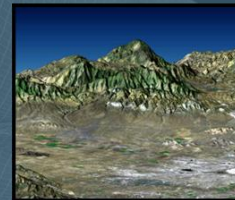
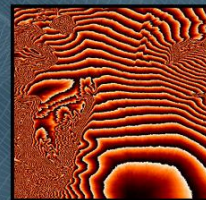
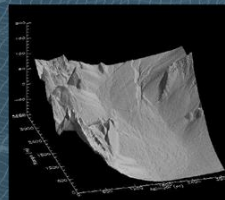


# Building Partnerships to Deliver National Earth Observation Portals



David Belton (MDA) and Jasper van Loon (NSO)  
Geospatial World Forum  
May 25, 2015



# Outline

- A Foundation for Collaboration: Private and Public Space Assets
- RADARSAT-2 As A Copernicus Contributing Mission
- Providing National Coverage at High Resolution
- A Case Study: Netherlands Satellietdataportaal
- Conclusions and Summary

# Private and Public Space Asset Collaboration

- Private and public sector investments in space create a tremendous amount of complementary capability.

## Public space strengths

- Broad area coverage
- Systematic acquisition
- Long term programs
- Open data models and access

## Private space strengths

- High resolution
- Priority access
- Short term and adhoc tasking
- Near real-time delivery
- Premium service levels

- Earth observation data portals are an effective mechanism for delivering the joint power of these capabilities to a broad user base.
- Long term partnerships between commercial operators and public sector agencies are fundamental to success.





## Sea Ice Monitoring

- Routine monitoring of the European Arctic, Baltic, and Antarctica
- Near real-time acquisition to delivery in 1 – 3 hours
- Supporting safe ship navigation and climate change monitoring

