

Tento projekt je spolufinancován Evropským sociálním fondem a státním rozpočtem České republiky.



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# Sensors, SWE and European spatial data initiatives – INSPIRE and GMES

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# Sensor Web Enablement and its future development

Sensor network – different producers, different protocols...

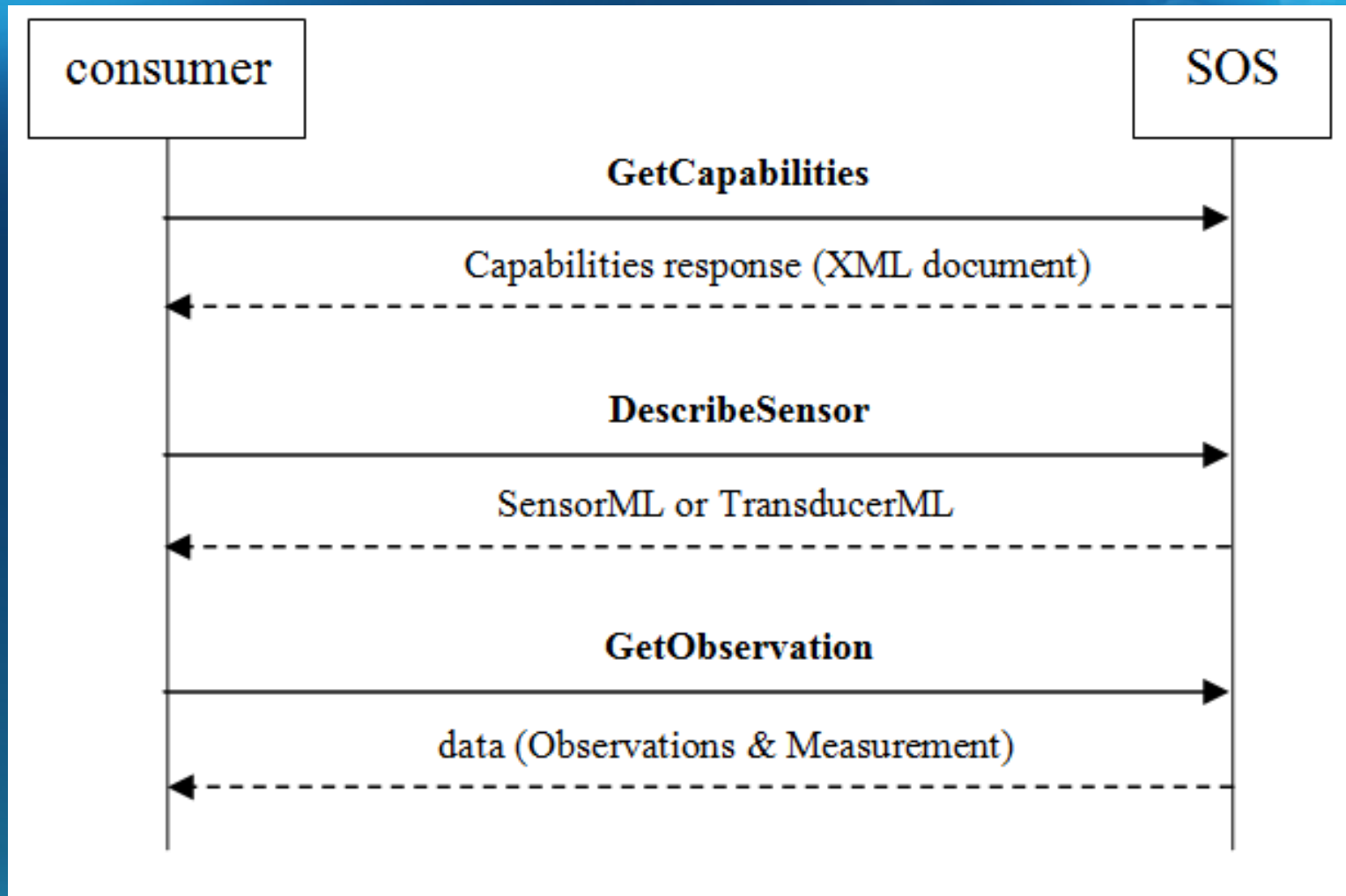
SWE:

- initiative of the Open Geospatial Consortium (OGC)
- standardizes web service interfaces
- hides the different hardware and communication protocols

