What the future holds for AIM

A perspective from the Federal Aviation Administration

Federal Aviation Administration

2010 AIXM/WXXM Conference

Name: Brett Brunk

AIM Architecture and Planning

Date: April 23, 2010
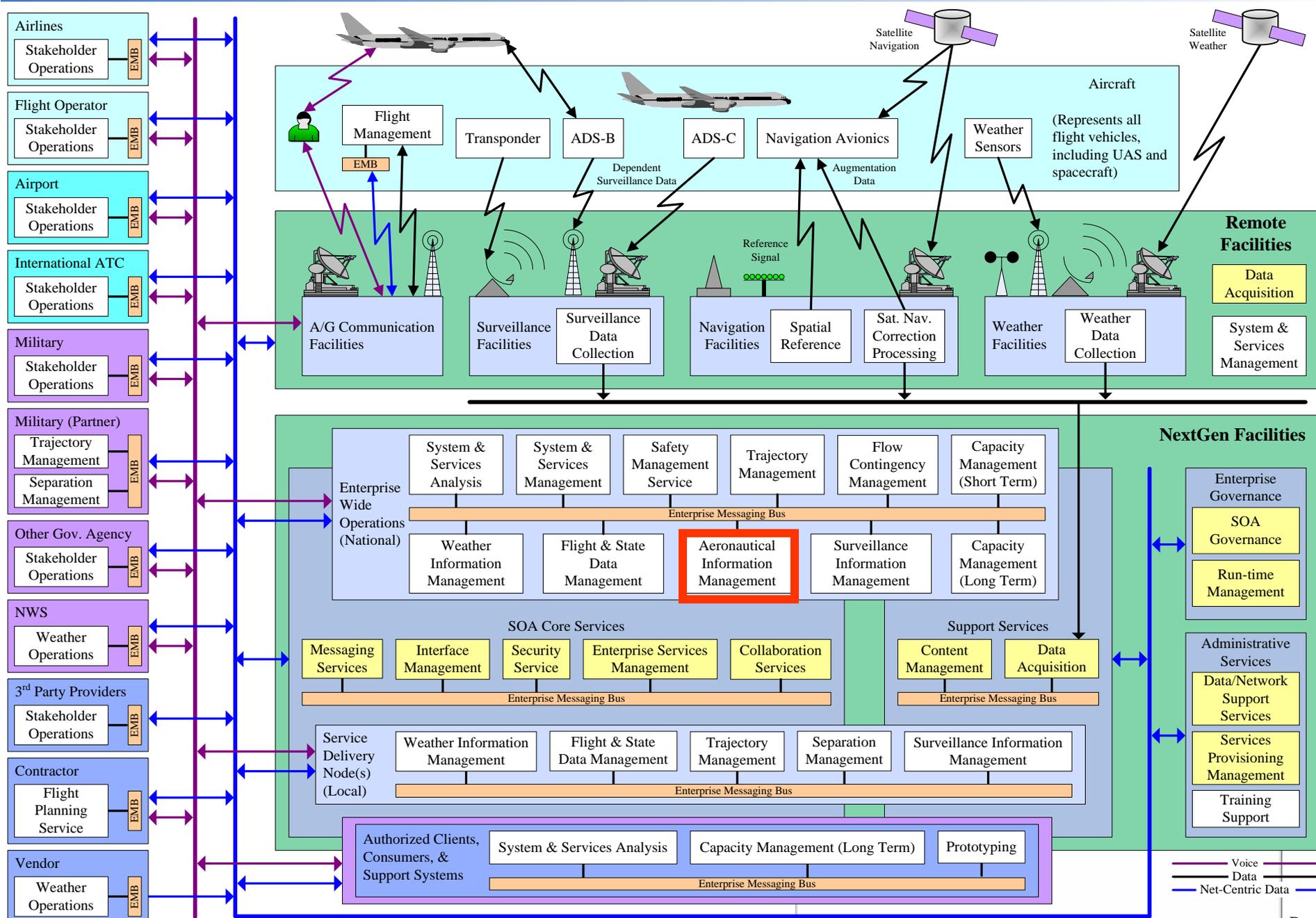
Aeronautical Information in the NAS

Figure 1. NextGen 2025 OV-1

Aeronautical Information in the NAS

Figure 1. NextGen 2025 OV-1

What is aeronautical information (AI)?

Aeronautical information is a <u>shared resource</u> describing a nation's <u>aviation infrastructure</u>. It identifies the systems, services and rules describing the structure and state of the operational environment

Systems: airspace, NAVAIDs, etc.

Services: airport fuel, weather briefing, ATC, etc.

Rules: instrument flight procedure containment, temporary flight restrictions, etc.

