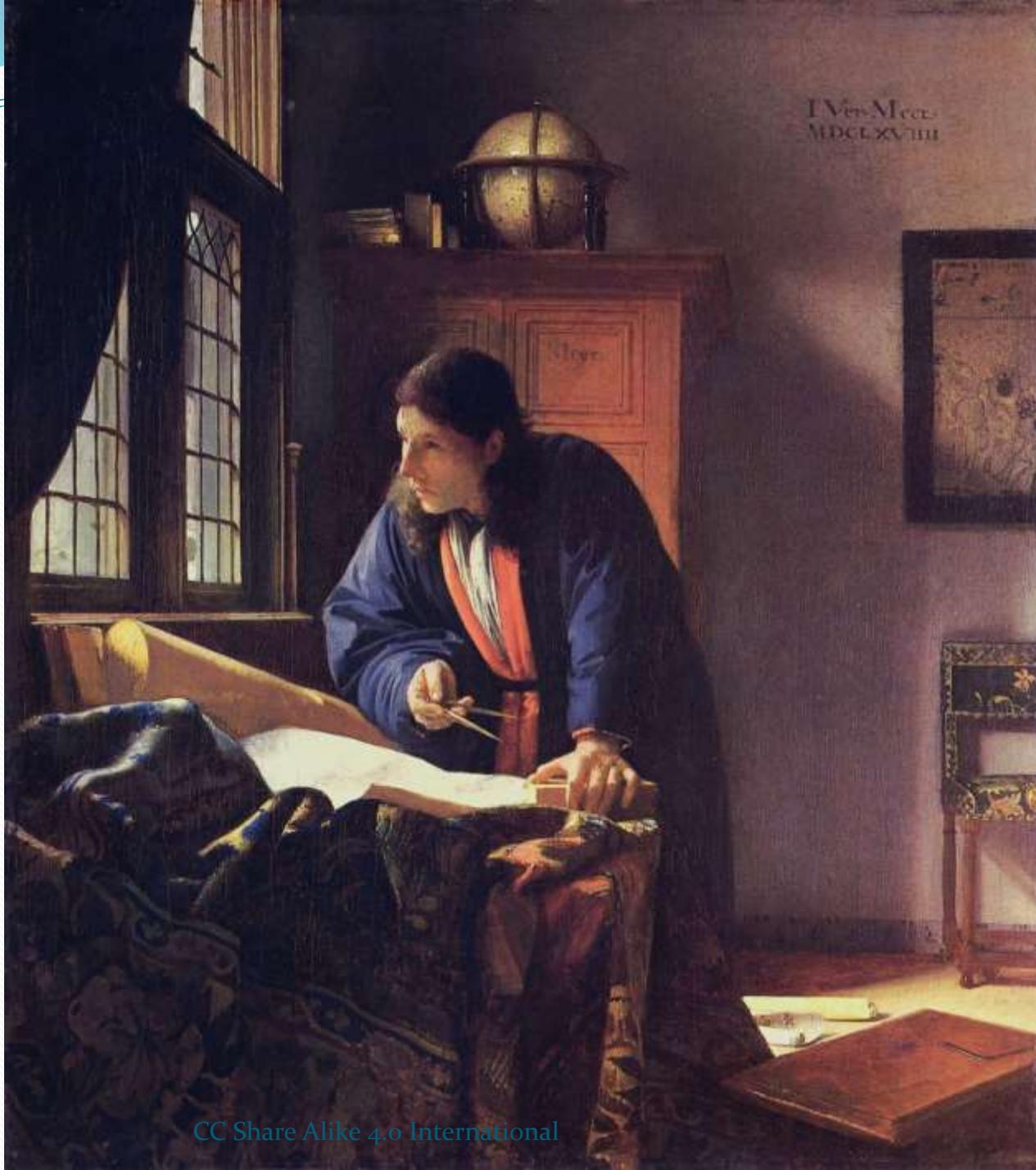
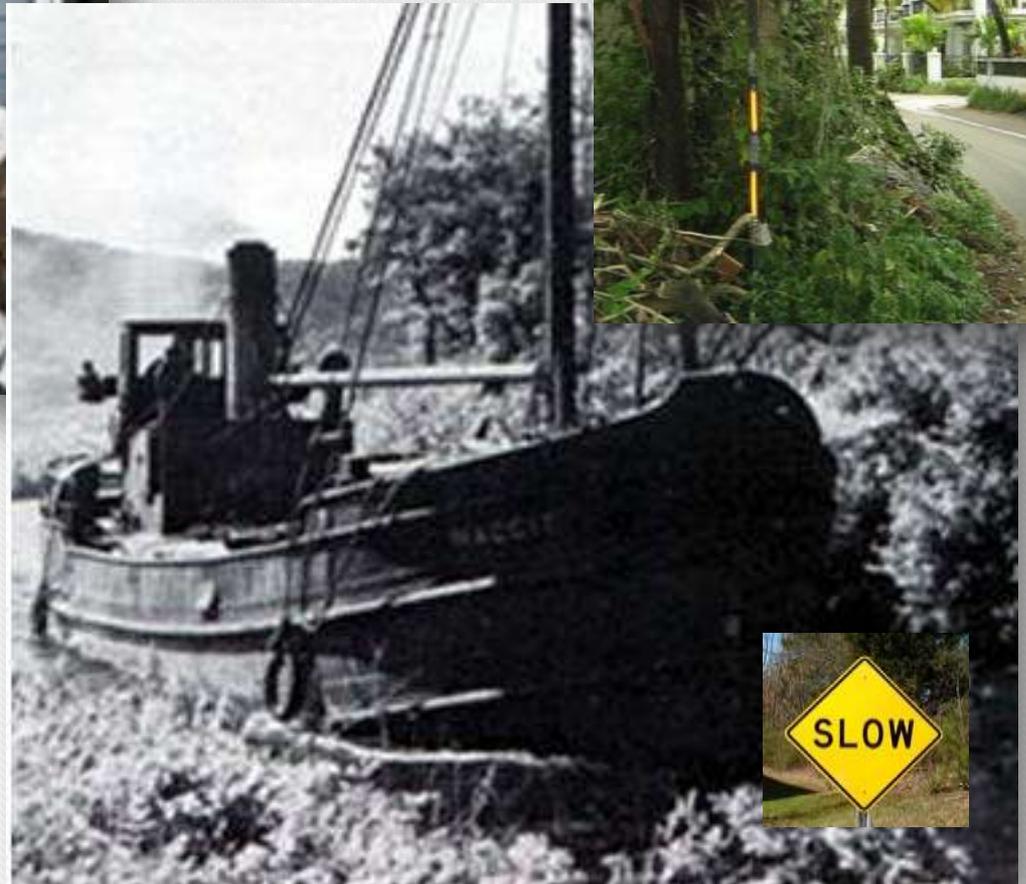


