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# Closing Plenary

110th OGC Technical Committee  
Singapore  
Scott Simmons  
28 February 2019

# Agenda



- Thanks to Sponsors and Hosts
- Quorum confirmation
- TC Motions
  - OWL Time candidate standard: Chris Little
  - SSN candidate standard : Krzysztof Janowicz
  - GeoAI DWG: Kyoung-Sook Kim
  - OpenFlight Community standard work item: David Graham
  - Seabed Survey Data Model Community standard work item: Andy Hoggarth
  - Tile Matrix Set candidate standard: Joan Maso
  - HDF5 candidate standard: Aleksandar Jelenak
  - Blockchain and Distributed Ledger DWG: Gobe Hobona
  - Portrayal DWG: Keith Ryden
  - CRS WKT candidate standard: Keith Ryden
- TC Member presentations
  - Update to Indexed 3D Scene Layers (I3S) Community standard
- Upcoming TC Meetings
- TC Chair announcements and motions
  - TC Policies and Procedures R27
  - AsciiDoc Templates
- Working Group reports with motions: 3 to Z
- “Important Things” discussion



# Thanks to our host and partners





# TC Motions



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# Time Ontology in OWL

110th OGC Technical Committee  
Singapore

Chris Little, Simon Cox  
28 February 2019

# Summary



OWL ontology for time

Originally published as *W3C Note*, 2006

A primary deliverable from the joint W3C/OGC *Spatial Data on the Web Working Group*

*W3C Recommendation* 2017

OGC Standard to be considered now

Document:

<https://www.w3.org/TR/owl-time/>

# W3C Recommendation 2017



## TABLE OF CONTENTS

- 1. **Motivation and background**
- 2. **Notation and namespaces**
- 3. **Principles and vocabulary overview**
  - 3.1 Topological Temporal Relations
  - 3.2 Temporal reference systems, clocks, calendars
  - 3.3 Time position
  - 3.4 Duration
- 4. **Vocabulary specification**
  - 4.1 Classes
    - 4.1.1 Date-time description
    - 4.1.2 Date-time interval
    - 4.1.3 Day of week
    - 4.1.4 Duration
    - 4.1.5 Duration description
    - 4.1.6 Generalized date-time description
    - 4.1.7 Generalized duration description
    - 4.1.8 Time instant
    - 4.1.9 Time interval
    - 4.1.10 Month of year
    - 4.1.11 Proper interval
    - 4.1.12 Temporal duration
    - 4.1.13 Temporal entity

## Time Ontology in OWL

W3C Recommendation 19 October 2017

### This version:

<https://www.w3.org/TR/2017/REC-owl-time-20171019/>

### Latest published version:

<https://www.w3.org/TR/owl-time/>

### Latest editor's draft:

<https://w3c.github.io/sdw/time/>

### Implementation report:

[https://www.w3.org/2015/spatial/wiki/OWL\\_Time\\_Ontology\\_adoption](https://www.w3.org/2015/spatial/wiki/OWL_Time_Ontology_adoption)

### Previous version:

<https://www.w3.org/TR/2017/PR-owl-time-20170907/>

### Editors:

Simon Cox, [CSIRO](#)

Chris Little, [Met Office](#)

### Contributors:

Jerry R. Hobbs

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### Repository:

[GitHub](#)

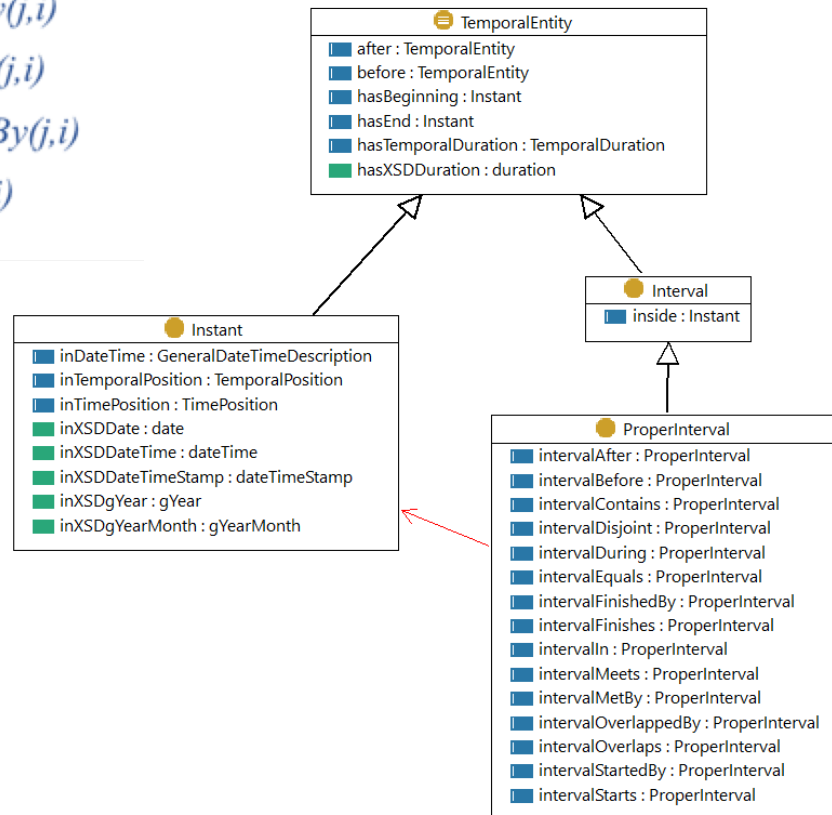
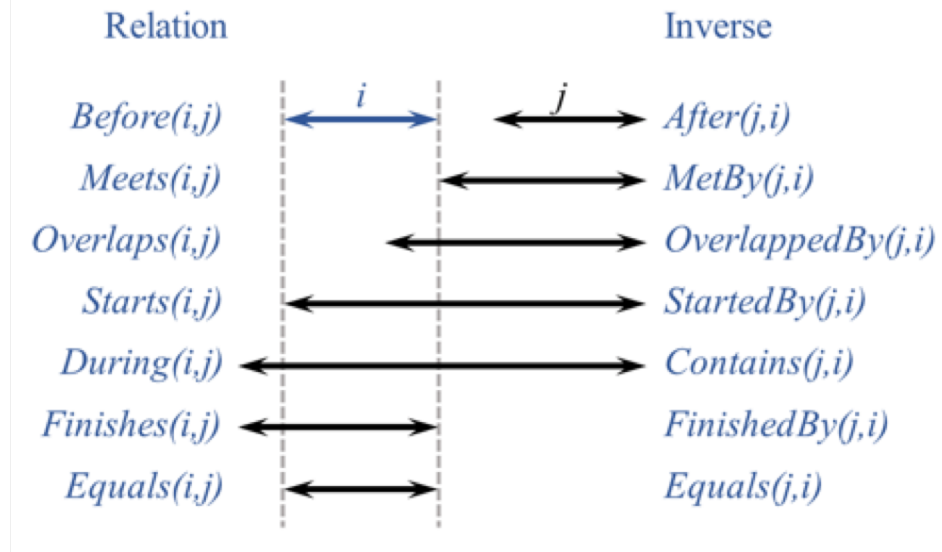
[Issues](#)

### OGC Document Number:

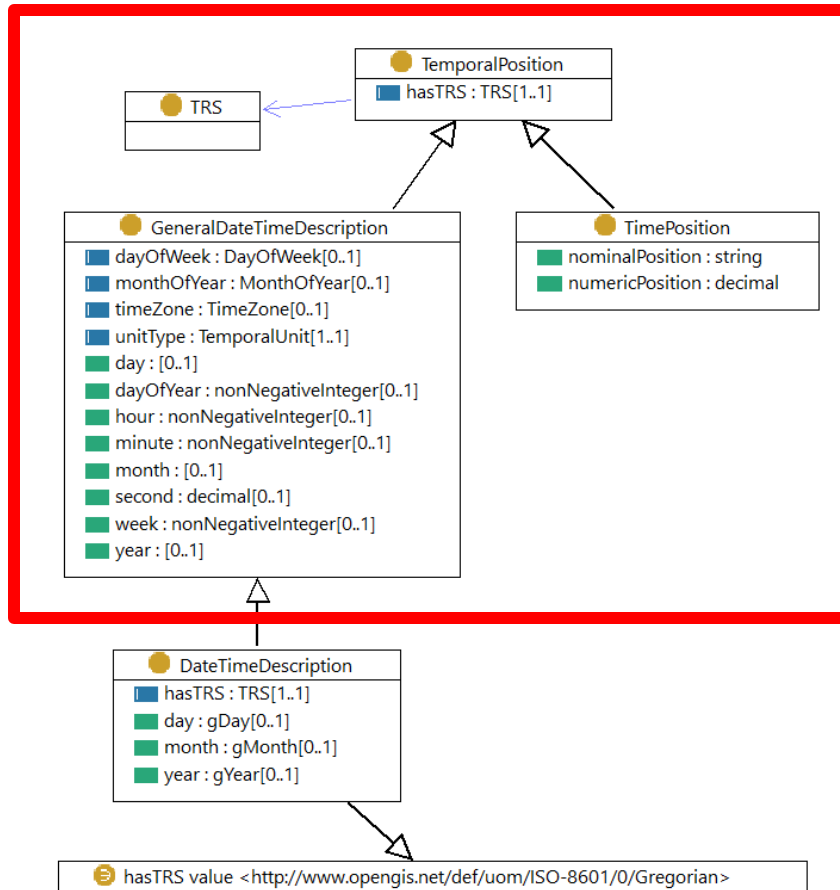
OGC 16-071r2



# What does OWL-Time do?



# What has changed?



# Why?



- So that descriptions of temporal entities are not limited to Gregorian calendar/clock
  - Unix-time, GPS time
  - Hebrew, Arabic, Baha'I calendars
  - Scientific applications
- A couple of generalized time-properties for general use



# Comments:



One comment received during OGC adoption process

- Roger Lott requested that references to ‘Temporal Coordinate System’ be updated to ‘Temporal Coordinate Reference System’ to align with the terminology used in the new version of OGC Abstract Specification – Topic 2
- This has been addressed in <https://github.com/w3c/sdw/pull/1115> and will be published by W3C as an erratum/non-normative editorial revision.



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# **SOSA & SSN**

## **An Overview of the OGC/W3C Semantic Sensor Network Ontology**

<https://www.w3.org/TR/vocab-ssn/>

# SEMANTIC SENSOR NETWORK ONTOLOGY

An OWL-2 DL ontology  
for describing  
sensors/actuators and  
the  
observations/actuations  
they make.

SSN is published in a  
modular architecture that  
supports the judicious  
use of "just enough"  
semantics for diverse  
applications.

TABLE OF CONTENTS		<b>Semantic Sensor Network Ontology</b> W3C Recommendation 19 October 2017 (Link errors corrected 08 December 2017)	
		OGC® W3C Making better sense.	
		<b>This version:</b> <a href="https://www.w3.org/TR/2017/REC-vocab-ssn-20171019/">https://www.w3.org/TR/2017/REC-vocab-ssn-20171019/</a>	
		<b>Latest published version:</b> <a href="https://www.w3.org/TR/vocab-ssn/">https://www.w3.org/TR/vocab-ssn/</a>	
		<b>Latest editor's draft:</b> <a href="https://w3c.github.io/sdw/ssn/">https://w3c.github.io/sdw/ssn/</a>	
		<b>Implementation report:</b> <a href="https://w3c.github.io/sdw/ssn-usage/">https://w3c.github.io/sdw/ssn-usage/</a>	
		<b>Previous version:</b> <a href="https://www.w3.org/TR/2017/PR-vocab-ssn-20170807/">https://www.w3.org/TR/2017/PR-vocab-ssn-20170807/</a>	
		<b>Editors:</b> Armin Haller, <a href="#">Australian National University</a> Krzysztof Janowicz, <a href="#">University of California, Santa Barbara</a> Simon Cox, <a href="#">CSIRO</a> Danh Le Phuoc, <a href="#">Technical University of Berlin</a> Kerry Taylor, <a href="#">Australian National University</a> Maxime Lefrançois, <a href="#">École Nationale Supérieure des Mines de Saint-Etienne</a>	
		<b>Contributors (ordered alphabetically):</b> Rob Atkinson, <a href="#">Metalinkage</a> Raúl García-Castro, <a href="#">Universidad Politécnica de Madrid</a> Joshua Lieberman, <a href="#">Tumbling Walls</a> Claus Stadler, <a href="#">Universität Leipzig</a>	
		<b>Repository:</b> <a href="#">GitHub</a> <a href="#">Issues</a>	
		<b>OGC Document Number:</b> OGC 16-079	
		Please check the <a href="#">errata</a> for any errors or issues reported since publication.	
		See also <a href="#">translations</a> .	
		Copyright © 2017 OGC & W3C® (MIT, ERCIM, Keio, Beihang), W3C liability, trademark and document use rules apply.	
		<b>Abstract</b> The Semantic Sensor Network (SSN) ontology is an ontology for describing sensors and their observations, the involved procedures, the studied features of interest, the samples used to do so, and the observed properties, as well as actuators. SSN follows a horizontal and vertical modularization architecture by including a lightweight but self-contained core ontology called SOSA (Sensor, Observation, Sample, and Actuator) for its elementary classes and properties. With their different scope and different degrees of axiomatization, SSN and SOSA are able to support a wide range of applications and use cases, including satellite imagery, large-scale scientific monitoring, industrial and household infrastructures, social sensing, citizen science, observation-driven ontology engineering, and the Web of Things. Both ontologies are described below, and examples of their usage are given.  The namespace for SSN terms is <a href="http://www.w3.org/ns/ssn/">http://www.w3.org/ns/ssn/</a> . The namespace for SOSA terms is <a href="http://www.w3.org/ns/sosa/">http://www.w3.org/ns/sosa/</a> .	
1. Introduction			
2. Modularization			
3. Origins of SSN and SOSA			
4. Axiomatization			
4.1	Namespaces		
4.2	Overview of Classes and Properties		
4.3	Observations		
4.3.1	Overview and examples		
4.3.2	Specification		
4.3.2.1	sosa:ObservableProperty		
4.3.2.2	sosa:Observation		
4.3.2.3	sosa:observedProperty		
4.3.2.4	sosa:phenomenonTime		
4.3.2.5	sosa:Sensor		
4.3.2.6	sosa:observes		
4.3.2.7	sosa:isObservedBy		
4.3.2.8	sosa:madeObservation		
4.3.2.9	sosa:madeBySensor		
4.3.2.10	ssn:Stimulus		
4.3.2.11	ssn:isProxyFor		
4.3.2.12	ssn:wasOriginatedBy		
4.3.2.13	ssn:defects		
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4.4.1	Overview and examples		
4.4.2	Specification		
4.4.2.1	sosa:ActuableProperty		
4.4.2.2	sosa:Actuation		
4.4.2.3	sosa:actsOnProperty		
4.4.2.4	sosa:isActedOnBy		
4.4.2.5	sosa:Actuator		
4.4.2.6	sosa:madeActuation		
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4.5.2.1	sosa:Sample		
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4.5.2.5	sosa:Sampler		
4.5.2.6	sosa:madeSampling		
4.5.2.7	sosa:madeBySampler		
4.6	Features of Interest and Properties		
4.6.1	Overview and examples		
4.6.2	Specification		
4.6.2.1	sosa:FeatureOfInterest		
4.6.2.2	sosa:hasFeatureOfInterest		
4.6.2.3	sosa:isFeatureOfInterestOf		
4.6.2.4	ssn:Property		
4.6.2.5	ssn:hasProperty		

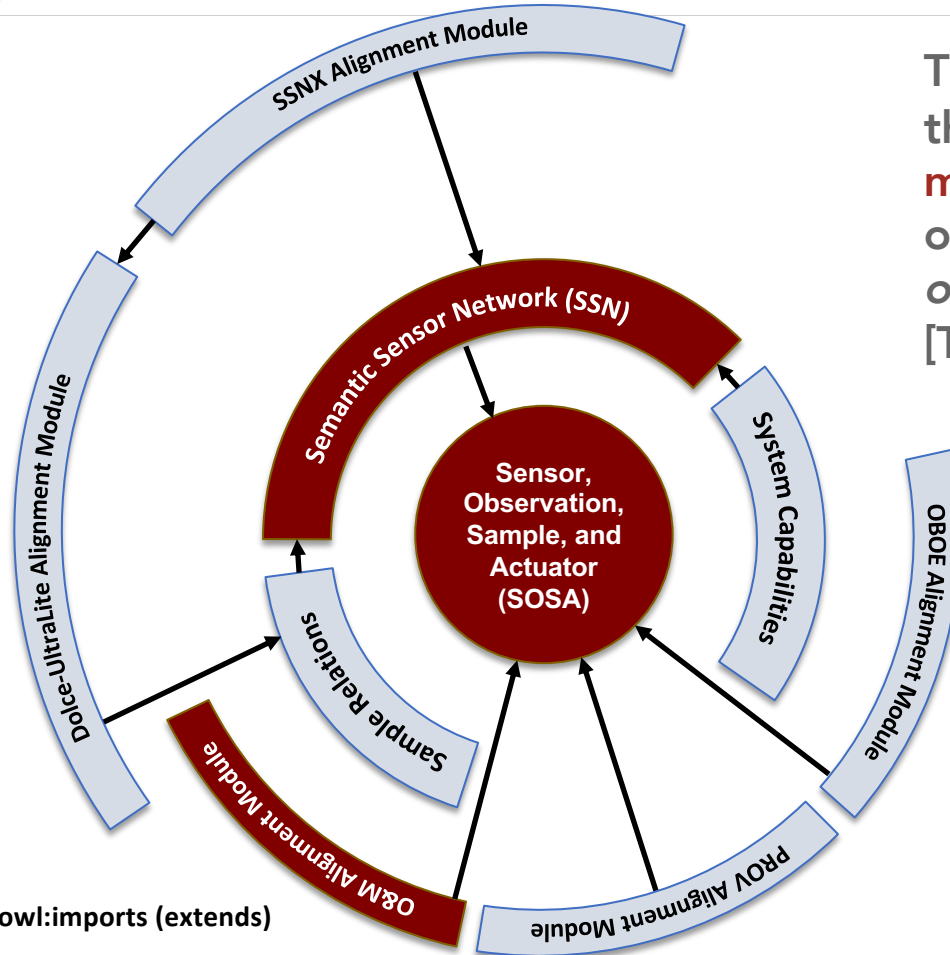
<https://www.w3.org/TR/vocab-ssn/>

# Origins of SOSA/SSN and Major Changes/Additions



- **Key influences:** W3C Semantic Sensor Network Incubator Group (SSN+SSO), OGC's O&M and SensorML, as well as related work on IoT and early sensor ontologies
- **Highlights of the most important updates**
  - **Addressing changes in scope and audience**
    - Broadening the audience by introducing SOSA as **lightweight core vocabulary**
    - Introduction of **Sampling** classes/properties to better serve the scientific community
    - Introduction of **Actuation** classes/properties to serve the IoT community
  - **Addressing shortcomings of the initial SSN**
    - **Streamline** the relations and need for the old Device, Platform, and Systems **classes**
    - Clarify and **change the semantics** of key notions such as Procedure and Observation
    - Various fixes to the now **truly optional upper ontology** (DUL) alignment
  - **Addressing technical developments**
    - **SOSA** makes **use of informal semantics**
    - Various considerations on the **axiomatization and relation between SOSA and SSN**

# Changes to *old* SSN - Modularization



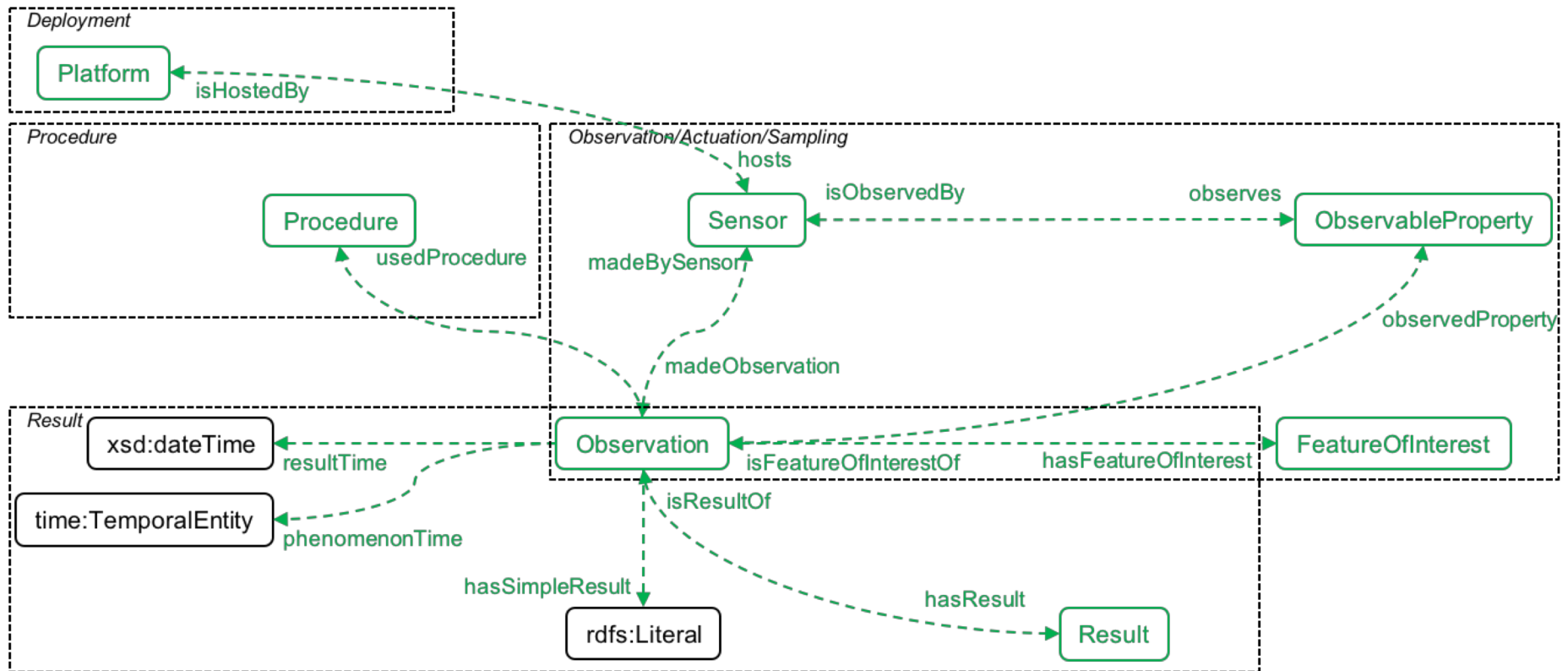
The SOSA and SSN ontologies and their **vertical and horizontal modules**. An interrelated collection of ontologies instead of a *one-size-fits-all* approach. [This makes SSN a module of SSN]

