



## The Need for Global Standards

AIXM/MET Information Exchange, 12 May 2009

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## What do we mean by interoperability?



- Institutional
- Organizational
- Cultural
- Legal
- Technical



"capability to communicate, execute programs, or transfer data among various functional units in a manner that requires the user to have little or no knowledge of the unique characteristics of those units"

Source: OGC Abstract Specification  
Topic 12: Services

## Interoperability allows a Common Reality



“What we are doing is facilitating a common picture of reality for different organizations which have different views of the reality, the disaster, the emergency, the catastrophe, that they all have to deal with collectively”

**David Schell**  
**CEO and Chairman**  
**OGC**



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## Why Open Standards?



- Rapidly mobilize new capabilities – plug and play
- Lower systems costs
- Encourage market competition
  - Choose based on functionality desired
  - Avoid “lock in” to a proprietary architecture
- Decisions to share information and services become policy decisions



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## What do we mean by “Open” Standard?



- Freely and publicly available
- Non discriminatory
- No license fees
- Vendor neutral
- Data neutral
- Agreed to by a formal consensus process



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## Return on Investment



Multiple studies confirm the value and advantage of open standards based solutions:

- NASA Geospatial Interoperability: Return on Investment Study:  
<http://gio.gsfc.nasa.gov/docs/ROI%20Study.pdf>
- Value of Standards, Delphi Report:  
<http://www.delphigroup.com/research/whitepapers/20030728-standards.pdf>
- Economic Benefits of Standardization, DIN German Institute for Standardization:  
<http://www.sis.se/upload/632248898159687500.pdf>



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## Interoperability is about Organizations



“Interoperability seems to be about the integration of information.  
What it’s really about is the coordination of organizational behavior.”

**David Schell**  
**CEO and Chairman**  
**OGC**



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## What is the OGC?



- Open Geospatial Consortium, Inc. (OGC)
  - Not-for-profit, international voluntary consensus standards organization
  - Founded in 1994, Incorporated in US, UK, Australia
  - 385 industry, government, research and university members

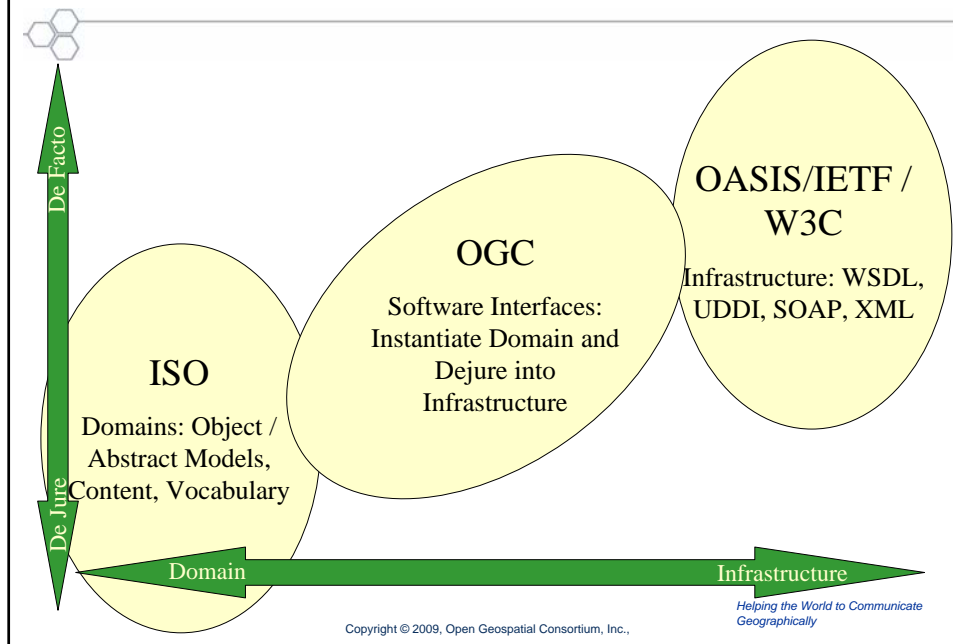
### OGC Mission

*To lead in the development, promotion and harmonization of open geospatial standards ...*

