REDAC NAS Ops Portfolio Review

NAS Operations PPT

John Marksteiner
March 2015

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PPT Portfolio Overview

- NAS Ops PPT for the FY2015 FAA budget process includes the following areas:

  - Concept Development and Validation (CD&V) activities

  - OCVM Funding ended in FY14

    - Future CD&V activities must be tied to Portfolios

    - FY16 proposed funding in Performance Based Navigation and Metroplex Portfolio (Optimized Route Capability, NextGen Trajectory Negotiation)

    - FY17 proposed funding in Separation Management (TMI Attribute Standardization, Vertical Conformance Verification) and PBN Portfolios (Optimized Route Capability, NextGen Trajectory Negotiation)

    - FY17 proposed funding in Improved Surface Operations Portfolio (Enhanced Services to Small Communities)

PPT Financial Summary

Program Title	FY 13 Enacted		FY 14 Enacted		FY 15 Enacted	
	In-House	Contracts	In-House	Contracts	In-House	Contracts
Base Program (RE&D)						
Base Program (F&E)						
NextGen Program (F&E)						
NextGen Ops Concept Validation		3,900,000		4,700,000*	0	0
F&E Subtotal		3,900,000		4,700,000*	0	0
					0	0
PPT Total		3,900,000		4,700,000*	0	0

*Approved to spend $2.2 M in FY14 PLA. Remaining funding approval TBD based on FY16 funding availability

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PPT 5-Year Financial Plan

Program	Out-Year Contract Dollars (For Planning Purposes Only)				
	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Base Program (RE&D)					
NextGen Program (RE&D)					
RE&D Subtotal					
Base Program (F&E)					
NextGen Program (F&E)					
NextGen Ops Concept Validation					
Separation Management (VCV)		0	$1,000,000	TBD	TBD
Performance Based Navigation (ORC)		$1,000,000	$1,000,000	TBD	TBD
Improved Surface Operations (ESSC)		0	$2,000,000	$1,000,000	$2,000,000
F&E Subtotal		$1,000,000	$4,000,000	$1,000,000	$2,000,000
PPT Total		$1,000,000	$4,000,000	$1,000,000	$2,000,000

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NextGEN

FY14 Accomplishments

- UAS Functional Analysis/Operational Requirements Report (Nov 2013)
- Report on NAS benefits of improved departure predictions (Nov 2013)
- NTN Concept of Operations Annotated Outline (Nov 2013)
- Dynamic Network Analysis (DNA) Model (Dec 2013)
- Concept of Operations for Datalink of Complex PBN Clearances (Dynamic RNP) (Apr 2014)
- Datalink of Complex PBN Clearances (Dynamic RNP) White Paper (Apr 2014)
- Bayesian Belief Network (BBN) of NAS Model (Jun 2014)
- TMI Taxonomy (Jun 2014)
- TMI Attribute Standardization Report (Jun 2014)
- SVO Concept of Operations in the NAS (Jun 2014)
- NTN Concept of Operations (Jul 2014)
- Requirements Document for Additional Type of Space Vehicle Operations (Aug 2014)
- VCV Operational Shortfall Assessment (Sep 2014)

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FY15 Accomplishments

- Integrated NAS/SVO Simulation Model (Oct 2014)
- VCV Operational Improvement Assessment (Oct 2014)
- VCV Concept Assessment Report (Dec 2014)
- Completed End-to-End Operational Description for Dynamic RNP / Update to Dynamic RNP Concept (Worked with RTCA SC 214 / EUROCAE WG-78) (Jan 2015)
- ORC Initial Concept of Use: Automation Support and Procedures (Mar 2015)
- Draft Requirements Document for Second Additional Type of SVO (May 2015)
- ORC Procedural Mapping (Jul 2015)

FY15 Planned Activities

- Draft Concept Reports for Class A&B (Sep 2015)
- Mature integration concept by developing Level 3 concepts for Class A&B UAS operations (Sep 2015)
- Prepare ORC Concept of Operations v2.0 (Sep 2015)
- Prepare Generic 4D TBO Use-Cases / Scenarios (Sep 2015)

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FY16 Planned Activities

- 4D TBO (TOps) Cognitive Walk-through (Oct 2015)

