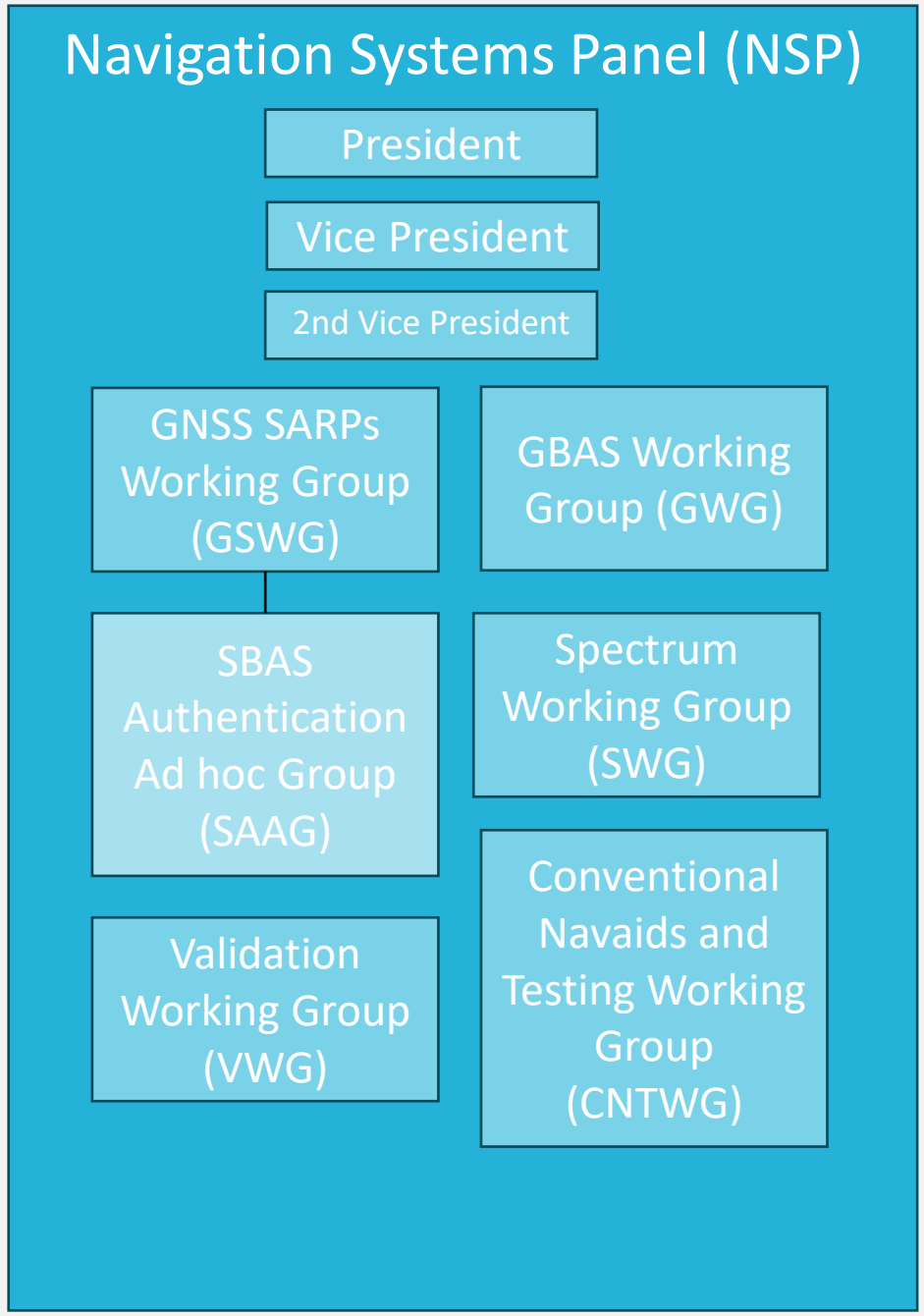
Status and timeframe of SARPs validation in NSP