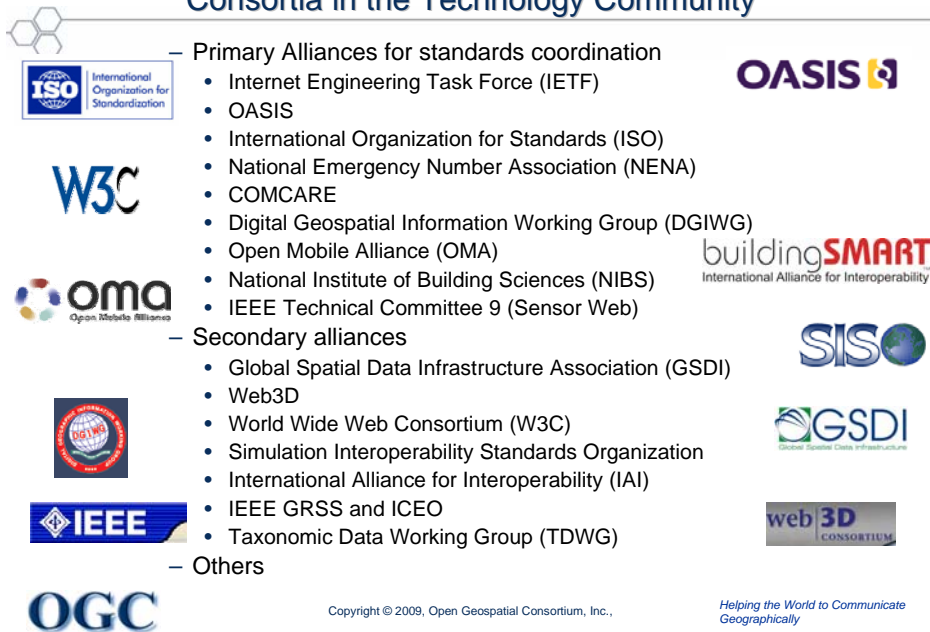


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## Where does OGC fit in the 'standards' world?



## OGC Works Closely With Standards Organizations and Consortia in the Technology Community



## Market Availability

see <http://www.opengeospatial.org/resource/products>



HOME » RESOURCE » PRODUCTS

### Implementations by Specification

1) Select a specification  
Web Map Service v.1.1.1

Web Map Service 1.1.1

2) Jump to Organization - | -

Product Name	OGC Spec.	Type	Contact	Date
<b>ABACO srl</b>				
OGMAP AS3.2.3	WMS 1.1.1 (Compliant)	Server	Olmo, Roberto	2005-08-09
<b>ABB</b>				
Fieldbus Spatial 2.4	WMS 1.1.1, WMS 1.1.0	Server	Polvo (Client/Server)Jacobsson, Jonas	2005-11-15
<b>AEO-SICAD AG</b>				
Product Name	OGC Spec.	Type	Contact	Date
SEAD-31 Area (Client A.A.)	WMS 1.0, WMS 1.1, WMS 1.1.1	Client	Holmsson, Henrika	2003-07-17
SEAD-Open - SHS A.A.	WMS 1.1.1, WMS 1.1, WMS 1.0	Server	Holmsson, Henrika	2003-07-17
SEAD-Client - SHS A.A.	WMS 1.1.1, WMS 1.1, WMS 1.0	Server	Holmsson, Henrika	2003-07-17
<b>Autodesk, Inc.</b>				
Product Name	OGC Spec.	Type	Contact	Date
Autodesk MapGuide Enterprise 2007	WFS 1.0, WMS 1.1.1 (Compliant)	Server	Raska, Peter	2004-08-28
Autodesk MapGuide WMS Extension 8.0	WMS 1.1.1	Server	Raska, Peter	2004-04-19
Autodesk MapGuide WMS Extension 8.0	WMS 1.1.1	Client	Raska, Peter	2004-04-19
<b>Bentley Systems Inc.</b>				
Product Name	OGC Spec.	Type	Contact	Date
Geo Web Publisher 1.1.2	WMS 1.1.1	Server and Client	Lapierre, Alain	2004-04-12
MicroStation 8.11	WMS 1.1.1	Client	Lapierre, Alain	2004-04-02
<b>BH CI GIS</b>				
Product Name	OGC Spec.	Type	Contact	Date
Geosoft WMS 2.0	WMS 1.1.1 (Compliant), SLD 2.0, WMS 1.1.0	Server	WISZKA, Levent	2005-10-27
<b>Blue Marble Geographics</b>				

**OGC**

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- Free availability of standards stimulates market
- Hundreds of Products Implementing OGC Standards
- Compliance Test & Certification Program

