OGC and IOGP Activities relevant to IHO HSSC

Including Oil Spill Response, Common Operating Picture

by Andy Hoggarth, CARIS
Support from George Percivall, OGC Chief Engineer
and Gareth Wright, OGP SSDM Chair

HSSC6-07.7A
November 2014

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Contents

- OGC Update
- IOGP SSDM Update
- Harmonizing Data and Smart Data Exchange
- Oil Spill Response Common Operating Picture

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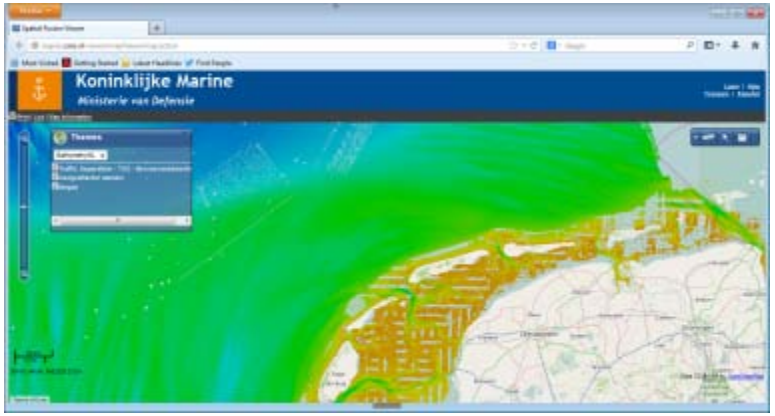
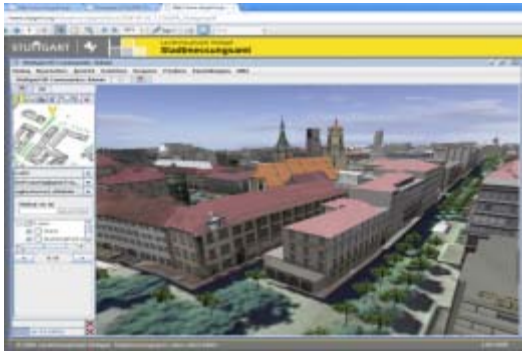
Basic Geospatial Interoperability Challenge Solved
Standards-based Technologies and Information Sources Abound

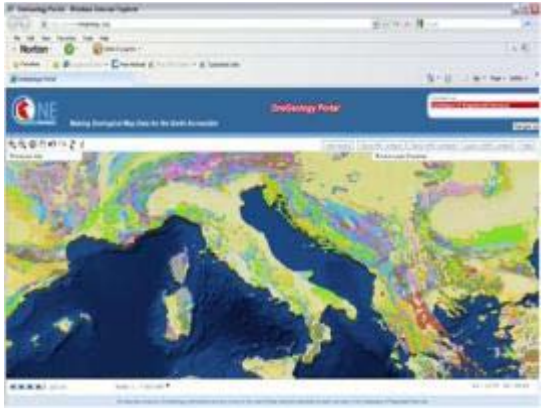
Source: Geoportal of the Catalonia SDI



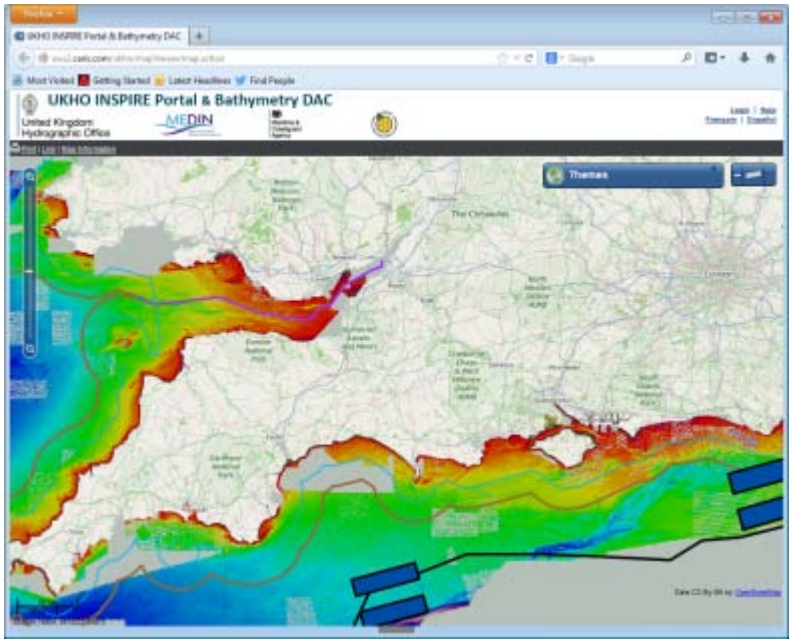
Source: Koninklijke Marine, Dutch Ministry of Defence



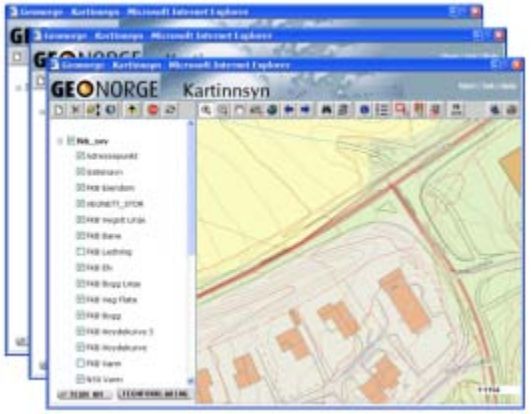
Source: Landeshauptstadt Stuttgart



Source: onegeology.org



Source: ukho.gov.uk



Source: GeoNorge

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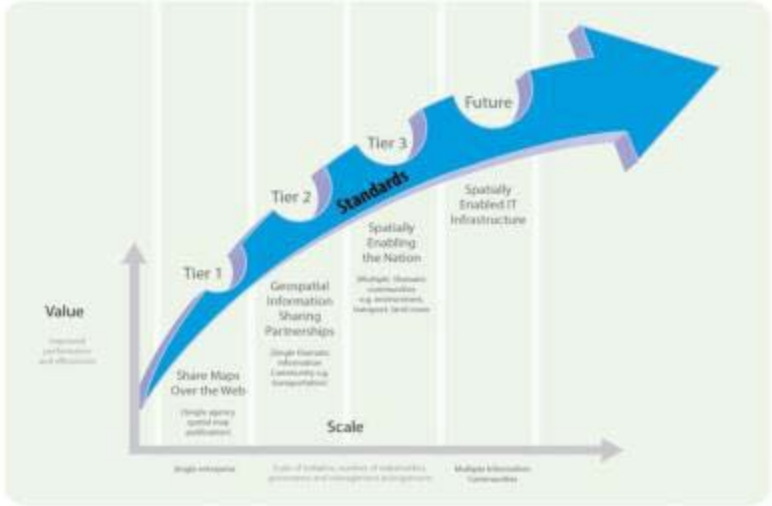
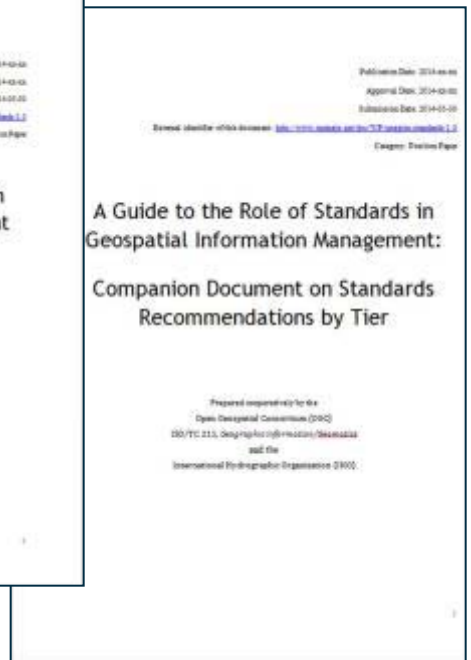
UN Global Geospatial Information Management (UNGGIM) Report