Definition sources: www.aixm.aero, ICAO Annex 15, ICAO AIS to AIM Study Group, CANSO, EUROCONTROL, Global AIM Consortium

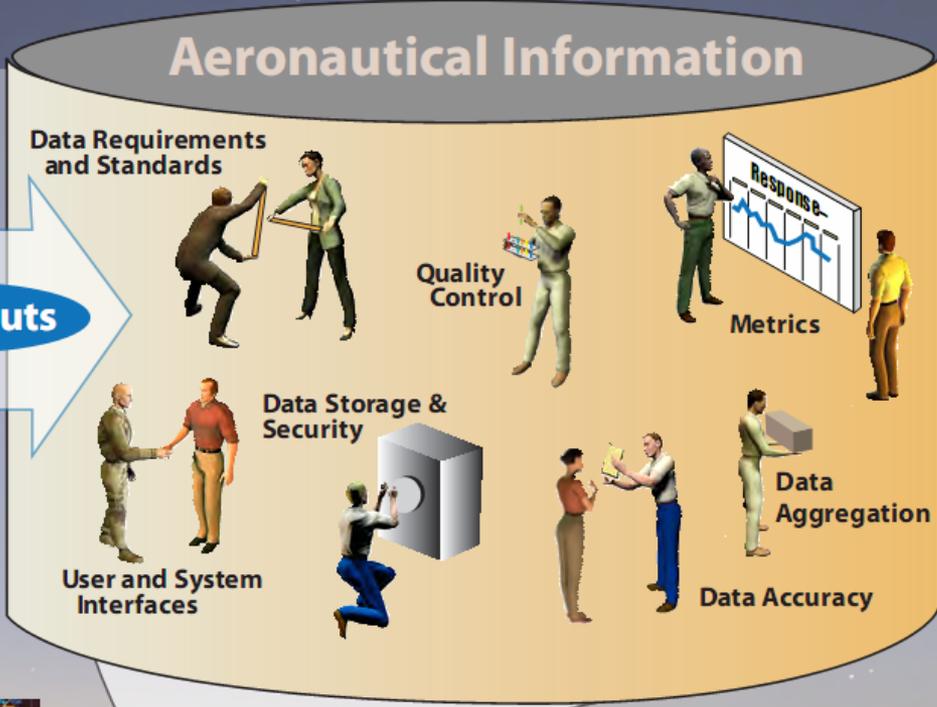# Aeronautical Information Management (AIM) Common Service
Ensuring the Right Data @ the Right Time @ the Right Place

Airport

Airspace

Procedures

Equipment

Data Inputs

Aeronautical Information

Data Requirements and Standards

Quality Control

Metrics

Data Storage & Security

User and System Interfaces

Data Accuracy

Data Aggregation

Surveillance

Weather

Flight Object

COMMON OPERATIONAL PICTURE OF THE NATIONAL AIRSPACE SYSTEM

Outputs

Integrated Products for Pilots, Air Traffic Contol Managers, Airspace Designers, Traffic and Strategic Planners

Draft April 2010

Evolving AIS to AIM

Product-centric $\Rightarrow$ Data-centric

- NOTAM $\Rightarrow$ Event
- Chart $\Rightarrow$ GIS
- Aeronautical Information Publications (AIPs) $\Rightarrow$ Aeronautical Information Services

Federal Aviation Administration

7

What is Information Management

Manage

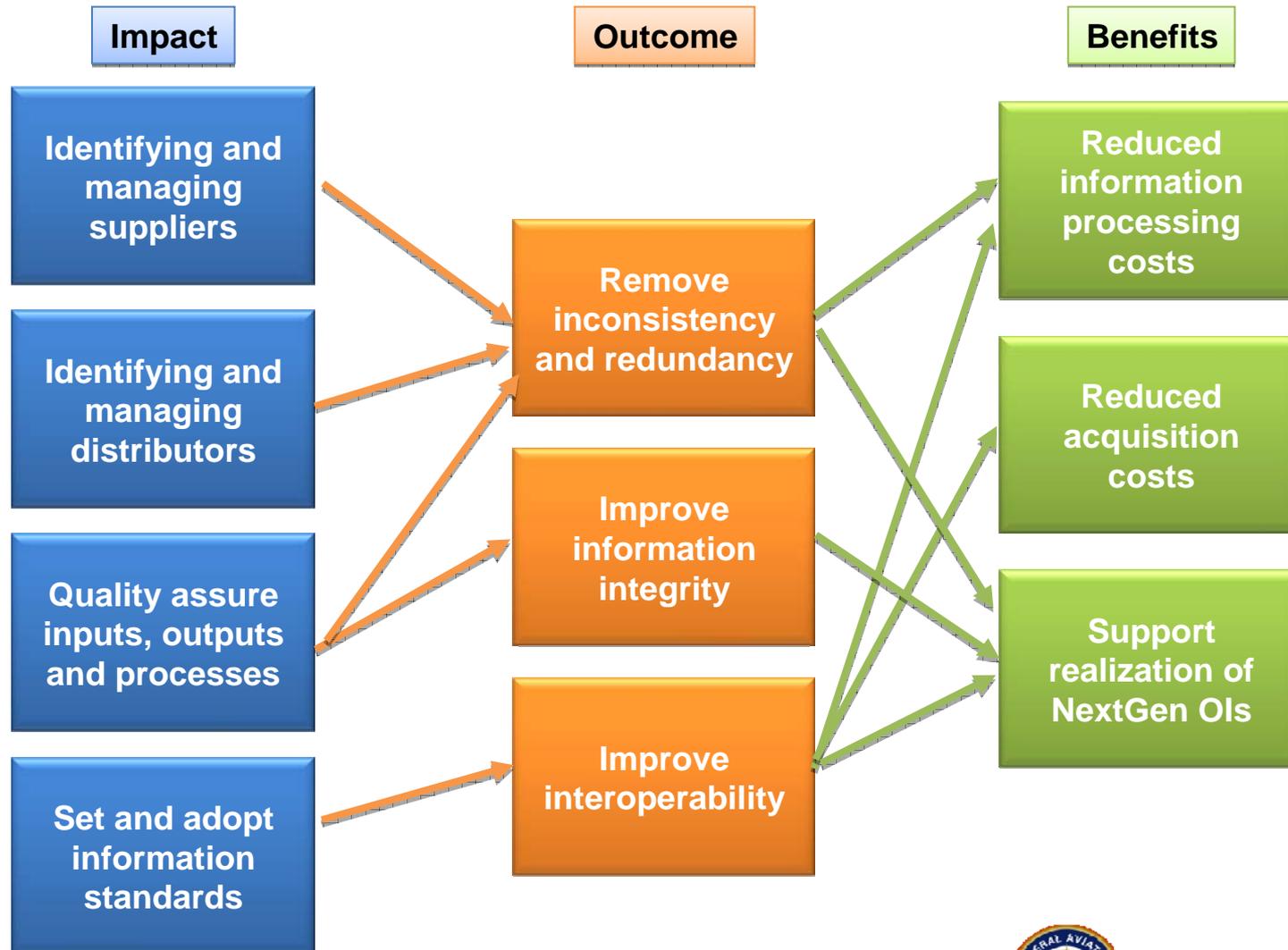Suppliers (Data) → Collect → Maintain → Disseminate → Users (Information)

