![Ordnance Survey logo]

Open standards for sustainable disaster risk reduction

Steven Ramage

Head of Ordnance Survey International,

Member of the OGC Global Advisory Council

The number of natural disasters has increased over the past 30 years in every region of the world.

World Development Report, World Bank   http://tinyurl.com/mq3gdw8

In the outcome document "*The future we want*" Governments and organisations urged to commit to disaster risk reduction to enhance the resilience of cities and communities to disasters.

Regarding geospatial standards we must consider mechanisms to assist Member States:

•Create a baseline or mechanism for data sharing;

•Adopt existing standards and implement them in national legal and policy frameworks;

•Include IHO, ISO, OGC and others.

UN-GGIM and international standards

"It is important to think about data standards, sharing and accessibility. Today's supply chain means integrating traditional and non-traditional types of information."
WU, Hongbo

"We must consider economic requirements."
LI, Pengde

"Successful response starts with a map."
McCONNELL, James

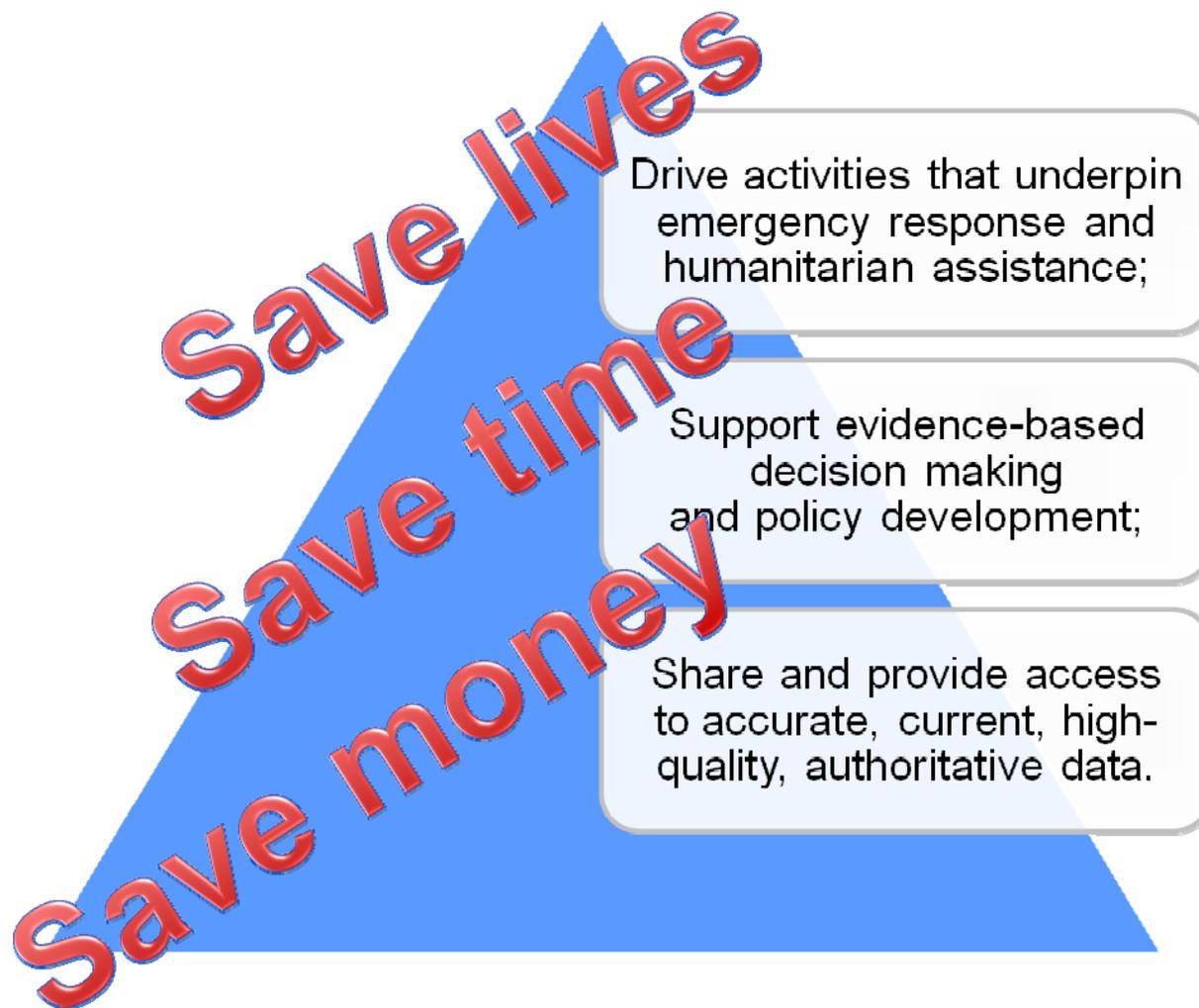*"Collaboration amongst agencies is critical."*
UNE, Hiroshi

"We use open standards to enable systems interoperability."
DEAKIN, Rob

UN-GGIM and international standards

Save lives
Save time
Save money

Drive activities that underpin emergency response and humanitarian assistance;

Support evidence-based decision making and policy development;

Share and provide access to accurate, current, high-quality, authoritative data.

UN-GGIM and international standards

New York,
13-15 August 2012
Second session of the
UN Committee of Experts on
Global Geospatial
Information Management

2/103
Inventory of issues to be addressed by the
UN-GGIM Committee of Experts

Concept proposed

(d) Suggestion by Technical Committee 211
(geomatics and geographic information) of the
International Organization for Standardization
(ISO/TC211) to put forward, jointly with the Open
Geospatial Consortium (OGC) and the International
Hydrographic Organization (IHO), a paper related to
standard-setting issues in the international community
…

International Hydrographic Organization
Organisation Hydrographique Internationale

International Organization for Standardization   TC 211

OGC®   Making location count.

UN-GGIM and international standards

Draft report submitted

**Second High Level Forum on Global Geospatial Information Management**

Qatar National Convention Centre, Doha, Qatar, 4-6 February 2013

Full report

Third Session of UN-GGIM Committee of Experts

Cambridge, UK, 24-27 July 2013

International Hydrographic Organization
Organisation Hydrographique Internationale

International Organization for Standardization   TC 211

OGC®   Making location count.
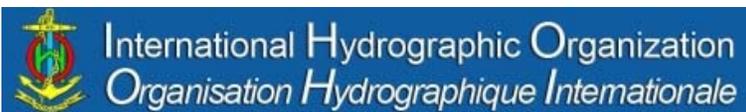
Committee of Experts on
Global Geospatial Information Management

Background document [1]
Available in English only

Third session
Cambridge, United Kingdom of Great Britain and Northern Ireland
24-26 July 2013

Item 8 of the provisional agenda

Establishment and implementation of standards for the global geospatial information community

The UN-GGIM inventory of issues

and

geographic information standardization

Background Document Prepared jointly by the International Organization for Standardization (ISO/TC211), the Open Geospatial Consortium (OGC) and the International Hydrographic Organization (IHO)

http://tinyurl.com/mmfxjh5

UN-GGIM inventory of issues

a) Developing a national, regional and global strategic framework for geospatial information;

b) Establishing institutional arrangements and legal and common frameworks;

c) Building capability and capacity, especially in developing countries;

d) Assuring the quality of geospatial information;

e) Promoting data sharing, accessibility and dissemination;

f) Embracing trends in information technology;

g) Promoting geospatial advocacy and awareness;

h) Working in partnership with civil society and the private sector;

i) Linking geospatial information to statistics.

Existing standards and inventory of issues

	UN-GGIM issue	Number of standards		
		ISO	OGC	IHO
(a)	Developing a national, regional and global strategic framework for geospatial information	6	5	1
(b)	Establishing institutional arrangements and legal and common frameworks	5	2	7
(c)	Building capability and capacity, especially in developing countries	5	2	2
(d)	Assuring the quality of geospatial information	7	6	8
(e)	Promoting data sharing, accessibility and dissemination	63	24	15
(f)	Embracing trends in information technology	20	18	3
(g)	Promoting geospatial advocacy and awareness	-	4	2
(h)	Working in partnership with civil society and the private sector	-	-	-
(i)	Linking geospatial information to statistics	7	6	-

International Hydrographic Organization (IHO)

- Intergovernmental consultative and technical organization established in 1921

- To support safety of navigation and the protection of the marine environment

- One of the IHO objectives:

  ➢ To bring about the greatest possible uniformity in nautical charts and documents (i.e. standardization)

  www.iho.int
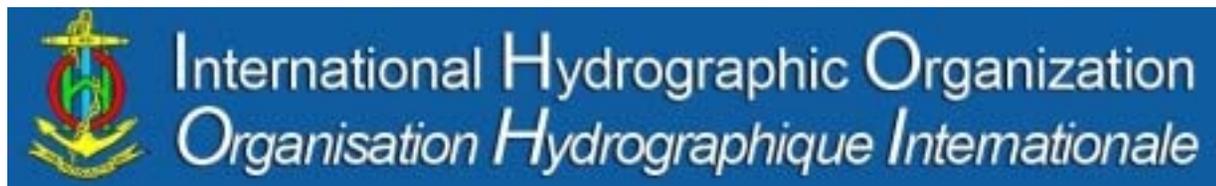
UN-GGIM and international standards: IHO

For disaster response lack of data has major impact: resolution and density of data for good tsunami inundation modelling far exceeds capabilities of existing data in most coastal areas of world.