# The OGC – A dynamic, continuously evolving standards organization

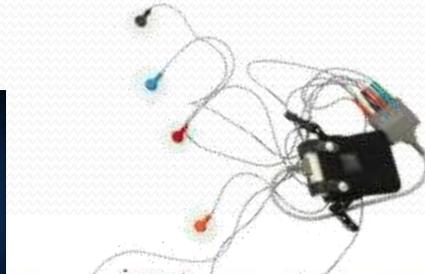
Carl Reed, PhD



# What most people think about standards work



# Going forward Most Location Data will come from Billions of Sensors



# In that context more and more User Generated Information / Crowdsourcing

Source: <http://www.usahidi.com/>



Source: Erik (HASH) Hersman. Flickr

- Ushahidi
- InRelief
- OpenStreetMap
- Sahana
- CrisisCommons



Source: [www.inrelief.org](http://www.inrelief.org)



Source: <http://www.sahanafoundation.org>



Source: <http://www.openstreetmap.org>

# OGC Interoperability Program

## Testbeds

Development of new technology

## Pilots

Optimization of your domain

## Plugfests

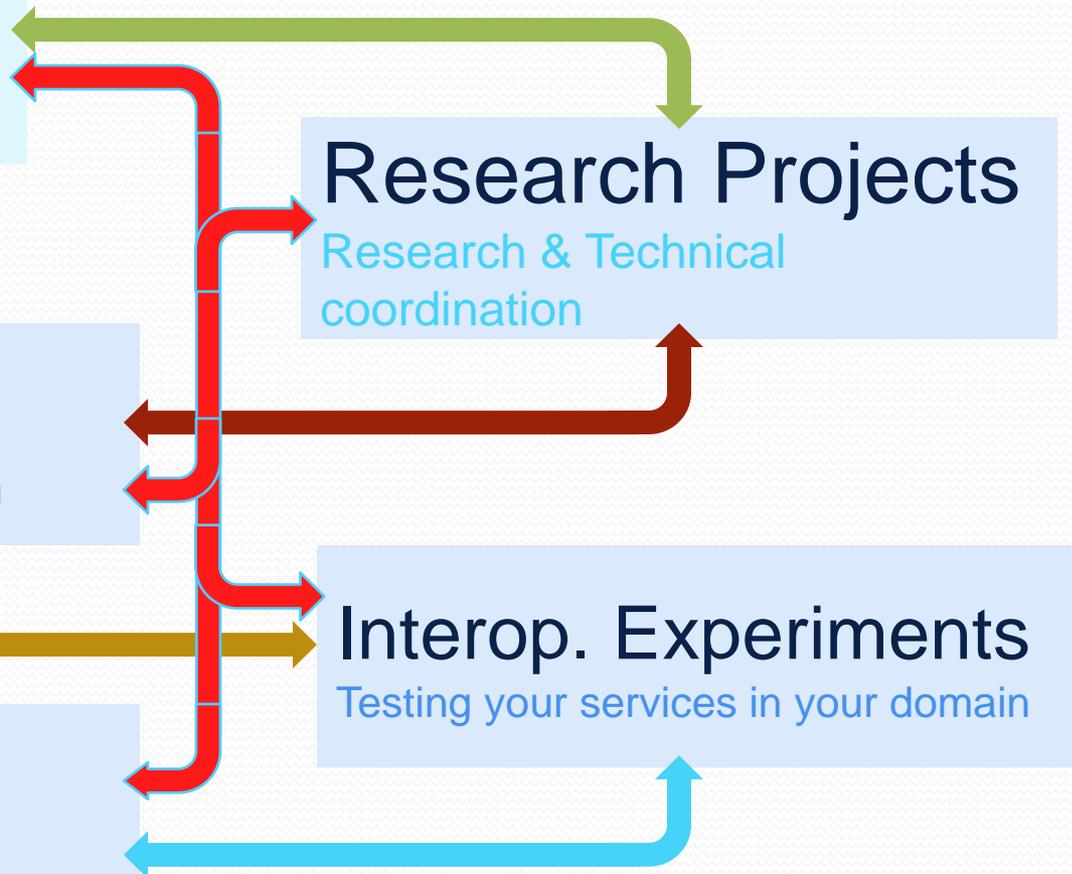
Hands on experience

## Research Projects

Research & Technical coordination

## Interop. Experiments

Testing your services in your domain



# Major Testbeds

- Multiple sponsors with requirements/interoperability pain points