5 **Summary**

1. NSP Structure

Working groups

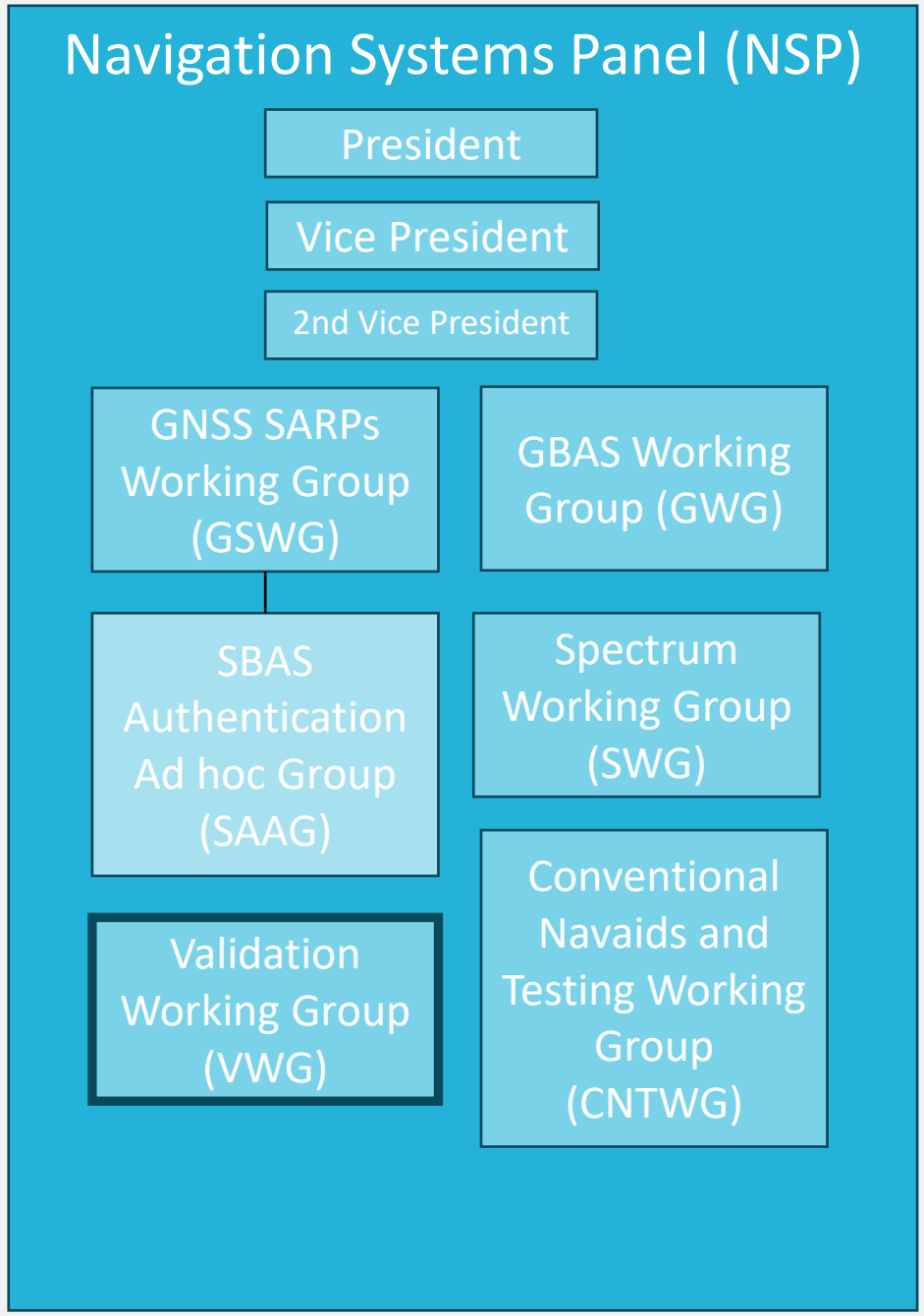
- Five working groups
  - CNTWG (Conventional navaids and testing)
  - GSWG (GNSS core constellations, SBAS)
  - GWG (GBAS)
  - SWG (Radio spectrum)
  - VWG (Validation)
- One ad hoc group
  - SAAG (SBAS Authentication, under GSWG)



