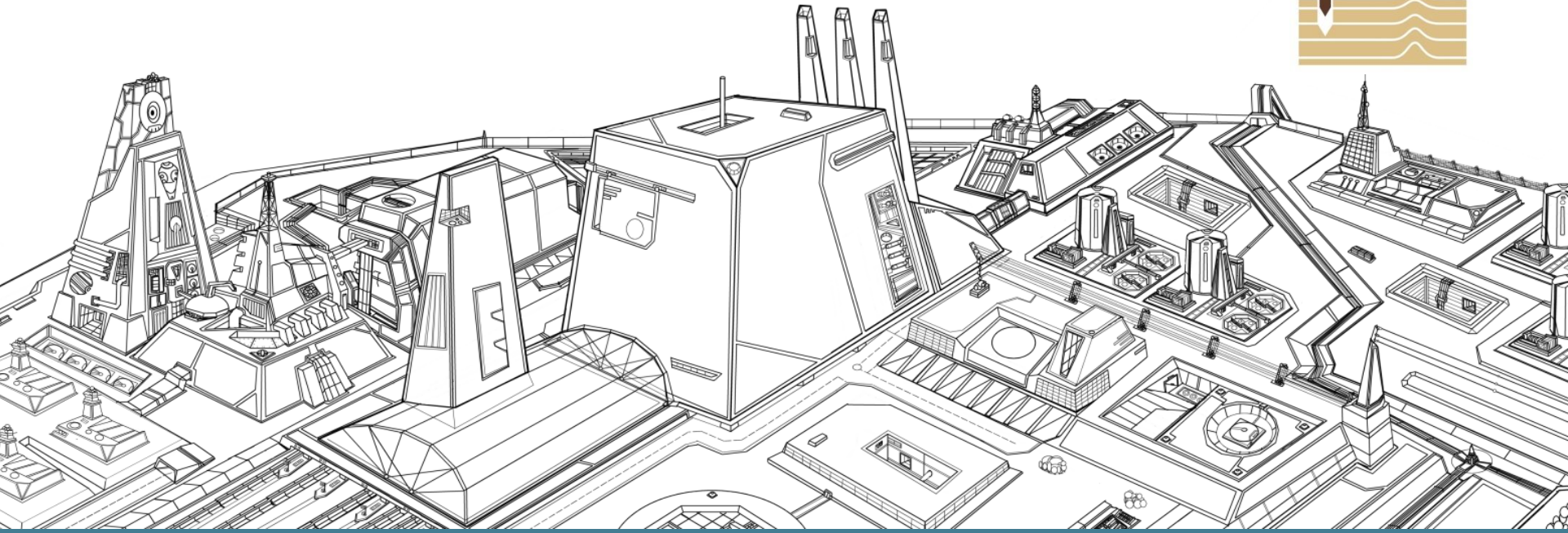


Geospatial information: More than a map

Pim Voogd

Mission

Our mission is to be the **world's leading service-provider** in the collection and interpretation of data relating to the earth's surface and sub-surface, and in the support of infrastructure developments on land, at the coast and on the seabed.

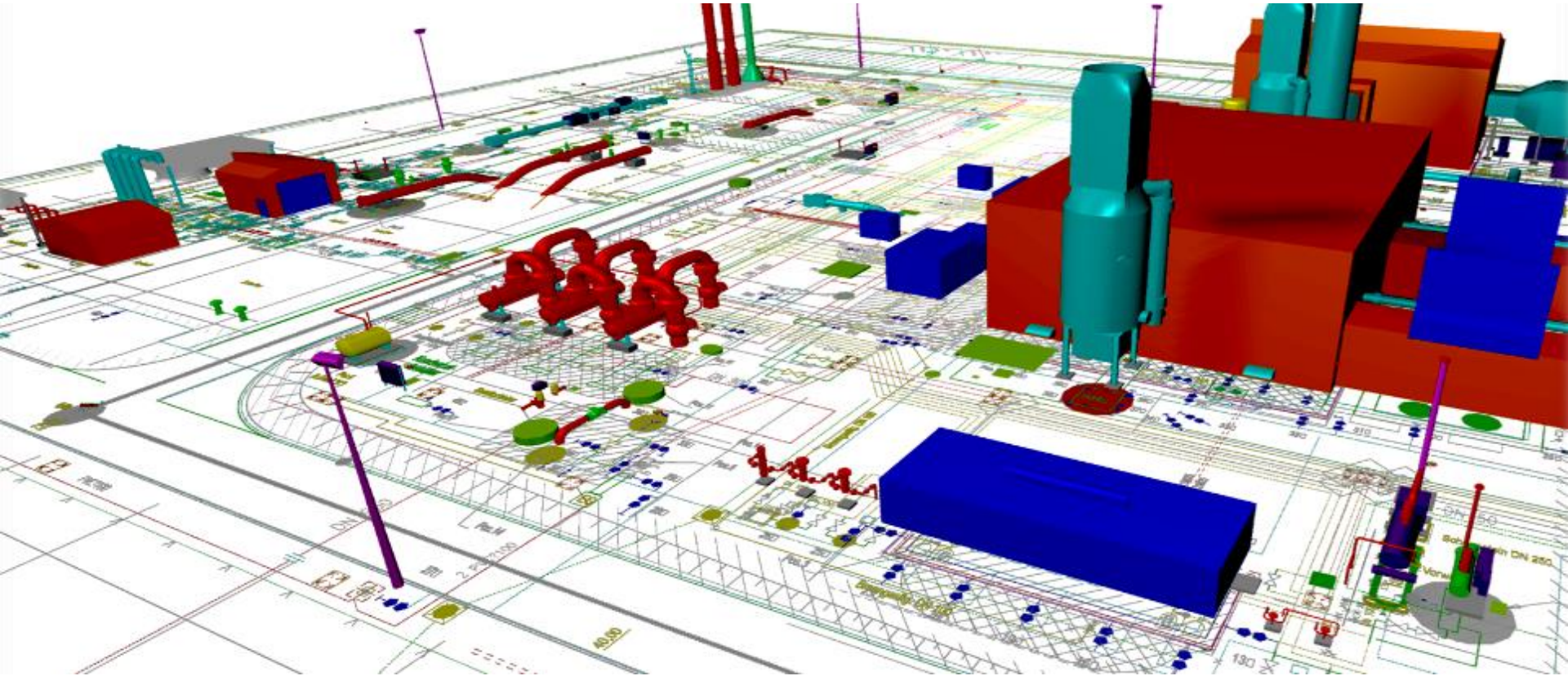
Think global, act local

Through our **international network of offices and facilities**, we deliver local expertise, specialist disciplines, pioneering technologies and world-class resources that combine to provide **unified support for large scale projects**.