## Emergency Response

- Flood mapping and response
- Landslide monitoring
- Critical asset monitoring

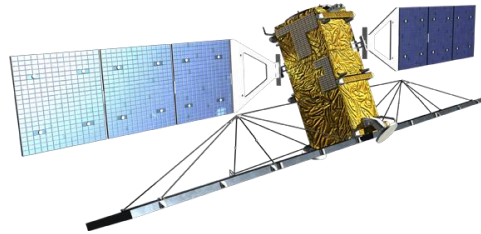
**Complementary to Sentinel-1**

# RADARSAT-2 GMES

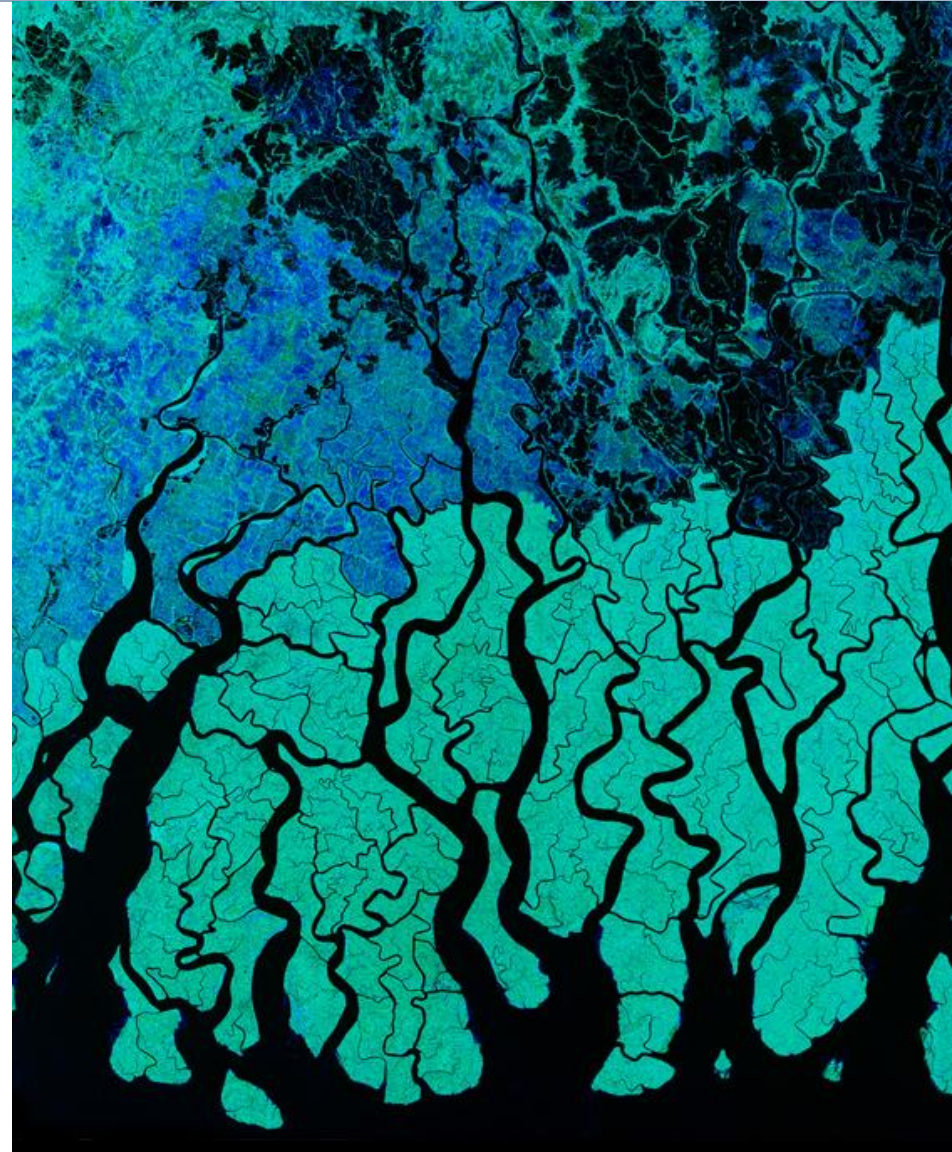
## Contributing Mission



# RADARSAT-2 Mission Benefits

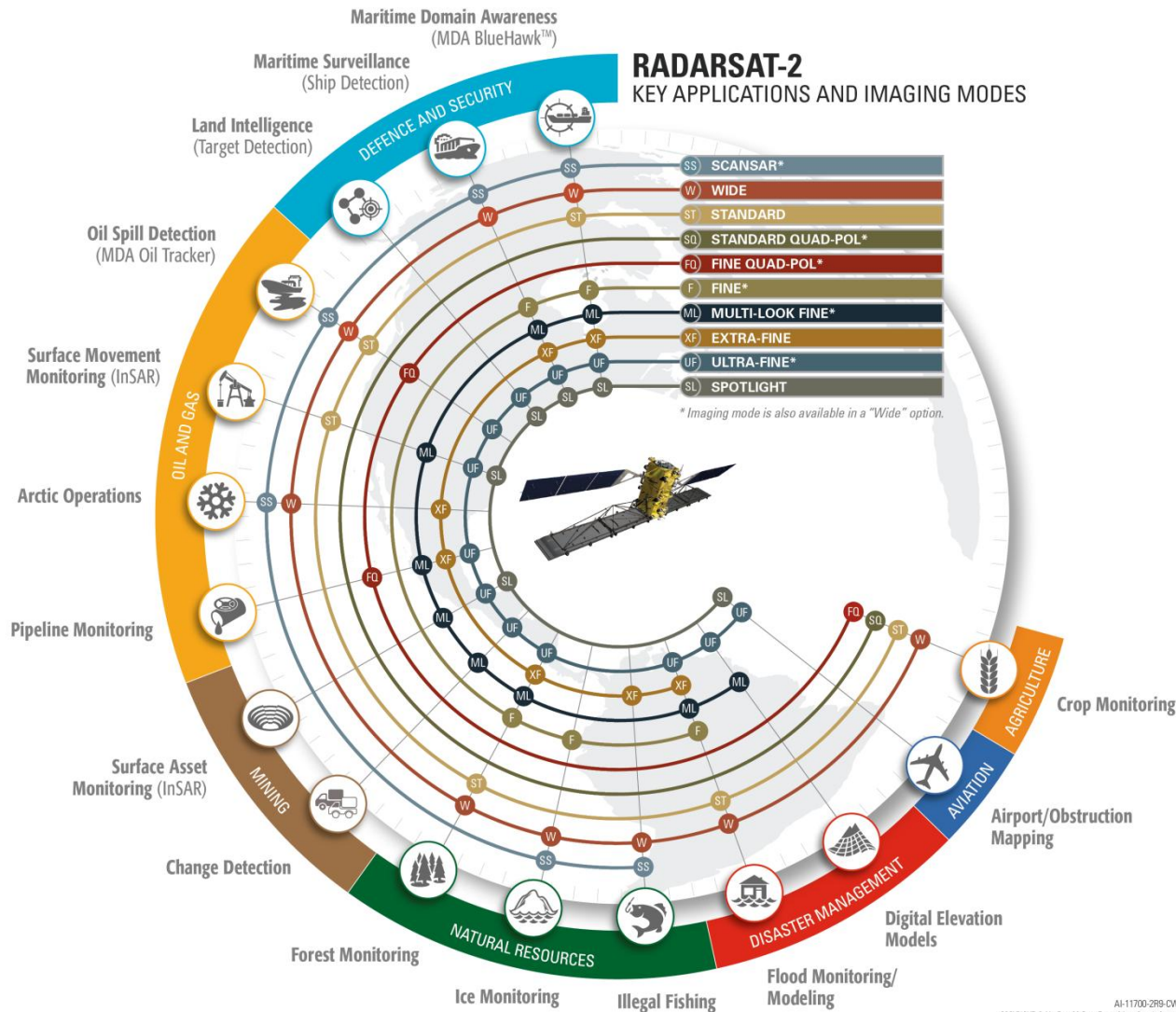


- **The right combination of coverage and resolution for any application**
  - 1 m to 100 m resolution
  - 18 km to 500 km swath
- **Huge capacity to reduce acquisition conflicts**
- **Rapid product delivery via a global network of NRT ground stations**
- **Superior performance and reliability**
- **Acquisition modes optimized for operational value-added services**