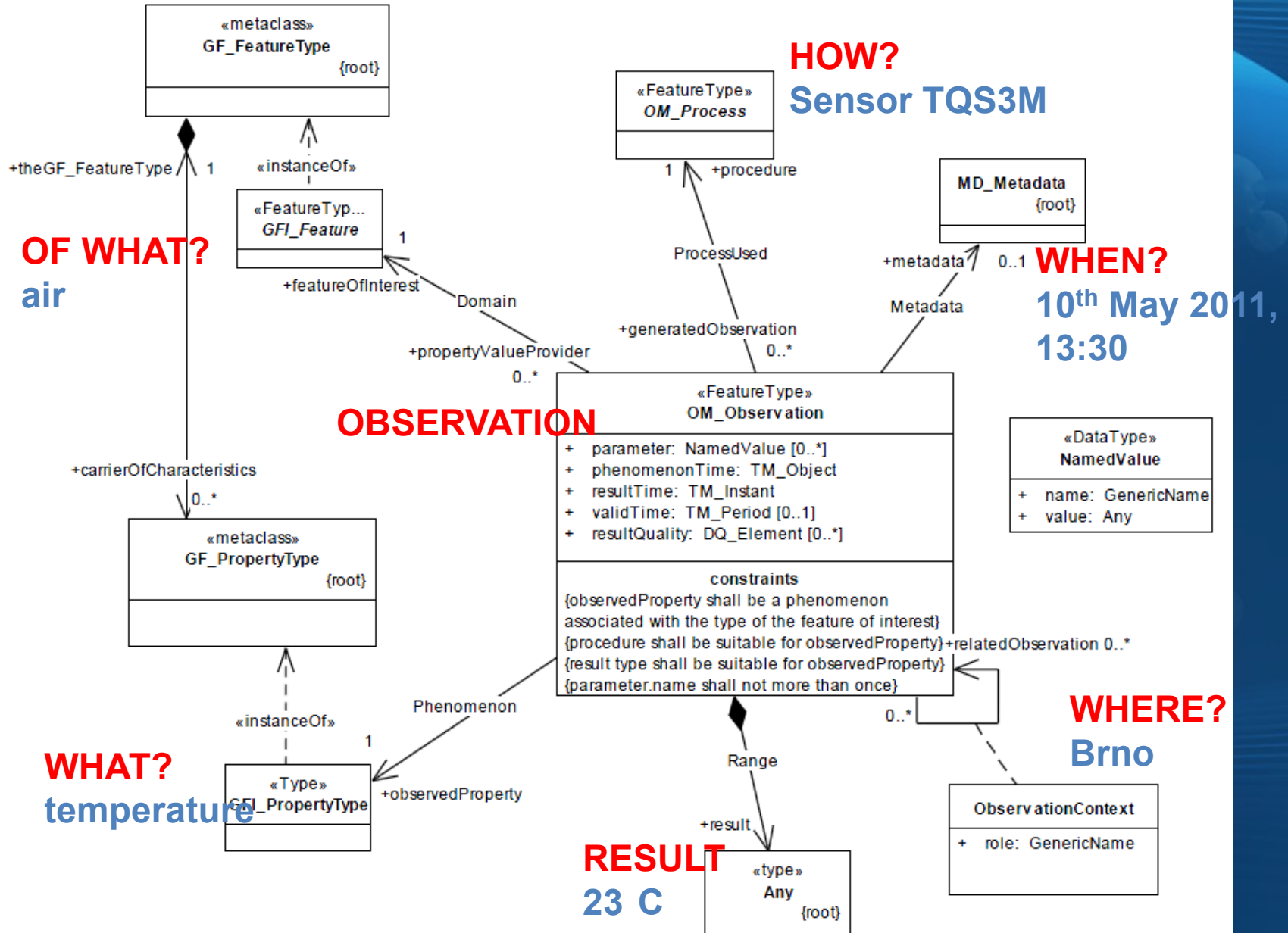
SWE framework:

- SOS – obtain observations from sensors
- SPS – control the sensor (e.g. make image at this time)
- SAS – receive sensor alert messages (e.g. low battery)
- WNS – SAS alerts can be delivered by e-mail, SMS...
- SensorML, TransducerML – model and XML schema for describing sensors
- Observation/Measurement – model and XML encoding of observations

# SOS – Sensor Observation Service



# O&M – Observation and Measurement





# Visit in Ispra and its topic



Joint Research Centre  
Institute of Environment and Sustainability  
Spatial Data Infrastructures Unit  
Ispra, Italy



Searching connections  
between sensors, SWE and  
important European  
initiatives – Inspire and  
GMES.

