

EO Applications: Opportunities and Challenges

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ENVISAT SUMMER SCHOOL 2008

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Content of presentation

- Challenges for the new century
- Overview of EO sector
- Overview of GMES
- EO Applications: Case studies
- Conclusions

Challenges for the new century

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Climate change



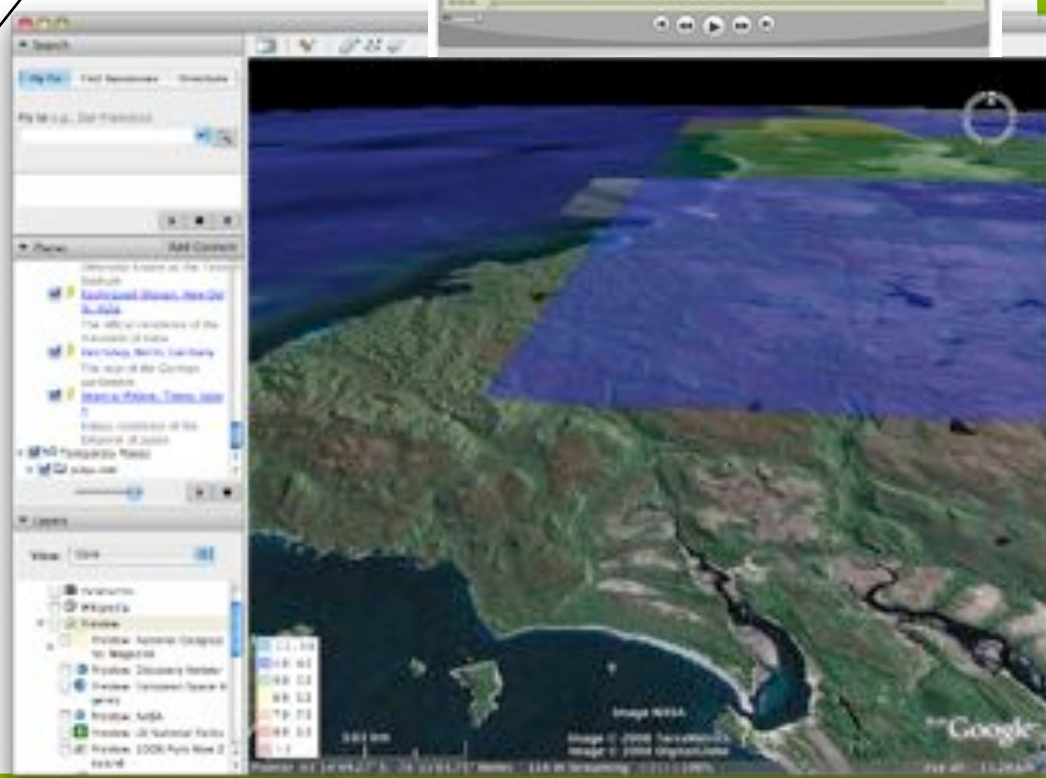
- <http://www.youtube.com/watch?v=zzjOcOcQ90U>