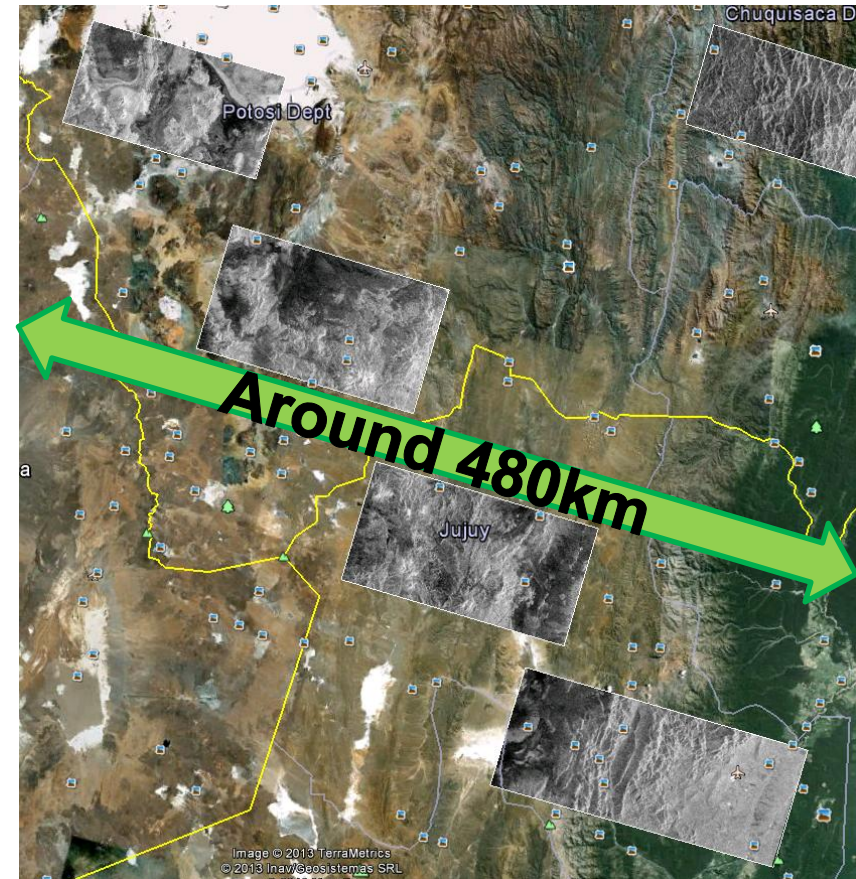
# Operational Application Focus



- Defense & Security
- Oil & Gas
- Mining
- Natural Resource Monitoring
- Disaster Management
- Airport Mapping
- Agriculture

