NextGen Net-Centric Operations
Supporting NextGen Weather
-A Work in Progress-

v1.4.1
Michael Little
Michael.M.Little@nasa.gov

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NCOD Support to NextGen Weather

• Support Definition of Information Sharing Services
  – Ensure inter-operability across business areas
• Assist in Resolving Supporting Infrastructure Service Issue
• Coordinate Inter-agency Testing of Resulting Services
Start with capability areas having potential for near-term success
JPDO NCOD Info Sharing Development Strategy

Operators/ Users

Select Operational Thread

Identify Processes/ Decisions

Describe Info Exchanges

Iterative approach allows incorporation of industry advancements

Derive Infrastructure Requirements

Perform Inter-organizational T&E

Transition to Operations

ID Inter-agency functional appeal

CONOPS

Scenarios, actors

Users, service levels, security requirements, Authoritative sources

Connectivity, speeds, bandwidth, standards

Validate, Experiment, Measure value

Adoption is an Option—endorse Efforts already underway

Iterative approach allows incorporation of industry advancements

Next Generation Air Transportation System
Joint Planning and Development Office
NextGen Actors
What decisions do they make?
What info do they need?

- Passengers
- Passenger-related users
- Cockpit Flight Crews
- Cabin Air Crews
- Air Traffic Controllers
- Air Traffic Planners
- Air Marshals
- Ramp Crew (refuel, bags)
- Baggage Handlers
- Airport Security
- Airport Concessionaires
- Airport Ground Transport
- FEMA Planners
- Weather Forecasters
- First Responders
- Shippers
- Freight Forwarders
- AMOC Operators
- AMOC Supervisors
- AMOC Intel Analysts
- TSA screeners
- TSA Intel Analysts
- CBP arrival inspectors
- CBP Intel Analysts
- Airline Management
- Flight Instructors
- Gate Agents
- Ticket Agents
- NORAD Analysts
- USAF/USA/USN Controllers
- Airport Owners
- Airport Ops Managers
- GA Pilots
- Air-taxi operators
- IT System Developers
- IT Infrastructure Ops
- Avionics Developers
- FAA Certification Ops
- Safety Review
- Aircraft Maintenance
- Air Rework Facilities
- Manufacturers
- NTSB Investigators
- Insurance Investigators
- Airline incident analysts
- Union Representatives
- Union Management
- Criminals
- Terrorists
- Drug Dealers
- Smugglers
IATB Concept

- IATB is a collaboration among partners who have NextGen information to share or want to find ways to use information related to NextGen
  - Not a physical facility itself
- Light Governance consistent with R&D maturity
  - Follows JPDO and JPDO/NCOD Governance models
  - Applies Internet Engineering Task Force (IETF) philosophy
    - “Community standards and working code”
- Services are NOT operational
  - Limitations are advertised
  - Cannot be permitted to impact operational systems
  - “Best Effort” made to keep them in operation for use by others
- Periodic, well-defined experiments to evaluate value of specific information sharing to stakeholders
IATB Capabilities

• Debug data communications issues which preclude inter-agency information sharing
  – Data comm network connectivity
  – Cybersecurity and Firewalls
  – Standards and Protocols

• Provide pre-production environment for developers of client applications to access information services

• Provide environment for evaluating business value of information sharing through focused experiments
  – similar to JEFX
  – Prepare for Research to Operations Transition within Agency

• Assist cultural change by showing feasibility and value
  – Educate Senior Management
IATB Participant Locations

- MIT Lincoln Labs
- MITRE
- ESC
- FAA Tech Center
- NASA GRC
- NPOESS/JPDO
- NASA LaRC
- NASA ARC
- NORAD-USNorthcom
- UCORE
- PMO
- SPAWAR
- NASA DFRC
- NASA NoTX
- AFNorth
- SPAWAR, Charleston
- MS Research
# Currently Adopted Information Services

(Reflects only Programs Adopted by 6/6/10)

<table>
<thead>
<tr>
<th>Information</th>
<th>Sensitivity</th>
<th>Source</th>
<th>ETA</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federated Metadata Directory</td>
<td>Public</td>
<td>NASA LaRC ASDC</td>
<td>7/30/10</td>
<td>Tool Selection through ESC. Initially duplication/synch with local directory. Final: federation with local control</td>
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<tr>
<td>Federated Registry</td>
<td>Public</td>
<td>NASA LaRC ASDC</td>
<td>Now</td>
<td>ebXML in JBOSS. Need UDDI version (IBM)</td>
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<tr>
<td>Timing Example</td>
<td>Public</td>
<td>NASA LaRC ASDC</td>
<td>Now</td>
<td>Alion COI Provisioning</td>
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<td>Weather (Initial test set)</td>
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<td>FAA NNEW</td>
<td>2010 Fall</td>
<td>Alion – Inventory artifacts</td>
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<td>Other Aviation Weather</td>
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<td>TBD</td>
<td>Need Official Coordination with FAA</td>
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</tbody>
</table>
# Currently Adopted Information Services
(Reflects only Programs Adopted by 6/6/10)