- Multiple participants
- Rapid lifecycle – less than one year from initiation to final demonstration and reports
- Drives input (new standards, enhancements to standards, change requests, best practices)

# Focus areas

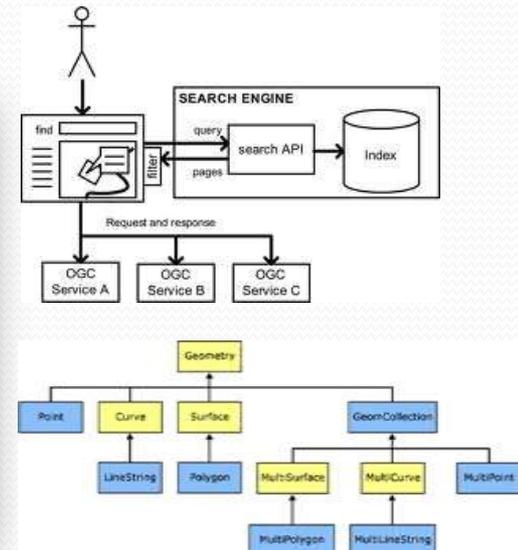
- Semantics (mediation, symbology, linked data)
- Cross community interoperability
- Aviation
- Analytics
- Baseline enhancements

# OGC Baseline Enhancements

- 8.3 Security and Soap
- 8.4 REST, JSON, and GeoJSON
- 8.6 Asynchronous Service Interaction
- 8.7 Tiling
- 8.8 Compression
- 8.9 SWE for LiDAR and Streaming
- 8.11 Catalogue
- 8.13 Big Data and Tile Stores

# Domain Working Groups (DWGs)

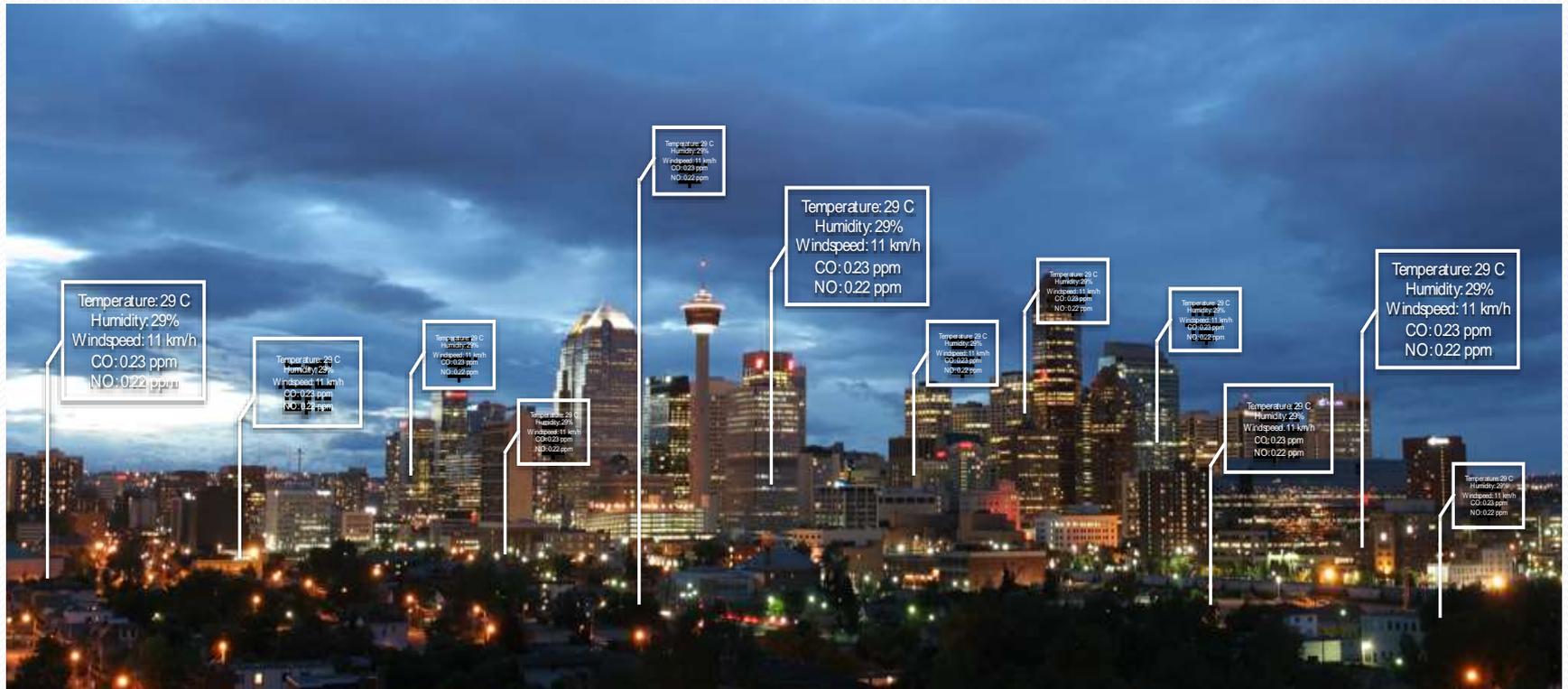
- Where Members discuss technical requirements, use cases, and issues related to the development and revision of OGC standards. The results of OGC interoperability projects are presented and discussed. Many members present on the use of OGC standards.
  - Any Member or invited guest can attend any DWG session.