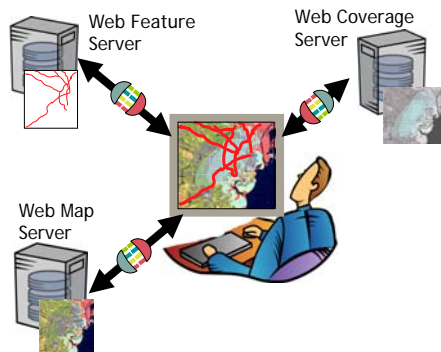


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## OGC Web Services (OWS)



Just as http:// is the dial tone of the World Wide Web, and html / xml are the standard encodings, the **geospatial web** is enabled by OGC standards:



- Web Map Service (WMS)
- Web Feature Service (WFS)
- Web Coverage Service (WCS)
- Catalogue (CSW)
- Geography Markup Language (GML)
- Web Map Context (WMC)
- OGC KML
- Others...

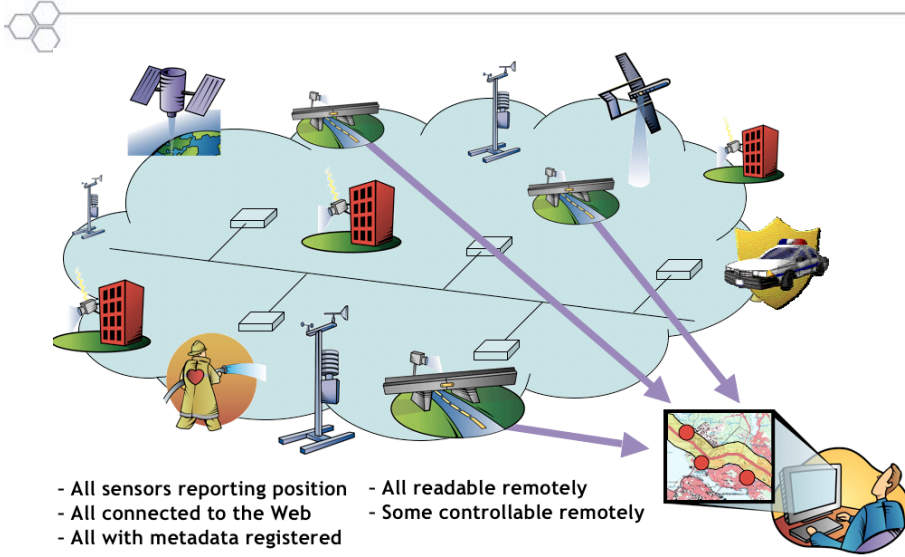
Relevant to geospatial information applications:  
Critical Infrastructure, Emergency Management, Weather, Climate, Homeland Security, Defense & Intelligence, Oceans Science, others



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# Sensor Web Enablement (SWE)



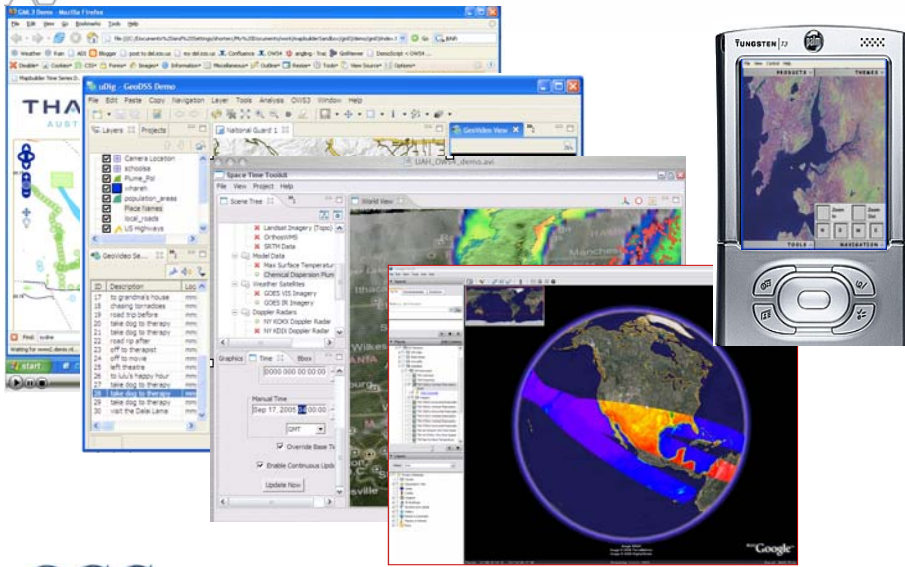
- All sensors reporting position
- All readable remotely
- All connected to the Web
- Some controllable remotely
- All with metadata registered



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# Variety of Clients for OWS