→ owl:imports (extends)

■ normative

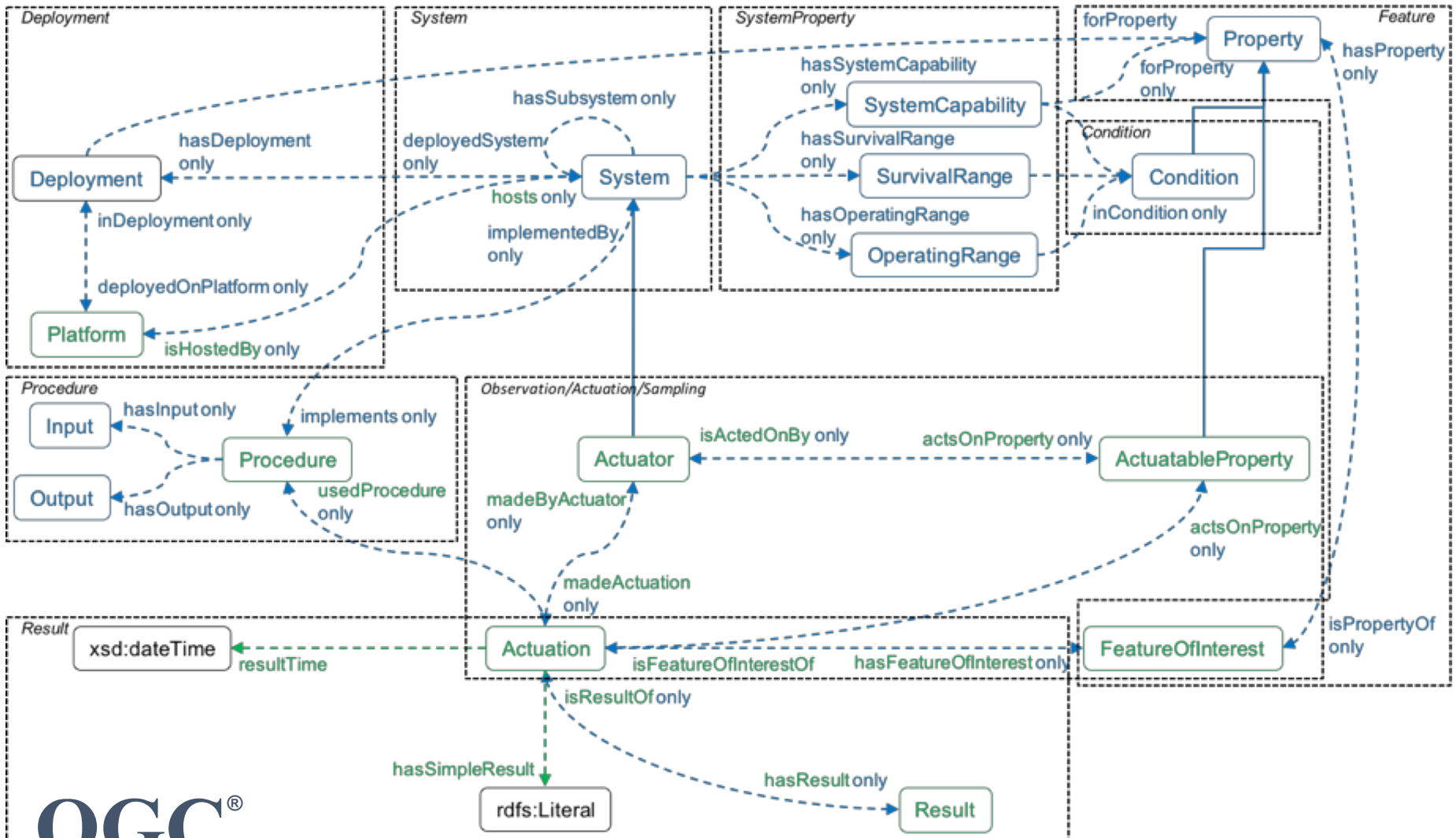
■ non-normative

# Changes to *old* SSN – SOSA



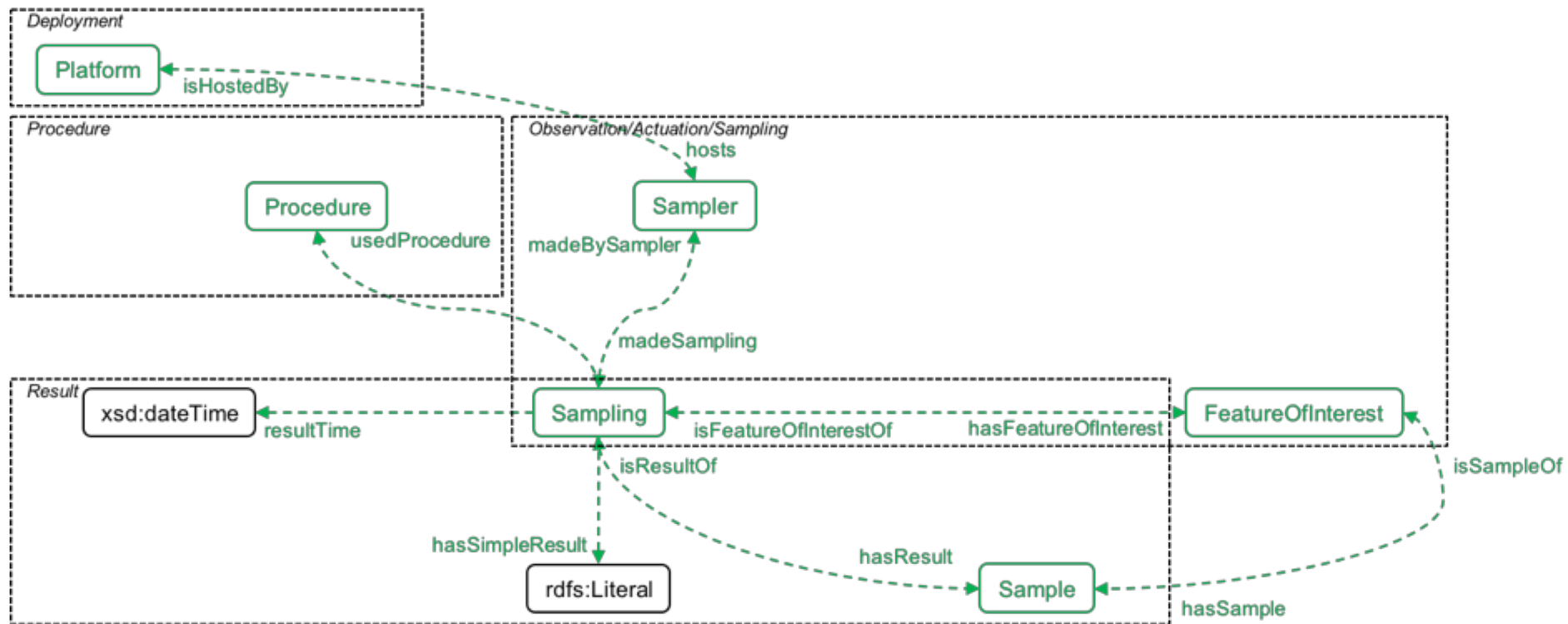
- **hasResult:Result** versus **hasSimpleResult** as a representative example of trade-off style **design decisions**.
- Procedures and observable properties are in a **1:n relation** to observations, sensors, features of interest, and so forth.

# Addition to *old* SSN – Actuation





# Addition to *old* SSN – Sampling







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# GeoAI ad hoc Report

110th OGC Technical Committee  
Singapore

Kyoung-Sook Kim, Tien-Yin Chou  
28 February 2019

# The most important thing for this WG is...



GeoAI DWG Charter

# GeoAI DWG Charter



- (18-054r2) GeoAI DWG Charter
  - [https://portal.opengeospatial.org/files/?artifact\\_id=82519&version=1](https://portal.opengeospatial.org/files/?artifact_id=82519&version=1)
- Artificial Intelligence (AI) is the capability of a functional unit to perform functions that are generally associated with human intelligence, such as reasoning and learning.
- AI is not new in investigating spatial domains!
  - k-nearest neighbors
  - Egenhofer's nine-intersection model (a spatial reasoning approach)
  - ...
- Why do we need a domain working group inside OGC?

# GeoAI DWG



## SERVICE

INNOVATION

**TRANSPORTATION**

**ENVIRONMENT**

**HEALTH CARE**

**LOGISTICS**

From automated intelligence to assisted, augmented, and autonomous intelligence

### ARTIFICIAL

INTELLIGENCE



### SDI

SPATIAL DATA  
INFRASTRUCTURES



**BIG DATA**

### SOCIETY

SIMULATION



## IoT

CONNECTED DEVICES

## OGC<sup>®</sup>

# Deep Learning and Reinforcement Learning



- Recent Deep Learning (DL) neural networks are disrupting traditional AI technologies and bring new requirements and usage models to current systems and applications.
- GIS software and platforms are also applying DL algorithms (e.g., CNN [7], RNN [8], LSTM [9], etc.) and frameworks (e.g., TensorFlow [10], Chainer [11], Caffe [12], Torch [13], MXNet [14], etc.) to their data processing pipelines.
- Incorporating geospatial information with AI brings a powerful new dimension to understanding, predicting, and optimizing the real world and improve the quality of our daily life.

# “Human-friendly” and “Earth-friendly” AI



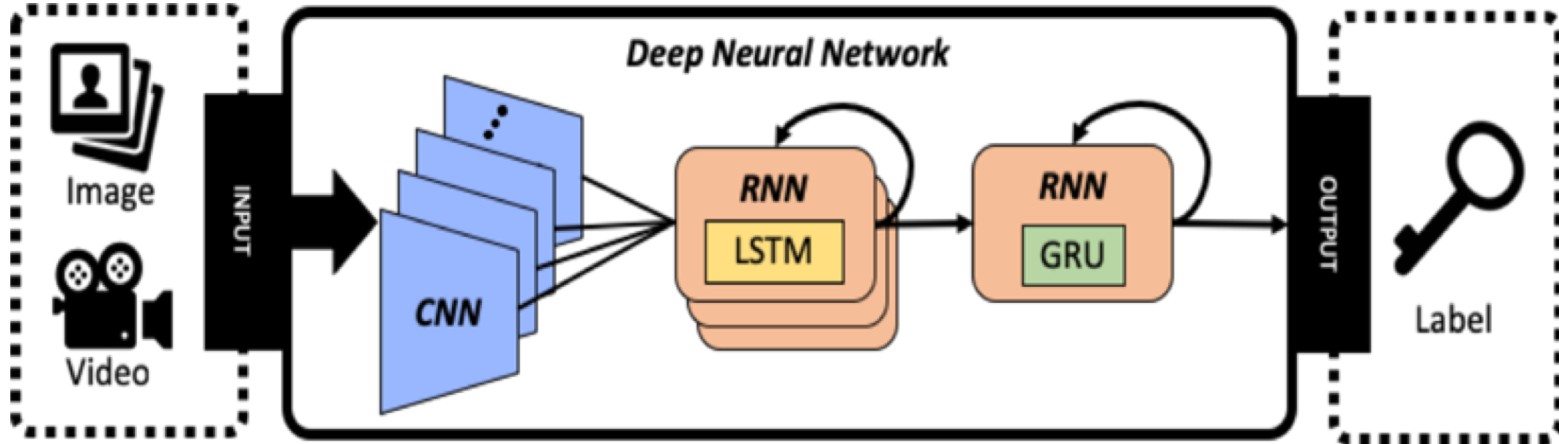
- AI should promise the trustworthy and safe technology to the Earth as well as human well-beings.
- With all the enormous potential, AI poses unintended consequences of performance, security, control, ethical, economic, and societal risks.
  - DARPA Explainable AI (XAI) program
  - Explainability, transparency, and validity of AI applications
- International standards will ensure wide-spread interoperability and security benefits among the various disciplines that work with AI to lead to the ethical and responsible use of AI technologies in geospatial applications.

# AI Standards Activities



- IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous System (April 2016)
- ITU has started the development of AI standards since 2016
  - ITU-T Y.AI4SC, Artificial Intelligence and IoT
  - ITU-T Y.qos-ml, Requirements of machine learning based QoS assurance
- **ISO/IEC JTC 1/SC 42: Artificial intelligence**
  - Scope
    - Standardization in the area of Artificial Intelligence
    - Serve as the focus and proponent for JTC1's standardization program on Artificial Intelligence
    - Provide guidance to JTC1, IEC, and ISO committees developing Artificial Intelligence applications
  - OGC: Liaison based on Big Data
- OGC Activities
  - Testbed-14: **Thread 1**: Modeling, Portrayal, and Quality of Service (**MoPoQ**)
  - Testbed-15

# Problem Definition



- Data-driven learning models
- Compositionality of constituents to assemble deep stacks of learning
- Not enough business use cases that can offer considerable benefits

- **Optimize: model performance and decision making;**
- **Retain: control and safety;**
- **Maintain: trust and ethics; and**
- **Comply : Accountability and regulation.**



# Key Activities



- Collect and analyze AI-related applications and use cases in the geospatial community.
- Discuss and identify primary GeoAI use cases and applications that would benefit from OGC standards.
- Identify geospatial requirements in different AI applications for inclusion in existing or new OGC standards.
- Identify other practice areas in the OGC that support or could be influenced by AI technologies.
- Identify GeoAI-related use cases and workflows for Interoperability Experiments or Testbeds.
- Provide guidance and best practices for managing, processing and sharing geospatial data for easily adapting to AI algorithms, tools, or applications.
- Determine OGC goals and organizational issues that impact GeoAI datasets, technologies, and markets.
- Promote a robust and traceable GeoAI by defining the quality or metadata elements where reliability/conformance testing results can be stored as well as lineage information for the algorithms.

# Business Goals



- Focus on ML, DL, and AI issues and problems that result in net gain for the community;
- Minimize incompatible technical distinctions between different AI application domains that utilize geospatial data, as this can lead to artificial barriers that limit the potential of all segments of the information community to come together and fully prosper;
- Lower the cost of deploying AI technology in any application domain through the use of standards to increase operational efficiency;
- Maximize the interoperability and usability of geospatial (training) data for various AI tasks such as recognition, prediction, recommendation, planning, optimization, inference, etc.;
- Improve the robustness and traceability in the uses of AI technologies with geospatial data and services; and
- Define the supporting infrastructure for the community to achieve these goals.

# Agenda



10:15 - 12:00, Tue. Feb 26 @NAK Auditorium (local time)

- GeoAI DWG charter
- Automated Exterior Attribute Extraction and Procedural Model Generation of 3D Structures (Lance Marrou, Leidos)
- Geospatial Data Analysis in Hitachi (Yoshihiro Osakabe, Hitachi Ltd.)
- Face recognition with imagery streaming in real time (Chih-Wei (Will) Kuan, Feng Chia University)
- A Human-Machine In Loop based Annotation Framework for Immersive Point Clouds (Jun Lee, National Institute of Advanced Industrial Science and Technology)
- Machine Learning in Agriculture (Liping Di, George Mason University)

# Activity Summary



- Discussion topics

- Potentials of deep learning to extract attributes of buildings
- Training data sets
- WebAPI for deep learning services

- Upcoming deliverables

- DWG chair & co-chair

- Coordination (ongoing and planned)

- SensorThings SWG
- ISG DWG
- Point Cloud DWG
- Integrated Digital Build Environment Sub Committee
- Unmanned "x" Systems Domain

- Future meetings

- Continuous offline discussion through TC meeting and online discussion via ML
- TC meeting @ Leuven, Belgium



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# **OpenFlight Candidate Work Item OGC Community Standard**

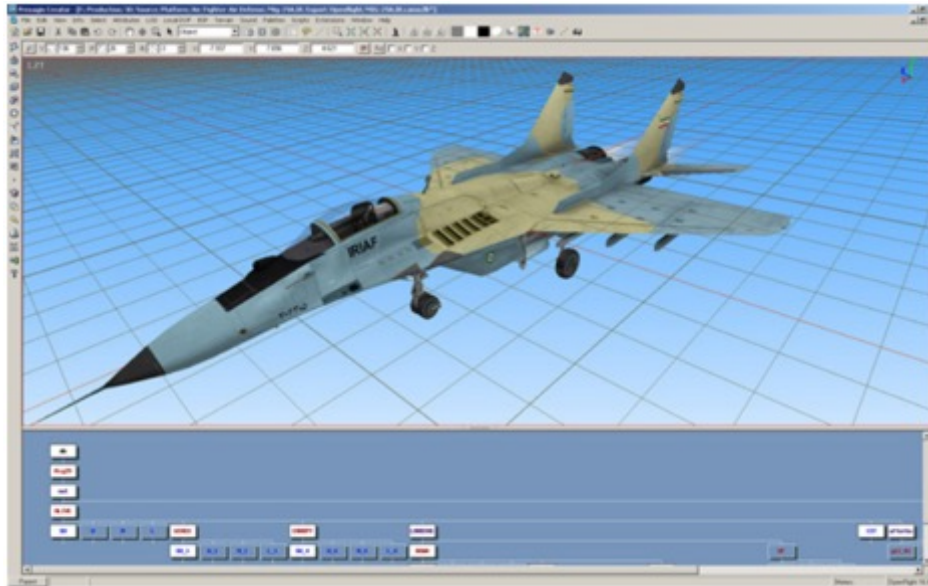
110th OGC Technical Committee

Singapore

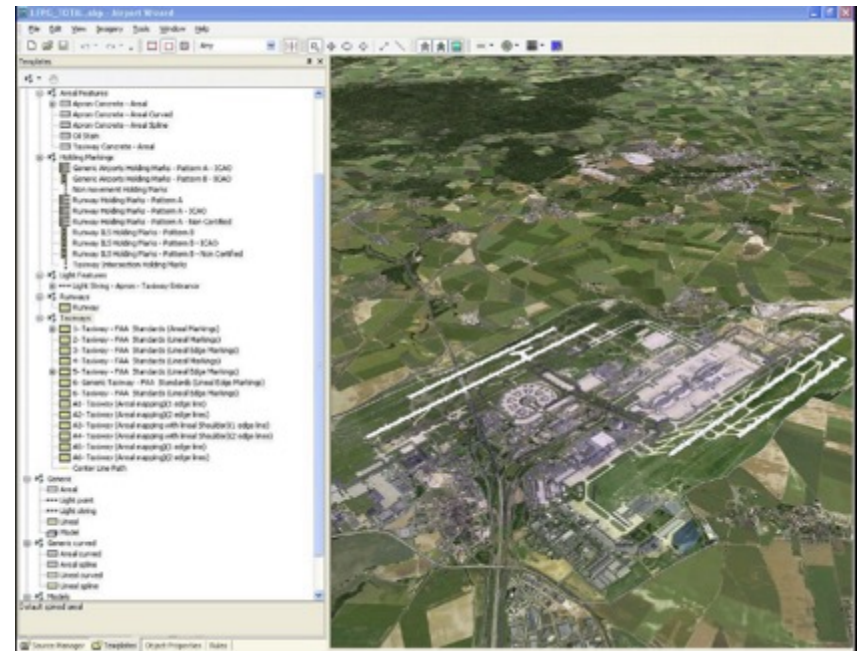
David Graham

28 February 2019

# OpenFlight (.flt) ... what is it?



OpenFlight[1] (or .flt) is a 3d geometry model file format originally developed by Software Systems Inc. for its MultiGen[2] real-time 3d modeling package in 1988. Originally called Flight, the format was designed as a nonproprietary 3d model format for use by real-time 3d visual simulation image generators. *Wikipedia*



# OpenFlight Implementations and Use U.S. Department of Defense



UNCLASSIFIED

Standard/Specification Comparison Matrix:

Organization	Terrain Generation Capability	Specification	Specification Category	Source Data Repository	Runtime Publishing Format	Standardized Schema & Attributes	Platform Independent	Operating System Independent	Transport Protocol Independent	Utilizes WGS-84 Earth Model	Geospatial Source & Formats				Industry Formats Utilized by the Specification											
											TIFF	DTED	OpenFlight	Shapefile	RGB/RGBA	JPEG	DDS	DXTn	FXTn	JPEG 2000	XML	Geo Packages	CityGML			
JS J7 Marines SOCOM	Terrain Generation Service (TGS) & SOFPREP	Common DataBase (CDB)	Open International Standard 6	Yes	Yes	Yes 8	Yes 9	Yes 9	Yes 10	Yes	Yes	Yes	Yes 5	Yes 4	Yes 3	Yes 1	Yes 1	Yes 1	Yes 1	Yes 1	Yes	Yes	No 2	No 2		
Army	Synthetic Environment Core (SE-Core)	Master Database (MDB)	Government Standard 7	Yes	No	Yes 8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	Yes	Yes	No 11	No		
Air Force		Air Force Common Dataset (AFCD)	Government Standard 7	Yes	No	Yes 8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes 1	Yes 1	Yes 1	Yes 1	Yes 1	Yes		No	No		
Navy		NAVAIR Portable Source Initiative (NPSI)	Government Standard 7	Yes	No	Yes 8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes 1	Yes 1	Yes 1	Yes 1	Yes 1	Yes	Yes	No	No		

Excerpted from 'Enterprise Terrain Data Standards for Joint Training', March 10, 2017 DTIC AD1040231



# OpenFlight Implementations



- OpenFlight with extensions is the (optional) encoding for 3D models in OGC CDB 1.1
- Commercial tools read and write OpenFlight
  - Presagis Creator
  - ESRI ArcGIS, ASCII Grid
  - Autodesk AutoCAD
  - SAFE FME
  - CityGML2Flt
  - Search returns hundreds of examples
- Open Source examples
  - FLTLIB
  - Open Scene Graph OpenFlight plugin