Converging technologies

Navigation

Telecom

EO

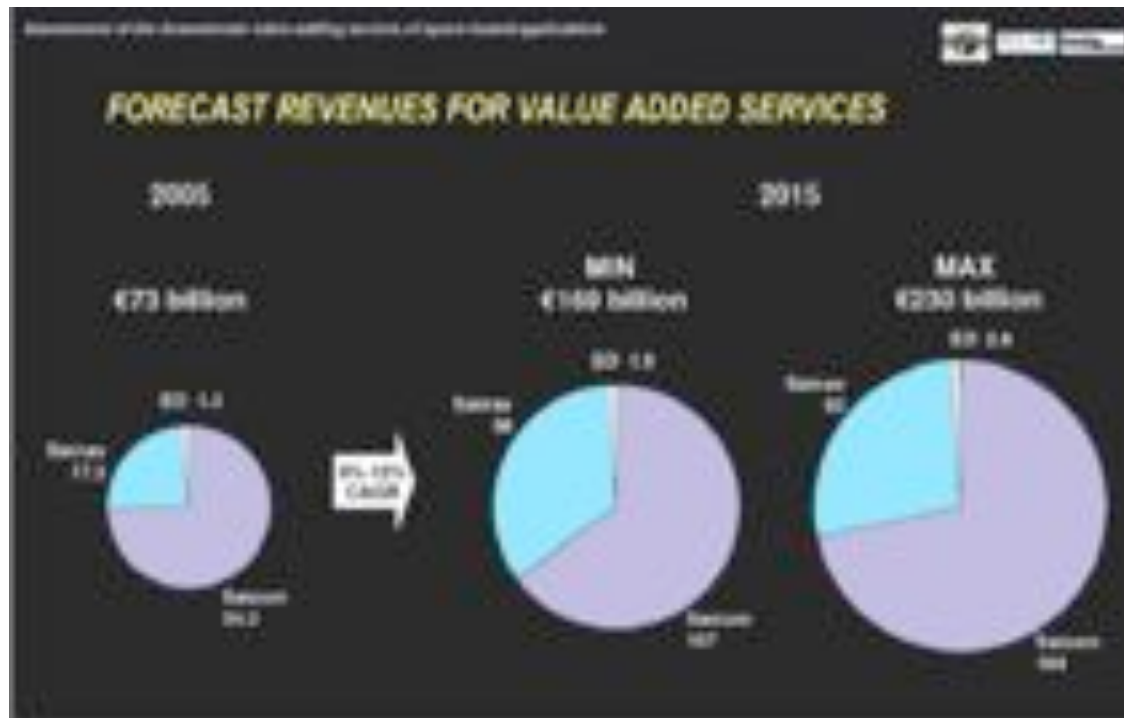


Overview of EO Sector

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EO Market

- The estimated global revenues of the Downstream-Value-Adding Sectors (DVAS) of space applications were bn€ 114 in 2005 and expected to grow to bn€ 300 by 2015. The EO sector represented the 1.3% in 2005.*



*From the ESA study "Assessment of the downstream value-adding sectors of space-based applications (2007)"

EO Market

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • World leaders in niche markets • Government investment has helped to build strong market position • Successful market positioning on international/export markets • Strong support of European consumers and user communities 	<ul style="list-style-type: none"> • Followers or marginal presence in segments with major market opportunities • Satellite cost effectiveness compared to alternative technologies • European markets for satellite services are fragmented • No strong institutional pooling of operational requirements • Industry structure: small size companies, less integrated than competitors
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Central & Eastern Europe expand market and capabilities opportunities • A number of markets waiting for take off • Several government initiatives and regulations boost the use of satellite • The industry structure is evolving, maturing 	<ul style="list-style-type: none"> • Time to market to introduce new services • Several market segments in a critical phase • Industry concerns with respect to Government initiatives • Competition is becoming more intense in many segments • Securing investment capabilities is challenging in many areas

EO sector- VEGA Study

The majority of companies are small - 60% of companies responding to the web survey are classed as very small, with less than 30 people.