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## OGC Reference Model (ORM)



[www.opengeospatial.org/standards/orm](http://www.opengeospatial.org/standards/orm)



- What is the purpose of the ORM?
  - Overview of OGC Standards Baseline
  - Insight into the current state of the work of the OGC
  - Basis for coordination and understanding of the OGC documents
  - Resource for defining architectures for specific applications
- Why Read This Document?
  - Better understand the OGC Standards Baseline
  - Better understand the ongoing work of the OGC
  - Gain an understanding necessary to contribute to OGC process
  - Aid in implementing one or more of the OpenGIS Standards



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## OGC's Approach for Advancing Interoperability



- **Interoperability Program (IP)** - a global, innovative, hands-on prototyping and testing program designed to accelerate interface development and validation, and bring interoperability to the market
  - **Standards Setting**
  - **Specification Development Program** – Consensus processes similar to other Industry consortia (World Wide Web Consortium, OMA, OMG, etc.).
  - **Rapid Interface Development**
  - **Market Adoption**
  - **Outreach and Community Adoption Program** – education and training, encourage take up of OGC specifications, business development, communications programs



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## OGC Web Services Testbed Phase 6 (OWS-6)

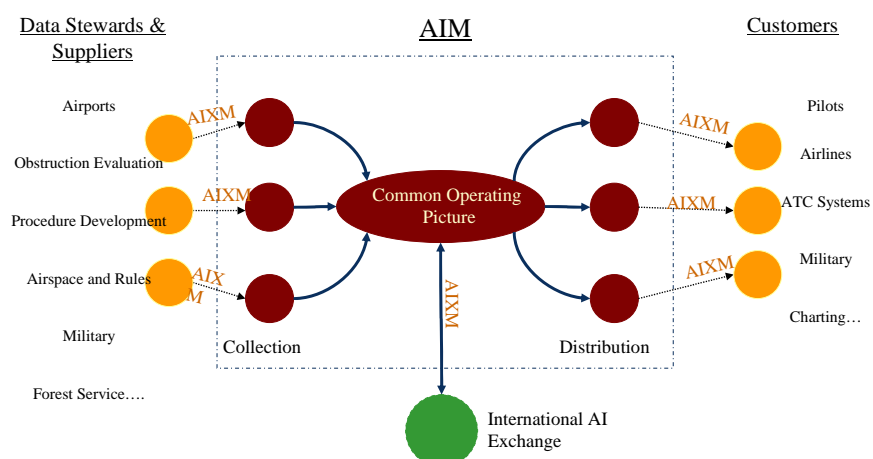
- Aeronautical Information Management (AIM) thread in OWS-6, sponsored by FAA and EUROCONTROL to:
  - Develop and demonstrate the use of AIXM 5.0 in an OGC Web Services Environment
  - Evaluate and advance various AIXM 5.0 characteristics in realistic scenario setting
- Develop and test standards-based service-oriented architecture to support the provision of valuable aeronautical information directly to flight decks and Electronic Flight Bags (EFB)



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## Vision for AIM requires Interoperability



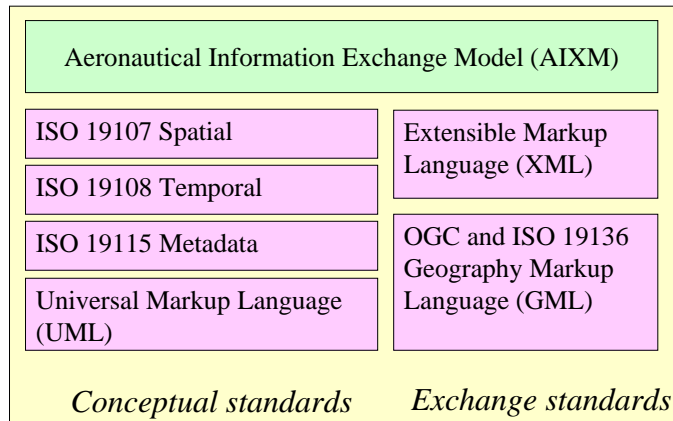
\* Adapted from RTCA, Incorporated. *Standards for Processing Aeronautical Data*. Report: RTCA/DO-200A. September 28, 1998.