# OpenFlight Version / Change History



OpenFlight 16.7	November 2018, 3 months ago	OpenFlight Scene Specification for version 16.7 Supported: Presagis OpenFlight API 18
<a href="#">OpenFlight 16.6</a>	January 2017; 13 months ago	OpenFlight Scene Specification for version 16.6 Supported : Presagis OpenFlight API 16
<a href="#">OpenFlight 16.5</a>	February 2016; 3 years ago	OpenFlight Scene Specification for version 16.5 Supported : Presagis OpenFlight API 15
<a href="#">OpenFlight 16.4</a>	June 2009; 8 years ago	OpenFlight Scene Specification for version 16.4 Supported : Presagis OpenFlight API v4.0
~~~~~	~~~~~	~~~~~
<i>Full Version of this table available on the Wikipedia <a href="#">OpenFlight entry</a></i>		
<a href="#">Flight 10.0</a>	April 1991; 28 years ago	Flight Scene Specification for version 10.0 Covering: Software Systems MultiGen version 10
<a href="#">Flight 9.0 A</a>	March 1991; 28 years ago	Flight Scene Specification for version 9.0 Covering: Software Systems MultiGen version 9
Flight 1.0	1988; 31 years ago	Flight Scene Specification for version 1.0 Covering: Software Systems MultiGen

# OpenFlight and the Future



- **U.S. Army Sharing Format Consolidation**

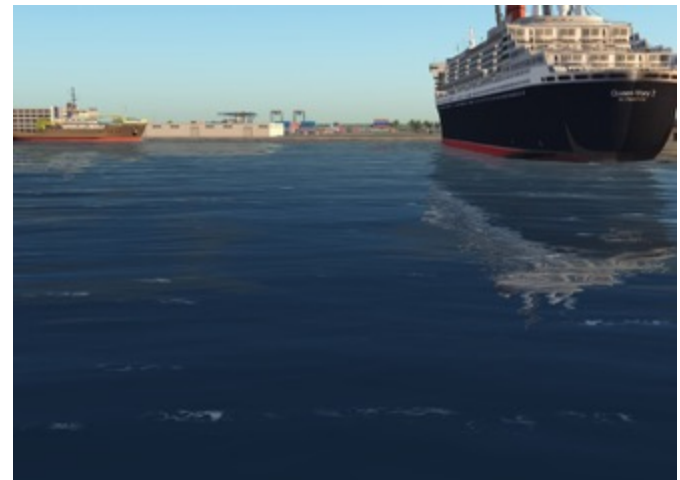
- Table excerpted from Leidos presentation to CDB SWG on December 5, 2017

	Current Formats	Initial Migration	Long-term
<b>Imagery</b>	GeoTIFF JPEG2000 Erdas Imagine LizardTech MrSID	JPEG2000 GeoTIFF LizardTech MrSID	JPEG2000 GeoPackage
<b>Elevation</b>	GeoTIFF .img DTED	GeoTIFF DTED	GeoTIFF GeoPackage
<b>Vector Features</b>	SDE Shapefile	SDE GeoPackage	GeoPackage
<b>Models</b>	OpenFlight Filmbox	OpenFlight Filmbox	X3D GeoPackage
<b>Maps</b>	CADRG GeoTIFF JPEG2000	CADRG GeoTIFF	CADRG GeoPackage

# There are literally millions of OpenFlight models in the inventory and libraries of real-time simulation archives



# More renderings of OpenFlight Models



# More renderings of OpenFlight Models



# OpenFlight Summary



- Mature, widely implemented, ‘de-facto’ specification
- Despite the age of the specification, it remains the real-time 3D model interchange specification for every DOD component and most international defense end-users
- Actively maintained and regularly improved and updated by Presagis
- OGC CDB 1.1: Volume 6 OGC CDB Rules for Encoding Data Using OpenFlight  
[https://portal.opengeospatial.org/files/?artifact\\_id=72717](https://portal.opengeospatial.org/files/?artifact_id=72717)
- OGC Testbed 13 ER recommendation to submit OpenFlight as a candidate OGC Community Standard





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# **IOGP “SSDM” for Community Standard**

## **18-100**

110th OGC Technical Committee

Singapore

Andy Hoggarth

28 February 2019

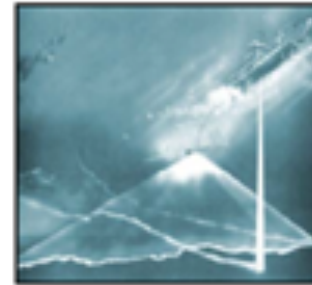
# Introduction – What is SSDM?



- Generally used by offshore O&G Operators to manage survey data for:

- Platform and Drilling Hazard Surveys
- Sweep Debris Surveys
- Environmental Surveys
- Bathymetric Surveys
- Geotechnical
- Pipeline Route Surveys
- Pipeline Pre-lay Surveys
- Maintenance Surveillance

Side scan sonar



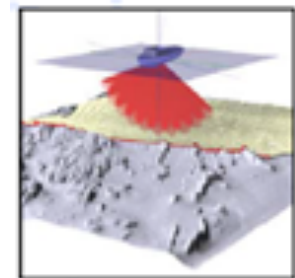
Geotechnical Sampling



ROV



Sub-bottom profilers



Multi-beam echosounders

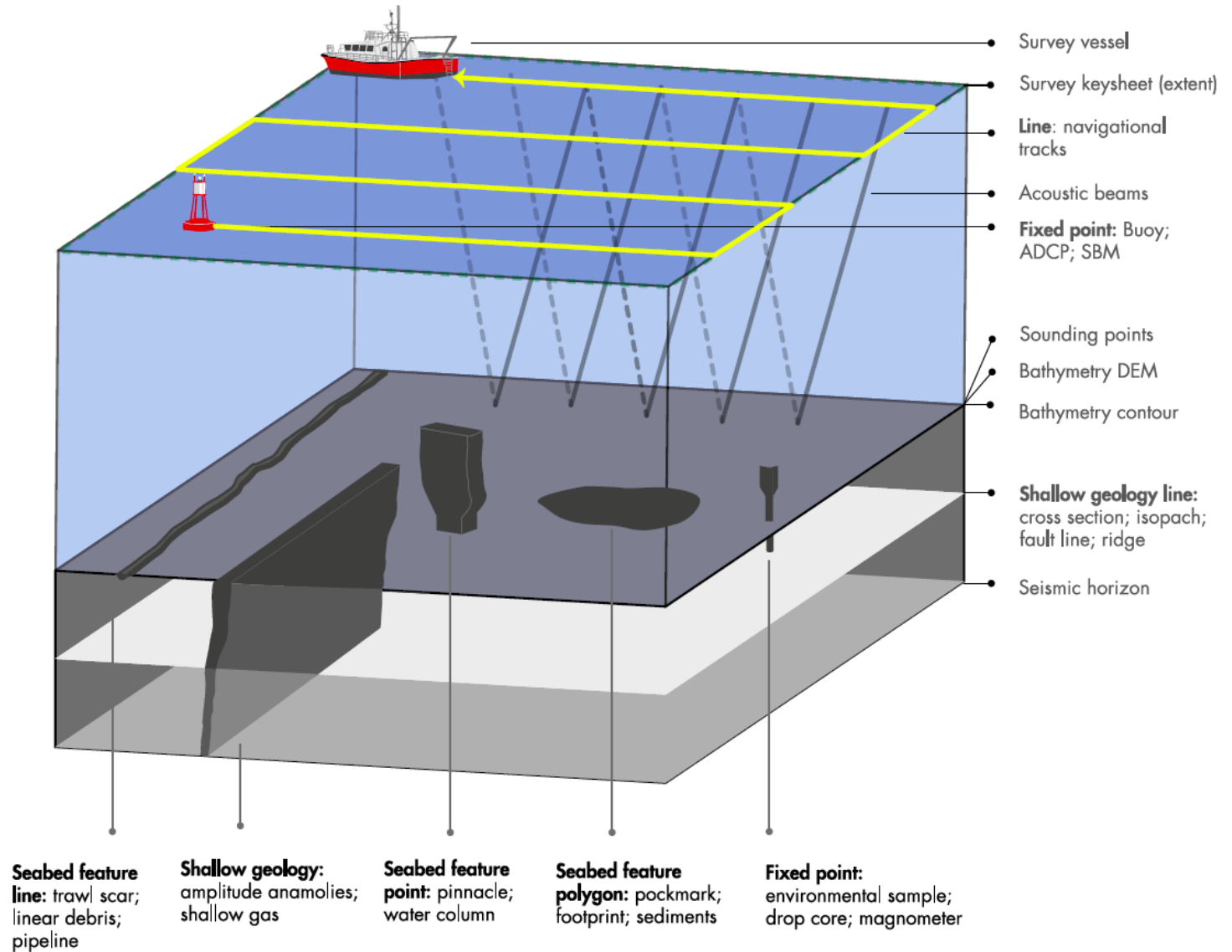


**SSDM v1 – released in 2011**

**SSDM v2 – released in 2017**



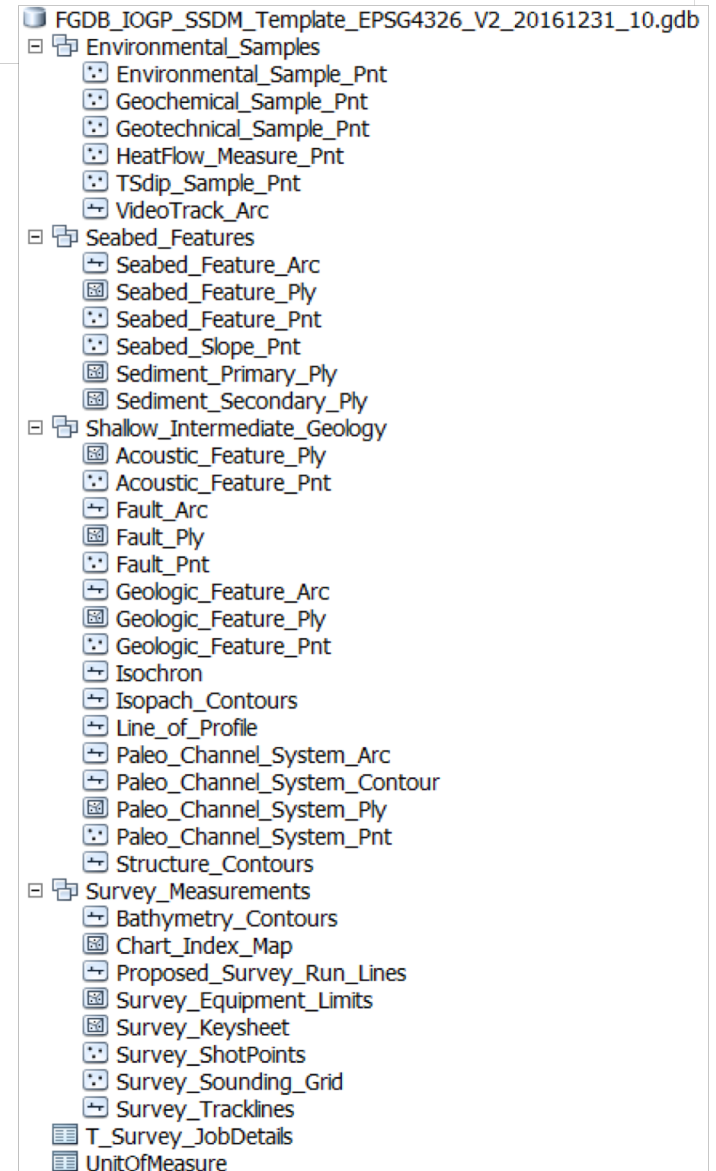
# Conceptual Framework



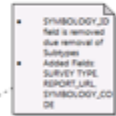
# What SSDM Includes



- Change Log
- Data Dictionary
- Data Model Template  
(ESRI File GDB & SeabedML)
- Data Model Guidelines
- Standardized Symbology  
(ESRI \*.style & CAD)
- Metadata Template
- FAQ



The diagram shows a branched polymer structure consisting of three hexagonal rings. One ring is connected to a horizontal line on its left side. Another ring is connected to the top-right vertex of the first ring. A third ring is connected to the bottom-right vertex of the first ring. A horizontal line extends from the right side of the top-right ring.



# SSDM Symbology Codes



Symbology Codes have been extended to close the gap in defining more seabed and subsurface features.

Changes and Additions to SSDMv2 symbology domain codes are presented in the Change Log as per below, with changes and/or additions highlighted in green:

## SYMBOL\_LINE\_SEABED\_FEATURE

Type: `esriFieldTypeString`

Removed: OGP2111, OGP2112, OGP2113, OGP2114 and OGP2115

Description	Value
IOGP2001 Anchor scar/Plough mark	IOGP2001
IOGP2002 Linear debris	IOGP2002
IOGP2003 Spud Can Drag Scar	IOGP2003
IOGP2004 Trawl Scar	IOGP2004
IOGP2005 Possible wreck	IOGP2005
IOGP2006 Plough Mark - Iceberg	IOGP2006
IOGP2050 Ridge Axis	IOGP2050
IOGP2051 Fault Scarp	IOGP2051
IOGP2052 Scarp/Escarpment	IOGP2052
IOGP2053 Lineament/Linear Feature	IOGP2053
IOGP2054 Channel/Superficial Channel	IOGP2054
IOGP2055 Mud Flow	IOGP2055
IOGP2056 Mound	IOGP2056
IOGP2057 Bulge	IOGP2057
IOGP2058 Diapiric structure	IOGP2058
IOGP2059 Ridge	IOGP2059
IOGP2061 Deposition - Rockfall	IOGP2061
IOGP2062 Deposition - Creep	IOGP2062
IOGP2063 Deposition - Slide	IOGP2063

## Seabed Features

IOGP2001 Anchor scar/Plough mark	IOGP2062 Deposition - Creep
IOGP2002 Linear debris	IOGP2063 Deposition - Slide
IOGP2003 Spud Can Drag Scar	IOGP2064 Deposition - Rotated Slide
IOGP2004 Trawl Scar	IOGP2065 Deposition - Slump/Slope Failure
IOGP2005 Possible wreck	IOGP2066 Deposition - Debris Flow
IOGP2006 Plough Mark - Iceberg	IOGP2067 Deposition - Grain/Fluidized Flow
IOGP2050 Ridge Axis	IOGP2068 Deposition - Turbidite
IOGP2051 Fault Scarp	IOGP2069 Sand Wave Crest
IOGP2052 Scarp/Escarpment	IOGP2070 Trough Axis
IOGP2053 Lineament/Linear Feature	IOGP2071 Boundary - Outcrop
IOGP2054 Channel/Superficial Channel	IOGP2072 Boundary - Sediment
IOGP2055 Mud Flow	IOGP2073 Boundary - Others
IOGP2056 Mound	IOGP2074 Inferred Boundary - Sediment
IOGP2057 Bulge	IOGP2075 Anchor Chain/Wire Scar
IOGP2058 Diapiric structure	IOGP2076 Bedrock
IOGP2059 Ridge	IOGP2077 Area of Depression
IOGP2061 Deposition - Rockfall	IOGP2078 Cable
	IOGP2079 Other ( Use Comments )

# SSDM Symbology Codes



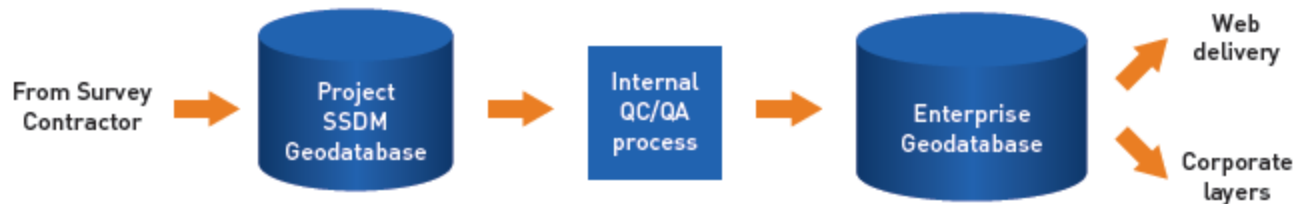
<div>Survey Measurements</div> <div><div><div></div><div>IOGP1306 Shotpoint at Antenna Position</div></div><div><div></div><div>IOGP1307 Shotpoint at Boomer Position</div></div><div><div></div><div>IOGP1308 Shotpoint at Common Depth Point (CDP)</div></div><div><div></div><div>IOGP 1309 Shotpoint at Echo-Sounder Position</div></div><div><div></div><div>IOGP 1310 Shotpoint at Receiver Group Position</div></div><div><div></div><div>IOGP 1311 Shotpoint at Pinger Position</div></div><div><div></div><div>IOGP 1312 Shotpoint at Bin Centre Position</div></div><div><div></div><div>IOGP 1313 Shotpoint at SSS Position / Centre of Source</div></div><div><div></div><div>IOGP 1314 Shotpoint at Towfish/Tailbuoy Position</div></div><div><div></div><div>IOGP 1315 Shotpoint at USBL Position</div></div><div><div></div><div>IOGP 1316 Shotpoint at Vessel Reference Point</div></div><div><div></div><div>IOGP 1317 Shotpoint at Magnetometer Position</div></div><div><div></div><div>IOGP1202 Spot Elevation</div></div></div>	<div>Seabed Features</div> <div><div><div></div><div>IOGP1001 Coral Pinnacle</div></div><div><div></div><div>IOGP1002 Coral spotheight</div></div><div><div></div><div>IOGP1003 Seabed Mound</div></div><div><div></div><div>IOGP1004 Sidescan Sonar Contact</div></div><div><div></div><div>IOGP1005 Isolated Depression or Pockmark</div></div><div><div></div><div>IOGP1006 Sonar Contact - Water Column</div></div><div><div></div><div>IOGP1007 Boulder</div></div><div><div></div><div>IOGP1008 Shallow Gas</div></div><div><div></div><div>IOGP1009 Megaripple Crest</div></div><div><div></div><div>IOGP1010 Anchor</div></div><div><div></div><div>IOGP1011 Anchor Chain</div></div><div><div></div><div>IOGP1012 Cable/Wire</div></div><div><div></div><div>IOGP1013 Soft rope</div></div><div><div></div><div>IOGP1014 Fishing net</div></div><div><div></div><div>IOGP1015 Scaffolding</div></div><div><div></div><div>IOGP1016 Pipe</div></div><div><div></div><div>IOGP1017 Drum</div></div><div><div></div><div>IOGP1018 Metal</div></div><div><div></div><div>IOGP1019 Concrete</div></div><div><div></div><div>IOGP1020 Plastic/Metal Container</div></div><div><div></div><div>IOGP1021 Debris/Suspected Debris</div></div><div><div></div><div>IOGP1022 Wreck</div></div><div><div></div><div>IOGP1023 Fish Trap</div></div><div><div></div><div>IOGP1024 Mine only</div></div><div><div></div><div>IOGP1025 Mine Sinker only</div></div><div><div></div><div>IOGP1026 UXO ( Unexploded Ordinance)</div></div><div><div></div><div>IOGP1027 Unidentified</div></div><div><div></div><div>IOGP1028 Possible Boulder</div></div><div><div></div><div>IOGP1029 Possible Mine</div></div><div><div></div><div>IOGP1030 Possible UXO (Unexploded Ordinance)</div></div><div><div></div><div>IOGP1031 Post Drill Well</div></div><div><div></div><div>IOGP1032 Unidentified Debris</div></div><div><div></div><div>IOGP1033 Anchor Pull-out Pit</div></div><div><div></div><div>IOGP1034 Magnetometer</div></div><div><div></div><div>IOGP1035 Megaripple Orientation</div></div><div><div></div><div>IOGP1036 Biogenic Feature</div></div><div><div></div><div>IOGP1037 Trawl board</div></div><div><div></div><div>IOGP1038 Tarpaulin</div></div><div><div></div><div>IOGP1039 Mine with sinker</div></div><div><div></div><div>IOGP1040 Identified Debris</div></div><div><div></div><div>IOGP1041 Other</div></div></div>	<div>Seabed Features</div> <div><div><div></div><div>IOGP3001 Isolated pockmark</div></div><div><div></div><div>IOGP3002 Pockmark Cluster</div></div><div><div></div><div>IOGP3003 Coalesced/Combined Pockmark</div></div><div><div></div><div>IOGP3004 Sand Ripples</div></div><div><div></div><div>IOGP3005 High Intensity Backscatter</div></div><div><div></div><div>IOGP3006 Jack-up rig / Spudcan Footprint</div></div><div><div></div><div>IOGP3007 Mound Cluster</div></div><div><div></div><div>IOGP3008 Pitted Seabed</div></div><div><div></div><div>IOGP3009 Sonar/Hard Contact</div></div><div><div></div><div>IOGP3010 Coral</div></div><div><div></div><div>IOGP3011 Biologically Sensitive (Chemosynthetic Communities)</div></div><div><div></div><div>IOGP3012 Channel Floor</div></div><div><div></div><div>IOGP3013 Hilllock/Hummucky Seafloor Topography Area</div></div><div><div></div><div>IOGP3014 Expulsion Feature</div></div><div><div></div><div>IOGP3015 Sediment Waveform</div></div><div><div></div><div>IOGP3016 Plough Mark - Iceberg</div></div><div><div></div><div>IOGP3017 Anchor Pull-out Pit</div></div><div><div></div><div>IOGP3021 Rock Dump</div></div><div><div></div><div>IOGP3022 Soil Dump</div></div><div><div></div><div>IOGP3023 Dredged Area - Trench</div></div><div><div></div><div>IOGP3024 Dredged Area - Borrow</div></div><div><div></div><div>IOGP3025 Debris</div></div><div><div></div><div>IOGP3026 Disturbed Sediment</div></div><div><div></div><div>IOGP3027 Depression</div></div><div><div></div><div>IOGP3028 Mound - Mud/Mud Lumps</div></div><div><div></div><div>IOGP3029 Eroded/Thinned drape</div></div><div><div></div><div>IOGP3030 