Headquarters U.S. Air Force

DoD - NextGen

Lt Col David Miller
Air Force Weather
21 July 2010
NextGen Governance

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)
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**

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

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* "Next Generation Air Transportation System in Brief" 2006
** Secretary of Transportation Peters, Speech to National Business Aviation Association, 25 Sep 07

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NextGen must ensure safety, efficiency, economic, security and sovereignty challenges are met
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
The **DoD Net-Centric Data Strategy** (signed 9 May, 2003) is the plan to make the Department’s information resources:

- **Visible**: Is an information resource discoverable by most users?
- **Accessible**: Is it available on the network, and are tools readily available to use it?
- **Understandable**: Can it be intelligibly used? Are the semantics well documented?
- **Trusted**: Is the source, accuracy and currency of the data available to users?
- **Interoperable**: Can it be combined or compared with other information? Can it be mediated?
- **Responsive**: 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
Old System of Systems Approach

Smart Targets
- Emerging
- Fleeting
- Managed Signatures
- Deceptive

Shooter
Sensor
Shooter
Command & Control
- 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
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
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Air Force Weather
Our tiered production flow

Environmental Inputs

AF Weather Agency:
Provides the weather data
and product flow

Data Received

Data & Products Provided

Teamwork

Tailored Products

Characterizer, Exploiter

OWS: Regional Focus

Wx Sqs / CWFs
- Eyes forward
- Integrated w/Ops
- Exploitation

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I n t e g r i t y  -  S e r v i c e  -  E x c e l l e n c e
**OWS Areas of Responsibility**

**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

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

METOC Capability Access Points: Standard points of presence to any METOC data, products, or services

Other Community of Interest Enterprise Services

DoD Core Enterprise Services

M2M Services
- JMBL/WFS
- CDC
- Value Added Services

Forecast actively optimizes METOC information exploitation

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
AFW Processes for Weather Operations

- 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)
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
Headquarters U.S. Air Force

Integrity - Service - Excellence

DoD - NextGen

21 July 2010
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**
- 6 OWSs Worldwide
  - E.g., 21st OWS Sembach AB, Germany
- 162+ WFs Worldwide
  - Aviano AFB 16 AF/South
- Fixed and Deployed Ops

**Mission Exploitation/Impacts**
- Global Scale
  - Global Data Collection
  - Global Analyses/Forecasts
  - Global Dissemination
  - Global/Mission Reachback Apps

**Characterize**
**Analysis**
**Forecasting**

**Tactical/Base Level**
- First-in/Small Footprint
- Mission Tailored Products
- Mission Tailored Wx Support
- Local Weather Sensing
- Local Dissemination

**Exploit**
**Mission Tailoring**

UNCLASSIFIED
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
**JMBL: M2M Weather**

**Warfighter System**
- Tailored data request
  - need winds/temps T-12 to T-6 for 5-10K ft...
- 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
- 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
- Model Data
- Satellite Imagery
- Space WX Data
- others