Governments should establish holistic bathymetric data gathering programmes that serve all requirements concurrently - not just improvement of nautical charts.

"Regarding data interoperability and standardisation the principal issue in the maritime domain is lack of data."

Robert Ward, President,
International Hydrographic
Organization (IHO)

Image courtesy of NOAA

UN-GGIM and international standards: IHO

IHO S-10*x* standards depend on several ISO19100 series standards
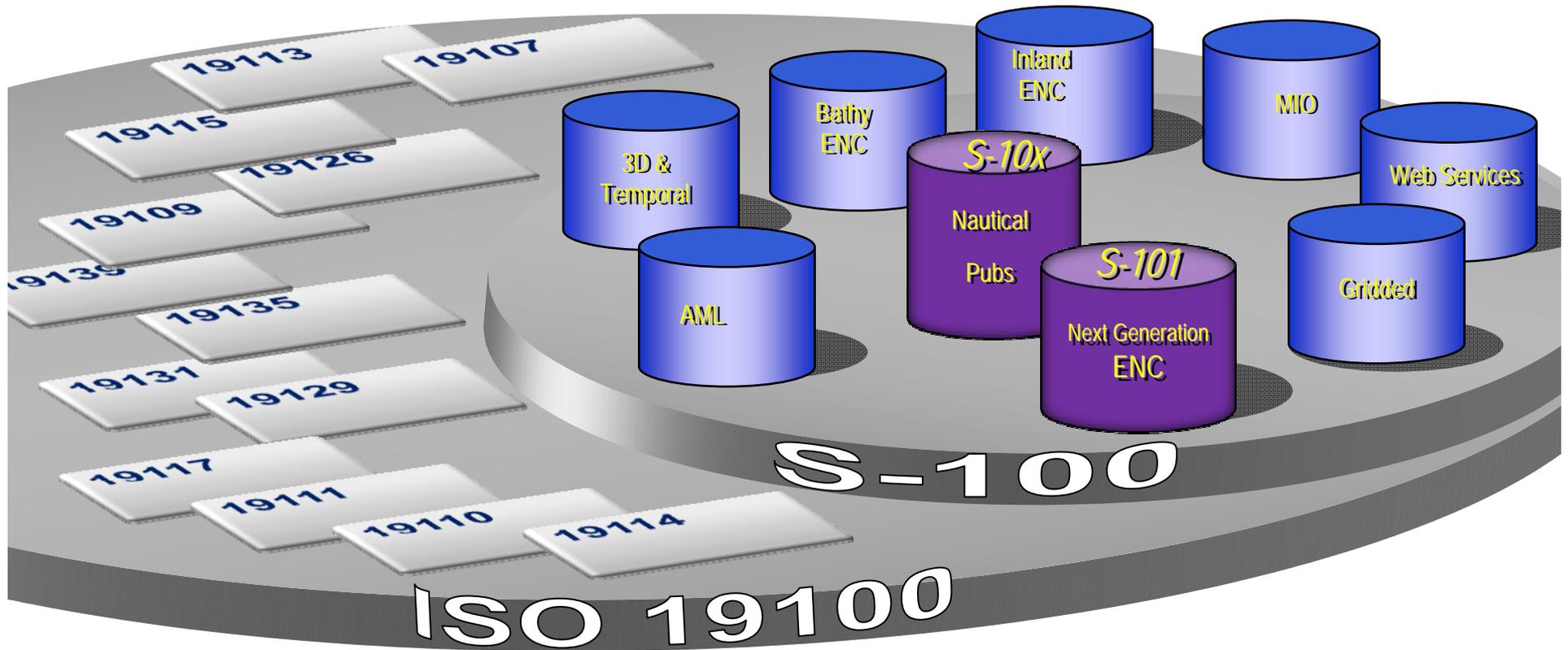
UN-GGIM and international standards: ISO

- World's largest developer of standards founded in 1946
  - ➢ Network of national standards institutes from 163 countries
  - ➢ 19 500 standards published
- Recognized by the UN, particularly agencies involved in the harmonization of regulations and public policies, and that provide assistance and support to developing countries
- Technical Committees (TCs)
  - ➢ Range from *food safety* to *computers* to *healthcare*
  - ➢ ISO/TC 211, *Geographic information/geomatics*

ISO International Organization for Standardization

www.iso.org   www.isotc211.org

Components of Spatial Data Infrastructure (SDI)

Standards	Access, Technology	Content (data)	Organization	Education

Components of Spatial Data Infrastructure (SDI)

ISO/TR 19122 - Qualifications and certification of personnel

Standards	Access, technology	Content (data)	Organization	Education
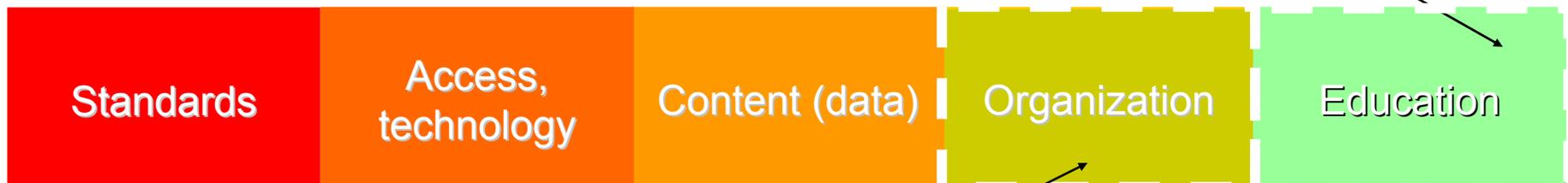
ISO 19101 – Reference model

ISO 19104 – Terminology

ISO 19105 – Conformance and testing

ISO 19106 – Profiles

ISO/TR 19120 – Functional standards

ISO 19135 – Procedures for registration of geographic information items

Components of Spatial Data Infrastructure (SDI)

Standards	Access, technology	Content (data)	Organization	Education

ISO 19103 - Conceptual schema language

ISO 19107 - Spatial schema

ISO 19108 - Temporal schema

ISO 19109 - Rules for application schema

ISO 19110 - Feature cataloguing methodology

ISO 19111 - Spatial referencing by coordinates

ISO 19112 - Spatial referencing by geographic identifiers

ISO 19113 - Quality principles

ISO 19114 - Quality evaluation procedures

ISO 19115 – Metadata

ISO 19115-2 - Metadata - Part 2: Extensions for imagery and gridded data

ISO/TR 19121 - Imagery and gridded data

ISO 19123 - Schema for coverage geometry and functions

ISO 19124 - Imagery and gridded data

ISO 19126 - Profile - FACC Data Dictionary

ISO 19127 - Geodetic codes and parameters

ISO 19129 - Imagery, gridded and coverage data framework

ISO 19130 - Sensor and data model for imagery and gridded data

ISO 19131 - Data product specification

ISO 19137 - Generally used profiles of spatial schema and similar important other schemas

ISO 19138 – Data quality measures

Components of Spatial Data Infrastructure (SDI)

ISO 19116 - Positioning services
ISO 19117 – Portrayal
ISO 19118 – Encoding
ISO 19119 – Services
ISO 19125-1 - Simple feature access
– common architecture
ISO 19125-2 – SFA – SQL option
ISO 19125-3 – SFA – COM/OLE
ISO 19128 - Web Map Server (WMS)
ISO 19132 - Location based services

ISO 19133 - Location based services
tracking and navigation
ISO 19134 - Multimodal location based
services for routing and navigation
ISO 19136 - Geography Markup
Language (GML)
ISO 19139 - Metadata
– Implementation specifications

| Standards | Access, Technology | Content (data) | Organization | Education |
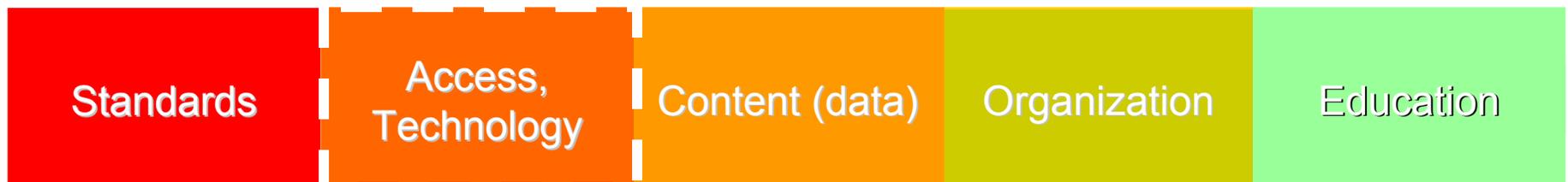
UN-GGIM and international standards

ISO/TC 211, OGC and IHO have been cooperating since 1994, mainly under the liaison mechanism of ISO.