Shoal Area/Shallow Water Hazard</div></div><div><div></div><div>IOGP3031 Fish Traps</div></div><div><div></div><div>IOGP3032 Shallow Gas Vents</div></div><div><div></div><div>IOGP3033 Mud Volcanoes</div></div><div><div></div><div>IOGP3034 Mound - Hydrate</div></div><div><div></div><div>IOGP3035 Collapse Features</div></div><div><div></div><div>IOGP3036 Scour</div></div><div><div></div><div>IOGP3037 Drills Cuttings</div></div><div><div></div><div>IOGP3051 Sand Bar</div></div><div><div></div><div>IOGP3052 Mega Ripples</div></div><div><div></div><div>IOGP3058 Diapiric Structures</div></div><div><div></div><div>IOGP3061 Deposition - Rockfall</div></div><div><div></div><div>IOGP3062 Deposition - Creep</div></div><div><div></div><div>IOGP3063 Deposition - Slide</div></div><div><div></div><div>IOGP3064 Deposition - Rotated Slide</div></div><div><div></div><div>IOGP3065 Deposition - Slump/Slope Failure</div></div><div><div></div><div>IOGP3066 Deposition - Debris Flow</div></div><div><div></div><div>IOGP3067 Deposition - Grain/Fluidized Flow</div></div><div><div></div><div>IOGP3068 Deposition - Turbidite</div></div><div><div></div><div>IOGP3069 Mass-Transport Deposit Area</div></div><div><div></div><div>IOGP3071 Boundary - Outcrop</div></div><div><div></div><div>IOGP3072 Boundary - Sediment</div></div><div><div></div><div>IOGP3073 Boundary - Others</div></div><div><div></div><div>IOGP3074 Inferred Boundary - Sediment</div></div><div><div></div><div>IOGP3075 Areas with Numerous boulders</div></div><div><div></div><div>IOGP3076 Areas with Occasional boulders</div></div><div><div></div><div>IOGP3077 Outline of Corals from acoustic data</div></div><div><div></div><div>IOGP3078 Area of Anchor/Wire scars</div></div><div><div></div><div>IOGP3079 Area of Bedrock</div></div><div><div></div><div>IOGP3080 Possible UXO (Unexploded Ordinance)</div></div><div><div></div><div>IOGP3081 Expelled Material</div></div><div><div></div><div>IOGP3082 Debris Disposal Path</div></div><div><div></div><div>IOGP3083 Seafloor Amplitude Anomalies</div></div><div><div></div><div>IOGP3084 Seafloor Furrow/Grooves</div></div><div><div></div><div>IOGP3085 Irregular Debris</div></div><div><div></div><div>IOGP3086 Gully (Rotate Arrows to Direction of Flow)</div></div><div><div></div><div>IOGP3087 Canyon</div></div><div><div></div><div>IOGP3088 Erosional Escarpment</div></div><div><div></div><div>IOGP3089 Sediment Transport Pathway</div></div><div><div></div><div>IOGP3090 Biogenic/Environmental</div></div><div><div></div><div>IOGP3091 Anchor Pull Out Pit</div></div><div><div></div><div>IOGP3092 Megaripple Orientation</div></div><div><div></div><div>IOGP3093 Coarse Sediment</div></div><div><div></div><div>IOGP3094 Heavily Faulted Zone</div></div><div><div></div><div>IOGP3095 Low Intensity Backscatter</div></div><div><div></div><div>IOGP3096 High Sonar Reflectivity</div></div><div><div></div><div>IOGP3097 Low Sonar Reflectivity</div></div><div><div></div><div>IOGP3098 Potential Hardgrounds (MBES Backscatter)</div></div><div><div></div><div>IOGP3099 Mottled Seafloor</div></div><div><div></div><div>IOGP3100 Pressure Ridge</div></div></div>
<div>Environmental Samples</div> <div><div><div></div><div>IOGP1101 Sampling Borehole</div></div><div><div></div><div>IOGP1102 Pilot Borehole</div></div><div><div></div><div>IOGP1103 CPT Borehole</div></div><div><div></div><div>IOGP1104 PCPT Borehole</div></div><div><div></div><div>IOGP1105 Composite Sampling and CPT Borehole</div></div><div><div></div><div>IOGP1106 Hydraulic Fracture (Packer) Test Borehole</div></div><div><div></div><div>IOGP1107 Box Core</div></div><div><div></div><div>IOGP1108 Seabed CPT</div></div><div><div></div><div>IOGP1109 Seabed PCPT</div></div><div><div></div><div>IOGP1110 Grab sample</div></div><div><div></div><div>IOGP1111 Piston Core</div></div><div><div></div><div>IOGP1112 Seismic PCPT</div></div><div><div></div><div>IOGP1113 Multi Core</div></div><div><div></div><div>IOGP1114 Jumbo Core</div></div><div><div></div><div>IOGP1115 Vibro Core</div></div><div><div></div><div>IOGP1116 Gravity Core</div></div><div><div></div><div>IOGP1042 Geotechnical Sample</div></div><div><div></div><div>IOGP1043 Benthic Sample</div></div><div><div></div><div>IOGP1044 SPI-Sediment Profile Index</div></div><div><div></div><div>IOGP1045 Soil/Sediment Sample</div></div><div><div></div><div>IOGP1046 Water Sample</div></div><div><div></div><div>IOGP1047 Video Sample (ROV/AUV)</div></div><div><div></div><div>IOGP1048 VELO-Velocimeter</div></div><div><div></div><div>IOGP2007 Camera Transect</div></div><div><div></div><div>IOGP1201 TSDip</div></div><div><div></div><div>IOGP1204 Geochemical Sample</div></div><div><div></div><div>IOGP1206 Heat Flow Measurement</div></div></div>	<div>Shallow and Intermediate Geologic Zone</div> <div><div><div></div><div>IOGP1301 High Amplitude Anomaly</div></div><div><div></div><div>IOGP1302 Phase Reversal</div></div><div><div></div><div>IOGP1303 Velocity Pulldown</div></div><div><div></div><div>IOGP1304 Acoustic Diffraction</div></div><div><div></div><div>IOGP1305 Acoustic Blanking/Masking</div></div></div>	

# SSDM Adoption



- Adopted by
  - O&G Operators: internal data standard
  - Survey Contractors: survey data delivery standard

Company	Do you use IOGP's SSDM?	
BHP		Yes: SSDM V2
Shell		Yes: SSDM V2
BP (representing Survey, Geospatial and Geohazards)		Yes: SSDM V2
NCOC NV	Yes: SSDM V1	
Nexen Petroleum	Yes: SSDM V1	
Shell International		Yes: SSDM V2
PETROBRAS	Yes: SSDM V1	
Shell International Exploration and Production		Yes: SSDM V2
REPSOL	Yes: SSDM V1	
PETRONAS Carigali Sdn Bhd		Yes: SSDM V2
SARAWAK SHELL BERHAD	Yes: SSDM V1	
Repsol	Yes: SSDM V1	
Sakhalin Energy Investment Company Ltd	Yes: SSDM V1	
Sarawak Shell Berhad		Yes: SSDM V2
Petronas Carigali Sdn. Bhd.	Yes: SSDM V1	
BP		Yes: SSDM V2
Shell Global Solutions International BV		Yes: SSDM V2
Shell GSNL		Yes: SSDM V2
Shell UK Ltd	Yes: SSDM V1	
petronas carigali sdn bhd	Yes: SSDM V1	
Brunei Shell Petroleum Company	Yes: SSDM V1	
Shell	Yes: SSDM V1	Yes: SSDM V2
TOTAL SA		Yes: SSDM V2
Woodside Energy	Yes: SSDM V1	



# Please Note: OISDM Terms of Reference



- IOGP Offshore Infrastructure Survey Data Model (OISDM) Task Force Terms of reference agreed April 2018
- Build on the success of the Seabed Survey Data Model (SSDM)
- Create an industry standard data model for the delivery and exchange of geographic features representing oil and gas infrastructure mapped during the course of offshore engineering and inspection surveys
- Will be implemented in GIS (ESRI File Geodatabase/GML) and CAD (template) formats
- Objectives:
  - Standardise IRM survey data deliverables
  - Maximise flexibility
  - Complement existing SSDM data model
  - Simplify asset charting
  - Reduce reporting costs



# OISDM Industry Collaboration



- Oil and Gas Operators

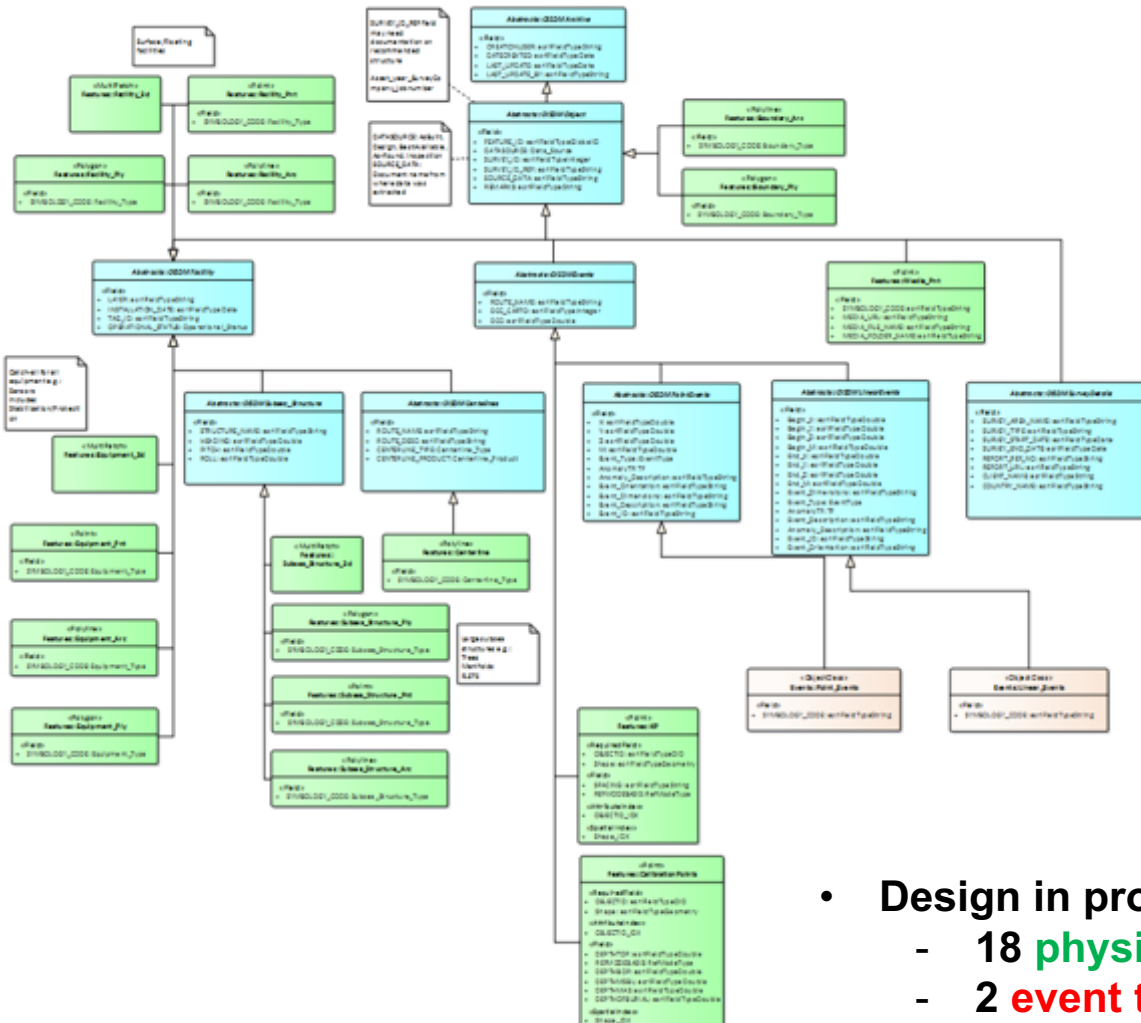


- Survey and Engineering Contractors





# OISDM Data Model progress



- Boundary\_Arc
- Boundary\_Ply
- CalibrationPoints
- Centerline
- Equipment\_3d
- Equipment\_Arc
- Equipment\_Ply
- Equipment\_Pnt
- Facility\_3d
- Facility\_Arc
- Facility\_Pnt
- KP
- Media\_Pnt
- Subsea\_Structure\_3d
- Subsea\_Structure\_Arc
- Subsea\_Structure\_Ply
- Subsea\_Structure\_Pnt
- Linear\_Events
- Point\_Events

- Design in progress:
  - 18 **physical classes** (Pnt, Arc, Ply, 3D)
  - 2 **event tables**
  - Use measures or absolute X/Y



Meeting Partners



Reception Sponsor



# 17-083r1 OGC Tile Matrix Set Standard

Joan Masó



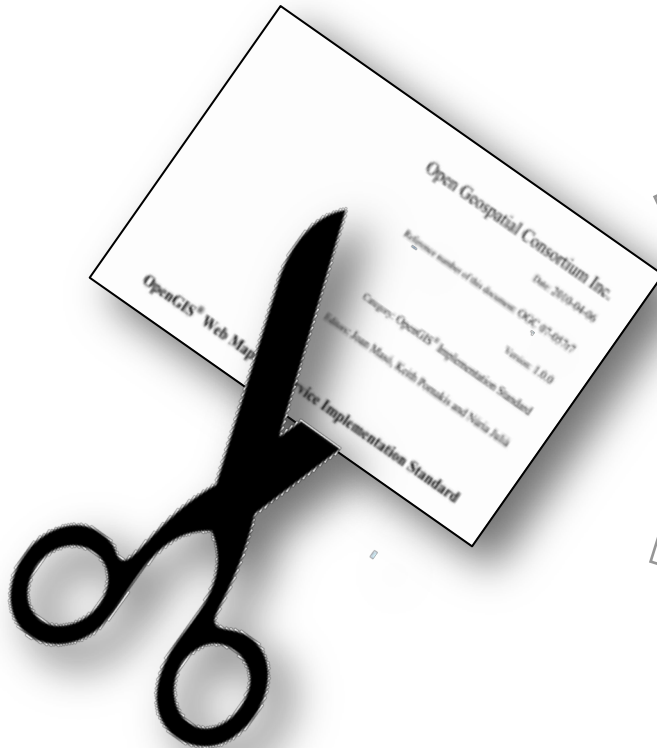
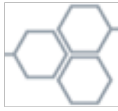
# Why?



- TMS data structure is used in other standards, not only in WMTS
- OGC web services are evolving and we need a stable TMS to be referenced from them
- There is a need for documenting some common TMSs
- There is a need to illustrate other encodings a part from XML: JSON



# The result



**17-083r1**  
**OGC Tile Matrix Set**  
**Standard**

**Testbed 15 & WMS.SV**  
**OGC WMTS API**



# History



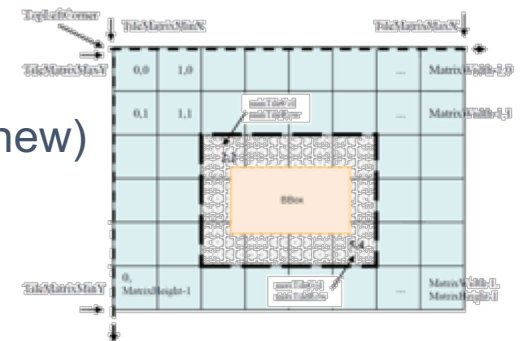
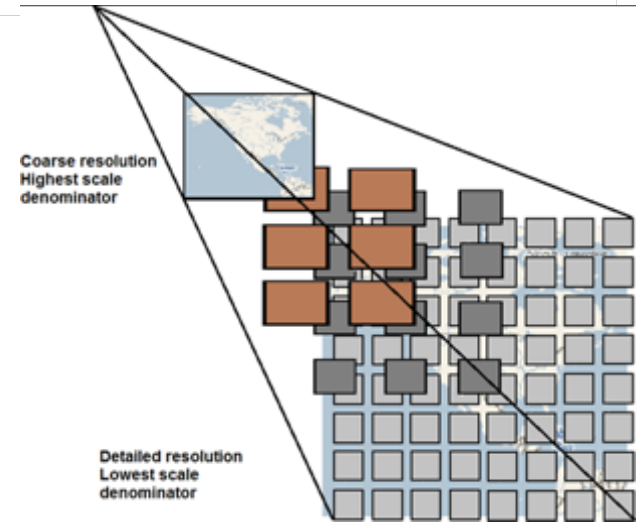
- 2007 WMTS writing started
- 2012 GeoPackage used the WMTS data structure
- 2015 Several vector tiles competing but use a tile structure
- 2017 MapML Testbeds. MapML uses a tile structure
- 2017 First draft of TMS started
- 2018 RFC period. Some CRs received
- 2018 Some initial discussions on a new WMTS – OpenAPI. Having TMS becomes *urgent*.
- 2019 Final draft submitted to the portal for TC consideration



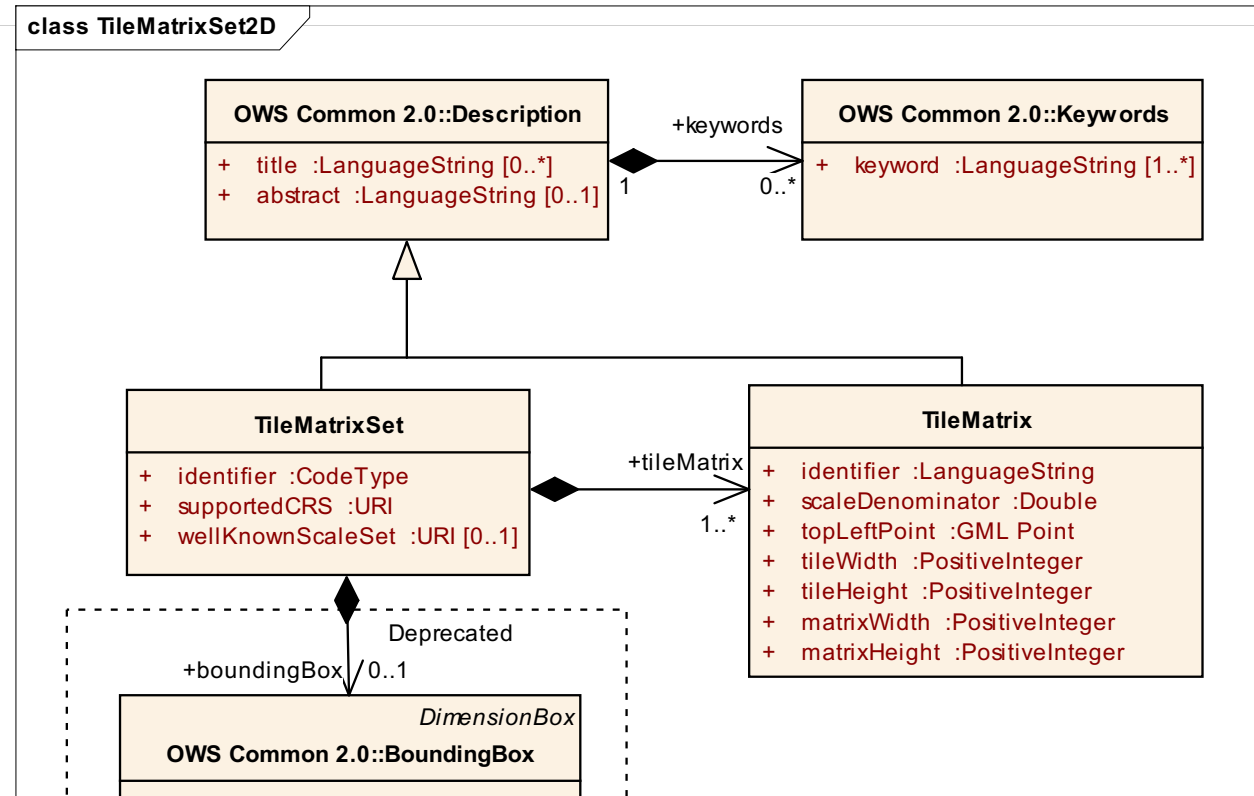
# TMS, what is in there?



- TMS concept
  - Tile coordinates vs. **tile matrix coordinates** (*new*)
- TMS limits
- **Variable width extension** (*new*)
- 2D UML models and tables
  - **Requirements** (*new*)
- XML encoding
- **JSON** and **JSON-LD encoding** (*new*)
- Annexes
  - ATS
  - WKSS
  - **Common Tile Matrix Set definitions** (*new*)
  - XML and **JSON Common Tile Matrix Set** definitions (*new*)
  - Tile Matrix Set Limits examples (*new*)
  - JSON-LD examples (*new*)
  - **Variable width extension examples** (*new*)
  - Pseudocode



# The *old* UML and the *new* requirements



**Req 1 → req/tilematrixset2d/model:**

A tile matrix set 2D *shall* be defined following the UML model as shown in Figure 1 and the model description in Table 1 and Table 2.

**Dependency:** <http://www.opengis.net/spec/owscommon/2.0/req>



# New



- Separation of
  - “tile scheme” (the division of the space)
  - “tile set” (the collection of tiles)
- Language carefully crafted to ensure to support:
  - Image tiles (\*.png)
  - Vector tiles (\*.mbt)
  - Coverage tiles (\*.tiff)
  - The tile matrix is divided into cells (and not the other way). It was not possible to completely remove the idea of “cell size” but we mitigated. Cells are not needed at the “beginning” but a tile is something created for rendering in a “rendering device” and the device has pixels that have a size.

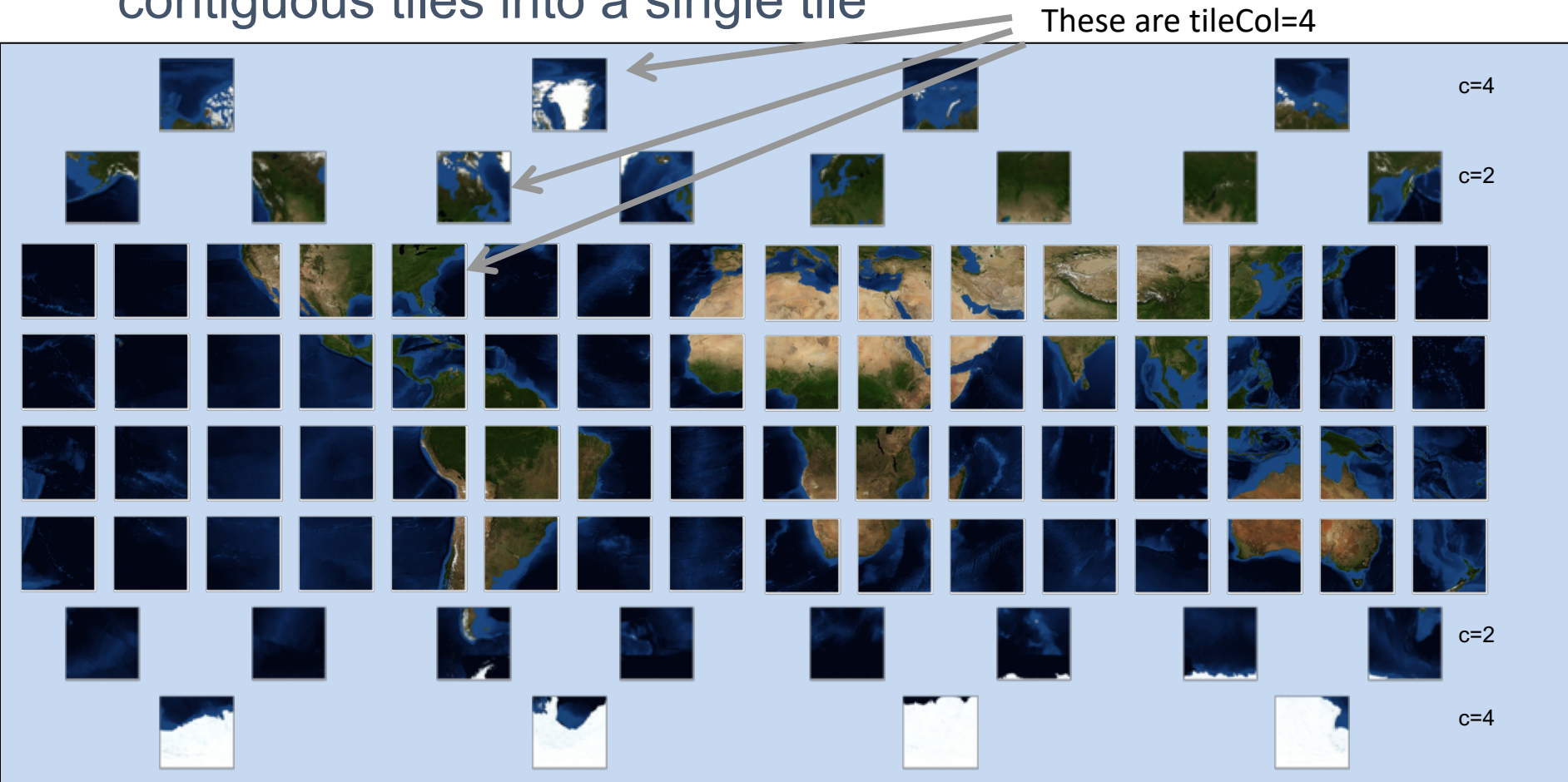




# Variable Tile Width



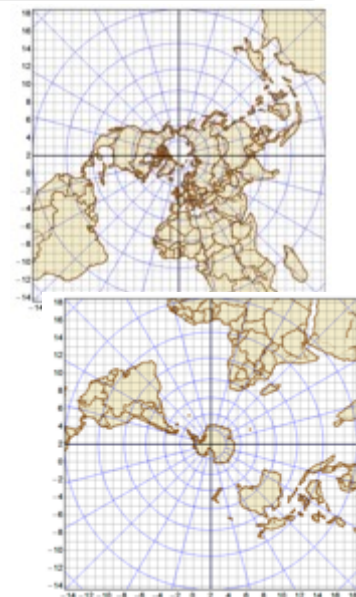
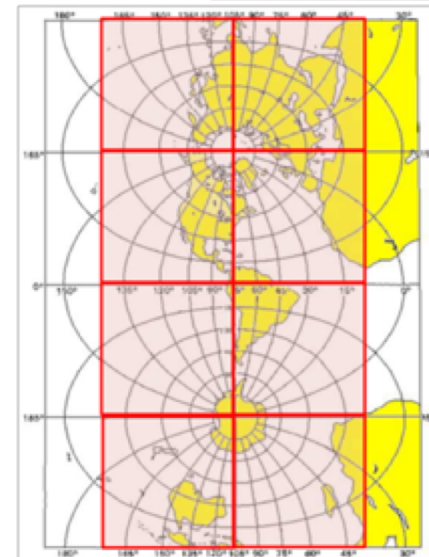
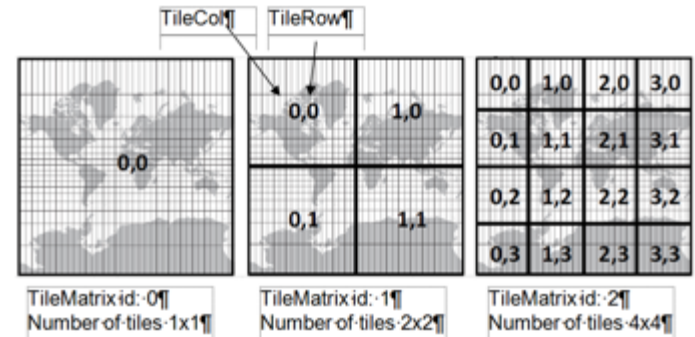
- It does NOT change the tile numbering it only *coalesce* contiguous tiles into a single tile



# Common Tile Matrix Set definitions



- Web Mercator Quad
- World Mercator WGS84 Quad
- World CRS84 Quad
- Universal Transverse Mercator WGS84 Quad family
- Arctic Universal Polar Stereographic WGS 84 Quad
- Antarctic Universal Polar Stereographic WGS84 Quad
- European Lambert Azimuthal Equal Area Quad
- Canadian NAD83 Lambert Conformal Conic



# Schema structure



schemas	Nombre
ows	
tms	
1.0	
json	
examples	CanadianNAD83_LCC.json
rdf	EuropeanETRS89_LAEAQuad.json
xml	GNOSISGlobalGrid.json
xlink	LayerWithTMSLink.json
schemas v0.1.zip	LayerWithTMSLink-schema.json
variableWidthTiles	UPSAntarcticWGS84Quad.json
TileMatrixSet Standard C	UPSArcticWGS84Quad.json
AbstractTest	UTM31WGS84Quad.json
Copia de schemas local	WebMercatorQuad.json
	WorldCRS84Quad.json
	WorldCRS84QuadVariableWidth.json
	WorldMercatorWGS84Quad.json

# Schemas & examples