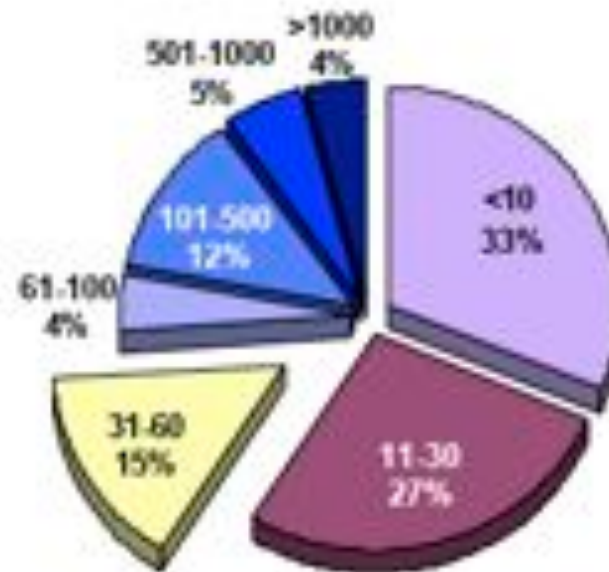


Figure 1.1-1 EO VACs Size by Staff Numbers

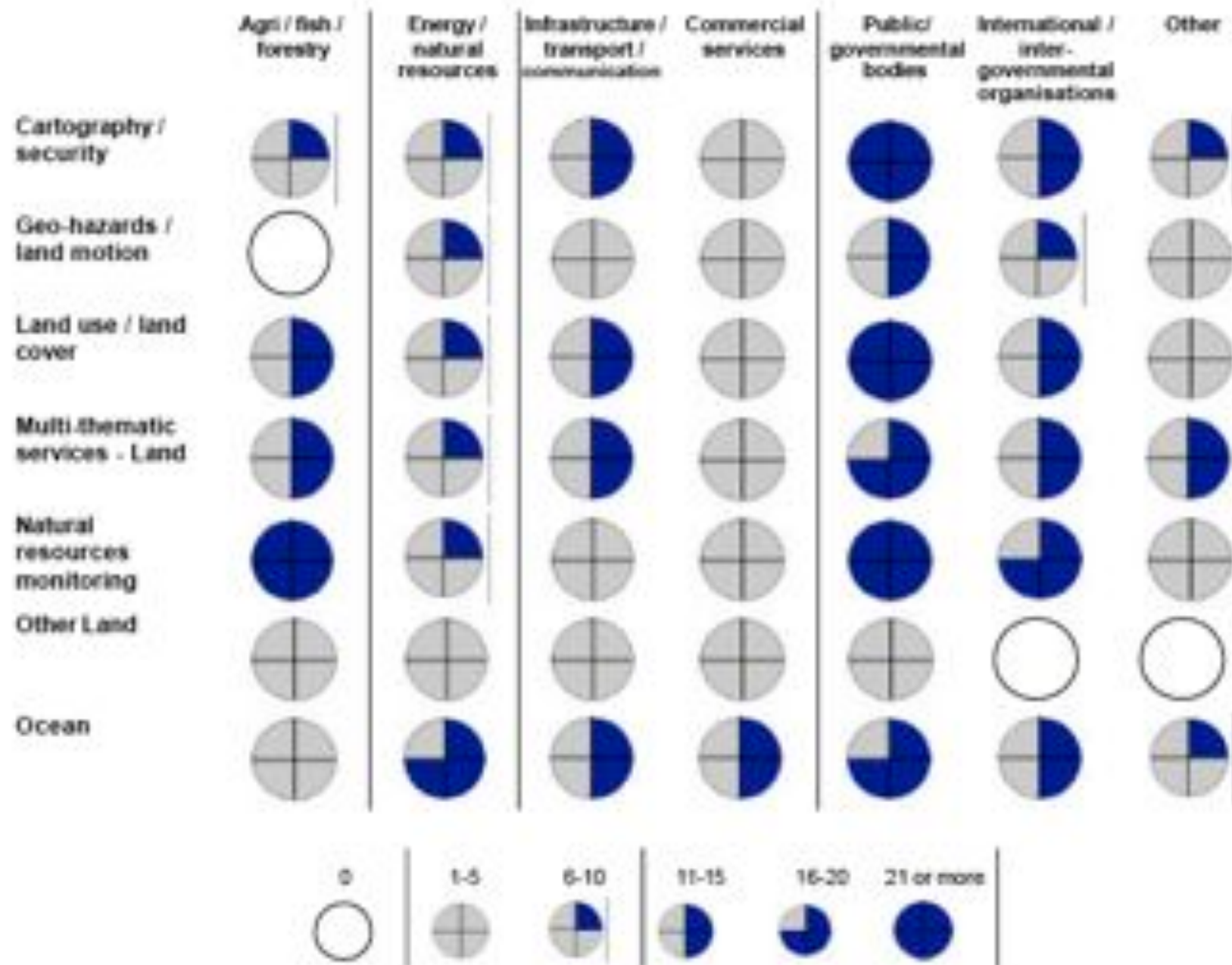


Figure 1.2-1 Sector and thematic footprint

EO sector- VEGA Study

The industry reports it is constrained by availability of sales resources and the cost of the sales process. The number of companies quoting these constraints is shown below