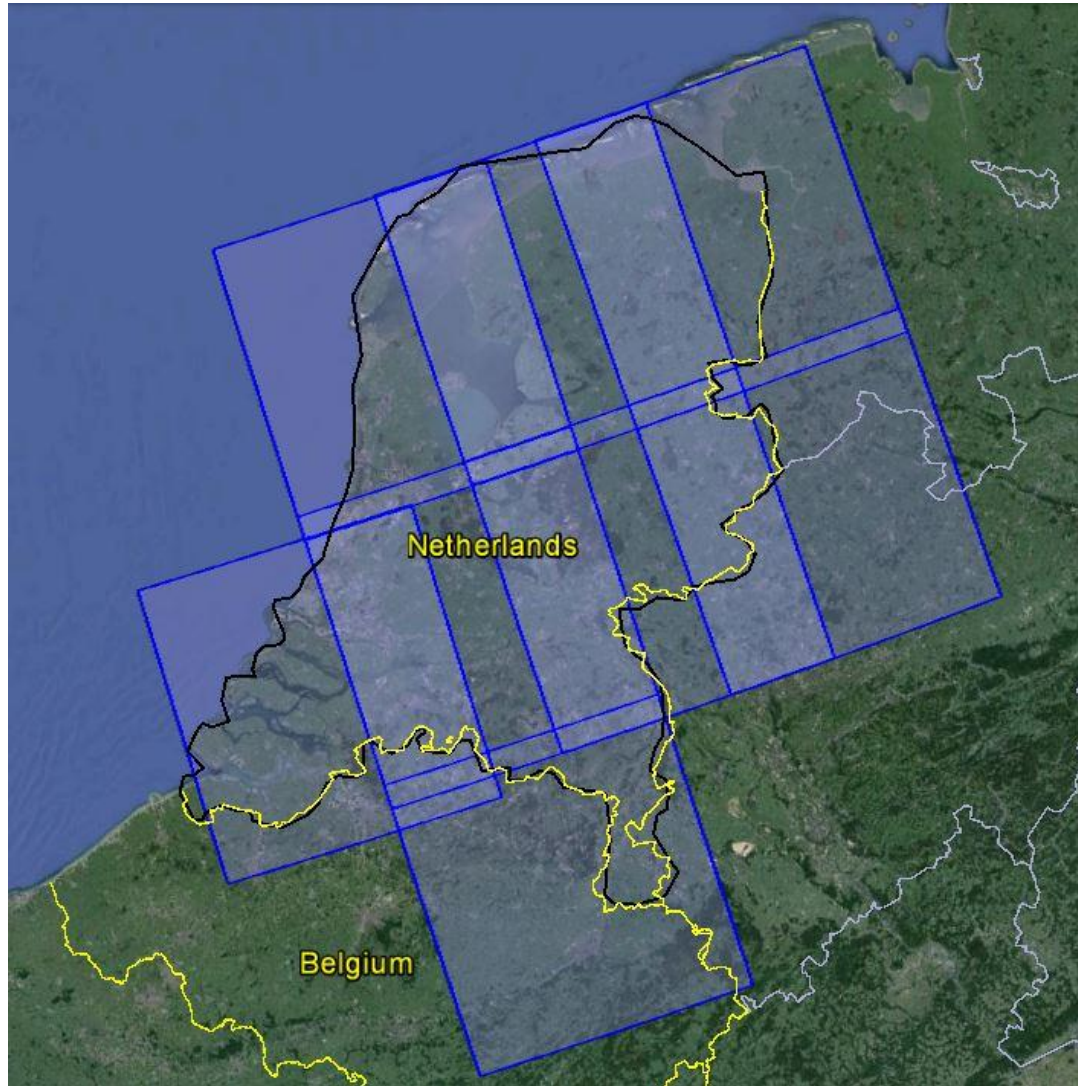
# National Coverage at High Resolution

- There is growing demand for systematic broad area coverage at sufficiently high resolution to monitor fine-scale features and changes
- MDA's answer to this demand is Extra-Fine Imaging Mode:
  - 125 km x 125 km @ 5m resolution
  - Unique capabilities for large scale land use/change detection
  - Gap free coverage at all latitudes
  - More efficient national scale coverage



