Perspectives from the International Community on the Use of EA - FAA

Federal Aviation Administration

Presented to: Enterprise Architecture Conference

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Question from the Moderator

- **How does your EA support international commitments, i.e., your system's role in a Global ATM, and identify and resolve harmonization issues including, but not limited to the timely development of necessary, stable international standards?**

$ ←→ Mission ←→ Services ←→ Infrastructure

Public Law – U.S. Code
< Title 31: Money & Finance >

President's Budget

OMB

OMB A-11

FEA
Reference Models

Performance

Business

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Public Law – U.S. Code
< Title 49: Transportation >

- Mission
- Appropriation

Regulations – CFR
< Title 14: Aeronautics & Space >
- FAR

ICAO Convention
- SARP
- PANS

Dept of Transportation (EA)

FAA (Enterprise Architecture)

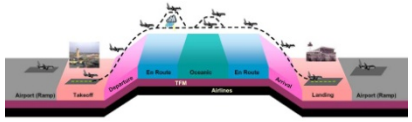
Regulatory & Admin EA

National Airspace System EA

Mission / Benefits

Services / Functions

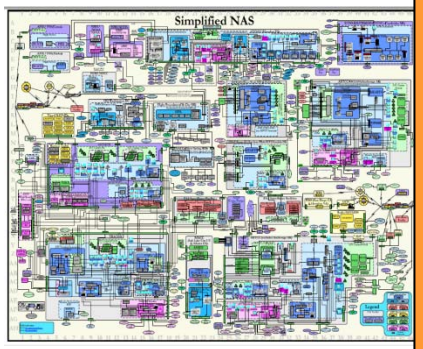
Infrastructure / Systems

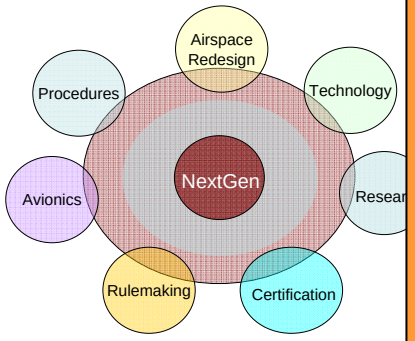


- The EA incorporates Regulations and Treaty obligations within its content

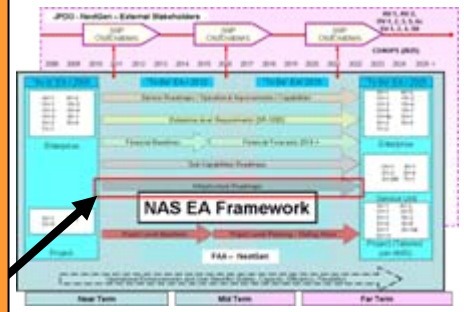
NAS EA Roadmaps Capture the Evolution Strategy

Current 2008

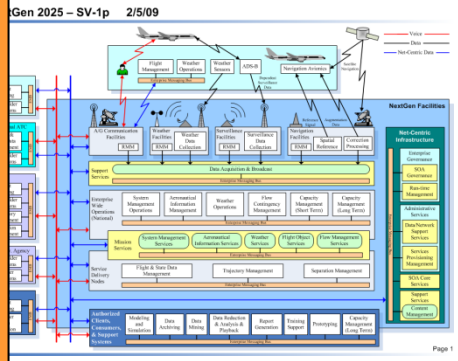




- The expanded NASEA provides detailed consistent look at for harmonization
  - CNS
  - Automation
  - Avionics
  - Procedures and Airspace
  - Human
  - Enterprise Services
  - Operations
  - Research
  - …



NextGen 2025+



International Considerations

- **To be successful:**
  - NextGen needs coincidental and synchronized public and private spending to provide the NextGen capabilities and benefits
    - Investments based on international standards and procedures
  - NextGen needs stability of the plans and configuration management will be key
    - Provisions and requirements can't change in mid-development
    - It's not just the same standards, but the same versions in many cases
- **Our NASEA and NextGen Implementation Plan are designed to address these cross-organizational and international issues**

EA and Harmonization – Europe

- **Action Plan 4 of FAA/Eurocontrol MOU**
  - SWIM
  - Flight Object
  - AIM *
  - Trajectory *

