



An Airborne Communications Roadmap for the U.S. Federal Air Marshal Service: Overview & Status

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Introduction

- Federal Air Marshal Service (FAMS) Mission:
“To promote confidence in our Nation’s civil aviation system through effective deployment of Federal Air Marshals (FAMs), to detect, deter, and defeat hostile acts targeting U.S. carriers, airports, passengers, and crews.”
- After 9/11, the need for improved air to ground communications capabilities for the FAMs and other law enforcement officers was identified.

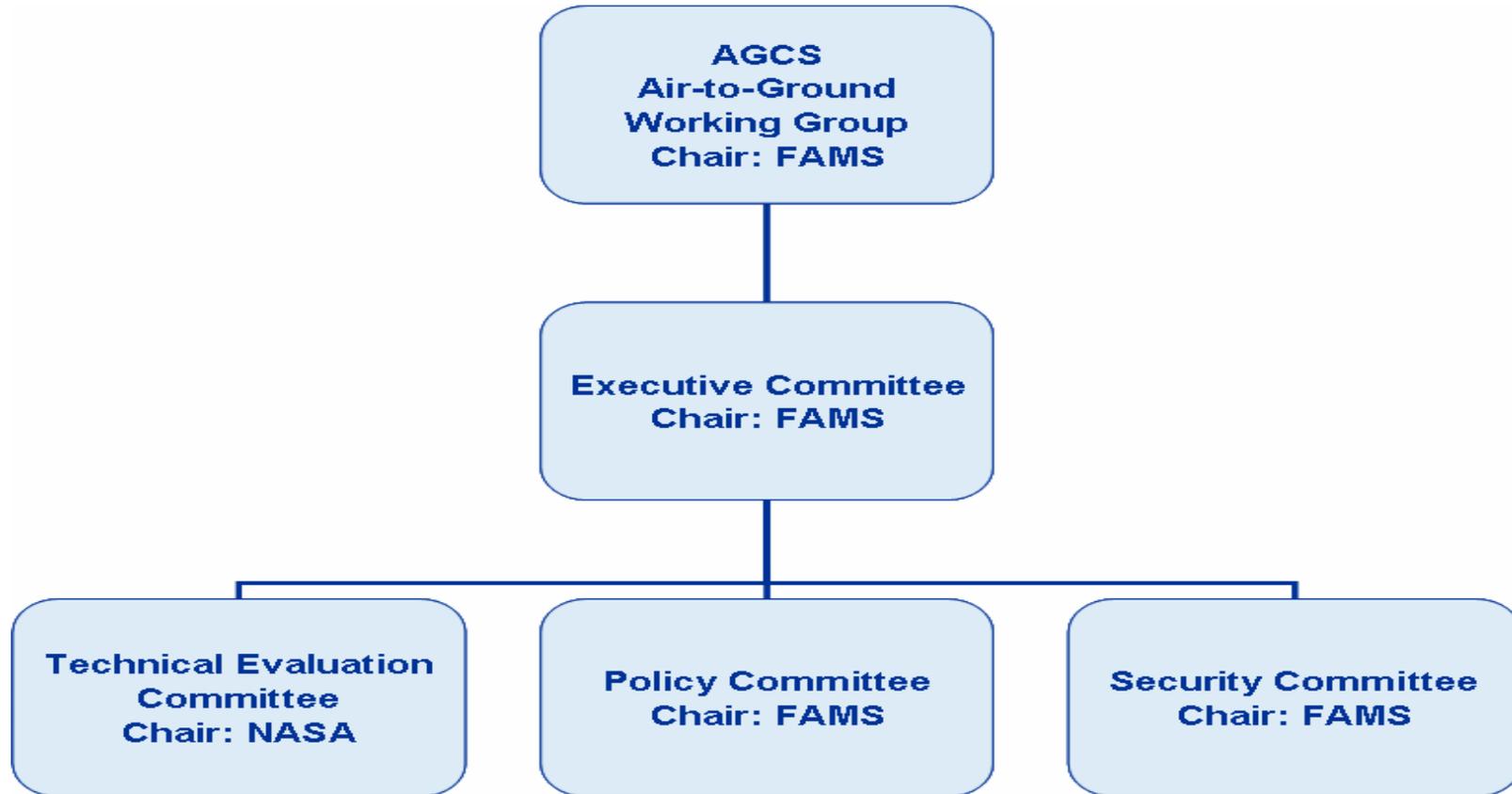


Communications Goal

- A communications *capability* satisfying the operational needs of the Federal Air Marshal Service involving *aircraft platforms*.
 - **Capability**: Fully realized, deployed and useable end-to-end solution.
 - **Aircraft Platforms**: Communications within an aircraft and between other air and ground contacts.



Air-to-Ground Working Group Structure



AGWG Membership: US Government Agencies, Commercial Air Carriers, and Aviation Industry Trade Organizations



Working Group Tasks

1. Develop a *Technical Implementation Plan*, or **Roadmap**, for time-phased options for implementation of the Air-Ground Comm System (delegated to the Technical Evaluation Committee)
2. Develop a *Business/Government Partnership* to implement the Roadmap

Key Note:

FAMS intent is to ultimately procure standard communications services and end-user equipment from commercial providers to meet its requirements.