- Final Requirements Document for Second Additional Type of SVO (Oct 2015)

- High-level 4D TBO Simulation Plan (Nov 2015)

- ORC Initial Integration Analysis/Model Development Report (Nov 2015)

- UAS Concept for Modified IFR (Feb 2016)

- VCV Technological and Procedure Review and Analysis of ERAM Vertical Limitations (Apr 2016)

- VCV Minimum Vertical Performance Tolerance Analysis (Jul 2016)

- SVO Data Requirements Definitions (Aug 2016)

- SMDP Single Airport Phase 2 Model (Aug 2016)

FY17 Planned Activities

- Initial data elements for FIXM (SVO) (Nov 2016)

- TAS Initial Requirements (Dec 2016)

- Recommendation for Interim Solution Prior to ADS-B Implementation (Jan 2017)

- Preliminary VCV ConOps (Jan 2017)

- 4D Trajectory Concept for SVO (Mar 2017)

- SMDP Core 30 Phase 2 Model (Apr 2017)

- TAS Standardization Requirements (May 2017)

- NTN Simulation Results Report (TBD)

- Low-Fidelity Simulation of NTN environment (TBD)

Optimized Route Capability (ORC)

Description:

- The addition of many new PBN routes and playbook options significantly increases complexity of optimal route selection and coordination

- ORC will research tools and procedures to assist ATM with assessment, coordination, selection, and implementation of these new options in order to optimize the benefits

Partnerships:
- MITRE
- NASA

Funding:

FY13	FY14	FY15	FY16	FY17
$1.2M	-	-	$1,000,000*	$1,000,000*

Proposed follow-on funding

Accomplishments/Plans:

- Define algorithm model attributes (Mar 2015)
- Initial ORC Concept of Use: Automation Support and Procedures (Mar 2015)
- ORC Procedural Mapping (Jul 2015)

Plans:

- ORC Concept of Operations v2.0 (Sep 2015)
- Initial Integration Analysis / Model Development document (Nov 2015)

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4D Trajectory-based Operations Sim. Trajectory Operations (TOps-Sim)

Description:

- Supports AVS/RTCA/ANG/ATO in defining an overall TOps Concept and requirements for NextGen avionics automation and collaborative capabilities

- Leverages NextGen mid-term TBO concepts and technologies to ensure concepts work cooperatively across all domains

- Partial validation of 4D TBO ConOps

- Identifies potential shortfalls in concepts and technologies for the mid-term

Partnerships:

- ATO
- AVS

Funding:

| FY13	FY14	FY15	FY16	FY17
-	$780,000	-		

Accomplishments/Plans:

- ConOps Description for Dynamic RNP (subset of 4D TBO) in support of 4D TBO Demonstration
- Initiated development of Generic 4D TBO Use-Cases / Scenarios

Plans:

- Generic 4D TBO Use-Cases / Scenarios (Sep 2015)
- Subject Matter Expert Panel (Oct 2015)
- High-level 4D TBO Simulation Plan (Simulation strategy / resources) (Nov 2015)

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NextGEN

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Space Vehicle Operations (SVO)
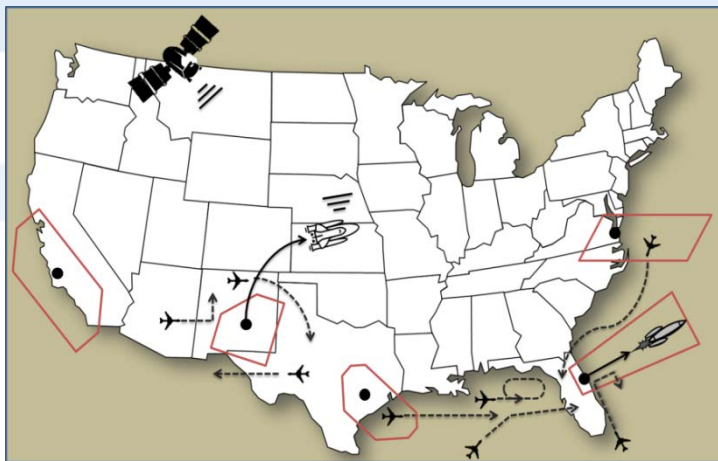
Description:

- SVO research facilitates synchronization of FAA's NextGen, Commercial Space, and Air Traffic Organization offices with the Center of Excellence for Commercial Space Transportation (COE CST) and industry stakeholders to develop a concept that will enable integration of air and space traffic management in the NextGen timeframe.