ISO/TC 211 and OGC also benefit from a range of people working actively in both organizations and have a Joint Advisory Group (JAG).

UN-GGIM and international standards: OGC

- Industry consortium, circa 500 member organisations

- 30+ geospatial standards, several also ISO standards

- Goal is to define, document and test implementation standards for use with geospatial content and services

  ➢ integration of geospatial content and services into applications

www.opengeospatial.org

About OGC

The OGC's Role in Emergency Response and Disaster Management

Table of Contents:

Overview

Emergency Response and Disaster Management are different domains of activity with different information sharing requirements. They do, however, overlap and and in both domains there is a need to rapidly *discover, share, integrate and apply geospatial information*. The standards work of the Open Geospatial Consortium (OGC) plays a key role in addressing this need. Speeding the flow of location information means more lives and property saved and less risk for first responders.

OGC

Making location count.

News & Events

OGC Blog

OGC Update

Events

Upcoming TC

Press Releases

Press Coverage

Social Media

⊞ Share | 🇫 🇾 ⬛ 🔳 🍪

Areas of Interest

Learn About OGC

Membership Benefits

Endorsements

Join OGC

OGC Standards

OGC Network™

OGC Public Forum

Registered Products

White Papers

A white paper is an OGC member approved publication released by the OGC to the Public that states a position on one or more technical considerations or other subjects that are germane to the work of the OGC, often including a high-level explanation of a standards based architecture or framework of a solution. A White Paper often explains the results or conclusions of research. A White Paper is not an official position of the OGC.

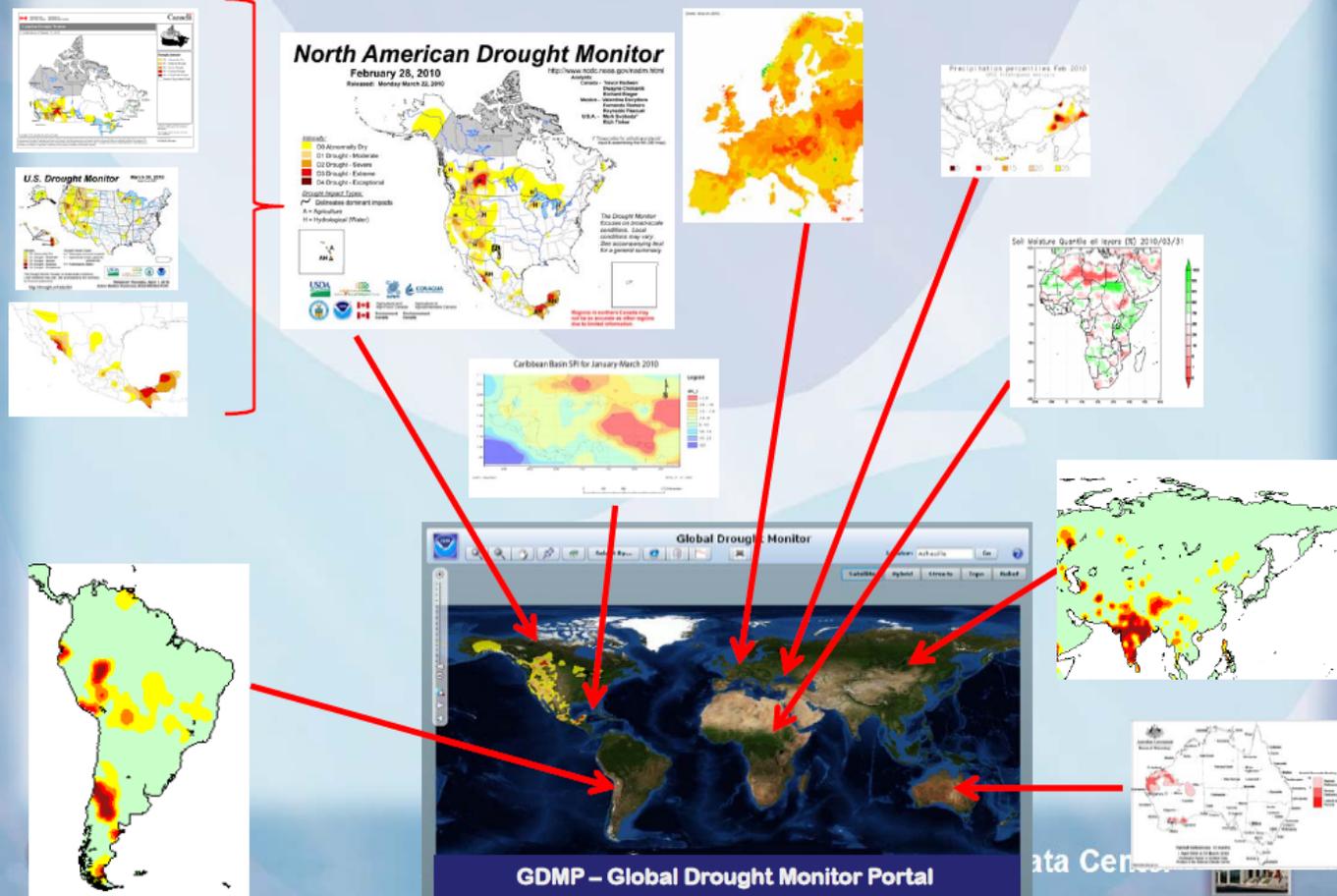| Title	Author	Date	File Formats
OGC Sensor Web Enablement: Overview and High Level Architecture (OGC 07-165r1)	Mike Botts, George Percivall, Carl Reed, John Davidson	2013-04-02	🔗 📕 📘
Architecture of an Access Management Federation for Spatial Data and Services in Germany (OGC 12-026)	Andreas Matheus	2012-04-18	📕 📘
Geospatial Business Intelligence (GeoBI) (OGC 09-044r3)	George Percivall and Raj Singh	2012-07-12	📕 📘
Open Source and Open Standards (OGC 11-110)	Arnulf Christl and Carl Reed	2011-08-11	📘
OGC Standards and Cloud Computing (OGC 11-036)	Lance McKee, Carl Reed, Steven Ramage	2011-04-07	📕
OGC Compliance Testing White Paper (OGC 10-128)	Luis Bermudez	2010-10-22	📕 📘
OGC Identifiers - the case for http URIs (10-124r1)	Simon Cox	2010-07-15	📕 📘
An Introduction to GeoRSS: A Standards Based Approach	Carl Reed (Editor), Raj Singh, Ron	2006-	📕 📘

