



Space and Naval Warfare Systems Center Atlantic

Air Traffic Control Systems Engineering

September 16, 2015

Presented To:
Armed Forces Communications
and Electronics Association
(AFCEA) Charleston Low Country
Chapter

Presented By:
Mr. Philip Braswell
ATC Sub-Portfolio Lead

Topics

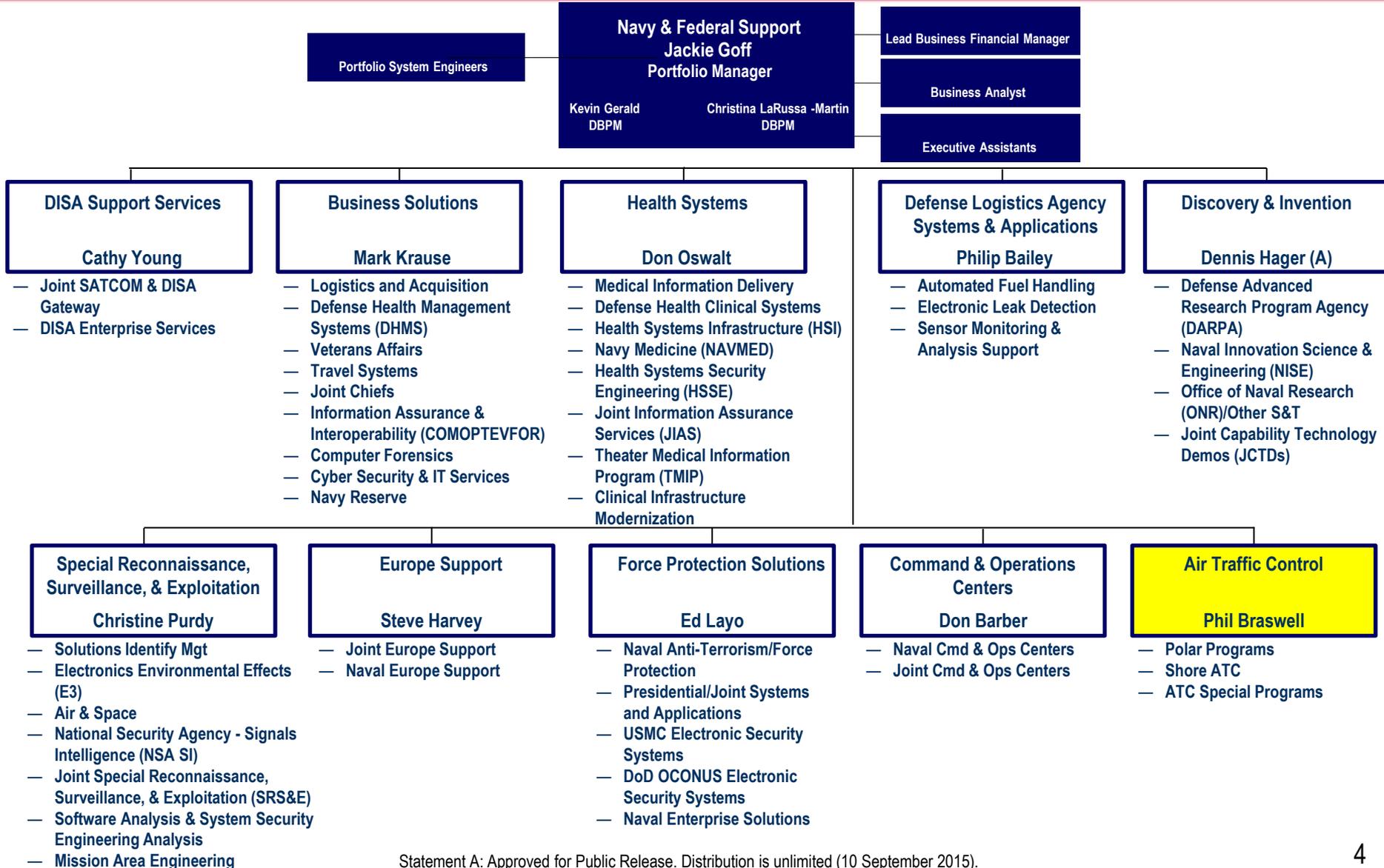
- ▼ Introduction
- ▼ Organizational Overview
 - Within SPAWAR Systems Center Atlantic
 - ATC Sub-Portfolio
 - IPT Overviews
- ▼ ATC Today
 - Civil
 - Military
- ▼ Future ATC
- ▼ Challenges

Business Portfolios and Customer Alignment

Portfolio	Customer Areas			Enterprise Services
 PEO C4I (PMW 100's and 700's) Charlie Adams	<ul style="list-style-type: none"> PMW 120 PMW 130 PMW 150 PMW 160 PMW 170 	<ul style="list-style-type: none"> PMW 740/750/760 PMW 770 PMW 790 FRD 100/200 	<ul style="list-style-type: none"> NAVSEA NAVAIR/USCG Navy Cyber/Numbered Fleet 	 Ryan Gunst Financial Service Areas <ul style="list-style-type: none"> Customer Services (ISC) Commercial Services (ECS) Test and Eval Services (PPT) Software Services (SADIE) Infrastructure Services (DCC) Network Services (RDTE) Production Services (CAEI) Installation Services (IMO/FSC) Contract Services (CSC)
 PEO EIS (all) Bruce Carter	<ul style="list-style-type: none"> PMW 205 PMW 240 PMW 220 	<ul style="list-style-type: none"> Innovation Cell Cloud Access Point 	<ul style="list-style-type: none"> Navy Data Center Application Optimization 	
 USMC/ SOCOM (all) Kevin Charlow	<ul style="list-style-type: none"> SOCOM Army 	<ul style="list-style-type: none"> USMC Air Force 		
 Navy and Federal Support Jackie Goff	<ul style="list-style-type: none"> DISA DLA NSA NSF NAVSUP CNIC NAVFAC 	<ul style="list-style-type: none"> NSMA Federal Navy & Defense Medical Veteran Affairs Europe DARPA 	<ul style="list-style-type: none"> ONR ONI AFRL iARPA DTRA NAVAIR (Other) Navy (Other) 	