March 2011



# INSPIRE Directive



- lays down general rules to establish an infrastructure for spatial information in Europe.
- for the purposes of Community environmental policies and policies or activities which may have an impact on the environment.
- entered into force 15 May 2007

## Inspire Network Services:

- Discovery Services
- View Services
- Download Services
- Transformation Services

# INSPIRE Directive



43 themes – 3 annexes, one theme – one Data Specification

Annex I – Data Specifications completed

Annex II-III – Data Specifications testing – April-October 2011

Annex III – many typical “sensor data”

## **Annex I**

- 1 Coordinate reference systems
- 2 Geographical grid systems
- 3 Geographical names
- 4 Administrative units
- 5 Addresses
- 6 Cadastral parcels
- 7 Transport networks
- 8 Hydrography
- 9 Protected sites

## **Annex II**

- 1 Elevation
- 2 Land cover
- 3 Orthoimagery
- 4 Geology

## **Annex III**

- 1 Statistical units
- 2 Buildings
- 3 Soil
- 4 Land use
- 5 Human health and safety
- 6 Utility and governmental services
- 7 Environmental monitoring Facilities
- 8 Production and industrial facilities
- 9 Agricultural and aquaculture facilities
- 10 Population distribution and demography
- 11 Area management/restriction/regulation zones & reporting units
- 12 Natural risk zones
- 13 Atmospheric conditions
- 14 Meteorological geographical features
- 15 Oceanographic geographical features
- 16 Sea regions
- 17 Bio-geographical regions
- 18 Habitats and biotopes
- 19 Species distribution
- 20 Energy Resources
- 21 Mineral Resources

# SWE and INSPIRE



**INSPIRE Cross Thematic Working Group on Observations & Measurements solves using of Sensor Web Enablement-related standards in INSPIRE data specification.**



# SWE and INSPIRE



## Observation & Measurement

- Some Annex themes include measured, modelled or simulated data.
- The ISO 19156 (Observation & Measurement 2.0) standard was designed for this explicit purpose, and thus shall be used in INSPIRE to cover these requirements.
- The following INSPIRE themes use O&M in data specifications:
  - Geology
  - Oceanographic geographical features
  - Atmospheric conditions and Meteorological geographical features
  - Environmental monitoring facilities
  - Soil

# SWE and INSPIRE



INSPIRE Cross Thematic Working Group on Observations & Measurements nominated also two other SWE specifications as useful for INSPIRE:

SOS – proposed to be used as Download Service

SensorML – description of data survey process

Not used in current version of Data Specification, only recommended for implementation into next version.

# GMES



**GMES** (Global Monitoring for Environment and Security) is the European Programme for the establishment of a European capacity for Earth observation.

- Six thematic areas: marine, land, atmosphere, emergency, security, climate change.
- Space division: Earth observation satellites
- In-situ division: ground stations, planes, balloons, sea-borne sensors