The PREVIEW Global Risk Data Platform

UNEP and UNISDR provide free and interoperable access to more than 60 global data sets on nine types of natural hazards, as well as related exposure and risk.
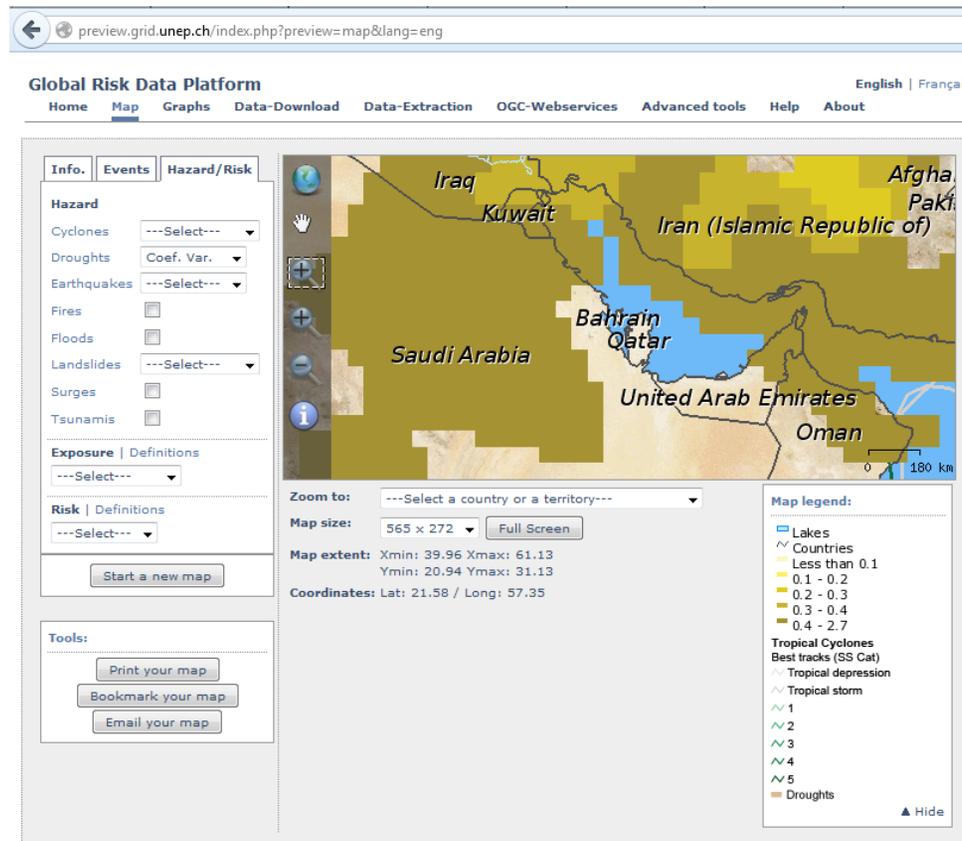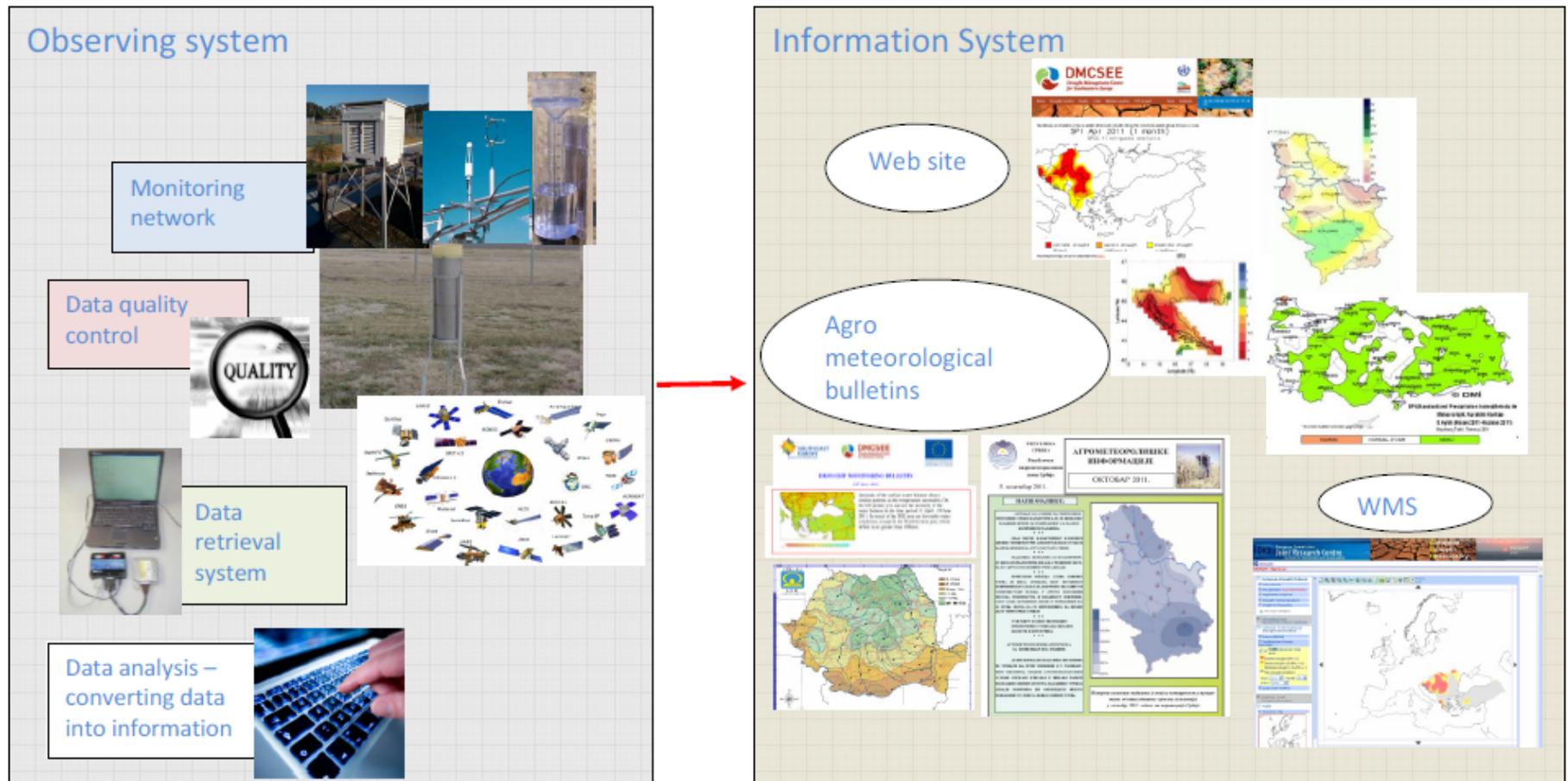
GEO (GEOSS) Global Drought Monitor

EuroGEOSS Regional Drought Monitor

Tsunami Information Portal

Developed by DM Solutions in concert with Asian Institute of Technology, Chulalongkorn University and Laboratory of Applied Geomatics.
Uses OGC WMS.
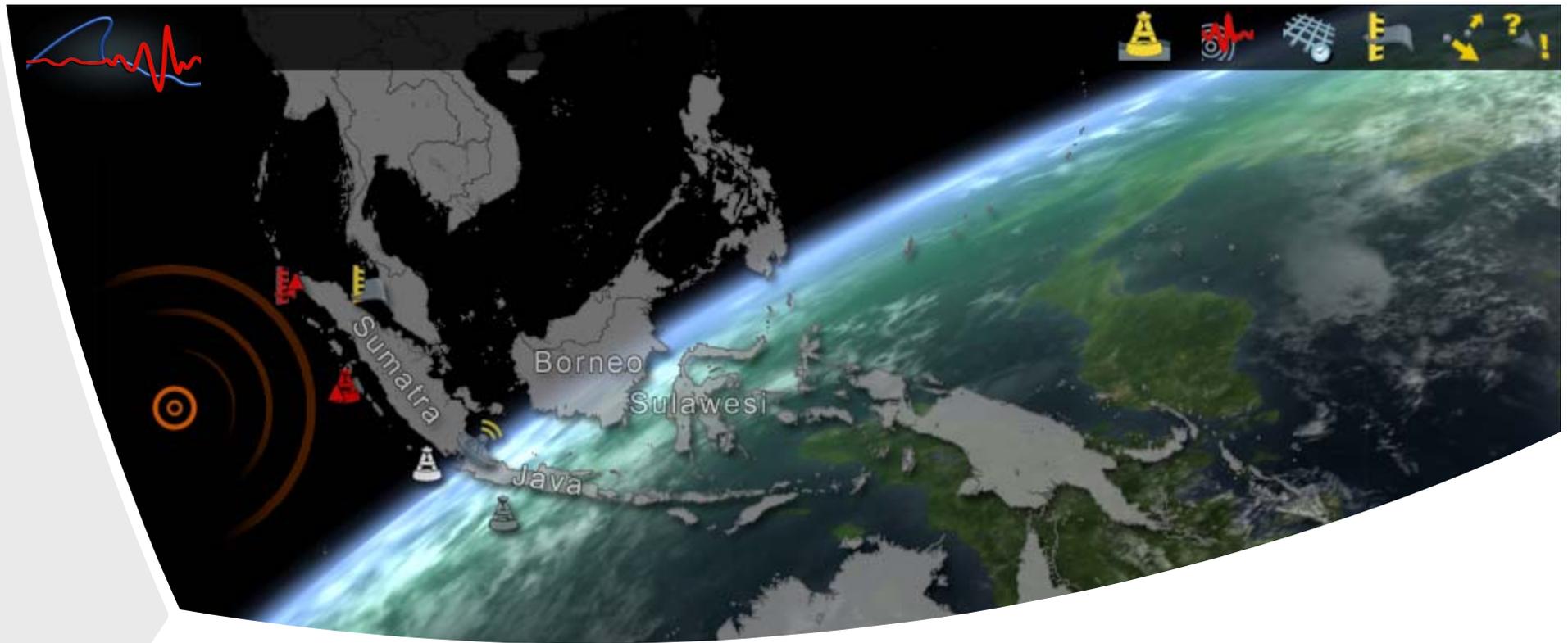
The German-Indonesian Tsunami Early Warning System (GITEWS)