Partnerships:

- FAA Commercial Space Transportation (AST)
- Air Traffic Organization Space Operations
- Stanford University
- William J. Hughes Technical Center
- ACTA
- Volpe Center
- Mosaic ATM

Funding:

| FY13	FY14	FY15	FY16	FY17
$1,090,272	$800,000	$470,000*		

FY14 Funds provided in FY15 PLA

Accomplishments/Plans:

- Draft Requirements Document for Second Additional Type of SVO (May 2015)

Plans:

- Final Requirements Document for Second Additional Type of SVO (Oct 2015)
- Define Data Requirements for SVO (Aug 2016)
- Initial data elements for FIXM (Nov 2016)
- 4D Trajectory Concept for SVO (Mar 2017)

UAS Integration into the NAS
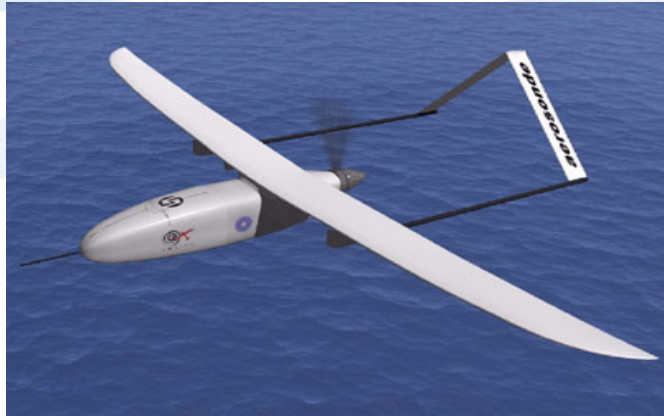
Description:

Mature concept of operations for UAS integration into the NAS

- Identify concept level operational requirements for evolution to mature state integrated UAS operations
- Ensure NextGen systems and capabilities are prepared for increased numbers of UAS operations
- Address issues/questions associated with the UAS ConOps that require further consideration, development and/or validation

Partnerships/Stakeholders

- AJV-7
- AFS-80
- ANG-C2
- AIR-130
- AFS-400

Planned Allocation

FY12	FY13	FY14	FY15	FY16
$445,627 PLA	$500,000 PLA	$360,535 PLA	$150,000 AJV	
	$100,000 AJV	$138,000 AJV		

Accomplishments/Plans:

- Assess UAS Functional Analysis/Operational Requirements (Sep 2013)
- UAS Functional Analysis/Operational Requirements Document - draft (Oct 2013)
- UAS Functional Analysis / Operational Requirements Report - final (Nov 2013)

Plans:

- Draft Concept Reports for Class A&B (Sep 2015)
- Mature integration concept by developing Level 3 concepts for Class A&B UAS operations (Sep 2015)
- UAS Concept for Modified IFR (Feb 2016)
- UAS concept maturation products (July 2015)

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NextGEN

Leesburg Remote Tower (r-TWR) Demonstration Project

ATC Console

Camera Nest

Description:

- Provide guidance on FAA's policies, processes and procedures to VSATS/Saab during demonstration and evaluation of Saab's technology at Leesburg Executive Airport (JYO).

- Provide guidance in the collection of data, analysis, and safety case generation for a potential operational approval of Saab's remote tower capability.

Stakeholders:

- Virginia Small Aircraft Transportation System (VSATS) Laboratory, Inc.

- Saab Sensis Corporation

- Federal Aviation Administration

- Unions (i.e. NATCA, PASS)

Funding:

- Project is sponsored by VSATS/Saab

- Currently no FAA funding allocated

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Accomplishments/Plans:

- VSATS/Saab installed Saab's remote tower system at JYO

- Initiated shadow operational data gathering at JYO

Plans:

- Finalize an integrated work plan in coordination with VSATS/Saab

- Provide guidance to VSATS on the Safety Risk Management process

NextGEN

Enhanced Services to Small Communities (ESSC)

The ESSC program will develop an approach to expanding low-cost service capability to small communities that are currently served by non-towered airports or airports with limited Air Traffic Control (ATC) services.