# DWGs as of March 2015

3DIM DWG (3DIM DWG)	Scott Simmons, Open Geospatial Consortium, Inc.
Agriculture DWG (Agriculture DWG)	Joshua Lieberman, Harvard University
Architecture DWG (Arch DWG)	Carl Reed III, Reed, Carl
Aviation DWG (Aviation DWG)	Navin Vembar, FAA System Operations Airspace and AIM Office
Big Data DWG (BigData DWG)	Peter Baumann, Jacobs University Bremen GmbH
Catalog DWG (Cat DWG)	Doug Nebert, US Geological Survey (USGS)
Coordinate Reference System DWG (CRS DWG)	Victor Minor, Blue Marble Geographics
Coverages DWG (Coverages DWG)	Peter Baumann, Jacobs University Bremen GmbH
Data Preservation DWG (PreservDWG)	Steve Morris, North Carolina State University
Data Quality DWG (DQ DWG)	Matt Beare, Beare, Matthew
Defense and Intelligence DWG (D and I DWG)	Lucio Colaiacono, European Union Satellite Centre
Earth Systems Science DWG (ESS WG)	Phillip Dibner, Ecosystem Research
Emergency & Disaster Management DWG (EDM DWG)	Jacqueline (Jaci) Knudson, US Dept. of Defense/DISA
Energy and Utilities DWG (EnergyUtilities)	Renee Bogle Hughes, Hughes, Renee Bogle
Geography Markup Language (GML) DWG (GML DWG)	Ron Lake, Galdos Systems Inc.
Geosemantics DWG (Semantics)	Joshua Lieberman, Harvard University
Health DWG (Health DWG)	Eddie Oldfield, Oldfield, Eddie
Hydrology DWG (Hydrology DWG)	Tony Boston, Australian Bureau of Meteorology
Land and Infrastructure DWG (LandInfraDWG)	Paul Scarponcini, Bentley Systems, Inc.
Law Enforcement And Public Safety DWG (LEAPS DWG)	Mohammed Saleh Al Mansoori, GIS Center for Security
Metadata DWG (Metadata DWG)	David Danko, Esri
Meteorology & Oceanography DWG (Met Ocean DWG)	Chris Little, UK Met Office
Mobile Location Services DWG (MLSDWG)	George Percivall, Open Geospatial Consortium, Inc.
Security DWG (SecurityDWG)	Andreas Matheus, University of the Bundeswehr - ITIS
Sensor Web Enablement DWG (SensorWeb DWG)	Mike Botts, Botts Innovative Research
Temporal DWG (Temporal DWG)	Chris Little, UK Met Office
University DWG (Univ DWG)	Chris Higgins, Open Grid Forum
Urban Planning DWG (Urban Planning )	John Herring, Oracle USA
Web Feature Service DWG (WFS DWG)	Martin Daly, cadcorp (Computer Aided Development Corp.) Ltd.
Workflow DWG (Workflow DWG)	Stan Tillman, Intergraph Corporation

# One example – Smart Cities



Graphic from Steve Liang, University of Calgary

# 2d → 3d → 4d

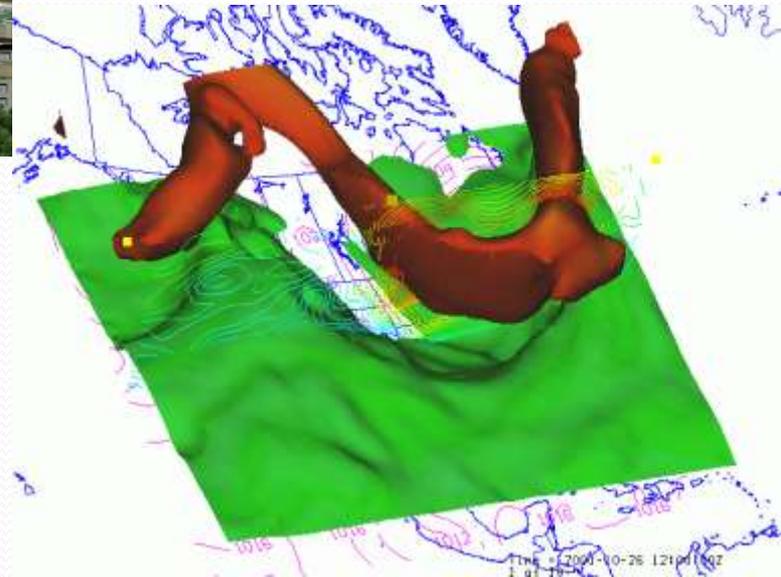
- 2d



- 3d



- 4d



# 3d and sensors

## Common Scents – City Sense

- Workflow of crowd sourced sensor input, Open Street Map, data fusion, and modeling that generates a 3d visualization. Uses numerous OGC standards