    * Expanded into individual action plans
- **EA Activities**
  - Concepts of Use
  - Operational Requirements
  - Standards
  - ICAO coordination
- **Continue and expand these activities with SESAR**

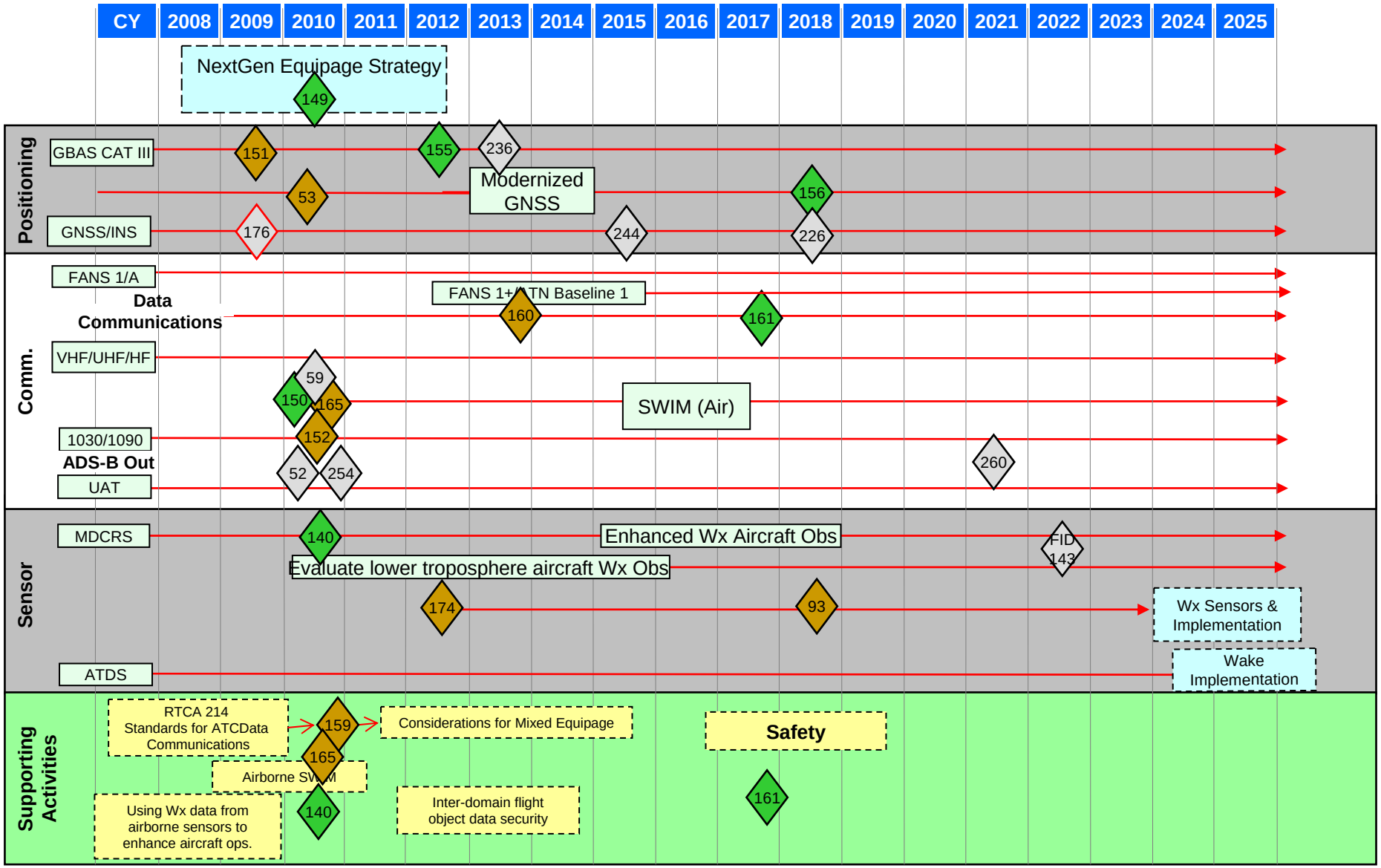
EA and Harmonization – ICAO

- **Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS) - provide the foundation for NextGen global harmonization**
  - The FAA is committed to the SARPS and PANS
- **We believe that current SARPs and PANS need to be assessed to determine the degree to which they support the migration to the Global Concept**
  - Mapping NextGen to the Global Plan
    - Operational Improvements
    - Performance
  - Identifying needed changes /new SARPS and PANS that support NextGen, SESAR and others efforts to transform ATM

