

# ***Headquarters U.S. Air Force***

---

*Integrity - Service - Excellence*

## **DoD - NextGen**



**U.S. AIR FORCE**

---

**Lt Col David Miller  
Air Force Weather  
21 July 2010**



# NextGen Governance

U.S. AIR FORCE

**NextGen transforms the air transportation system by leveraging new technologies, such as satellite-based navigation, broadcast surveillance and networking**

- **Public Law 108-176 “Vision 100 - Century of Aviation Reauthorization Act” (12 Dec 03)**
  - **Established Joint Planning & Development Office (JPDO)**
- **Presidential Executive Order (18 Nov 08)**
- **Deputy Secretary of Defense Memo (28 Dec 07)**
  - **USAF is Lead Service to coordinate DoD participation**
- **Interagency Memo – signed by SECAF to “integrate planning and align policy and programs” (9 Jun 08)**

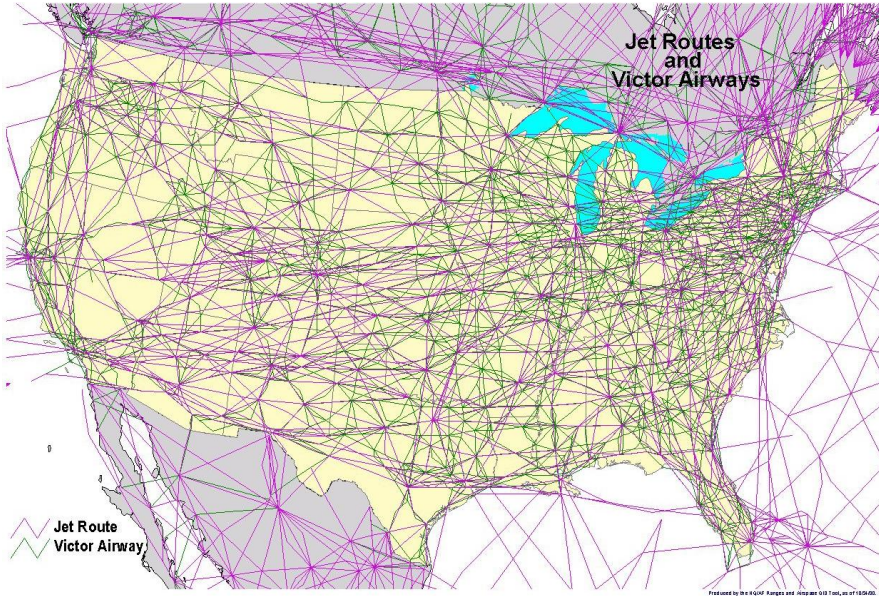


*Integrity - Service - Excellence*



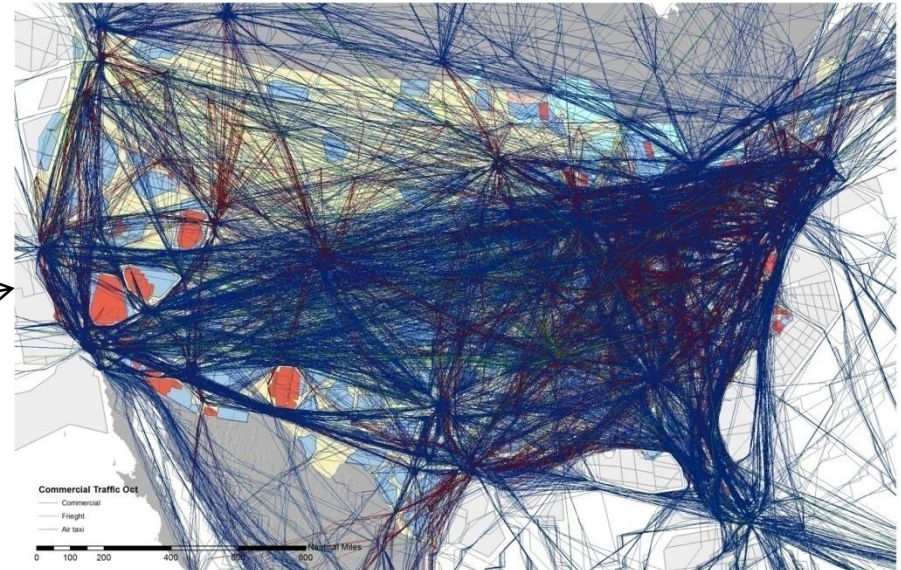
**U.S. AIR FORCE**

# Why NextGen?



**We designed our national airspace like this...**

**...but we use it like this.**





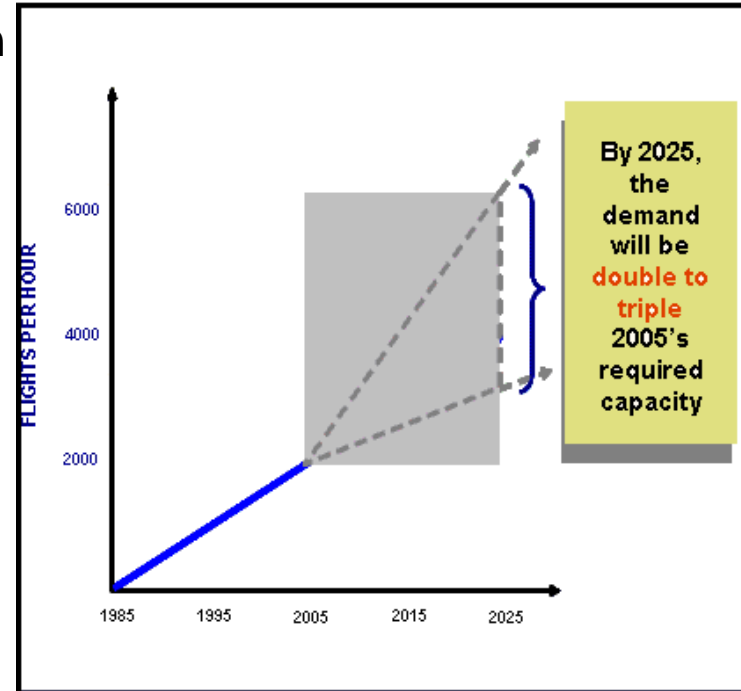
# Why NextGen?

- **Forcing Function:** Current air transportation system is reaching its limits; projected growth will result in system gridlock \*
  - 2012 - 2015: System capacity maximized
  - 2025: Double to triple the demand of 2005
  - Without modernization, the economic loss due to gridlock to USA = \$40B by 2033\*\*

\* "Next Generation Air Transportation System in Brief" 2006

\*\* Secretary of Transportation Peters, Speech to National Business Aviation Association, 25 Sep 07

- **Military Requirement:** Constrained airspace access will impact DoD's ability to operate, train and test future manned aircraft & RPAs



**NextGen must ensure safety, efficiency, economic, security and sovereignty challenges are met**



U.S. AIR FORCE

# DoD involvement in NextGen JPDO Working Groups

- Aircraft
- Air Navigation Services
- Airports
- Environmental
- **Weather**
- Global Harmonization
- Net-Centric
- Safety
- Security

Each working group has service representation





# DoD Net-Centric Data Strategy

U.S. AIR FORCE

*The DoD Net-Centric Data Strategy (signed 9 May, 2003) is the plan to make the Department's information resources:*

