Federal Aviation Administration

Wide Area Multilateration Implementation (WAM) Example

Presented to: ADS-B Implementation Workshop

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Module Objectives

- Definition of AMS
- AMS Policy
- AMS Guidance
- Lifecycle Management Process
- WAM Implementation Example
- Document Summary

Definition of AMS

Acquisition Management System (AMS) establishes agency-wide policy and guidance for all areas of lifecycle acquisition management.

AMS Policy

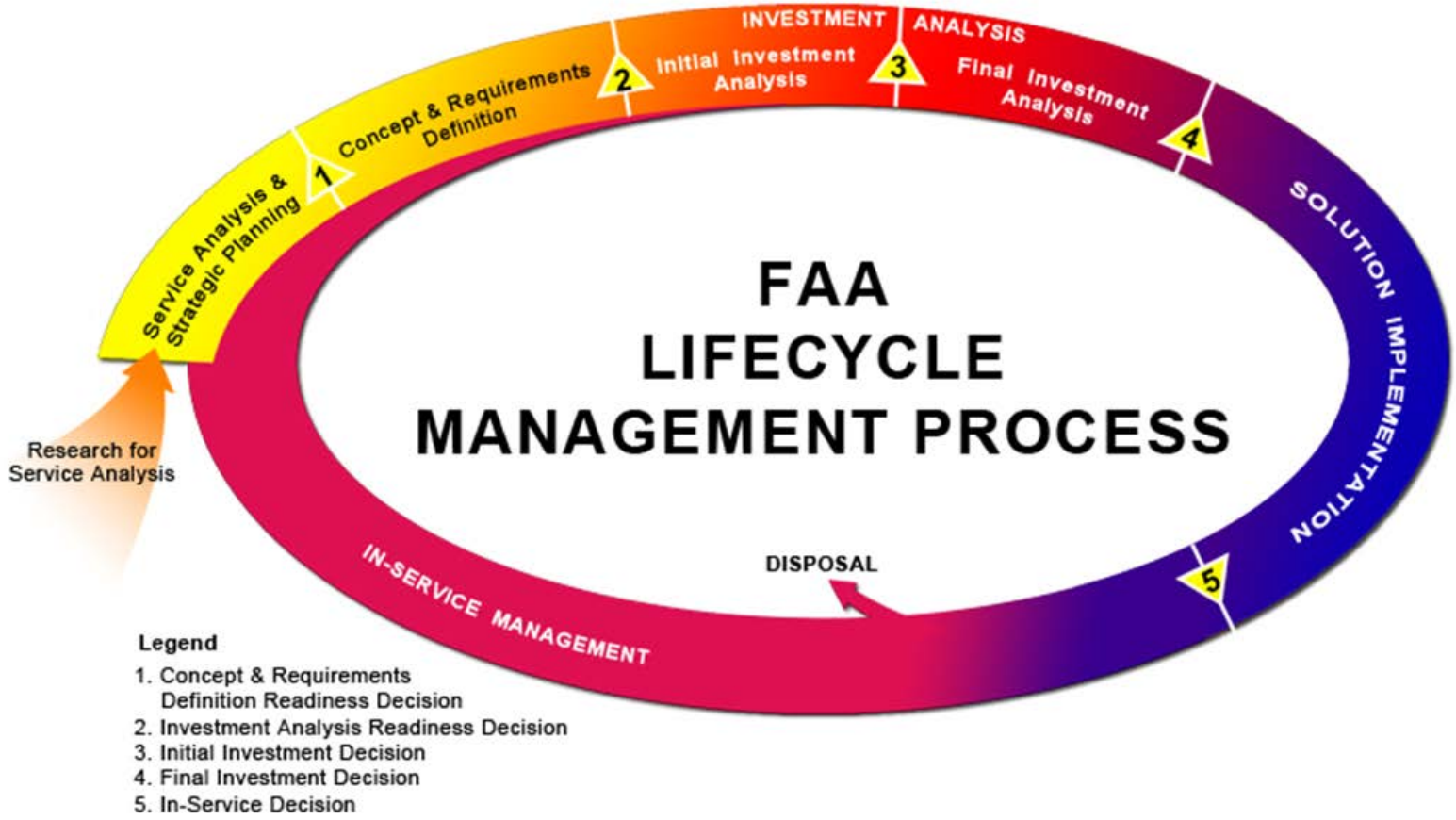
- **Acquisition Management Policy describes the mandatory requirements of the AMS, applicable to all activities associated with the analysis of agency needs for:**
  - Products, Services, and Facilities
  - Determination of Requirements
  - Analysis of Investment alternatives
  - Establishment of Investment Programs
  - Allocation and Expenditure of Resources
  - Procurement
  - Deployment, In-Service Management, and Disposal of products and services