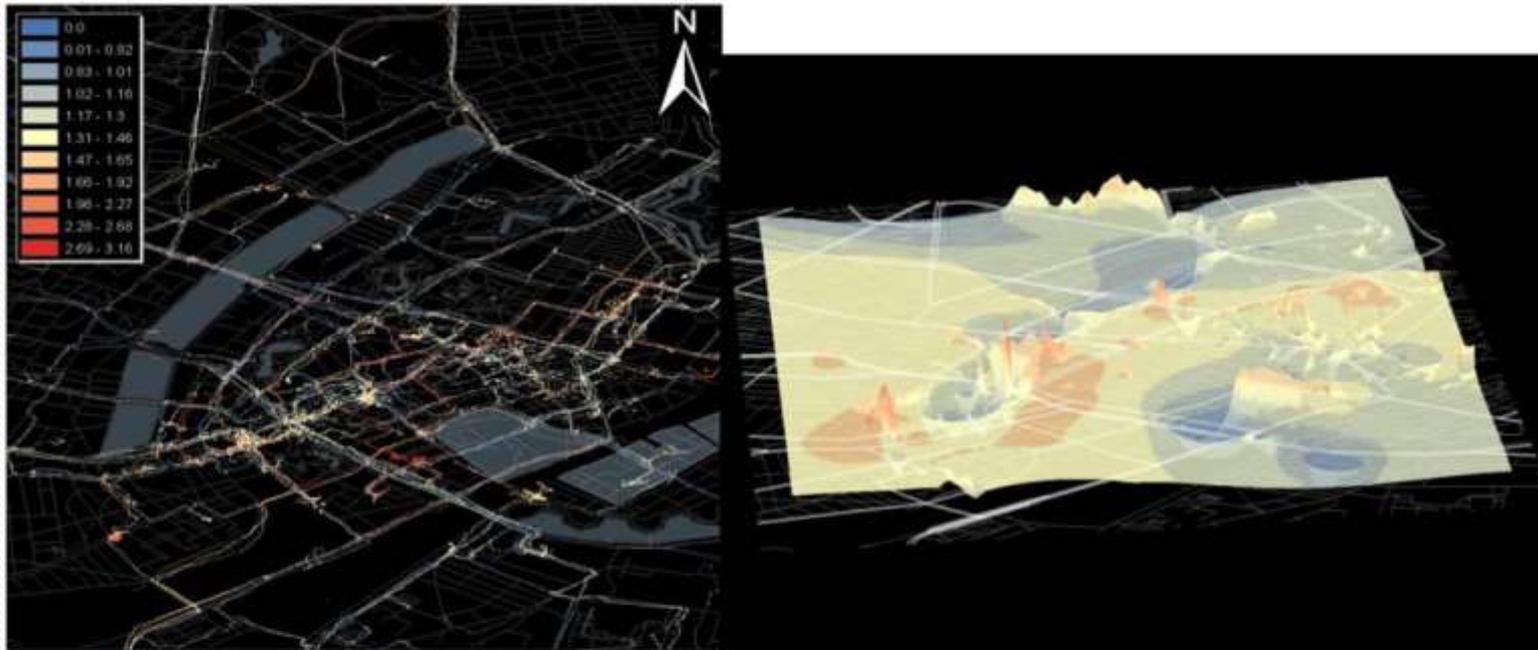
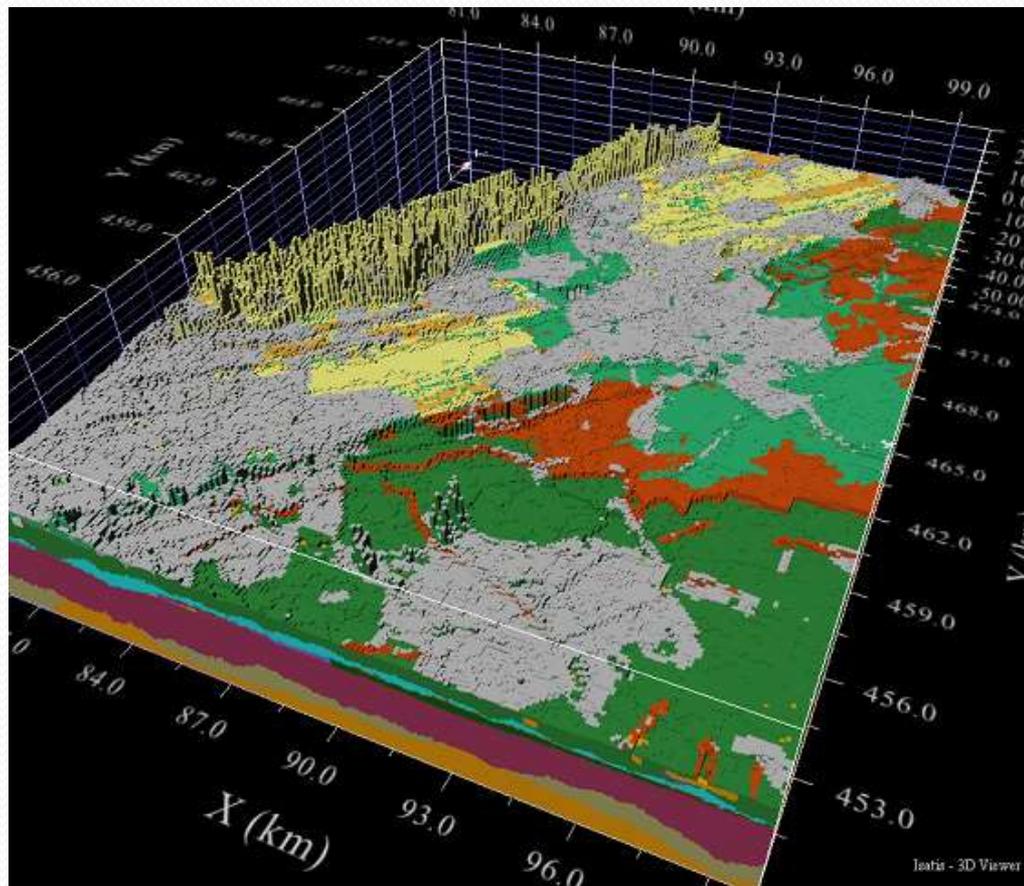