Transform data into information that can be used by ATM

Information and data management…

- Identify and manage information needs of the business.
- Identify and manage suppliers
- Manage information lifecycle
  - Optimized, Architected, Standardized
  - Governed, Configuration Managed
- Aggregate data and deliver information services

Value Chain of Information/Data Management

Impact

- Identifying and managing suppliers
- Identifying and managing distributors
- Quality assure inputs, outputs and processes
- Set and adopt information standards

Outcome

- Remove inconsistency and redundancy
- Improve information integrity
- Improve interoperability

Benefits

- Reduced information processing costs
- Reduced acquisition costs
- Support realization of NextGen OIs

Federal Aviation Administration

9

Performance & Business Driven Approach to AIM

Performance Requirements
- Desired outcomes
- Performance measures

Business Services
- ATM functions

Information Exchange
- Conceptual model
- Net-centric and across domains

Standards
- Data
- Interoperability

Performance & Business Driven Approach to AIM

NextGen Operational Improvements

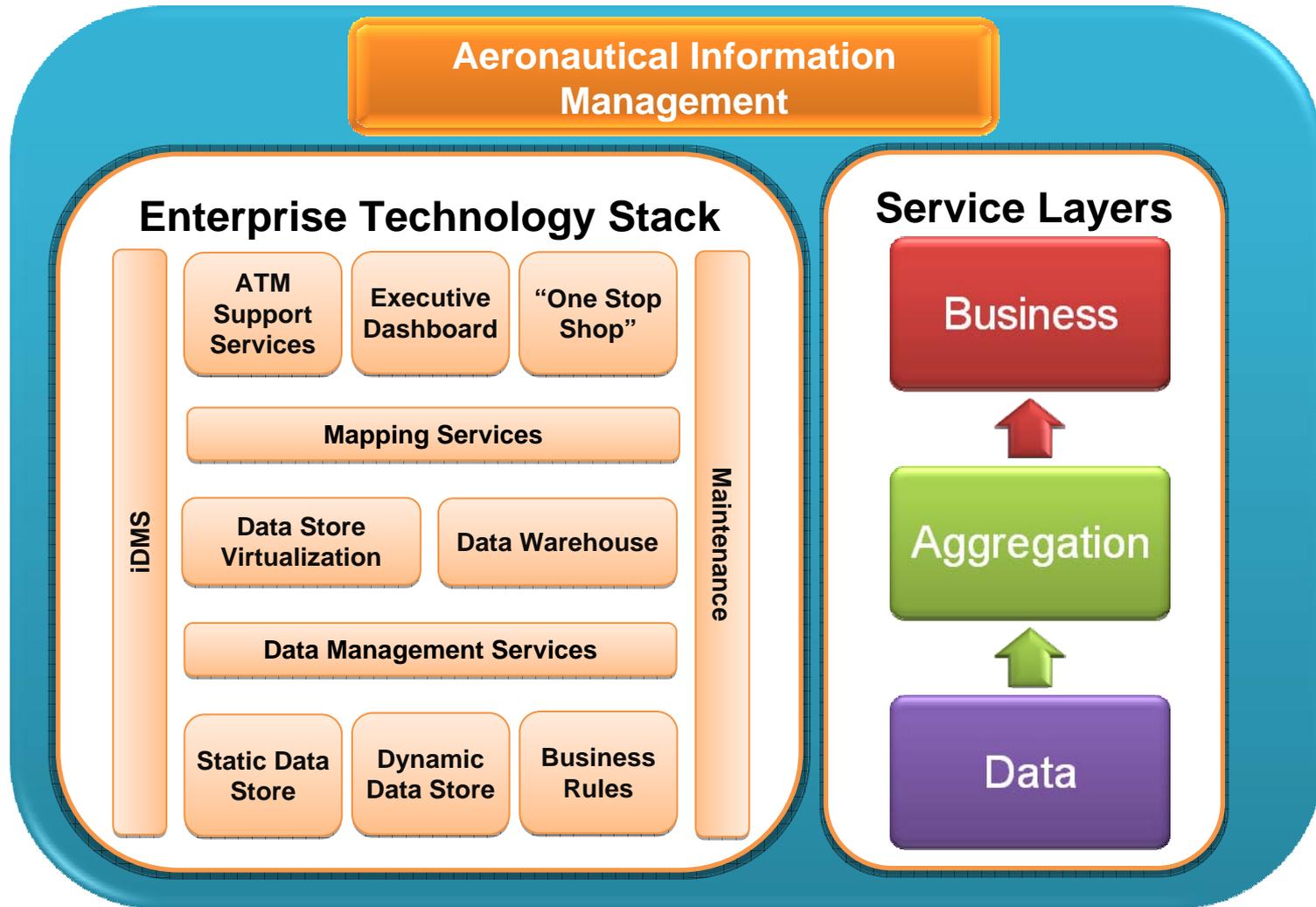**NextGen Systems**
- ERAM, TFDM, TBFM, TFMS

