

# Implementation of Space Based ADS-B

at



July 17<sup>th</sup> 2023

# General introduction DC-ANSP (1/2)

- DC-ANSP provides service within the Curaçao airspace (TNCF FIR).
- The TNCF FIR is situated in the central part of the Caribbean Sea, covers 300,000 square kilometers and contains 18 high routes, and 13 lower routes.
- The TNCF FIR borders six FIRs:
  - Venezuela;
  - Puerto Rico;
  - Dominican Republic;
  - Haití;
  - Jamaica;
  - Colombia.

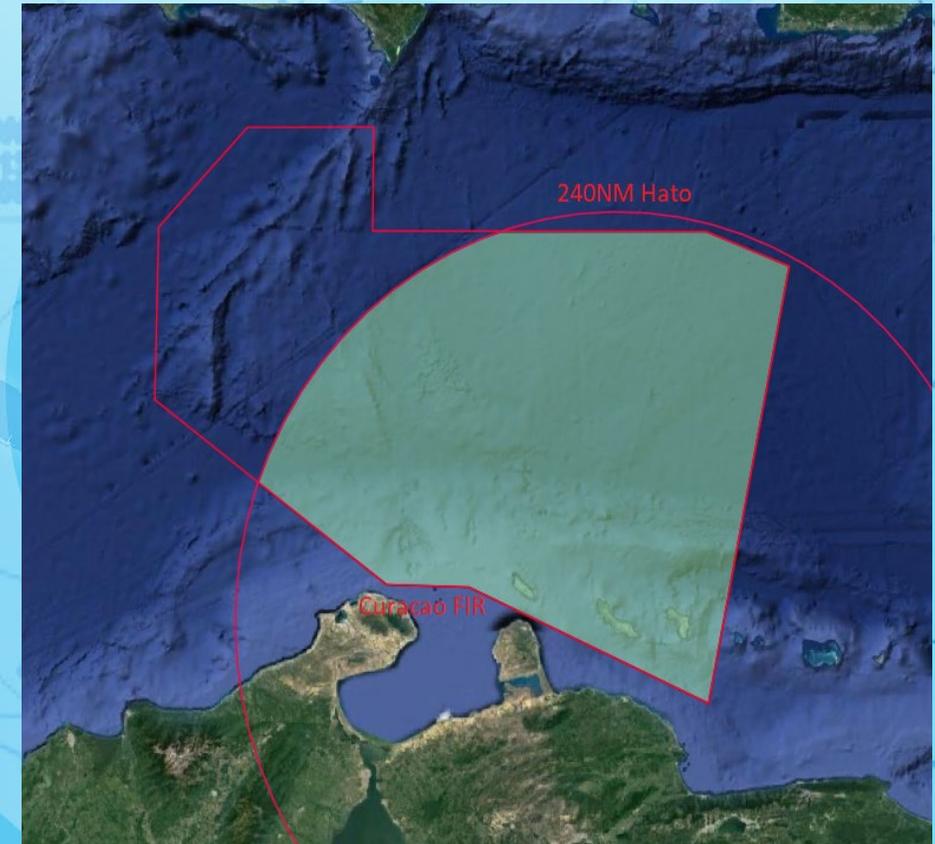


Overview of the Curaçao FIR  
(Source: Dutch Caribbean AIP AIRAC AMDT05-18)

# General introduction DC-ANSP (2/2)

Before implementing ADSB-space based:

- Surveillance service was available up to 250NM from the Radar site on the island of Curaçao.
- For the remaining part of the TNCF FIR only procedural control service was available.
- Air traffic volume and complexity was increasing in the northwestern non-radar area of the TNCF FIR where previously no surveillance service was available.
- With that, workload went up, and increased pressure on service quality in a non-surveillance area.



*Surveillance coverage within the TNCF FIR based on Hato radar coverage without ADSB-space based*

# Improving surveillance in TNCF FIR

- DC-ANSP added Space Based ADSB to daily Operations in November 2019.
- This increased surveillance coverage and improved overall safety, helped reduce operational errors (LHD's) and allowed reduction of separation.
- Reducing separation (horizontal), increased capacity, allowing users to more frequently receive preferred Flight Level.