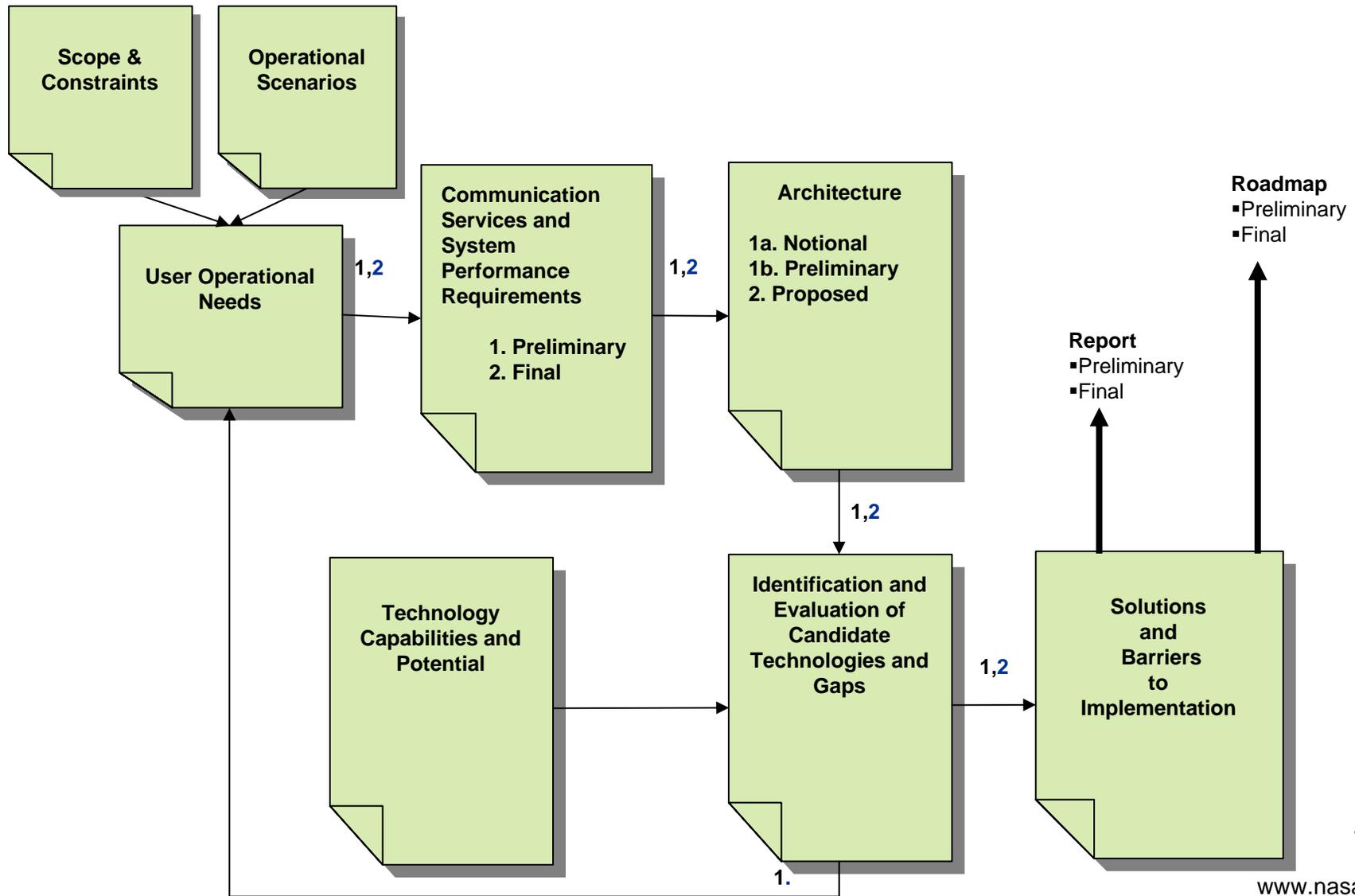


Technical Evaluation Committee Objective

- Provide communications technology *roadmap* identifying *services*, *technology maturity*, and *gaps* for the Federal Air Marshal Service.
 - **Services:** End-to-end capabilities provided to users.
 - **Technology Maturity:** Commercially available, adopted by aviation, full aviation deployment.
 - **Roadmap:** Information provided as to how to achieve a final destination or goal that includes a timeline of expected capabilities (progress) attained.
 - **Gaps:** Existing and emerging technologies determined as inadequate to fully realize FAMS operational needs.