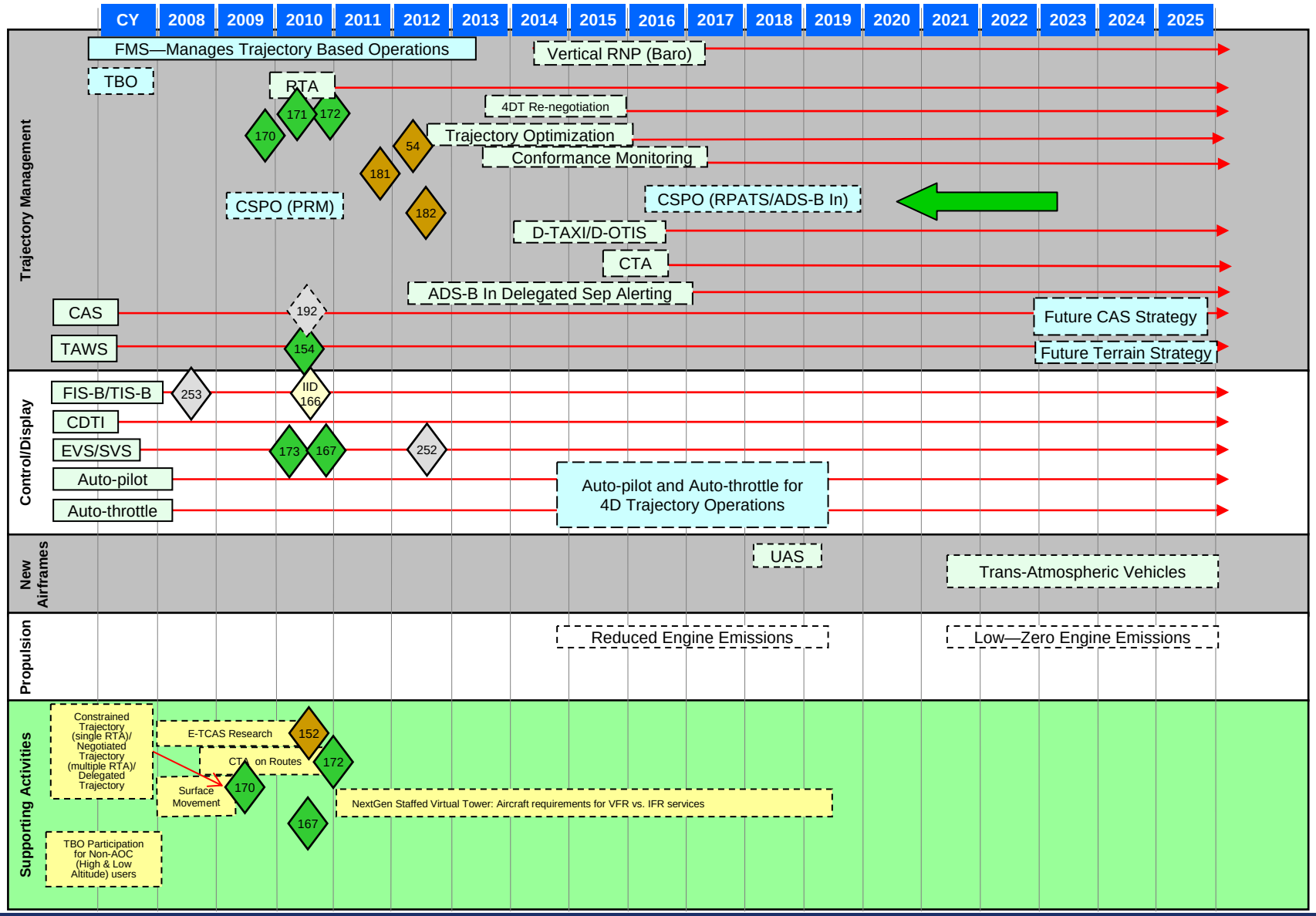
EA and Harmonization - Example

- **EA provides a systematic way to identify decisions and activities which may need harmonization**
  - Aircraft Roadmap as example
- **EA supports detailed activities prior to investments**

