ARAIM Outreach Event
Service provision / Operations, Certification

Location: ENAC

Presenter: Jason Burns (FAA)

The concepts discussed in this briefing are the opinion of the author and do not constitute a position of the US Government.

ISM Roles

- ISM Provider (ISMP)
  - Responsible for verifying ISM parameters against a constellation
  - Responsible for generating the ISM
  - ISM generation and verification should be conducted in compliance with a international standard. This will aid with international acceptance and use of ISM values in different states.
  - ISMP role likely fulfilled by ANSP in most cases, but may not be in all cases (e.g. approved company).
- Regulator of ISMP
  - One state regulator must accept a ISMP based on their compliance with a standard

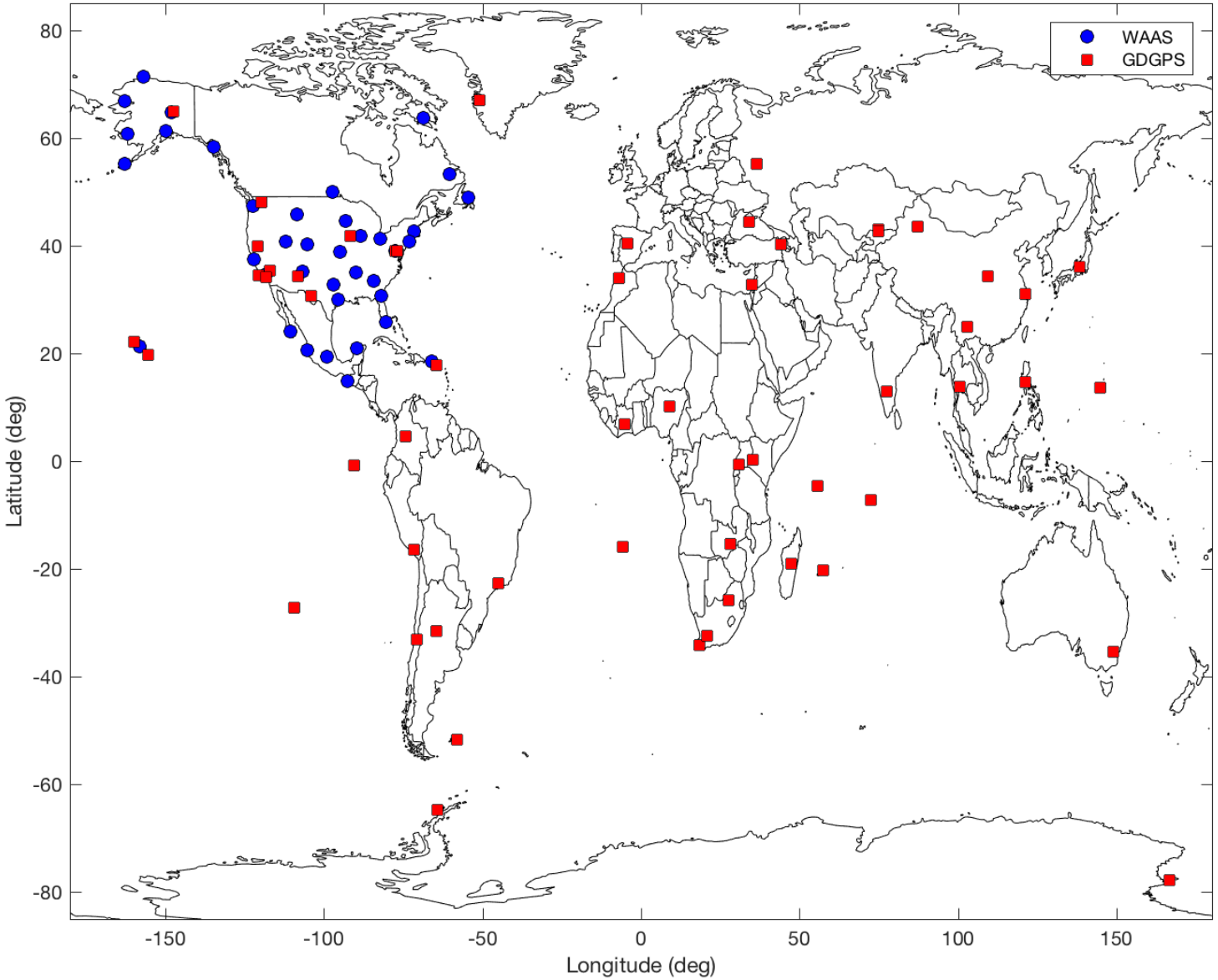
ISM Roles (cont)

- Destination Regulator
  - Regulator must authorize a ISMP ISM for use in their airspace for specific aircraft operations.
  - Note, the ISMP might be located in a different country from where the operations are approved.
    - This is similar to the case with GPS today. Each state regulator is responsible for approving use of GPS in their country even though the signal can be received everywhere.