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<th>Issues</th>
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<tbody>
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<td>•Live Data</td>
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<td>Aircraft Registration</td>
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<td>International Flight Data Objects</td>
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<td>Airport/runway status</td>
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<td></td>
<td></td>
<td>•Spring 2011</td>
<td>•Live Data</td>
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<tr>
<td>LRR/SRR Radar detections and reports</td>
<td>Public</td>
<td>FAA EDX R6</td>
<td>•Fall 2010</td>
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<td></td>
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# IATB Collaborative Tools

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Provided by</th>
<th>ETA</th>
<th>Test Bed Impact</th>
<th>Operations Impact</th>
<th>Tool Implemented</th>
<th>Comments</th>
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<tr>
<td>Calendar</td>
<td>NASA LaRC</td>
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<td>Scheduling IATB Events, needs</td>
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<td>iCal</td>
<td>Standards based for interchange of events</td>
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<td>Registry – Authoritative Data Sources</td>
<td>NASA LaRC</td>
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<td>File Sharing &amp; Digital Library</td>
<td>NASA LaRC</td>
<td>Summer 2010</td>
<td>Publish requirements, documents</td>
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<td>Test plans, test results. Published documents</td>
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<td>Shared Test Management Software</td>
<td>Local</td>
<td>Partial</td>
<td>Characterize performance</td>
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<td>iTKO Lisa</td>
<td>Each Site. Need licensing and procurement help</td>
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<td>WebEx</td>
<td>JPDO</td>
<td>In Place</td>
<td>Real-time</td>
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<td>Meeting Place</td>
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<td>JPDO</td>
<td>In Place</td>
<td>Troubleshooting</td>
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<td>JPDO</td>
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<td>Chat/IRC</td>
<td>JPL</td>
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<td>Troubleshooting</td>
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<td>Action Tracking</td>
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<td>Experiment Mgt</td>
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<td>Video Repository</td>
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<td>Lessons Learned</td>
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<td>IATB Twitter</td>
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<td>TBD</td>
<td>Experiment Mgt</td>
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<td>Experiment Mgt</td>
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<td>Facebook</td>
<td>JPL</td>
<td>TBD</td>
<td>Expert Coordination</td>
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<td>TBD</td>
<td>Private</td>
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A Phased Approach

• Phase 0 – 4-6 weeks
  – Prove that a minimal service can be shared from LaRC to ESC and FAA’s WJH Technical Center

• Phase 1 - 5-6 months
  – Evaluate the interagency sharing of initial information from the 4D Weather Cube, C2Gapfiller, EDX and other services already exposed

• Phase 2 – 1 year
  – Add key collaboration sites
  – Add Information Sharing Services, as Projects are adopted

• Phase 3
  – Demonstrate candidate C2GF disadvantaged client, if available
  – Implement Sustaining Business Model
<table>
<thead>
<tr>
<th>Reportable Milestones</th>
<th>Committee of Corresp</th>
<th>Program Management</th>
<th>Infrastructure Connectivity</th>
<th>Emerging Services</th>
<th>Client Access</th>
<th>Test Exercises</th>
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<tbody>
<tr>
<td>Service Demo</td>
<td>Timing Service</td>
<td>Fully Provisioned</td>
<td>NNEW 10 Demo</td>
<td>C2GF Demo 1</td>
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<td>Kick-Off Mtg</td>
<td>Draft Charter CoC</td>
<td>JPDO Approval</td>
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<td>NNEW &amp; 4D Wx Cube</td>
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<td>C2 Gapfiller JCTD</td>
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<td>C2GF Demo 1</td>
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<td>ITT IDL/Envi Service Access Plug-in</td>
<td>Initial Demo</td>
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<td>Open Source Initial Test</td>
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<td>GMU Web Client</td>
<td>Initial Demo</td>
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<td>ESC CEIF Testing</td>
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<td>Draft</td>
<td>Final</td>
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<td>FAA NNEW Testing</td>
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<td>JEFX 11 Planning</td>
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<td>Experiments</td>
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**LEGEND:**
- ▲ Planned Event
- △ Completed
- ▲ Overdue
- ▼ Replan