1. NSP Structure

Role of the Validation Working Group (VWG)

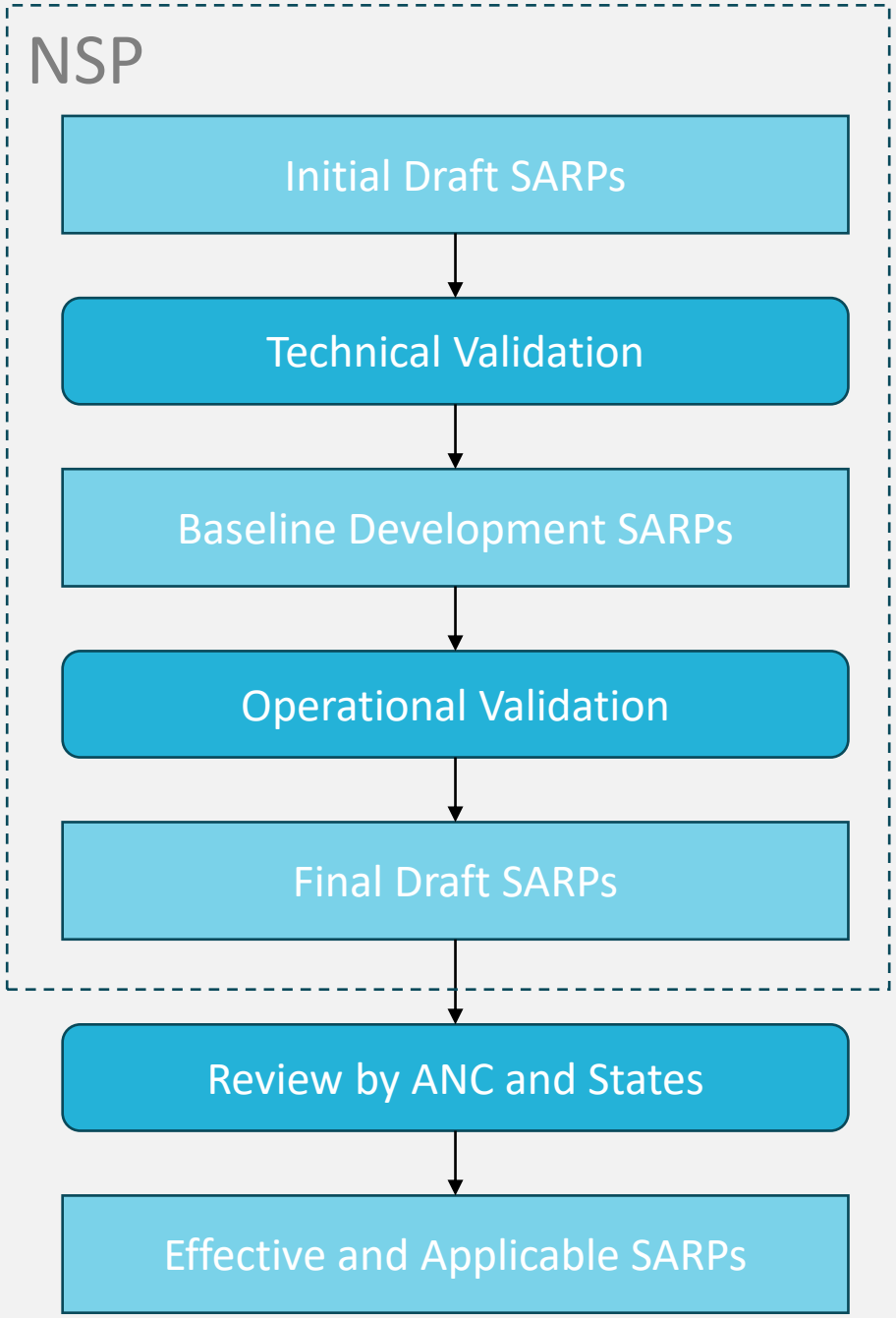
- ➢ Validate draft SARPs developed by the NSP as a third party
- ➢ Ensure the traceability and transparency of the SARPs development
- ✓ There is no regular member other than the Rapporteur
  - Works with members of WG(s) relevant to each subject