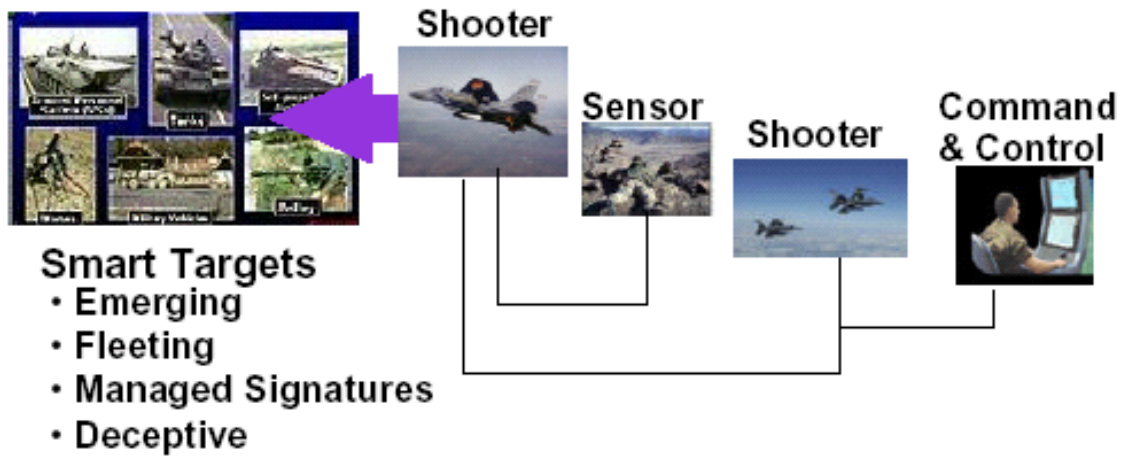
<b>Visible</b>	Is an information resource discoverable by most users?
<b>Accessible</b>	Is it available on the network, and are tools readily available to use it?
<b>Understandable</b>	Can it be intelligibly used? Are the semantics well documented?
<b>Trusted</b>	Is the source, accuracy and currency of the data available to users?
<b>Interoperable</b>	Can it be combined or compared with other information? Can it be mediated?
<b>Responsive</b>	Is the data what users need? Are robust user feedback mechanisms in place to improve it?