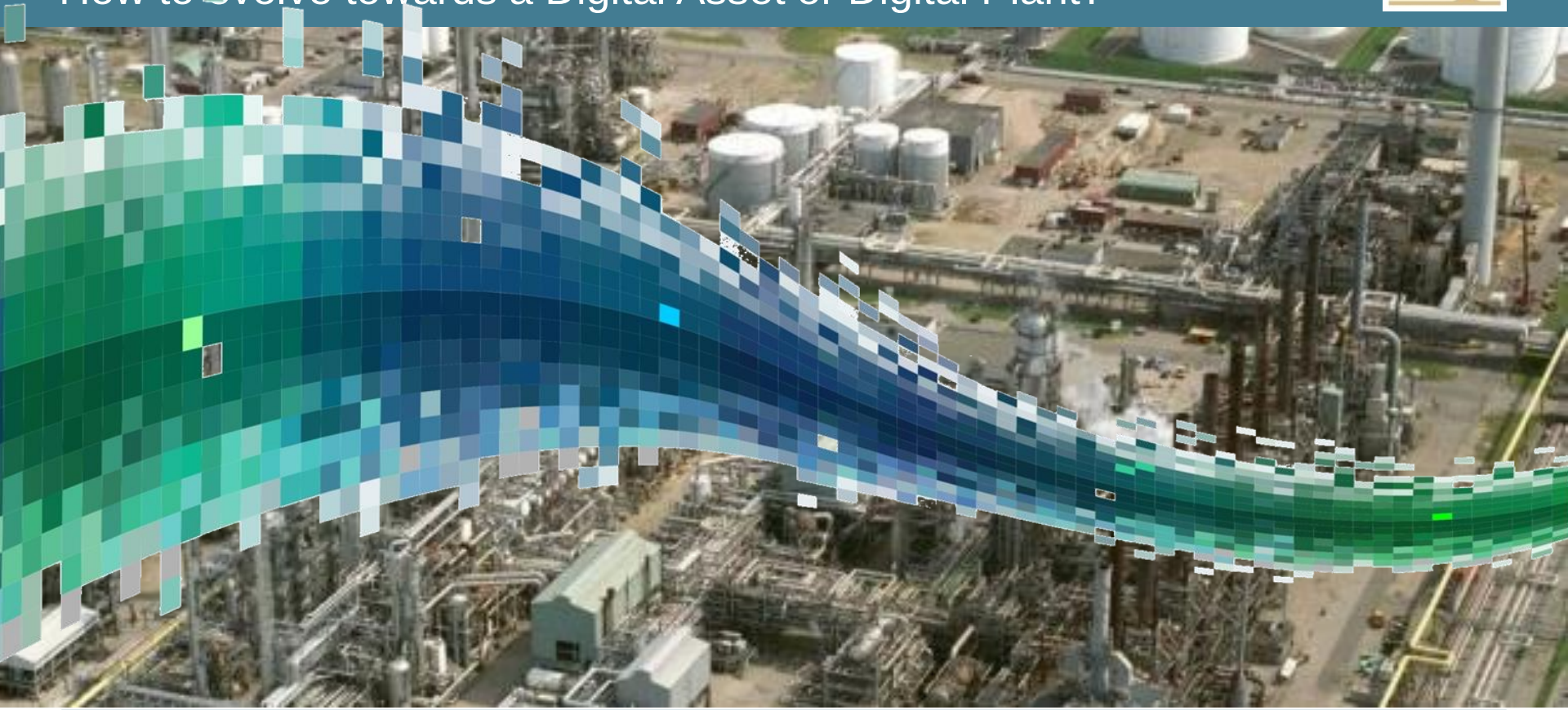
The world is changing…

The way we survey is changing…

And the way we manage our assets is changing…



How to evolve towards a Digital Asset or Digital Plant?



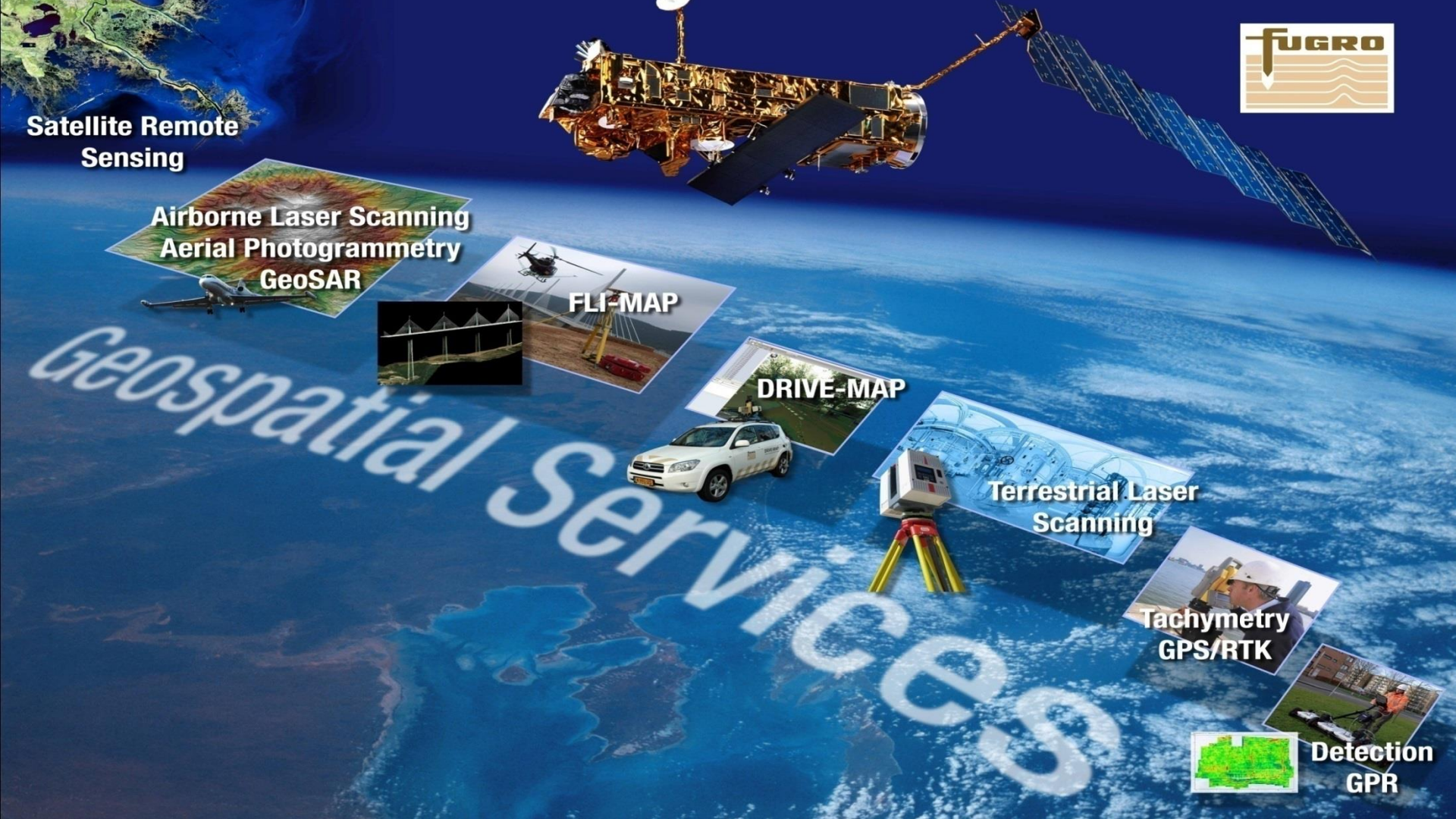
Three relevant aspects to evolve towards a Digital Plant