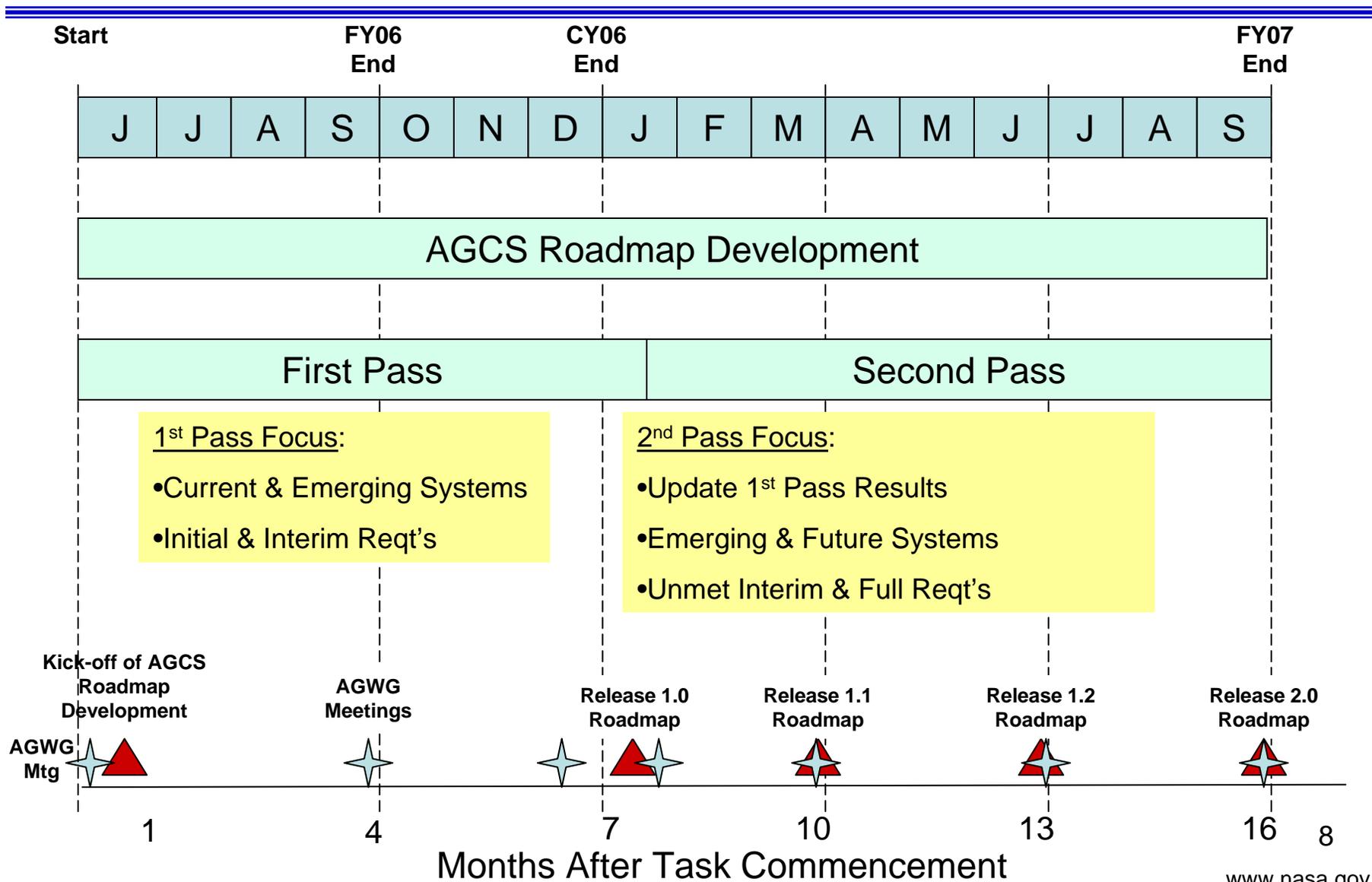


Approach: Iterative Process (Passes 1 & 2)