**6/10/10 14**

**Inter-agency Testbed Near-term Schedule**

**Q3**
- APR: Service Demo
- MAY: Timing Service
- JUN: Fully Provisioned
- JUL: NNEW 10 Demo
- AUG: C2GF Demo 1

**Q4**
- SEP: NNEW Fall Demo
- OCT: Fully Provisioned
- NOV: C2GF Demo 1
- DEC: Fully Provisioned

**Q1**
- JAN: JPDO Approval
- FEB: NG Testbed to R&D Enclave
- MAR: FAA TechCtr to R&D Enclave

**Q2**
- APR: NoTX to R&D Enclave
- MAY: FAA, ESC, ASDC, MITRE, NoTX, JPDO Internet Verification
- JUN: NNEW 10 Demo
- JUL: C2GF Demo 1

**Q3**
- AUG: NNEW 10 Demo
- SEP: C2GF Demo 1
- OCT: Fully Provisioned
- NOV: Fully Provisioned

**Q4**
- DEC: JPDO Approval
- JAN: NG Testbed to R&D Enclave
- FEB: FAA TechCtr to R&D Enclave
- MAR: FAA, ESC, ASDC, MITRE, NoTX, JPDO Internet Verification

**Q1**
- APR: NNEW Fall Demo
- MAY: Fully Provisioned
- JUN: C2GF Demo 1
- JUL: Fully Provisioned
IATB Governance

• 2-Body Problem
  – Steering Committee – policy and review
  – Committee of Correspondence – technical working group

• Conceptual Origins
  – Modeled after Internet Engineering Task Force
    • Collaboration not direction
    • Community Standards and Working Code
  – An Element under JPDO’s NextGen NCO Governance Model

• Responsibilities
  – Service Level Agreements by Providers
  – Appropriate Use Agreement by Consumers
  – Acceptance and application of Standards
  – Clear and consistent statement of information protection for data
Nearterm Technical Issues for IATB

- Exchange Electronic Credentials
  - Initially USAF and NASA
  - Work with FAA
  - Expand to include agencies using PIV-2 cards
  - Expand to include industry using PIV-2 cards
- Verify connectivity between the various consumers and a reference info service
- What is a Fully Provisioned Service
- Interoperability among registry services
- Interoperability of info services between ESBs
  - Web services
  - Java messaging services
- Interoperability between SOAP and REST Services
- Authorization of access to information services
- Monitoring services for outage
- Enforcement of compliance of service delivery SLAs (technical)
Key Issues to be worked out

• Governance and how do we manage IATB in the face of natural inertia from Agencies to remain isolated or limit collaboration
• Data Communications architecture across multiple security domains
• Relationship to data.gov
• Research to Operations Transition Process
• Access Control
  – Federated ID Management across Agencies and Companies
  – Authorization schema
    • Needed to protect proprietary or SBU data before industry can participate
• Outreach and collaboration with additional assets
  – Expand Agency participation
  – Create industry involvement
    • Need to show value
Proposed IATB Follow-on Focus Areas

- Information Exchange
  - Air-to-ground, air-to-air communications testing
  - Data and Information standards
  - Data compression and/or encryption for transmission only
  - Cyber-security in inter-organizational information sharing

- SOA Business Applications
  - Develop common user interfaces across communities of interest
  - Evaluate impact of each test to needs, providing value to NextGen and NAS
  - Identify or develop easy-to-use mashup environment

- Interoperability of SOA Software Tools
  - Catalog & test various tools (ESB, registry server, metadata, etc.)
  - Test Management tools
  - Metadata creation and alignment tools
IATB: What Can I Do With It?

• Register your interest
  – Notify Emily Brandes Emily.CTR.Brandes@faa.gov of your interest

• Join the NextGen Institute to clarify Organizational Conflict of Interest

• Test Your Info Service Client connection to the ASDC Timing Service
  – Service reports clocktime on unix box at NASA Langley Atmospheric Science Data Center
  – Located in DMZ at NASA LaRC and has been verified accessible to outside clients without prior arrangements
  – Service at http://soa-asdc.larc.nasa.gov/ASDCTimeService/TimeService
  – Examine the service using generic client: http://www.soapclient.com/soaptest.html
  – NOTE THAT THIS URL DOES NOT LOAD A Web Browser – it takes a client

• Report success to Ms. Brandes
  – Suggest information services that you would like to see added

• Stay in touch as we add services
  – Look for effective mashups that can be used to demonstrate business value to the partners