Technology

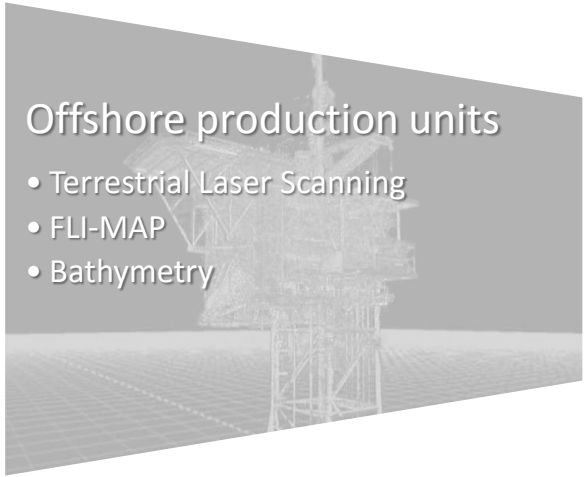
Infrastructure

Standards

Technology


Satellite Remote Sensing
Airborne Laser Scanning
Aerial Photogrammetry
GeoSAR
FLI-MAP
DRIVE-MAP
Terrestrial Laser Scanning
Tachymetry
GPS/RTK
Detection
GPR
Geospatial services
FUGRO

Combination of different sensors



Capture the physical asset

- Demand can be result driven.
- Combination of sensors: Complete overview, Accuracy, and processing getting Near-Realtime
- However a full **Data As A Service** that serves all purposes will take some time