AMS Guidance

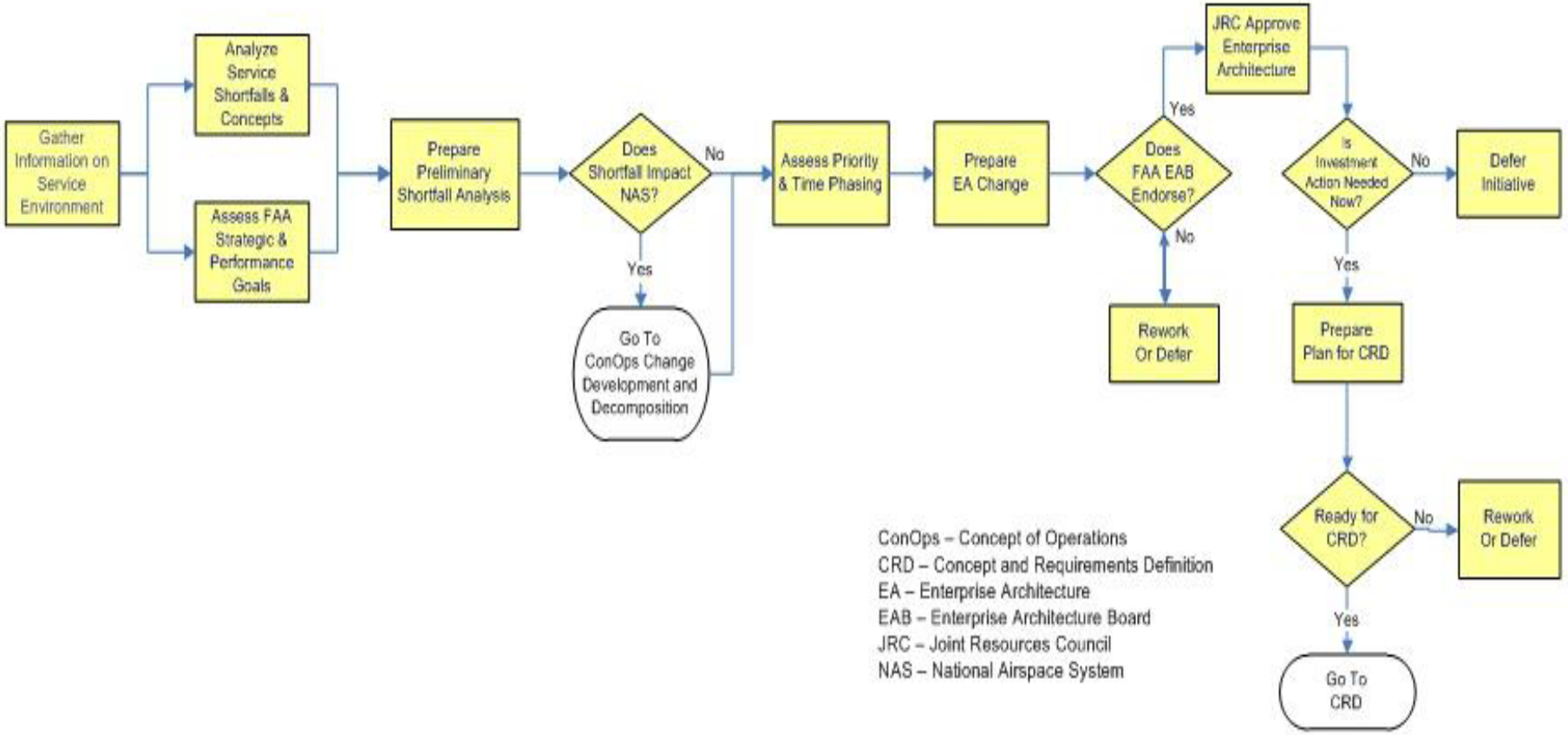
- **Acquisition Management Guidance is the set of agency-endorsed guidelines, processes, instructions, templates databases, handbooks, checklists, and other information that supplements, expands, illustrates, or implements acquisition management policy.**