Figure 4: Spatial Distribution of CO Values in the City of Copenhagen.

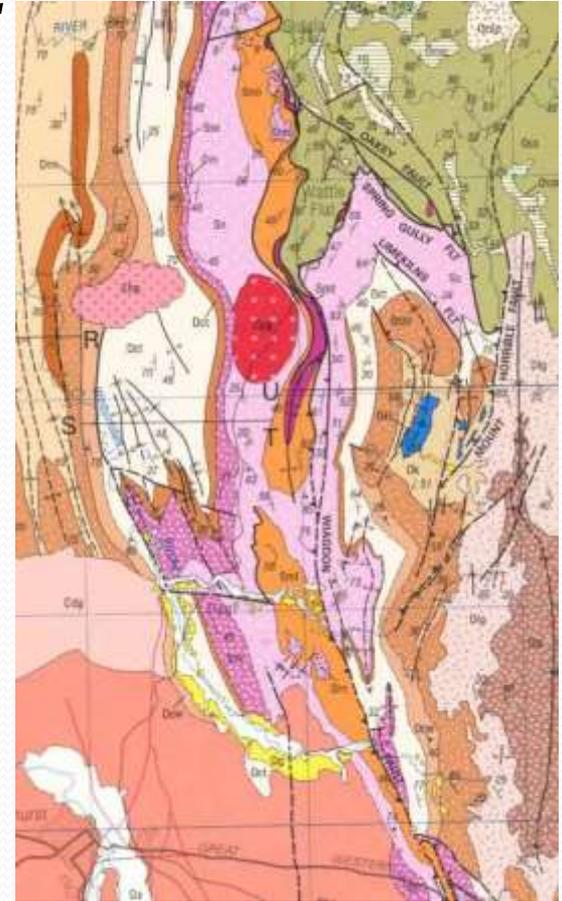
And of course OGC standards can be used together in applications and workflows

- CityGML & NetCDF for energy neutral cities
  - Source: <http://www.3dpilot.nl/?p=92>



# GeoSciML

- A GML Application Schema standard for the exchange of digital geology and borehole information.
- Representation and description of features typically found on geological maps,



Source: [www.onegeology.org](http://www.onegeology.org)

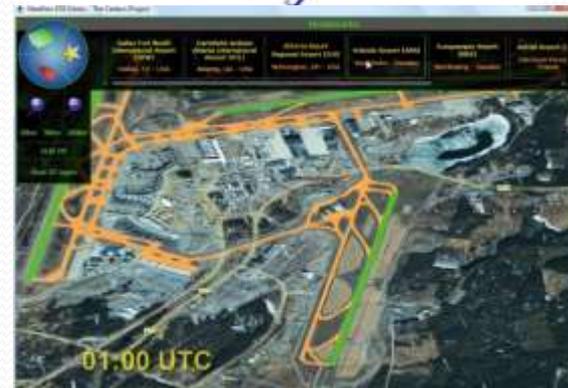
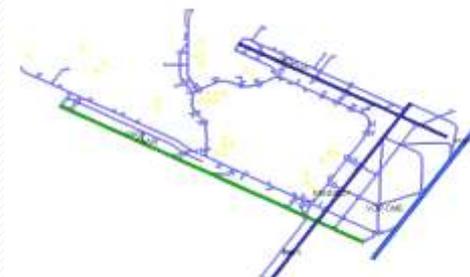
# Aeronautical Information Exchange Model (AIXM)