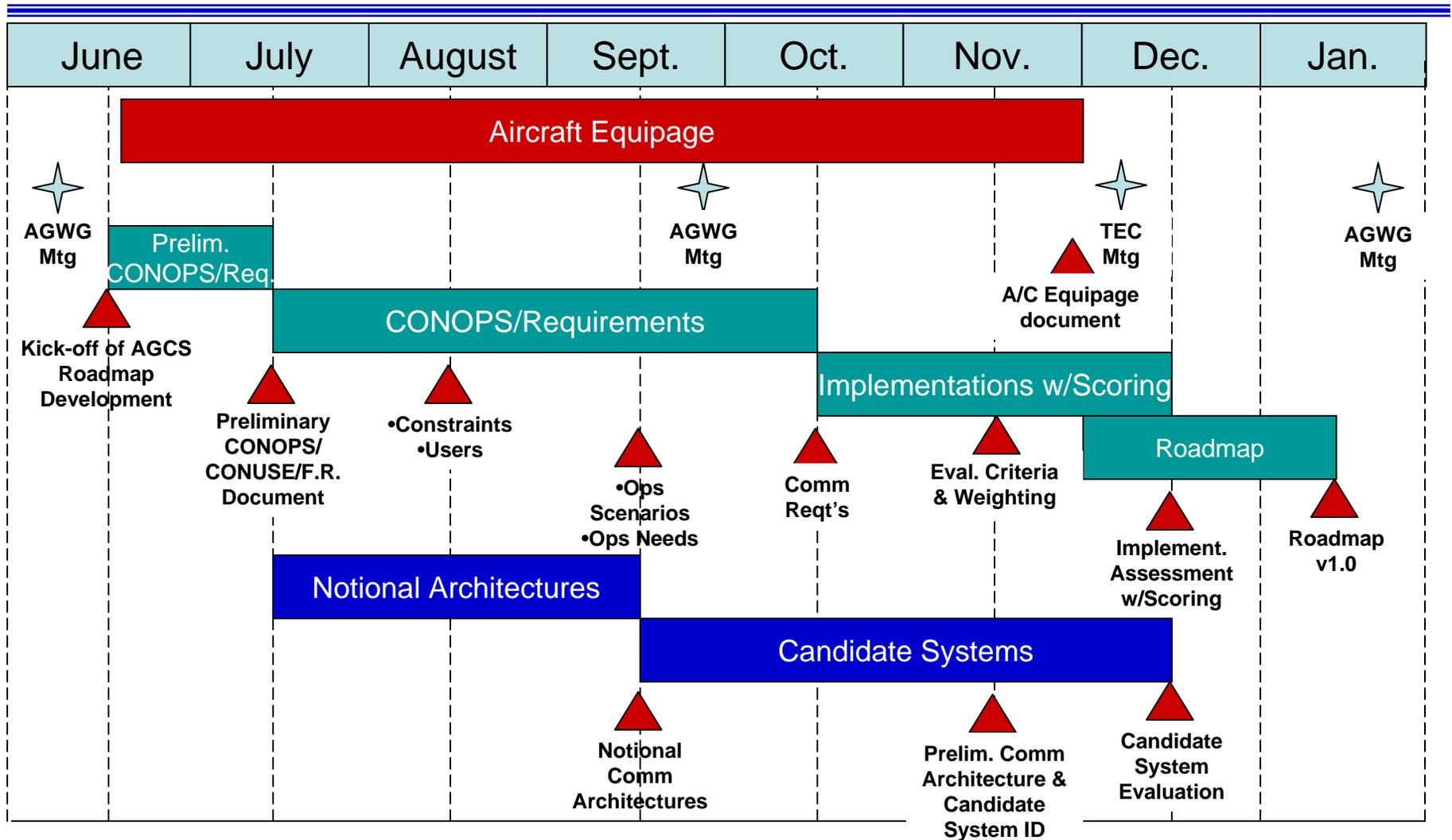


Overall Schedule



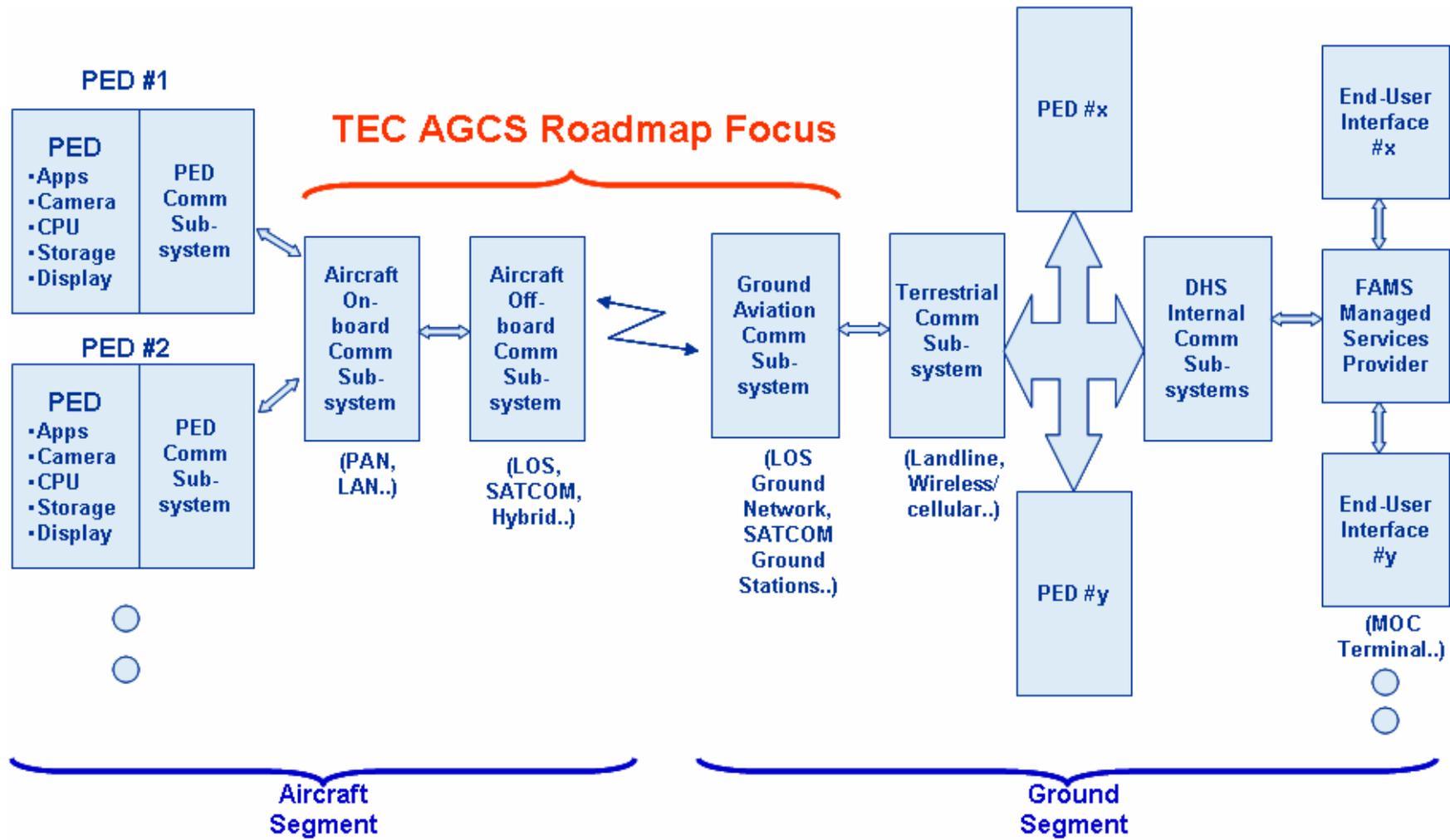


“Pass 1” Schedule & Key Deliverables





Roadmap Scope/Focus



Air Ground Communications System (End-End)



Key Constraints

- Regulatory
 - RF interference to on-board and ground systems; certification
 - Compliance to Comm Assistance for Law Enforcement Act (CALEA)
- Operational
 - FAMS operational mission sensitivity
 - Aircraft operator constraints
 - RF interference, PIC approval (e.g. sterile cockpit), business case
- Programmatic
 - Aggressive Roadmap development schedule
 - Unique Business/Govn't Partnership & shared funding strategy
 - FAMS as primary users, others secondary
 - Information protection in the context of building Partnership
- Other:
 - Nuisance to other passengers (for voice comm)



Users

- FAMS (Primary)
 - FAMS in the field
 - TSA FAMS Mission Operations Center (MOC), as chief coordination mechanism
- TSA Explosive Division (transportation explosives security)
- Force Multiplier Program (far term use)
 - Potential users at federal, state & local levels
- On-board flight crew
 - Pilots
 - Flight Attendants