US Example

- FAA ANSP (ATO) could function as ISMP
  - FAA currently monitors GPS against its public commitments and ICAO requirements. This could also be done for Galileo.
  - FAA would generate ISM against new ARAIM criteria (e.g. published in Annex 10)
    - A more detailed specification would be generated for ISM generation and verification based on FAA preferred implementation
- ATO ISM would be approved for operational use in process(es) coordinated and approved by FAA regulator
- US procedures and operations for ARAIM would be approved based on ISM standards, avionics ARAIM performance requirements, aircraft specific requirement and likely other requirements
- ATO ISM might be distributed globally (e.g. via GPS). As with GPS today, foreign state regulators may determine ATO ISM is ok for use in their airspace.
  - Likely foreign state may want to independently verify ISM performance, but it would require much less effort than needed by the ATO to generate and verify the ISM

ISM Generation and Verification



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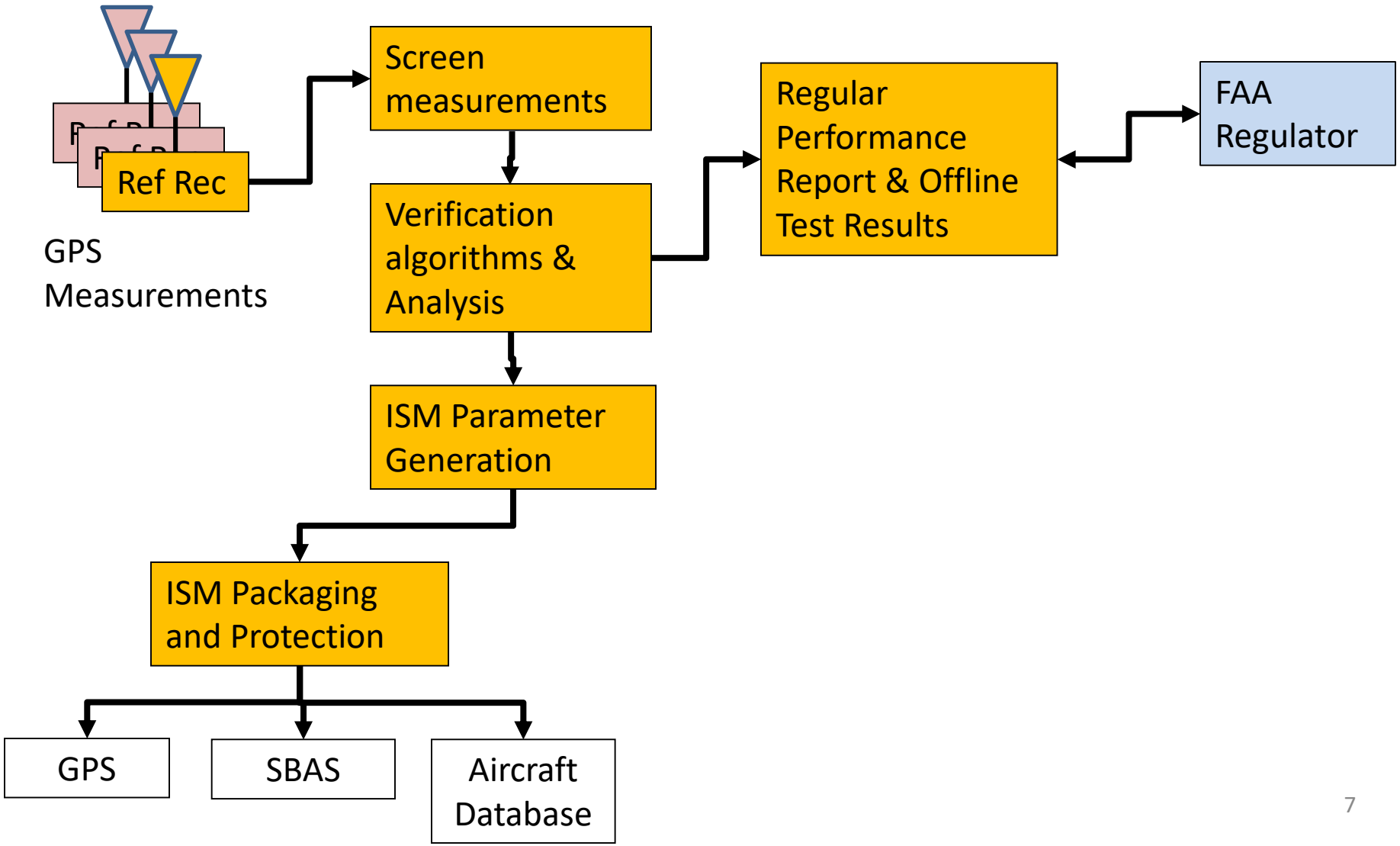
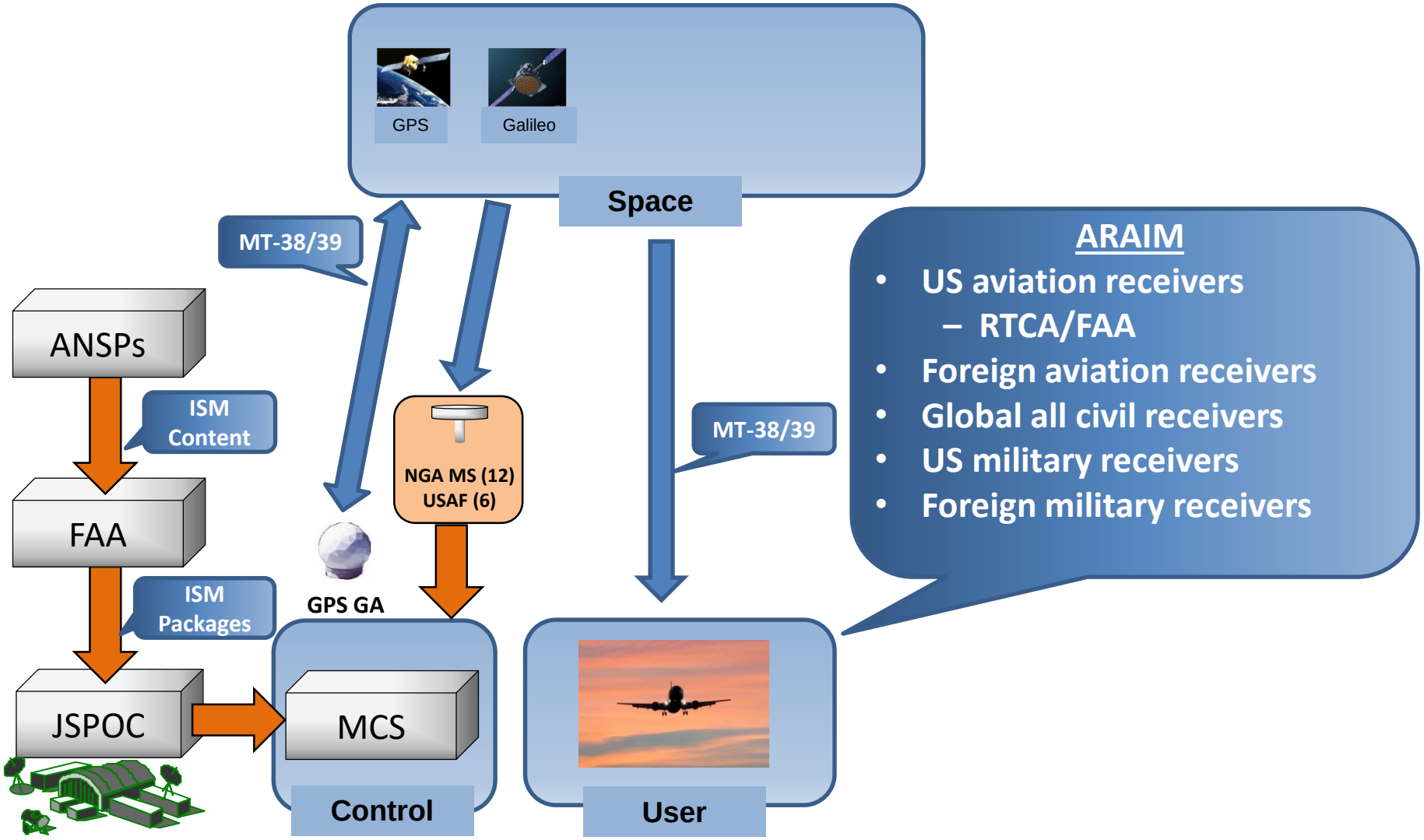


Example ISM Delivery via GPS



Some Challenges

- Need to develop standard verification requirements and methods
  - Standards need to work for multiple constellations and potentially different offline monitoring methods. Developing such standards will be challenging.
- Industry wants as few ISMs as possible and preferably one, agreed ISM delivered through standard interfaces (e.g. GPS, SBAS, database)
  - This maybe difficult in some cases, but the EU-US WG-C is developing common methods and processes for verification which could apply to both GPS and Galileo
- ARAIM and ISM concept needs to be developed with current approval process in mind
  - Each state is responsible for approving aircraft operation against a published procedures for use in their airspace. The concept must be developed with this in mind to be feasible.
- RAIM provides precedence for H-ARAIM
  - Need to follow existing regulatory path. Existing regulations should support H-ARAIM approval.

Backup