

# EARSC

European Association  
of Remote Sensing  
Companies



## **The European EO Services Industry: Development of the market and the impacts of GMES**

Geoff Sawyer , EARSC Secretary General  
13<sup>th</sup> February 2012, Vienna



# What is EARSC?

- EARSC is a non-profit-making organisation created in 1989 as the voice of the European geo-information EO service industry
- Mission & objectives:
  - to foster the development of the European Geo-Information Service Industry
  - to stimulate a sustainable market for Geo-information services using EO data, openly accessible to all members
- Today EARSC has 70 members in more than 22 countries, and is a recognized association worldwide
- Represents European geo-information providers creating a sustainable network between industry, decision makers and users



# European EO Services Industry

- Offers a full range of services based on extensive experience serving government, industry and the citizen
- Includes data providers, downstream service providers, software and consultancy companies with a mastery of space-borne/airborne/in-situ systems and sensors technologies.
- Innovative / dynamic; many new companies, changing ownership
- Between 100 and 200 companies largely SME's with strong partnership experience across European borders.
  - Estimated as €800m to €1b annual revenues.
  - Highly skilled workforce; interchange with other sectors
  - Last survey in 2006 identified 152 organisations.
  - Full industry survey will be made by EARSC during 2012.



# What does EARSC do?

- To achieve our mission, we focus on:
  - Improving customer awareness and acceptance of Earth observation and remote sensing based solutions
  - Improving market access for our members
  - Promoting our members capabilities
  - Engaging with key organisations (ESA, the EC and others) to make the EO VA sector's views known and acted upon.
- EARSC works with many partners to achieve these goals.



# How can EARSC help?

## For Companies:

- Networking: meet and partner with other member companies
- Communications - website, newsletter, directorate, numerous events on both European and International stages.
- Information on the EO services industry and on potential markets.
- Exchange of best practice and common standards.

## For Companies and Clients:

- **EOpages** is a web-based marketplace for users to find the services they need and suppliers to provide them.
- **OGEO Portal** is a web-based tool to enable Oil & Gas and EO service industries to work together.



# OGEO Portal

**ogeo**  
oil and gas earth information group

Login

**OGEO IS THE FORUM FOR INFORMATION EXCHANGE BETWEEN THE OIL AND GAS AND GEOINFORMATION COMMUNITIES.**

**FAST INFORMATION**  
The portal offers the advantage of rapid and direct information exchange across the range of activities undertaken in both market sectors allowing users to post questions related to information that is being sought.

**BUILDING NETWORKS**  
Suppliers could co-ordinate and exchange expertise as well as building networks and partnerships to respond to demand requests making commercial offers easier to put together and more targeted as a result of price exchange.

**PROBLEM SOLVING**  
As the online site members could find other members dedicated to helping each other solve business problems, find new suppliers, win new customers, share experiences and practical advice. Do you want to know more about registration.

# OGEO Portal - Applications

OGEO Wiki » Home » Applications » Sea Ice and Icebergs

## Sea Ice and Icebergs

Labels: [icebergs](#) [arctic](#) [sea-ice](#) [ice](#)

Added by [Geoff Sawyer](#), last edited by [Geoff Sawyer](#) on Nov 17, 2011 ([view changes](#))

[Sea ice](#) and [icebergs](#) pose a significant set of challenges for offshore oil and gas, and are becoming increasingly relevant as offshore interests extend into more extreme environments. The Arctic region in particular is becoming a focus for oil and gas activities as surveys suggest the presence of significant resources. According to the [US Geological Survey](#), 30% of the world's gas and 11% of the world's oil deposits are estimated to lie beneath the Arctic regions[1].

Areas of current oil and gas interest include the Barents Sea (Shtockman), east and west Greenland, and the Beaufort and Chukchi Seas. [Sea ice](#), which is formed from sea water, is not just a challenge in the polar regions. It is also present in temperate areas of oil and gas activity including the Sea of Okhotsk (Sakhalin), along the east coast of Canada and in the Caspian and Bohai Seas. [Icebergs](#) and ice islands, which unlike sea ice are calved from coastal glaciers and ice shelves and are thus formed from fresh water, have a quite different distribution and pose quite distinct challenges to oil and gas operations, particularly around Greenland, along the east Canadian coast, in the Barents Sea and, potentially, in the south Atlantic (Falkland Islands).

Within the Arctic, the pressure to exploit resources in this challenging environment is encouraged by declines in sea ice coverage. The most significant reductions in ice coverage over the last few decades have been in summer, with the result that many areas have been experiencing longer ice-free seasons and/or are becoming more accessible to marine vessels. While this has been creating opportunities for the oil and gas industry, in many Arctic regions sea ice remains a threat even in summer and there is a keen awareness that the challenges of operating in this region remain formidable. Remoteness and harsh operating conditions combined with strict standards on health and safety and protection of the environment create demanding conditions for entry into these areas, with earth observation being an essential and important component of the required package of technology.