```
<TileMatrix>
  <ows:Identifier>2</ows:Identifier>
  <ScaleDenominator>139770566.007179</ScaleDenominator>
  <TopLeftCorner>-20037508.3427892 20037508.3427892</TopLeftCorner>
  <TileWidth>256</TileWidth>
  <TileHeight>256</TileHeight>
  <MatrixWidth>4</MatrixWidth>
  <MatrixHeight>4</MatrixHeight>
</TileMatrix>
```

```
{
  "type": "TileMatrixType",
  "identifier": "2",
  "scaleDenominator": 139770566.007179,
  "topLeftCorner": [-20037508.3427892, 20037508.3427892],
  "tileWidth": 256,
  "tileHeight": 256,
  "matrixWidth": 4,
  "matrixHeight": 4
},
```

# Change requests



- In the ZIP file on pending you can see the detailed responses to every aspect of all CRs (most of them accepted)
  - Changes in title (includes *2D*)
  - Reorganization of annexes
  - Inclusion of variable width
  - Mistakes in UML data types
  - Reference to ISO19123
- Last minute changes
  - Introduction of the “tiling scheme” and “tile set” in the definitions coming from vector tiles
  - Correction of the polar stereographic CRS in the recommended TileMatrixSet from EPSG:32661 (y,x) to EPSG:5041 (x,y).

# Future priorities



- WMTS 3.0 OpenAPI
  - Using **17-083r1 TMS**
  - Variable width and vector tile friendly
  - Tiles apply to features and coverages ... How to connect the building blocks
  - Including support for WMS (BBOX)?
  - GetTiles
  - Styles
    - Transactional (create tiles + styles)
    - Get the styles to render them in the client side.
  - Considering relations with other standards.



Meeting Partners



Reception Sponsor



# HDF5 candidate standard

110th OGC Technical Committee

Singapore

Aleksandar Jelenak

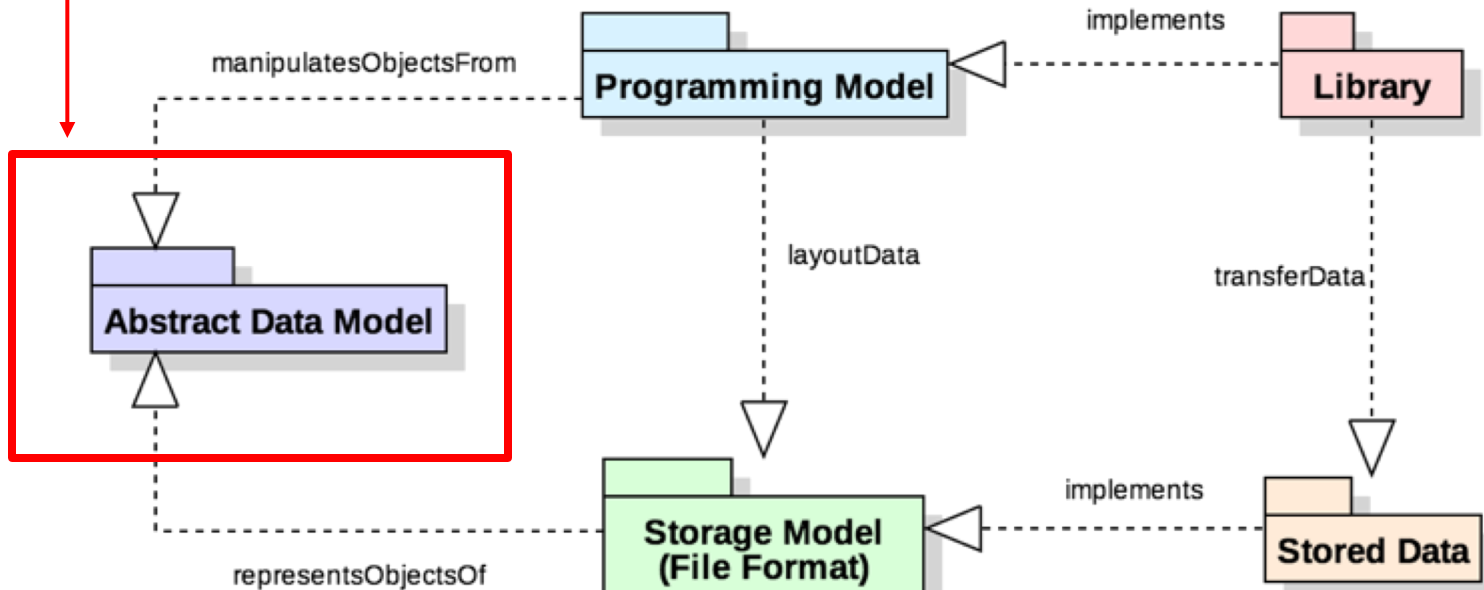
28 February 2019



# HDF5 *Universe*

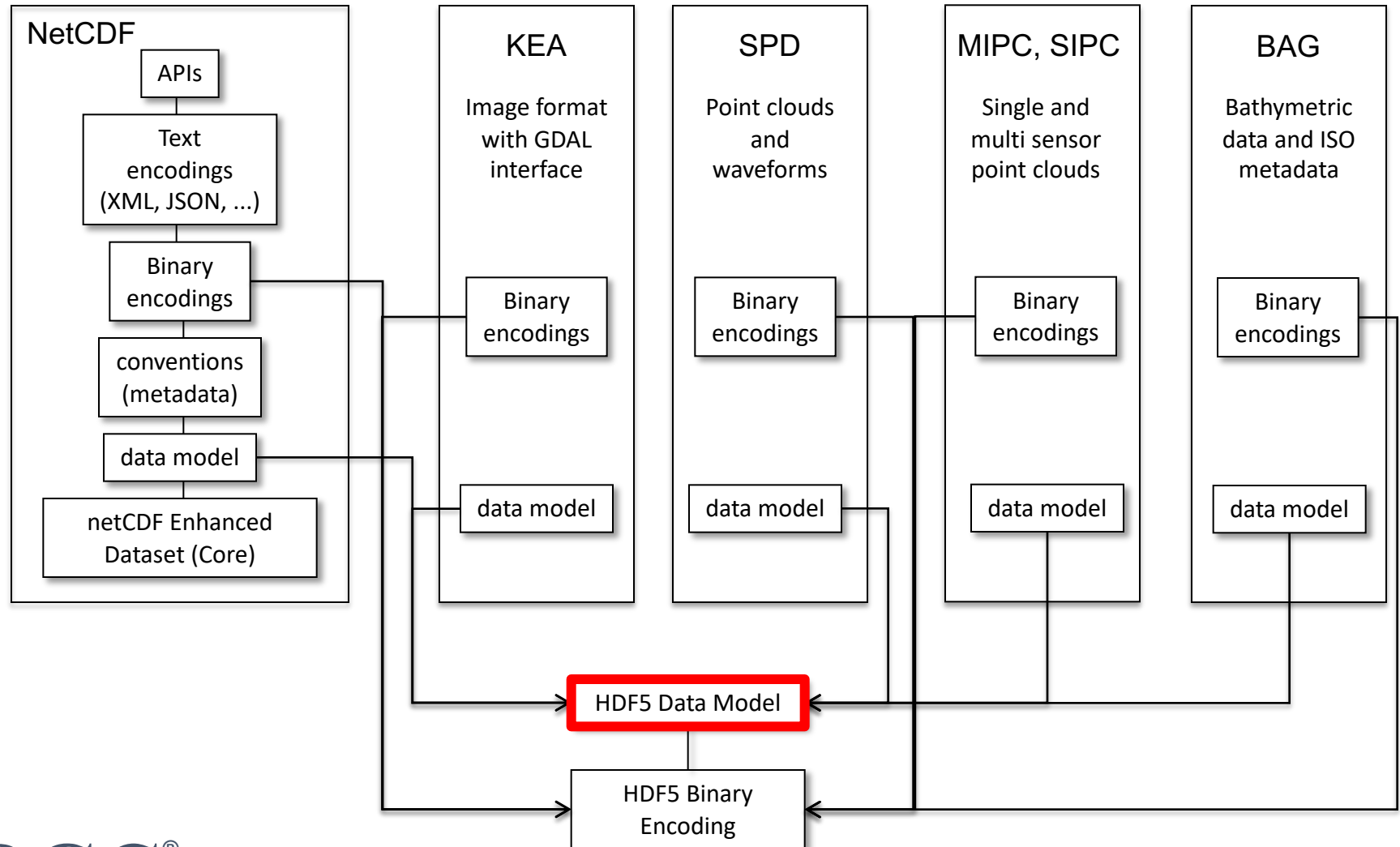


The subject of this standard

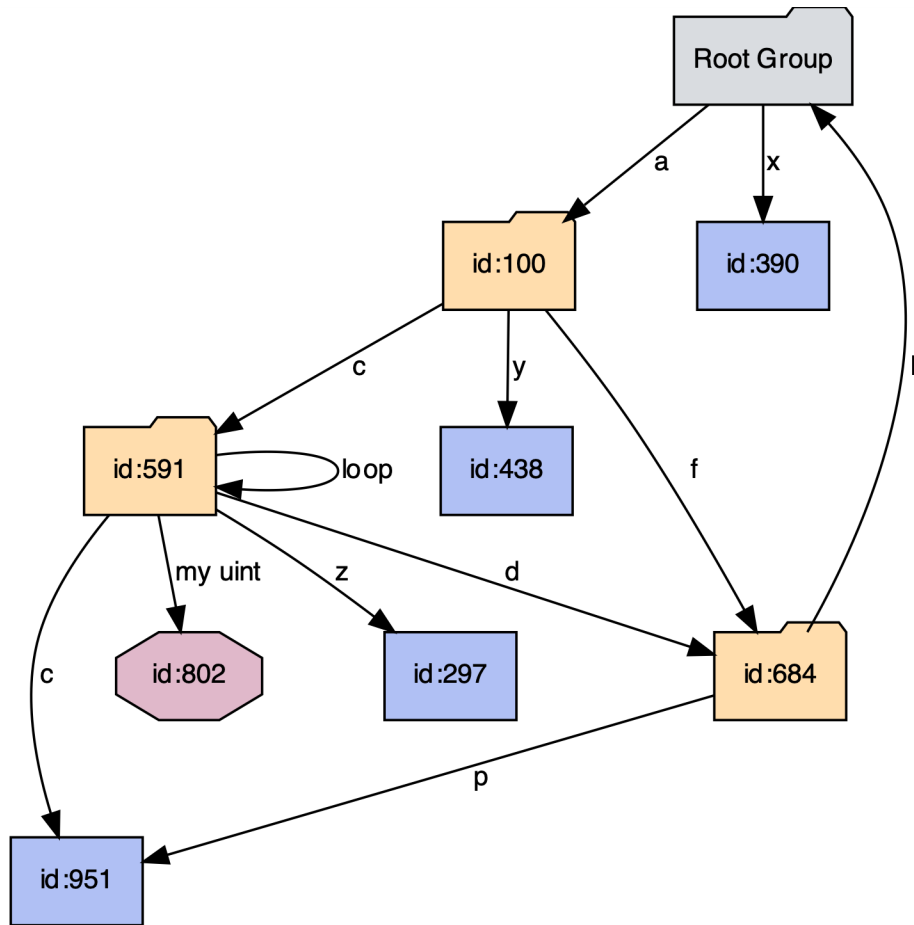




# Where HDF5 Fits in OGC (Present)



# HDF5 Object Graph



HDF5 Object Graph:

A rooted, directed multigraph whose edges consist of HDF5 links, and whose vertices consist of all HDF5 objects which can be reached by traversing the edges starting from the HDF5 root group.

Folder shape represent groups.

Rectangle shape represents datasets.

Octagon shape represents committed datatypes.

Arrows represent links.

*id:NNN* represents an internal object identifier. Not part of the data model.

One group is *special* and called *root group*. All other objects can be reached by links only from this group.

One HDF5 object graph is serialized into one HDF5 container (e.g. file).



Meeting Partners



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# Blockchain and Distributed Ledger Technologies DWG Charter

110th OGC Technical Committee

Singapore

Gobe Hobona

28 February 2019

# Introduction



- Distributed Ledgers are collections of replicated, shared and synchronized digital records that are stored across multiple sites that are geographically spread.
- The technologies used to implement such ledgers are referred to as Distributed Ledger Technologies (DLT).
- An example of a DLT is Blockchain, the technology underneath Bitcoin and Ethereum

# Background



- Review initiated by OGC Technology Trends activity
- March 2018: Workshop held during the Orleans TC
- July 2019: Teleconference held to discuss draft Charter
- June 2018: Ad-hoc session held during the Fort Collins TC
- September 2018: TC-wide briefing during the Stuttgart TC
- October 2018: OGC Discussion Paper published
- December 2018: Ad-hoc session held during the Charlotte TC

# About the Charter



- Defines the role of the DWG within the OGC, Blockchain and Distributed Ledger Technologies communities
- Allows for an open forum for the discussion and presentation of interoperability requirements, use cases, pilots, and implementations of OGC standards in this domain.

# Mission and Role



- Mission

- to enable the OGC as a community to improve its understanding of distributed ledger technologies, their use cases, applications and opportunities for geospatial standardization...

- Role

- to serve as a forum within OGC for distributed ledger technologies issues...
- to serve where appropriate as a liaison to other relevant industry, government, independent, research, and standards development organizations active within the DLT domain

# Activities Planned



- Regular presentations and discussions during OGC Technical Committee meetings
- Informing and providing alternatives to the DLT community for use of geospatial standards
- Outreach and education of the DLT community
- Organization of summits and workshops
- Advising the OGC Innovation Program (IP) on ideas for future IP activities (e.g. testbeds)
- Initiate services or prototypes that demonstrate convergence of geospatial technologies and Blockchain, as well as with other DLT
- Liaison with other OGC working groups (e.g. the Security DWG, Smart Cities DWG).
- Engagement with other standards-developing organizations (e.g. ISO)





Meeting Partners



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# Portrayal DWG Charter

110th OGC Technical Committee  
Singapore

Keith Ryden and Matt Sorenson  
28 February 2019

# Agenda



- Recent Portrayal Activities
- Portrayal Charter

# Recent OGC Portrayal-related activities



- Portrayal Concept Development Study
- Testbed 14 Symbology
- Symbol Encoding Core draft
- Vector Tile Pilot & Extension (Styling)
- Testbed 15 Open Portrayal Framework
- Multiple Portrayal Ad Hoc meetings at TCs
  - Charlotte TC (Dec 2018) recommends drafting DWG charter to begin establishment of Portrayal DWG
- Draft Charter
  - [https://portal.opengeospatial.org/files/?artifact\\_id=82719&version=1](https://portal.opengeospatial.org/files/?artifact_id=82719&version=1)
- Press Release on public review
  - <http://www.opengeospatial.org/pressroom/pressreleases/2955>

# Portrayal DWG Charter: Goals



- Understand implementation barriers for portrayal communities and document them in a format that can guide future technology design.
- Identify a common portrayal framework and conceptual model that can better align portrayal standards development, leverage emerging technologies, and ensure the framework, standards, and encodings are well suited to modern computer architectures. (i.e. rendering off loaded to the client GPU).
- Identify interfaces and information encodings that complement the existing OGC standards but are directly tailored to the requirements discovered in understanding the needs of the portrayal user communities.
- Promote development of best practices and standards to meet the portrayal objectives. Candidate standards may come from external, market-established standards or from anticipatory standards developed in OGC initiatives.
- Promote sharing of portrayal content across user communities and reuse of symbology and styles.
- The Portrayal DWG will provide an organizational entity through which SWGs may be chartered to produce relevant and consistent candidate abstract and encoding standards documents resulting in a net gain for the community.



Meeting Partners



Reception Sponsor



# Coordinate Reference Systems SWG

110th OGC Technical Committee  
Singapore  
Keith Ryden  
28 February 2019

# The most important thing for this WG is...



Completion of the Well Known Text Representation for Coordinate Reference Systems Standard. Change the focus to getting implementations into the field.

# Activity Summary



- Discussion topics

- Resolution of ISO comments on 19162/OGC 18-010r4
- Status of PROJ4 and related work for WKT updates

- Upcoming deliverables

- Resolution spreadsheet for ISO comments
- OGC 18-010r5 for electronic vote

- Coordination (ongoing and planned)

- Coordination with ISO TC211 for joint document (ISO 19162/OGC 18-010r5)

- Future meetings

- None planned at this point



# Key activities



- Review and respond to consolidated ISO comments
- Update CRS WKT document to pick up last comments
- Obtain TC approval to proceed to electronic adoption vote

# Document Relationship



- **OGC Abstract Specification Topic 2: Referencing by coordinates**
  - This document describes the elements that are necessary to fully define various types of coordinate reference systems applicable to geographic information.
  - OGC Topic 2 and ISO 19111 are the same document
- **Geographic information — Well known text representation of coordinate reference systems**
  - The CRS WKT text string provides a cleartext encoding for humans and machines to correctly and unambiguously interpret and utilise a coordinate reference system
  - OGC 18-010r5 and ISO 19162 are the same document

# Scope of update - ISO 19162/OGC 18-010r5



This document updates WKT for the extensions to ISO 19111 made through its 2019 revision:

- The description of dynamic geodetic and vertical coordinate reference systems;
- The change of coordinate values within a coordinate reference system due to point motion caused by tectonic deformation;
- The description of geoid-based vertical coordinate reference systems;
- The description of datum ensembles, groups of realizations of one terrestrial or vertical reference system that for low accuracy purposes may be merged ignoring coordinate transformation;
- A rigorous description of temporal coordinate reference systems;
- The removal (deprecation) of image coordinate reference systems; and
- The remodelling of scope and extent information.

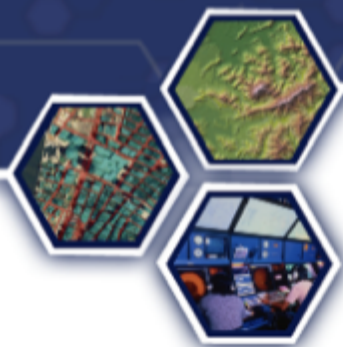
# Document Status



- 18-010r3 has same content as in ISO 19162 DIS ballot. Posted to pending in mid 2018.
  - 18-010r4 updates this for OGC and IOGP comments submitted to the ISO ballot. Posted January 2019.
  - 18-010r5 minor updates for the two additional comments from UK and Australia discussed in the Singapore CRS SWG. These are in subclauses 6.2 requirement (a) and 17.3 example 2 respectively and considered by the SWG to be editorial.
- 
- ISO 19162 has passed DIS vote (24 yes, 0 no, 14 abstain)
  - It's now time for an OGC electronic vote



# TC Member Presentations



Meeting Partners



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# Indexed 3D Scene Layers Update 1

110th OGC Technical Committee  
Singapore  
Keith Ryden  
28 February 2019

# Project Background



Indexed 3D Scene Layers (I3S) is an open specification for streaming large, heterogeneous geospatial data sets with 3D content :

- First released in July 2015
- Proposed as an OGC work Item in September 2016
- Adopted as an OGC Community Standard in August 2017

## Reference Materials

- The I3S Work Item Justification for this update (Document 19-006) - [https://portal.opengeospatial.org/files/?artifact\\_id=82971&version=1](https://portal.opengeospatial.org/files/?artifact_id=82971&version=1)
- Original I3S Work Item Justification (Document 16-133r2) - [https://portal.opengeospatial.org/files/?artifact\\_id=71232&version=2](https://portal.opengeospatial.org/files/?artifact_id=71232&version=2)
- I3S Community Standard - <http://www.opengeospatial.org/standards/i3s>
- Community I3S Github repository - <https://github.com/esri/i3s-spec>



# Project Scope



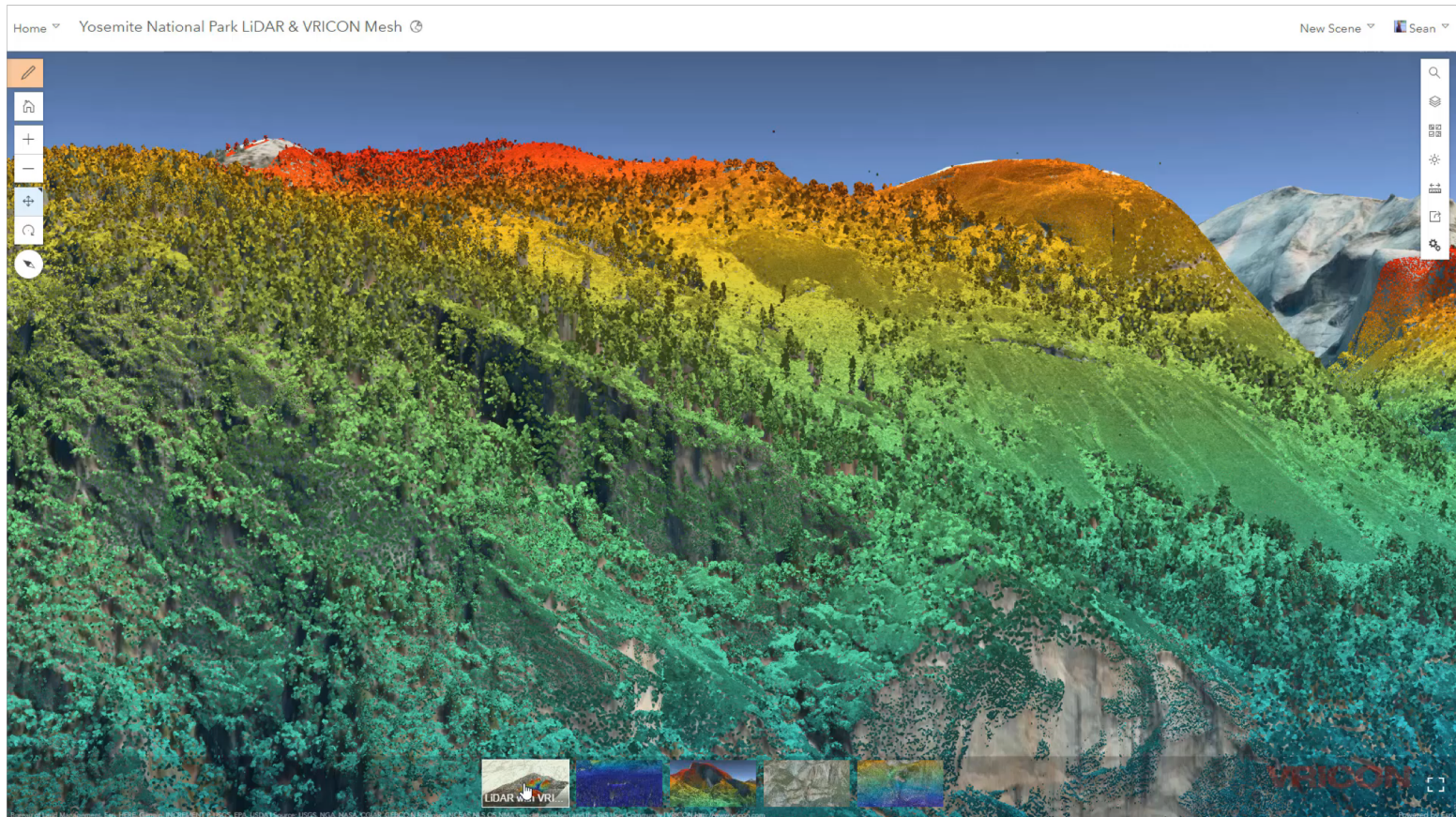
This is a limited scope update of the existing I3S Community Standard. This update is fully backwards compatible, and is limited to:

- Adding the Point Cloud Scene Layer type
- Updating all existing layer types to add:
  - Oriented Bounding Boxes
  - Attribute Domain Rules
  - Service Update Timestamp
  - Index hash table for improved performance
- Editorial updates for clarity

# Point Cloud Scene Layers



- Manage large collections of points in space with properties
- Sources may include LIDAR, Photogrammetric tools, etc.



# Project Deliverables



This project updates the OGC I3S Community Standard document. The following deliverables will be generated over the life of the project:

- Work Item Justification document to be approved by the OGC TC.
- An updated I3S Community Standard document for public comment.
- A presentation to the OAB seeking approval to release the document for public comment.
- A document collecting and responding to public comments.
- Final revision of the I3S Community Standard document reflecting public comment.
- A presentation to the TC reviewing the I3S Community Standard updates prior to adoption vote.

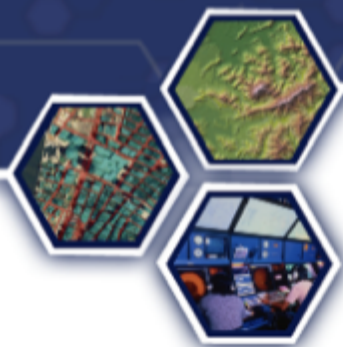
# Next Steps



- The I3S Work Item Justification for this update has been posted to pending as document 19-006
- The TC Chair will call for a public comment period on the Work Item Justification
- After the public comment period, a TC vote will be called to approve proceeding with the OGC I3S Community Standard Update.



# Upcoming TC Meetings



Meeting Partners



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# **111<sup>th</sup> OGC TC Meeting**

## **24-28 June, Leuven**

110th OGC Technical Committee  
Singapore

Danny Vandenbroucke  
28 February 2019



# Leuven in Europe





# Leuven



- » Capital of the province of Flemish Brabant
- » 100,764 inhabitants (2017)
- » Area of 5.751,25 ha
- » A stone's throw away from Brussels
- » 15' train ride from BRU Airport



# Leuven



There are two important things in Leuven ...

**Students ...**



**... and beer**



**+  
Bikes !**





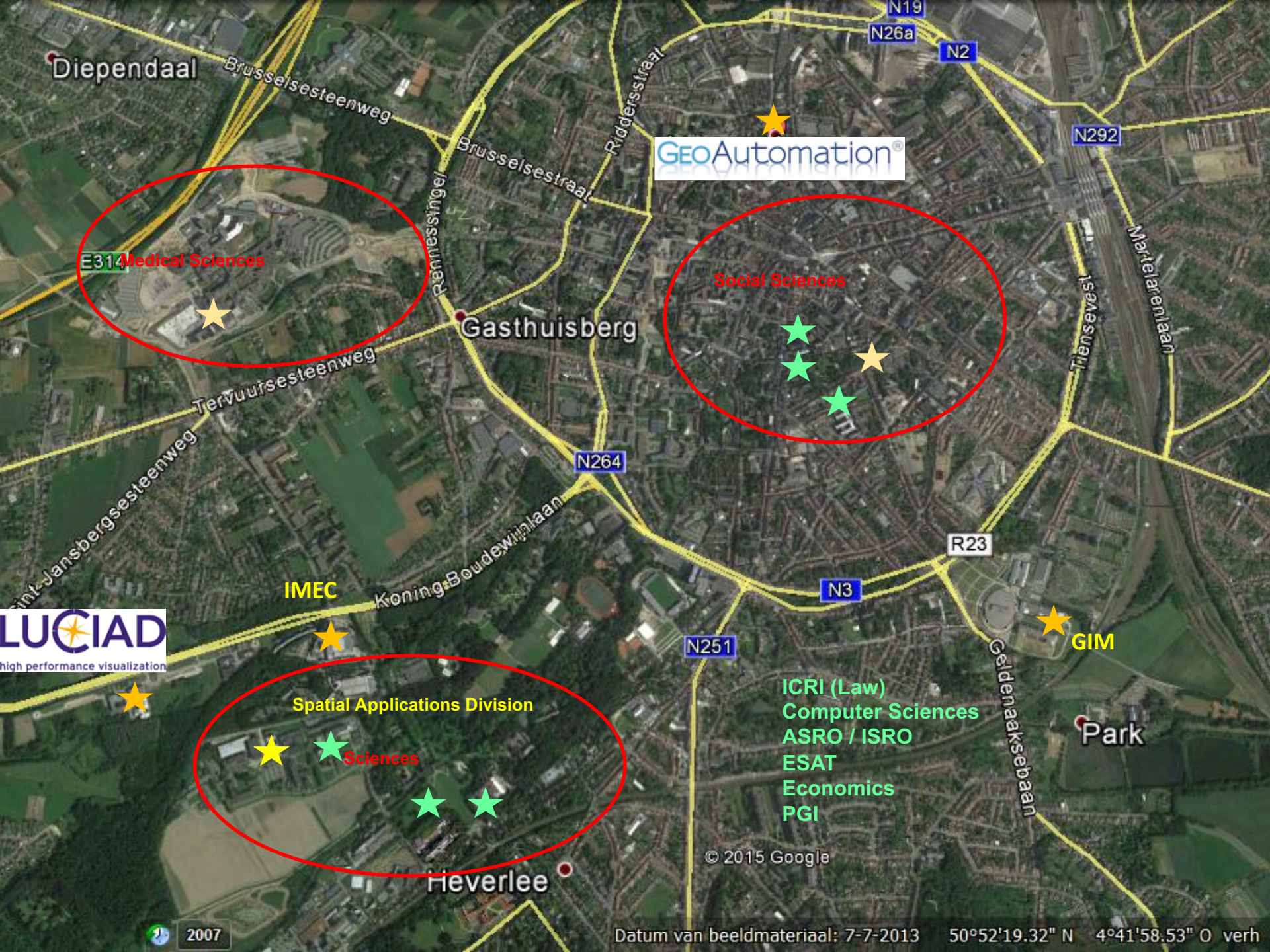


## One of the oldest universities in Europe (1425)

- Number of students (2017-2018)
  - In total 58.064, 10.173 international, 4.500 PhDs
- Education
  - 78 Bachelor, 205 Master,
  - 44 Advanced Master
- Staff
  - 12.008 (2018)
  - 21.500 (including UH)
- Research
  - Expenditure 467 million € (2017)
- 127 Spin-off companies







Diependaal

Brusselsesteenweg

Brusselsestraat

Riddersstraat

N19

N26a

N2

N292

Martelarenlaan

Tienseveste

E314

Medical Sciences

Gasthuisberg

GEOAutomation®

Social Sciences

N264

N3

R23

IMEC

Koning Boudewijnlaan

N251

LUCIAD  
high performance visualization

GIM

Spatial Applications Division

Sciences

ICRI (Law)  
Computer Sciences  
ASRO / ISRO  
ESAT  
Economics  
PGI

Park

Geldenaksebaan

Hieverlee

© 2015 Google



2007

Datum van beeldmateriaal: 7-7-2013

50°52'19.32" N 4°41'58.53" O verh



# Venue



- ‘Province House’
  - Close to railway station
  - Walking distance center
  - Close to various hotels



# Social events



- 24/06, 18h, ice-breaker  
– TBC
- 26/06, 19h, diner  
– Tervuren, by bus



# OGC TC



- Regular schema ... but still ... a bit different ...
  - Earth Observation (EO) Summit
    - Powered by EO4GEO, OGC and the Copernicus Academy
    - Will last 2,5 days
    - 1 to 1,5 days there will be 5 sessions / rooms
    - Some sessions will be jointly: Future Directions, Open AOB
  - User uptake of GI/EO will be central, together with ‘policy’ perspective
    - Reflected in the key-notes
    - Reflected in special sessions of the EO summit and some of the DWG’s
      - Different EC DG’s and Agencies will be present
  - Other important, ‘special’ sessions



# Sponsors



**KU LEUVEN**





# Practical



- Fly to ...
  - Brussels Airport
    - for European members – avoid ‘Brussels South’ since that is far away
  - Or Amsterdam, Paris and then the train
    - or connecting flight for AMS
- Take the train from BRU
  - 9,8€ and a 14’-15’ ride
- Do NOT rent-a-car
  - Quite useless in and around Leuven
  - You can rent a bike (or ‘borrow’ one 😊)
- List of hotels will follow in due course
  - Between 60 and 200€, but regular prices around 100€

# What after the meetings



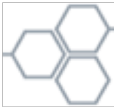
- You can stay for a series of concerts and music festivals
  - Rock Werchter (27-30/06), close to Leuven – 60.000 people



- Tomorrowland (July), Boom – 400.000 people ... try to catch the plane with live DJ's



# Technical / Planning Committee Meetings



Date	Location	Host/Sponsor
Now	Singapore	NUS/SLA/MPA
24-28 June 2019	Leuven, Belgium	KU Leuven
9-13 September 2019	Banff, Canada	University of Calgary
mid-Nov 2019	Toulouse, France	Airbus
March 2020	South Korea (TBC)	
June 2020	Montreal, Canada	CAE
14-18 Sept 2020	Munich, Germany	TUM
30 Nov – 4 Dec 2020	Palo Alto, CA USA	EPRI

**Who wants to host or sponsor? We are particularly looking for sponsorship assistance (\$,€,£...) for upcoming meetings.**



# **TC Chair Announcements and Motions**

# TC Policies and Procedures



- major revision of the TC PnP proposed:
  - [https://portal.opengeospatial.org/files/?artifact\\_id=81792](https://portal.opengeospatial.org/files/?artifact_id=81792)
  - Section 7.7 Policies Specific to a SWG
  - some language on use of collaboration environments/tools (7.7.11)
  - a new Task process for continuation of SWG work per PC guidance (7.7.13)
- Section 8.6 Best Practice and Community Practice Documents
  - new document type per PC and TC guidance
- Section 9 Policies and Procedures for Adoption and/or Revisions of Standards
  - major overhaul to reflect member desire for evidence of implementation

# Section 7.7



- SWGs are persistent and should not need to be continuously rechartered for new work, but the TC should also have visibility into proposed new work