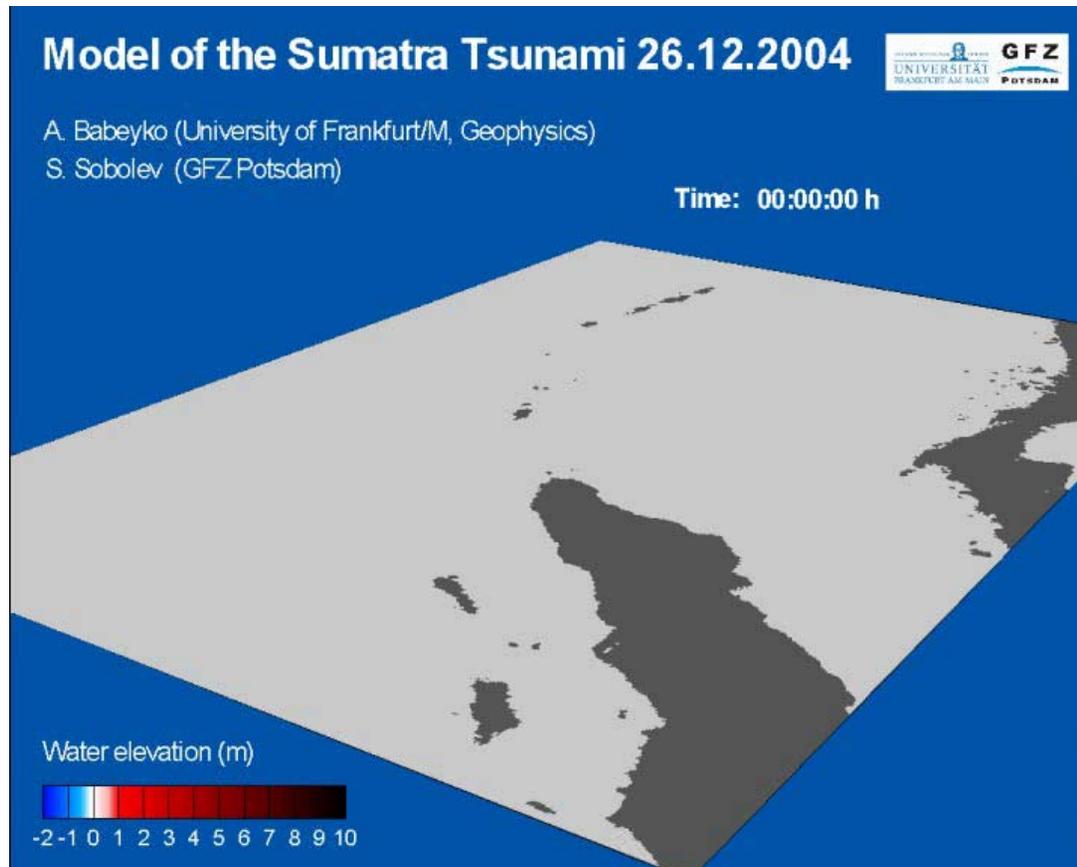Decision Support System (DSS) by DLR:
Overview, Architecture and Schedule

Torsten Heinen; Ulrich Raape
German Remote Sensing Data Center (DFD)
German Aerospace Center (DLR)

Deutsches Zentrum
DLR   für Luft- und Raumfahrt e.V.
in der Helmholtz-Gemeinschaft

GITEWS

Tsunami Early Warning and Mitigation

Model of the Sumatra Tsunami 26.12.2004

A. Babeyko (University of Frankfurt/M, Geophysics)
S. Sobolev (GFZ Potsdam)

Time: 00:00:00 h

Water elevation (m)
-2 -1 0 1 2 3 4 5 6 7 8 9 10

Problem:
- Generation of Tsunamis near coastlines with small travel times
- **Extremely short time window** for **tsunami detection**, early warning and effective disaster response
- Occurs, for example in Indonesia and Japan
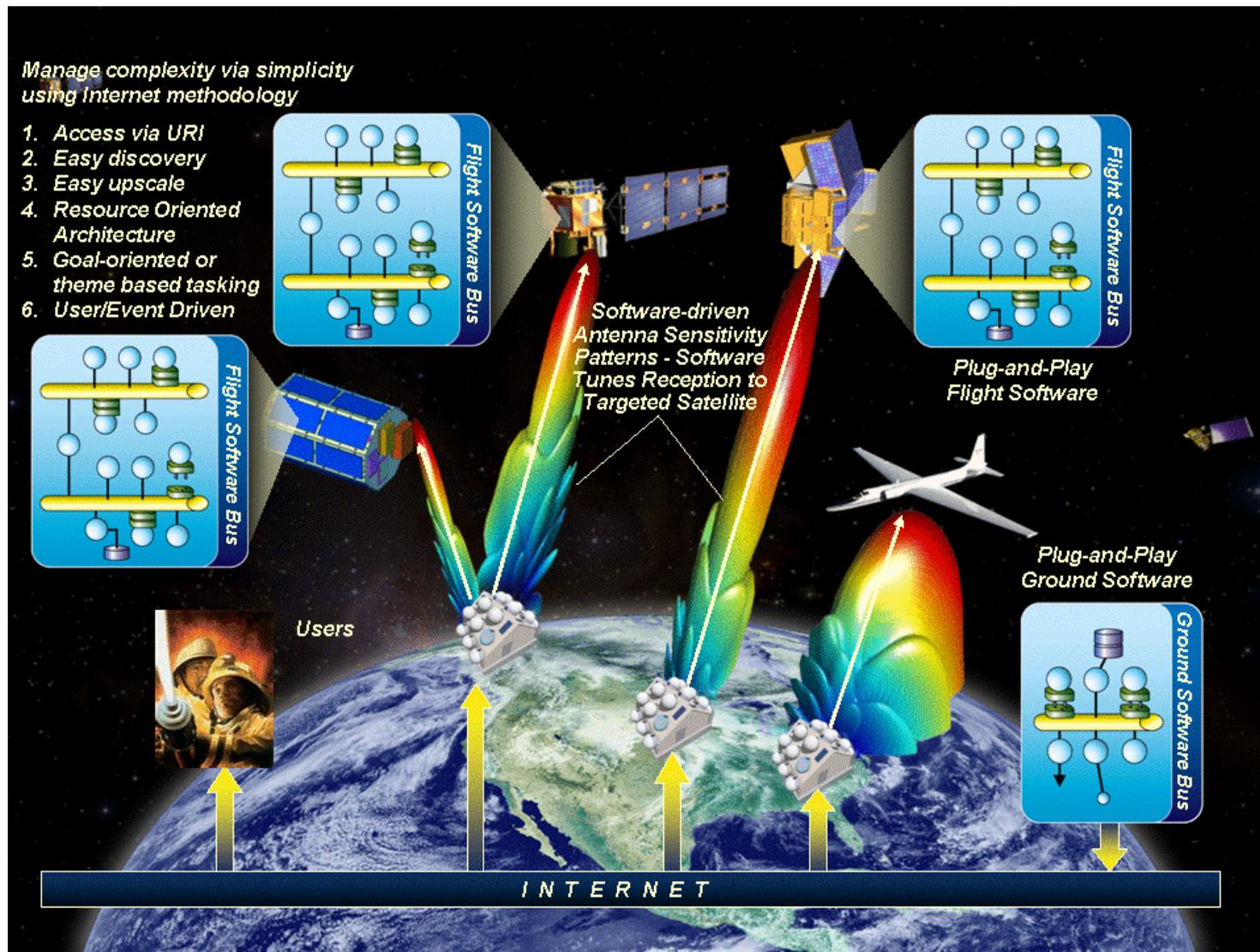
GITEWS Approach:
- Development and deployment of sophisticated **sensor systems** to provide sensor observations as early as possible
- Simulate **tsunami scenarios** (large scenario database)
- Provide **decision support**