Subject to change

Navy and Federal Support Portfolio Organization – IPT Structure



Air Traffic Control Sub-Portfolio

Top Sponsors

Rank	Sponsor Name
1	NAVAIR PMA213 & PEO T
2	AFCENT
3	NSF
4	SPAWAR FRD & PEO C4I

Programs

- NAS Mod
- Navy Fleet ATC
- Aviation C2
- BC3
- ATC O&S
- USAP
- Arctic Services
- SASC
- NAVFIG
- AN/TRC-215

Key Technologies

- ATC/METOC Design, Engineering, Integration & Sustainment
- Aviation Command and Control Services
- ATC/METOC Logistics and Configuration Management
- TERPS Development



MISSION

Provide complete Air Traffic Control and Meteorology systems engineering; Air Traffic Control operations, Airfield Management, Electronics Maintenance, and Meteorological forecasting and observation services in support of federal and military operations worldwide.

FY 14 TOA: \$194.4 M



IPTs

- Polar Programs TOA: \$20.2 M
- METOC TOA: \$7.5 M
- Shore ATC TOA: \$37.4 M
- Special Programs TOA: \$129.3 M



Air Traffic Control Systems Engineering Center



- ▶ Air Traffic Control Tower
- ▶ Conference/Training Room with VTC capability (1,850 sq. ft.)
- ▶ In-Service Engineering Activity Equipment Lab with raised deck (10,300 sq. ft.)
- ▶ Software Support Lab (2,000 sq. ft.)
- ▶ Instrument Flight Rules (IFR) Room (1600 sq. ft.)
- ▶ Shipping and Storage Area (1,600 sq. ft.)
- ▶ General Office Space (15,300 sq. ft.)
- ▶ External Equipment Pad (625 sq. ft.)
- ▶ RF COMM Antenna Tower
- ▶ External Analog and Digital Radar Facilities

- ▼ 38,783 sq. ft. Facility
- ▼ Investment - \$7.2 Million
- ▼ Accommodates over 100 people

Naval Air Traffic Control Systems

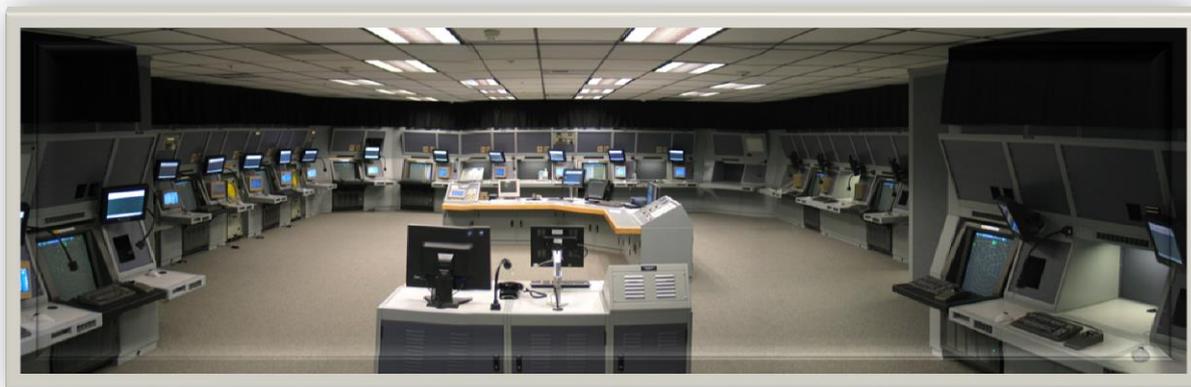
**Supporting over 72
Navy and Marine Corps facilities**
Operating and supporting all aspects
of Air Traffic Control, Airspace
Operations, Meteorological
Forecasting and Observation
Services Worldwide



Air Base in Iraq



Antarctica



MCAS Yuma Radar Air Traffic Control Facility (RATCF)



Containerized Airport Surveillance Radar (CASR)

ATC Sub-Portfolio

▼ Cradle to grave engineering and logistics support/services:

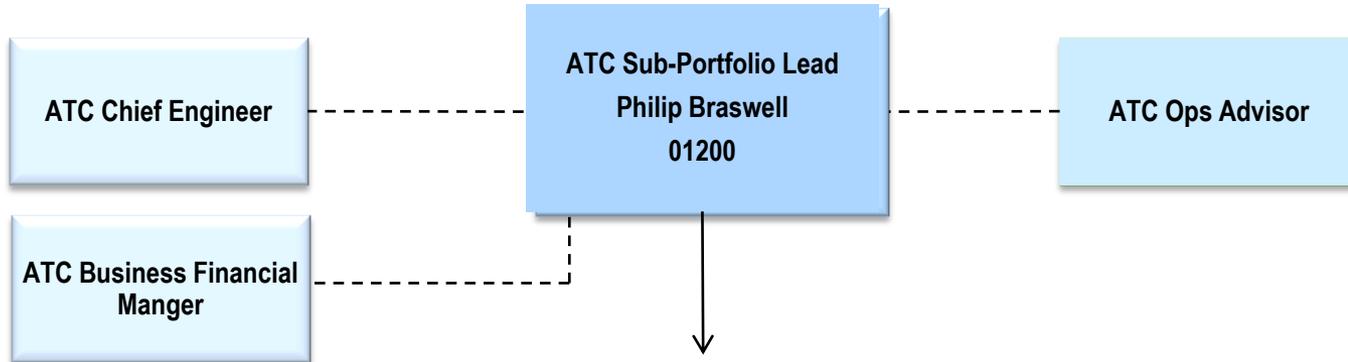
- Requirements
- Design
- Systems / Software Development
- Acquisition
- Testing
- Integration / Installation
- MILCON Support
- Parts and Repair Support
- Training
- In-service Engineering and Software Support
- Subsystems Engineering