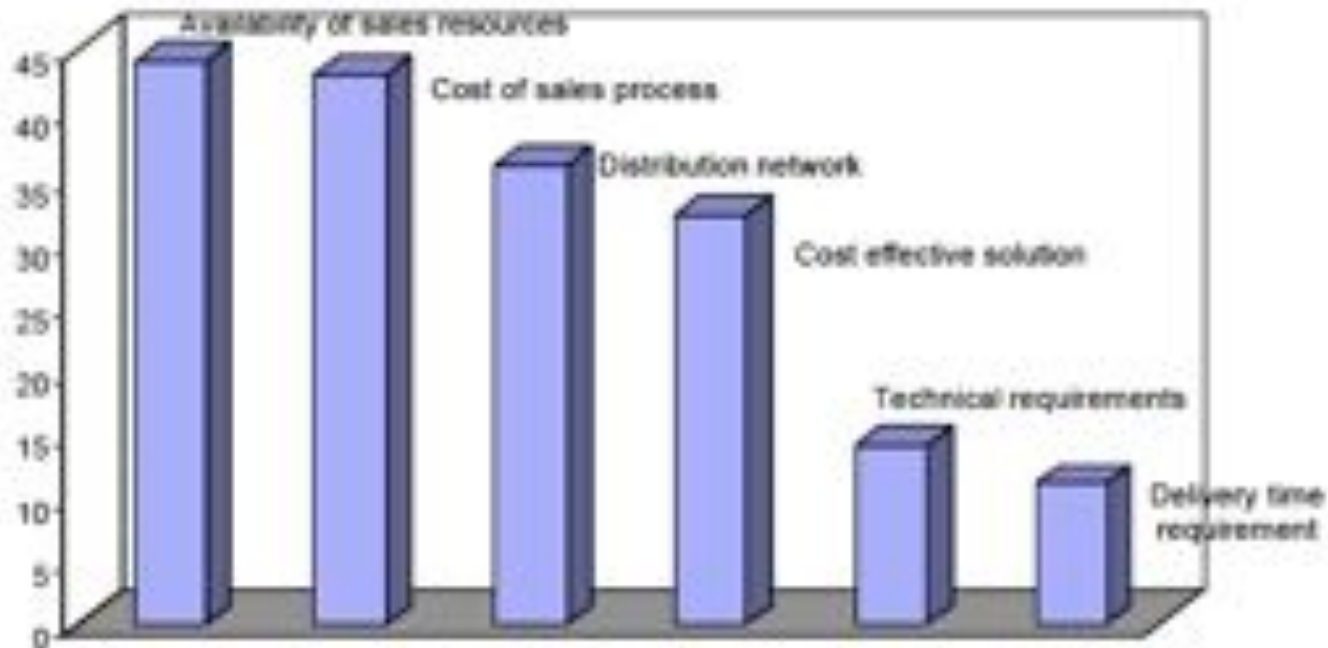


Figure 1.3-8 Internal constraints to sales

EO sector- VEGA Study

Markets outside Europe are a small part (15%) of the typical customer base for European VACs.