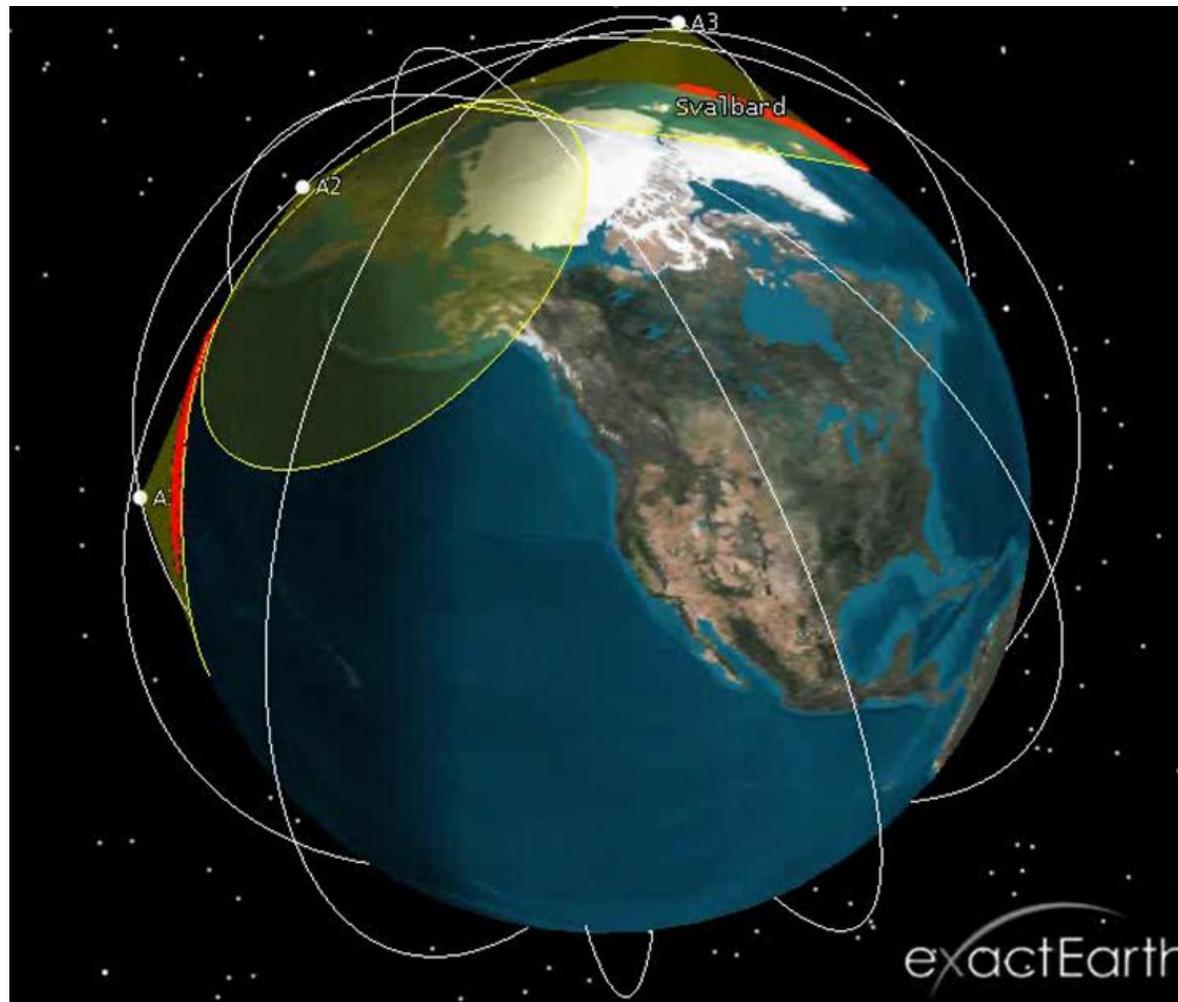# Sensor-based Landslide Early Warning System (SLEWS)
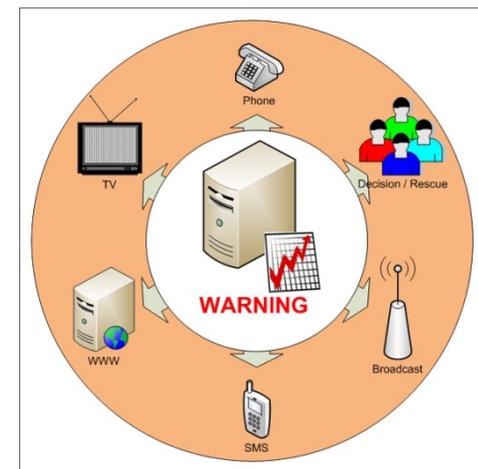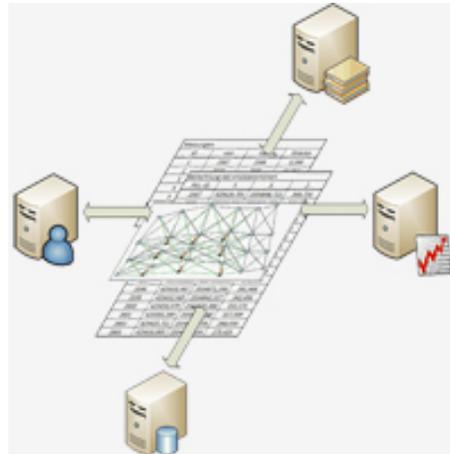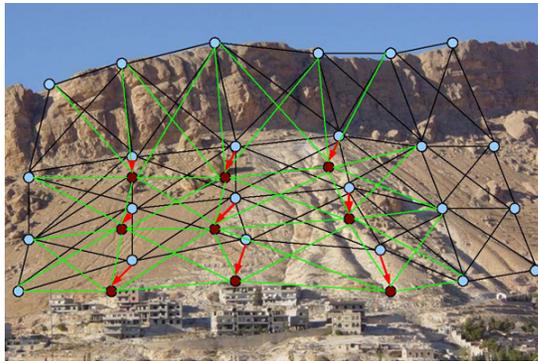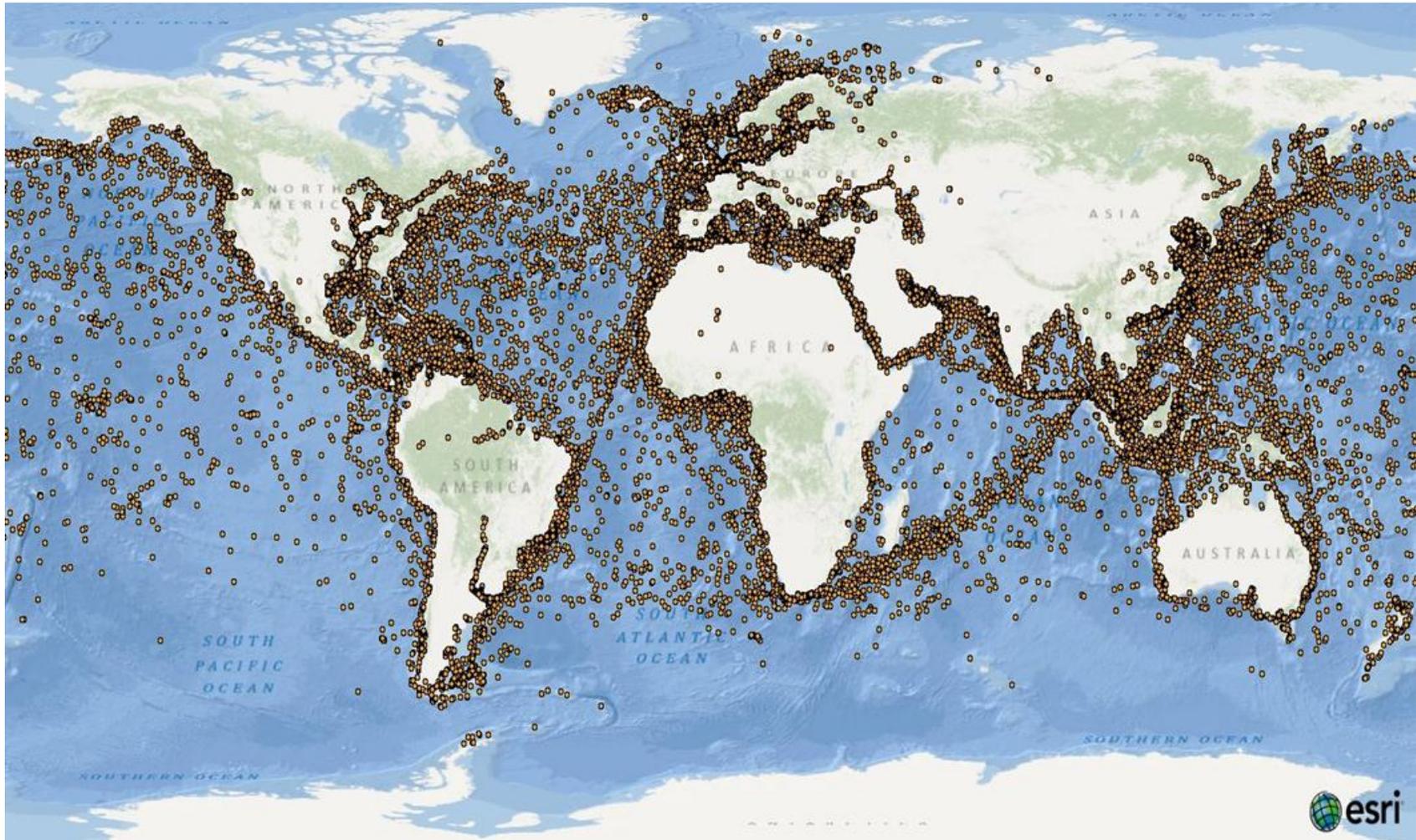