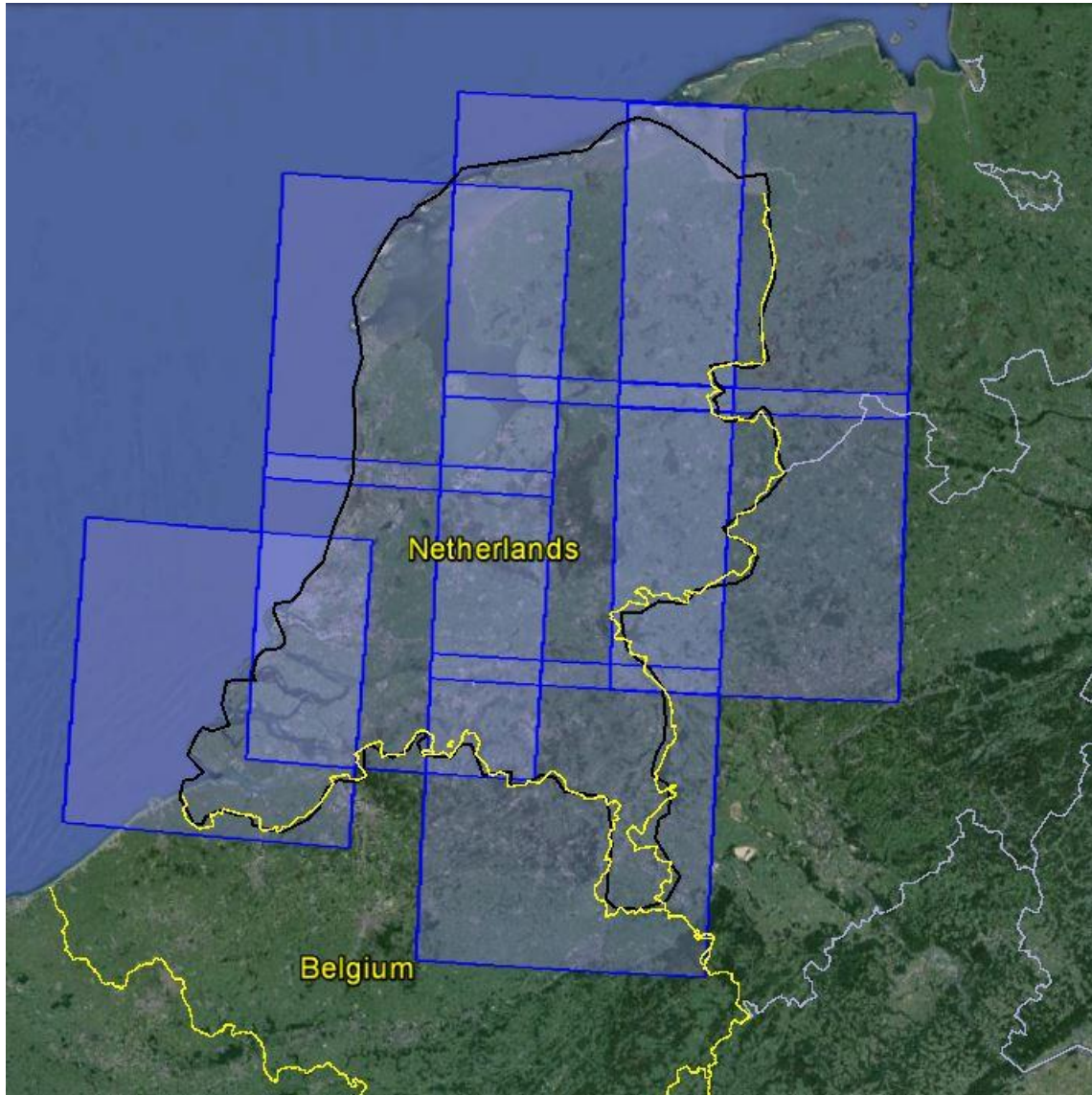


# Extra Fine Beam (XF) Coverage of the Netherlands - Ascending Passes



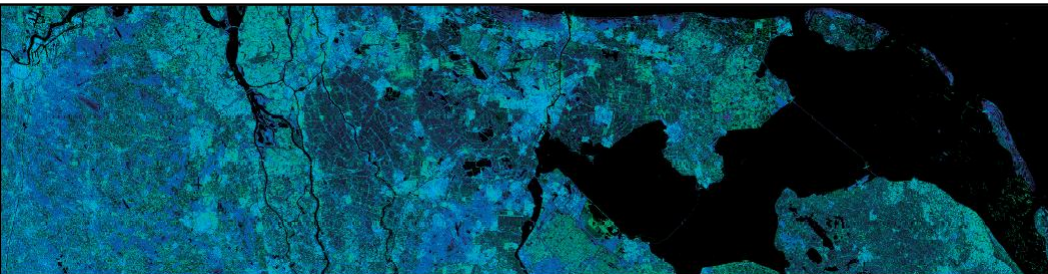


# Extra Fine Beam (XF) Coverage of the Netherlands - Descending Passes

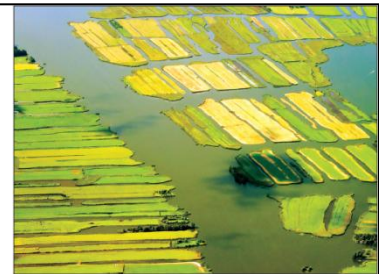


# A Case Study: NSO's Satellietdataportaal

- The NSO developed a **Satellietdataportaal** to encourage geospatial application development by Dutch government, educational and commercial users.
- NSO has licensed RADARSAT-2 data with coverage over the Netherlands to populate the Satellietdataportaal.
- The focus of the work by the NSO and the Dutch geospatial community is on agricultural and InSAR applications.
- Dutch users are developing geospatial services based on RADARSAT-2 as a complement to Sentinel-1 data access.



Netherlands  
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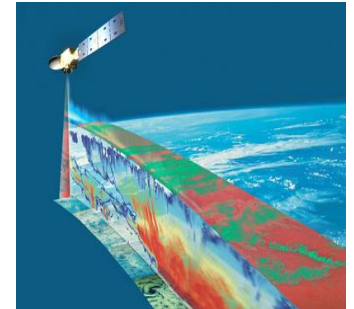
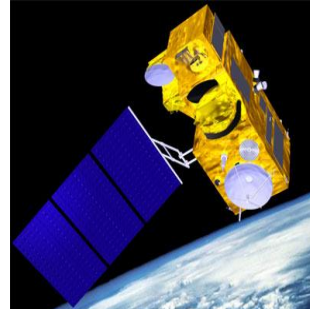




## Limited growth downstream sector

- Satellite images are expensive
- The (foreseen) customer is unaware of the possibilities
- Competition with aerial images (resolution!)
- Only SME's involved
- Limited connection with geo information market
- A scientist is in general not an entrepreneur...