Earth observation plays important roles in assessing ice conditions during several stages of



Undiscovered oil in the Arctic region, courtesy US Geological Survey, 2008 [1].





# OGEO Portal – Success Stories

OGEO Wiki - Home - Success Stories - Monitoring Dredging Plumes and Water Quality

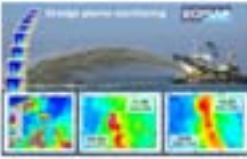
Labels: [Success-story](#) [Woodside](#) [Home](#)

Added by [Geoff Sawyer](#), last edited by [Geoff Sawyer](#) on Oct 18, 2011 ([View changes](#))

Tools

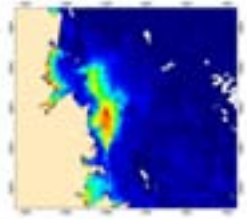
### Project Background

[Woodside Energy](#) needed a dredge monitoring solution to satisfy regulatory requirements. Starting in October 2007, satellite based turbidity mapping offered a solution and operationally generated maps were delivered on a regular basis. The coastal water monitoring area is located in North Western Australia and water turbidity products were delivered on average every two days for more than two years for an area of 1000 sqkm. These data sets complemented the localised, point based environmental monitoring strategy of [Woodside's](#) PLUTO LNG development project with spatially resolved distribution maps. Dredging operations support new pipeline laying activities and the shipping channel expansions. The Service provider was [Eamus GmbH](#).



### Issues and Needs

The large size of the required water quality monitoring area (~1000 sqkm) needed to be covered in regular intervals, allowing for a high frequency during dredging operations. The movements and size of the dredge plume had to be detected and quantified consistently in terms of turbidity with an adequate spatial resolution. The creation and fading of plumes, their potential impact on adjacent coastal areas, and the impact of natural factors such as re-suspension due to tidal currents and storms needed to be quantified for the environmental assessment. Conventional methods using in-situ sensors of turbidity allow a point wise, vertically resolved measurement of turbidity and suspended solids, but not an area wide coverage with a clear classification of natural or man made turbidity sources. An increased number of in-situ sensors would not only just increase cost, but also require regular maintenance and together with conventional airborne monitoring would increase HSE risks substantially.



### Solution

Satellite based monitoring allows a sustainable service provision without any direct HSE risks. Physics based retrieval algorithms ensure the consistent and operational generation of quantitative water quality maps. Additionally, flexible client defined temporal and spatial resolutions and back-up solutions can be implemented if satellite sensor independent processing technologies are applied. These requirements were fulfilled with the established EOMAP processing technology. Within the monitoring program, various other remote sensing sources were integrated for verification, using the hyperspectral airborne HYMAP sensor and the multispectral satellite sensors IKONOS, RapidEye, MERIS, MODIS Terra and Aqua. The product evidence shows consistent and well calibrated turbidity data, comprising spatial resolutions between 3 and 250 meters and a frequency of up to two records per



# EOpages – home page

Home Search & Find Address Book EMarket Success Stories News Search Login | Sign up

## EO PAGES

### A MARKETPLACE BETWEEN EARTH OBSERVATION INDUSTRY & USERS beta release

EOpages is a Marketplace between the Earth Observation Service Industry & Users. EOpages shows the capabilities of the geo-information industry in general and value-adding companies in particular. The objective of this project is to help potential customers explore the available value-added geo-information services of interest to them in an interactive and user-friendly manner.  
[More info about the project](#)

- 159 COMPANIES
- 24 COUNTRIES
- 338 SERVICES
- 147 BUSINESS QUERIES

#### Search & Find

Search & Find is an easy, three-step process, guided search to access our exhaustive information repository on the EO industry

#### Address Book

Address Book contains the latest contact information of the EO industry. The online Address Book is easy to use, simply selecting and choosing the relevant categories or tags.

#### EMarket

EMarket is a customise section where Users contact directly industry looking for product's technical characteristics, applications, availability, resources, etc...

#### Success Stories

Some examples of recent success stories resulting from EO industry development activities.

#### News

The news section aims to provide a quick access to the top stories. We provide information for stakeholders and users about the capabilities of the information value added services.