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## AIXM is based on International Standards



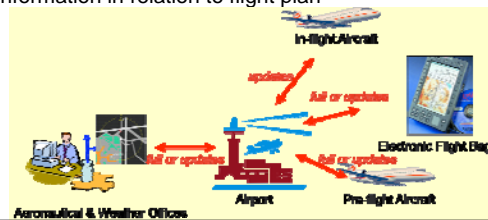
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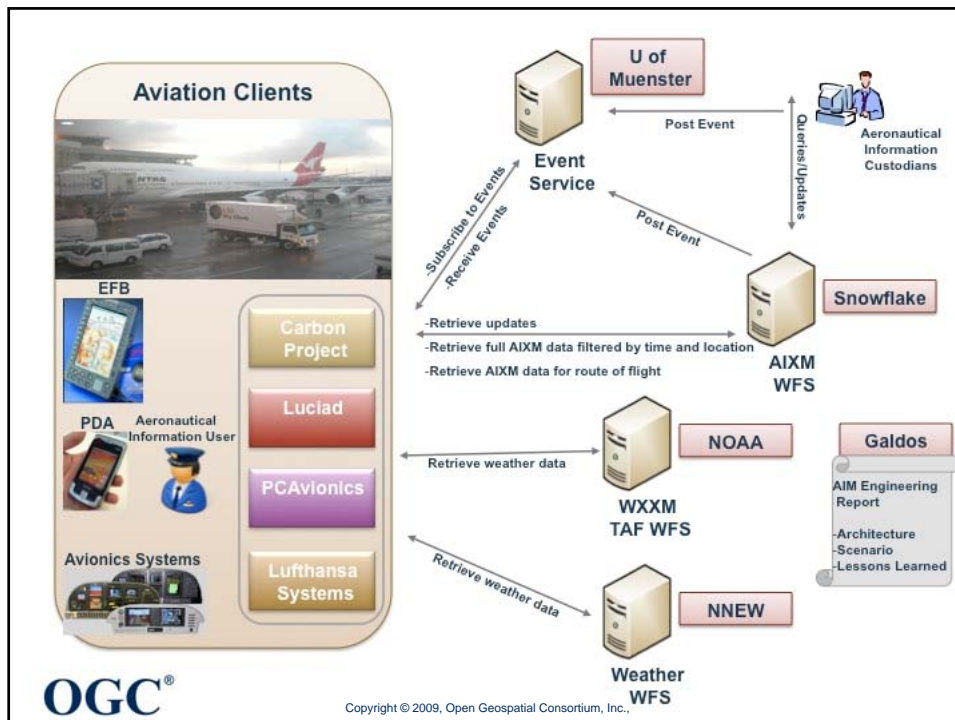
## OWS-6 AIM Goals: Right Data, Right Time, Right Place



- Demonstrate use of OGC Web Feature Service (WFS) and Filter Encoding (FE) to support AIXM 5.0
  - In particular temporal aspects of AIXM and temporal queries
- Demonstrate filtering of AIXM data based on 4D flight trajectory planning
  - Support for spatio-temporal queries
- Develop and demonstrate event alert architecture to notify users of changes to selected relevant aeronautical information
- Prototype client applications to integrate and overlay AIXM and weather data to support better situational awareness
- Demonstrate improved access to information on demand
  - Order, integrate and visually present information on demand based on relevant and up-to-date information in relation to flight plan



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## OWS-6/AIM Session on Day 2 11:00 am

- Introduction – Nadine Alameh, MobiLaps/OGC
- AIM Thread – Nadine Alameh
- Event Architecture - Nadine Alameh & Ian Painter, Snowflake
- Demonstrations – Nuke Goldstein & Jeff Harrison, Carbon Project; Frank Suykens, Luciad; Todd Sprague, PCAvionics
- Lessons Learned – David Burggraf, Galdos

## Benefits - Participation in OGC Programs



- **Direct, legal, and broad dialog with industry on interoperability needs**
- **Align industry on priority standards needs** – User community organizations help to identify and prioritize requirements for new standards.
- **Small investments in OGC process reduces life cycle risk and cost** – minor investments by many OGC members often yields industry action and consensus on standards. When this happens, organizations reduce their reliance on custom solutions and associated maintenance costs
- **Improve choice and competition in the marketplace** – Involvement in OGC helps create broad industry incentive to advance and implement OGC standards in their products. This increases the pool of standards-based products that can be plugged into a system or enterprise -- no single application meets the needs of all users



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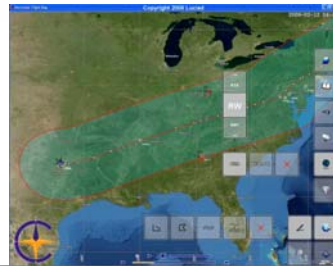
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## Questions & Comments



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