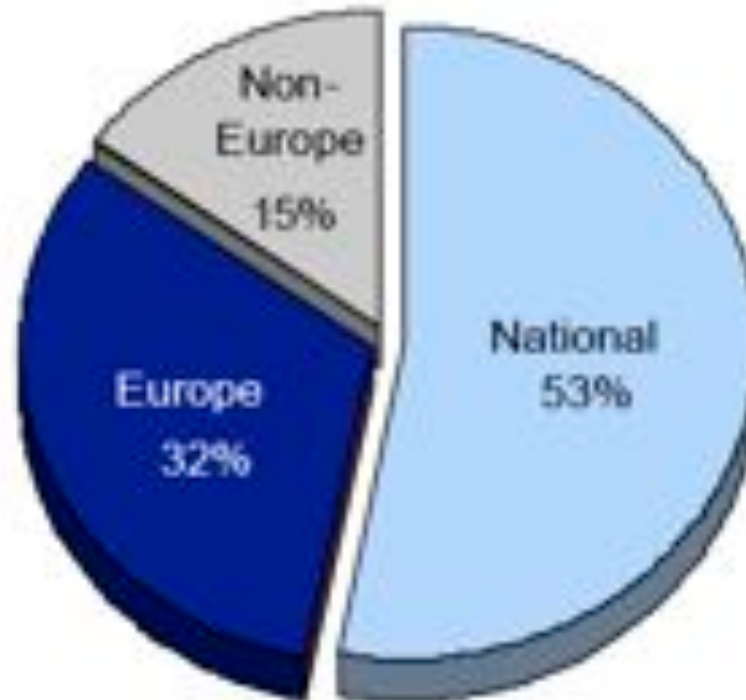


Figure 1.3-11 Customer location



EARSC

EARSC is a non-profit-making organisation which is actively involved in coordinating and strengthening the Earth-observation chain and promoting the European Earth observation industry in programmes such as Global Monitoring for Environment and Security (GMES). It is open to corporate and observer members with deeply interest in the Earth Observation sector.

Member List (83)

EARSC has members from most European countries. Its membership is open to any European company or organization active in the remote sensing business. Who are our actual members?

Company or Organization	Country
Advanced Computer Systems, ACS	Italy
Aerodata International Surveys	Belgium
Argoss	Netherlands
Assimila Ltd	United Kingdom
Aurensis	Spain
Belgian Institute for Space Aeronomy (Observer)	Belgium
Brockmann Consult	Germany
C-CORE (Observer)	Canada
Captec	Ireland
Chelys	Italy
Critical Software S.A.	Portugal
CS Communications & Systems	France
Definiens AG	Germany
Deimos Space	Spain
DNV-Dei Norske Veritas (Observer)	Norway
EADS Astrium GmbH	Germany
EADS Astrium Satellites	France
Edisoft S.A.	Portugal