# Infrastructure Development Planning

Earth Observation Support to Urban Development

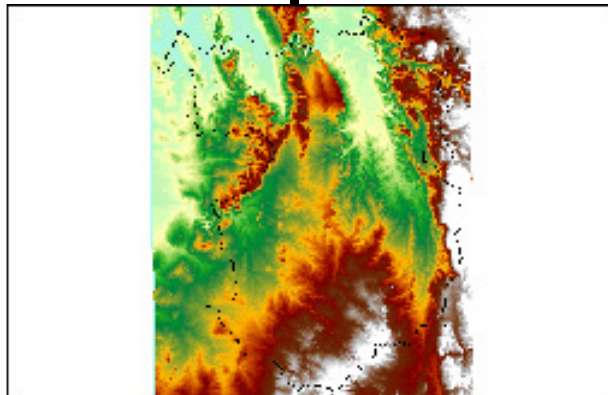
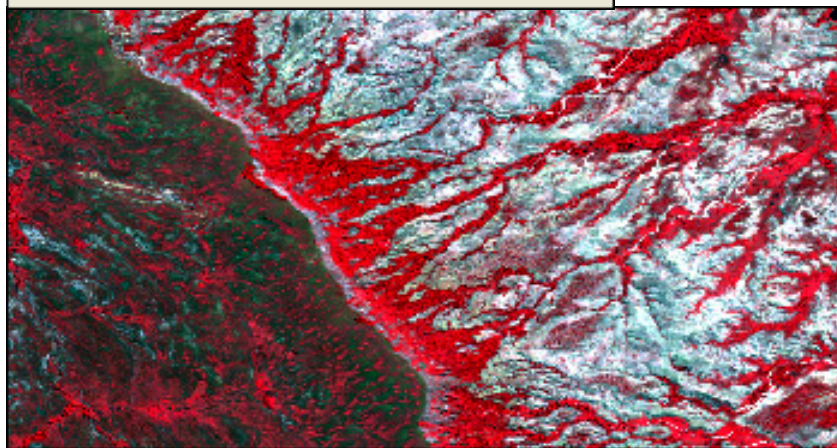


Fig.1 3D Overfly DEM within the area of Service Trial 2 using ESRI ArcScene with Basic Drainage System overlay

DEM\_3D\_arscene\_hydro

Fig.2 Samples of Satellite imagery in CIR and Land Cover overlay

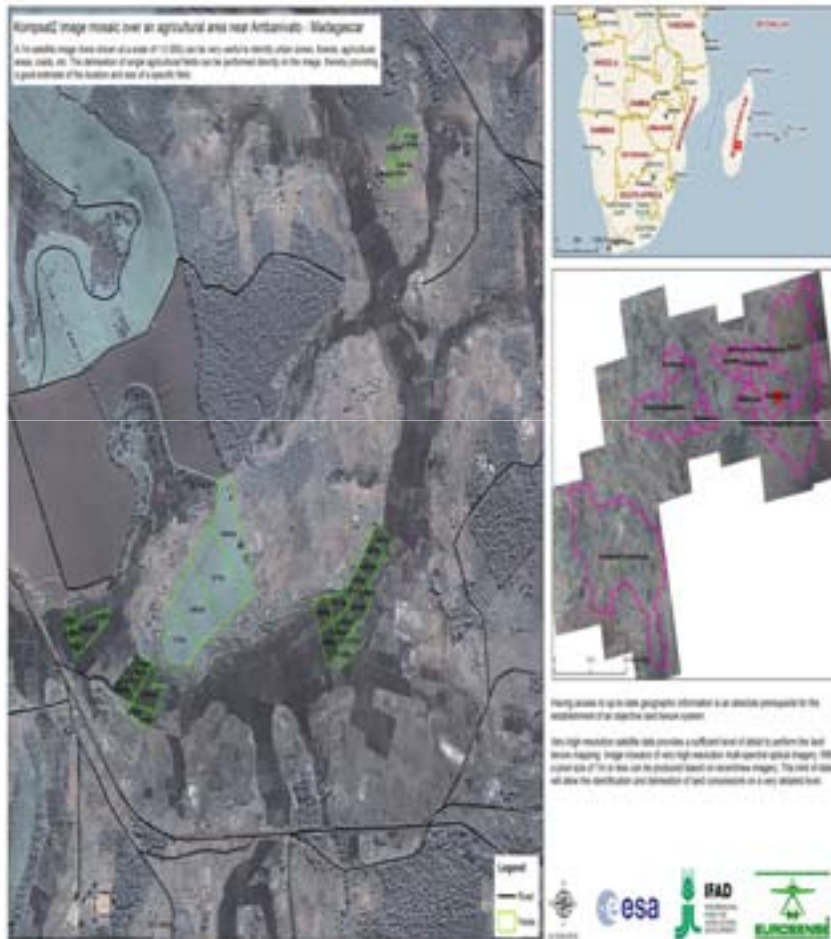


SatData\_LC

- **Users:** Int. Fund Agricultural Development, Madagascar
- **Need:** Situation awareness information of large areas in Madagascar to contribute to an improved development planning for agricultural production
- **Challenge:** Identify service areas with potential for further agricultural activities within the region
- **Initiative:** Production of Land Cover Maps for agricultural activities within the river valleys and Digital Elevation Models to support the actual development planning within the region using high spatial and thematic accuracy.
- **Results:** The information provided through this service and its product has led to a more efficient development planning
- **Service provider:** GAF-AG ([www.gaf.de](http://www.gaf.de))