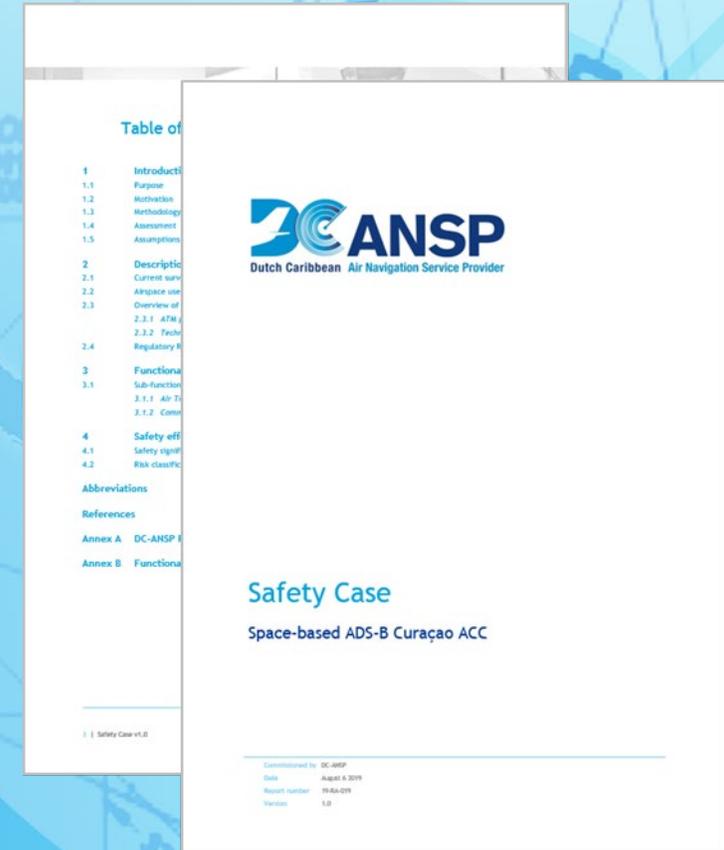
Surveillance coverage within the Curaçao FIR based on Hato radar and Space Based ADSB

# Challenges that had to be overcome

- Implementation of new technology on Raytheon Autotrack II (legacy technology) with the use of converter boxes from Sunhillo.
- Establishing communication redundancy by using MEVA platform and with this strengthening regional collaboration.
- Seeking approval from the oversight for implementation of a complete new method of surveillance.
- Safety Assessment was made to identify and mitigate, Functional and Technical Hazards.
- FPL's were analyzed to check aircraft equipage, this confirmed over 86% to be already ADS-B compliant.
- Introduction to ATCOs

# Approval process by CCAA

- The Safety Assessment consisted of an overview of the changes in the overall ATM-system, and an assessment on functional and system hazards.
- The CCAA has been involved during the whole process through both informal and formal sessions regarding progress of the project.
- DC-ANSP organized an information session for all relevant CCAA stakeholders regarding the needs for and the benefits of a Space Based ADS-B system.



# Mandate from the State

- DC-ANSP proposed a phased implementation of space based ADSB, and dates for airspace users to be properly equipped.
- These dates were published in the CCAA mandate on August 26<sup>th</sup> 2019.
- Until start of CCAA mandate on Jan 1<sup>st</sup> 2020, non ADS-B equipped A/C outside of radar coverage were subject to procedural control.
- From Jan 1<sup>st</sup> 2020, non ADS-B equipped A/C are not able to fly in RVSM airspace as stated in the mandate for the NW airspace.
- From Jan 1<sup>st</sup> 2021, non ADS-B equipped A/C are not able to fly in RVSM airspace for the whole FIR, as stated in the mandate.