- SWG is chartered to create a specific product
- SWG can create additional products, but only if each effort is approved as a new work **Task**
  - Extensions, Revisions, Profiles all require TC approval before work can start
  - Task requires 21 day TC and public review
  - Approval can be voted in a TC Closing Plenary or via 2-week email vote

## Section 8.6



- **Best Practice:** a document describing the use of one or more OGC standards, typically to address a domain-specific topic or provide a solution to an interoperability challenge. Best Practices may also describe implemented extensions to or profiles of OGC standards.
  - only OGC standards
- **Community Practice:** a document describing implemented standards, specifications, or technologies that originate outside of OGC, but which are relevant to address interoperability requirements in the geospatial and related communities.
  - focus on external specs/standards, but could also include OGC standards

# Section 9



- Standards are approved at their final state after evidence of implementation is provided
  - Prior to such evidence, standard is published as a “Draft standard” and yes, “draft” could be substituted with another term
  - Draft standard will be published on OGC website
  - Evidence requires at least 3 implementations (exceptions to the number can be granted)
  - Uplift to a standard occurs via the normal public comment and voting process



# Section 9 (cont.)



- Nature of implementation: API, service, and exchange protocol standards shall have as evidence of implementation running services which deliver content to another machine (including client software). Encoding standards shall have as evidence of implementation data sets containing content representative of the standard, but not necessarily containing an example of every element in the standard.
- Conceptual model evidence of implementation: a standard that is conceptual in nature (e.g., cannot be implemented directly) shall only be advanced from a Draft to a final stage once at least one implementation standard based on the conceptual model is approved at the Draft stage.
- Abstract Specification Topics: these standards do not require evidence of implementation due to their foundational nature. Abstract Specification Topics are approved as standards without a Draft stage.

# AsciiDoc templates now available



- <https://github.com/opengeospatial/templates>
  - Standards
  - Best Practices
  - Discussion Papers
  - White Papers
  - Release Notes
- Populated per initiative
  - Engineering Reports



# **WG Reports not to be briefed**

# Not being briefed today

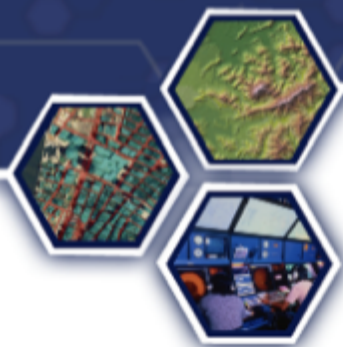


- 3DPS SWG
- CDB SWG
- CITE SC
- Citizen Science DWG
- CityGML SWG
- Coverages DWG / WCS SWG
- DGGS DWG
- DocTeam
- Future Directions
- IDBE SC
- Interoperable Simulation and Gaming DWG
- JAG
- Joint Smart Cities, Land Infra, IDBE
- LandInfra DWG
- LandInfra SWG
- Marine Summit
- Metadata and Catalog DWG
- Moving Features SWG
- OGC Naming Authority
- OWS Common – Security SWG
- PipelineML SWG
- Security DWG
- SensorThings SWG
- SWE DWG
- Temporal DWG
- TimeSeries SWG
- University DWG
- WMS SWG
- Workflow DWG / WPS SWG



3 – Z (except that “O” comes after “V” today... there is a good reason)

# **WG Reports with TC Motions**



Meeting Partners



Reception Sponsor



# 3DIM DWG Agenda

110th OGC Technical Committee  
Singapore

J Stoter, D Graham C Rösndorf  
28 February 2019

# The most important thing for this WG is...



Lot's of

# Agenda



- CityGML & Augmented Reality work in Testbed 14,  
*Jérôme Jacovella-St-Louis, Ecere*
- CityGML Utility Network ADE - Recent developments,  
*Tatjana Kutzner, TUM*
- An Underground Environment Data Model for BIM and GIS Integration - A CityGML ADE focusing on Groundwater",  
*Tatjana Kutzner, TUM*
- 3D development for pipeline information management,  
*Ivy Chen Feng Chia University*
- AR Consensus-formation system for "i-City Restoration (Urban Structure Visualization)"(TBD) in Japan; CityGML Use Case,  
*Tomohisa Oishi, Panasonic*



# Activity Summary



- Discussion topics
  - CityGML supporting AR
  - Representation of (underground) utilities
- Upcoming deliverables
  - none
- Coordination (ongoing and planned)
  - New Built Environment DWG
- Future meetings
  - next TC Meeting
  - CityGML 3.0 Hackathon April/May 2019

# 18-025 OGC Testbed-14 - CityGML and AR Engineering Report



- The 3DIM DWG recommends that the OGC Technical Committee approve release of 18-025 OGC Testbed-14 - CityGML and AR Engineering Report as an OGC Public Engineering Report.
  - Pending any final edits and review by OGC staff
  - There was no objection to unanimous consent

This OGC Testbed 14 Engineering Report (ER) describes the results of the Augmented Reality (AR) work performed in the Testbed 14 CityGML and Augmented Reality work package which was part of the Next Generation services thread.



Meeting Partners



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# Architecture DWG

110th OGC Technical Committee  
Singapore

Joan Maso, Gobe Hobona  
28 February 2019

# The most important thing for this WG is...



The need for the next OWS Common version to support API building blocks. This work is already in progress.

# Agenda



- Vector Tiles Pilot Extension Engineering Report
  - Jeff Yutzler (Image Matters)
- Unified Mapping Service
  - Jerome St-Louis (Ecere)
- OWS Hackathon proposal
  - Chuck Heazel (Heazel tech/WiSC)
- OGC Web API Guidelines Review
  - Andreas Matheus (Secure Dimensions)
  - Clemens Portele (Interactive Instruments)

# Activity Summary



- Discussion topics

- Vector Tiles Pilot Extension (vector tiles and styling)
- **VTP/VTPExt engineering reports: These are not OGC standards.**
- Need for the next OWS Common version to support API building blocks
- OWS Hackathon suggestion from the WFS SWG

- Coordination (ongoing and planned)

- OWS Common SWG
- OAB
- All DWGs and SWGs

- Upcoming deliverables

- OGC Web API guidelines
- JSON Best Practices

- Future meetings

- June TC

# Key activities



- Development of the OGC Web API Guidelines
- Development of JSON Best Practices

# Request for an electronic vote for 18-101 Vector Tiles Pilot Extension Engineering Report to be released as a Public ER



- The Architecture DWG recommends that the OGC Technical Committee approve an electronic vote to approve release of 18-101 Vector Tiles Pilot Extension Engineering Report as an OGC Public Engineering Report.
  - Pending any final edits and review by OGC staff
  - There was no objection to unanimous consent
- The purpose of the OGC Vector Tiles Pilot Extension (VTPEExt) was to address portrayal and style encoding concerns that were discovered in the initial phase of the Vector Tiles Pilot (VTP). This ER presents the findings of the VTPEExt project.



# Motion to approve Pull Request #34 of the OGC Web API Guidelines



- The Architecture DWG approves Pull Request #34 of the OGC Web API Guidelines. This Pull Request is the result of a review undertaken by Clemens Portele and Andreas Matheus considering the WFS3 API design. Also, this review included consideration of the comments and issues so far. This will merge commits into the **master** branch from the **II-and-SECD-brainstorming-session** branch.
  - Discussion: All the issues remaining will be reviewed subsequent to this and those that are addressed will be closed.
  - No objection to unanimous consent



Meeting Partners



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# Defense and Intelligence DWG

110th OGC Technical Committee  
Singapore  
Sly Hagler  
28 February 2019

# The most important thing for this WG is...



Agreed on the need to better coordinate between D&I organizations to make better use of the OGC. In particular, start planning for TB-16 now.

# Agenda

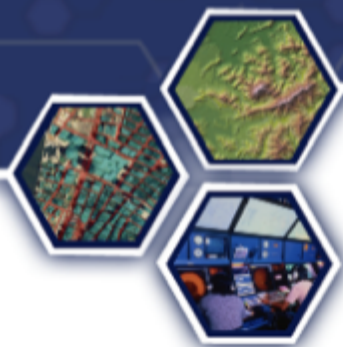


- Discussion on how to increase the value provided to the D&I community by the OGC.

# Key activities



- There was a general consensus that D&I community members need to better coordinate their engagement with the OGC. It was decided that the DGIWG was the most appropriate venue for pursuing this coordination. The D&I DWG may be incorporated once the process has stabilized.
- The next DGIWG meeting is April 13, 2019 in Vienna Austria.
- Actions taken:
  - Standup a D&I DWG GitHub (NGA)
  - Establish a roadmap of standardization needs (ALL)
  - Develop a Reference Architecture to organize and prioritize the needs (ALL)
  - Pitch this proposal to the next DGIWG meeting (NGA)



Meeting Partners



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# DGGS SWG REPORT

110th OGC Technical Committee

Singapore

Matthew Purss

28 February 2019

# The most important thing for this WG is...



Progressing Topic 21/ISO 19170 through the ISO publication process. Comments received during the ISO balloting process thus far will be considered in light of the proposed Standards Development Roadmap for Topic 21



# Agenda



- Meeting Open
- Update on DGGS ISO progress
- DGGS standards roadmap
  - optional vs compulsory elements
  - multi-part standard suite e.g.
    - part 1 - current Topic 21 (surface DGGS)
    - part 2 - 3D DGGS
    - part 3 - temporal encoding in a DGGS
- Other Business
- Meeting Close



Meeting Partners



Reception Sponsor



# IndoorGML SWG Report to TC

110th OGC Technical Committee  
Singapore

Hyeyoung Kang, Ki-Joune Li  
28 February 2019

# The most important thing for this WG is...



The Most Important thing for IndoorGML SWG meeting in Singapore is to prepare **IndoorGML 2.0** to

- Improve the data model and schema,
- Simplify the data model module, and
- Include more aspects to reply to several demands using extension mechanism

This is led by Sisi Zlanatanova (UNSW, Australia)

# Agenda

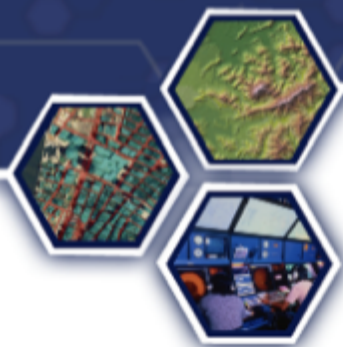


- Progress Report by Ki-Joune Li (5 min.)
- Presentations
  1. UI/UX for Indoor Navigation by Sanghee Shin (15 min.)
  2. IndoorJSON and IndoorGML Validator by Hugo Ledoux (15 min.)
- Voting on discussion paper (5 min.)  
[Anchor Node Extension in IndoorGML - Seamless Navigation between Indoor and Outdoor Space](#) by Kyoung-Sook Kim and Jiyeong Lee
- Report on IndoorGML 2.0 by Sisi Zlatanova (20. min.)
- Discussion (25 min.)
- Extensions (Non-Official extensions)
  1. Public Safety (NIST-OGC Pilot Project for Indoor Mapping)
  2. Non-Navigable Space
  3. Storey

# TC Approval Motion



- IndoorGML SWG recommends that the OGC Technical Committee approve release of [OGC 19-004] “Anchor Node Extension in IndoorGML - Seamless Navigation between Indoor and Outdoor Space” as an OGC Discussion Paper.
  - Pending any final edits and review by OGC staff
  - There was no objection to unanimous consent
- Summary: investigate the approach of connection between indoor and outdoor space and how to extend IndoorGML core and navigation modules for this purpose.



Meeting Partners



Reception Sponsor



# Met Ocean Domain Working Group Plenary Report

110th OGC Technical Committee  
Singapore  
Chris Little  
28 February 2019

# The most important thing for this WG is...



Development of a globally accepted 'Weather on the Web'  
API based on OpenAPI and WFS3.0 with modern  
serialization (JSON) delivery of data

# Met Ocean DWG Agenda



Welcome, Introduction, technology struggles

Updates:

~~Finland Met. Institute & Spatinee WFS3 report, Tervo Roope [10min]~~

New activity with WMO/ICAO Weather Symbols, Chris Little [5min]

OGC Tiling and Portrayal strategic activities, ? [5min]

OGC Temporal activities, Chris Little [5min]

Time Series ML progress, Paul Hershberg/Steve Olson [5min]

Weather on the Web API:

Outcome & deliverables of Washington Workshop, Steve Olson [10min]

Weather on the Web API & live demo, Mark Burgoyne [10min]

UK Met Office/IBL scalable, operational 4+D tiling Service Hub [10min]

Intro to CoverageJSON & way forward discussion, Mark Burgoyne [5min]

Further cross-domain collaboration discussion:

Current activities [15min]

Future activities [15min]

OGC<sup>®</sup> Any Other Business



# Activity Summary



- Discussion topics

- Weather on the Web API live demo with internal WCS2.1/CIS1.1
- Standardize CoverageJSON encoding
- Finnish Met Institute & Spatineo implementation of WFS3
- Strategic OGC work: tiling, portrayal, time

- Upcoming deliverables

- Ongoing documentation of Weather on the Web API work
- CoverageJSON SWG Charter

- Coordination (ongoing and planned)

- WCS SWG for Met Ocean Extensions
- WMO Progress report on Weather on the Web
- W3C SDWIG, SVG, IWWG (xR)

- Future meetings

- Telcos
- OGC TC Leuven
- OGC 'Hackathons' for WxS3.0

# Key activities



- Several implementations of OpenAPI WFS3 based services
- Agreed on data orientated API roadmap
- WCS2.1/CIS2.1 Met Ocean extensions for Polygons and Trajectories/Corridors
- Standardize CoverageJSON

# Request to establish a SWG



- The Met Ocean DWG recommends that the OGC Technical Committee approve the development of a charter to establish a SWG to progress Coverage JSON to an OGC Implementation Standard.
  - Coverage JSON fits the ISO concept but being schema-less, not completely WCS2.1/CIS1.1 compatible
  - NOTUC There was no objection to unanimous consent

# Next Quarter WG Communications Plan



- Publish documentation from the Weather on the Web workshop, Dec 2018 in Washington DC, USA
- Highlight OGC work (Met, Ocean, Hydro) at WMO Congress in June 2019 (every 4 years), Geneva, Switzerland



Meeting Partners



Reception Sponsor



# Point Cloud DWG Report to TC

110th OGC Technical Committee  
Singapore

Stan Tillman, Hexagon  
28 February 2019

# The most important thing for this WG is...



Discussion around whether we know enough to begin an effort to standardize a point cloud service interface.

# Agenda



- A Human-Machine In Loop based Annotation Framework for Immersive Point Clouds
  - Jun Lee, National Institute of Advanced Industrial Science and Technology
- What's next for the Point Cloud DWG?
  - Stan Tillman, Hexagon
- Presentation of motion to the TC
  - Stan Tillman, Hexagon

# Activity Summary



- Discussion topics

- A Human-Machine In Loop based Annotation Framework for Immersive Point Clouds
- Do we know enough to begin an effort to standardize a point cloud service interface?

- Upcoming deliverables

- Testbed 14 Point Cloud Handling ER

- Coordination (ongoing and planned)

- N/A

- Future meetings

- Next Meeting: Leuven, Belgium



# Document Approval Motion



- The Point Cloud DWG recommends that the OGC Technical Committee approve release of [18-048r1] “Point Cloud Data Handling Engineering Report” as an OGC Engineering Report.
  - Pending any final edits and review by OGC staff
  - There was no objection to unanimous consent
  - Abstract:
    - This Engineering Report (ER) describes requirements a point cloud web service must satisfy to enable application developers to provide convenient remote access to point clouds. It provides a short contrast of five point cloud web service software approaches

# Next Quarter WG Communications Plan



- < Are there any upcoming events (e.g., conference papers) related to your WG that you would like OGC to promote? >
  - No
- <Is there a new project or outcome that you think is worthy of an article or blog post? Please add a short description.>
  - No
- <Have there been any articles published online/in magazines that reference the work your WG is doing?>
  - An article about the Point Cloud DWG is being written for Lidar News – Scott Simmons has more details.



#### Meeting Partners



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# OWS Common

110th OGC Technical Committee  
Singapore  
Joan Masó  
28 February 2019

# The most important thing for this WG is...



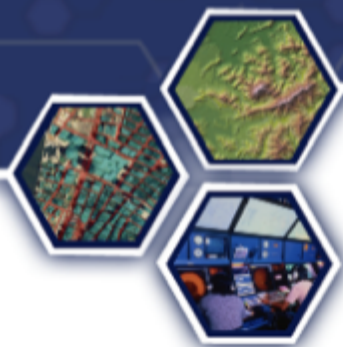
Urgency: It is time to write: we agreed to provide a draft document “OWS common API” in by May 27th (one month before the closing plenary)

The process will be done in the GitHub public repository  
[https://github.com/opengeospatial/oapi\\_common](https://github.com/opengeospatial/oapi_common)

# Agenda (sorted as it happened)



- Introduction to OAPI\_Common GitHub repository [1] and future work. Chuck Heazel (Heazeltech)
- Discussion about how we organize ourselves to continue
- How can we design a common framework for OpenAPI. Peter Vretanos (Cubewerx)
- OpenAPI to serve coverages. Peter Baumann (Jacobs University)
- [1] [https://github.com/opengeospatial/oapi\\_common](https://github.com/opengeospatial/oapi_common)



#### Meeting Partners



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# WFS SWG

110th OGC Technical Committee  
Singapore  
Clemens Portele  
28 February 2019

# The most important thing for this WG is...



That the OGC membership is aware of the ongoing work on WFS 3.0, engages in the OWS Evolution discussions in the Architecture DWG and raises any concerns about using the non-feature-specific part of the WFS 3.0 Core as a potential “OGC API Common” as discussed at the TC meeting in Stuttgart