**Organized around Communities of Interest (COIs) within Warfighter, Business, and Intelligence Mission Area Domains**



U.S. AIR FORCE

# Old System of Systems Approach

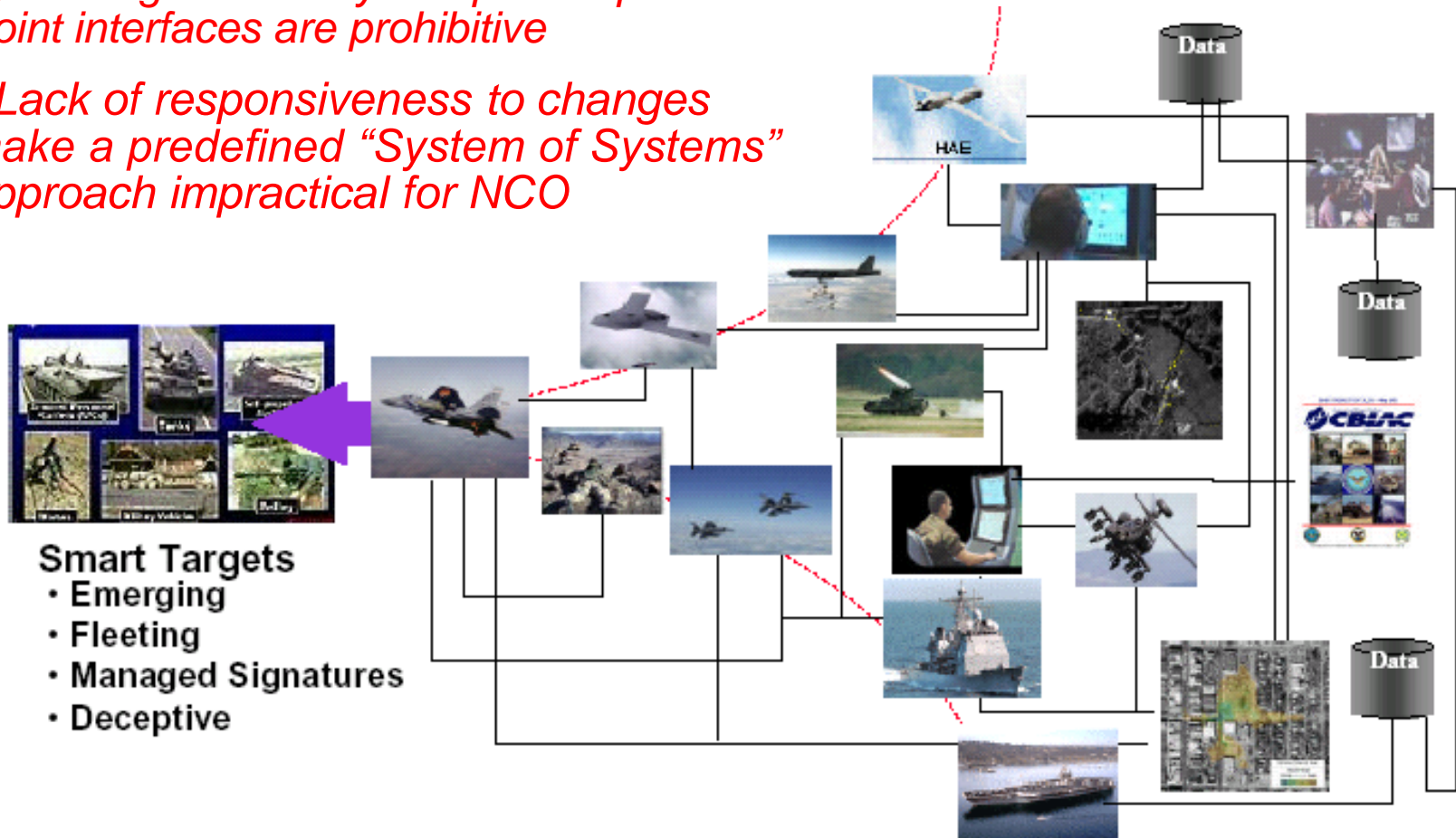




# Reality Wall - System of Systems N-squared Systems Problem

U.S. AIR FORCE

- Costs to modify/maintain system of systems governed by N-squared point-to-point interfaces are prohibitive
- Lack of responsiveness to changes make a predefined "System of Systems" approach impractical for NCO