# Image support for land tenure mapping

Earth Observation Support to Urban Development



•**Users:** Int. Fund Agricultural Development, Madagascar

•**Need:** Support the current land reform programme (facilitating the issuance of land certificates)

•**Challenge:** Provision of earth observation to facilitate the delineation of titled land parcels

•**Initiative:** Very High Resolution optical satellite data can provide a detailed and homogeneous view of agricultural areas (identify and delineate of land concessions on a very detailed level)

•**Results:** Land titling creates a security of tenure and increases investment in land, agricultural productivity, and land values hence an overall improvement of income situation and standard of living

•**Service provider:** Eurosense ([www.eurosense.com](http://www.eurosense.com))

•**More info:** [www.ifad.org](http://www.ifad.org),  
[www.eomd.esa.int/index.asp](http://www.eomd.esa.int/index.asp)



# Wide-area Urban Development

Earth Observation Support to Urban Development

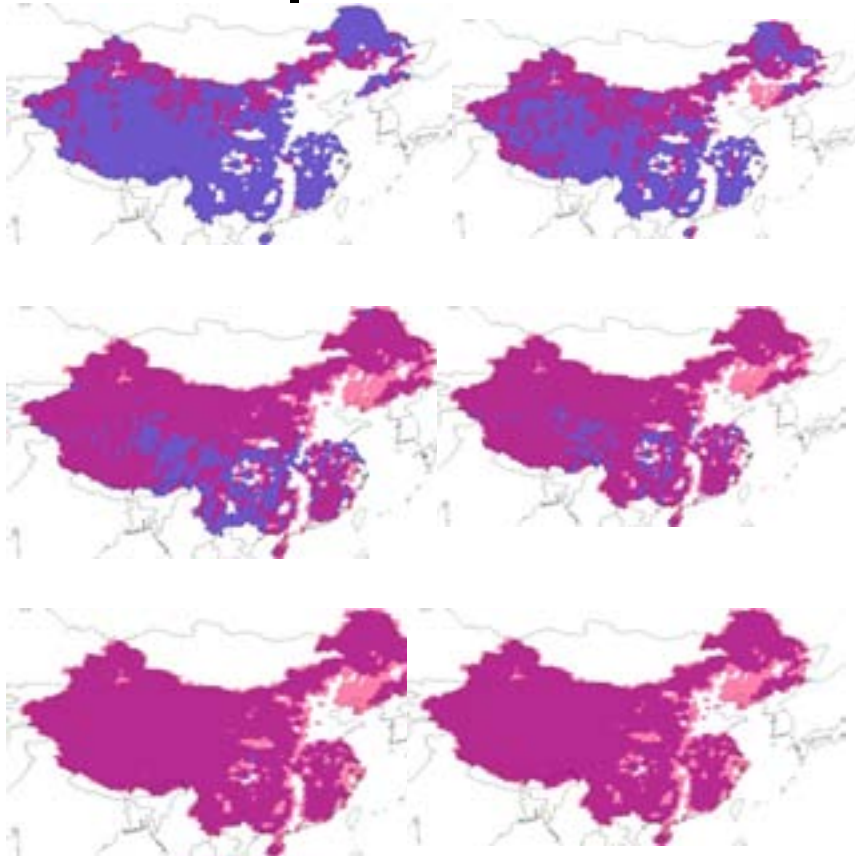


Fig. color coded map showing the coverage RapidEye provided during the 2009-2010 collection by month.

- **Users:** Ministry of Land and Resources in China
- **Need:** Complete and uniform coverage for mapping, monitoring and change detection
- **Challenge:** Full area coverage within 6 months window; optimal collection of low or cloud-free data to be delivered on time
- **Initiative:** RapidEye satellite constellation is an operational system with the combination of capabilities which allow for repetitive coverage of large areas acquiring consistent data in high resolution with an option for daily revisit to an area. Some uses were focus on monitor their agricultural lands and protecting it from illegal urban sprawl
- **Results:** Quick coverage and delivery of the country (5.8 Million km<sup>2</sup>, 60%) during the 2009-2010 growing season
- **More Info:** RapidEye ([www.rapideye.de](http://www.rapideye.de))