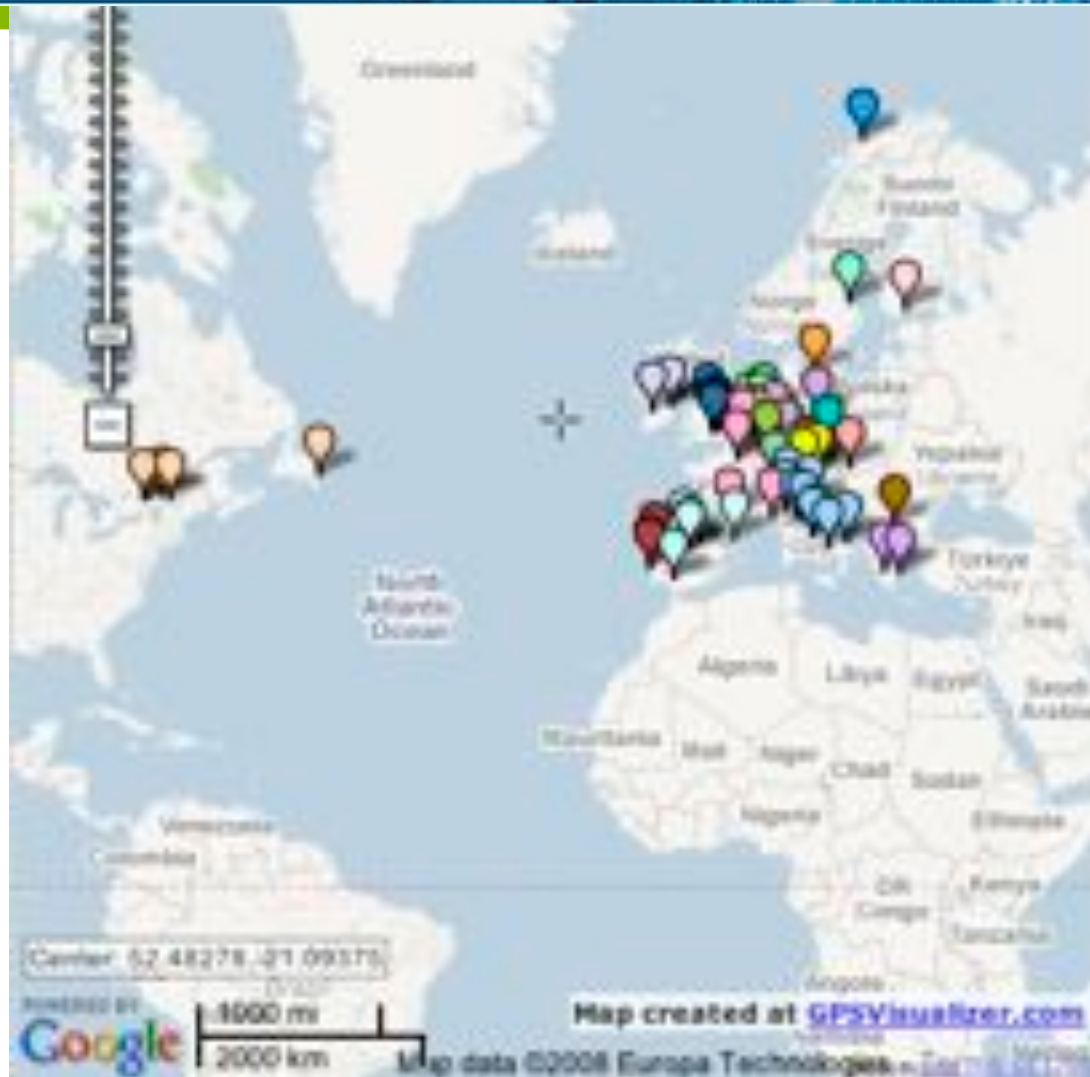
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CS Communications & Systems	France
Definiens AG	Germany
Deimos Space	Spain
DNR-Der Norske Veritas (Observer)	Norway
EADS Astrium GmbH	Germany
EADS Astrium Satellites	France
Edisoft S.A.	Portugal