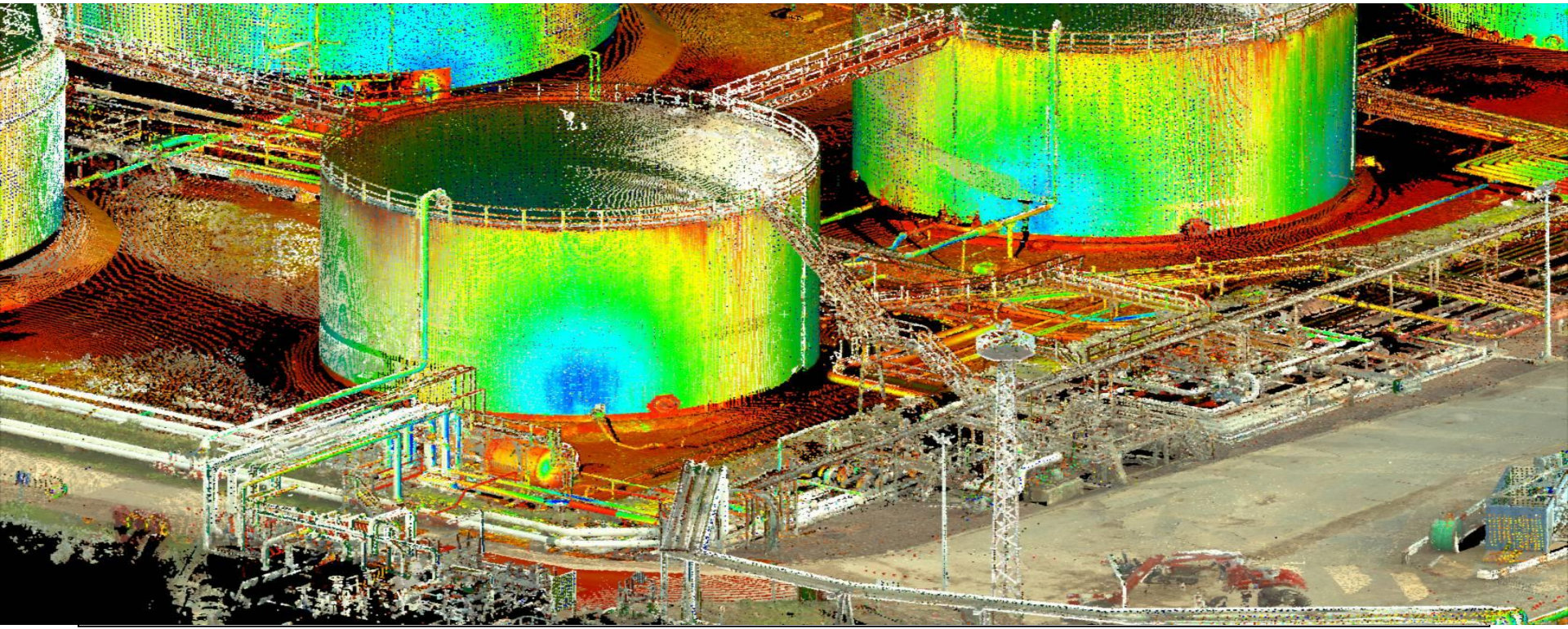
User cases

Laser Scanning – Storage Tank Park

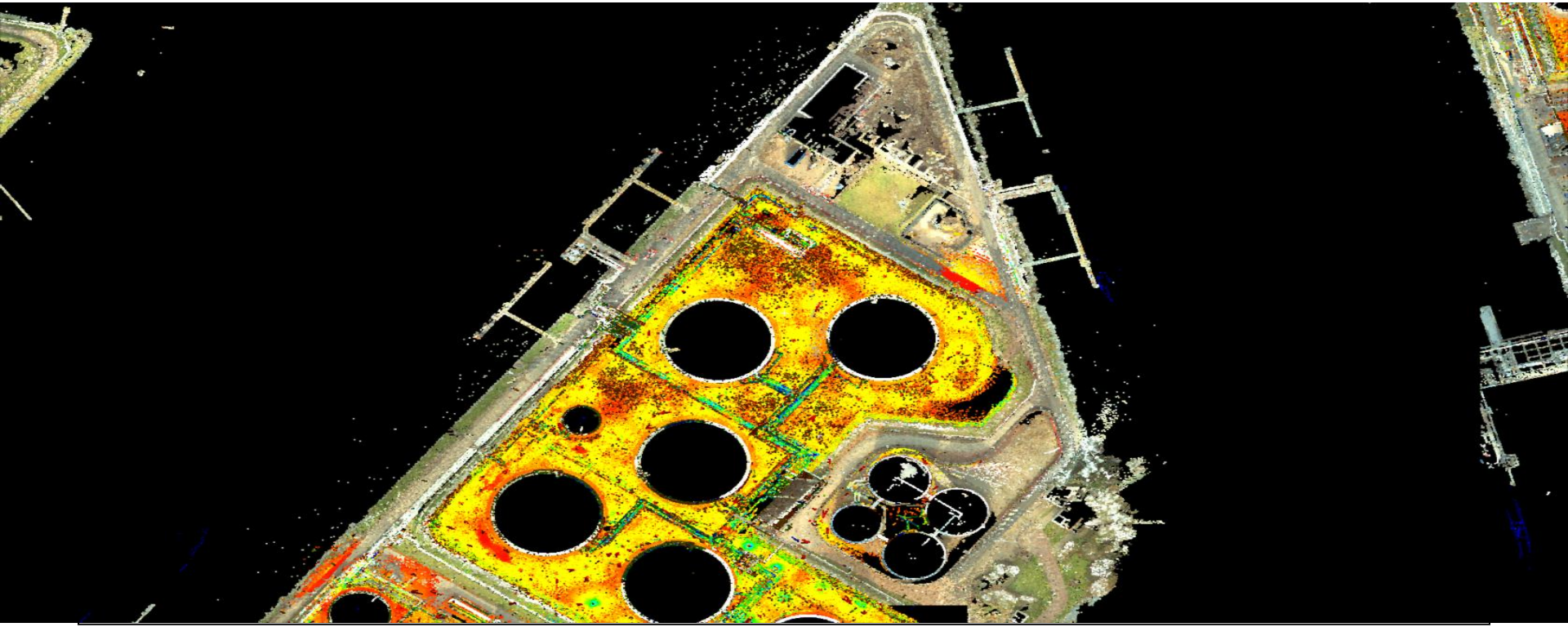
Scope: Valuation of plant. As-Built information required of more than 260 tanks, over 63 hectares.

Solution: Mobile mapping (DRIVE-MAP) and terrestrial laser scanners of the total area, and Ground Penetrating Radar for subsoil infrastructure.