ESSC will identify and group airports based on similar characteristics. The program will recommend and evaluate a group of airports based on their required level of service and potential benefits to be achieved.

Description:

- ESSC will evaluate procedures and technologies, and leverage NextGen surveillance, communications, data sharing and new optical technologies to provide ATC tower-like services at airports that do not currently meet the criteria for an ATC Tower.

- ESSC will identify and develop the recommended changes to controller equipment, standards, procedures and policies to provide the required surveillance, communications and other capabilities to support improved air traffic services and improved access to smaller airports. These services may be performed from a remote location.

Partnerships:
- TBD

Funding:

FY17	FY18	FY19	FY20	FY21
$2M	$1M	$2M	$3M	$3M

Accomplishments/Plans:

- Analyze current airport operational capabilities and characteristics

- Draft ESSC alternatives analysis document

- Draft ESSC feasibility study document

- Draft concept of operations (ConOps) document for ESSC

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NextGEN

14

Vertical Conformance Verification (VCV)

Description:

- Misjudgment of aircraft rate of climb and descent during Converging/Opposite Direction operations is among the top 5 risks to the NAS (FAA Safety Office)

- VCV researches the impact of new technologies on primary surveillance parameters, and how to mitigate the effects on ATC ability to leverage historical methods to mentally calculate vertical rate

- Providing near real time VR information will aid ATC in assessing conformance and promote more efficient airspace utilization

Partnerships:

- Boeing

Funding:

FY13	FY14	FY15	FY16	FY17
-		$490,000*		$1,000,000

** FY14 Funds provided in FY15 PLA*

Accomplishments/Plans:

- Operational Shortfall Assessment (Sep 2014)
- Operational Improvement Assessment (Oct 2014)
- VCV Concept Assessment Report (Dec 2014)

Plans:

- Technological and Procedure Review and Analysis of ERAM Vertical Limitations (Apr 2016)
- Minimum Vertical Performance Tolerance Analysis (Jul 2016)
- Recommendation for Interim Solution Prior to ADS-B Implementation (Jan 2017)
- Preliminary VCV ConOps (Jan 2017)

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NextGen Trajectory Negotiation (NTN)
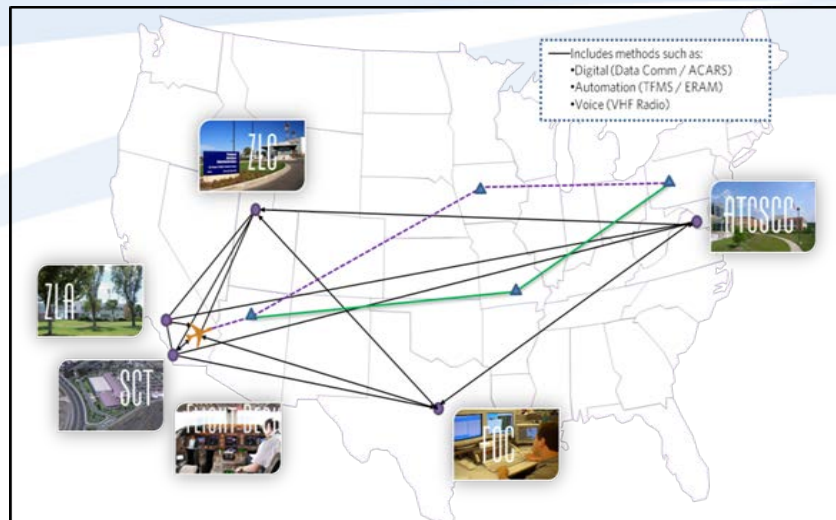
Description:

- NTN will provide the methodology for performing real-time trajectory negotiation for trial planning, coordinating, issuing, and accepting or rejecting trajectory changes (reroutes) in real –time

- Existing trajectory negotiation tools will be modified or developed as appropriate, utilizing defined research activities, to implement the NTN concept