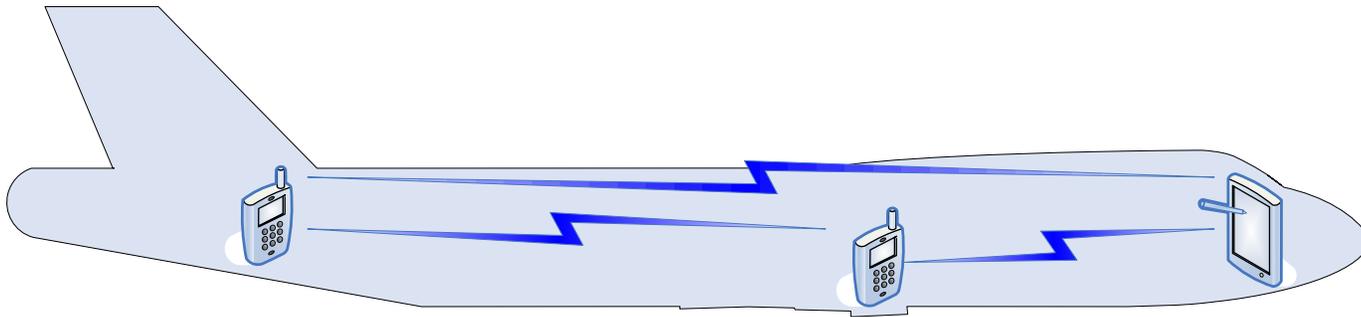


Operational Service Needs

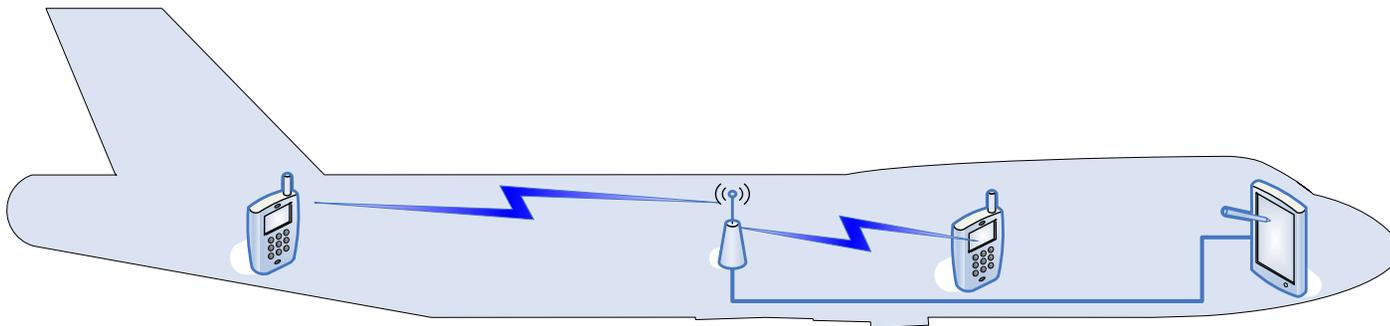
- Categorized as
 - Initial (within 2 yrs), Interim (within 5 yrs), Full (within 10 yrs)
- On-board:
 - Cabin and Cockpit
 - Voice, text paging, instant messaging, imagery
 - One-way and two-way
 - Connectivity (FAM-FAM, FAM-Pilot, etc.)
- Off-board:
 - Similar to on-board, but includes E-mail and Internet services
- Above mapped to phase of flight
 - Departure gate, departure taxi, departure, en-route, arrival, arrival taxi, arrival gate)