# Assisting urban planning activities

Earth Observation Support to Urban Development

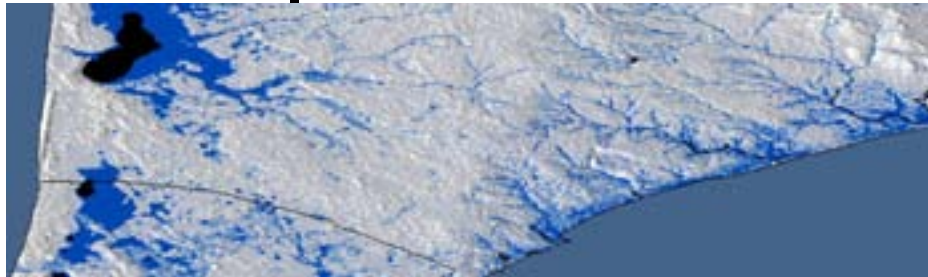


Fig. Baku regional development graphic

- **Users:** World Bank
- **Need:** Assist urban planning activities
- **Challenge:** Provision of up-to-date EO based land monitoring products focused on various aspects of urbanized areas
- **Initiative:** Identification of infrastructure, settlements including classification into urban density classes, hydrology or environmental threats at different levels of detail.
- **Results:** Investment done will return in practical consequences of the fact that planning activities in Greater Baku area in following years could be based on accurate and up-to-date information
- **Service provider:** Gisat ([www.gisat.cz/content/en](http://www.gisat.cz/content/en))
- **More info:** [www.respond-int.org](http://www.respond-int.org)

# Assessing Natural Hazards & Climate Change Risks

*Integration of Satellite EO Technology in Disaster Management*



*Fig. Hydrologic modelling output of flood risk areas in part of semi-urban areas outside of Dakar, Senegal.*

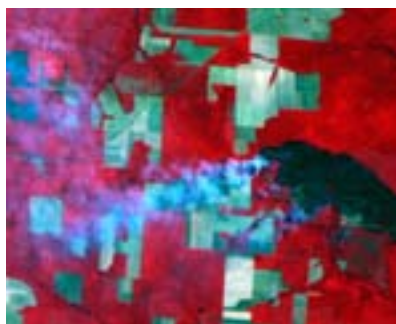
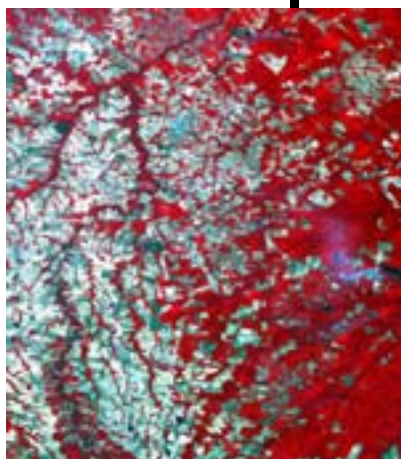
**Users:** World Bank's Spatial and Local Development Team (FEU, SDN), WB Senegal Office

- **Need:** Evaluate spatial assessment of natural hazards and climate change risks and help to address the critical knowledge and capacity gaps of local governments in dealing with rapid peri-urban expansion into areas that may face vulnerability to natural hazards, including those risks associated with climate variability
- **Challenge:** Develop, demonstrate and provide a method for identification and diagnostics for Peri-Urban Expansion Risks
- **Initiative:** Provide series of information on: Multi-temporal land cover mapping and population distribution, natural single and multi-hazard potential, social exposure and vulnerability, built-up areas and vacant land exposed to hazards
- **Results:** Critical information for the formulation of action plans to ramp up natural hazard and climate change risk management practices
- **Service provider:** Geoville ([www.geoville.com/apps/urbanmapping/climate-change-risk.php](http://www.geoville.com/apps/urbanmapping/climate-change-risk.php))

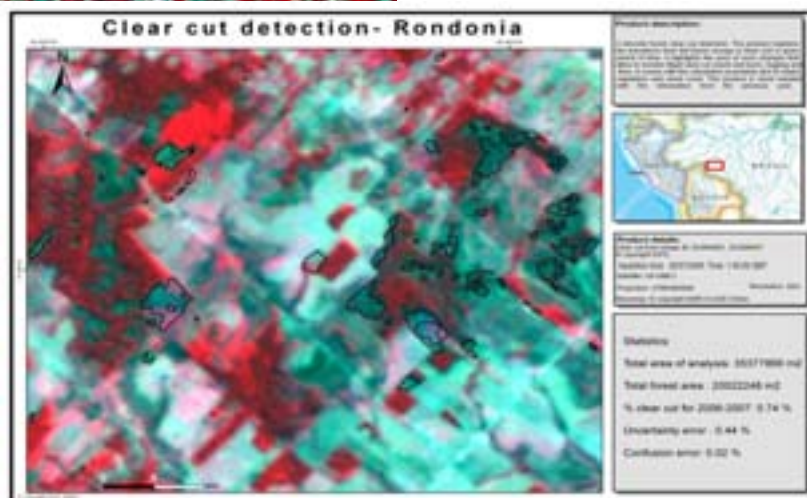


# Mapping long term trends in deforestation in tropical regions

*Integration of Satellite EO Technology in Climate Change*



Right. Fire and burn scar in Matto Grosso region, (Brazil).  
Left. 11/08/2010, UK-DMC2, 22m resolution



DMCii develops its own value-added products: clear cut detection, forest/non-forest classification maps, land cover classification.