2. SARPs Development

Two-step approach

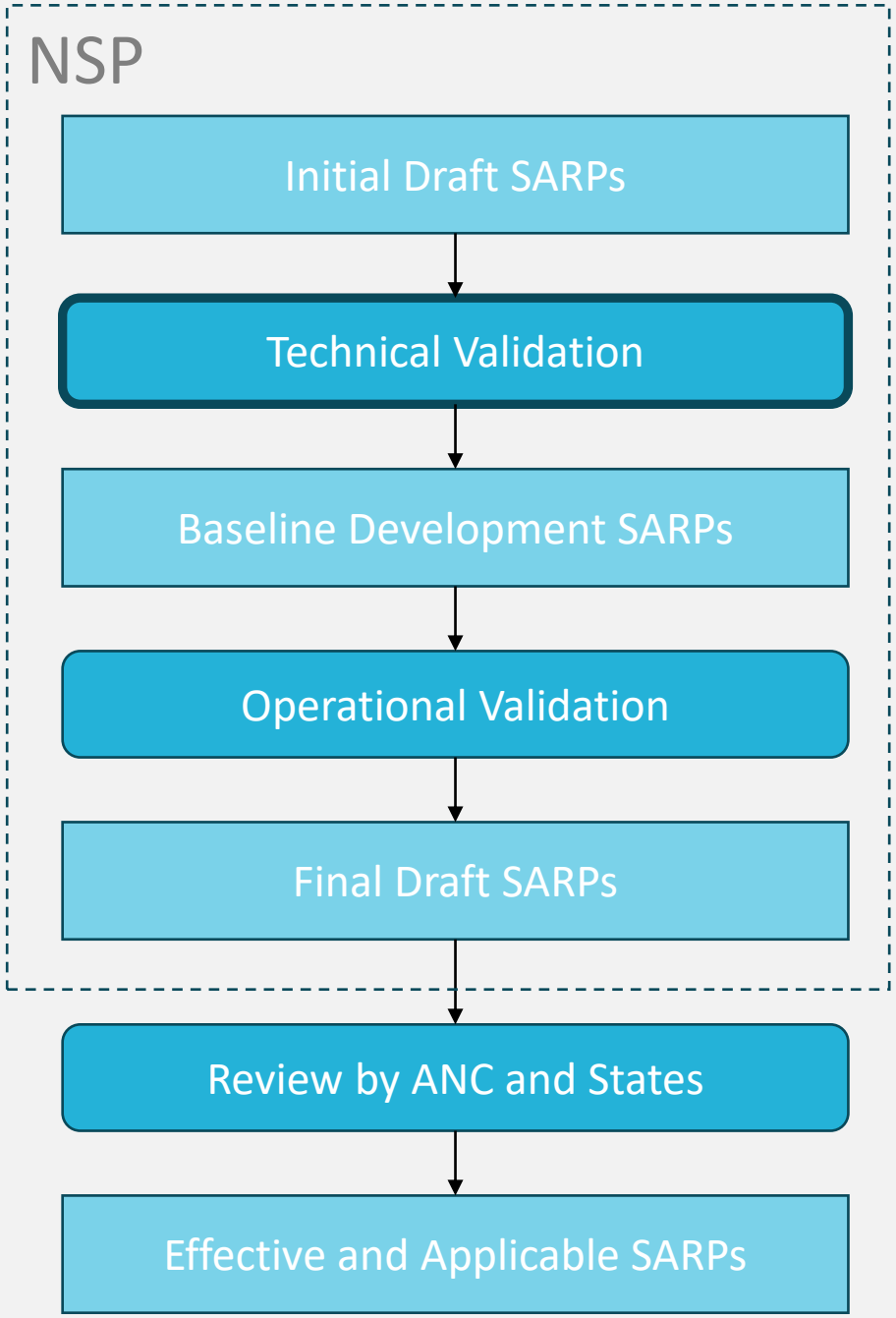
- Baseline development SARPs(BDSARPs) development
  - Baseline Development SARPs
    - Enable prototyping
  - Validation Matrix for technical validation of the BDSARPs
- Final draft SARPs development
  - Final draft SARPs
    - Enable manufacturing operational equipment
  - Validation Matrix for operational validation of the final draft SARPs