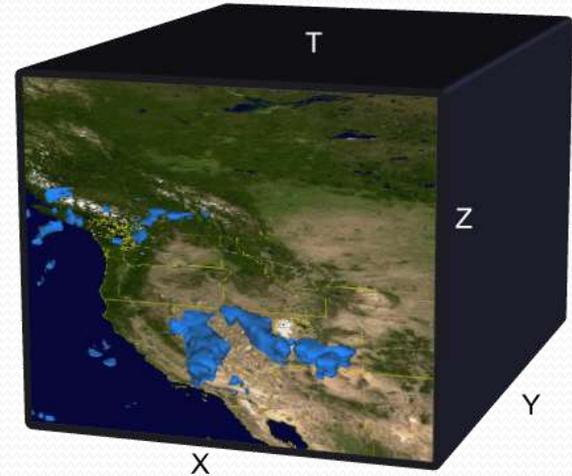
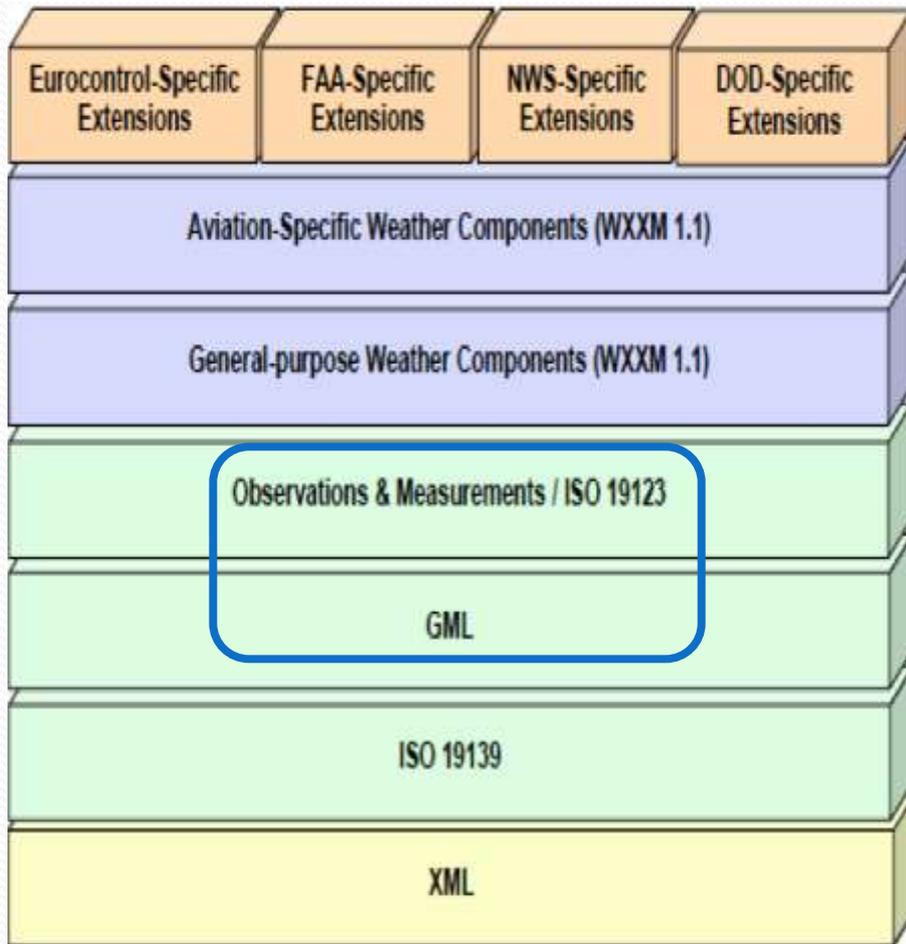
Standards-based data model and exchange format that can satisfy the aeronautical information exchange requirements for current and future aeronautical information applications;  
Models temporality

Accommodates ICAO standards and recommendations:  
Accommodates industry requirements: ARINC 424/EUROCAE ED-99/  
RTCA DO-272

- Uses XML and **GML**
- Is modular and extensible
- Supports current and future AIM IS requirements  
Digital AIPs, automated charting and pubs, integrated digital NOTAMs,  
Aerodrome mapping databases and apps  
Situational displays, etc

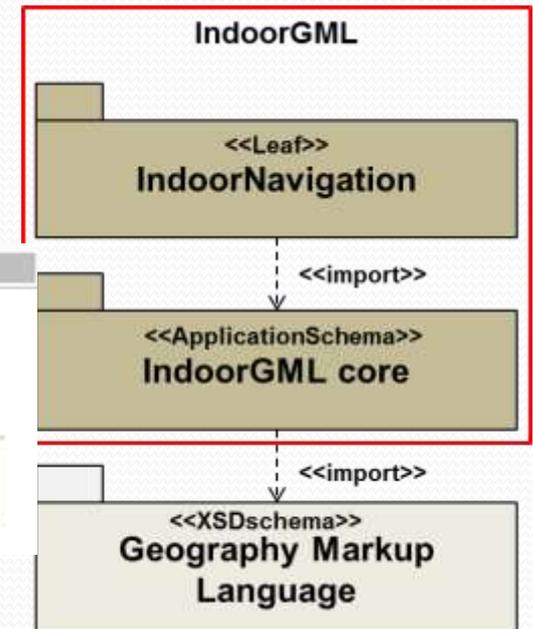
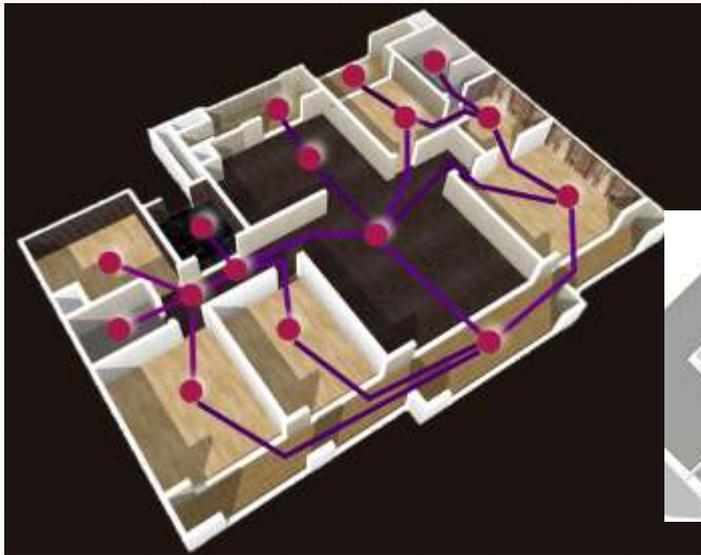