- *A Guide to the Role of Standards in Geospatial Information Management*
  - Purpose to provide a policy leader level guide to the role and benefit of geospatial standards in geospatial information management
  - Non-Technical
  - Joint development between OGC, IHO, ISO members, and others



- Final version to UNGGIM secretariat June 2014

- Presented by OGC in NYC in August on behalf of OGC,IHO and ISO



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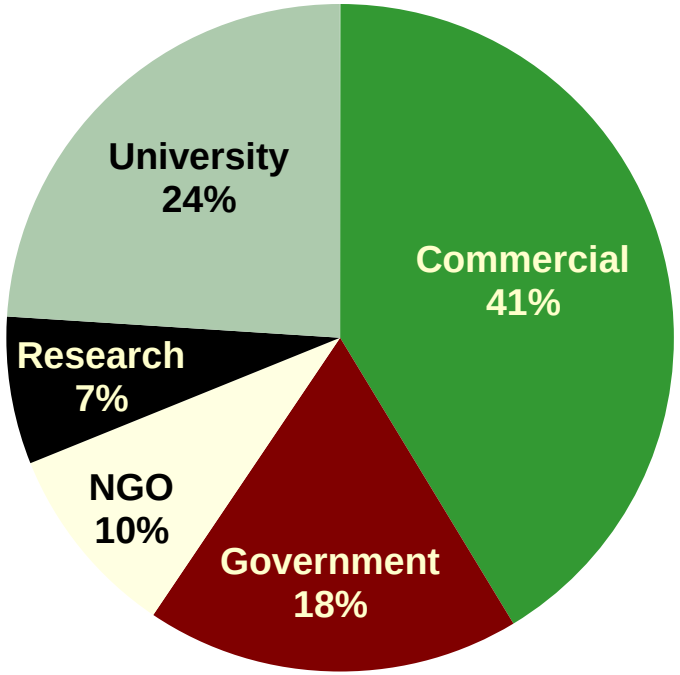
The Open Geospatial Consortium

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

- 20th Anniversary
- 498 members
- 33 “core” standards
  - 15 extensions/profiles
- Hundreds of product implementations
- Broad user community implementation worldwide
- Alliances and collaborative activities with many other organizations



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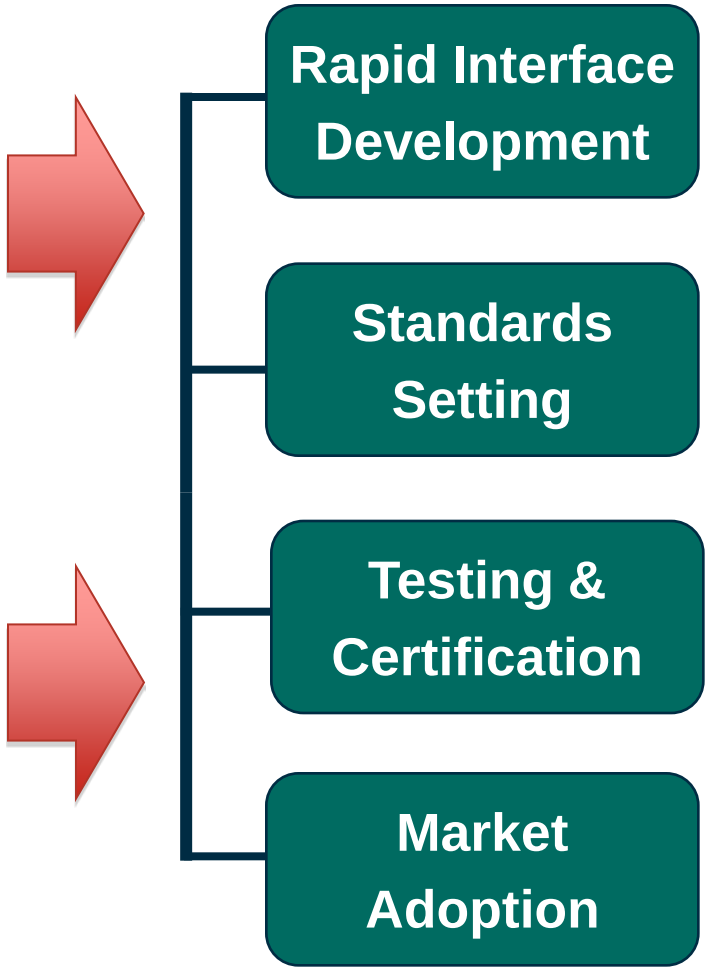
OGC's Approach for Advancing Interoperability

- ***Interoperability Program*** – global, innovative, rapid prototyping program uniting users and industry in accelerating interface development and delivery of interoperability to the market
- ***Standards Program*** – consensus standards process similar to other Industry consortia (WC3, OMA)
- ***Compliance Program*** – allows organizations that implement an OGC standard to test their implementations with the mandatory elements of that standard
- ***Communications and Outreach Program*** – education and training, encourage take up of OGC specifications, business development, communications programs



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OGC/ISO Web Services Standards

Rapid discovery, access, fusion and application of location information for:

- Catalogue
- Geography Markup Language
- KML
- Web Coverage Service
- Web Feature Service
- Web Map Service
- Web Map Tile Service
- Web Processing Service
- Sensor Web Enablement