- **Derived from the AMS Policy and is followed unless a rational basis for adopting a different approach exists.**

Lifecycle Management Process



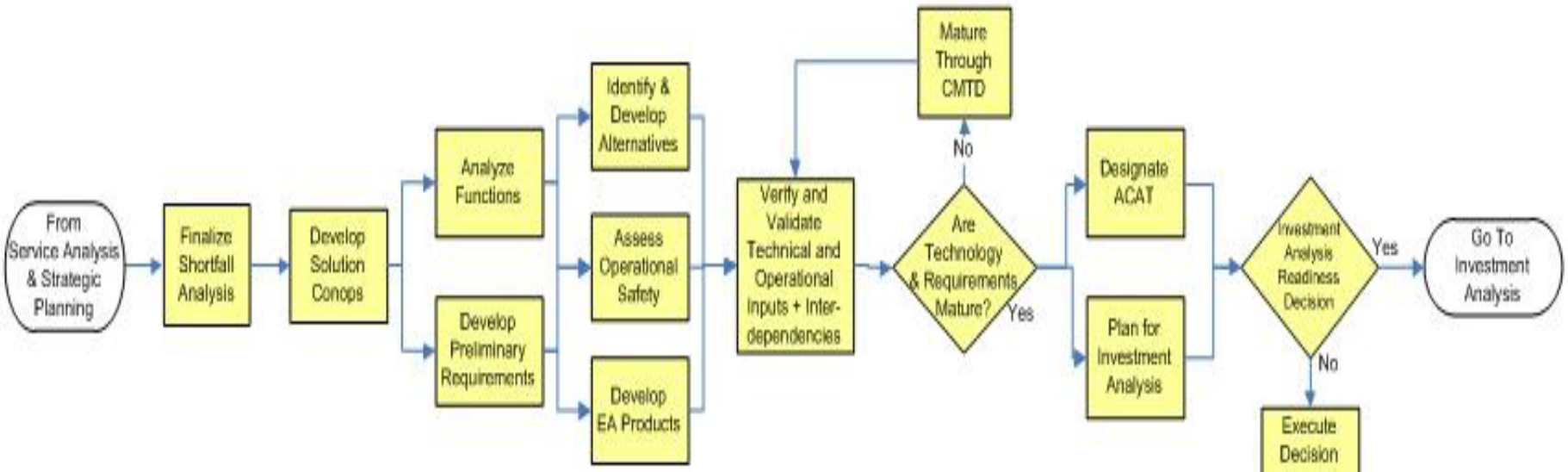
Service Analysis and Strategic Planning



Acquisition Example

- **Colorado Mountain Airport Surveillance**
  - Background
    - Over the past 15 years the Ski Country of Colorado has become an increasingly popular recreational destination
    - The corresponding increase in traffic volume resulted in increased delays and denied service especially during bad weather
    - FAA implemented a Special Traffic Management Program (STMP) during peak travel months in an effort regulate traffic to the airports
      - Program keeps traffic volume manageable but produces extended delays and/or diversions and denial of services
    - Shortfall analysis suggested that a lack of surveillance is one of the main reasons behind the economic losses as a result of reduced capacity
      - The base of existing radar coverage is at or above 12,000ft

Concept and Requirements Definition



ACAT – Acquisition Category
CMTD – Concept Maturity Technology Development
EA - Enterprise Architecture