Source: SLEWS, www.slews.de

NASA SensorWeb Vision

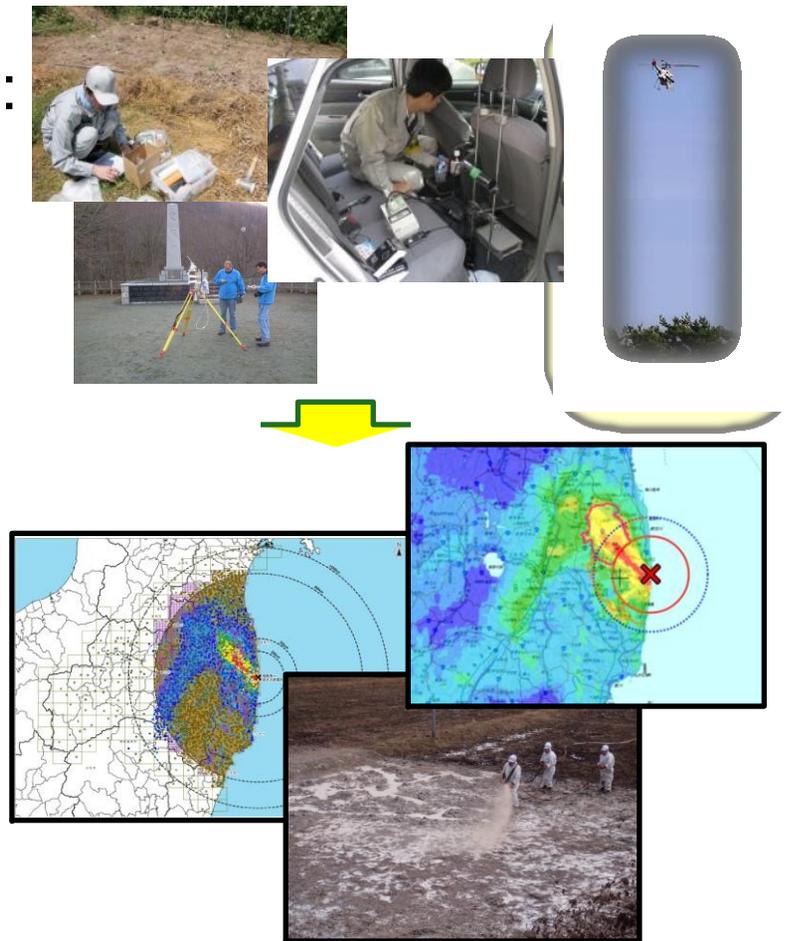# exactEarth Satellite AIS (S-AIS)
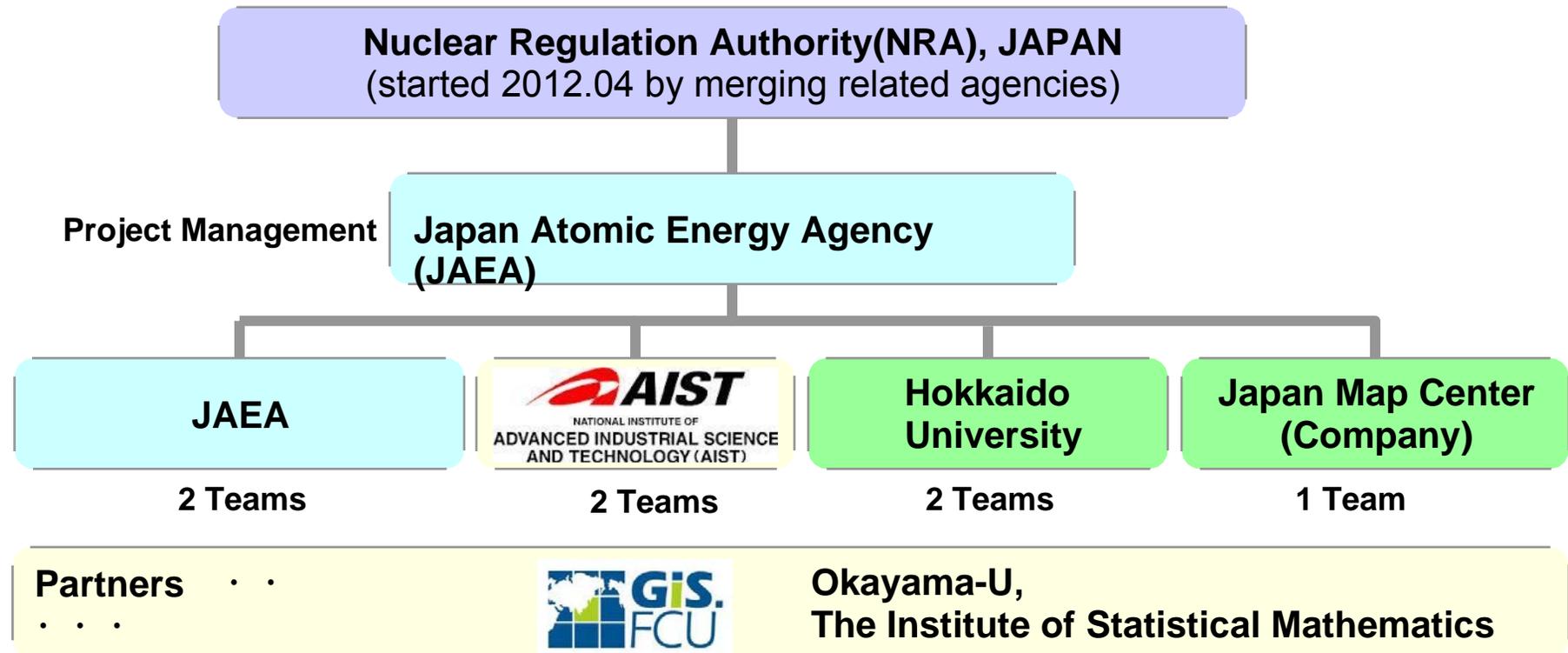
80, 000 vessels daily worldwide

Fukushima Radiation Monitoring

- Database construction project
- Integrate data from many sources: from CSV to Web Services
- Construct OGC standards-based service framework
- Use Sensor Web Enablement (SWE) standards, notably Sensor Observation Services

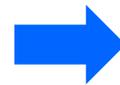# Fukushima Radiation Monitoring: project structure

Nuclear Regulation Authority(NRA), JAPAN
(started 2012.04 by merging related agencies)

Project Management **Japan Atomic Energy Agency (JAEA)**

JAEA | **AIST** NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST) | **Hokkaido University** | **Japan Map Center (Company)**

2 Teams | 2 Teams | 2 Teams | 1 Team

Partners · · · · · GiS.FCU Okayama-U, **The Institute of Statistical Mathematics**

AIST project role

Provide Database Federation Framework based on international standards.

1.Convert/Wrap "legacy" databases(CSV) into standard web services

2. Construct a database federation framework based on activity in 1.
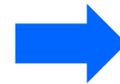
Framework

- Easy to access/interoperate
- Easy to reuse
- Easy to combine with other data

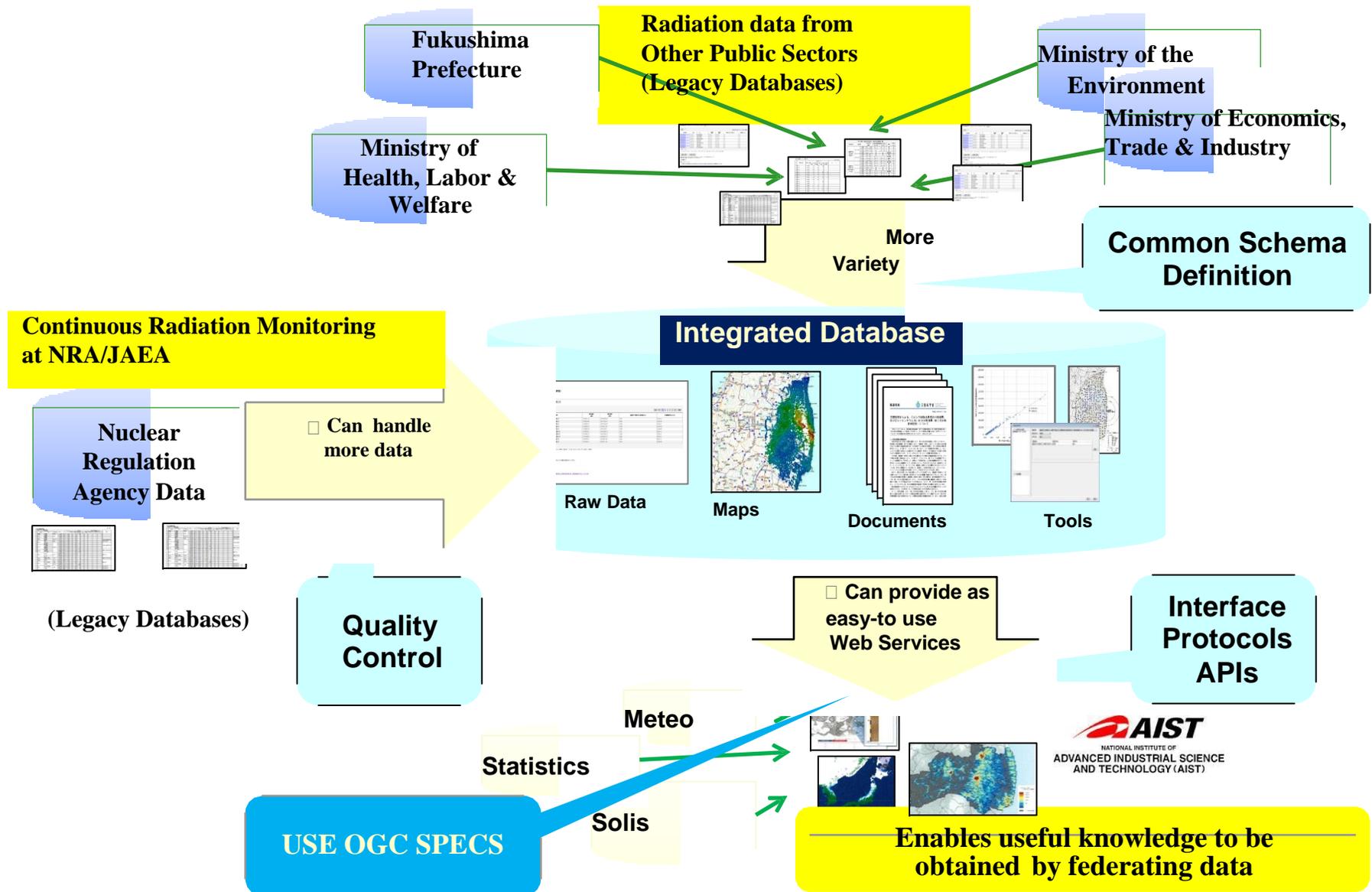➡ **OGC Web Services (W*S)**

Various Radiation Data

- Need to handle various sensors (including real-time sensors)