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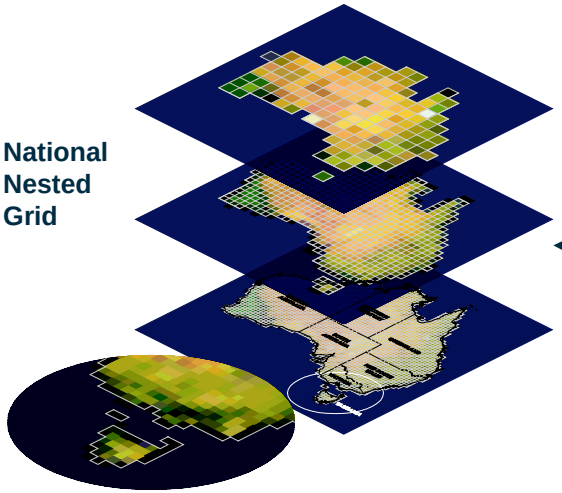
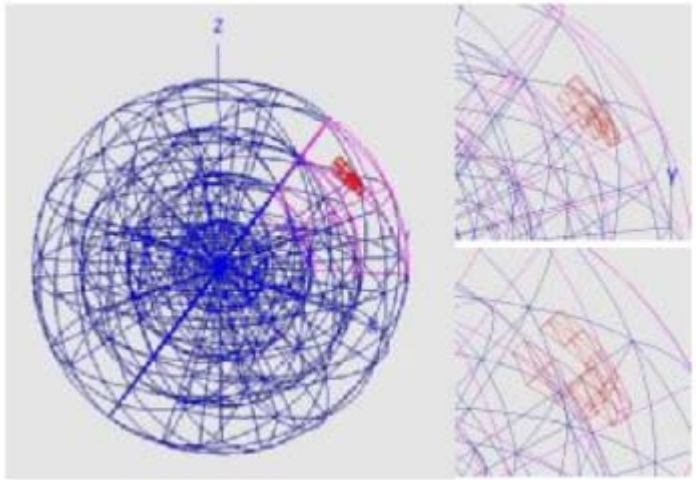
Complete OGC Standards List: http://www.opengeospatial.org/standards

Discrete Global Grid Systems

National Nested Grid





Earth System Spatial Grid

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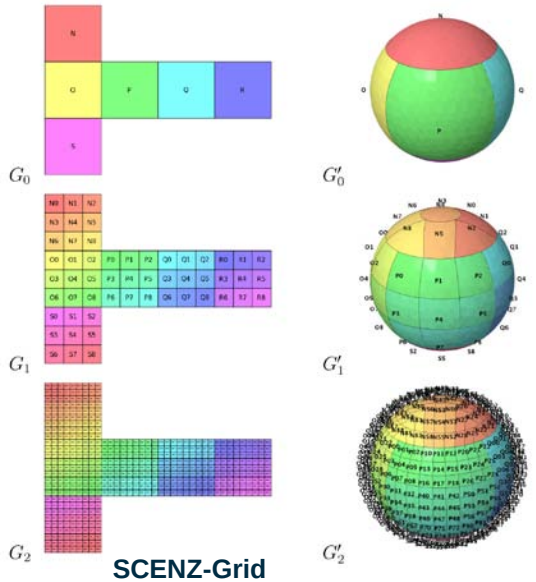
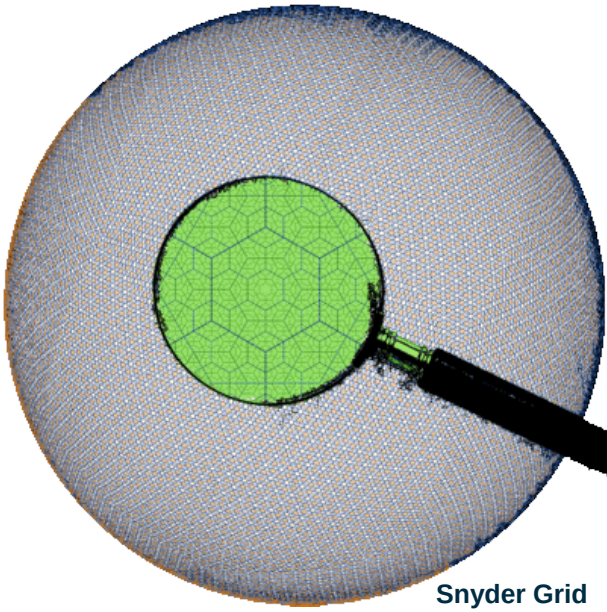


SCENZ-Grid



Snyder Grid

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Source: Matt Purss, Geoscience Australia

3D Information Management and Portrayal

- Interoperation across Geospatial domains
  - 3D City Models
  - 3D Visualization and Portrayal Services
  - Location Services
  - Indoor Location / Navigation
  - CityGML Discussions

  - *3D for e-Navigation?*

Adapted from BuildingSmart Alliance presentation

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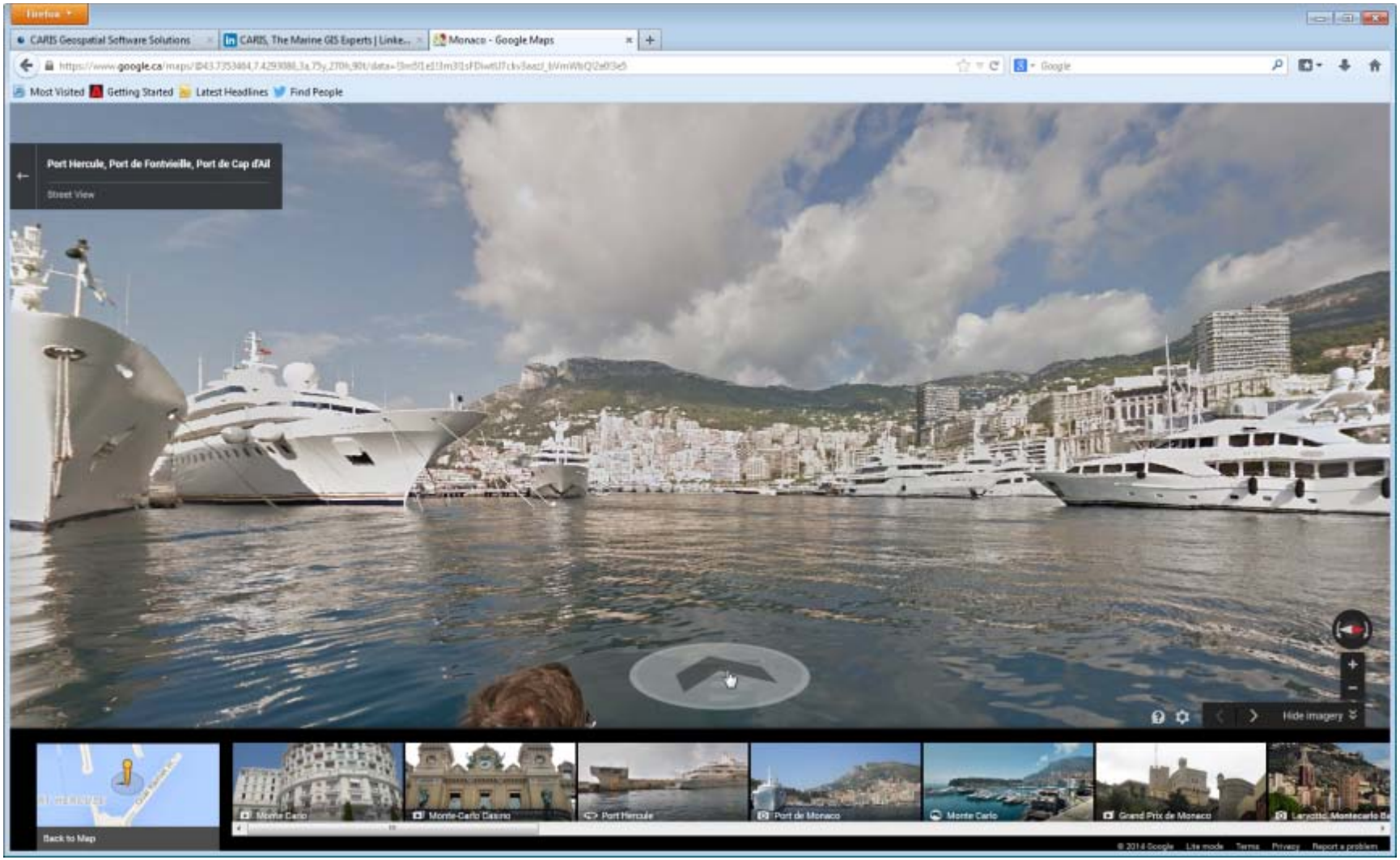
3D Aided Navigation



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OGC Geography Markup Language (GML)

- XML-based language for encoding geographic information to be stored and transported over the Internet
- GML serves as a modeling language for geographic systems as well as an open interchange format for geographic transactions on the Internet.
- GML defines both the geometry and properties of objects that comprise geographic information.
- GML "Application Schemas" support data interoperability within a community of interest.
  - Development of GML Application Schemas supported by ISO TC211 (ISO 191XX) and OGC standards and tools.