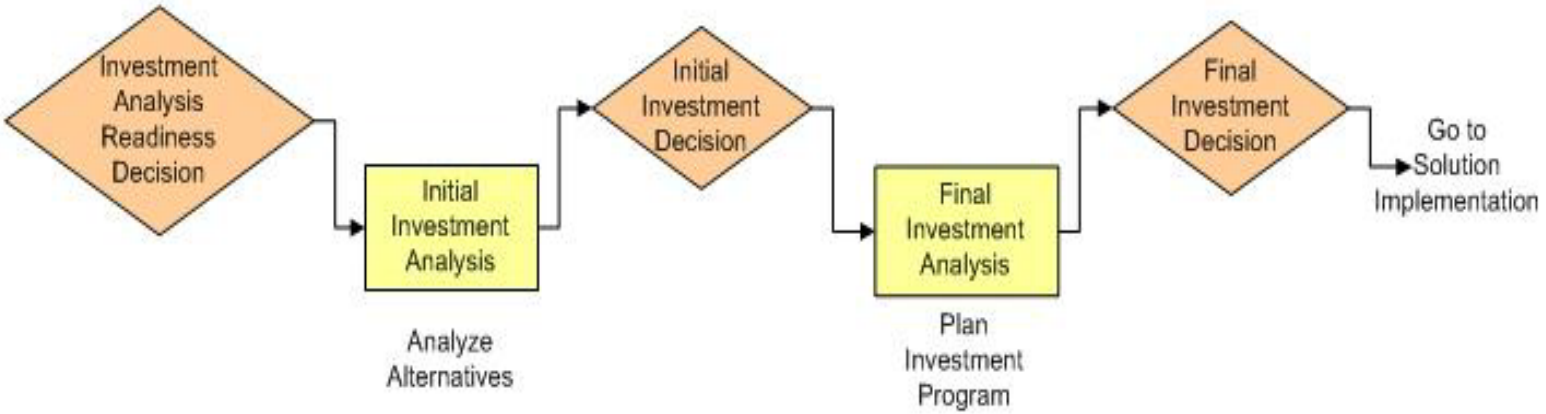
Acquisition Example

- Alternatives Analysis
  - An alternatives analysis was conducted to determine the most cost and operationally effective solution to increase airport capacity
    - Ten (10) airports were included in the analysis
  - Analysis was divided into two phases:
    - A preliminary analysis for establishing initial evaluation criteria, potential alternatives, and down selecting alternatives
    - A detailed analysis for producing a technology recommendation on the basis of effectiveness, risk, benefits, and cost considerations.
  - The following alternatives were considered during detailed analysis
    - ATCBI-6 SSR Interfaced to ERAM
    - ADS-B 1090ES Surveillance interfaced to ERAM
    - Multilateration with 1090ES ADS-B interfaced to ERAM
    - Multilateration with 1090ES and UAT ADS-B interfaced to ERAM

Acquisition Example

- Alternatives Analysis (con't)
  - An evaluation team was established to identify evaluation criteria and assign a relative weighting to each criterion
  - The team assessed the effectiveness of each alternative on the basis of the following evaluation criteria:
    - Performance
    - Aircraft Equipage
    - Maintainability
    - Execution Schedule
    - Deployment Complexity
  - The evaluation team also assigned risk levels to implementing each alternative
  - A life cycle cost estimate was developed for each alternative