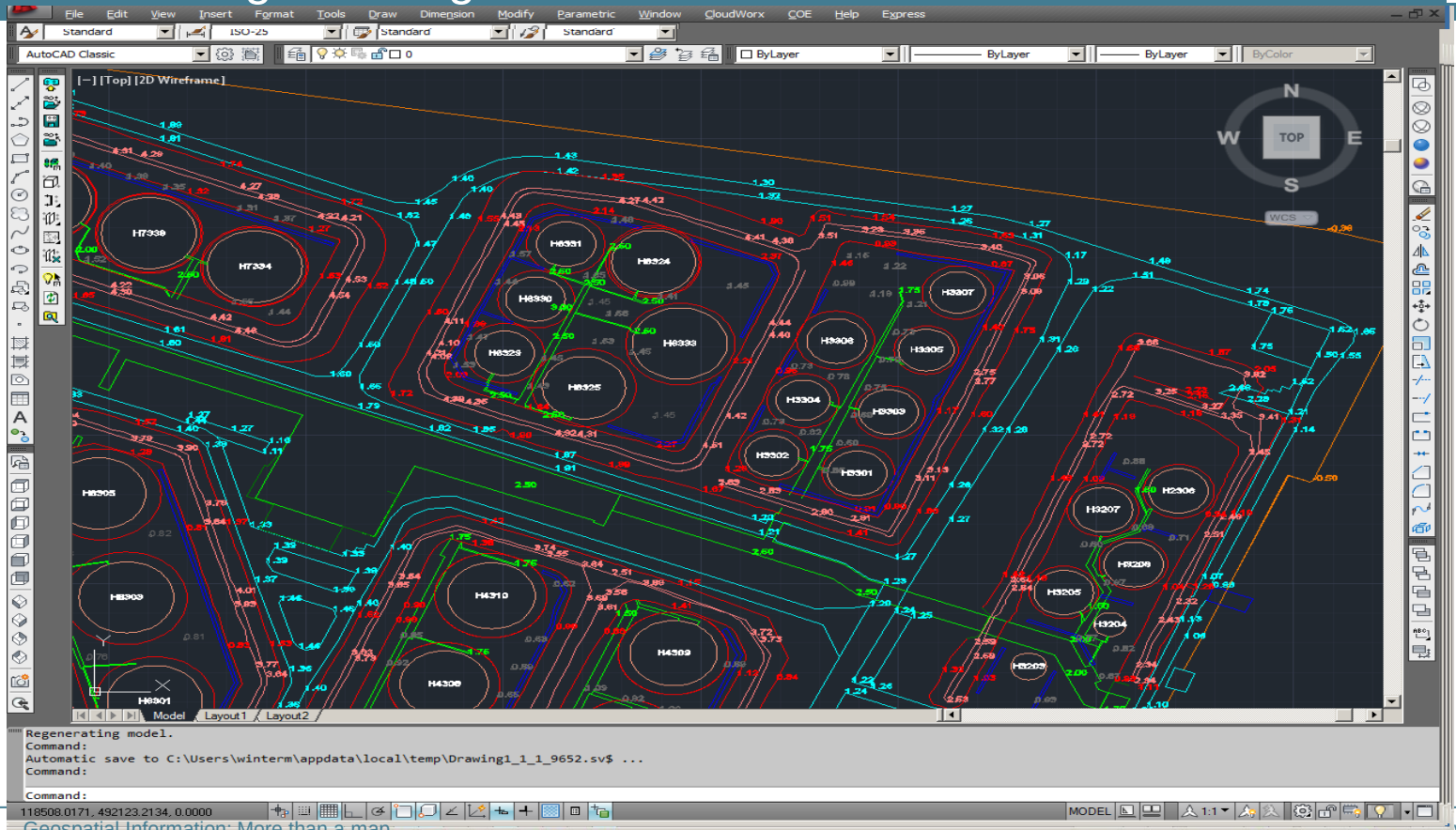
Laser Scanning – Storage Tank Park



Laser Scanning – Storage Tank Park



Laser Scanning – Storage Tank Park



Laser Scanning – Refinery

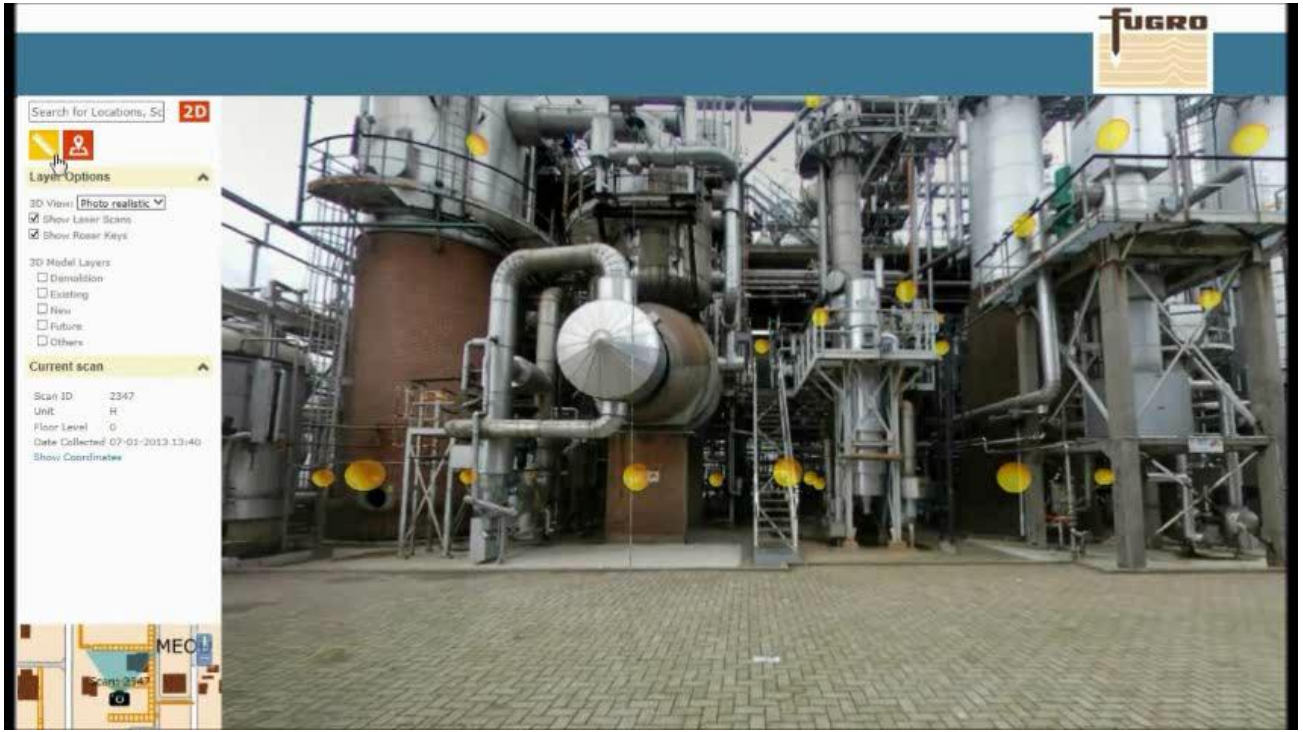
Scope:

- Compliancy (updating of As-Built records)

Solution:

- Laser scanning all off-plot infrastructure and a few major plants (close to 30,000 scans).
- Data delivered in PDMS format, but also via a web service (SITE-SPOT)
- Whole new range of application of this data:
  - ✓ IRM (Inspection, Repair and Maintenance)
  - ✓ Turn-around planning
  - ✓ Control Room

Data As A Service



Laser Scanning – Pipelines

Scope:

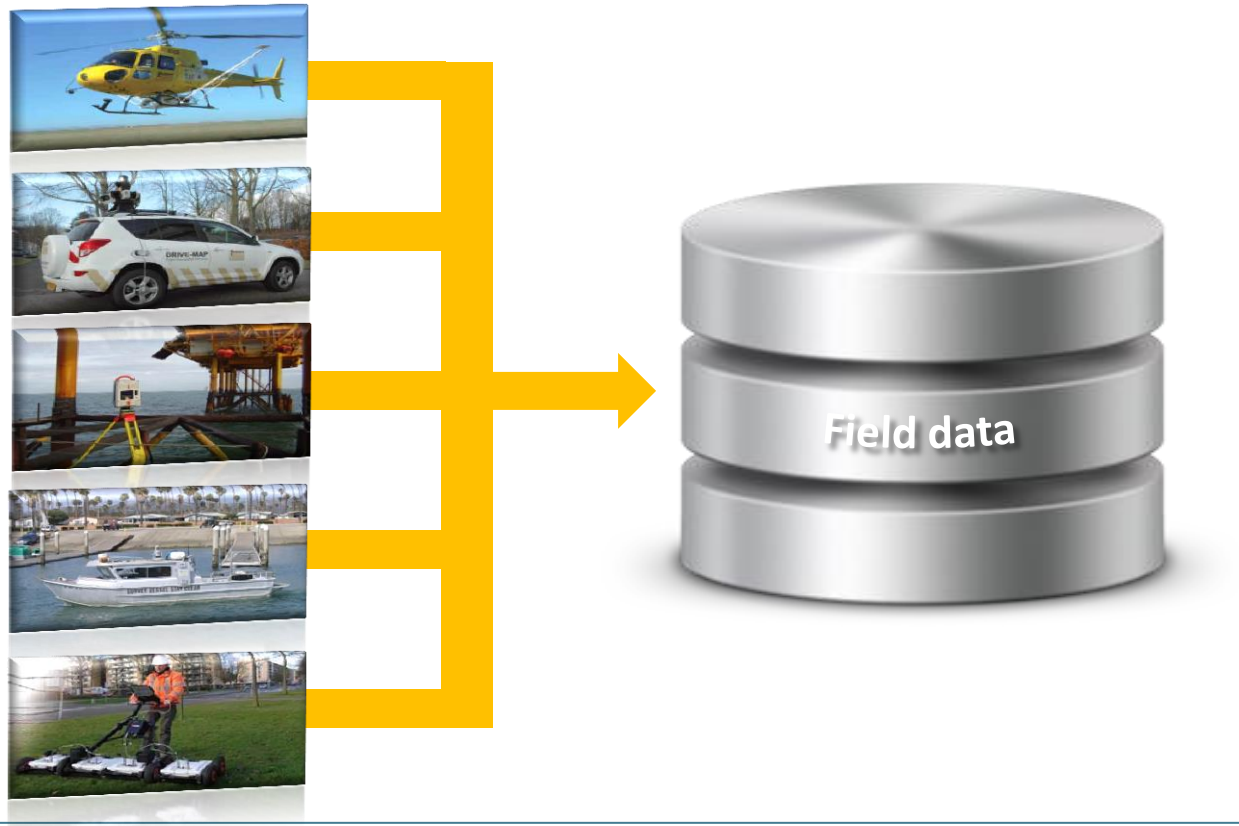
- Provision of pipeline information

Solution:

- Laser scanning of pipeline with DRIVE-MAP
- Extraction of traditional CAD deliverables
- Provision of ‘As-Is’ data via SITE-SPOT

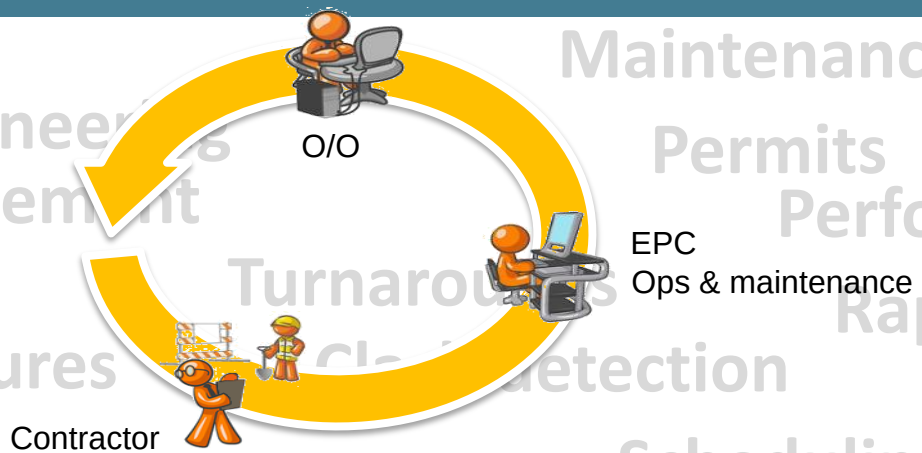
Technology – The near future

Field Data Repository



Infrastructure

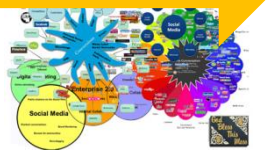
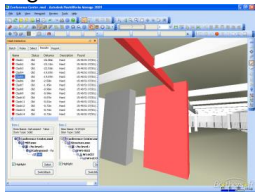
Multiple applications



We all use Geo-Information

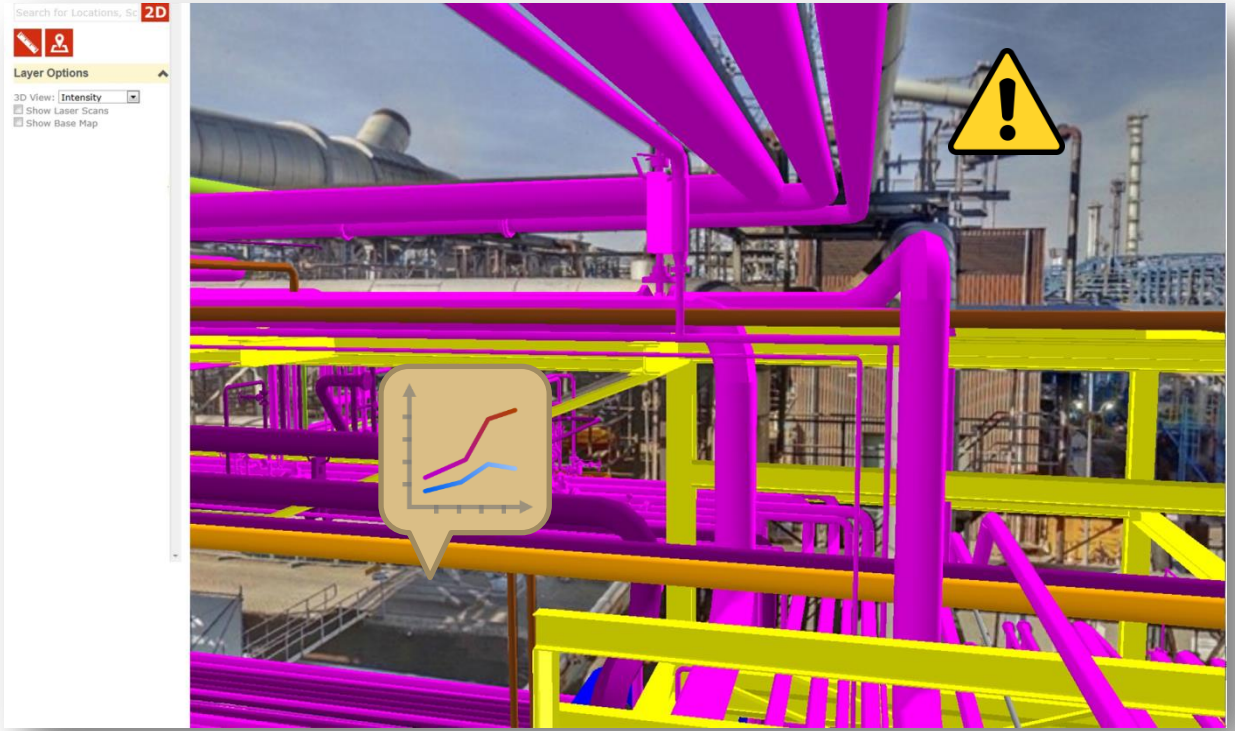
- **Different software applications**
- **Different ‘maps’**
- **Different organisations**