# Weather Information Exchange Model (WXXM)



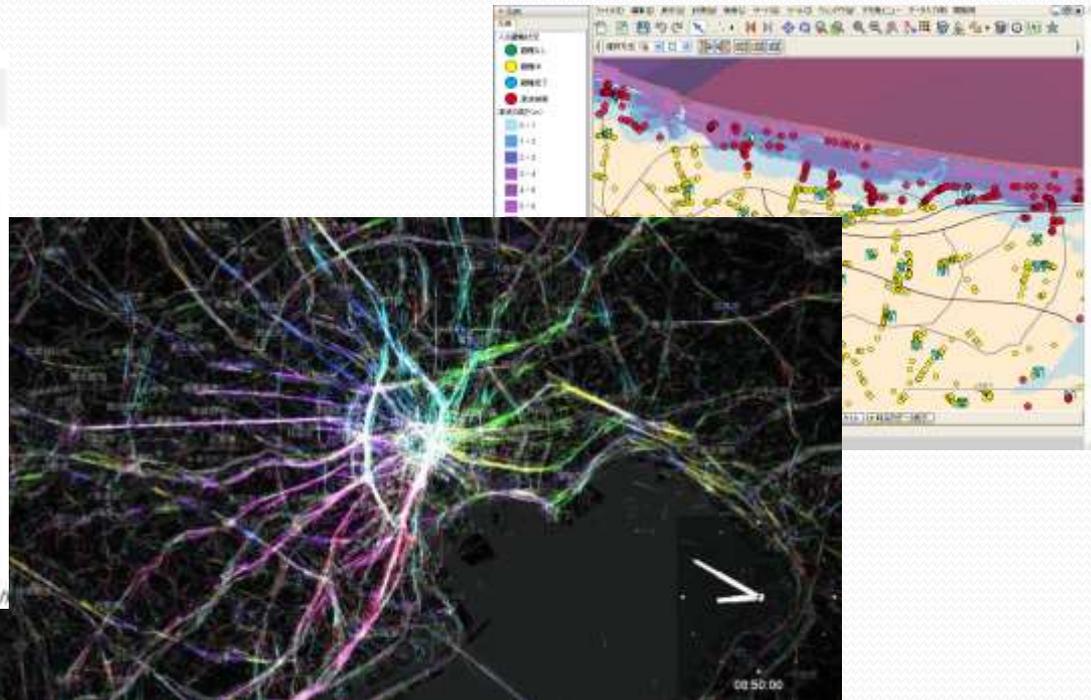
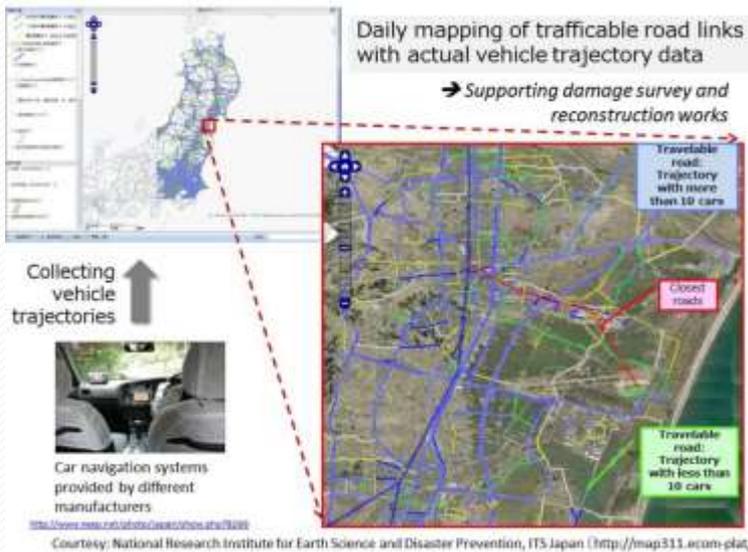
# InDoorGML

- The aim of IndoorGML is to represent and exchange the geoinformation that is required to build and operate indoor navigation systems.
- Not just geometry but a model of the indoor space!



# OGC Moving Features

- "Moving features" data describes such things as vehicles, pedestrians, airplanes and ships.
  - This is Big Data – high volume, high velocity.



Source: Presentation to OGC Technical Committee

# Modeling and Simulation

- DoD C-TGS Architecture
  - (Chambers and Sherman, 2014)