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GML Application Activities

Profiles

- GML Point Profile
- GML Simple Features Profile
- GML GeoShape for use in IETF
- GML in JPEG2000
- GeoRSS: GML Serialization

Programs building GML App Schemas

- US NSDI
- GEOINT
- INSPIRE
- IHO
- IOGP

Application Schemas

- CityGML
- WaterML
- GeoSciML
- Climate Science ML (CSML)
- CleanSeaNet
- NcML/GML (NetCDF and GML)
- TDWG Biodiversity GML
- MarineXML
- Ground Water Modeling Language
- S-100
- SeabedML (SSDM)

More GML Application Schemas
http://www.ogcnetwork.net/node/210
http://en.wikipedia.org/wiki/GML_Application_Schemas

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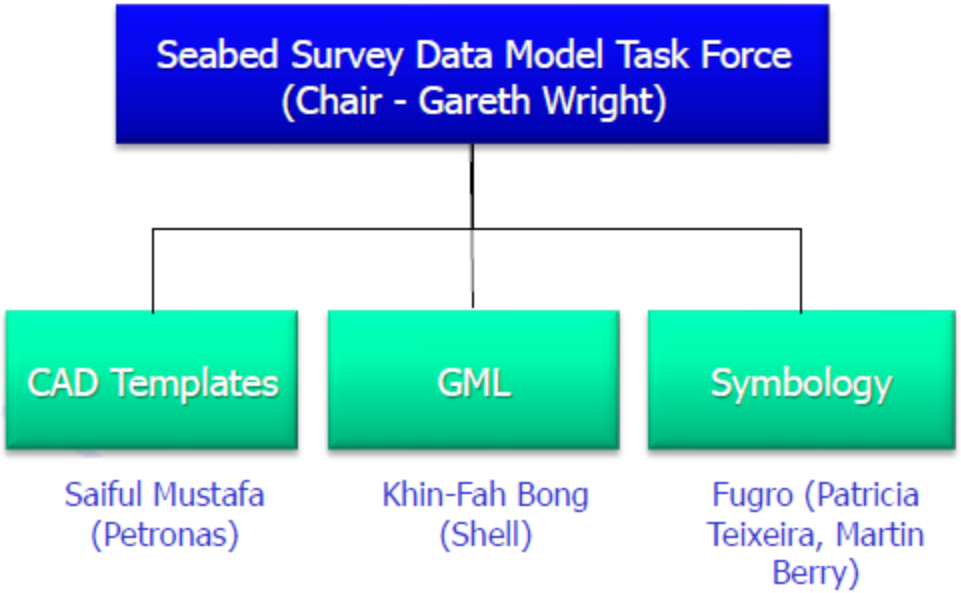
IOGP SSDM Task Force

- Members
  - Wright, Gareth, WOODSIDE
  - Mustafa, Saiful Nizam, PETRONAS
  - Butcher, Katherine, DOF SUBSEA
  - Bong, Khin-Fah, SHELL
  - Vidal, Arnaud, TOTAL
  - Van Beusekom, Xander, CHEVRON
  - Berry Martin, FUGRO
  - Blackburn, Tony, BP
  - Bt M Faiz, Fariza, PETRONAS
  - Haneberg, Bill, FUGRO
  - Hoggarth, Andrew, CARIS
  - Ingebresten, Egil, STATOIL
  - Kennedy, Paul, FUGRO
  - Larsen, Christine, FUGRO
  - Lovely, Narmina, BHP BILLITON
  - Quarrill, Bob, WOODSIDE
  - Rutledge, Anne, EXXONMOBIL
  - *Pamela, Kanu, FUGRO*
  - *Milligan, Ian, BP*



- SSDM V1 and all ancillary materials available in early 2015
  - SSDM schema remains unchanged
  - Symbology completed / improved
  - CAD templates available
  - Open version through SeabedML
- SSDM V2 in the works “late 2015”

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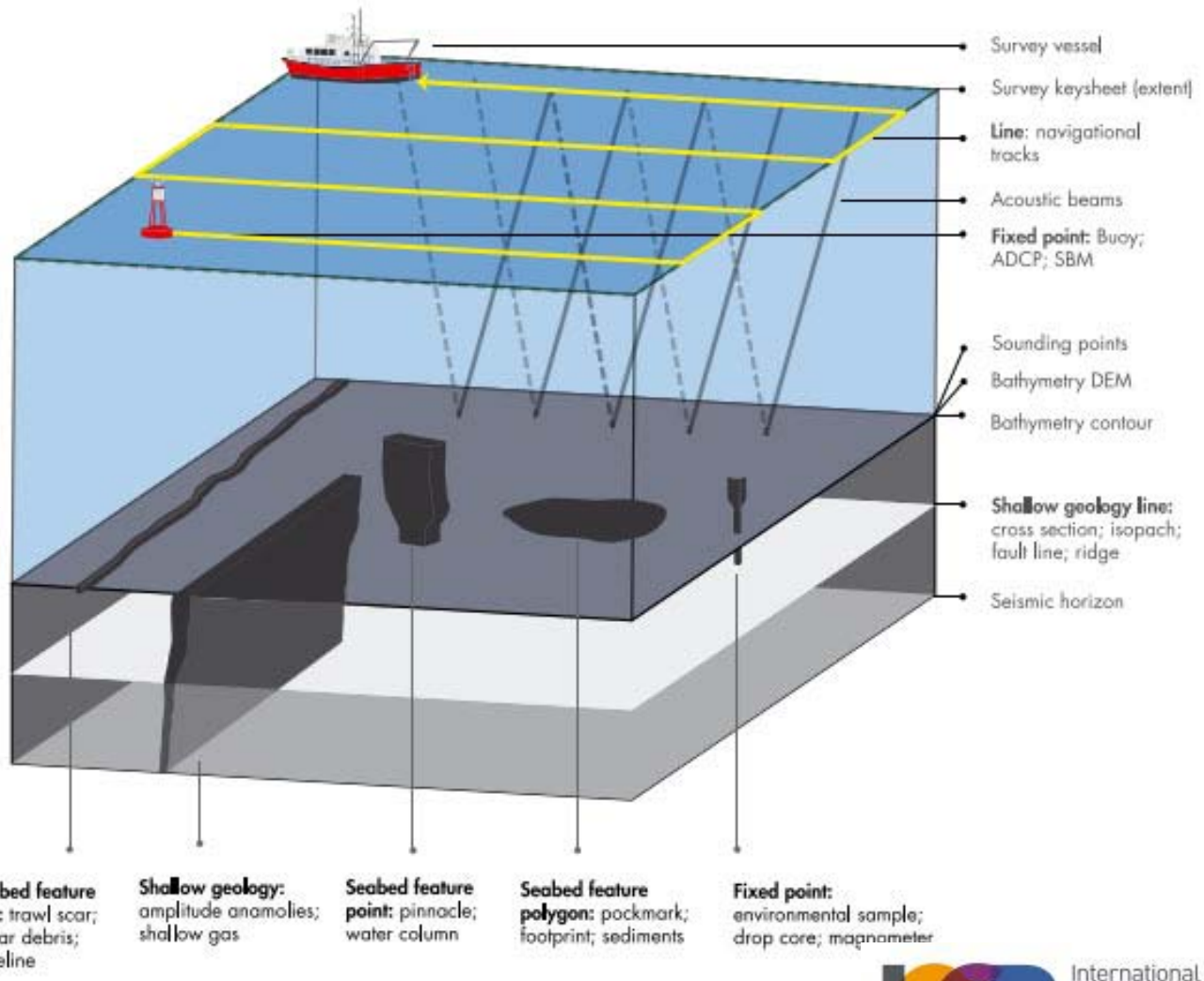
Seabed Survey Data Model