Partnerships:

- Boeing Airline Operations Experience (AOE)

Funding:

| FY13	FY14	FY15	FY16	FY17
-	-	-		

Accomplishments/Plans:

- Concept of Operations Annotated Outline (Nov 2013)
- Dynamic Network Analysis (Dec 2013)
- DNA Findings document (Dec 2013)
- Concept of Operations Draft Report (Apr 2014)
- NTN Concept of Operations document (Jul 2014)

Plans:

- NTN Simulation Results Report (Date TBD)

- Low-Fidelity Simulation of NTN environment (Date TBD)

Statistical Methods for Departure Predictability (SMDP)
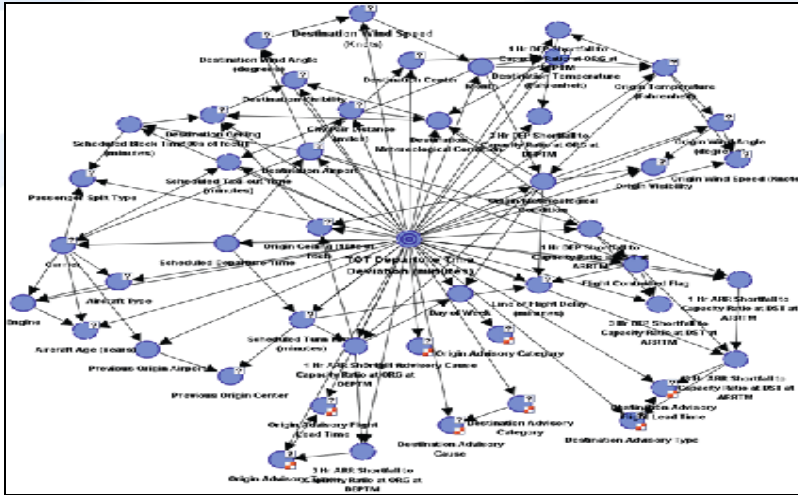
Description:

- SMDP research will develop a probabilistic directed acyclic graphical model for improving departure time predictions by developing a Bayesian Belief Network (BBN) model.

- BBN model will utilize historical data to improve the reliability of departure time predictions for real-time traffic flow management.

Partnerships:
- FAA Mission Support (AJV)
- TBD

Funding:

FY13	FY14	FY15	FY16	FY17
-	-	$695,000*		

FY14 Funds provided in FY15 PLA

Accomplishments/Plans:

- Bayesian Belief Network (BBN) of NAS Model (Jun 2014)
- BBN Model Approach document (Oct 2013)
- BBN Model (Jun 2014)

Plans:

- Obtain TFMS Historical Database (Jan 2016)
- SMDP Single Airport Phase 2 Model (Aug 2016)
- SMDP Core 30 Phase 2 Model (Apr 2017)

TMI Attribute Standardization (TAS)

Description:

- TAS research utilizes historical and current Traffic Management Initiative (TMI) data to define a system model in which TMI attributes are categorized in a manner that will facilitate real-time TMI information and feedback to NAS users, unified TMI modeling, post-event analysis, and continuous flight day evaluation.

- This research will also result in standardized TMI entry, parsing, and tracking, by enhancing functionality currently provided by NTML.

Partnerships:

- Volpe Center
- Mosaic ATM
- FAA Mission Support (AJV)

Funding:

FY13	FY14	FY15	FY16	FY17
-	-	$290,000*		

FY14 Funds provided in FY15 PLA

Accomplishments/Plans:

- Conduct Research of TMIs (Nov 2013)
- Develop TMI Taxonomy (Jun 2014)
- TMI Attribute Standardization Report (Jun 2014)

Plans:

- Initial Requirements (Dec 2016)
- Coordinate with AJV Advanced Methods (May 2017)
- TAS Standardization Requirements (May 2017)

Status of the Advanced Operational Concept Division (ANG-C4)

ANG-C4 Historical Situation

- Division Manager (John Marksteiner) to retire in Oct 2015
- C41 is fully customer funded, lost ATDP funds in FY 2013 to AJV-7
- C42/43 with same mission currently aligned under 1 branch chief (PLA funded)
- AJV-7 efforts overlap our business area (we have partnered, but losing ground)

