



Geospatial Standards and Interoperability in Transportation

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Geographic Information Systems (GIS) in Transportation Safety
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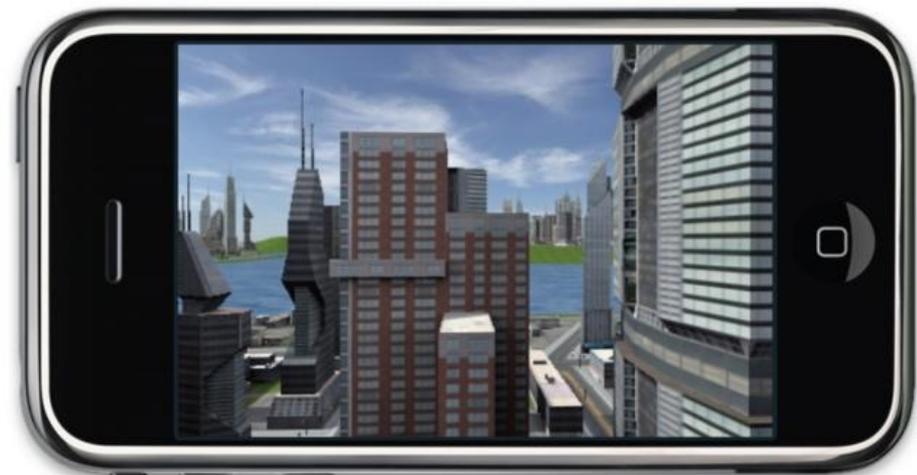
Everything we do happens somewhere, and sometime!

- Geography – the master framework for data integration
- Location is critical to the vast majority of decision support, situational awareness, modeling, and simulation systems









<http://www.webviewservice.org/>



Source: <http://en.wikipedia.org/wiki/File:Wikitude.jpg>

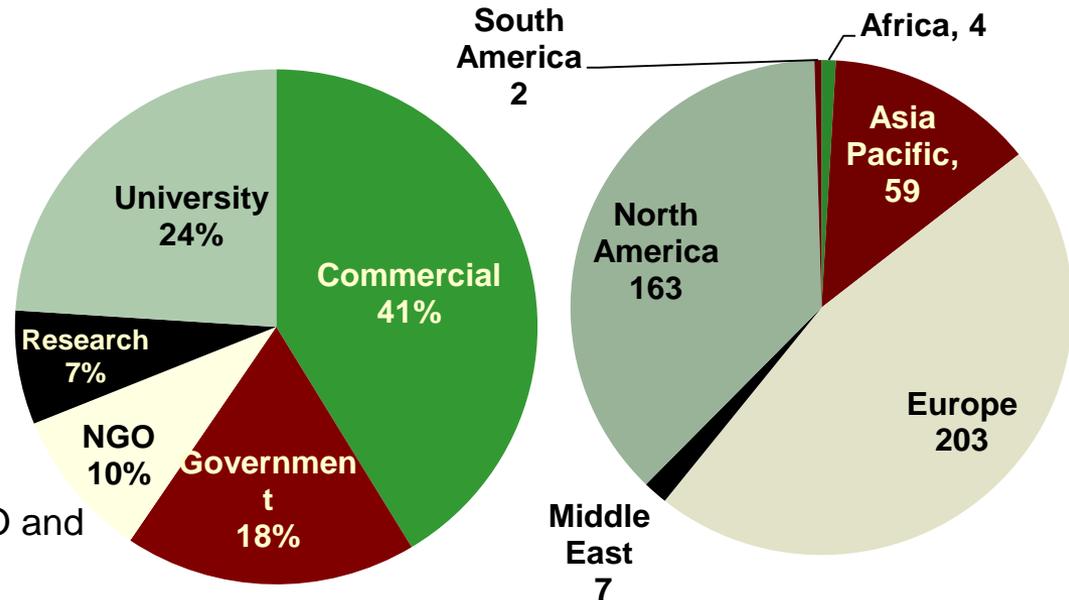
The Open Geospatial Consortium



Achieve the full societal, economic and scientific benefits of integrating location resources into commercial and institutional processes worldwide

Not-for-profit, international voluntary consensus standards organization; leading development of geospatial standards

- Founded in 1994.
- 475+ members and growing
- 38 standards
- Hundreds of product implementations
- Broad user community implementation worldwide
- Alliances and collaborative activities with ISO and many other SDO's