➡ **OGC Sensor Web (SWE)**

Fukushima Radiation Monitoring: project overview

Collaboration tools

Sahana is a Free and Open Source web based Disaster Management collaboration tool that addresses coordination problems. Sahana uses OGC standards to serve, access and display geographic data.

Sahana also works with the OGC's Open GeoSMS standard. Open GeoSMS is compatible with other OGC standards, such as those for sensor webs and earth imaging, and it is also compatible with standards such as the OASIS Common Alerting Protocol (CAP) standard.
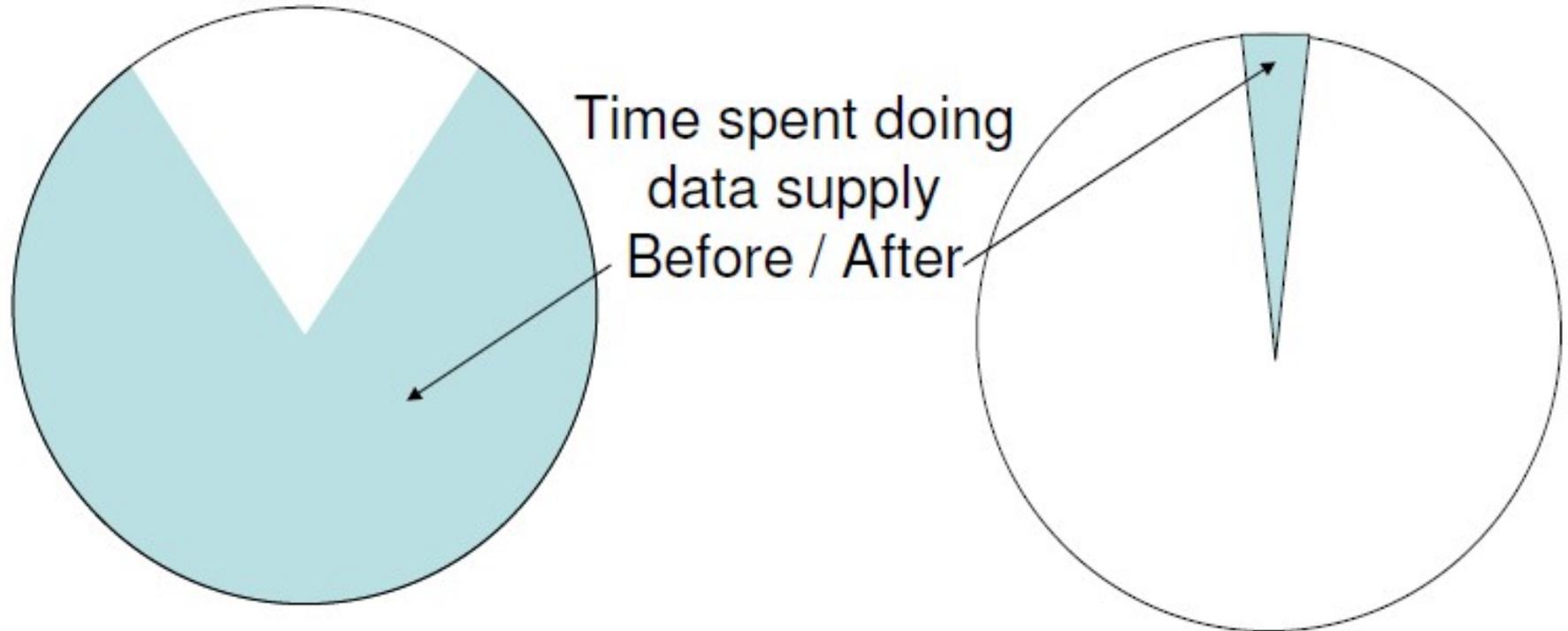
OGC Open GeoSMS

An open standard based on the international Short Message System (SMS) for sharing location information between multiple mobile platforms.

Existing OGC standard –
now submitted to ITU-T Study Group.

WFS for Data Supply Works

Time spent doing data supply
Before / After

Christchurch City Council

Kyle Dow, Senior Data Analyst, Corporate Data Team, CCC

Same Issues, but…

▶ Christchurch City holds **Authoritative Data**, e.g…

▶ WasteWater

▶ Building Status

▶ Construction partners **manually** submit data in variety of formats

▶ Time and **money wasted** on data loading and management

▶ WFS has **no capability to receive** updates through interoperable web services

What they needed:

▶ Transactional Interoperability between recovery partners:

▶ CERA, CCC, SCIRT

▶ ESRI, Intergraph

▶ OGC Standards (NZGO SDI Cookbook)

    ▶ Practical, short-term solution (can't wait)

▶ Focus on issues with existing (OGC) standards interfaces, notably WFS-T

▶ Immediate results that will accelerate recovery & reconstruction efforts

Solution: WFS-T Plugfest

▶ Short Duration

▶ Collaborative

▶ Hands-on

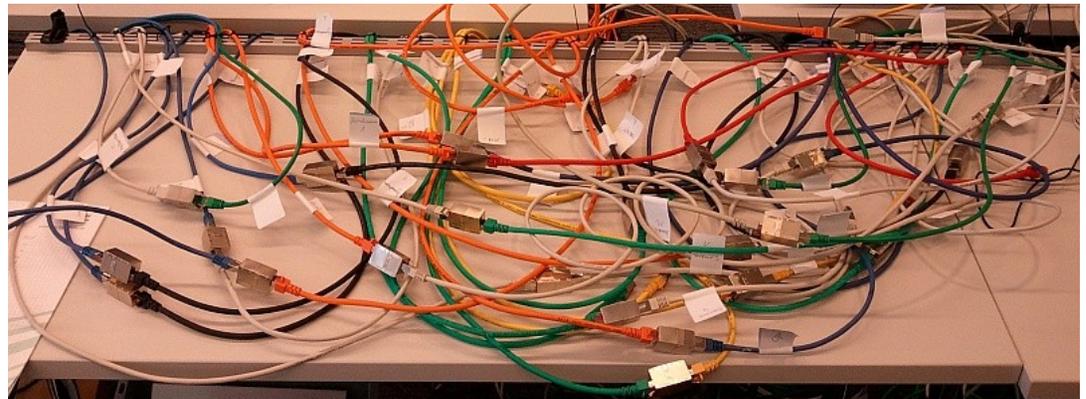▶ Independent Facilitation & WFS-T Architect

▶ "Just Make it Work"

Image: http://www.ispcs.org

Technology Agnostic

Organisation	Technologies
CCC	Intergraph GeoMedia Pro Intergraph GeoMedia WebMap
SCIRT	ESRI ArcGIS Server ESRI ArcGIS Desktop Safe Software – FME WFS 'Pump script'
CERA	Benoli Silverfish ESRI GeoDatabase WFS 'Pump script'
InsureCorp*	Pitney Bowes Software MapInfo Professional

* fictitious name to protect any commercial interests

Before and After

Before
* Data submitted to CCC on paper, email, disk
* Significant effort & resource strain for data entry
* Doesn't Scale

After
* "Set and forget"
* Significant time & resources savings
* Submitters choose their own technology

OGC Business Value Committee (BVC)

The goals of the BVC are:
1. Determine the value of using open standards;
2. Assess the business reasons for developing standards;
3. Provide an independent forum for discussion.

business.value@lists.opengeospatial.org

UN-GGIM and international standards

With thanks to the following persons:

Robert Bessaro, President, IHO

Olaf Ostensen, Chair, ISO/TC211

Mark Reichardt, President, OGC

Maurits van der Vlugt, Mercury Project Solutions

Richard Murcott, LINZ

Steven Ramage, Head of Ordnance Survey International

Member of the OGC Global Advisory Council and
Chair of the OGC Business Value Committee
steven.ramage@ordnancesurvey.co.uk