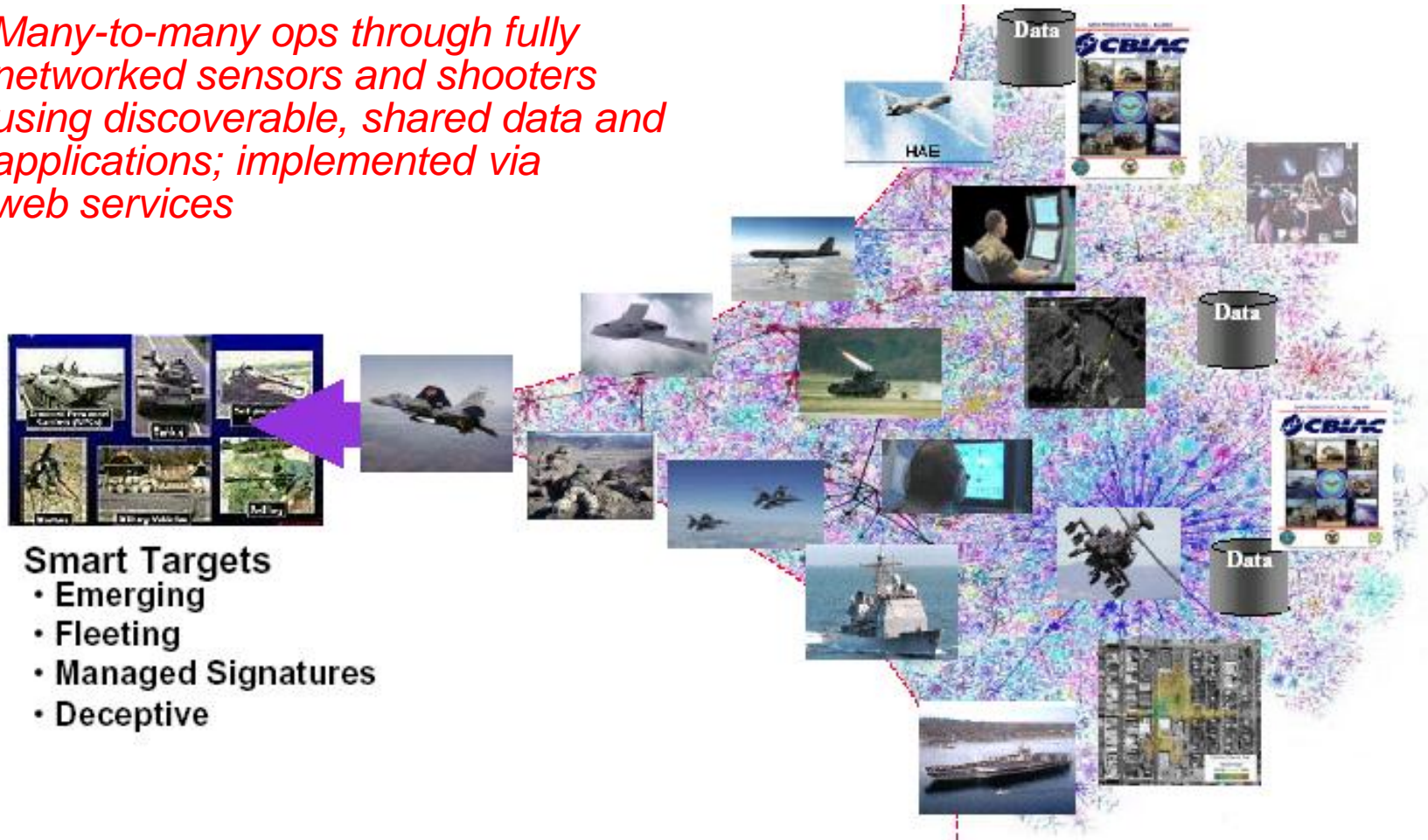




U.S. AIR FORCE

# Net-Centric Approach

*Many-to-many ops through fully networked sensors and shooters using discoverable, shared data and applications; implemented via web services*