Example Member Organizations



NORTHROP GRUMMAN

ORACLE

Google



EADS
ASTRIUM

latlon
raumbezogene
informationssysteme

PCI
Geomatics

BAE SYSTEMS

SAIC
From Science to Solutions

LOCKHEED MARTIN

BENTLEY

INTERGRAPH

erdas
The Earth to Business Company

KISTERS

DIGITALGLOBE

European Environment Agency



METEO FRANCE
Toujours un temps d'avance

Microsoft

universität bonn

Landcare Research
Manaaki Whenua

Infotech
Creating Business Impact



Landgate

Fraunhofer

MBARI

IBM

COMPUSULT

CSIRO

GeoEye

OGC

Example Government Organizations



- Abu Dhabi Police
- DOD Australia
- Geoscience Australia
- NSW Dept of Environment and Climate Change (Australia)
- Eurocontrol
- European Environment Agency
- European Satellite Centre
- European Space Agency
- UK MOD
- UK MET
- METEO France
- Korea Land & Housing
- BRGM (France)
- Ordnance Survey (UK)
- State Land Agencies (Germany)
- US DHS
- US EPA
- US FAA
- US NASA
- USGS
- US NGA
- US Census
- US NOAA
- US Joint Program Executive Office
- Oakridge National Lab
- Natural Resources Canada
- NC Dept of Environment & Natural Resources
- Dept. Science & Technology (India)
- EU Joint Research Centre
- Korea Land & Housing...

OGC Alliance Partners

A Critical Resource for Advancing Useful Standards



... and others

www.opengeospatial.org/ogc/alliancepartners

Approved OGC[®] Standards

- Web Services
 - Web Map Service (WMS) {ISO}
 - Web Feature Service (WFS) {ISO}
 - Web Coverage Service (WCS)
 - Catalog Services for the Web (CS/W)
 - Coordinate Transformation
- XML Encodings
 - Geography Markup Language (GML) {ISO}
 - KML
 - Web Map Context
- Sensor Web Enablement
 - SensorML
 - PUCK
 - Sensor Observation Service (SOS)
 - Sensor Planning Service (SPS)
 - Sensor Web Enablement Service Model
- Open Location Services (OpenLS)
- Tightly coupled
 - Simple Feature Access – OLE, SQL, CORBA {ISO}
 - Grid Coverages

Available free of charge at
<http://opengeospatial.org/standards>

The screenshot displays the OGC website homepage. At the top, the OGC logo is accompanied by the tagline "Making location count". Navigation tabs include "About", "Standards", "Programs", "Events", "Press", "Implementing", and "Compliance". A search bar is located in the top right corner. The main content area features a "Welcome to the OGC Website" message, followed by "Recent News" and "Upcoming Events" sections. A sidebar on the left lists "Areas of Interest" and "Visit Our Members". A bottom section highlights "Next OGC TC/PC Meetings" for February/March 2011 in Bonn, Germany. A right sidebar lists various standards such as OGC Reference Model (ORM), OGC Axis Order Policy, and OGC KML.

Interoperability: information integration



“We don't have a common language to speak about our geospatial data or our services.”



Value of open standards

“We need to find and pull together data from our automated sensors.”



“We need to deliver data to different systems.”

“We have security issues relating to geospatial data exchange.”