SWIM Network
- Web Feature Services (WFS), Web Mapping Services (WMS), Web Coverage Services (WCS),
- Enterprise Service Bus (ESB) & Service Registry

Standards
- AIXM
- OGC Service Standards
- SWIM Protocols

AIM Enablers – The Systems

Aeronautical Information Management

Enterprise Technology Stack

iDMS

ATM Support Services	Executive Dashboard	"One Stop Shop"

Mapping Services

Data Store Virtualization	Data Warehouse

Data Management Services

Static Data Store	Dynamic Data Store	Business Rules

Maintenance

Service Layers

Business

↑

Aggregation

↑

Data

Aeronautical Information Standards and Protocols
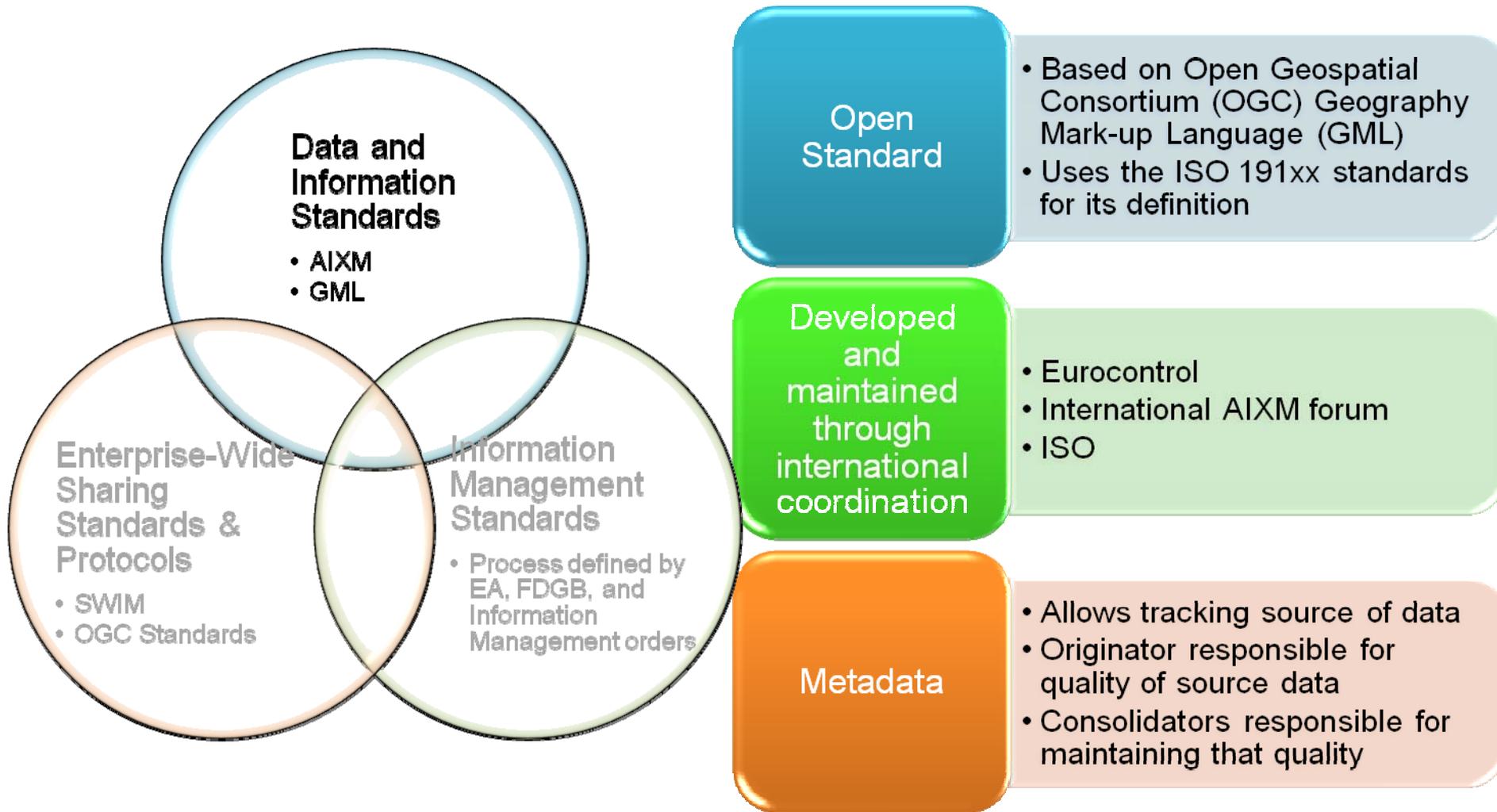
Data and Information Standards
- AIXM
- GML
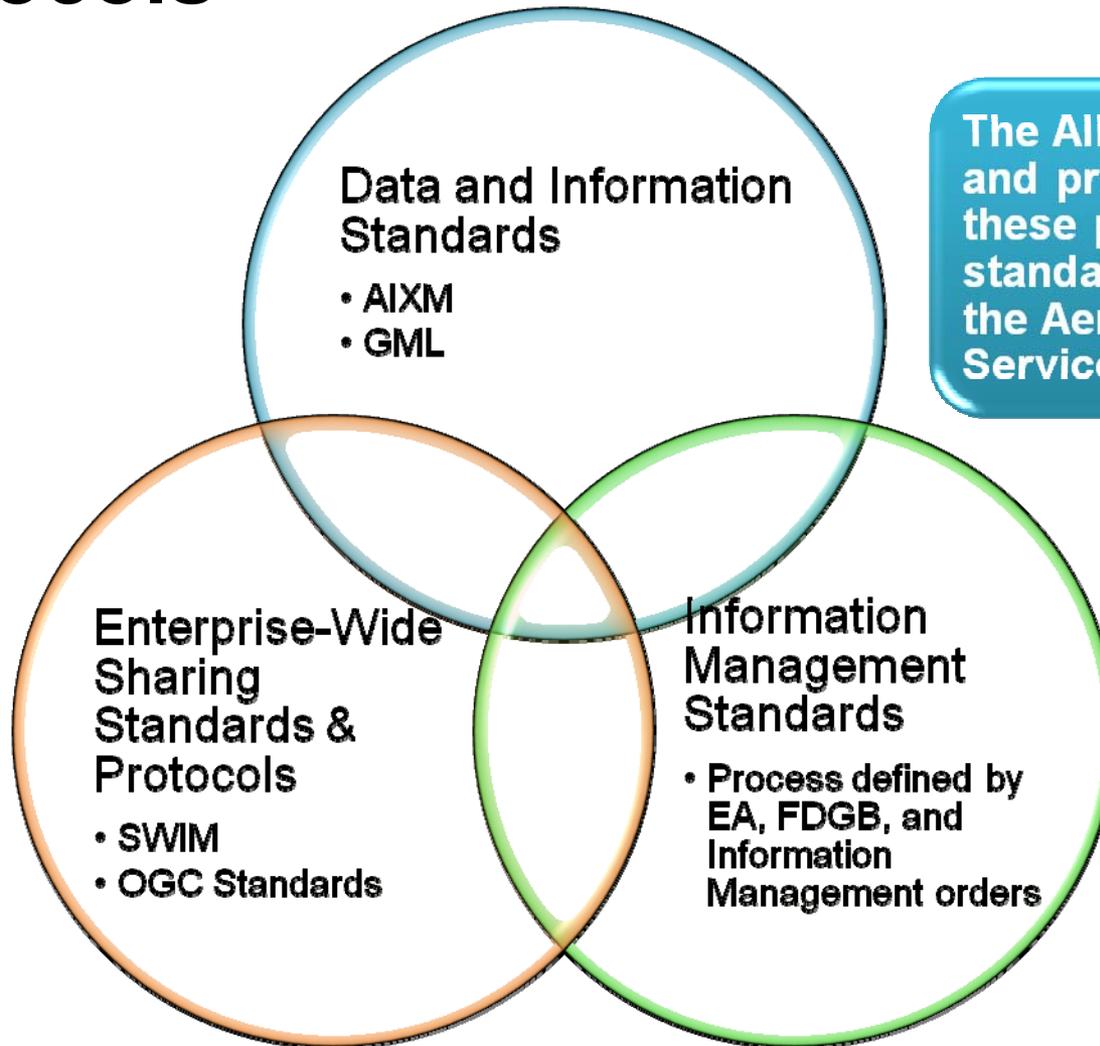
The AIM business unit and programs leverage these policies and standards to provision the Aeronautical Common Services to the NAS