- Seabed Survey Data Model (SSDM)
  - GIS model used by E&P industry for exchange of survey data
  - Implemented initially in ArcGIS
  - Emphasis on vector features rather than raster coverages



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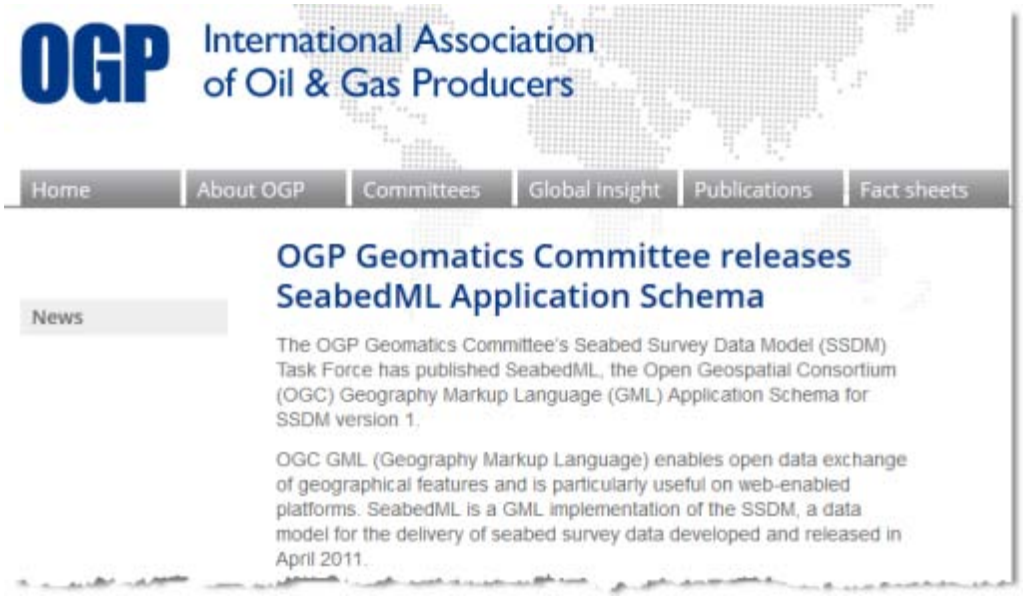
SeabedML

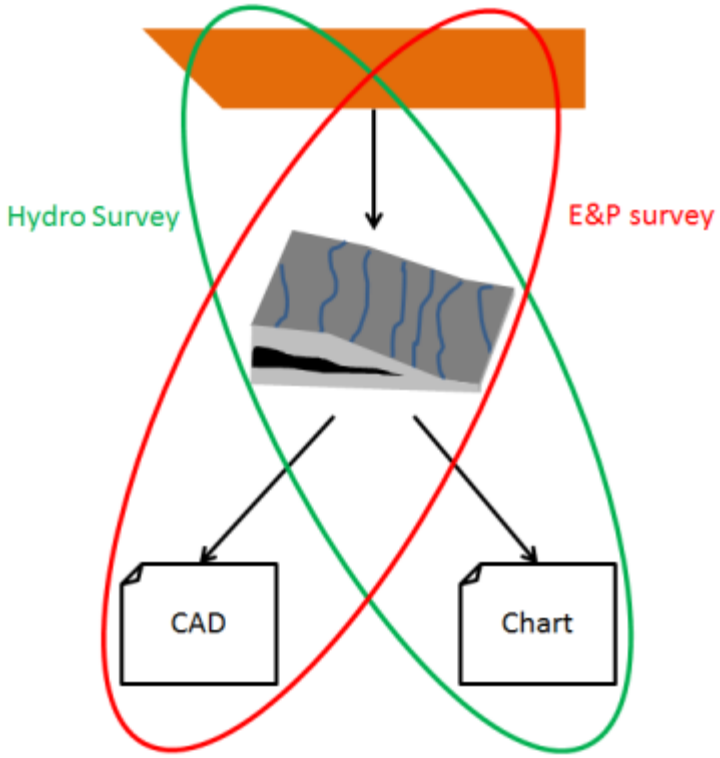
- SeabedML
  - Non-proprietary data exchange format for SSDM
  - SeabedML is a GML application schema
    - GML is a OGC standard
    - GML is a ISO standard
    - XML is a W3C standard



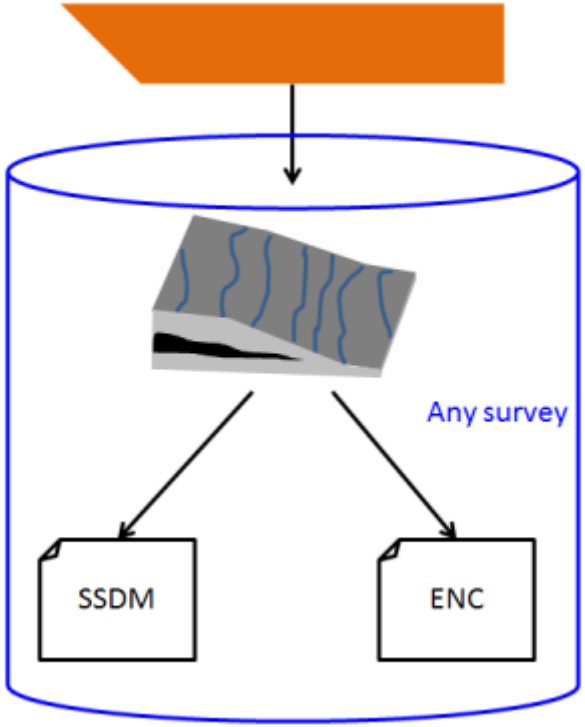
  - SeabedML is an open data format allowing any GIS to work with SSDM data
  - SeabedML provides interoperability between Energy and Hydro
  - CARIS working on SeabedML with Shell