2. SARPs Development

Technical validation

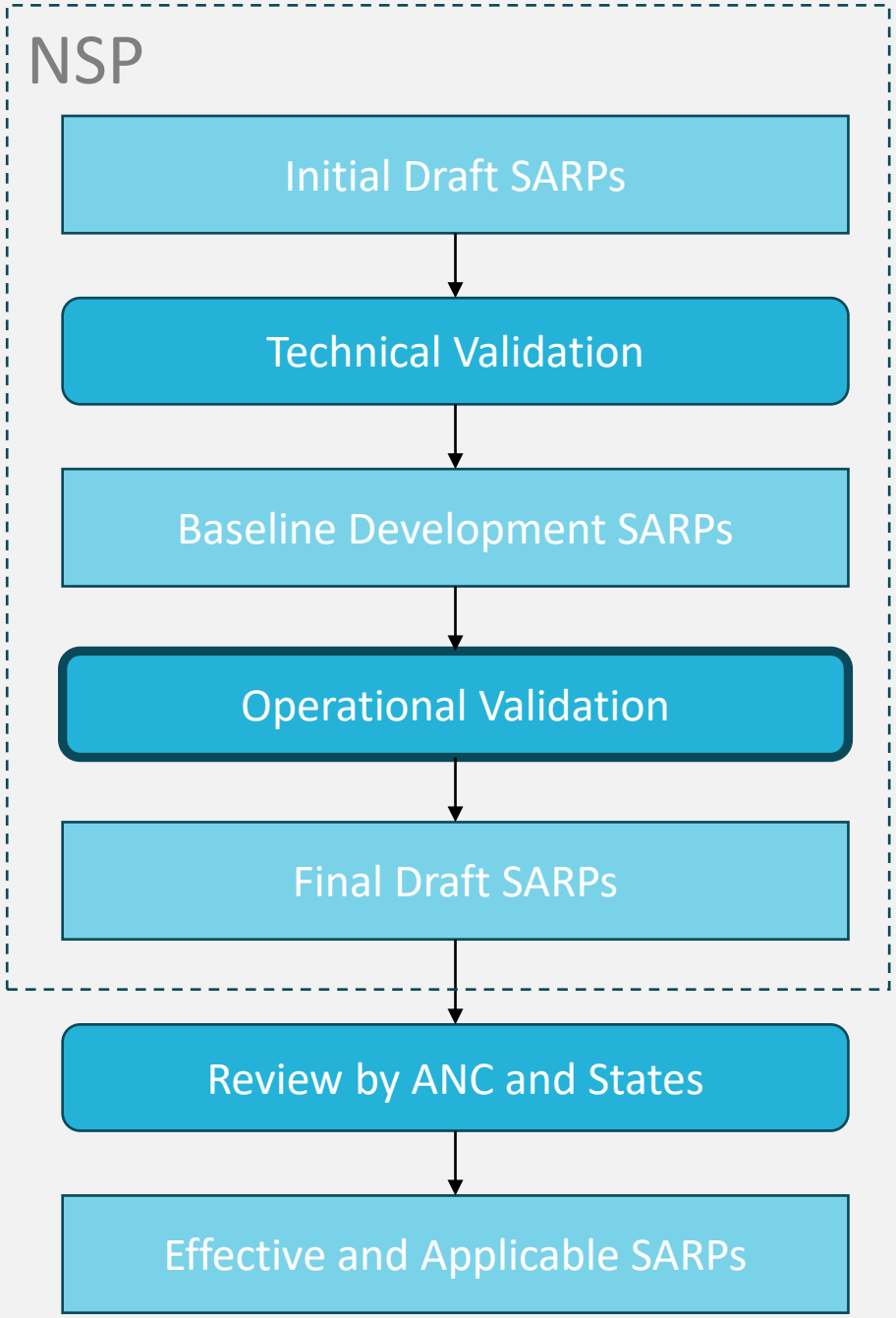
- ➢ Validate technical feasibility to develop a prototype
  - Theoretical analysis
  - Analysis with available data
- ➢ Update draft SARPs to be ”Baseline Development SARPs (BDSARPs)”
- ✓ At this point, freeze the BDSARPs for Operational Validation