Enterprise-Wide Sharing Standards & Protocols
- SWIM
- OGC Standards

Information Management Standards
- Process defined by EA, FDGB, and Information Management orders

AIXM – The Data Standard for AI

Data and Information Standards
- AIXM
- GML

Enterprise-Wide Sharing Standards & Protocols
- SWIM
- OGC Standards

Information Management Standards
- Process defined by EA, FDGB, and Information Management orders

Open Standard
- Based on Open Geospatial Consortium (OGC) Geography Mark-up Language (GML)
- Uses the ISO 191xx standards for its definition

Developed and maintained through international coordination
- Eurocontrol
- International AIXM forum
- ISO

Metadata
- Allows tracking source of data
- Originator responsible for quality of source data
- Consolidators responsible for maintaining that quality

AIM Enterprise Services

Data and Information Standards

- AIXM
- GML

Enterprise-Wide Sharing Standards & Protocols

- SWIM
- OGC Standards

Information Management Standards

- Process defined by EA, DGB, and Information Management orders

Airports GIS Web Mapping Services

Long-Term AIXM Vision

Data and Information Standards
- AIXM
- GML

Enterprise-Wide Sharing Standards & Protocols
- SWIM
- OGC Standards

Information Management Standards
- Process defined by EA, FDGB, and Information Management orders
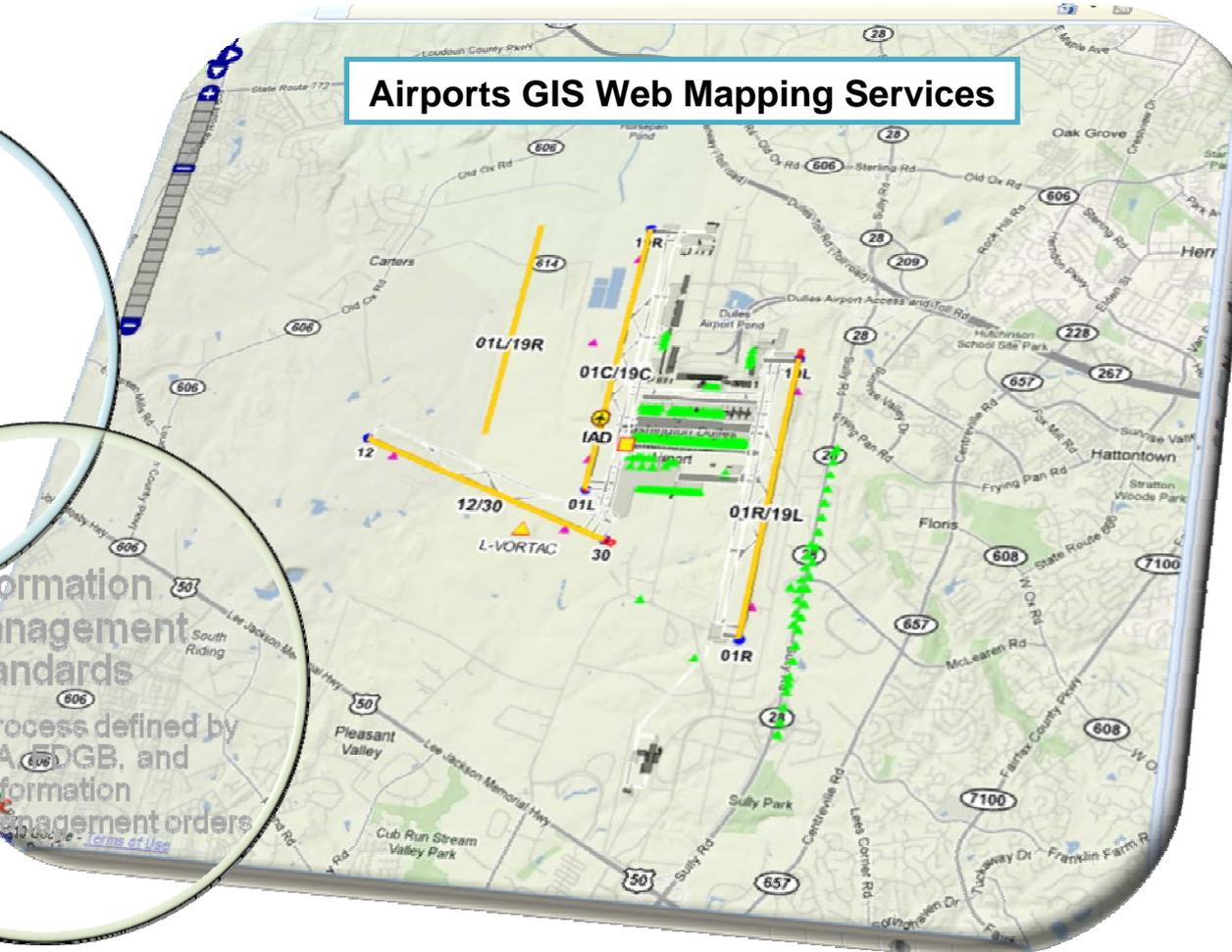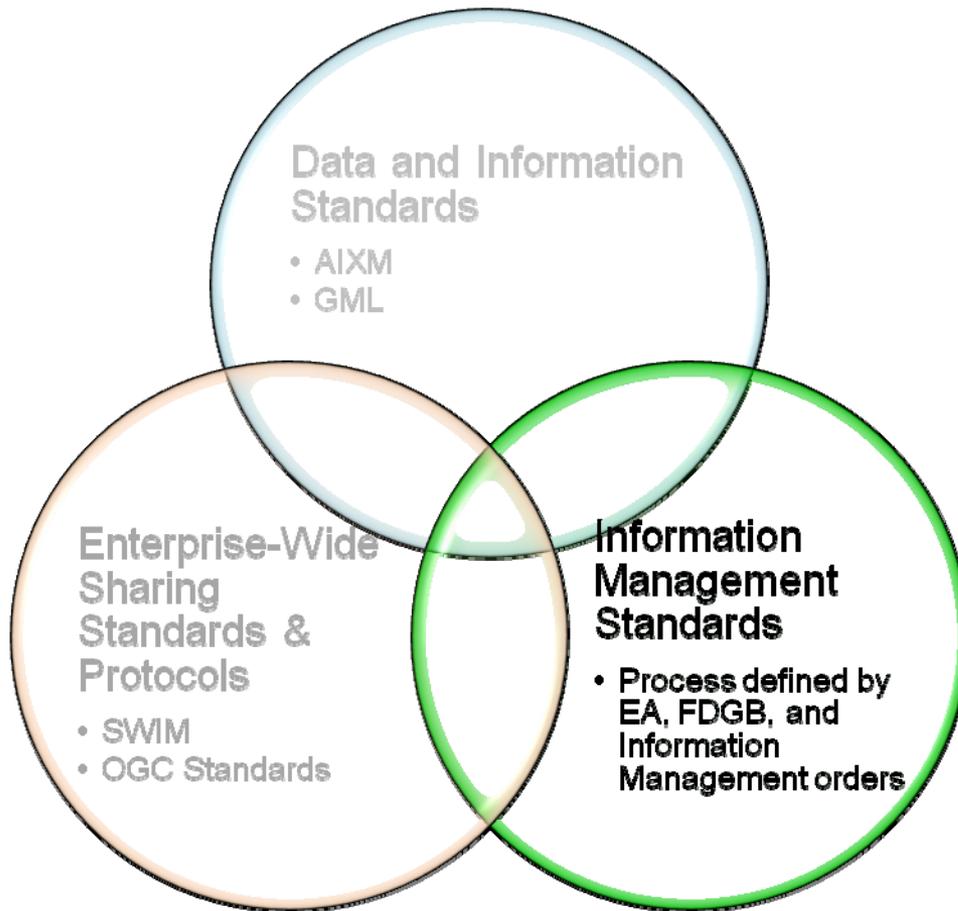
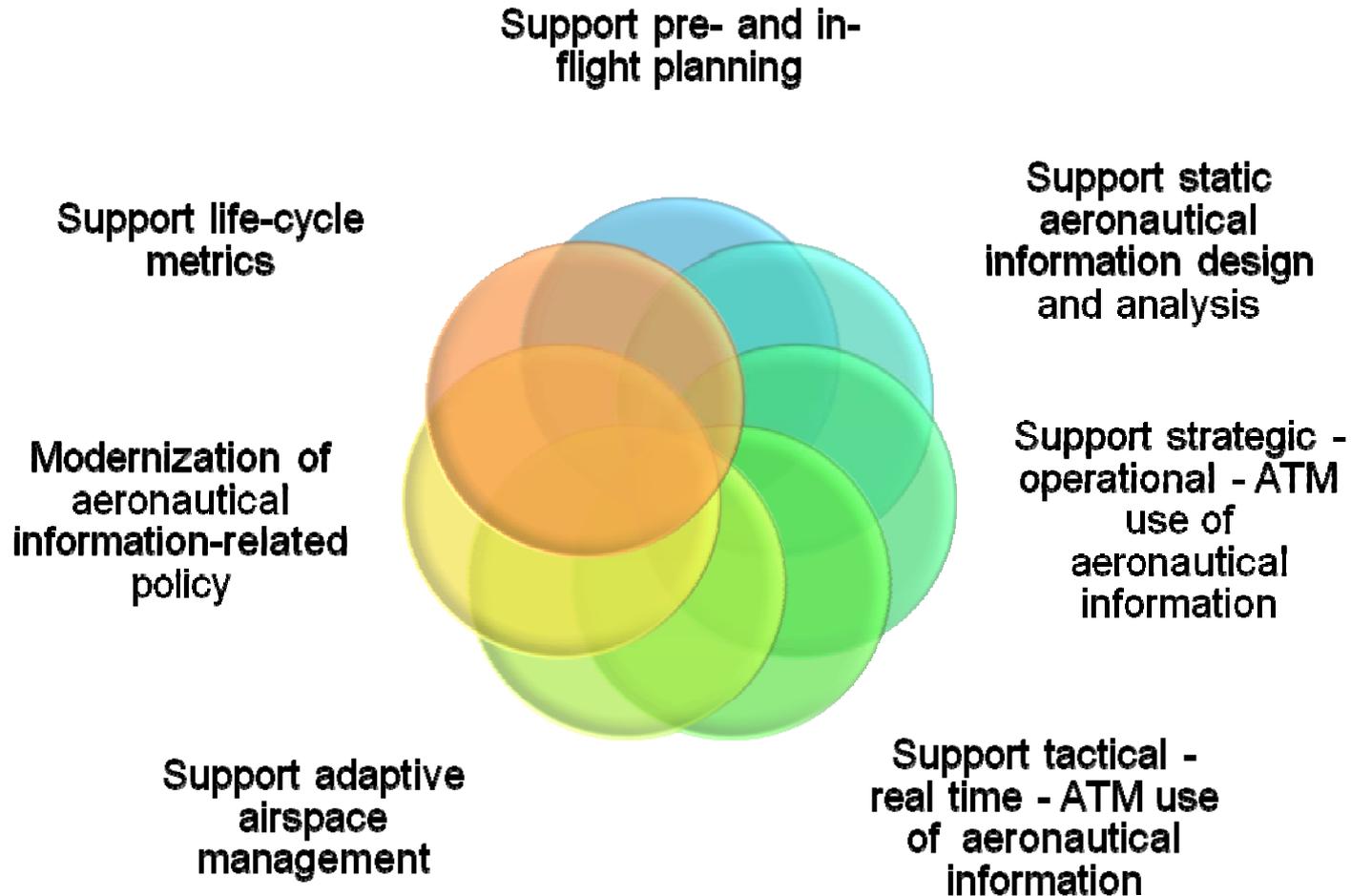**Maturing the FAA's aeronautical information**
- Harmonization of services
- Registration and management of aeronautical features
- Governance of common AIM services
- Metadata management

