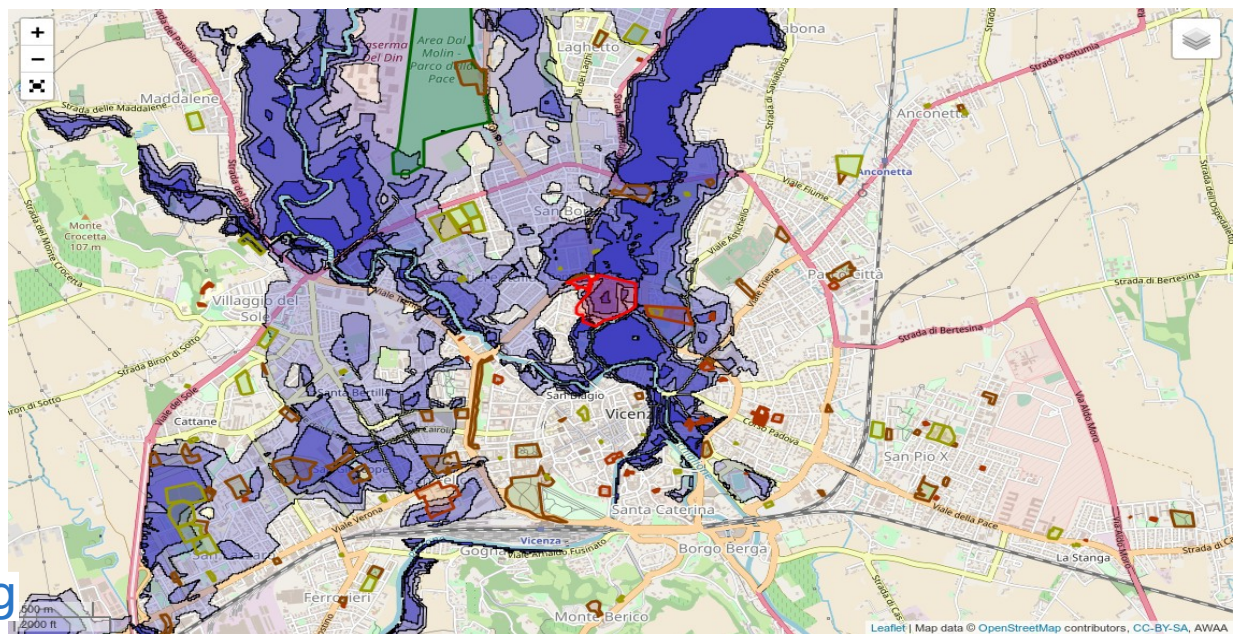

OGC SensorThings API

Dr. Hylke van der Schaaf



Fraunhofer
IOSB

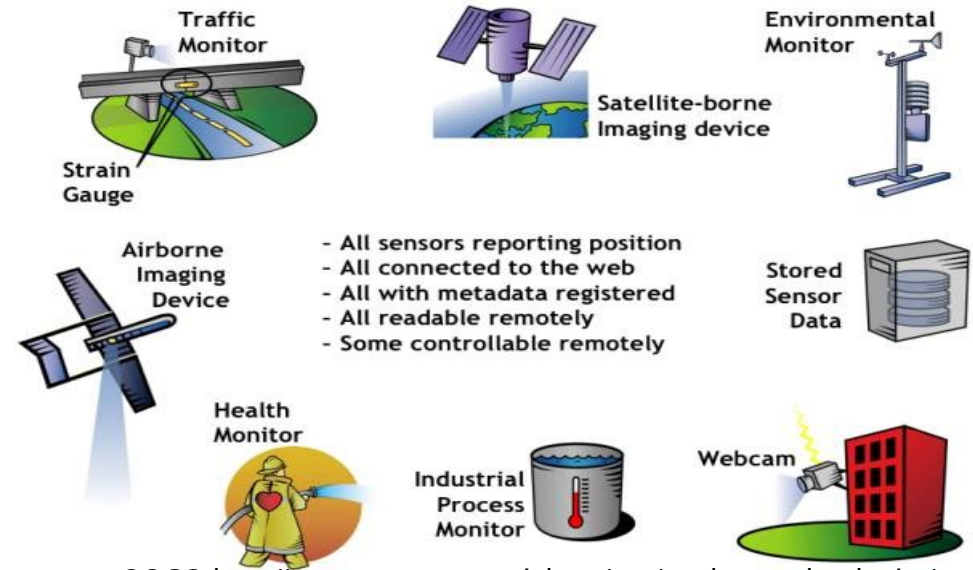
- International consortium
 - over 522 companies, government agencies and universities
- “Geo-enable” mainstream IT
- Develop publicly available interface standards
 - Maps (Web Map Service)
 - CityGML
 - WaterML
 - Earth Observations
- Conformance testing



■ <http://www.opengeospatial.org>

OGC & IoT?