▼ Operations & Maintenance Services

- ATC
- Meteorological and Oceanographic (METOC)
- Airfield Management



Air Traffic Control (ATC) Sub-Portfolio Organizational Chart



← **Four (4) Integrated Product Teams** →

Special Programs



METOC



Shore ATC



Polar Programs



Shore ATC IPT

- ▼ Provide top systems-level technical direction to include planning, programming, budgeting, development, acquisition, deployment, ILS & CM of ATC projects
 - National Airspace System Modernization (NAS Mod)
 - Next Generation Air Transportation System (NextGen)
 - ATC Facility Equipment Installations
 - Fleet Area Control and Surveillance Facility Integration
 - Major equipment refurbishments & overhaul
 - ATC Facility Relocations
 - Terminal Approach Procedures (TERPS)

Fielded Systems



RADIO



VOICE SWITCHES



VIDS



RADARS



RECORDERS



STARS

Polar Programs IPT

- ▼ Providing engineering and operational functional support for:
 - Meteorology
 - Local observing and forecasting for McMurdo Station,
 - Remote Forecasting provided for all area's south of 60°
 - Air Traffic Control
 - Enroute, Approach & Tower operations
 - TERPs development for Antarctica region
 - ATC Maintenance
 - ATC systems and landing aids
 - Frequency management



Meteorology and Oceanographic (METOC) IPT

- ▼ Technical fleet support to METOC Systems, equipment, and devices for ship and shore activities worldwide throughout the Navy and Marine Corps:
 - Surface observing
 - Doppler weather radar
 - Atmospheric profiling
 - Sensing data dissemination



Special Programs IPT

- ▼ Provide top systems-level technical direction to include planning, programming, budgeting, development, acquisition, deployment, ILS & CM of aviation and ATC, C2, C4I systems supporting:
 - U.S. Air Forces Central Command (AFCENT)
 - Air Force Life Cycle Management Center (AFLCMC)
 - U.S. Marine Corps Training and Education Command (TECOM)
- ▼ Provide aviation O&M services (Divesting)
 - U.S. Marine Corps Range Control (29 Palms)
 - U.S. Air Forces Central Command (AFCENT)