Survey Specifications

- Different equipment, processes and data standards used depending on type of survey:
  - IOGP / IMCA guidelines for E&P Survey data deliverables
  - IHO for Hydro / Safety of Navigation Survey data deliverables
  - **Much of the data is the same!**



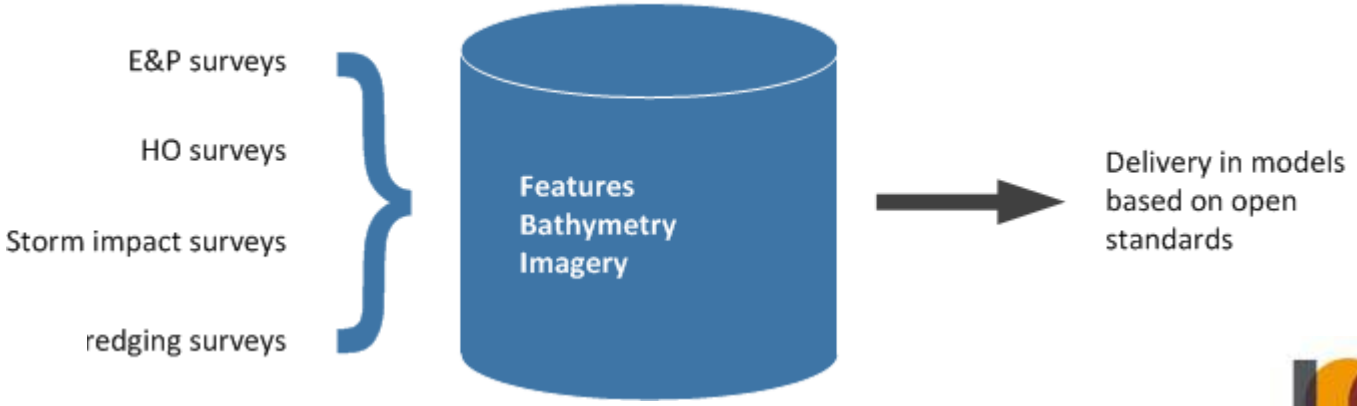
Traditional approach



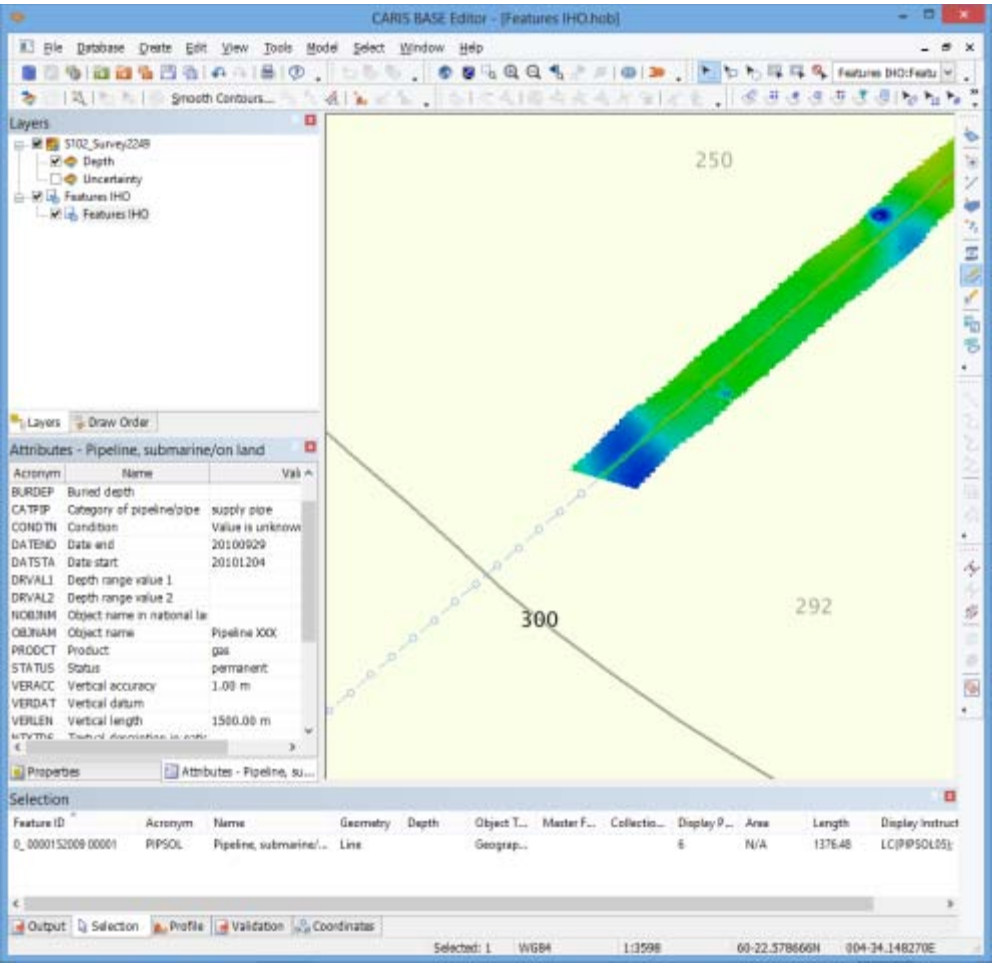
Better approach

Harmonizing Survey Deliverables

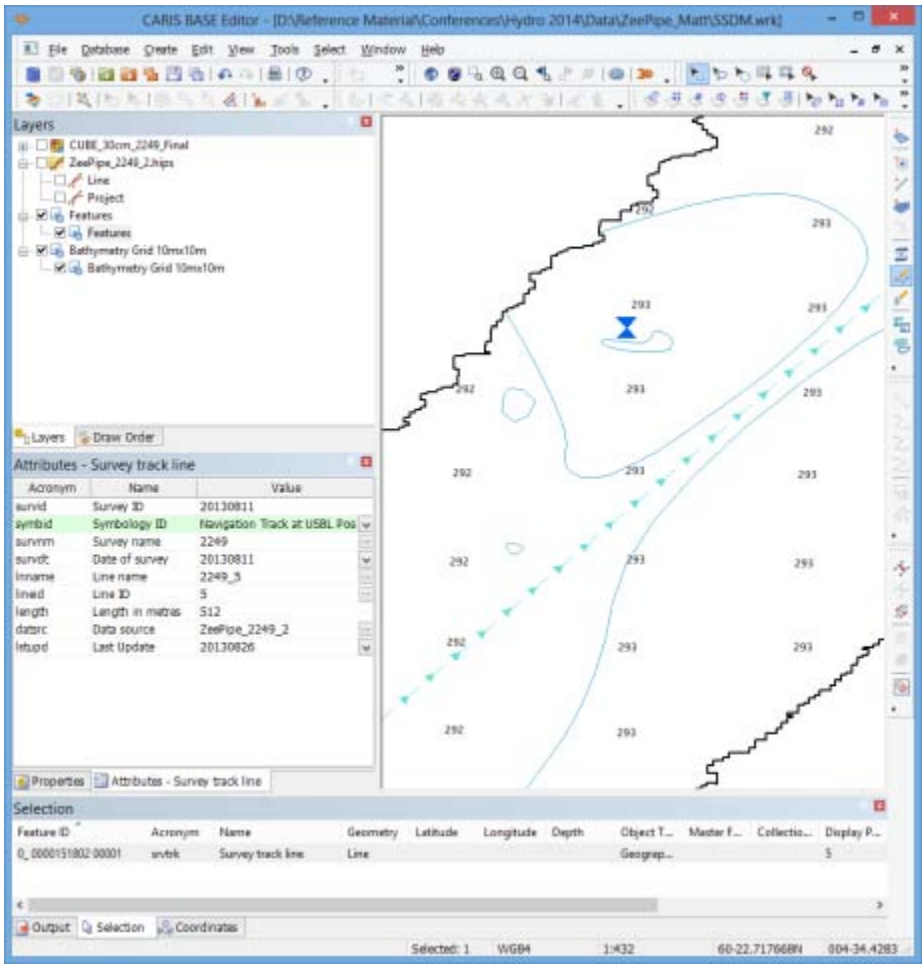
- E&P Industry and Hydrographic Offices can benefit from modern Data Management and GIS practices :
  - Increasing focus on data rather than paper products
    - Charts should be a report on a database (not the database)
  - High resolution source and vector features should co-exist
  - Support for different / multiple data models
    - SSDM, S-100, *AIXM, PODS*
  - Commonality in metadata profiles e.g. ISO 19115
  - Portrayal and coordinate reference systems switched on the fly



Harmonizing Survey Deliverables



IHO portrayal (S-52, S-102)



SSDM portrayal

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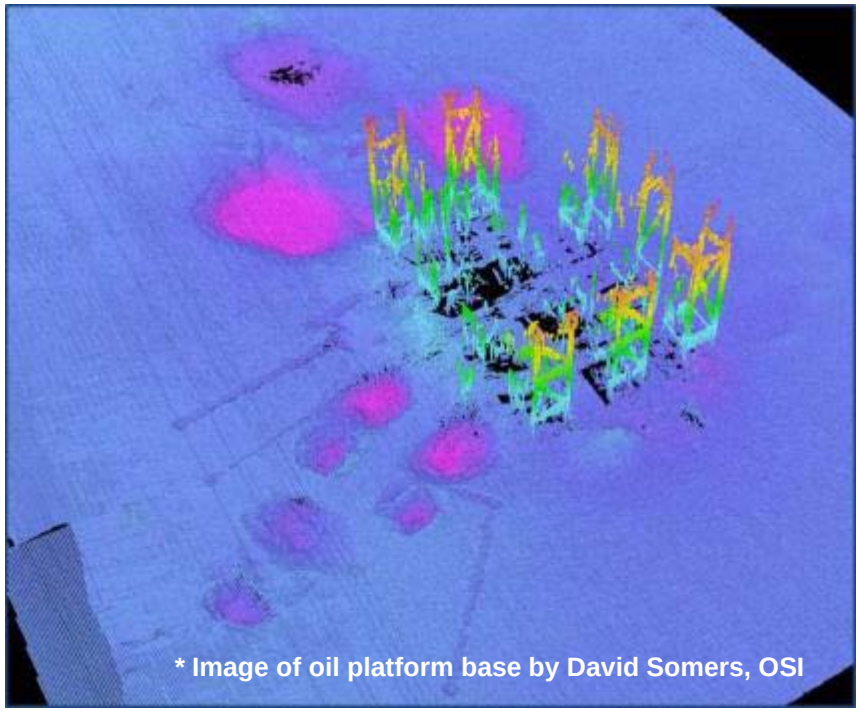
Standards and Smart Data Exchange

- A standard's based approach supports:
  - Exchange of data between stakeholders using **OGC/ISO** standards
  - Collect once use many times
  - Is required for the "Big Data" age
  - Needed for autonomous survey
  - Supports a **Common Operating Picture** incase of disaster



- Supports Marine Spatial Data Infrastructure

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The OGC Interoperability Program (IP)

- A global, collaborative, hands-on engineering, prototyping and testing designed to rapidly deliver