- IoT deals with Sensors and Actuators
- Sensors and Actuators have Location
- OGC Sensor Web Enablement (SWE)
 - Enable developers to make *all types* of sensors, transducers and sensor data repositories discoverable, accessible and useable via the Web
 - Since 1990 by NASA
 - Since 2001 in OGC
 - SensorML
 - Sensor Observation Service (SOS)
 - Sensor Planning Service (SPS)
 - Sensor Data & Metadata
 - Core of INSPIRE



©OGC: <http://www.opengeospatial.org/ogc/markets-technologies/swe>

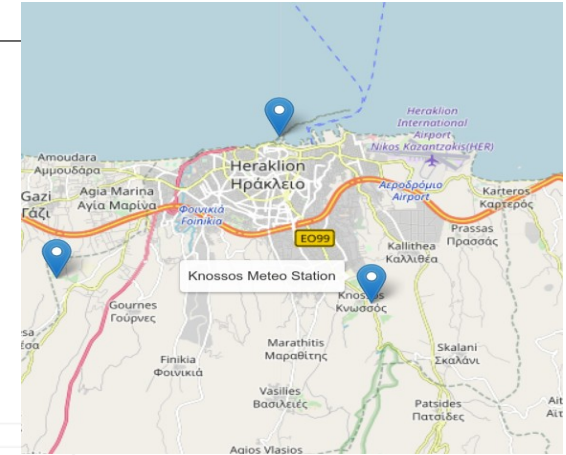
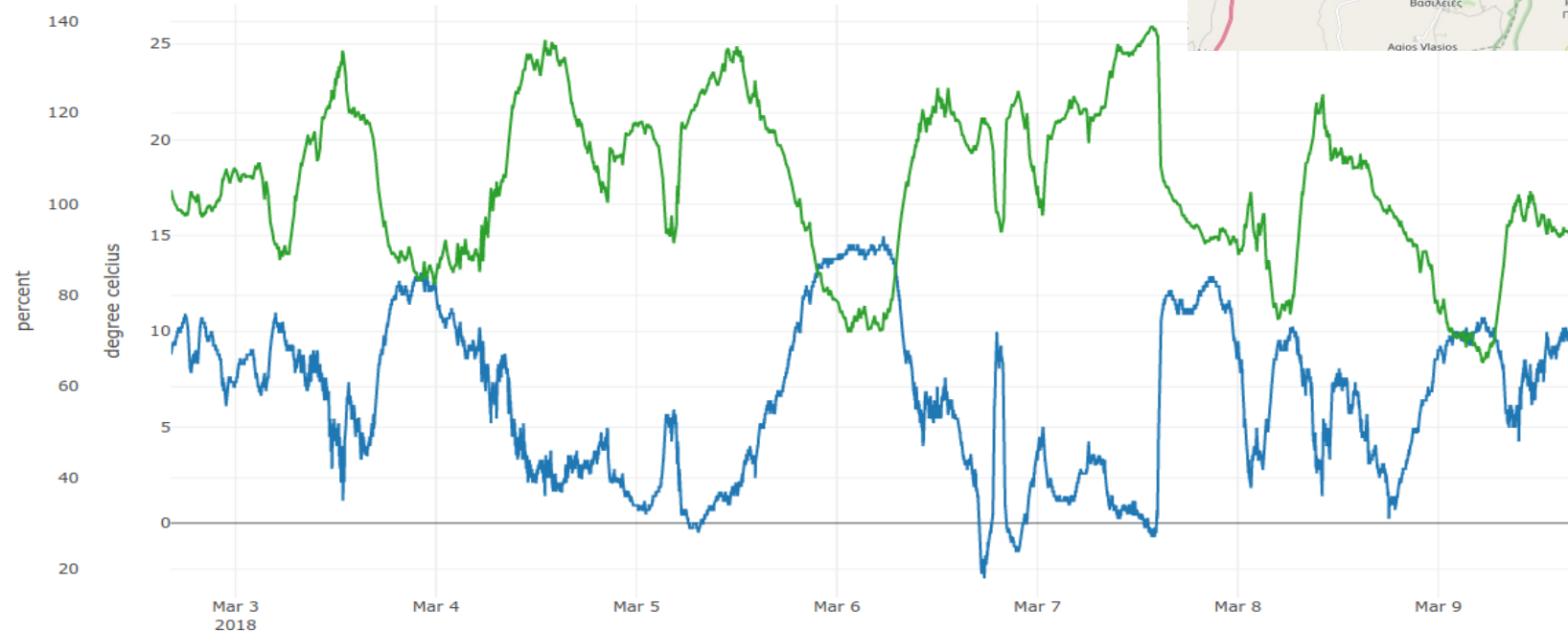
Sensor Metadata?