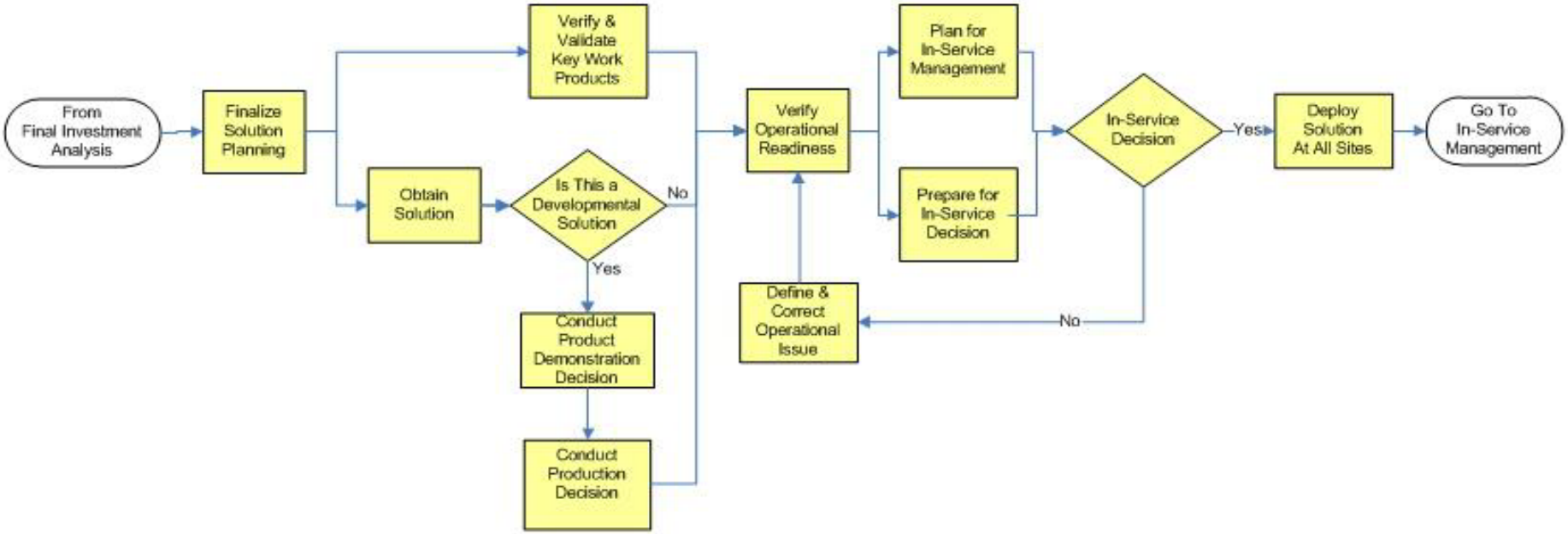
Investment Analysis



Acquisition Example

- Alternatives Analysis (con't)
  - A life cycle cost estimate was developed for each alternative
    - Estimates were compared with the effectiveness scores and risk levels associated with each alternative
  - Multilateration with 1090ES and UAT ADS-B interfaced to ERAM was selected based on the effectiveness scores, relative risk levels, and life cycle costs
- Benefits Analysis
  - A detailed Benefits Analysis was conducted in conjunction with the alternatives analysis
    - Identified the solution which yielded the most economical results
    - FAA, User, and Indirect benefits are included in the analysis