- Users:** Brazilian National Institute Space Research (INPE)
- Need:** Satellite imagery to estimate Amazon Basin deforestation assessment, rapid revisit times and wide area coverage.
- Challenge:** Achieving a full coverage in short imaging windows to achieve homogeneity of data for analysis and reducing the impact of cloud cover common to tropical rainforest regions.
- Initiative:** DMC wide swath images can cover huge areas and they reduce the time of the analysis significantly. It provided reliable annual large area coverage, and multi-temporal coverage of high risk areas.
- Results:** Frequent forest monitoring with timely action leads to significant decrease of deforestation and prevents forest loss.
- Service provider:** DMCii ([www.dmcii.com](http://www.dmcii.com))



# Supporting agricultural and food security decisions

Earth Observation Support to Agriculture and Rural Development

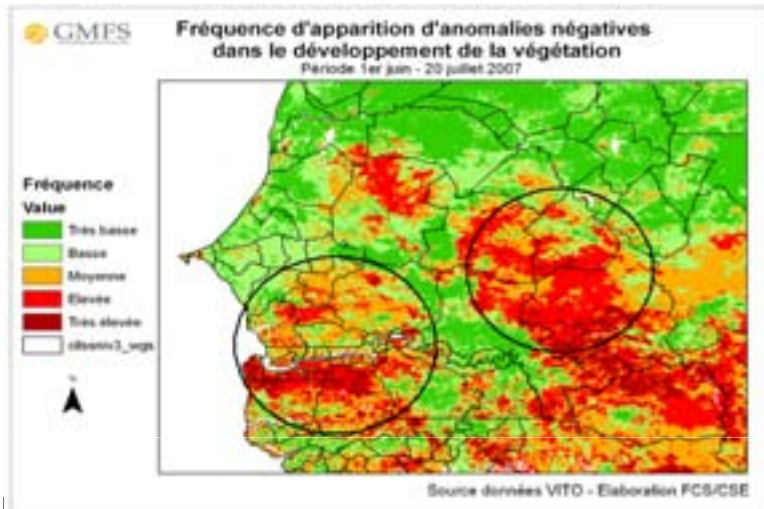


Fig 1. Frequency analysis of negative anomalies at the start of the growing season. Red indicates high anomalies



Fig 2. Comparison of family agriculture in Brazil, Food Acquisition Programme

- **Users:** Centre Suivi Ecologique, Senegal and CONAB, Brazil
- **Need:** Accurate and timely information on the growing season utmost importance for decision making
- **Challenge:** Implementation of appropriate interventions aimed to manage the risk of food insecurity in time
- **Initiative:** Use low cost data, daily meteo achieves and field observation to obtain Vegetation Productivity Indicators to develop further tools for faster and more adequate decisions
- **Results:** Early warning. EO data ensures rapid, accurate and timely information over large areas of the countries
- **Service provider:** VITO ([www.vito.be](http://www.vito.be)),
- **More info:** [www.gmfs.info](http://www.gmfs.info), [www.devcoast.eu](http://www.devcoast.eu)

# Implementing & managing agriculture projects

Earth Observation Support to Agriculture and Rural Development



Fig 1. Map showing parcel management of a small scale irrigation scheme during dry season of 2010.



Fig 2. Overview of a small scale irrigation scheme with a false colour near infrared image of 1m resolution.

- Users:** Ministry Agriculture Malawi
- Need:** Develop a sustainable irrigation plan and environmental impact assessments
- Challenge:** Preparation for an irrigation plan to avoid erosion and reduced transport capacity of the water flow
- Initiative:** Very high resolution images on irrigation sites used to make a detailed map outlining the irrigation scheme (timing of cultivation steps & greenness of the crops) providing a good inventory of the infrastructure. Information was derived by visual interpretation, image classification, analysis of NDVI-temporal profile
- Results:** Land cover maps facilitate the selection of new irrigation sites, or the impact assessment of existing schemes helping to target field visits or to make the management of very large schemes more efficient
- Service provider:** VITO ([www.vito.be](http://www.vito.be))