# WFS 3.0 Core - Resources



From the Stuttgart TC meeting

Table 1. Overview of resources, applicable HTTP methods and links to the document sections

Resource	Path	HTTP method	Document reference
Landing page	/	GET	<a href="#">7.2 API landing page</a> information about the API
API definition	/api	GET	<a href="#">7.3 API definition</a>
Conformance classes	/conformance	GET	<a href="#">7.4 Declaration of conformance classes</a>
Feature collections metadata	/collections	GET	<a href="#">7.11 Feature collections metadata</a> a dataset with a sub-division into named collections
Feature collection metadata	/collections/{name}	GET	<a href="#">7.12 Feature collection metadata</a>
Feature collection	/collections/{name}/items	GET	<a href="#">7.13 Feature collections</a>
Feature	/collections/{name}/items/{fid}	GET	<a href="#">7.14 Feature</a> the features

[https://cdn.rawgit.com/opengeospatial/WFS\\_FES/3.0.0-draft.1/docs/17-069.html#tldnr](https://cdn.rawgit.com/opengeospatial/WFS_FES/3.0.0-draft.1/docs/17-069.html#tldnr)

Only the feature resources are specific to a “feature service”



# Agenda



- Status overview (Clemens Portele)
- Resolving open WFS 3.0 Core issues (all)
  - [https://github.com/opengeospatial/WFS\\_FES/issues?page=2&q=is%3Aissue+is%3Aopen+label%3A%22Document%3A+Part+1+-+Core%22](https://github.com/opengeospatial/WFS_FES/issues?page=2&q=is%3Aissue+is%3Aopen+label%3A%22Document%3A+Part+1+-+Core%22)



Meeting Partners



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# Working Group Reports (no motions)

110th OGC Technical Committee  
Singapore  
Scott Simmons  
28 February 2019



Meeting Partners



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# 3DPS Working Group Report

110th OGC Technical Committee  
Singapore  
Volker Coors  
28 February 2019

# The most important thing for this WG is...



Discussion on requirements for 3D symbology and styling –  
conceptual model and support of style sheets

# Agenda



- TOP 1: 3D Tiles Community Standard
- TOP 2: A light solution for WebVR produce automatically (Will Chih-Wei Kuan)
- TOP 3: Symbolology and Styling requirements in 3D Portrayal (Volker Coors)
- TOP 4: Symbolology and Styling in I3S (Tamrat Belayneh)
- TOP 5: Open Discussion on Symbolology and Styling

# Activity Summary



- Discussion topics

- Requirements for symbols and styling in 3D scenes
- Annotation / Labels as symbols?
- Open API spec. for 3DPS based on prototype implementation in Testbed 14

- Upcoming deliverables

- 3D Tiles as new community standard
- 3DPS on github:
- <https://github.com/opengeospatial/3DPS>

- Coordination (ongoing and planned)

- Future Portrayal DWG
- Vector Tiles

- Future meetings

- Next TC meeting Belgium

# Key activities



- Action item as agreed in the SWG meeting:
- Link 3D building model of the US (<https://github.com/opencitymodel/opencitymodel>) to OGC test data set at <http://www.opengeospatial.org/resources/data>



Meeting Partners



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# **CDB SWG**

## **Closing Plenary Report**

110th OGC Technical Committee

Singapore

David Graham

28 February 2019



# The most important thing for this WG is...



Maintaining momentum on the multiple efforts underway connected to the SWG: an Interoperability Experiment, development of a minor revision, development of a major revision

# Agenda



- **Turn on GTM recording**; Patent Call; roll call; quorum;
- Update from CDB2 Working Group Meeting in February;
- Update from Vector Data in Geopackage Interoperability Experiment (currently underway):
- Summary of discussion from ISG DWG meeting earlier in the TC week
- Related 'external' activities
- Other Business / New Business
- Short term meeting schedule



Meeting Partners



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# CITE Sub-Committee

110th OGC Technical Committee  
Singapore  
Chuck Heazel  
28 February 2019

# The most important thing for this WG is...



The compliance program is looking for additional test leads.  
See <https://github.com/opengeospatial/cite/wiki/CITE-Introduction-Roles-and-Responsibilities>.

GeoPackage 1.2, WFS 3.0, and  
GML in JPEG 2000 2.0 test suites  
have advanced in status.

# Agenda



- OGC Validation Tools – Status Report (lat/lon)
- GeoTIFF ATS – Issues for discussion (C. Heazel)

# Key activities



- The compliance program is looking for additional test leads.
  - <https://github.com/opengeospatial/cite/wiki/CITE-Introduction-Roles-and-Responsibilities>
  - Contact Dirk Stenger ([stenger@lat-lon.de](mailto:stenger@lat-lon.de)) if interested
- TEAM Engine Status
  - Version 5.3.1 is the current TEAM Engine release.
  - Version 5.4 is in development.
  - A list of the complete fixes and enhancements can be found at: <https://github.com/opengeospatial/teamengine/milestone/31?closed=1>
- Test Suite Status
  - GeoPackage 1.2 test suite has moved to production
  - WFS 3.0 test suite have moved to beta
  - GML in JPEG 2000 2.0 test suite has moved to beta



Meeting Partners



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# Citizen Science DWG

110th OGC Technical Committee  
Singapore  
Joan Masó  
28 February 2019

# The most important thing for this WG is...



Monitoring and supporting the Citizen Science  
Interoperability experiment and supporting the Earth  
Challenge 2020



# Agenda



- Progress on the Citizen Science Interoperability experiment
  - [http://external.opengeospatial.org/twiki\\_public/CitSciE/2019\\_04\\_EGU](http://external.opengeospatial.org/twiki_public/CitSciE/2019_04_EGU)
- Earth Challenge 2020: Research Questions to Help Citizen Science Scale
  - [https://portal.opengeospatial.org/files/?artifact\\_id=82880](https://portal.opengeospatial.org/files/?artifact_id=82880)

# Activity Summary



- Discussion topics
  - CitSciE
  - Earth Challenge 2020 research questions

- Upcoming deliverables
  - CitSciE ER

- Coordination (ongoing and planned)
  - NAD ad-hoc

- Future meetings
  - Need for telecons in support to the Earth Challenge 2020 research questions



#### Meeting Partners



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# CityGML

110th OGC Technical Committee  
Singapore

C Roensdor, S Smyth, C Roensdorf  
28 February 2019

# The most important thing for this WG is...



Hackathon planning and UML model consolidation are currently the two main activities

# Agenda Modelling Sub-group



- Status: summary of work plan and work to date.
  - GitHub Issues:
  - Process
  - Hackathon dependency – see main CityGML SWG meeting
- Key changes between 2.0 and 3.0
  - Specification as UML not XSD
  - Cloning or replacement of GML concepts
  - New concepts: LOD, Spaces
- Review of Modelling Subgroup Progress
- Experience with Draft 3.0 model
  - Automated conversion
  - FZK-Haus models

# Agenda Main Meeting



- Welcome members/observers/OGC staff
- Patent call
- Sign-in/Roll Call – Do we have quorum?
- Status:
  - Quick summary of progress at Modelling subgroup
  - CityGML Lite approach
  - CityGML 3.0 Hackathon
- CityGML ADE , Filip Biljecki
- CityGML 3.0 test data created by NUS, James Crawford
- CityGML 3.0 Hackathon planning



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# Coverages+Datacubes Session, WCS.SWG

110th OGC Technical Committee  
Singapore

Peter Baumann

28 February 2019

# The most important thing for this WG is...



...to maintain & continuously enhance  
a flexible, easy-to-use, but powerful service suite  
for multi-dimensional coverages,  
in particular: datacubes,  
*and preserve assets of the many tools & services existing*



# Agenda

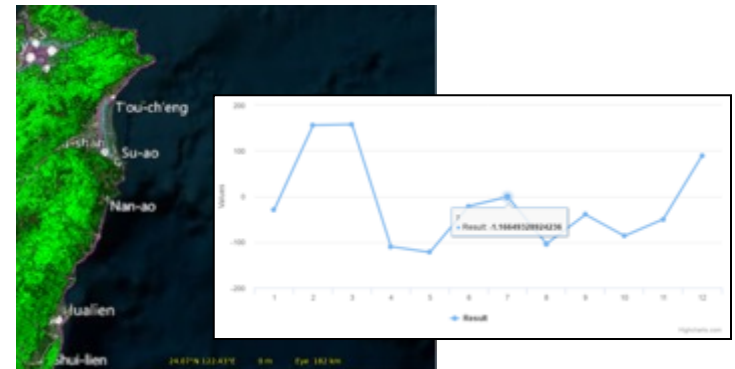
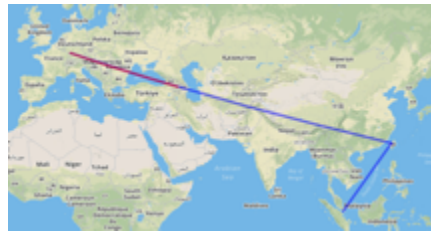
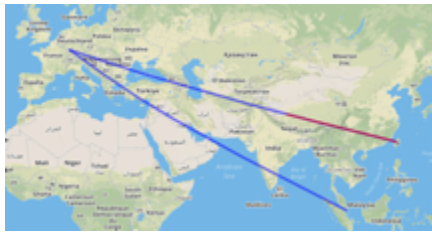


- Coverages+Datacubes session:
  - Coverages status brief (P. Baumann)
  - Rasdaman Datacubes for Agricultural Management in Taiwan (振宇 How)
  - Geospatial Data Cubes Community Practice (G. Percivall)
  - Met Ocean sampling geometry use cases implemented by sampling a data cube (P. Trevelyan)
  - WCS & OpenAPI (P. Baumann)
- WCS.SWG session:
  - WCS Hackathons - 2019 (George Percivall)
  - Corrigenda (P. Baumann)

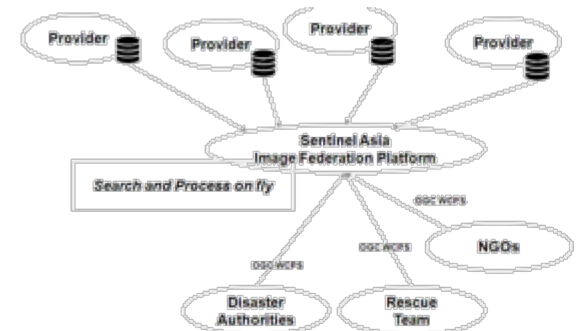
# Rasdaman Datacubes for Agricultural Management in Taiwan (振宇 How)



- History:
  - FCU report on Open Data Cube experience @ Ft Collins, 2018
  - Interest expressed in rasdaman, joint workshops in Taiwan
- Status:
  - first Federation NCHC/Taiwan + CODE-DE/Germany



- Next step:  
Sentinel Asia data federation network



# Data Cubes Community Practice



- Reviewed recently posted version of the document – Version 0.3 – 18-095r2
- Main changes: addition of more implementations
- Binning Requirements into Core and Extensions
  - Discussion, to be continued
- Plan a Workshop, perhaps at the June TC
  - Friday opposite the PC?
- Discussion: what are the rules for a „community practice“?  
How to decide what's in and what's out?
  - Example: „ftp is a datacube service“



Meeting Partners



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# DGGS DWG Report

110th OGC Technical Committee

Singapore

Matthew Purss

28 February 2019

# The most important thing for this WG is...



Establishing an official Registry of DGGS implementations  
(and how they measure up to the requirements of Topic 21)  
is the most important activity for the DGGS DWG at the  
moment.

# Agenda



- Meeting Open
- Update on DGGS Registry
- Digital Earth Canada Update
- Provenance and O&M considerations for a DGGS
- Discussion: Equal area vs non-equal area
- DGGS Outreach Activities
- Other Business
- Meeting Close

# Activity Summary



- Discussion topics

- DGGS Registry status and path forward with CITE and OGC-NA was discussed
- Deeper consideration of the question of equal area vs non-equal area was discussed
- Concept of holding a dedicated DGGS workshop floated

- Upcoming deliverables

- nil

- Coordination (ongoing and planned)

- GEBCO, EC, UN targeting broader applications of both surface and higher dimensional DGGS
- Continued outreach activities to promote DGGS and explore their application to spatial industries

- Future meetings

- Next Telecon 27 March 2019
- Next Face-to-Face Meeting June TC

# Key activities



- The discussion on Equal Area vs Non-Equal Area requires further discussion. Concerns raised during the meeting were focused on ensuring that the OGC is not seen as being too elitist contrasted against the risk of reputation to the OGC if the Equal Area requirement of Topic 21 were to be relaxed.
- The DGGS DWG felt more discussion on the issue was warranted before it was comfortable proposing a formal motion that the OGC put out an official position on this issue.



# Next Quarter WG Communications Plan



- Discuss an appropriate wording for any official position the OGC should take on the equal-area vs non-equal area issue.
- Continue to work with the OGC staff to publish the OGC DGGS Registry.



#### Meeting Partners



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## DocTeam

110th OGC Technical Committee  
Singapore  
Scott Simmons  
28 February 2019

# The most important thing for this WG is...



Develop a document management system that manages multiple editing and publishing environments and templates.

# Agenda



- Ron Tse, Ribose: Metanorma document management
- Scott Simmons: new AsciiDoc templates

# Activity Summary



- Discussion topics

- Demonstration of content management capabilities of Metanorma
- Assess capabilities gap in Metanorma
- Highlight new AsciiDoc templates for ALL OGC document types

- Upcoming deliverables

- Revised template use guidance

- Coordination (ongoing and planned)

- Working with CalConnect and ISO on potential use of Metanorma for ISO document publication

- Future meetings

- next TC Meeting

# Templates now available



- <https://github.com/opengeospatial/templates>
  - Standards
  - Best Practices
  - Discussion Papers
  - White Papers
  - Release Notes
- Populated per initiative
  - Engineering Reports



Meeting Partners



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# **Future Directions: Modeling, Simulation & Prediction**

110th OGC Technical Committee  
Singapore  
Gobe Hobona  
28 February 2019

# The most important thing for this WG is...



OGC standards could allow for different levels of detail/complexity to accommodate basic users who may only be interested in a subset of the capabilities offered by a standard



# Agenda



- Future Directions of Modeling, Simulation and Gaming used for Training and Rehearsal – David Graham (Eagle Cap Systems/CAE)
- Observations on Developments in Information Modelling – Clemens Portele (Interactive Instruments GmbH)
- A Brief History of Meteorology and Numerical Weather Prediction – Chris Little (UK Met Office)
- Lessons for Future OWS-Supported Geospatial Predictive Modeling – Gobe Hobona (OGC)
- Panel Discussion

# Activity Summary



- Discussion topics
  - Modeling and Simulation for Training
  - Information modelling
  - Predictive modeling
  - History of meteorology and the impact of computing on accuracy of forecasts
- Upcoming deliverables
  - None
- Coordination (ongoing and planned)
  - OGC Technology Trends
- Future meetings
  - June 2019 TC



#### Meeting Partners



#### Reception Sponsor



## IDBE SC

110th OGC Technical Committee  
Singapore  
C Rönsdorf, J Plume  
28 February 2019

# The most important thing for this WG is...



Exploring and defining use cases and plans for future projects.

# Agenda



## [08:00 – 08:50] **Session 1, Improving digital collaboration**

The summit is intending to try to generate and share ideas for potential development and testing (R&D) that can help solve urban complex problems, where multiple stakeholders need **improved forms of digital collaboration** in order to participate effectively and contribute in decision-making processes.

Integrated Digital Build Environment – Jim Plume, bSI and  
Carsten Rönsdorf, OS

How developing use case stories can become an effective  
tool to facilitate complex, multi-stakeholder collaboration  
challenges presentation, James Crawford, OS

# Agenda



## [08:55 – 09:45] **Session 2, Expertise round-up and knowledge share**

- Outcomes from current and previous R&D projects, Jeremy
- Energy, Adrian
- Human Building Interaction (HBI), PJ
- BIM/Geo IFC2CityGML, Rudi
- Parametric Information Modelling, Patrick
- Analysing and summarising the Munich findings, Tom

Discussion

# Agenda



**[10:15 – 11:30] Session 3, interactive ideas generation and presentation**

Breakouts to generate draft project ideas

**[11:30 – 12:00] Session 4, interactive ideas generation and presentation**

Presentations back to plenary and discuss about potential impact and delivery.

# Activity Summary



- Discussion topics

- Transfer of data from construction to operations
- Accessibility of data
- Data coming together in a secure environment

- Upcoming deliverables

- Munich report describing relationship between IFC, CityGML and LandInfra

- Coordination (ongoing and planned)

- Portfolio of projects
- bSI

- Future meetings

- Heerbrugg IDBE PC and rail workshop, 1-2 April in Heerbrugg





Meeting Partners



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# **Interoperable Simulation and Gaming Domain Working Group Closing Plenary Report**

110th OGC Technical Committee

Singapore

David Graham

28 February 2019

# The most important thing for this WG is...



Continuing to draw inputs, presentations, and discussions from the 'Gaming' stakeholders in the ISG Community of Practice

# Agenda



- Introduction; DWG Chairs
- Introduction to the STE World Server: Pete Morrison, co-CEO Bohemia Interactive Simulations
- One World Terrain – Well-formed 3D Data for Next-Generation M&S: Ryan McAlinden, Institute for Creative Technology
- Discussion
- CDB SWG and other related, ongoing OGC activities

# Activity Summary



- Discussion topics
  - The U.S. Army STE Initiative
  - The U.S. Army One World Terrain (OWT) component of the STE initiative
  - The BIS STEWS (STE World Server)

- Upcoming deliverables

- Coordination (ongoing and planned)
  - CDB SWG
  - SISO
  - Mixed Reality to the Edge CDS

- Future meetings
  - Potential joint meeting with SISO



#### Meeting Partners



#### Reception Sponsor



# JAG Report

110th OGC Technical Committee  
Singapore

Matthew Purss

28 February 2019

# The most important thing for this WG is...



One key thing that is of importance to JAG is finding the most appropriate, consistent and smoothest way for adopted OGC standards to be published by ISO/TC 211



Meeting Partners



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# **Joint smart, Landinfra DWG etc + IDBE Agenda**

110th OGC Technical Committee  
Singapore

D Sarafinof, L Granholm, J Herring, C Rönsdorf  
27 February 2019

# Agenda



- LandInfra ADE for CityGML and converter between CityGML and InfraGML,  
*Kavisha Kumar, TUD*