# GMES Sentinels



Sentinel-1	RADAR (land and marine applications)	<b>2014</b>
Sentinel-2	Multi-spectral (land applications)	<b>2015</b>
Sentinel-3	Multi-spectral (marine applications)	<b>2015</b>



Satellite data portal : 2012 – ~~2015~~  
2020





# Satellite data portal

- Economic profit for end-users (precision agriculture)
- Reduction of pollution (pesticides in agriculture)
- Reduction of governmental costs (e.g. deformation measurements)
- Quick start for NL value adding sector
- Ministry of Economic Affairs signs contract in Oct 2011.
- Ministry of Infrastructure and Environment joins later in Dec 2012.



# Free and open data

De groenmonitor geeft de actuele vegetatiekaart van Nederland weer, welke verkregen is uit satellietbeelden. Voor onbewolkte (gedeeltes van) satellietbeelden wordt de NDVI berekend. De NDVI is een indicator van de hoeveelheid groene biomassa met een waarde tussen de 0 en 1. De NDVI waarden kunnen "vertaald" worden naar landbouwkundige processen of natuurontwikkeling over de seizoenen. Zo kan per perceel de gewasontwikkeling gevolgd worden.

NDVI	Landbouw	Natuur
0	Open water	Open water
0.1	Drassig/nat geploegd land	Wit zand of rotsachtige
0.2	Geploegd land	Kale bodem
0.3	Net opkomend gewas	Bladverliezende veget.
0.4	Opkomend gewas, gemaaid gras	Naaldbos in de winter
0.5	Gesloten gewas	Opkomende (lente) of
0.6	Gewas met ongeveer 2 bladlag...	Naald bos in de zomer
0.7	Gewas met ongeveer 3 bladlagen	Moerasvegetatie in de
> 0.8	Groene volgroeide mais, groen...	Groen loofbos