Aircraft Roadmap (1 of 2)



Aircraft Roadmap (2 of 2)



Aircraft Roadmap: Decision Points (1 of 2)

DP #	Target Date	Name
53	2010	Agency policy published on Navigation future configuration to be GNSS-based
54	2012	Decision to develop avionics policy and standards for Enhanced Aircraft Flight Management Systems to support 4D super density operations. (DP 171. DP 172 must be completed)
93	2018	Rulemaking decision for equipage of Weather Sensors and Wake Turbulence implementation
140	2010	Decision on Enhanced Weather Sensors to support enhanced Wx observations and forecasting
149	2010	NextGen Equipage Implementation Plan (not realistic for single equipage for all capabilities)
150	2010	Airborne Communications Infrastructure
151	2009 Q3	Airborne Navigation Backup (eLoran, IRU, other backup) (must complete NAV DP 23, 24 2009Q1, likely FY09Q3, New Administration)
152	2010	Cooperative Surveillance Concept (SC-218, including TCAS concept)
154	2010	Determine are TAWS algorithms sufficient for NextGen (Terrain)
155	2012	First operationally approved GBAS Cat III through proof-of-concept (non-Fed)
156	2018	Initial new GNSS capabilities expected to become operational
159	2010	Aircraft standards publication for Segment 1 linked to DataComm
160	2013	Aircraft standards publication for Segment 2 linked to DataComm
161	2017	DataComm Avionics development complete, Forward Fit begins.
165	2010	SWIM Air Policy
166	2010	Decision on enhanced FIS-B services
167	2009 Q4	Decision on Enhanced Vision System (EVS) architectures to support low and zero visibility approach and surface operations (IR signature) (SC-213 MASPS, MOPS, TSO, AC)
170	2009 Q3	Decision on implementation of required time of arrival (without full 4DT) (AVS Product?)
171	2010	Define role of aircraft vs. AOC vs ATS in trajectory optimization (defining requested trajectory)

Notional Example: NextGen Parallel Approaches – Independent Below 3000ft

- **Near-Term Evolution of Capability**
  - Authorize RNP-0.3 approaches (using GNSS), GBAS GLS and SBAS LPV under same conditions as ILS
  - Authorize use of ADS-B under same conditions as SSR
- **Mid-Term Potential Strategies**
  - Blunder Strategies
    - **Prevention**
    - **Controller intervention**
    - **Pilot intervention**
    - **VMC-like capability**
  - Wake Vortex Strategies
    - **Along-track and vertical navigation**
    - **Wake vortex prediction and monitoring**
    - **VMC-like capability**

Notional - Standards Maturity

Code	Description	GPS	RNP	SBAS	GBAS	ADS-B Out	Precise ADS-B Out	App moni-tor	EVS	Data link	ATK nav	Wake sensor	SVS	TCAS
RS-PR-2	Parallel Approaches in IMC with reduced lateral spacing	●	●	●	●	●	⊗	⊗	x	⊗	x	x	x	x

Near-term applications have complete standards

Precise ADS-B Out: Performance requirements as function of runway spacing and intervention strategy

Approach Monitor (ADS-B In): Required parameters (selected approach, flight control mode?), displays

EVS: Suitability of EVS image, reliability of acquisition

Datalink: Approach clearance, aircraft automatic loading of approach, confirmation of loaded approach

ATK nav: RTA and velocity, or relative nav?

Wake sensing: Feasibility, performance, displays

SVS: Display of other traffic, display of wake?

TCAS – Current TCAS logic may not be able to deal with reduced separation requirements implied by high-density

Summary

- **EA plays a strong role in FAA's Mission**
- **EA plays a strong role in global harmonization**
- **EA provides a basis for identifying**
  - Needs for harmonization
  - Timing for harmonization
- **EA at the global coordination level is evolving**

Conclusion

- **NASEA provides a basis for a coordinated and coherent plan for the evolution of ATM – including the aircraft component**

- **Our NASEA and the NextGen Implementation Plan allows us to set expectations for the community, airspace users, our civil aviation department counterparts and ICAO on our phased implementation**

- **We support detailed comparisons and joint planning with SESAR and other ANSP initiatives to assure global harmonization**