- Investment Analysis results support decision to move forward with implementation
  - Positive Benefit to Cost ratio

Solution Implementation



Acquisition Example

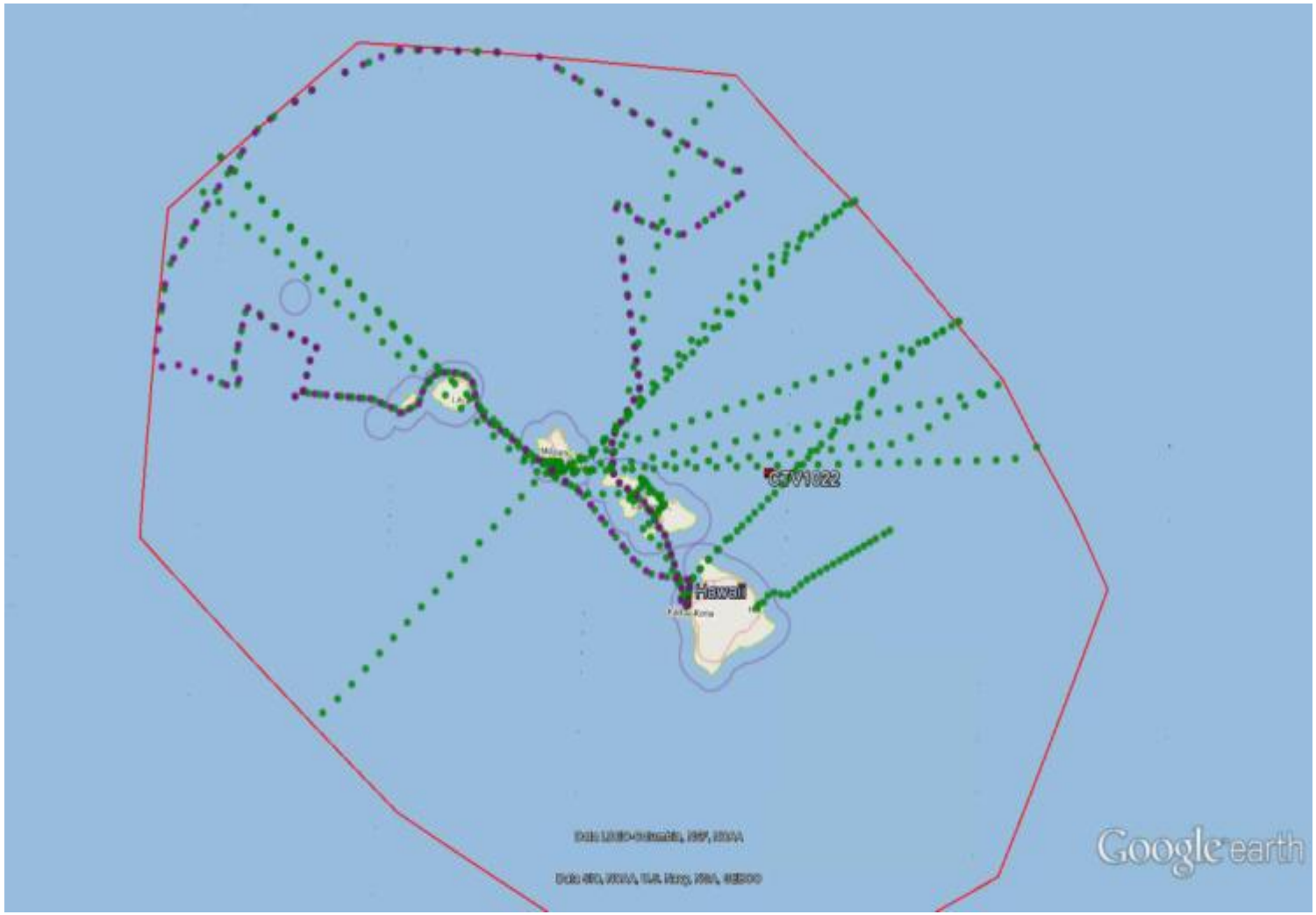
- Solution Implementation
  - Detailed requirement documentation was developed to support acquisition activities including:
    - Specifications
    - Interface Requirement Documents
    - Statement of Work
  - Request for Proposal (RFP) for system procurement published
  - Proposals from vendors evaluated for conformance with solicitation and “best value” solution
  - Contract awarded based on the outcome of the proposal evaluations
  - Post-award conference held with Vendor to discuss development and implementation activities and schedule