Infrastructure

	SENSOR	STORE & VIEW	ENGINEERING	MULTIPLE APPLICATIONS	LINKED DATA
TECHNOLOGY & SOLUTIONS	 Static, Mobile, Airborne, Hand-held	 Cloud Storage and Portal			
USER CASES	 Photo realistic Image  Point Cloud & 'Bubble-View' Up to 3~5 mm of accuracy	• Allows access to view the point cloud and photo realistic view (similar to Google street view) • Navigate through or along asset • Measuring points •Tag item • Prevents "Go and See" what is out there	• Redlining • Clash detection • Tagging • Communication and planning 	• A 3D Model built from the Laser Scan point cloud data, includes tag references etc •Operator Training •IRM •Control Room	• Standards • Single Points Of Truth • Leverage innovation, integration and efficiency

Complexity, Cost, and Intelligence increases

Linked Data



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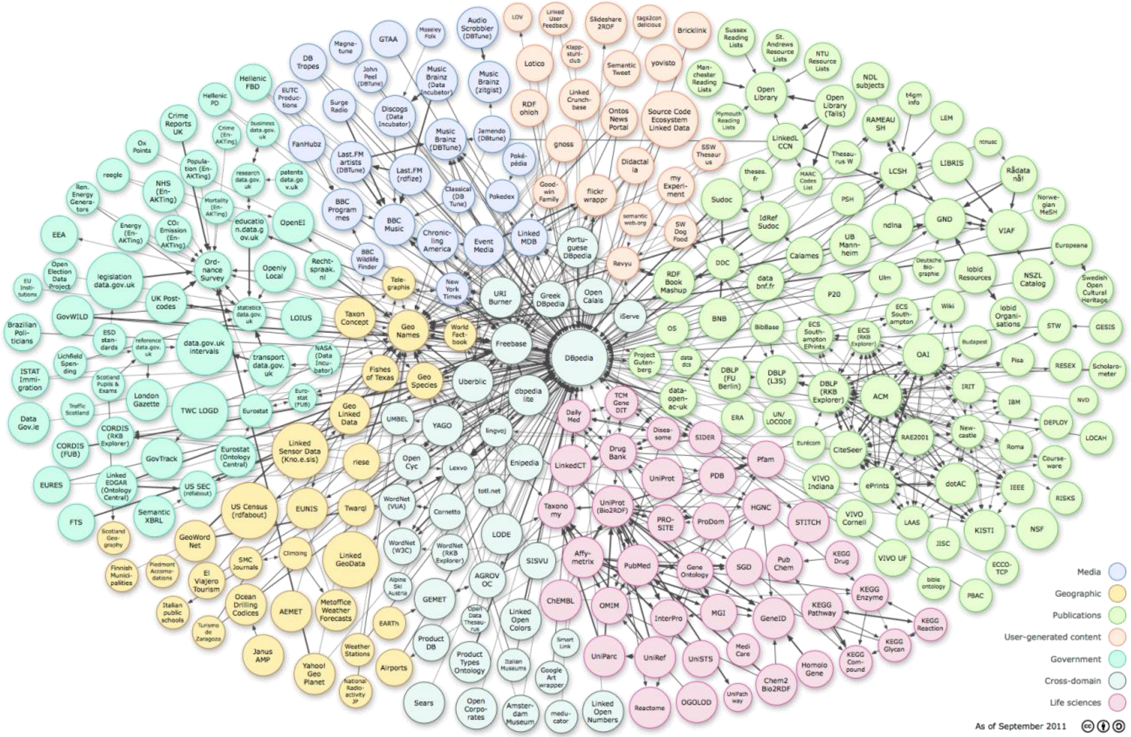
SAP®