OGC Activities Driven by Community Needs

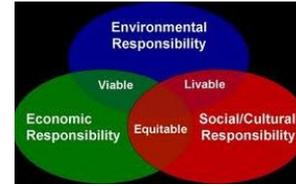


Other Standards Organizations

Education & Research



Sustainable Development



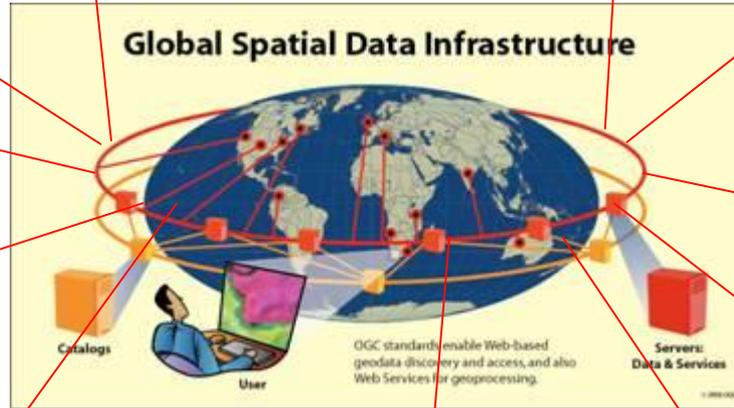
Infrastructure - Transportation



Health



Global Spatial Data Infrastructure



E-Government



Emergency Services, Disaster Management



Energy



Geosciences



Aviation



Consumer Services, Real Time Information



Aviation Safety

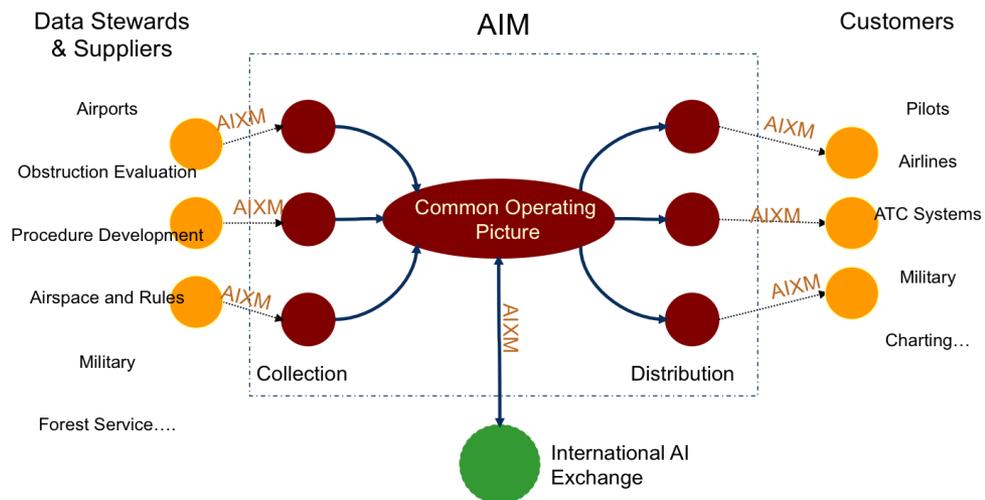


- To improve air travel safety and operational efficiency, the global aviation community is moving forward on the adoption of an international framework of standards that enable communication in a net-centric, globally interoperable Air Transport System (ATS).
- Because location information is critical in virtually all aviation activities, location interface and encoding standards from the OGC play an important role.

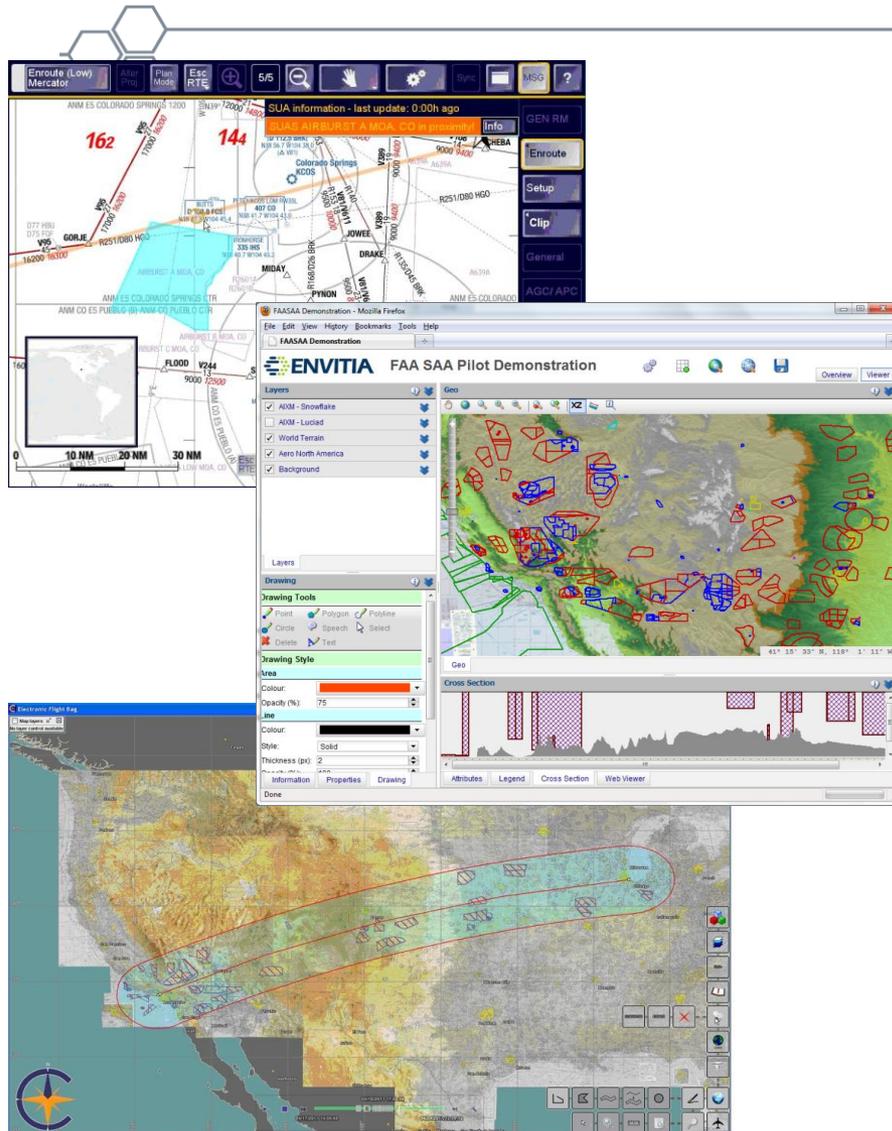
Aeronautical Information Management (AIM)