15 maart 2012



25 mei 2012



25 juli 2012



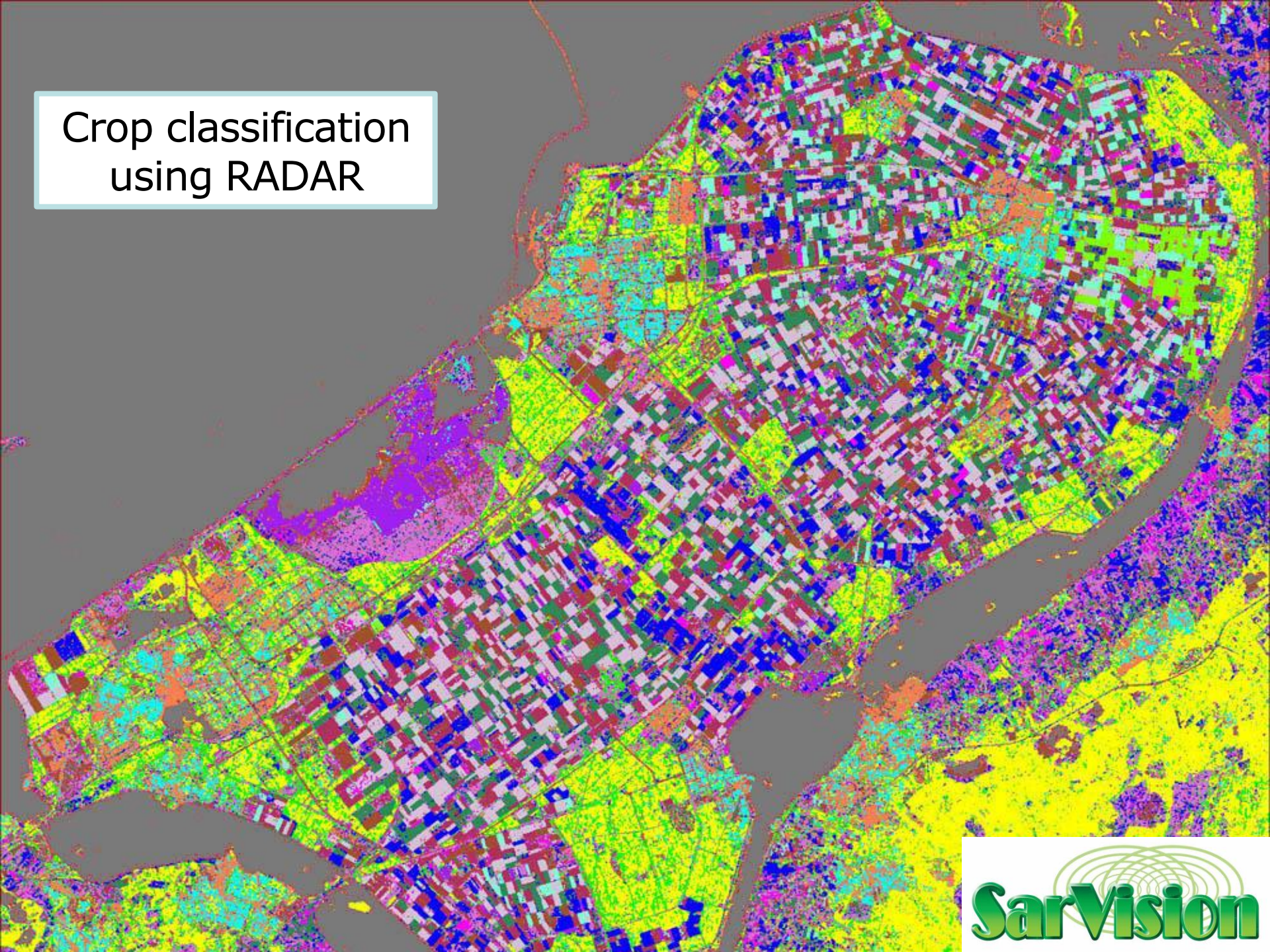
30 september 2012



OK



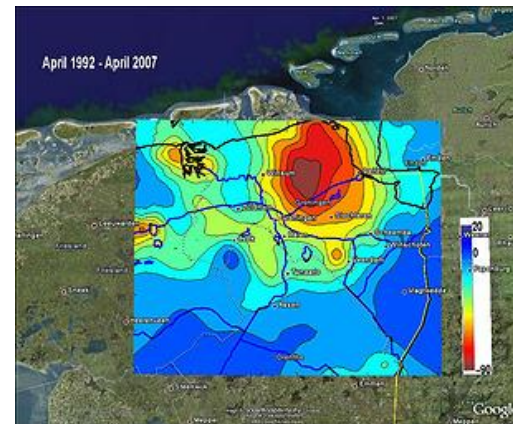
Crop classification  
using RADAR







# Deformation measurements



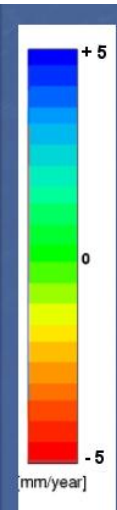




## Deformations in de Port of Rotterdam

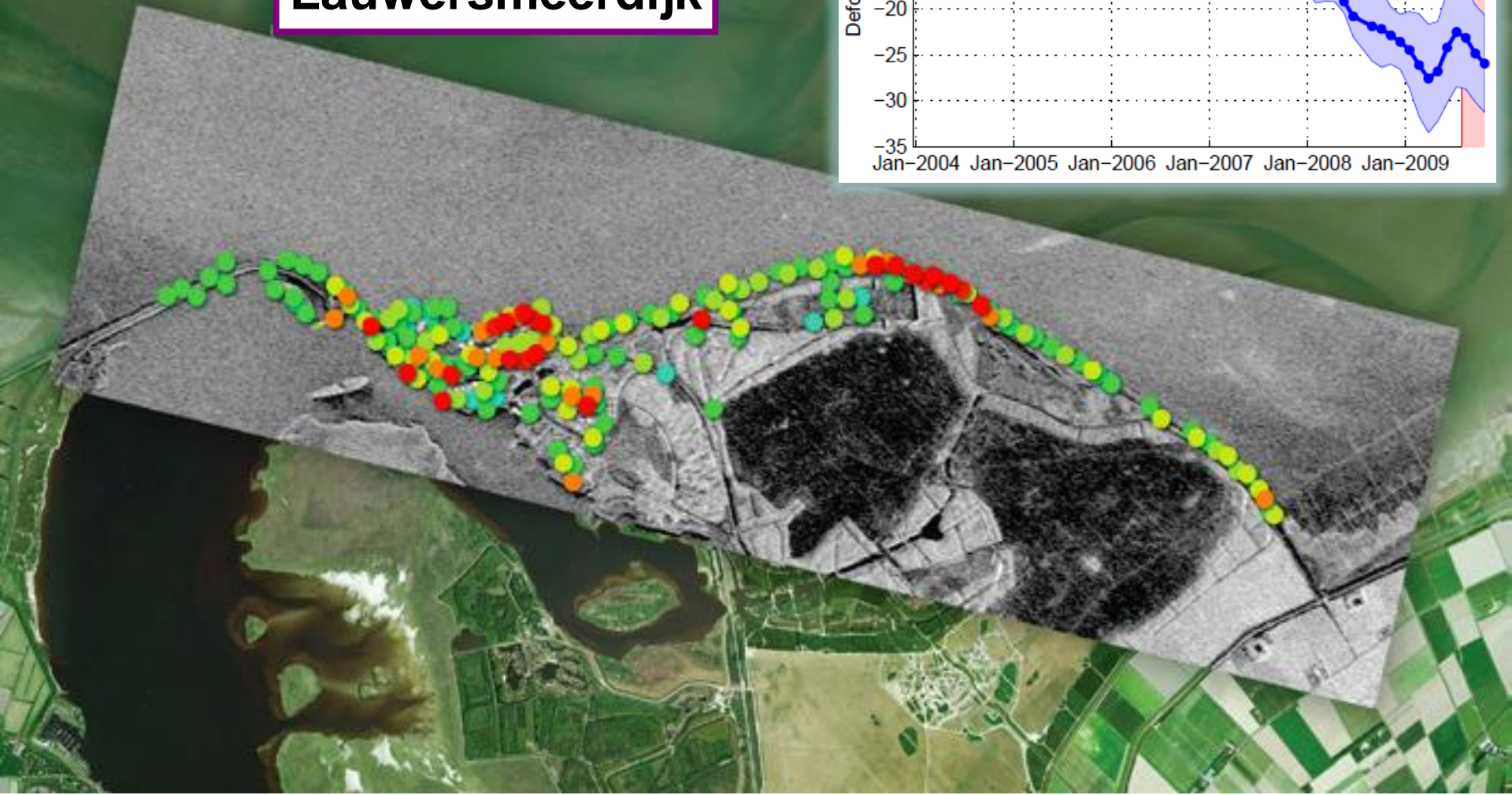
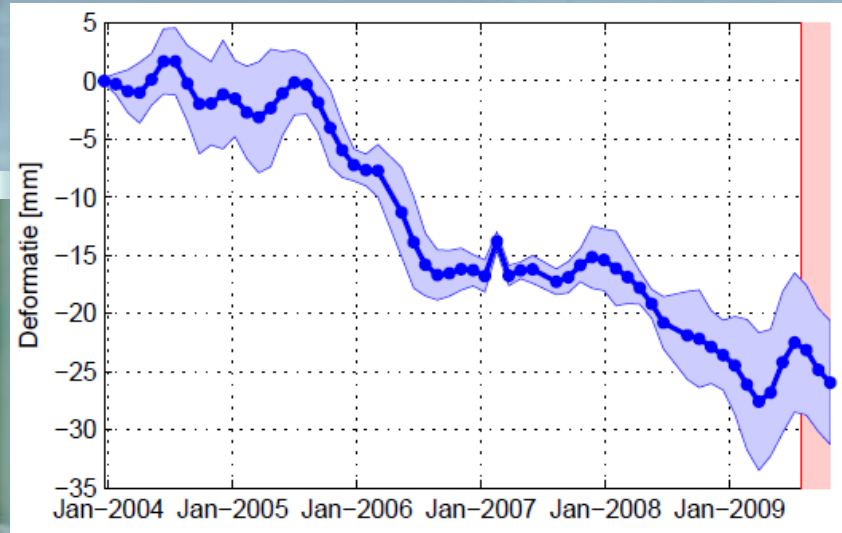