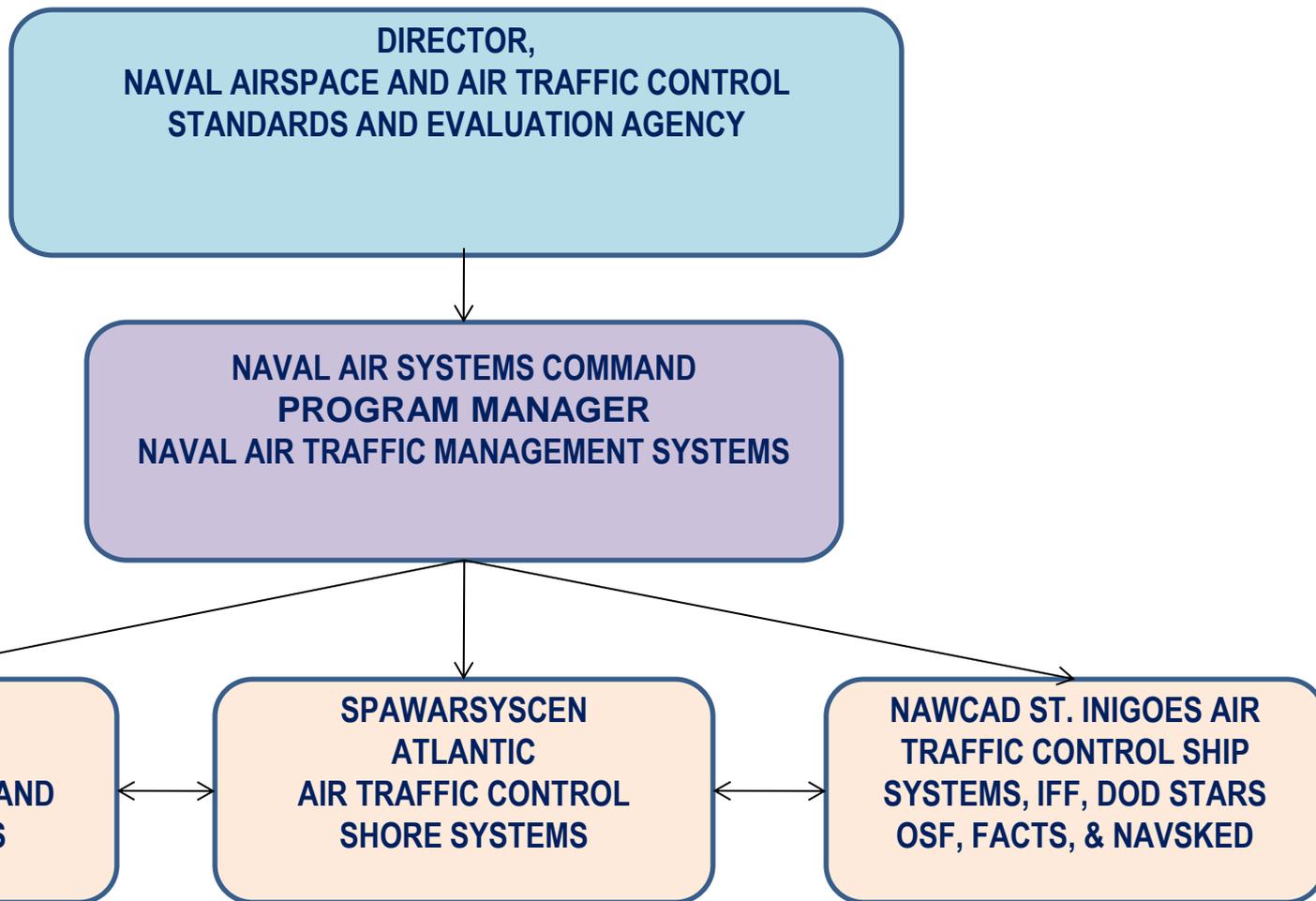
ATC Sub-Portfolio Major Sponsors

Sponsor	Scope
US Navy	
NAVAIRSYSCOM	ATC Engineering and Support
SPAWARSYSCOM FRD	METOC Systems Engineering
NAVMETOCOM	METOC Support
OPNAV N45	Engineering analysis, encroachment
CNI Regions	ATC Engineering and Support
US Marine Corps	
USMC TECOM	Airspace Range Design
MCI Regions	ATC Engineering and Support
US Army	
PMATC	ATC Engineering and Support
US Air Force	
AFLCMC, Hanscom AFB	DoD NAS Modernization, AC2 Engineering
ACC, Langley AFB	AC2 Engineering
AFCENT	AC2 Engineering, Operational, & Maintenance
Department Of Transportation	
Federal Aviation Administration	ATC Engineering and Support
National Science Foundation	
Office Of Polar Programs	ATC Engineering, Operational, & Maintenance

ATC SP Services Contracts

Name	Number	Vendor	End Date
Aviation Engineering & Design Support	N65236-07-D-6880	Booz Allen Hamilton (BAH) Engineering Services	3/6/2016
ATC Engineering and Technical Services Multi-Award Contract	N65236-15-D-4804 N65236-15-D-4805 N65236-15-D-4806	BAH Engineering Services CSSI Serco	7/28/2020
Pillar DS Unrestricted	N65236-13-D-4910 thru 4922	Multi-Award Contract	4/2/2018
Polar Aviation Operational Support	N65236-12-D-3803	Scientific Research Corporation (SRC)	1/8/2017
8(a) Incubator	N65236-15-D-8000 thru 8021	Multi-Award Contract	10/13/2019
METOC SWR (AN/FPS-131) Support	N65236-10-D-3107	Enterprise Electronics Corporation	4/18/2018

DON ATC TEAM



Civil Air Traffic Control Today

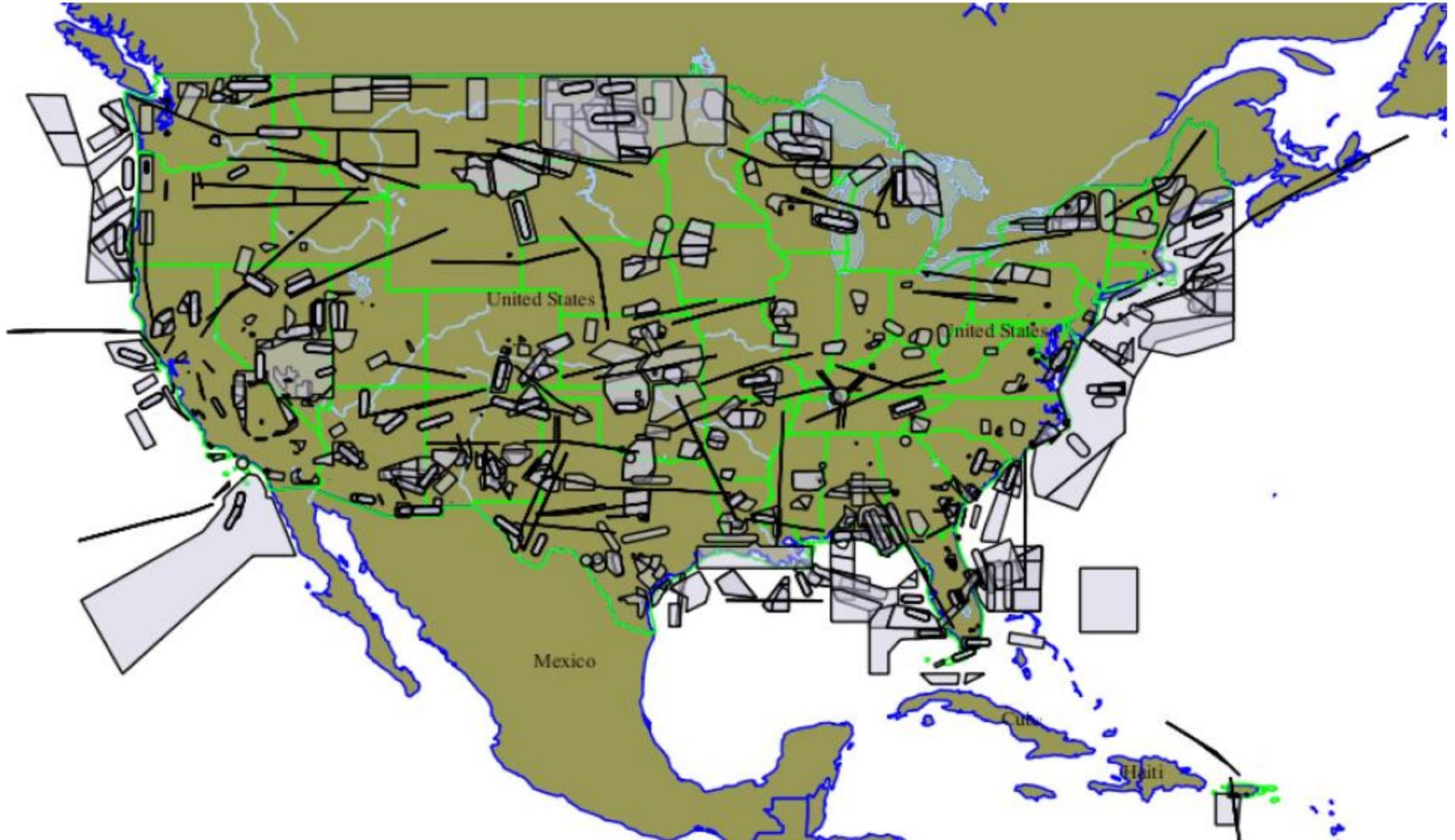
- ▼ During peak air travel times in the United States, there are about 7,000 airplanes in the sky every hour. This translates to approximately 87,000 aircraft operating in our skies each day.
- ▼ In the US 90% of higher altitudes are covered by radar systems
- ▼ There are 185 TRACON facilities in the United States
- ▼ In 2012 civil aviation supported 11.8 Million jobs and contributed \$1.5 Trillion to the US economy
- ▼ Civil aviation accounts for 5.4 percent of U.S. gross domestic product (GDP)
- ▼ In recent years, there have been an average 900 daily flight delays of 15 minutes or more. The cost of these delays to the airlines and their customers is estimated at more than \$5 billion annually.