- Develop and test standards-based service-oriented architecture to support the provision of aeronautical information directly to flight decks and Electronic Flight Bags (EFB)
- Support vision for Aeronautical Information Management
 - Interconnected systems with many actors and many users
 - Need for real-time information used in flight planning, navigation, rerouting, etc
 - Right information at the right time at the right place to the right user
 - End-to-end management of information



FAA Special Access Airspace (SAA) Pilot



- Provide access to SAA information to National Airspace System (NAS) Stakeholders
- Support airlines in automated flight dispatch and planning
- Increased situational awareness and flight decision support
- Geospatial and temporal data fusion for the display and use of airspace activation data

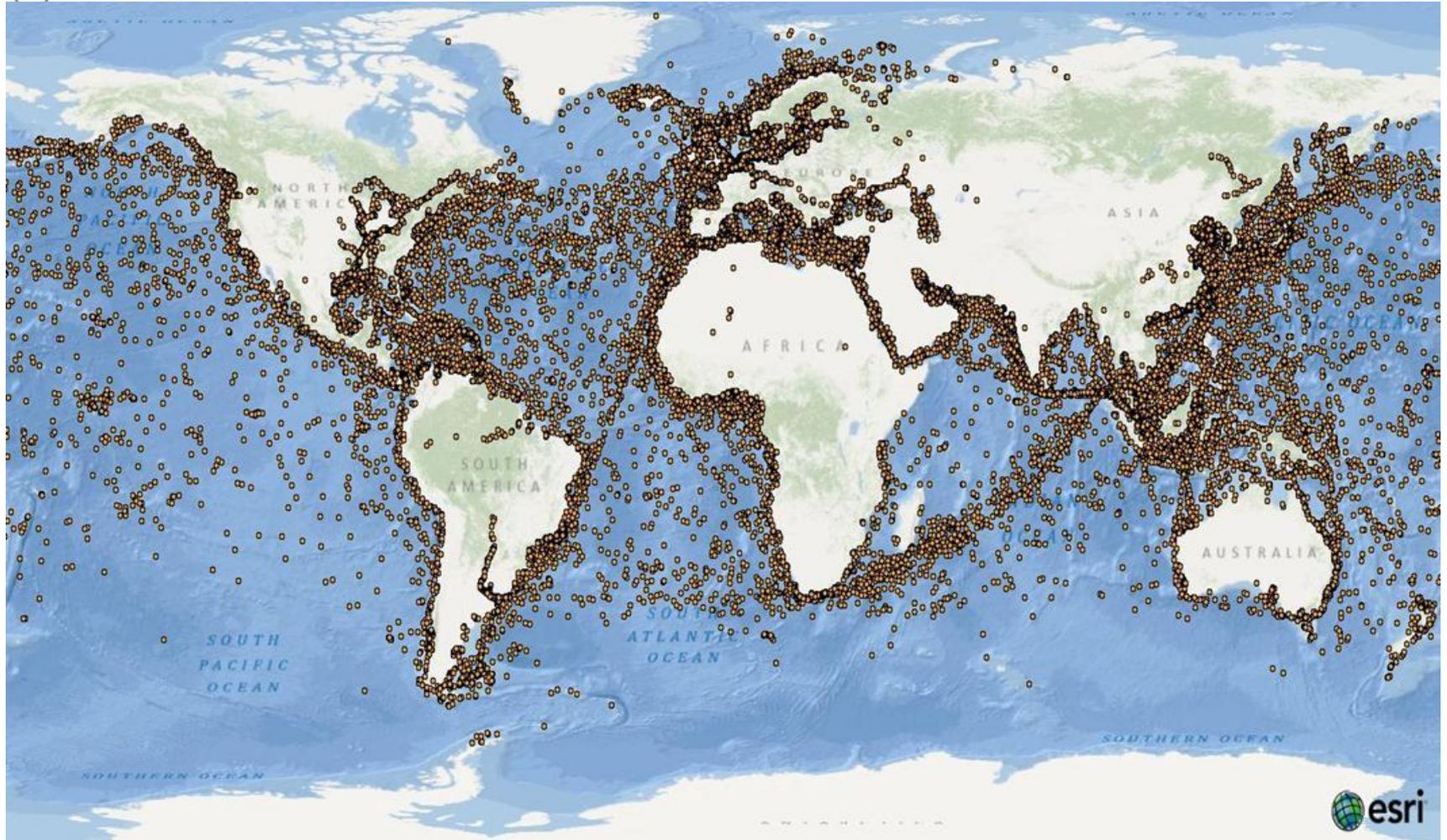
SAA Pilot Demo page

<http://www.opengeospatial.org/pub/www/saa/index.html>

OGC Aviation Domain Working Group

<http://www.opengeospatial.org/projects/groups/aviationdwg>