C41

- **Current customer funding ends by September 2015**
- Funds limited with dwindling customer projects due to overall NextGen budget reductions
- At minimum, infrastructure resources needed to maintain capability (e.g. licenses, lab support, etc.)
- Outlook could change if new customer projects secured

C42 / 43

- No PLA funds FY15
- Anticipate ~$1M PLA funds in FY16 (PBN Portfolio)
- **Current funds support work into FY 2016**
- Ops Concepts should drive acquisition and SE process
- NextGen benefit realization depends on operational concept implementation
- 1 customer program

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Dissolution of the Advanced Operational Concepts Division (ANG-C4)

- Combination of factors make continuation of ANG-C4 nonviable
  - OMB guidance/migration of Mission Analysis aligned to Portfolios
  - Formation of AJV-7 and overlap with ANG-C4 Mission
  - Retirement of ANG-C4 Division Manager and short C42 Branch Manager
  - Loss of OCVM (FY15) and ATDP (FY13) fund lines
  - Much of NextGen now in implementation - reduction on Concept Development

Recommendation

- Merge ANG-C4 into ANG-C5
  - The Concept Development & Validation HQ Branch, ANG-C42 will be collapsed and members will be placed in the PBN Portfolio Branch, ANG-C51, the new Remote Operations Portfolio Branch, ANG-C52, and the new ANG-C54 Concept Development & Validation Portfolio Branch
  - Concept Development & Validation Tech Center Branch, ANG-C43 becomes the new Concept Development & Validation Portfolio Branch, ANG-C54
  - Concept Analysis Branch, ANG-C41 becomes the new Concept Analysis Branch, ANG-C55
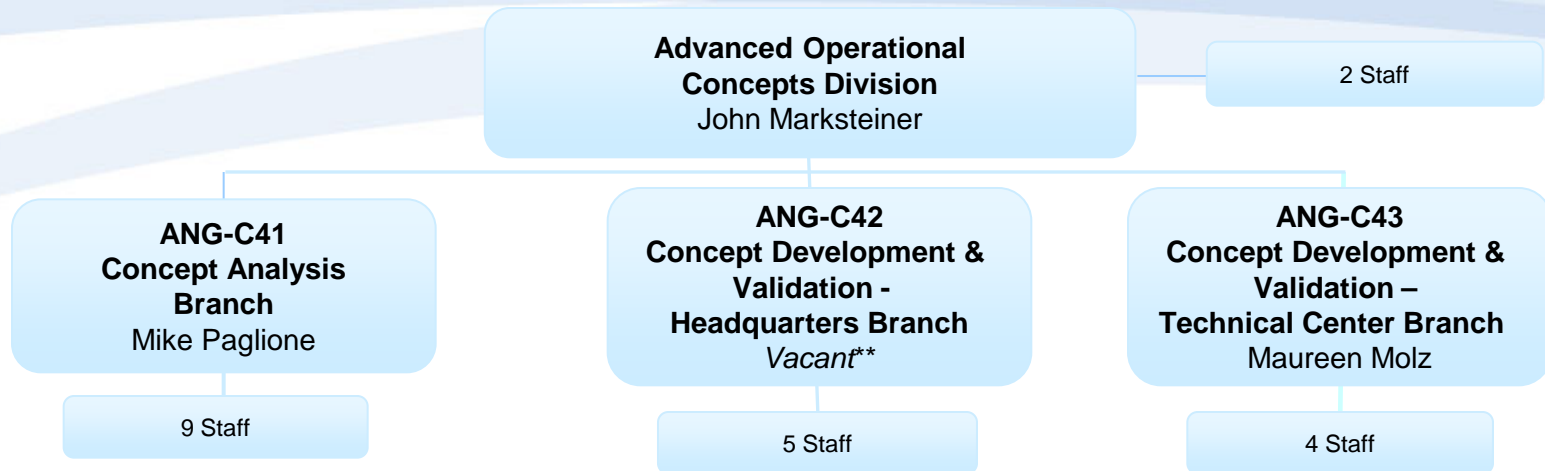
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Recommendation