  - Running code implementations
  - Engineering Reports
  - Change Requests
  - Demonstration in real world scenarios

- Sponsors and Participants work together.
  - Sponsors provide requirements, ***use / business cases*** and funding
  - Participants work with sponsors to define and/or refine standards to solve a given interoperability problem

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Oil Spill Response Common Operating Picture

- OGC Concept Development process applied to IOGP
  1. Request for Information (RFI) – October 2013
  2. Engineering Workshops – December in UK, January in USA
  3. Prepare a Reference Architecture and Feasibility Report, 2014

- Team
  - OGP (International Association of Oil and Gas Producers)
  - IPIECA (Global oil and gas association for environmental and social issues)
  - Resource Data Inc.
  - OGC

  - IHO has provided input and feedback

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IPIECA

IOGP International Association of Oil & Gas Producers

Geographic Settings and Sources

On Land Release

- Rupture during excavation work by local construction company at site close to a village.

Coastal Terminal Release

- Storage tank rupture due to structural failure

Tanker in Transit

- Tanker suffers shell plate damage to one of its cargo tanks releasing oil before entry to port.

Offshore Platform

- Accidental discharge of crude oil during daylight hours.

Offshore Pipeline

- Rupture during dredging activity work by local company.

Deep Water Well Blowout

- Blowout through the riser, drill pipe/tubing, choke/kill lines at the rig

(Figure source: IPIECA)