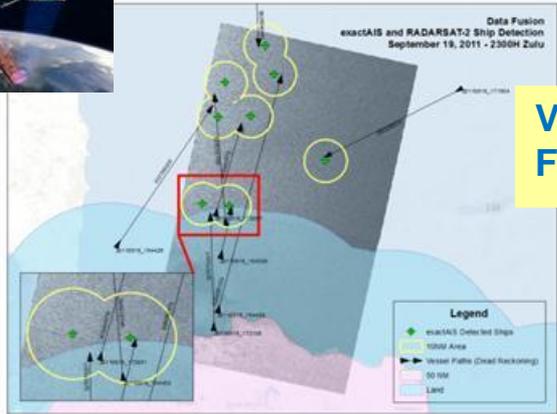
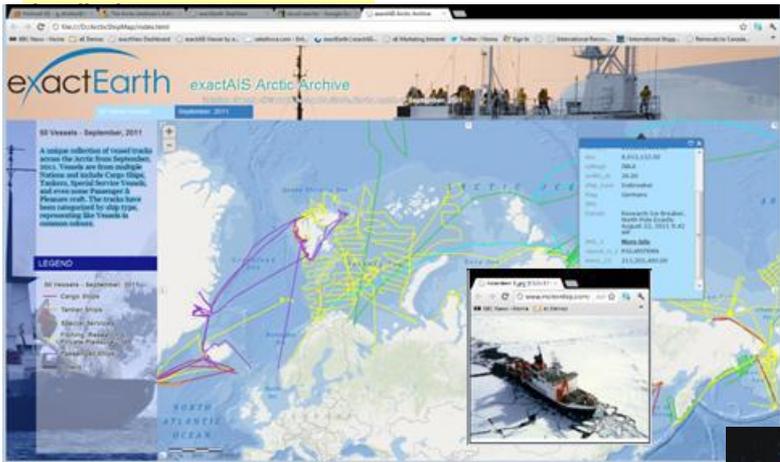
80,000 Vessels Daily – Global Capability



S-AIS: Sample Uses



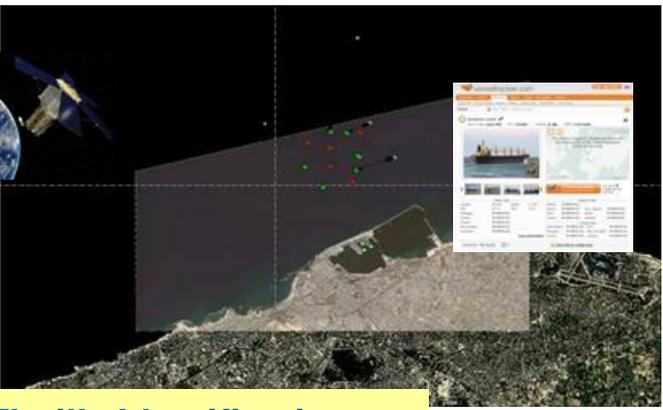
Arctic Monitoring



Vessel Detections: Fusion with Radar



Casualty Alerting: Drifting vessels fused with Wave Heights



Flotilla Identification: Fusion with Optical Imagery, Tripoli, Summer 2011

Piracy prevention and tracking: Mother Ship and Pirated Vessel Tracking



Conclusion



- Location is an integral part of transportation data
- Technological innovation continues to better support navigation and safety in transportation
- Standards are critical for information exchange and sharing
- OGC membership (commercial, government, academia and research) continues to push the boundaries to find effective solutions for today's and tomorrow's interoperability problems
- Standards innovation needs you! Voice your requirements and get involved <http://www.opengeospatial.org>



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