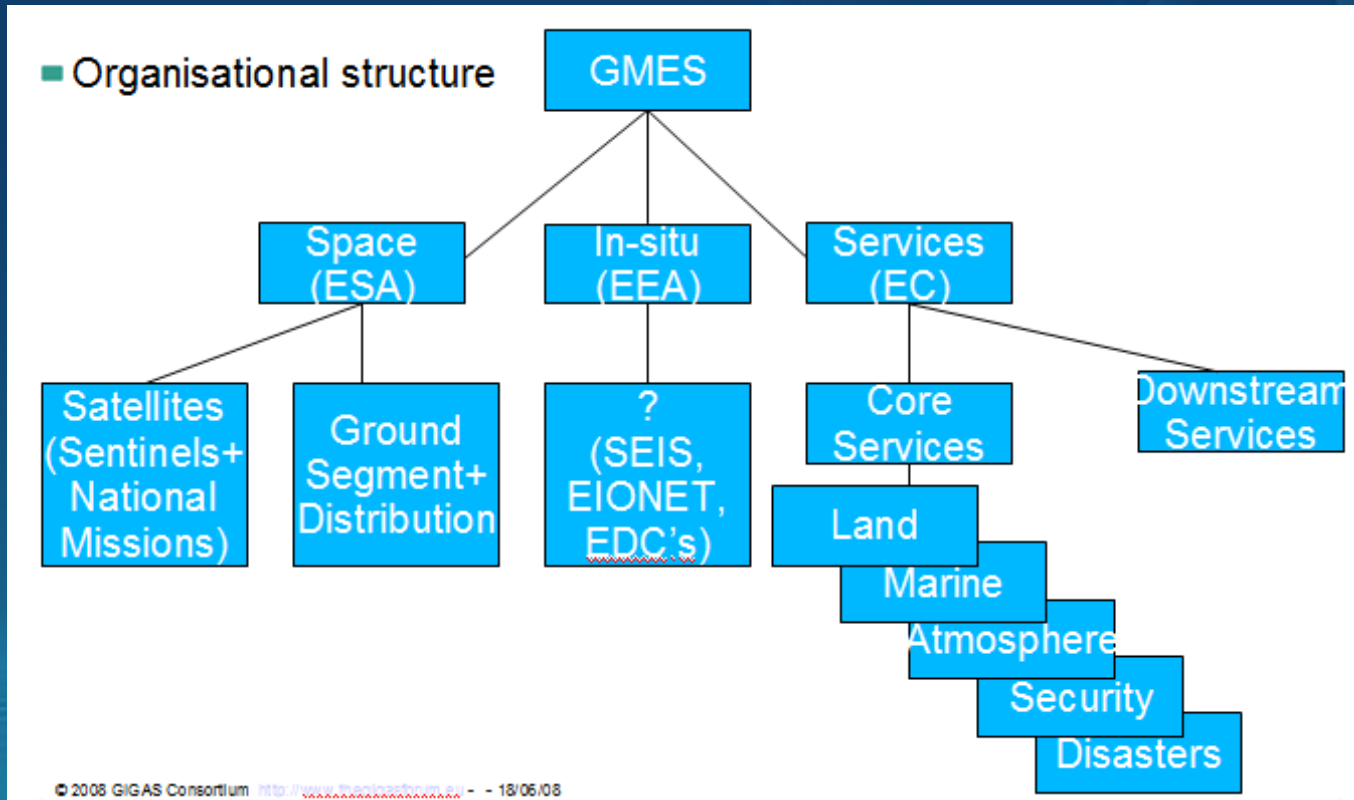


# GMES



DG Enterprise – coordination

- **Space division** – European Space Agency
- **In situ division** – European Environmental Agency
- **Service segment** – European Commission. This segment should produce “value added products” from raw data of ground and space division – e.g. landcover maps.







## **GMES plan for 2011:**

Start of GMES Initial phase (2011-2013)

Services preparation should start (delivery in 2013-2014):

- GMES emergency management services – Mapping in support to crisis management inside and outside EU.
- European Flood Alert System
- Pan-EU Land Cover monitoring service

Space segment preparation. First sentinel should be launched in 2013.

# SWE and GMES



Is SWE framework considered in preparation of GMES?

SWE tested in some GMES-related projects:

e.g. **OSIRIS** (Open architecture for Smart and Interoperable networks in Risk management based on In-situ Sensors)

- addresses the monitoring, preparation and response phases of environmental risk and crisis management (forest fires, industrial risks, water pollution, air pollution)
- SOS, SensorML and O&M were used

<http://www.osiris-fp6.eu/>

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# TEST - answers

# Test - answers



SOS is part of Sensor Web Enablement. This acronym means:

✓ Sensor Observation Service

Save Our Souls. But not in SWE framework.



# Test - answers



Which specification from SWE framework is the most frequently used in Data specifications of themes in Annex III?

✓ Observation & Measurement

SensorML is only recommended for using by INSPIRE Cross Thematic Working Group on Observations & Measurements.

# Test - answers



What is standard ISO 19156?

✓ Observation & Measurement specification released as ISO standard.

SWE framework was not released as ISO standard.

# Test - answers



Which from following Inspire themes use O&M in their Data specifications?

- o Buildings
- ✓ Soil
- o Human health and safety
- ✓ Environmental monitoring facilities
- ✓ Atmospheric conditions
- ✓ Meteorological geographical features

Also Geology and Oceanographic geographical features.

# Test - answers



Is European Space Agency responsible for whole GMES coordination?

✓ No

ESA is responsible only for space segment of GMES. DG Enterprise is main GMES coordinator.





**Thank you for your attention!**  
<http://geotym.geogr.muni.cz>

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