- Summary of IDBE Geotechnics workshop in Paris,  
*Scott Simmons*
- Discussion about joining DWGs into a Built Environment DWG





#### Meeting Partners



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# LandInfra DWG

110th OGC Technical Committee  
Singapore  
Leif Granholm  
28 February 2019

# Agenda



At the moment main focus on advancing and supporting software implementations of InfraGML

# Activity Summary



- Discussion topics

- supporting ISO TC 127 Earth moving machinery in creating a standard to transfer terrain models to machines
- Delft university JSON encoding of LandInfra vconceptual model
- Merging with Smart Cities DWG

- Upcoming deliverables

- Coordination (ongoing and planned)

- ISO TC 127

- Future meetings

- Leuven
- <special forum or conference>



Meeting Partners



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# LandInfra SWG

110th OGC Technical Committee  
Singapore  
HC Gruler  
28 February 2019

# The most important thing for this WG is...



Create sample datasets and get some feedback and push implementations for InfraGML 1.0 – Get aligned with other WG and define the scope and collect the requirements for the next version.

# Agenda



- Ressources – new members to SWG
- DWG activities
- IDBE update
- bSI update
- Definition of work packages
  - Alignments with bSI
    - Site – restart of Site in InfraGML
    - Maintenance of 1.0
      - Roads – superelevation, surface representation
      - Rail – Cant
      - Tunnel
      - RFC
  - Utilities - MUDDI
  - LADM
- Ambassador for new implementations



Meeting Partners



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# Marine Summit outputs

110th OGC Technical Committee  
Singapore  
28 February 2019

# Summit Aims



- Assess the current state of marine geospatial data standardisation and broader use to feed into future areas of work for the MDWG.
- Highlight interesting and innovative technologies applicable to the marine geospatial community that utilize standards
- Promote the work of the Marine Domain Working Group within the OGC, and the OGCs unique capabilities to a broad marine audience.
- Advance the MDWG's mission and objectives
- Gather feedback for the IHO community on impacts related to relevant hydrographic activities



# Agenda



## **Session 1. Introduction, Keynote and MSDI**

10:15 – Welcome to the Marine Summit, OGC overview and objective for the day – Trevor Taylor, OGC

10:45 – Key Note Speech – Cathrine Armour, UKHO

11:15 – Singapore MSDI concept GeoSpace-Sea – Jamie Chen, MPA

11:45 – The Natural Capital Project – Dr. Dan Friess, NUS

## **Session 2. Marine Geospatial Standards – Chair: Jonathan Lewis**

13:00 – IHO, OGC and industry standards collaborations – Jonathan Pritchard, IIC

13:30 – Spatio-Temporal Datacubes for Marine Big Data: Concepts, Standards, Tools  
– Dr. Peter Baumann, Jacobs University

14:00 – Challenges around environmental data exchange formats – Byron Cochrane, NIWA

## **Session 3. Bathymetry – Chair: Andy Hoggarth**

14:45 – AusSeabed: Standardising seabed mapping data for the development of a National data hub – Kim Picard, Geoscience Australia (REMOTE)

15:15 – Seabed 2030 Project Overview – Dr. Thierry Schmitt, SHOM, co-chair GEBCO TSCOM (REMOTE)

15:45 – Discrete Global Grid Systems in the Marine Context – Dr. Matthew Purss – Geoscience Australia

## **Session 4. Innovations – Chair: Jonathan Pritchard**

16:30 – S-102 bathymetry data as a service – Andy Hoggarth, Teledyne Caris

17:00 – Achieving maritime domain awareness through standards – Frederic Houbie, Hexagon

17:30 – METIS - A Marine Environmental Information System – Choo Heng Kek, National University of Singapore

# Key outputs



- Summarised Issues and Challenges to go to full day MDWG meeting in Busan 7<sup>th</sup> March
- Co-located with IHO MSDIWG and UN-GGIM. Also forms input for both these meetings too
- More comprehensive outputs from Marine summit will be compiled for MDWG Busan

# Summary of Challenges identified (short version)



- The pain point of Interoperability and discoverability for the marine community in general
- Discoverability specifically for scientific data
- Datum harmonization, particularly vertical (land / sea) + coastal domain (+tide)
- Management and manipulation of temporal data in the marine domain (bathymetry, point clouds)
- Storage and handling for variable resolution data
- DGGs for data discovery and analysis
- Governance + policy for data sharing
- Interoperability and implementation of data catalogues. Not easy “to find everything relevant to my domain of interest”
- Metadata for bathymetry
- Security, provenance, authenticity



#### Meeting Partners



#### Reception Sponsor



# MetCat DWG

110th OGC Technical Committee  
Singapore  
Frédéric Houbie  
28 February 2019

# The most important thing for this WG is...



Metadata & Catalogues  
(and therefore the DWG)  
are cool ...

Great developments ...  
... need good alignment

# Agenda



- Discrete Global Grid Systems (DGGS) - impacts and opportunities for metadata and catalogs - Byron Cochrane (5-10 minutes)
- ISCM/ANZLIC ISO 19115-1&3 Metadata Working Group Report - Byron Cochrane (15 minutes)
- GeoDCAT-AP: progress of activities - Danny Vandenbroucke (15 minutes)
- Testbed-15 and MetCat DWG (10 minutes)
- AOB (5 minutes)

# Activity Summary



- Discussion topics

- DGGS, new way of referencing datasets in metadata
- ISO19115:2014 is not endorsed, why, what should we do for the future of cataloguing, what is expected by the end-users ? TB15 will do a first analysis to be reviewed by the DWG

- Upcoming deliverables

- Draft charter MD&C DWG
- Update of GeoDCAT BP

- Coordination (ongoing and planned)

- OGC Testbeds (15, ...)
- WFS3 SWG
- W3C DXWG
- Projects: POLIVISU, NEXTGEOSS, other projects
- CSW(4), STAC, ...

- Future meetings

- Leuven meetings



Meeting Partners



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# Moving Features SWG Report

110th OGC Technical Committee  
Singapore

Nobuhiro Ishimaru, Kyoung-Sook Kim  
28 February 2019



# The most important thing for this WG is...



To recategorize OGC 16-140r1 “OGC Moving Features Encoding Extension – JSON” Best Practice Paper as OGC Standard, we had better support the compatibility with GeoJSON.

# Agenda



16:30-18:00, Tuesday Feb 26 @ NAK Auditorium

- Roll call, General Introduction, Review the previous discussion at the TC in Charlotte (Nobu, 10min)
- Promotion on Moving Features with tutorial documents (Akinori, 10min)
- A Draft of Moving Features JSON Encodings Standard (Kyoung-Sook, 70min)
- 20+ members presented, Quorum has been established

# SWG internal motion (informative)



- The Moving Features SWG approves the movingfeatures repository on Github as a public repository to release tutorial materials for developers and expand use of OGC Moving Features.
  - There was no objection to unanimous consent.



Meeting Partners



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# OGC Naming Authority

110th OGC Technical Committee  
Singapore  
Gobe Hobona  
28 February 2019

# The most important thing for this WG is...



The potential relationship between the DGGS registry and the Compliance/Implementations database. The discussion centred around whether registered DGGS should be published through the Compliance/Implementations database.

# Agenda



- DGGs Registry – Matthew Purss
- OGC Definitions Server update - Rob Atkinson
- hyf appschema - Rob Atkinson
- OWS Security Authentication Codelist - Gobe Hobona
- Review of requirements for future user interface - Rob Atkinson
- Sensor Model Registry - Gobe Hobona
- Sensor model registries for the marine domain – Alexandra Kokkinaki

# Key activities



- Supporting the DGGs DWG with development of the DGGs Registry
- Development of a Sensor Model Registry



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# OWS Common – Security SWG

110th OGC Technical Committee  
Singapore

Andreas Matheus  
28 February 2019



# The most important thing for this WG is...



being dormant.

According to the charter waiting for Change Requests on the published standard „OGC Web Services Security“  
([http://docs.opengeospatial.org/is/17-007r1/17-007r1.html#\\_mitigations\\_to\\_this\\_threat](http://docs.opengeospatial.org/is/17-007r1/17-007r1.html#_mitigations_to_this_threat))

# Agenda



- \* Verify that the Authentication Code and the resolver is working as intended
- \* Towards Data Centric Security & Security Considerations from 17-007 ([http://docs.opengeospatial.org/is/17-007r1/17-007r1.html#\\_security\\_considerations\\_informative](http://docs.opengeospatial.org/is/17-007r1/17-007r1.html#_security_considerations_informative)) XML Digital Signatures in Capabilities Documents, OGC Encoding Standards (e.g. GML) and OGC Service Encoding Standards (e.g. WFS Feature Collection)



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# PipelineML SWG

110th OGC Technical Committee  
Singapore

John Tisdale & Jan Stuckens

28 February 2019

# The most important thing for this WG is...

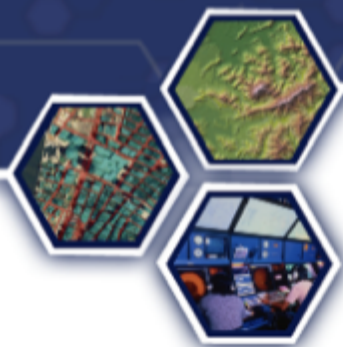


We discussed the 76 public comments and the decisions the SWG made regarding each of them.

# Agenda



- Status of PipelineML proposed standard
- OGC Naming Authority and code management
- Public comments review
- Next steps
- Questions and discussions



Meeting Partners



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# Security DWG

110th OGC Technical Committee  
Singapore

Andreas Matheus  
28 February 2019

# The most important thing for this WG is...



## Data Centric Security

Extending OpenAPI to allow additional security schemes required for securing deployments in the geo-business

# Agenda



- Research of active detection mechanism for UAV application (Mei-Ling (Milly) Yeh, Feng Chia University)
- OpenAPI and Security (Chuck Heazel, Heazeltech)
- Challenges when applying Data Centric Security to SDIs (Andreas Matheus, Secure Dimensions)



# Activity Summary



- Discussion topics
  - How to leverage existing / craft new OGC standards to support drone detection
  - How to extend OpenAPI with additional security schemes
- Upcoming deliverables
  - %
- Coordination (ongoing and planned)
  - Blockchain DWG once approved
- Future meetings
  - next TC Meeting in Leuven



#### Meeting Partners



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# SensorThings SWG

110th OGC Technical Committee  
Singapore  
Steve Liang  
28 February 2019

# The most important thing for this WG is...



Finishing SensorThings Part I – Sensing v1.1 draft, and submit to OAB in April or May 2019

# Agenda



- SensorThings roadmap
  - Moving Object BP #29
  - Security BP #28
  - Authentication BP #27
  - Observation Mutation Optional BP #26
  - Part III – Rules Engine
  - V2.0
- Part I - Sensing v1.1 Discussions
  - new GitHub issues -  
<https://github.com/opengeospatial/sensorthings/issues>
  - existing GitHub issues



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# SWE DWG

110th OGC Technical Committee  
Singapore  
Steve Liang  
28 February 2019

# The most important thing for this WG is...



Promote the SWE works around the world, including better integration with other OGC standards (e.g., digital twin)

# Agenda



- SWE in Taiwan and Demo, FCU - Frank Fang, FCU.GIS
- Innovative Regulatory Applications Based on Metal Oxide Nanostructured Sensors for Air Quality - Andreas N. Skouloudis, JRC
- Demonstration of several smart cities projects in Canada - Steve Liang, SensorUp/University of Calgary

# Activity Summary



- Discussion topics

- Integrate SWE (SensorThings) with other DWG
  - CityGML
  - IndoorGML
  - Moving Features

- Upcoming deliverables

- N/A

- Coordination (ongoing and planned)

- ITU-T FG-DPM WG1
- Moving Features

- Future meetings

- Meeting at next TC





Meeting Partners



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# Temporal Domain Working Group Plenary Report

110th OGC Technical Committee  
Singapore  
Chris Little  
28 February 2019

# The most important thing for this WG is...



Refreshing the very draft Best Practice for Time

# Temporal DWG Agenda



- Brief history of the Temporal DWG [5 min]
- Proposed Best Practice paper V2 [Discussion 15min]
  - OAB revising OGC Reference Model. Basis for new ORM?
  - Propose two approaches: calendar versus coordinates
  - Document OGC/ISO/W3C standards implementing these
- What to do with V0.3 draft Best Practice? [Discussion 10 min]
- OGC & WCS OWL Time Ontology [Discussion 15min]
  - Comments on OGC version retro-fitted W3C doc or not?
- Any Other Business

# Activity Summary



- Discussion topics

- How to Revamp draft BP for Time
- Aligning OGC and W3C OWL-Time documents

- Upcoming deliverables

- New draft BP to be added to GitHub
- Propose informative content from existing BP to inform an Abstract spec document

- Coordination (ongoing and planned)

- **Proposed Liaison with ISOTC154**
- Liaison with W3C

- Future meetings

- Telco
- OGC TC Leuven

# Key activities



- Establishing various time orientated SWGs
- Developed OWL-Time Recommendation in W3C SDWWG
- Consistency of OGC and W3C documents, and life cycle alignment
- New Draft Best Practice and Abstract Spec by end of 2019
- Input into ISO TC154 WG5 code tables for timescales and calendars (and re-use in WKT?)

# No TC Motions or Votes



Motion: The Temporal DWG agreed to liaise, at the expert level, with the ISO TC154 WG 5 over temporal issues, including:

- ISO/CC 34100 (“physical time scales”)
- ISO/CC 34300 (“calendar codes”).

Note: Ronald Tse is convenor, also of CalConnect DateTime

NOTUC

# Next Quarter WG Communications Plan



- W3C SDWIG telcos and Face to face meetings in 2019
- On 15 Jan 2019, UK government adopted ISO8601:2004 as the standard for annotating machinable documents

# Timely Quotes



"The only reason for time is so that everything doesn't happen at once."

*Albert Einstein*

"While the Internet does have a tradition of accepting reality when creating specifications, this should not be done at the expense of interoperability. "

*RFC 3339 Date and Time on the Internet: Timestamps, July 2002*

"Quid est ergo tempus?  
Si nemo ex me quaerat, scio.  
Si quaerenti explicare velim,  
nescio."

"What then is time?  
If no one asks me, I know.  
If I wish to explain it to him who asks, I  
do not know."

*St. Augustine (354–430CE) Confessions, XI, 14*

"O tempora! O mores!"

"What times! What standards!"

*Marcus Tullius Cicero (106–43 BCE) Oratio In Catilinam I, 1.2*





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# Timeseries SWG Closing Plenary Report

110th OGC Technical Committee  
Singapore  
Paul Hershberg  
28 February 2019

# The most important thing for this WG is...



Decipher whether any of NASA's Use Case Requirements are duplicated or shared among other disciplines to determine if they are not so "NASA centric".

# Agenda



- Status of TSML Ver 1.2 & Ver 1.3
- NASA Use Cases - Update
- Gather Version 2.0 Requirements



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# University DWG

110th OGC Technical Committee  
Singapore  
Steve Liang  
28 February 2019

# Agenda



- EO4GEO – Towards an innovative method for designing vocational education and training curricula in the space/geospatial sector” - Danny Vandenbroucke, KU Leuven
- Gauging interest in an activity to benchmark relative costs of sponsoring PhD research internationally - Jeremy Morley, Ordnance Survey
- Mission and Vision of University DWG - Steve Liang, University of Calgary

# Activity Summary



- Discussion topics

- Mission and Vision of University DWG
  - Why are researchers attending OGC activities?
- Benchmarking the value of sponsoring University research

- Upcoming deliverables

- A Mission and Vision document of University DWG before Banff TC

- Coordination (ongoing and planned)

- N/A

- Future meetings

- Two telecons, one for Asian and one for EU/NA
- Meeting at next TC



#### Meeting Partners



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# WMS SWG

110th OGC Technical Committee  
Singapore  
Joan Masó  
28 February 2019

# The most important thing for this WG is...



WMTS 3.0 (or 2.0) work will start with the support of the  
Testbed15 and the eventual approval of TMS 1.0

WMTS 3.0 = WMTS OpenAPI



# Agenda



- Final review of the "17-083r1 - OGC Tile Matrix Set Standard" and the responses to the CRs received.
- Motion to send 17-083r1 to Plenary for final TC approval.
- Open discussion on next steps towards a WMS-WMTS based on OpenAPI



Meeting Partners



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# Joined Workflow/WPS WG meeting

110th OGC Technical Committee  
Singapore

Benjamin Pross, Stan Tillman

28 February 2019

# The most important thing for this WG is...



WPS 3.0

(was WPS 2.0 REST/JSON binding extension)

# Agenda



- WPS3 Cloud Native Hackathon planning, Ordnance Survey
- WPS 2.0 REST/JSON Binding - Update and next steps, Benjamin Pross, Stan Tillman
- AOB