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  - Concept Development & Validation Tech Center Branch, ANG-C43 becomes the new Concept Development & Validation Portfolio Branch, ANG-C54
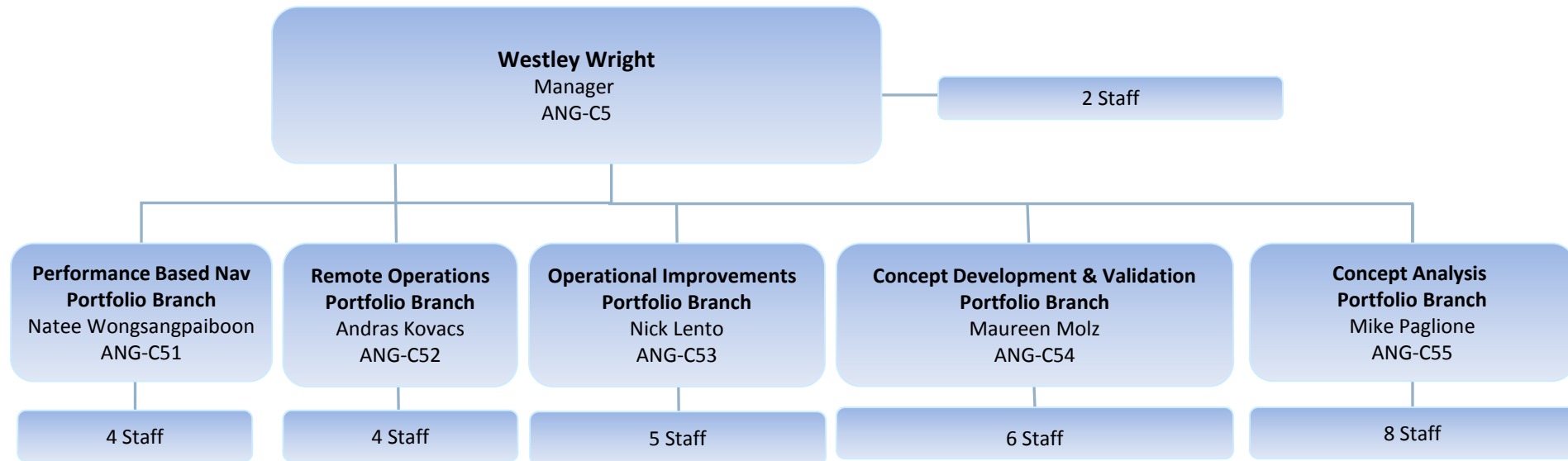 - Concept Analysis Branch, ANG-C41 becomes the new Concept Analysis Branch, ANG-C55

ANG-C4 Organization (Historical)

Advanced Operational Concepts Division
John Marksteiner

2 Staff

ANG-C41 Concept Analysis Branch
Mike Paglione

9 Staff

ANG-C42 Concept Development & Validation - Headquarters Branch
Vacant**

5 Staff

ANG-C43 Concept Development & Validation – Technical Center Branch
Maureen Molz

4 Staff

Merged ANG-C5 Organization

Westley Wright
Manager
ANG-C5

2 Staff

Performance Based Nav Portfolio Branch
Natee Wongsangpaiboon
ANG-C51

4 Staff

Remote Operations Portfolio Branch
Andras Kovacs
ANG-C52

4 Staff

Operational Improvements Portfolio Branch
Nick Lento
ANG-C53

5 Staff

Concept Development & Validation Portfolio Branch
Maureen Molz
ANG-C54

6 Staff

Concept Analysis Portfolio Branch
Mike Paglione
ANG-C55

8 Staff

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NextGEN

Acronyms

4D	4 Dimensional
ESSC	Enhanced Services to Small Communities
NTN	NextGen Trajectory Negotiation
ORC	Optimized Route Capability
RTS	Remote Tower Services (Leesburg)
SMDP	Statistical Methods for Departure Predictability
SVO	Space Vehicle Operations
TAS	TMI Attribute Standardization
TBO	Trajectory-based Operations
TMI	Traffic Management Initiative
TOps	Trajectory Operations
UAS	Unmanned Aircraft System
VCV	Vertical Conformance Verification

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Next**GEN**