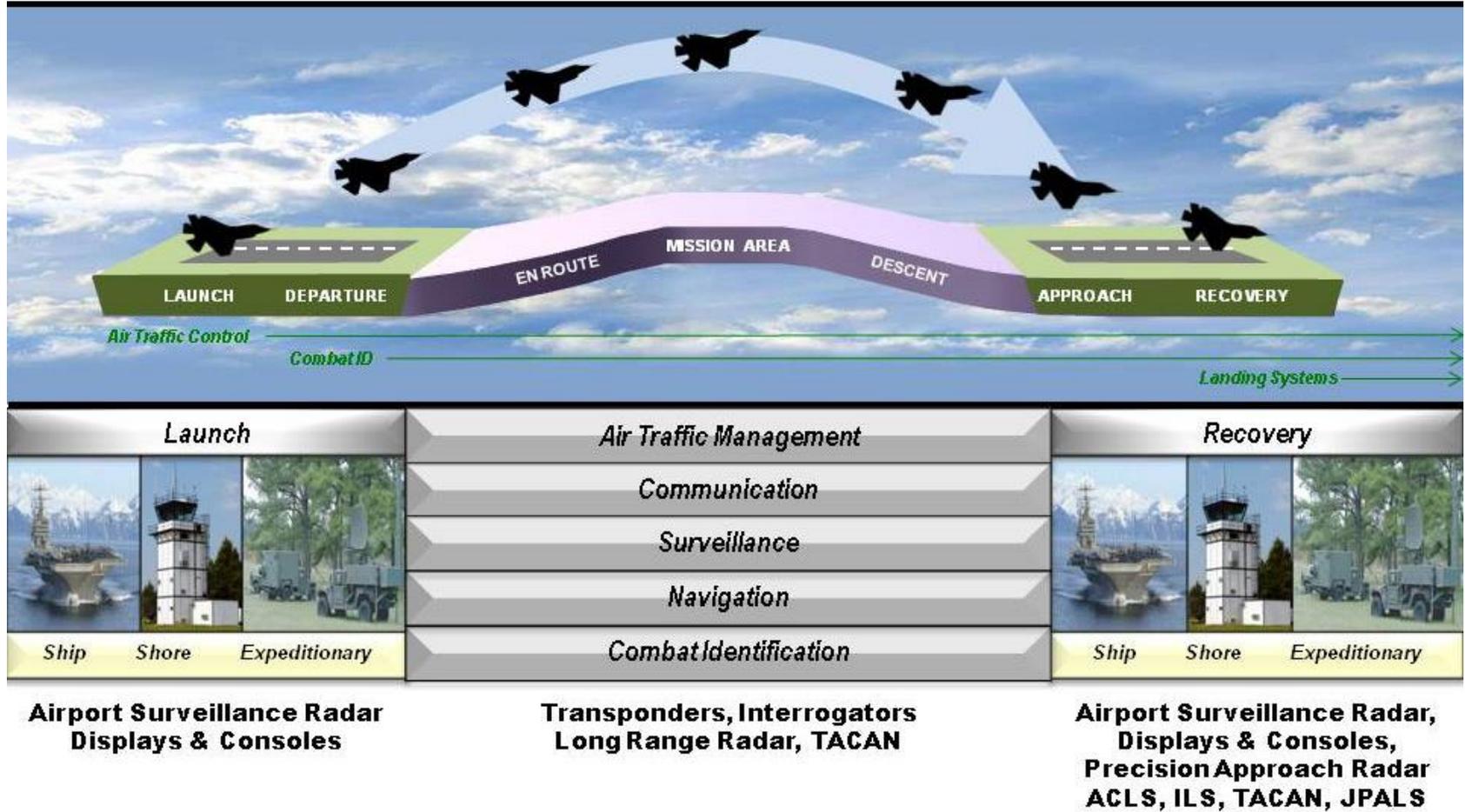
DOD ATC Today

- ▼ FAA is responsible for managing the National Airspace System (NAS)
- ▼ DOD is an airspace user, service provider, airport manager and certifier
 - 15,852 fixed wing, rotary wing, and large and small USA/RPA aircraft
 - 235 Active, Guard, Reserve & Shared use Airports/heliports in the US
 - DOD Controls 20% of the NAS
 - 11,368 Controllers and Airfield Managers
 - Provides civil, military and GA services
- ▼ Airspace is delegated to the DOD for:
 - Approach Control Services where majority of air traffic is Military
 - SUA for training missions
- ▼ DOD is responsible for Emergency Security Control of Air Traffic (ESCAT)
 - Only under an hostile act