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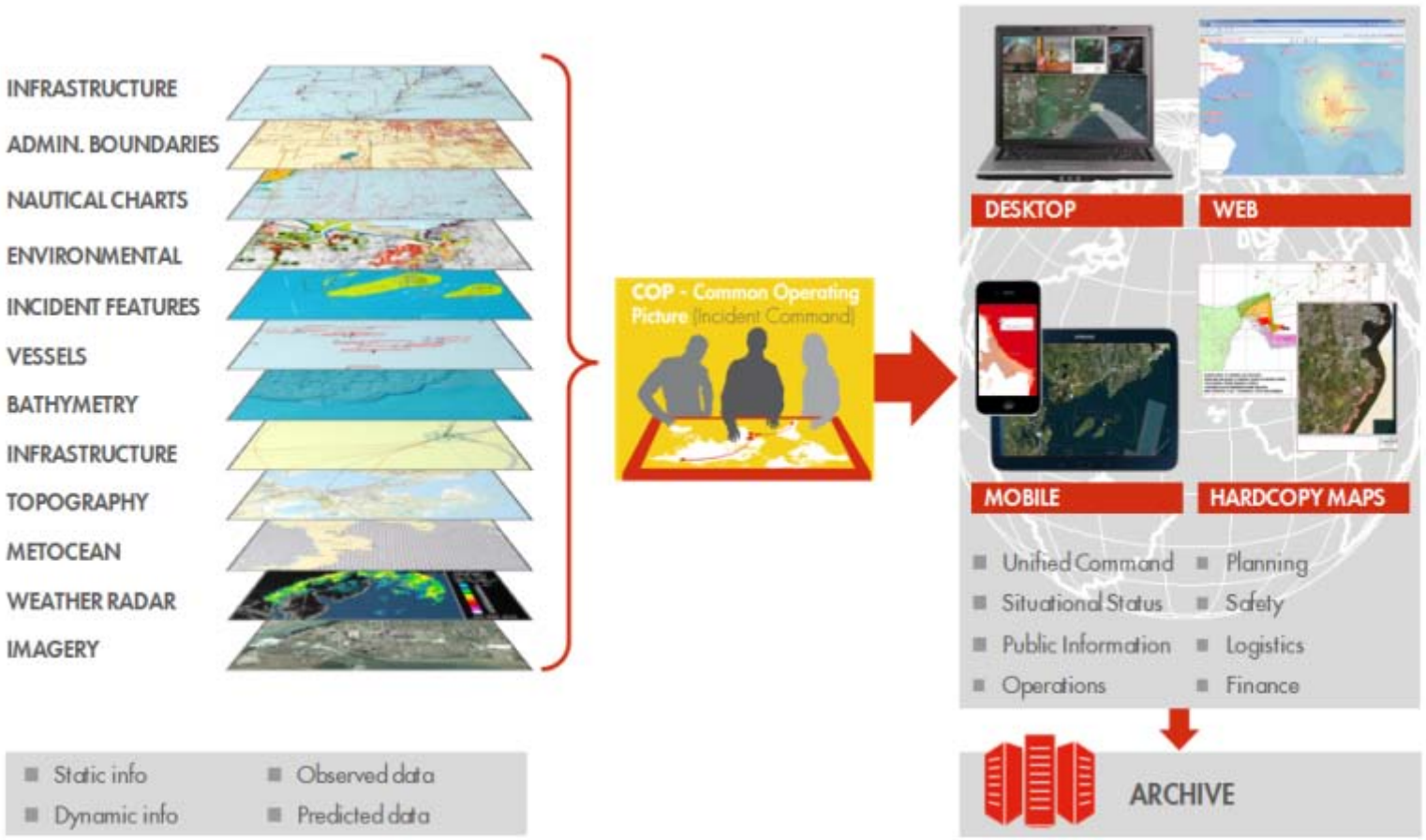
COP - highlighting geospatial information



(Figure Source: Shell)

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Organization of Geospatial Information

- Base map and reference information
  - Information exists prior to the occurrence of a spill incident,
  - May be gathered and updated routinely as newer information becomes available
- Incident-specific information
  - includes relevant information following a spill incident
- Dashboard for COP users
  - Query resources
  - Combines maps, videos, graphs

(Graphics Source: Esri)

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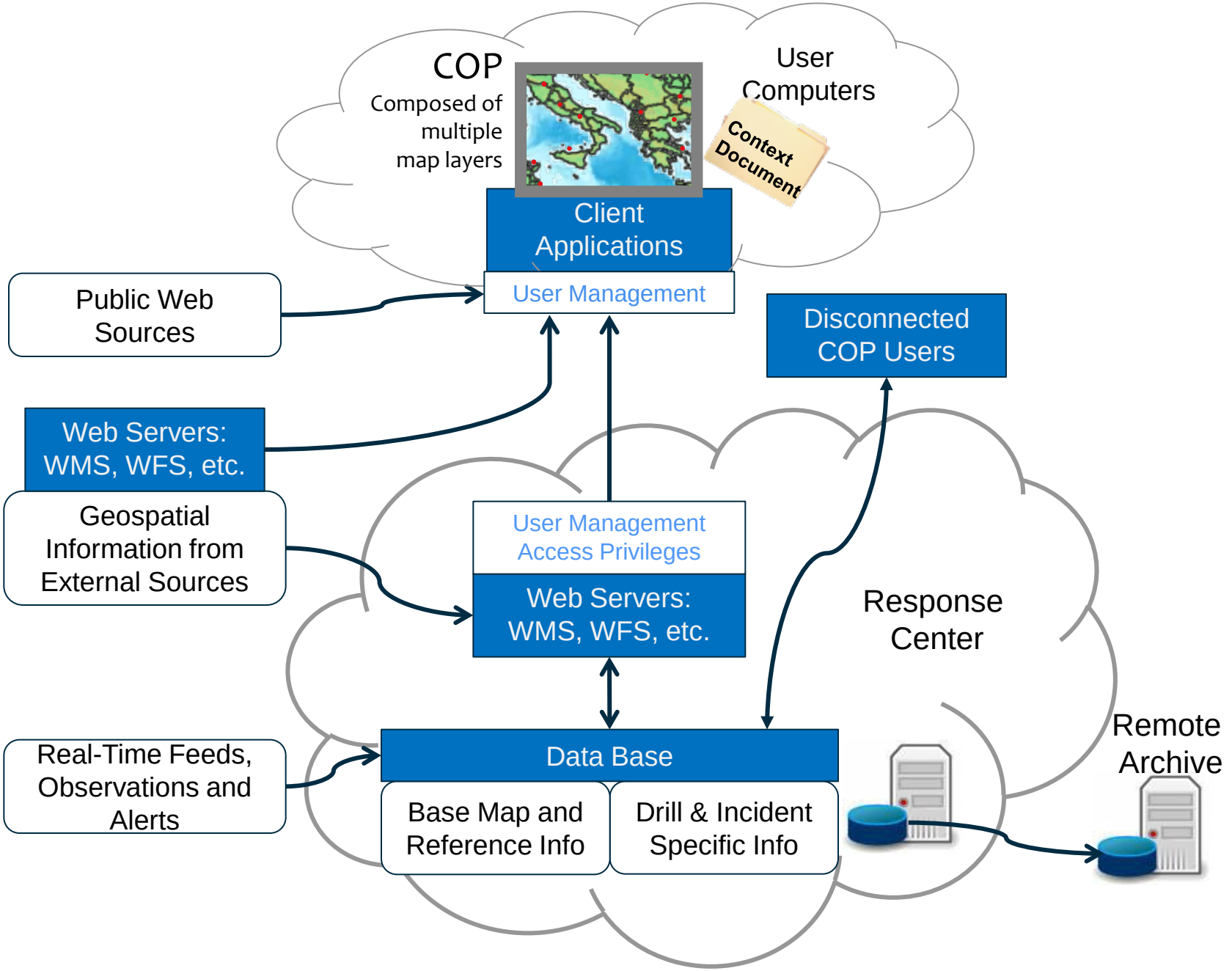
Map Templates

Sets of geospatial information for specific purposes

- Facility Template
- Resource Allocation Templates
- Public Incident Template
- Situation Status Template
- Tactical Planning / Operational Templates:
  - Boom, Dispersant, Skimming, In-situ burning, SCAT. shoreline cleanup, Fish and wildlife, Environmental, Safety

Annex A identifies datasets for each Map Template

COP Service-Oriented Architecture



- **Requesting that HSSC continues to make use of OGC and ISO standards as S-100 evolves**

- **And to be aware of IOGP SSDM SeabedML as mechanism to share data with the oil and gas industry**

Questions?

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