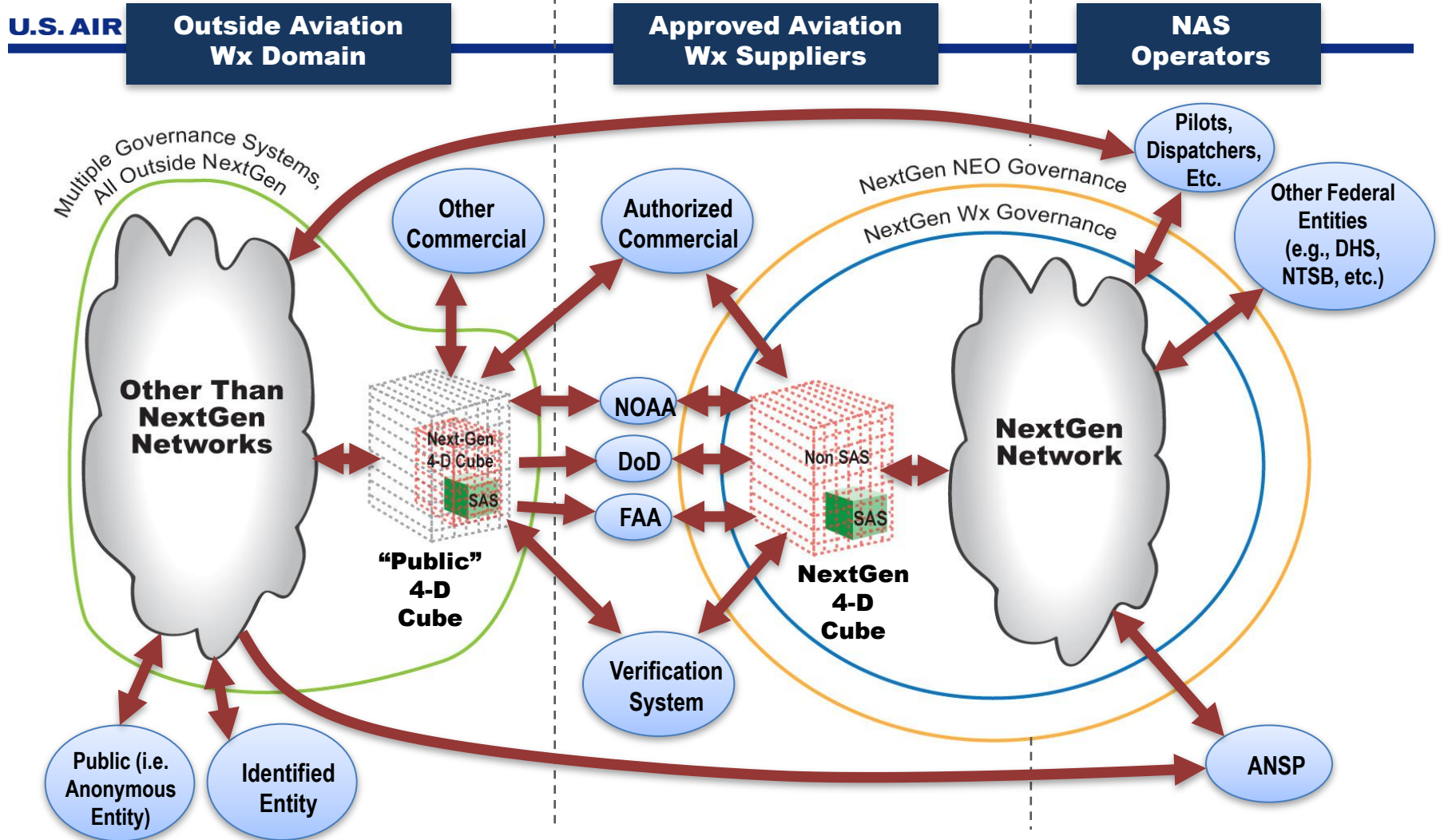


## Smart Targets

- Emerging
- Fleeting
- Managed Signatures
- Deceptive



# Policy Architecture Concept

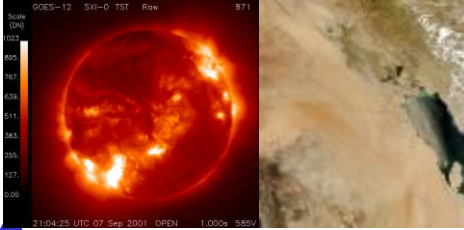




# Air Force Weather Our tiered production flow

**U.S. AIR FORCE**

## Environmental Inputs



KOFF 141855Z AUTO 33008KT  
10SM CLR

**Data Received**

Observations



Data & Products Provided



Teamwork

Tailored Products



OWS: Regional Focus

*Integrity - Service - Excellence*



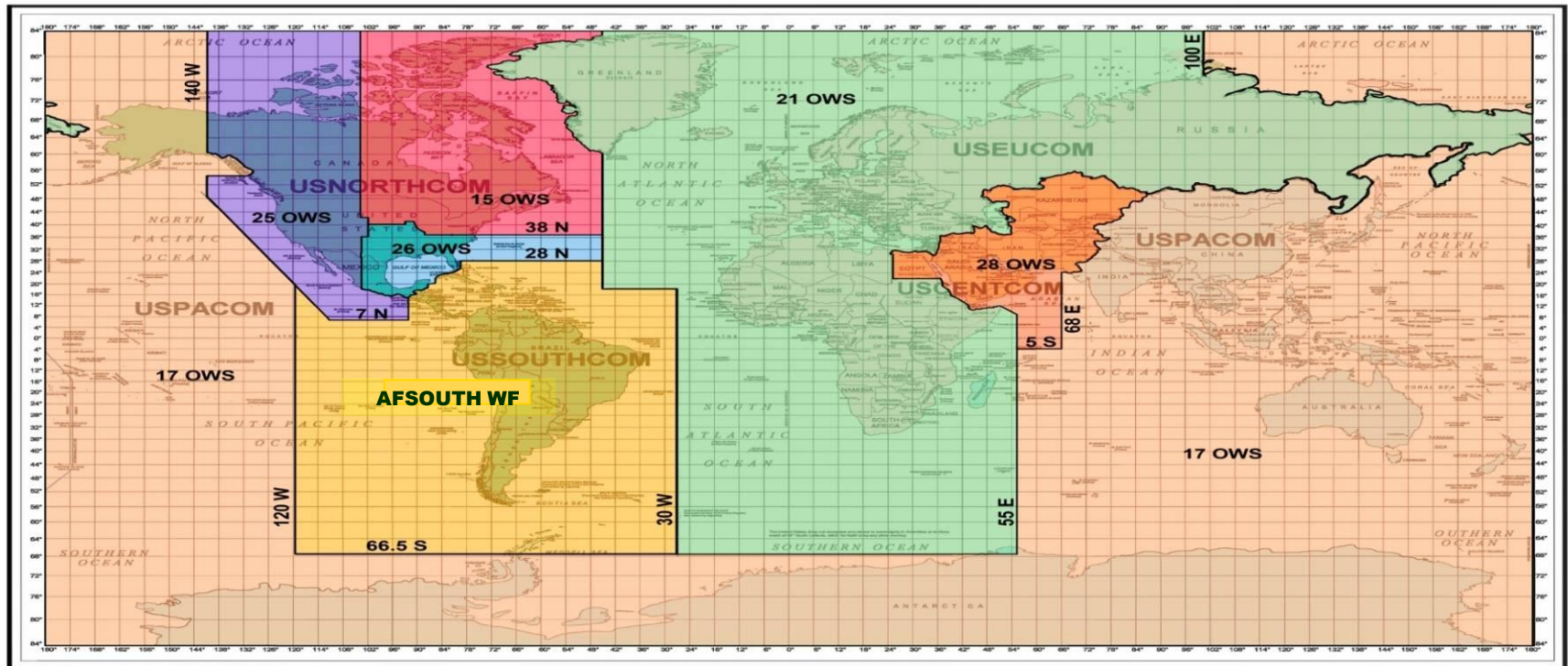
# OWS Areas of Responsibility

**U.S. AIR FORCE**

**Regional Reachback:** Currently provided by 6 OWSs and 1 Wx Flt

**Operations:** Supports AF, Army, Navy, Marine, Guard, Reserve and regional Combatant Commanders

**Training:** Provides all forecaster upgrade training for our new recruits





# AFW Net-Centric Architecture

U.S. AIR FORCE

Forecaster injects value in building the Virtual Joint METOC Database (VJMDB)

Forecaster actively optimizes METOC information exploitation



Other Community of Interest Enterprise Services

**M2M Services**

- JMBL/WFS
- CDC
- Value Added Services

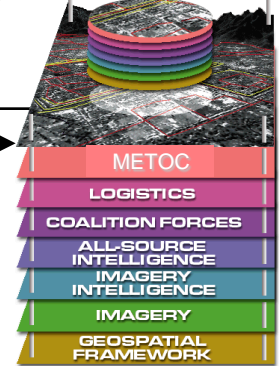
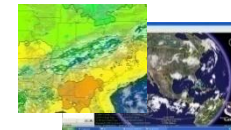
Warfighter Systems (e.g., C2, MP, ISR)

GIG

**METOC Capability Access Points:**

Standard points of presence to any METOC data, products, or services

DoD Core Enterprise Services



**Machine to Human Services**

- WMS, WFS, KML, GeoRSS
- Web Pages (html)

DoD Wx data & knowledge integrated into warfighter decisions, applications, & displays

**VJMDB:** METOC observations, analysis, forecasts, model output, warnings, advisories, products, etc. The full aggregation of METOC information stored at Analysis and Prediction Centers, Regional/Mission reach-back centers, & any forward deployed DBs located at worldwide DoD METOC nodes



U.S. AIR FORCE

# AFW Operations During NextGen CONOPS

- Data exchange with NWS continues
  - AFW wx observations and TAFs provided to NWS for national “4D Cube” in WMO/ICAO formats
  - Both bulk data exchange and web service exchanges available/used
- AFW ingests NWS and FAA ADS data and products and uses in our production weather operations
  - Used for M2M and M2H in military automated flight planning tools similar to same services available today - evolving as needed
  - Forecasters in the Loop add key value to both data and products
  - Flight Wx briefing process same as peace and war, we will use ADS sources for consistency
  - AFW unique data sources used for missions flown both in and outside civil ATM (e.g., wartime and training in MOAs)