Implementation	Airspace	Altitude / Classification	Date Requested for Transponder Requirement
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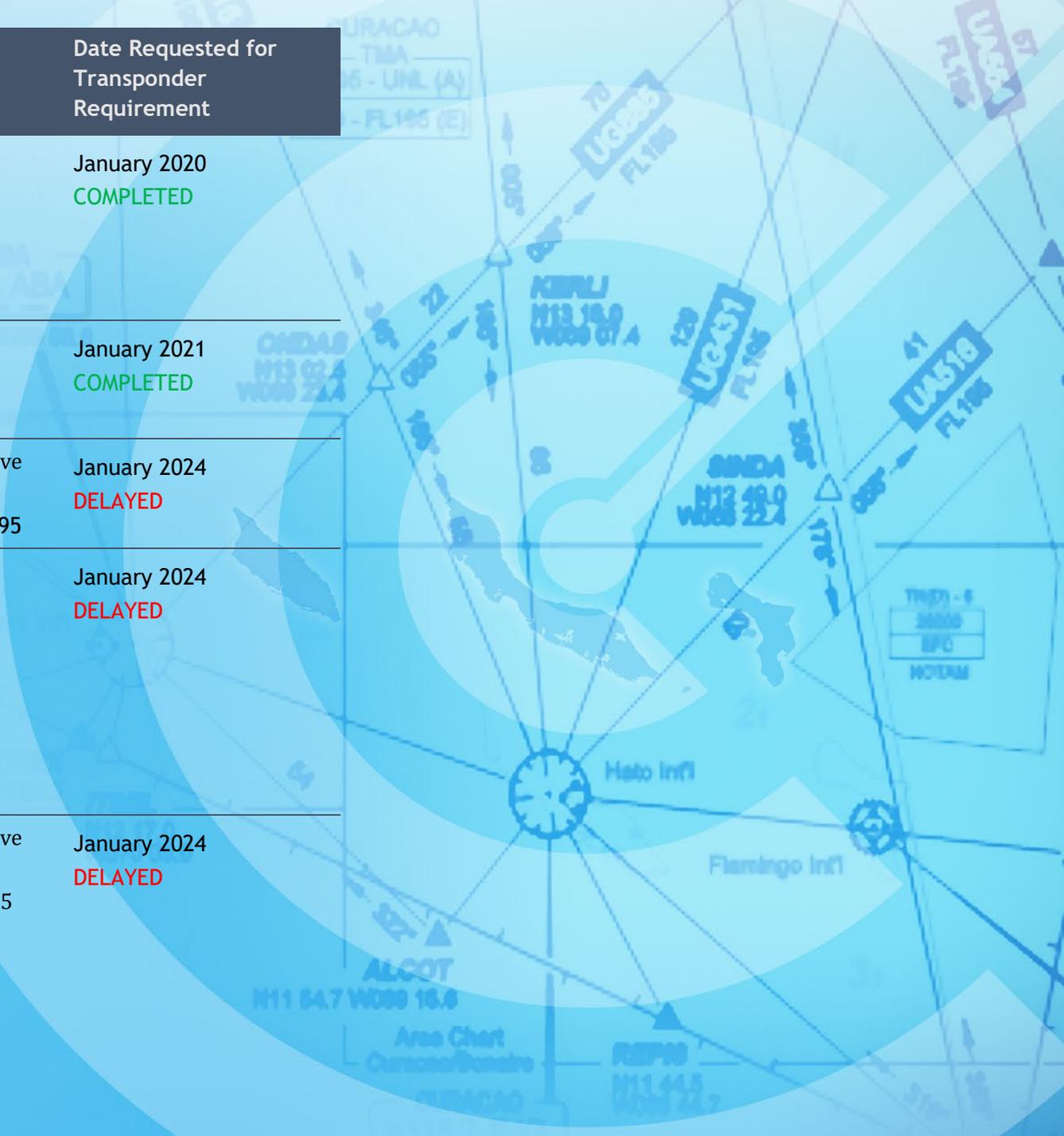
Phase 1	RVSM Airspace in Northwest Portion of Curaçao FIR (all airspace west of and including airway UM525)	Flight Level 290 and Above	January 2020 <b>COMPLETED</b>
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Phase 2	RVSM Airspace in remainder of the Curaçao FIR	Flight Level 290 and Above	January 2021 <b>COMPLETED</b>
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Phase 3	Curaçao TMA	Class A Flight Level 195 and above Class E 2500 ft. - Flight Level 195	January 2024 <b>DELAYED</b>
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Phase 3	CTR Hato	Class C 2000 ft. – Flight Level 65	January 2024 <b>DELAYED</b>
	CTR Flamingo	Class D Surface – 2000 ft.	
	Hato ATZ	Within 6 NM Radius Class B Surface – 2000 ft.	
	Flamingo ATZ	Within 6 NM Radius Class B Surface - 2000 ft.	

Phase 3	Outside the Curaçao TMA (Airspace encompassing the remainder of the Curaçao FIR outside the Curaçao TMA)	Class A Flight Level 195 and above Class E 2500 ft. – Flight Level 195 Class G MSL - 2500 ft.	January 2024 <b>DELAYED</b>
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# General experience and performance

- ATM system proved to perform to expectations using new configuration
- Reliability of Communication lines and ADS-B Data delivery are according RA
- Operational coordination errors are low since improved surveillance, improving overall Safety
- DC-ANSP postponed the full implementation for the TNCF FIR to 1 Jan 2024.