SUA in the NAS



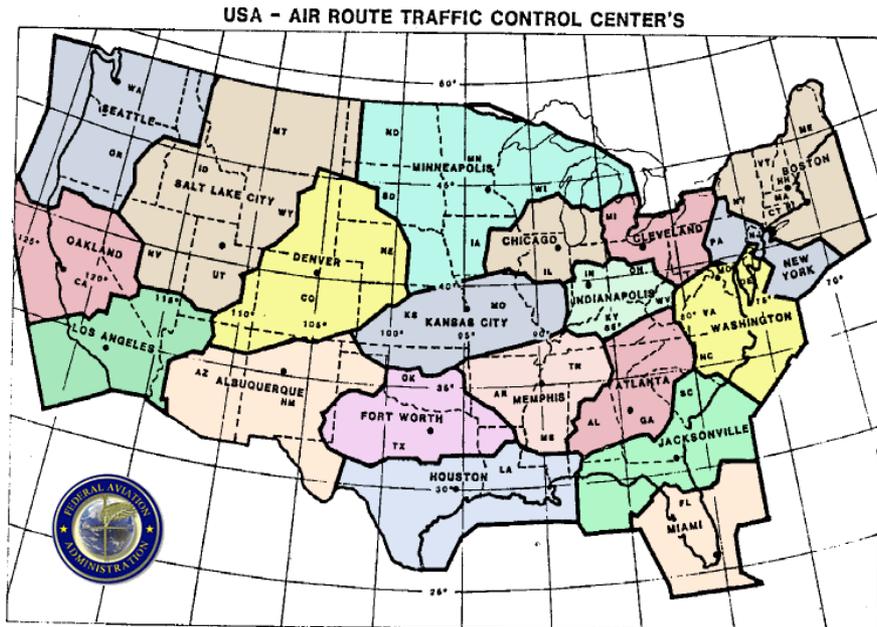
Mission Support Through All Phases of Flight



SSC Atlantic systems touch every Air Station across the Navy and Marine Corps Fleet

Instrument Flight Rules (IFR) Control

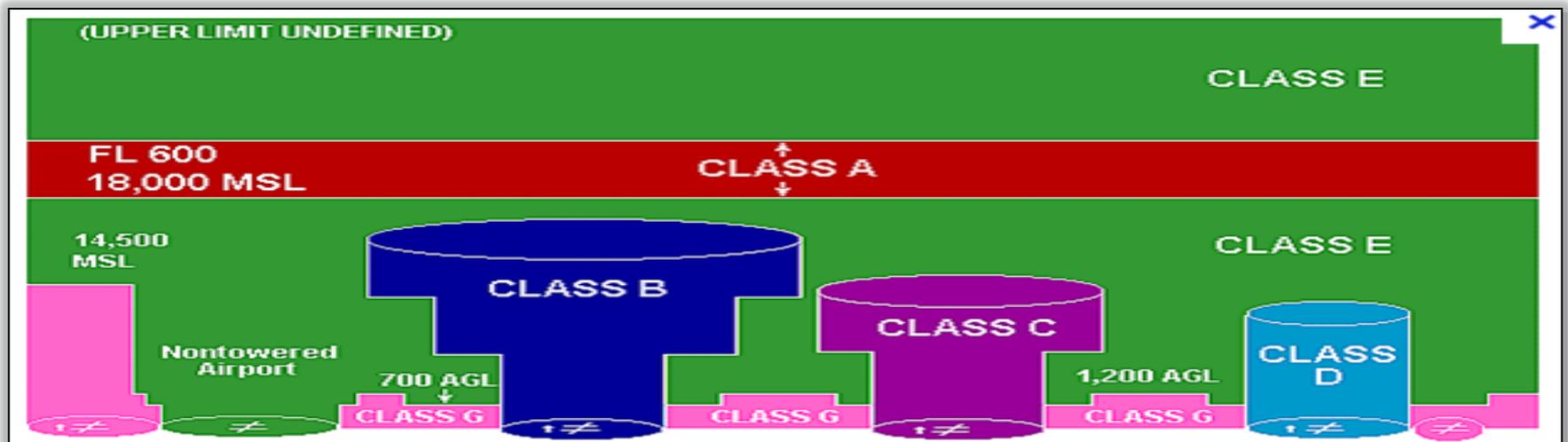
- ▼ Air Traffic Control Tower
- ▼ Terminal Approach Control
- ▼ En-Route Control



Airspace Classes

▼ In the U.S. airspace is categorized as:

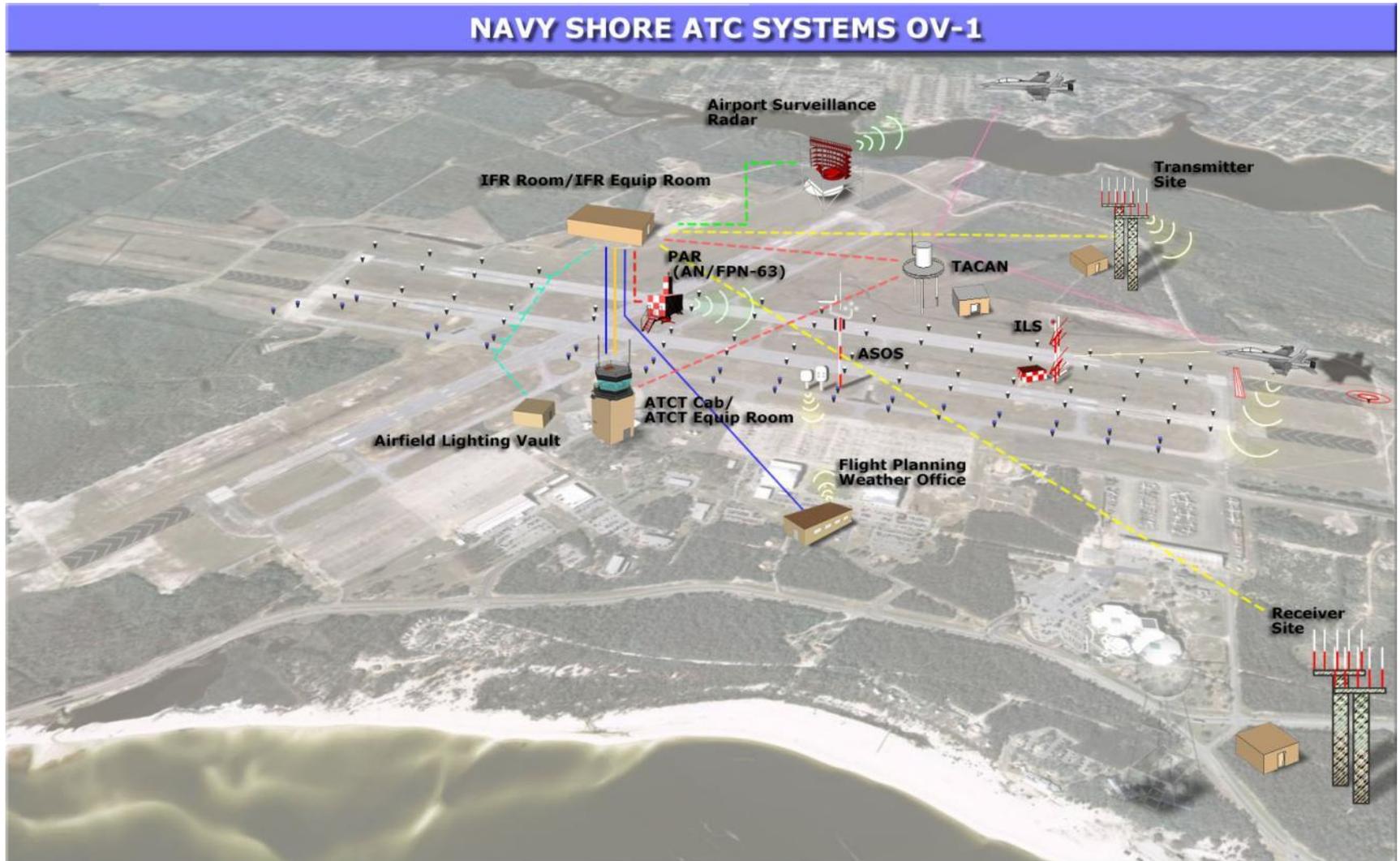
- Class A: Interstates of the skies/Jetways; IFR only; En-route
- Class B: Surface - 10,000'; busiest airports; TRACON/ATCT
- Class C: Surface - 4000'; most airports and military air stations; TRACON/ATCT
- Class D: Surface - 2500', 4-5 miles; ATCT only
- Class E: Visual Flight Rules (VFR) only, uncontrolled



Commonality of ATC Systems

- ▼ Prior to 1988, Commonality of Naval ATC systems was between afloat carrier ATC systems and ashore ATC systems
- ▼ Congress mandated FAA and DOD to establish Interagency Agreements in 1988
- ▼ Since 1988, FAA and DOD use common ATC systems to ensure seamless ATC services throughout the NAS

ATC Operational View



Future ATC

- ▼ Next Generation Air Transportation System (NextGen)
- ▼ NextGen will take advantage of GPS technology. Expectations include:
 - Shorten Routes
 - Save time and fuel
 - Environmental Improvements
 - Reduce delays
 - Greater Safety

Implementation of NextGen across the United States will happen in stages between 2012 and 2025.

▼ NextGen Programs:

-  Automatic Dependent Surveillance-Broadcast (ADS-B)
-  Collaborative Air Traffic Management Technologies (CATMT)
-  Data Communications (Data Comm)
-  National Airspace System Voice System (NVS)
-  NextGen Weather
-  System Wide Information Management (SWIM)

Next Generation Air Transportation System

▼ NextGen Priorities

- Multiple Runway Operations
 - Increase Airport efficiencies and reduce flight delays
- Performance Based Navigation
 - Improve air traffic flow
 - Shorter and more direct flight paths, improved airport arrival rates, enhanced controller productivity, increased safety due to repeatable and predictable flight paths, fuel savings and a reduction in aviation's adverse environmental impact
- Surface Operations and Data Sharing
 - Increase predictability and provide actionable and measurable surface efficiency improvements
- Data Communications
 - Reducing communication errors, increase controller productivity, and increase airspace capacity and efficiency while reducing delays, fuel burn, and carbon emissions