Developing global aeronautical information management
- CANSO, Global AIM, ICAO

AIM Capabilities in the Future

Support pre- and in-flight planning

Support static aeronautical information design and analysis

Support life-cycle metrics

Support strategic - operational - ATM use of aeronautical information

Modernization of aeronautical information-related policy

Support tactical - real time - ATM use of aeronautical information

Support adaptive airspace management

How AIM Capabilities Relate to NextGen OIs/ ATM Operations

NextGen Operational Improvements	Flight Planning	Static AI Design	Strategic AI	Tactical AI	Adaptive Airspace	AI Policy	Life-Cycle Metrics	AI Dissemination
On-Demand NAS Information- 103305		X	X	X		X	X	X
Improved Management of Airspace for Special Use – 108212	X	X	X	X	X	X		X
Integrated Arrival /Departure Airspace Management - 104122		X	X	X	X			X
Continuous Flight Day Evaluation -105302	X	X	X		X	X	X	
Provide full flight plan constraint evaluation with feedback – 101102	X	X	X		X			X
Traffic Management Initiatives with Specific Flight Trajectories – 105208	X	X	X				X	
Provide Full Surface Situation Information – 102406			X	X				X
Low Visibility Surface Operations – 107202			X	X				X
Improved Runway Safety Awareness for Pilots – 103208	X		X	X				X
Improved Runway Safety Situational Awareness for Controllers – 103207			X	X			X	X
Initial Surface Traffic Management – 104209			X	X				X
Improved Management of Arrival/Surface/Departure Flow Operation – 104117			X	X	X		X	X
Remotely Staffed Towers - 109402			X	X				X

AIM Capabilities

Federal Aviation Administration

18

Conclusions

- Development of "Common Aeronautical Services"
  - Focusing on services that support future ATM
- Three pillars of AIM
  - AIXM – Data Standards
  - SWIM – Information Distribution Standards (SOA)
  - Information Management'

Suppliers → **Manage** [Collect → Maintain → Disseminate] → Users

Acknowledgements

ICAO AIS to AIM Study Group

- Japan, EUROCONTROL, Australia, France, Nigeria, United States and others
- Enabling the benefits of information management – digital NOTAM, digital publications and services, digital mapping

Civil Air Navigation Service Organization (CANSO)

- AIM Workgroup "Transition from AIS to AIM"

NAS Enterprise Architects / AIO Information Architects

NextGen Concepts and Implementation Plans

AIM Community of Interest - CSSD

Global AIM Consortium

- Promoting world wide modernization of aeronautical information