Knossos Meteo Station

- ☒ Air Humidity Knossos Meteo Station [auto][raw][1 hour][1 day]
- ☐ Air Pressure Knossos Meteo Station [auto][raw][1 hour][1 day]
- ☒ Air Temperature Knossos Meteo Station [auto][raw][1 hour][1 day]
- ☐ Dewpoint Knossos Meteo Station [auto][raw][1 hour][1 day]
- ☐ EvapoTranspiration Knossos Meteo Station
- ☐ Heat Index Knossos Meteo Station [auto][raw][1 hour][1 day]
- ☐ Precipitation Knossos Meteo Station [auto][raw][1 hour][1 day]
- ☐ Windchill Knossos Meteo Station [auto][raw][1 hour][1 day]
- ☐ Wind Knossos Meteo Station

Full Range 1 year 1 month 1 week 1 day ← → T ↓

— Air Humidity Knossos Meteo Station
— Air Temperature Knossos Meteo Station



Sensor Metadata!

Wired Nov. 10, 1999: Metric Math Mistake Muffed Mars Meteorology Mission

LISA GROSSMAN 11.10.10 07:00 AM

NOV. 10, 1999: METRIC MATH MISTAKE MUFFED MARS METEOROLOGY MISSION



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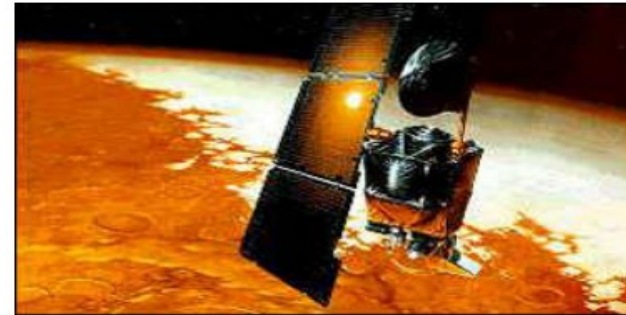
[Low Graphics](#)

[Help](#)

Thursday, September 30, 1999 Published at 18:53 GMT 19:53 UK

Sci/Tech

Confusion leads to Mars failure



The Mars Climate Orbiter: Now in pieces on the planet's surface

The Mars Climate Orbiter Spacecraft was lost because one Nasa team used imperial units while another used metric units for a key spacecraft operation.

Sci/Tech Contents

Relevant Stories

24 Sep 99 | Sci/Tech
[Scientist fights Mars setback](#)

23 Sep 99 | Sci/Tech
[Mars probe feared destroyed](#)

23 Sep 99 | Sci/Tech
[What the loss of Mars Climate Orbiter means](#)

17 Jul 99 | Sci/Tech
[Astronauts call for Mars mission](#)

Internet Links

[Mars Climate Orbiter](#)

The BBC is not responsible for the content of external internet sites.

From SWE to SensorThings

- “Old” SWE Standards
 - XML Encoded
 - SOAP bindings
 - Requires tools for use
 - Complex in use
 - No easy browsing
 - No pagination
 - No pub/sub
 - No updating
 - No delete

Time for an update → SensorThings API

OGC SensorThings API

- A standard for exchanging sensor data and metadata
 - Historic data & current data
 - JSON Encoded
 - RESTful
 - Adapting OASIS Odata URL patterns and query options
 - Supporting ISO MQTT messaging
- Easy to use & understandable
 - Discoverable with only a web browser

How does it work?

- Part 1: Data model
 - Which entities exist
 - How are they linked
- Part 2: URL patterns for queries
 - How do I get & search data
 - How do I add data
 - How do I modify data
 - How do I delete data

REST
&
MQTT

Open Source Server Implementations

- FROST-Server (Fraunhofer IOSB)
 - JavaEE / PostgreSQL / Postgis
 - the first complete, open-source server implementation
 - <https://github.com/FraunhoferIOSB/FROST-Server>
- GOST (Geodan)
 - GO / PostgreSQL / Postgis
 - <https://github.com/gost/home>
- Mozilla Sensorweb (Mozilla)
 - NodeJS / PostgreSQL / Postgis
 - <https://github.com/mozilla-sensorweb/sensorthings>
- Kinota Big Data (CGI)
 - Java / Spring Boot / Cassandra
 - <https://github.com/kinota/kinota-bigdata>

Open Source Client Implementations

- FROST-Client (Fraunhofer IOSB)
 - Java
 - <https://github.com/FraunhoferIOSB/FROST-Client>
- Sensorthings-net-sdk (Geodan)
 - .NET
 - <https://github.com/gost/sensorthings-net-sdk>
- GOST Dashboard
 - JavaScript
 - <https://github.com/gost/dashboard-v2>
- SensorThings-Dashboard (KIT)
 - JavaScript
 - <https://github.com/SensorThings-Dashboard/SensorThings-Dashboard>

Future

- Version 1.1 & new extensions in progress
 - JSON properties for all Entity types
 - Better support for moving Things
- Actuators
 - SensorThings API Part II: Tasking Profile
Published as a standard
<http://docs.opengeospatial.org/is/17-079r1/17-079r1.html>

Finally

- OGC SensorThings API
Because Metadata matters
<https://github.com/engeospatial/sensorthings>
- FROST
<https://github.com/FraunhoferIOSB>
In 5 steps
<https://github.com/FraunhoferIOSB/FROST-Server/wiki/Docker-Quick-Start>
- Hylke.vanderSchaaf@iosb.fraunhofer.de