# EARSC and GMES

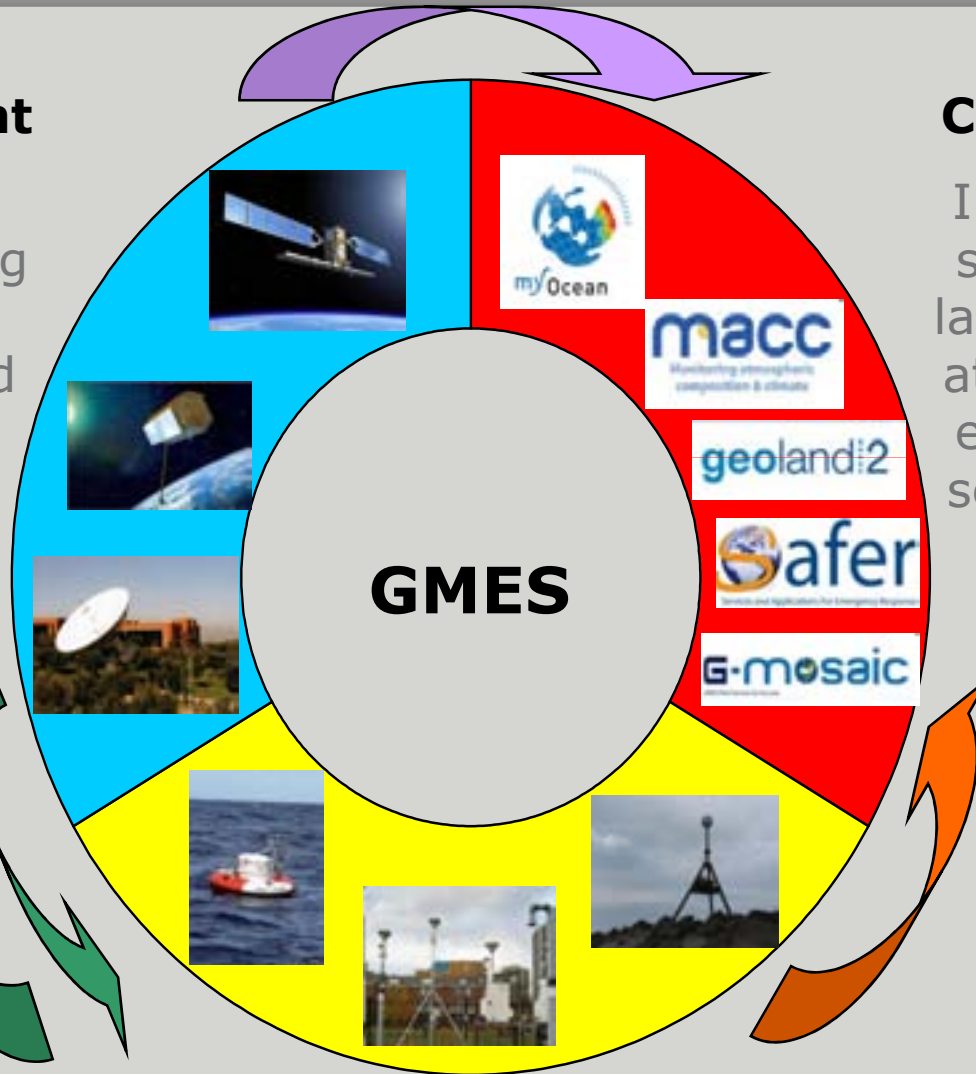
- GMES is a key European public programme to provide space-derived information on environment and security to European policy makers and citizens.
- GMES provides a strong opportunity as a market driver for EO Services.
  - Industry has invested quite heavily with the goal to exploit opportunities using GMES products & services in other markets eg. commercial, export and non-EU government.
- Hence, EARSC has a strong interest in the way GMES will be implemented:
  - 3 Position papers available on EARSC web-site.