Acquisition Example

- Solution Implementation
  - The following major contractual milestones were defined:
    - System Requirements Review – discuss interpretation and issues with any program requirements
    - Preliminary Design Review (PDR)
    - Critical Design Review (CDR)
    - Factory Acceptance Tests (FAT)
    - Site Acceptance Tests (SAT)
  - Once Vendor testing was completed the FAA conducted the following activities:
    - Operational Test and Evaluation (OT&E)
    - Independent Operational Assessment
  - The system then entered an Initial Operational Capability (IOC) period once all stakeholder major issues have been addressed

Hawaii ADS-B LV2: 24 Hour Snapshot (Fri July 10th, 2015) Suitable for ATC automation

https://vimeo.com/134012172

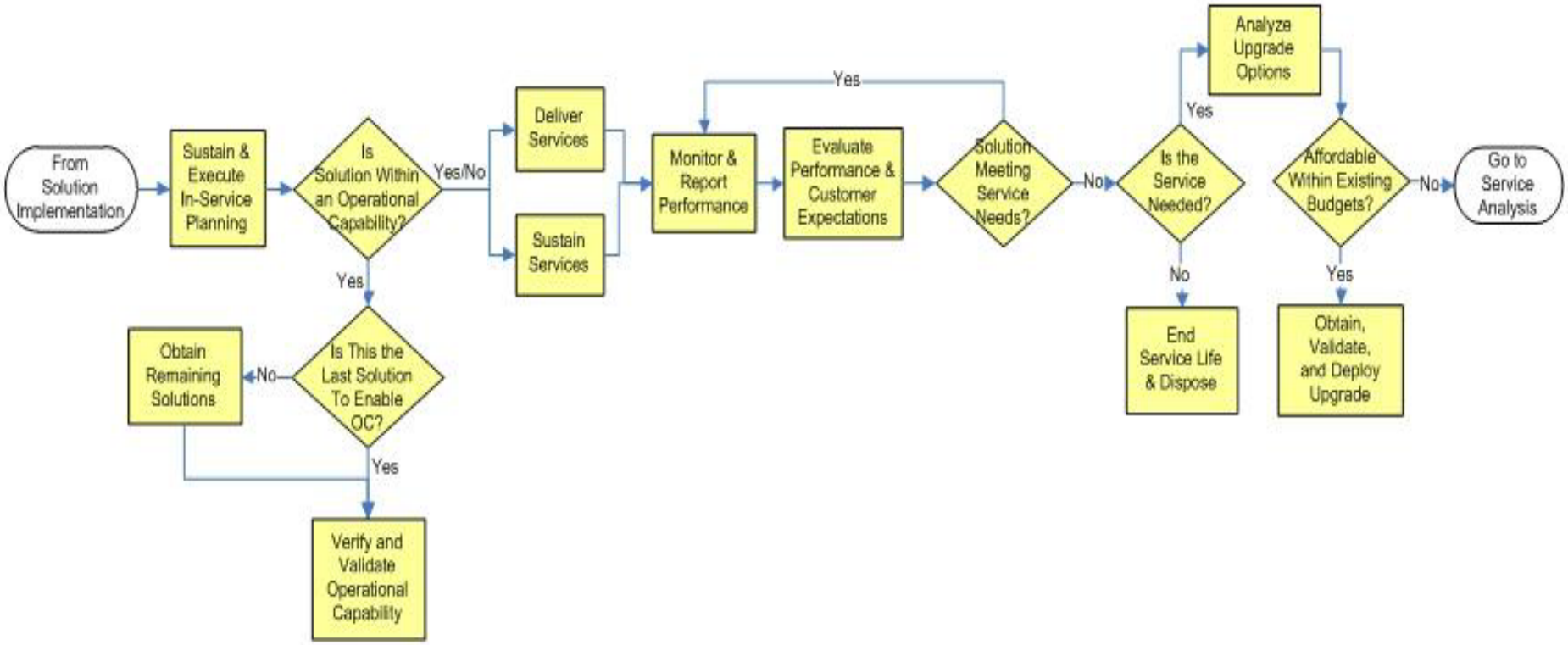


Count	Operator or Type
3	UPS
6	Business Jets
2	Delta
1	FAA Test Aircraft
12	Total

Note: Some aircraft with multiple flights

Green = DO-260B

In-Service Management



Document Summary

- Minimum Operational Performance Standards (MOPS) for ADS-B and TIS-B, 1090ES [RTCA DO-260B, Eurocae ED-102A, and ICAO Doc 9871, Edition 2]
- Minimum Operational Performance Standards (MOPS) for ADS-B Universal Access Transceiver (UAT), [RTCA DO-282B and ICAO Doc 9861, Edition 2]
- Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications (ASA) System [RTCA DO-317A and Eurocae ED-194]

- TSO-C74d: Air Traffic Control Radar Beacon System (ATCRBS) Airborne Equipment
- TSO-C112d: Air Traffic Control Radar Beacon System / Mode Select (ATCRBS/MODE S) Airborne Equipment
- TSO-C145c: Airborne Navigation Sensors Using The Global Positioning System Augmented By The Satellite Based Augmentation System
- TSO-C154c: Universal Access Transceiver (UAT) Automatic Dependent Surveillance-Broadcast (ADS-B) Equipment Operating on Frequency of 978 MHz
- TSO-C157a: Aircraft Flight Information Services – Broadcast (FIS-B) Data Link Systems and Equipment
- TSO-C166b: Extended Squitter Automatic Dependent Surveillance - Broadcast (ADS-B) and Traffic Information Service - Broadcast (TIS-B) Equipment Operating on the Radio Frequency of 1090 Megahertz (MHz)
- TSO-C195a: Avionics Supporting Automatic Dependent Surveillance-Broadcast Aircraft Surveillance Applications

- AC 90-114, Change 1: Automatic Dependent Surveillance-Broadcast (ADS-B) Operations
- AC 20-165A: Airworthiness Approval of Automatic Dependent Surveillance - Broadcast (ADS-B) Out Systems
- AC 20-172A: Airworthiness Approval for ADS-B In Systems and Applications

- 14 CFR 91.225: ADS-B Out Equipment and Use
- 14 CFR 91.227: ADS-B Out Equipment Performance Requirements

- FAA Order 8200.45: Automatic Dependent Surveillance-Broadcast (ADS-B) Flight Inspection

http://rgl.faa.gov/

Implementation Summary

- **Having a clearly identified AMS process is a powerful tool to ensure a standardized approach in the decision making process.**
  - Policy
  - Guidance

- **Lifecycle management does not end at deployment.**
  - In-Service Management