3V, 2011



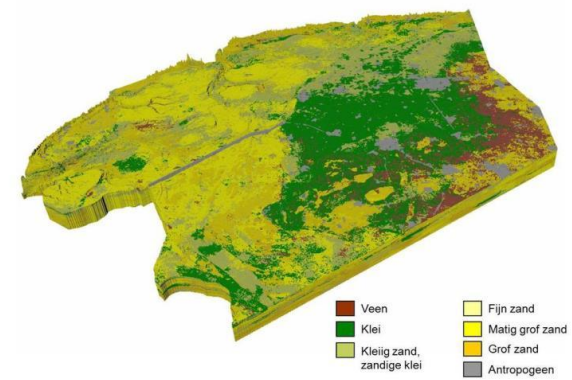
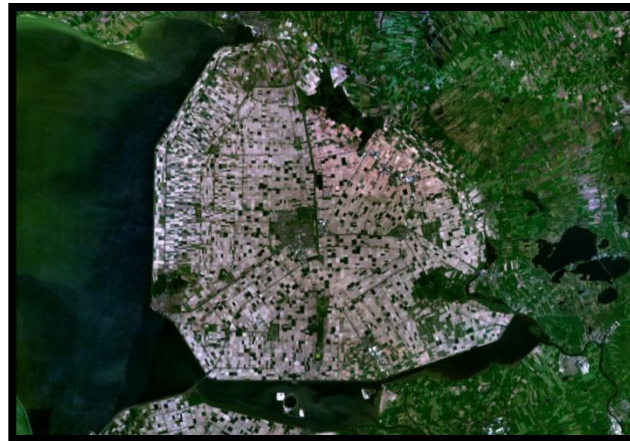


# Lauwersmeerdijk





# National task force surface deformations





# Conclusions and Summary

- Data portals effectively deliver the joint power of private and public sector space assets
- Systematic coverage at higher resolution can fulfill a multitude of national requirements to complement Sentinel data.
- Partnerships between operators and agencies drive a mutual understanding of requirements and are fundamental to success.
- NSO's Satellietdataportaal is a case study for the effective combination of commercial and public sector space assets.





Netherlands  
**Space**  
Office