**AFW Processes for Weather Operations**



**U.S. AIR FORCE**

# *Bottom Line*

- **A transformed national airspace system is inevitable, but we can influence the end state**
- **Global engagement is more important than ever**
- **NextGen is about capabilities, not technology alone**



**Focus on common interests, Optimize for all users, Leverage investments**

*Integrity - Service - Excellence*

# ***Headquarters U.S. Air Force***

---

*Integrity - Service - Excellence*

## **DoD - NextGen**



**21 July 2010**

**U.S. AIR FORCE**

---





**U.S. AIR FORCE**

---

# ***Backups***



# Current Operational Architecture Operational View (OV-1): AFW Enterprise

Relevant/Timely Accurate Support:  
National Command Authority to  
Air Force and Army Units

Integrated Aerospace Capabilities  
(Terrestrial and Space)

Data Available Globally

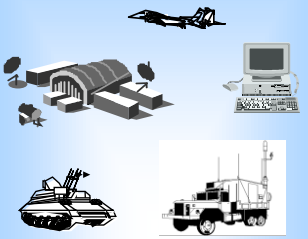
Same Ops - Peace and War

Tiered Production

Collaboration with AFW and C2/ISR Nodes

## Users

### Warfighter



AF, Army, IC/ISR,  
Special Operation Forces



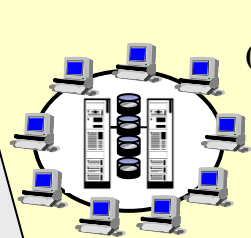
Command Posts  
/ Base Ops

Mission Information

Mission Exploitation/Impacts

Weather Data/Products

## 2WXG



AFWA-Offutt  
(Aerospace Weather)

14<sup>th</sup> WS

### Global Scale

- Global Data Collection
- Global Analyses/Forecasts
- Global Dissemination
- Global/Mission Reachback Apps

## Characterize

Analysis  
Forecasting

### Theater Scale

## 6 OWSs Worldwide

E.g., 21st OWS  
Sembach AB, Germany



- Theater Data Collection
- Theater/Regional Analyses/Fcsts
- Theater/Regional Dissemination
- Theater/Mission Reachback Apps

### Tactical/Base Level

- First-in/Small Footprint
- Mission Tailored Products
- Mission Tailored Wx Support
- Local Weather Sensing
- Local Dissemination

## 162+ WFs Worldwide

Aviano AFB  
16 AF/South



Fixed and Deployed Ops

Exploit  
Mission  
Tailoring



U.S. AIR FORCE

# ***Building Blocks Available for: Virtual National METOC Database***

- METOC DB/JMBL reuse and forward collaboration to NOAA/NWS - Feb 08
- AFW/DoD lessons learned helping shape national way forward
  - Provided “Lessons Learned”/Architecture brief to:
    - NWS/FAA - Jul 09
    - JPDO - Aug 09
- Provided AFW DB/JMBL code for NWS/ESRL reuse assessment
  - Conducted tutorial/training on code & components at AFWA - Nov 09
  - Reach back consulting provided Jan 10 - Ongoing
  - Proposed method to obtain key engineering support to help ESRL finish port from IBM AIX to LINUX -- Up and functioning after only 3 days on-site help

*Building blocks available for National  
collaboration/reuse*



U.S. AIR FORCE

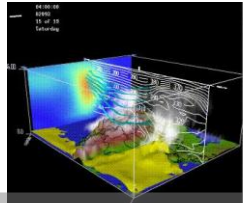
# JMBL: M2M Weather

## Warfighter System



JMBL Request

Tailored data request  
...need winds/temps T-12 to T-6  
for 5-10K ft...



JMBL Response

Tailored M2M data for user  
specified request

Ready for ingest into  
warfighter application  
(e.g. precision airdrop,  
risk avoidance, etc.)

## Weather System

Automatically determine best  
weather data for  
tailored request

Format  
Response

Ask and retrieve  
tailored data from  
internal data stores

## WX physical DBs – all WX data holdings

Sensor  
Data  
Locations

Observed  
Data

Special  
WX  
Bulletins/  
Forecasts

others  
▪ ▪ ▪

Model  
Data

Satellite  
Imagery

Space  
WX  
Data