# GMES Components



## Space Component

Sentinels,  
Contributing  
Missions  
and related  
Ground  
Segment



## Services Component

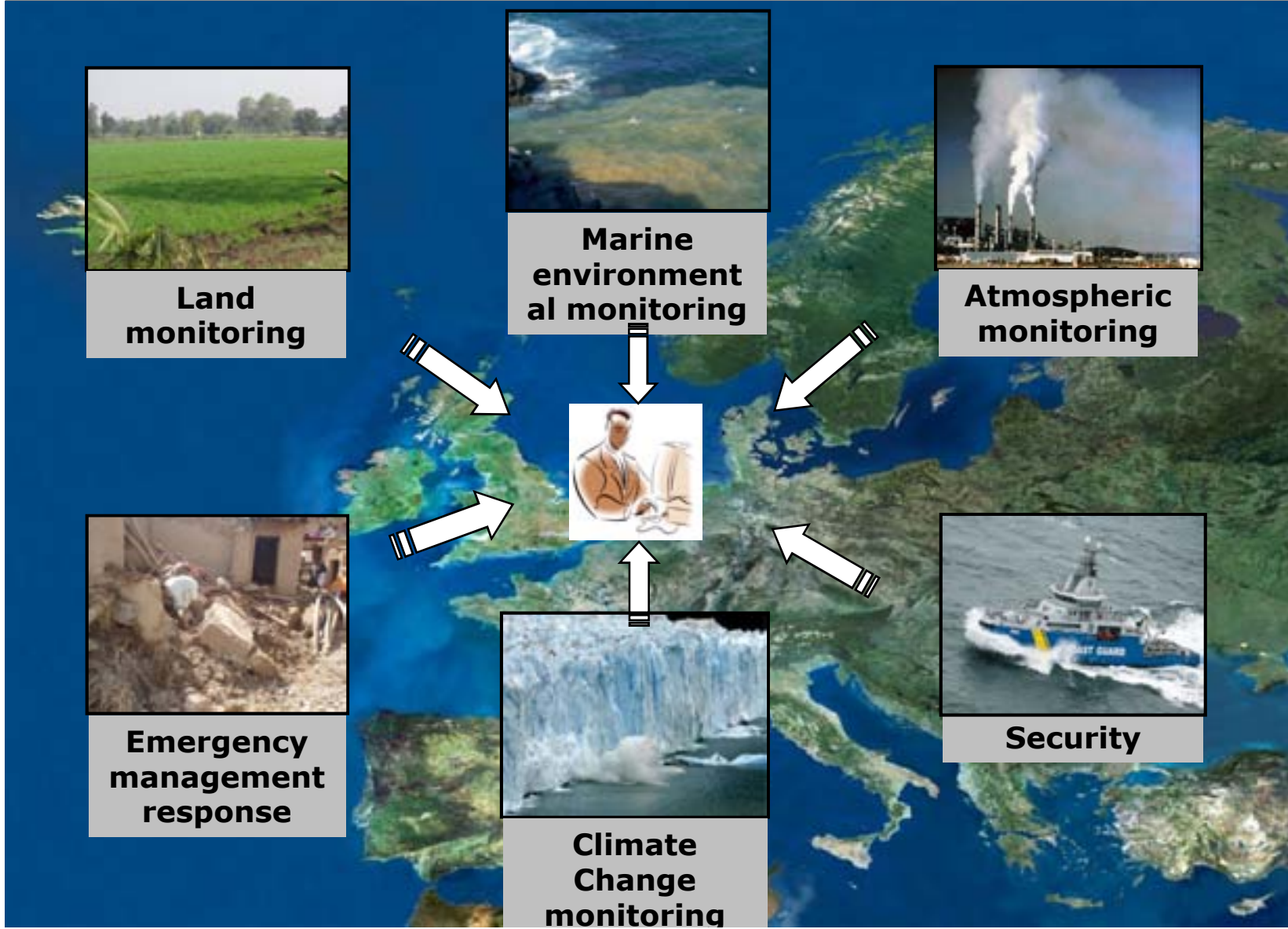
Information  
services for  
land, marine,  
atmosphere,  
emergency,  
security and  
climate  
change

**In-situ Component** Land, air and water monitoring sensors





# GMES Services domains



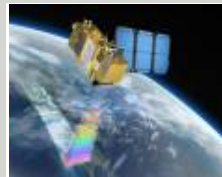
# GMES dedicated missions: Sentinels



## Sentinel 1 – SAR imaging

All weather, day/night applications, interferometry

2013 / 2015



## Sentinel 2 – Multi-spectral imaging

Land applications: urban, forest, agriculture,..  
Continuity of Landsat, SPOT

2013 / 2015



## Sentinel 3 – Ocean and global land monitoring

Wide-swath ocean color, vegetation, sea/land  
surface temperature, altimetry

2013 / 2014



## Sentinel 4 – Geostationary atmospheric

Atmospheric composition monitoring, trans-  
boundary pollution

2019



## Sentinel 5 – Low-orbit atmospheric

Atmospheric composition monitoring  
(S5 Precursor launch in 2015)

2019





# EARSC and GMES Data Policy

Development of the market is best supported by raw data being made available at low or zero cost:

- Raw data from Sentinels should be free and open.
- Data from commercial satellite operators should be procured under appropriate license conditions.
- Core services to be freely and unconditionally available to all European users.
- Downstream services should be procured commercially on a fair and competitive basis.
- A registration system for GMES users should be put in place to ensure that basic quality conditions are met and licensing conditions are respected as well as achieving fair competition (reciprocity) on the international market.





# Summary

- EARSC provides stakeholders with an effective interface to the EU EO services industry
  - Neutral support to find suppliers and obtain contractual services
  - Eopages will provide a first entry point to the full range of services being offered.
  - OGEO-Portal provides an example of a link to a specific client community
- GMES will be an opportunity for users and industry to develop new markets and services.

[www.earsc.eu](http://www.earsc.eu) / [www.eomag.eu](http://www.eomag.eu) / [www.eopages.eu](http://www.eopages.eu) / [www.ogeo-portal.eu](http://www.ogeo-portal.eu)