NextGen Touchpoints

Today's NAS

Ground-based Navigation and Surveillance

Voice Radio Control

Disconnected Information Systems

Human-Centric Air Traffic Control

Fragmented Civil Weather Forecasting

Visibility Limited Airfield Parameters

Forensic Safety Systems

Inefficient Security Screening

Current Aircraft Environmental Footprint



NextGen

Satellite-based Navigation and Surveillance

Digital Data Exchange

Net-Centric Information Access

Automation Assisted Air Traffic Management

Probabilistic Weather Decision Tools

Equivalent Visual Operations

Prognostic Safety Systems

Integrated Security Risk Management

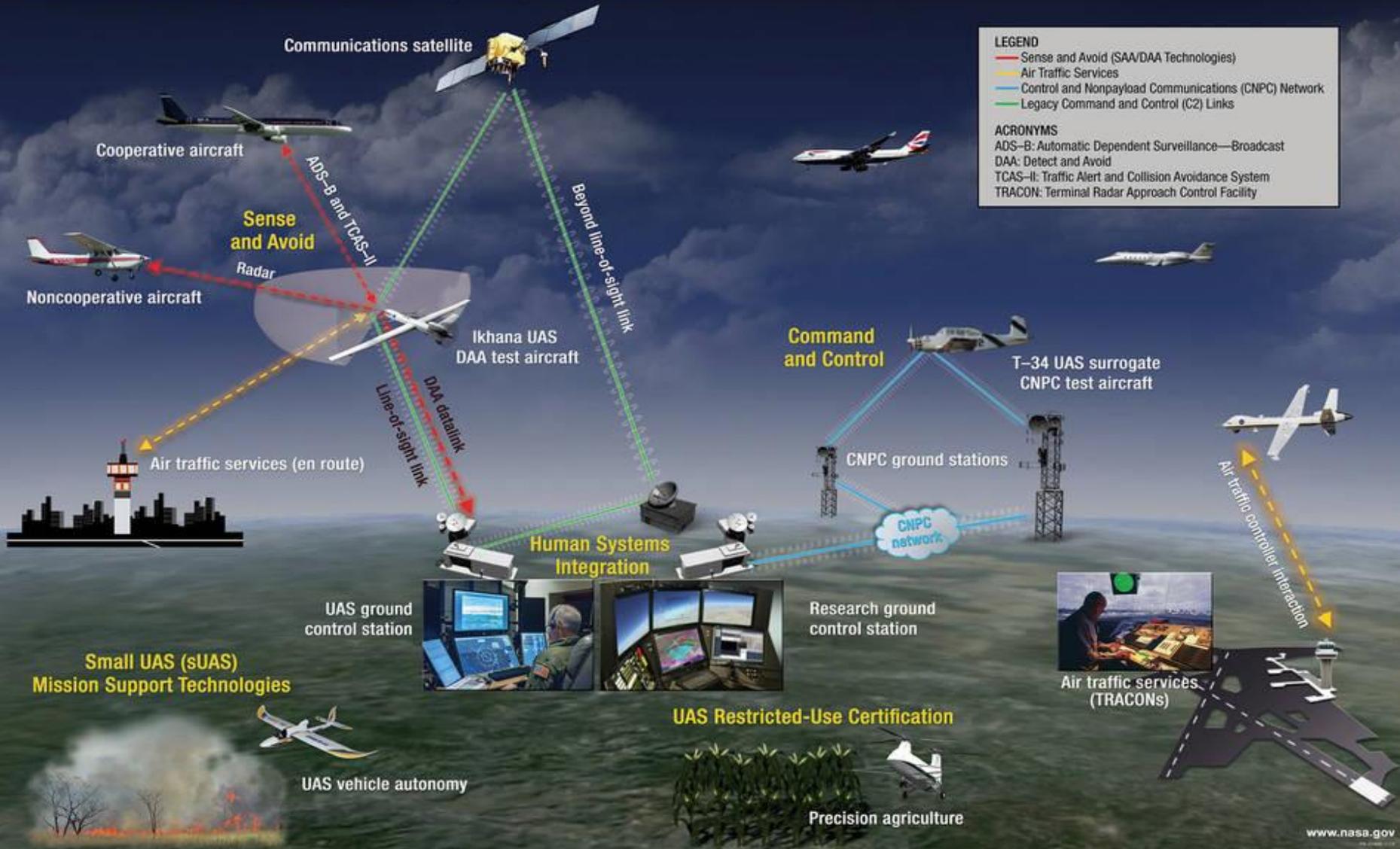
Reduced Aircraft Environmental Footprint

Challenges in the NAS

- ▼ Drones: Rules of Operation
 - Public Operations
 - Leased or Owned UAS by the Federal or State Government
 - Requires a Certificate of Waiver or Authorization (COA) by FAA
 - Uses a defined block of airspace
 - Civil Operations
 - Section 333 Exemption: requires civil COA; may be used to perform commercial operations in low-risk, controlled environments
 - Special Airworthiness Certificate (SAC); must describe how their system is designed, constructed, and manufactured, along with how and where they intend to fly
 - Model Aircraft
 - Hobby or recreational purposes only
 - Fly below 400 feet and remain clear of surrounding obstacles
 - Keep the aircraft within visual line of sight at all times
 - Don't fly within 5 miles of an airport unless you contact the airport and control tower before flying



Unmanned Aircraft Systems (UAS) Integration in the National Airspace System (NAS) Project

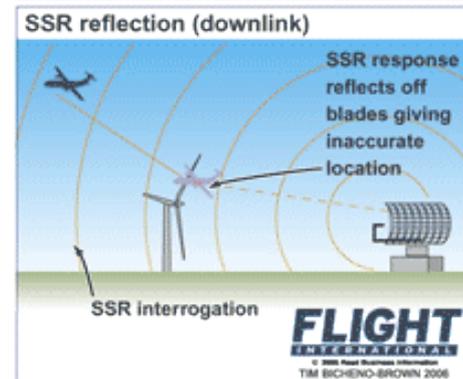
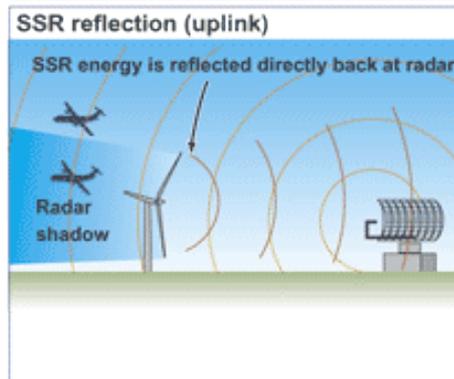
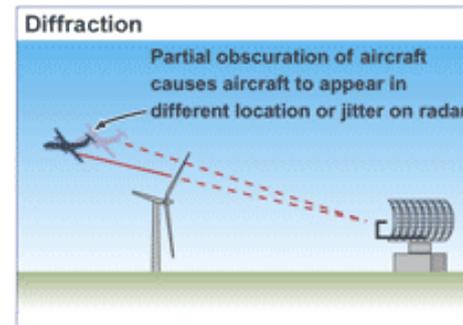
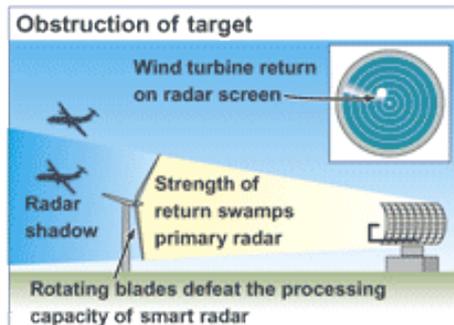


Challenges in the NAS

▼ Renewable Energy

- Wind Farms
 - Radar Interference
- Solar Energy Farms
 - Glare
 - RF Interference
- Mitigation
 - ASR software changes
 - Radar Optimization
 - Gap Filling Radars
 - Multiple Radar Fusion

EFFECTS OF WIND TURBINES ON RADAR SURVEILLANCE



Questions?