2. SARPs Development

Operational validation

- ➢ Validate implementation feasibility for operational equipment
  - Prototyping based on the BDSARPs
  - Data analysis with the prototypes
- ➢ Update the BDSARPs to be final draft SARPs
- ✓ If any major issues identified, additional validation may be required.



2. SARPs Development

Validation Matrix

- Purpose
  - Ensure the **traceability and transparency** of SARPs development
- Contents
  - SARPs paragraph, contents, method, status, description, notes, references (papers used as basis of validation), etc.
- ✓ How and why the particular SARPs items have been developed can be traced back by following the Validation Matrix

Paragraph [SARPs Paragraph No.] Paragraph	Title [Paragraph Title] Title	Change Type	Validation method	Validation Status (green, red, blue only)	count - green 706	count - red 000	count - blue 000	Validation Activity Description Description	Validation Notes Notes	References References
3.7.3.5	Ground-based augmentation system (GBAS) and ground-based regional augmentation system		I		1			Validated by inspection by CSG, Apr 2015	no change	Apr 15 NSP/CSG/WP 15 rev3 Mar 13 CSG/WP 3
3.7.3.5.1	Performance	CB	I, (A, T)		1			Validated by inspection by GWG, December 2016. Validated by inspection by GWG, August 2016.	Changed coverage to service volume. Completed validation of IGM, August 2016	Dec 16_NSP/3/WP19 Aug 16 GWG/WP 2

Method:
Inspection/analysis/simulation/test

3. SARPs Development Example

- GBAS Approach Service Type D (GAST D) : Single-frequency Category II/III GBAS

2000

Category II/III GBAS SARPs development started.

2000-2010

BDSARPs development

Technical Validation

"GAST" concept introduced

2010

BDSARPs for GAST D delivered

2010-2016

Operational Validation

Prototyping by 3 ground and 2 airborne manufacturers

New issues identified, additional validation needed for revised SARPs

2016

Final draft SARPs for GAST D approval by NSP

2018

SARPs including GAST D (Amendment 91) Effective and Applicable

4. Ongoing SARPs Validation

Annex 10 Volume I

- SBAS Message Authentication
  - A protocol to guarantee authenticity of SBAS messages.
  - Under operational validation for final SARPs approval by NSP in 2027
- Advanced Receiver Autonomous Integrity Monitoring (ARAIM) for vertical guidance
  - Integrity monitoring of GNSS signals withing airborne GNSS receivers based on Integrity Support Data
  - Under technical validation for BDSARPs approval by NSP in 2027

4. Ongoing SARPs Validation

Annex 10 Volume I

- Dual-Frequency and Multi-Constellation (DFMC) GBAS
  - GBAS based on GNSS signals at two frequencies from multiple GNSS Core Constellation
  - Under technical validation for BDSARPs approval by NSP in 2027
  - Final draft SARPs for NSP approval by 2030
- Others
  - Maintenance of existing SARPs as identified
  - Validation is always necessary.

5. Summary

- ICAO NSP takes a unique approach to develop SARPs (Annex 10 Vol. I).
- Two-step approach
  - Technical validation to develop a Baseline Development SARPs (BDSARPs)
  - Operational validation based on BDSARPs to develop a final draft SARPs
- NSP Validation Working Group (VWG) is responsible for validation of draft SARPs.
  - VWG consists of the Rapporteur only, works with relevant WG(s).
  - Validation Matrix is an important tool to keep traceability and transparency of the validation process..

Thank You


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