On-board Notional Architectures



Personal Area Network

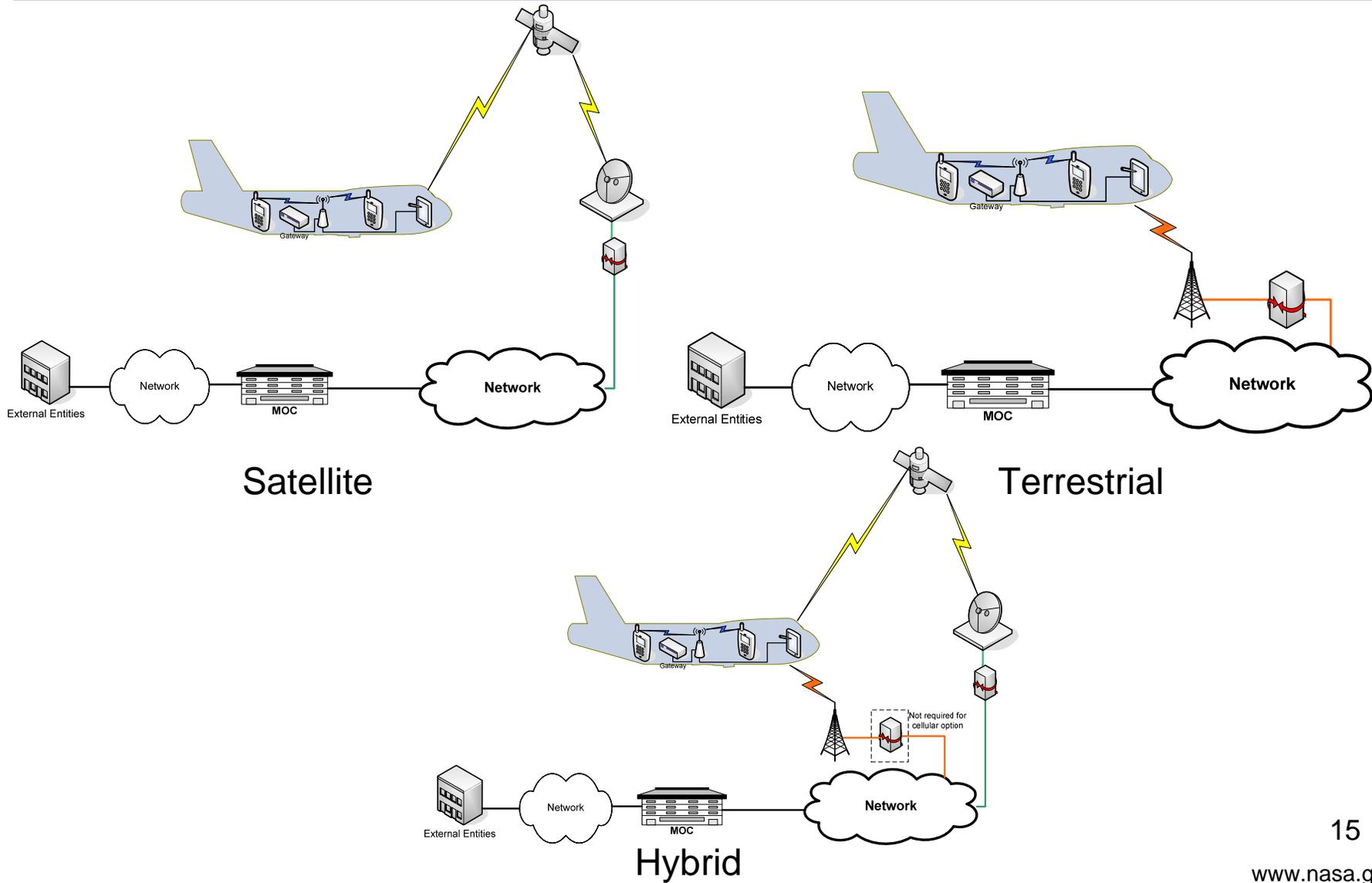


Note: Cockpit device may be wired or wireless depending on a number of factors (e.g., airline equipage, certification, etc.)

Local Area Network



Off-board Notional Architectures





Comm System Performance Requirements

- System availability/reliability
- Propagation/coverage
- Spectrum
- Performance:
 - Capacity
 - Latency
 - Link quality (e.g. Bit Error Rate)
 - Accessibility
 - Integrity
 - Security

Preliminary Aircraft Capacity Requirements (aggregate in Kbps)



	GATE	TAXI	DEPARTURE	ENROUTE	ARRIVAL	TAXI	GATE
On-Board							
Initial:							
Typical	0.6	0.3	0.3	0.3	0	0.3	0.3
Peak	876.6	876.6	0.3	12.3	0	876.3	876.3
Interim:							
Typical	0.9	0.9	0.6	0.9	0.6	0.9	0.9
Peak	11532.9	11556.9	12.6	11556.9	12.6	11556.9	11544.9
Off-Board							
Initial:							
Typical	0.6	0.6	0	0.3	0	0.6	0.6
Peak	108.6	108.6	0	0.3	0	108.6	108.6
Interim:							
Typical	20.6	20.6	0.6	20.6	0.6	20.6	20.6
Peak	574.6	574.6	0.6	574.6	0.6	574.6	574.6