AVEVA
CONTINUAL PROGRESSION

esri ArcGIS

Schneider Electric

Linked Data


DBpedia
Freebase
Geo Names
URI Burner
Greek DBpedia
Open Calais
Uberblic
dbpedia lite
YAGO
UMBEL
Open Cyc
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Cornetto
LODE
SISVU
GEMET
AGROV OC
Linked GeoData
EUNIS
Twarql
riese
Geo Linked Data
Geo Species
Fishes of Texas
Taxon Concept
LOIUS
Linked Sensor Data (Kno.e.sis)
US Census (rdfabout)
GeoWord Net
AEMET
Metoffice Weather Forecasts
Airports
Yahoo! Geo Planet
Janus AMP
Ocean Drilling Codices
SMC Journals
Climbing
EARTh
Weather Stations
Product DB
Product Types Ontology
Linked Open Colors
Sears
Open Corpo-rates
Amster-dam Museum
Linked Open Numbers
Reactome
OGOLOD
Chem2 Bio2RDF
Homolo Gene
GeneID
KEGG Pathway
KEGG Enzyme
KEGG Reaction
KEGG Glycan
InterPro
MGI
OMIM
ChEMBL
UniParc
UniRef
UniSTS
PubMed
Gene Ontology
SGD
Pub Chem
Affy-metrix
UniProt (Bio2RDF)
PRO-SITE
ProDom
HGNC
STITCH
Taxono my
UniProt
PDB
Pfam
LinkedCT
Drug Bank
SIDER
Disea-some
Daily Med
TCM Gene DIT
Enipedia
totl.net
lingvoj
Project Guten-berg
data dcs
OS
BNB
iServe
ACM
DBLP (L3S)
DBLP (RKB Explorer)
DBLP (FU Berlin)
CiteSeer
ePrints
dotAC
KISTI
NSF
IEEE
RISKS
LAAS
VIVO Indiana
VIVO Cornell
VIVO UF
JISC
ECCO-TCP
PBAC
bible ontology
KEGG Drug
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IRIT
IBM
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LOCAH
Roma
Course-ware
New-castle
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Eurécom
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ECS South-ampton EPrints
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Pisa
RESEX
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Calames
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Rådata nå!
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NSZL Catalog
Swedish Open Cultural Heritage
lobid Resources
Deutsche Bio-graphie
Ulm
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Thesau-rus W
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RAMEAU SH
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NDL subjects
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St. Andrews Resource Lists
Sussex Reading Lists
Man-chester Reading Lists
Plymouth Reading Lists
SSW Thesaur us
my Experi-ment
SW Dog Food
Revyu
Didactal ia
Source Code Ecosystem Linked Data
Ontos News Portal
Semantic Tweet
yovisto
Bricklink
tags2con delicious
Slideshare 2RDF
Linked User Feedback
LOV
Klapp-stuhl-club
Lotico
RDF ohloh
Linked Crunch-base
gnoss
flickr wrappr
Good-win Family
Poké-pédia
Pokedex
semantic web.org
Portu-guese DBpedia
Linked MDB
Event Media
Chronic-ling America
BBC Music
BBC Wildlife Finder
BBC Program mes
Classical (DB Tune)
Last.FM (rdfize)
Last.FM artists (DBTune)
Jamendo (DBtune)
Music Brainz (DBTune)
Music Brainz (zitgist)
Music Brainz (Data Incubator)
Discogs (Data Incubator)
Audio Scrobbler (DBTune)
Moseley Folk
GTAA
Magna-tune
John Peel (DBTune)
DB Tropes
Surge Radio
EUTC Produc-tions
FanHubz
New York Times
Tele-graphis
World Fact-book
NASA (Data Incu-bator)
Euro-stat (FUB)
Eurostat
Eurostat (Ontology Central)
TWC LOGD
data.gov.uk intervals
transport data.gov. uk
reference data.gov. uk
statistics data.gov. uk
Recht-spraak. nl
Openly Local
OpenEI
Ord-nance Survey
legislation data.gov.uk
UK Post-codes
GovWILD
ESD stan-dards
London Gazette
GovTrack
CORDIS (RKB Explorer)
CORDIS (FUB)
Linked EDGAR (Ontology Central)
US SEC (rdfabout)
Semantic XBRL
EURES
FTS
Scotland Geo-graphy
Finnish Munici-palities
Piedmont Accomo-dations
El Viajero Tourism
Italian public schools
Turismo de Zaragoza
Data Gov.ie
ISTAT Immi-gration
Brazilian Poli-ticians
EU Insti-tutions
Open Election Data Project
EEA
Ren. Energy Genera-tors
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Ox Points
Crime Reports UK
Hellenic PD
Hellenic FBD
NHS (En-AKTing)
Popula-tion (En-AKTing)
Energy (En-AKTing)
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patents data.go v.uk
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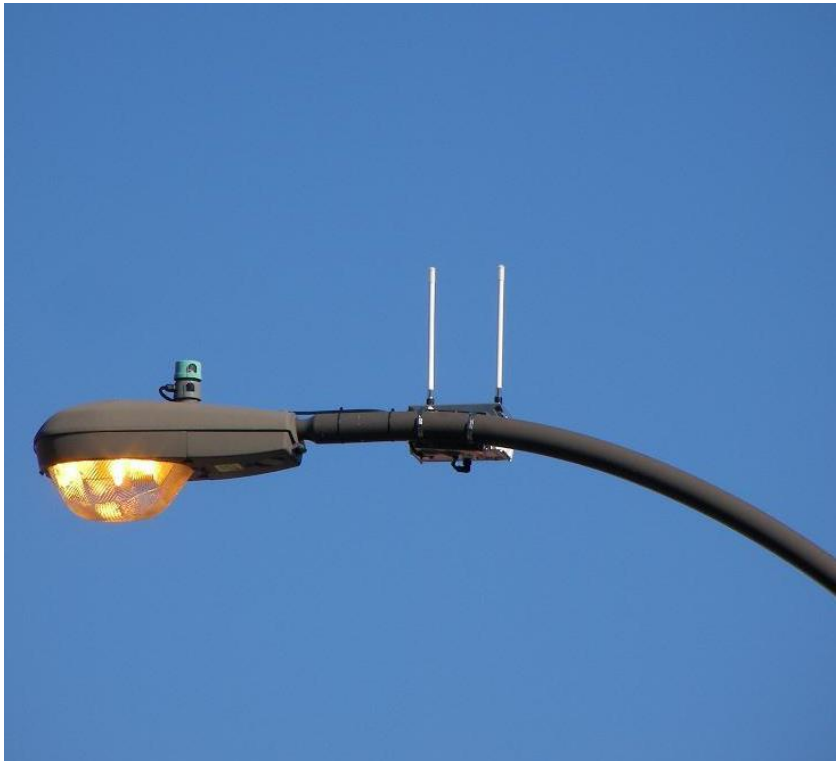
Government
Cross-domain
Life sciences
As of September 2011

Standards

Standards

- Currently **no standard for large enterprises**, interfaces are driven by vendors.
- Standards are a **necessity to enable Linked Data** and **Smart Systems** and to **unlock value of data**.
- Standards should enable:
  - Data is **stored only once**
  - Data can be **combined**
  - Data is **available**
  - Data can be **shared**
  - Data is **easy to find**

Bright future ahead



Geo-Information:
More than a map

Thank you