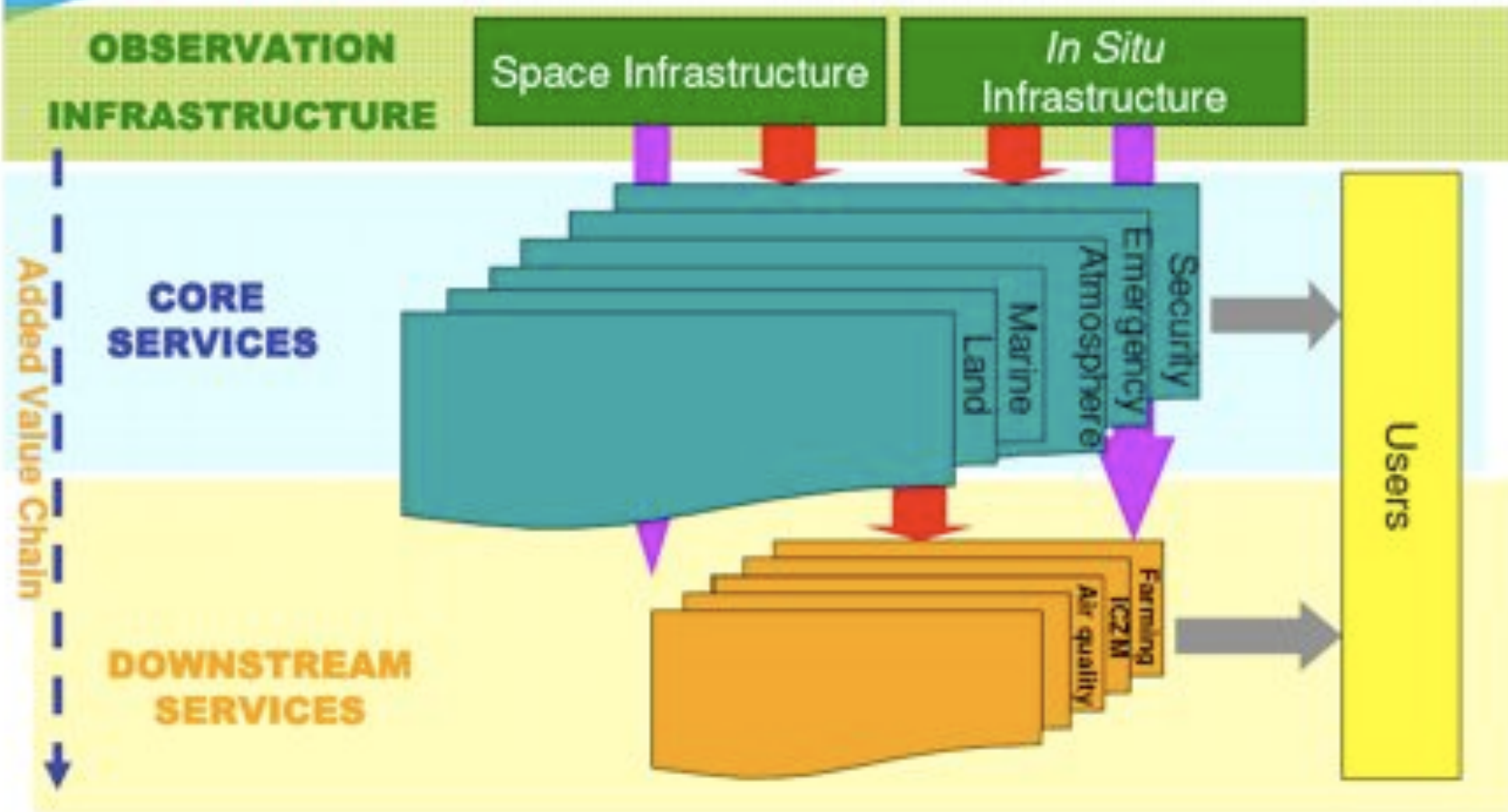


Overview of GMES

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GMES Overall Architecture



GMES opportunities



Thematic Priority		
A. Land cover change in Europe		BIOPRE
B. Environmental stress in Europe		LADAME
C. Global vegetation monitoring		SIBERIA
D. Global ocean monitoring		MERSEA
E. Global atmosphere monitoring		DAEDAL Meth-MO
F. Support to Regional Development Aid		AMESO
G. Systems for risk management		DISMAR
H. Systems for crisis management and humanitarian aid		RISK_FO
I. Information management tools and Contribution to the development of a European spatial data infrastructure		EOLES,

GMES ESA Video



http://a1862.g.akamai.net/7/1862/14448/v1/esa.download.akamai.com/13452/Archive/Quicktime/gmes_09112001_qthigh.mov

GMES Opportunities & threats

- GMES is a good opportunity for business development looking at mid-long term revenues
- GMES is an excellent platform where to establish service chain networks
- GMES can be used as service demonstrator towards users vs future clients
- GMES still does not guarantee data access to build credible and sustainable services
- GMES might not be supported by Industry if the long term revenues turn out to be too long

EO Applications: case studies

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Case Study 1. Environmental Oil spill detection

A "Prestige" every week

Catastrophes like the one provoked by the sinking of the Prestige make the main page of all newspapers and create social outrage. Remarkably, the 60,000 tons of oil which affected the Galician coasts represent a very small part of those affecting the ocean: every year we dump about 3 million tons of oil into the sea—a Prestige every week. Moreover, the majority of polluting events are intentional. They originate from industries and ships that clean their tanks in the open sea.

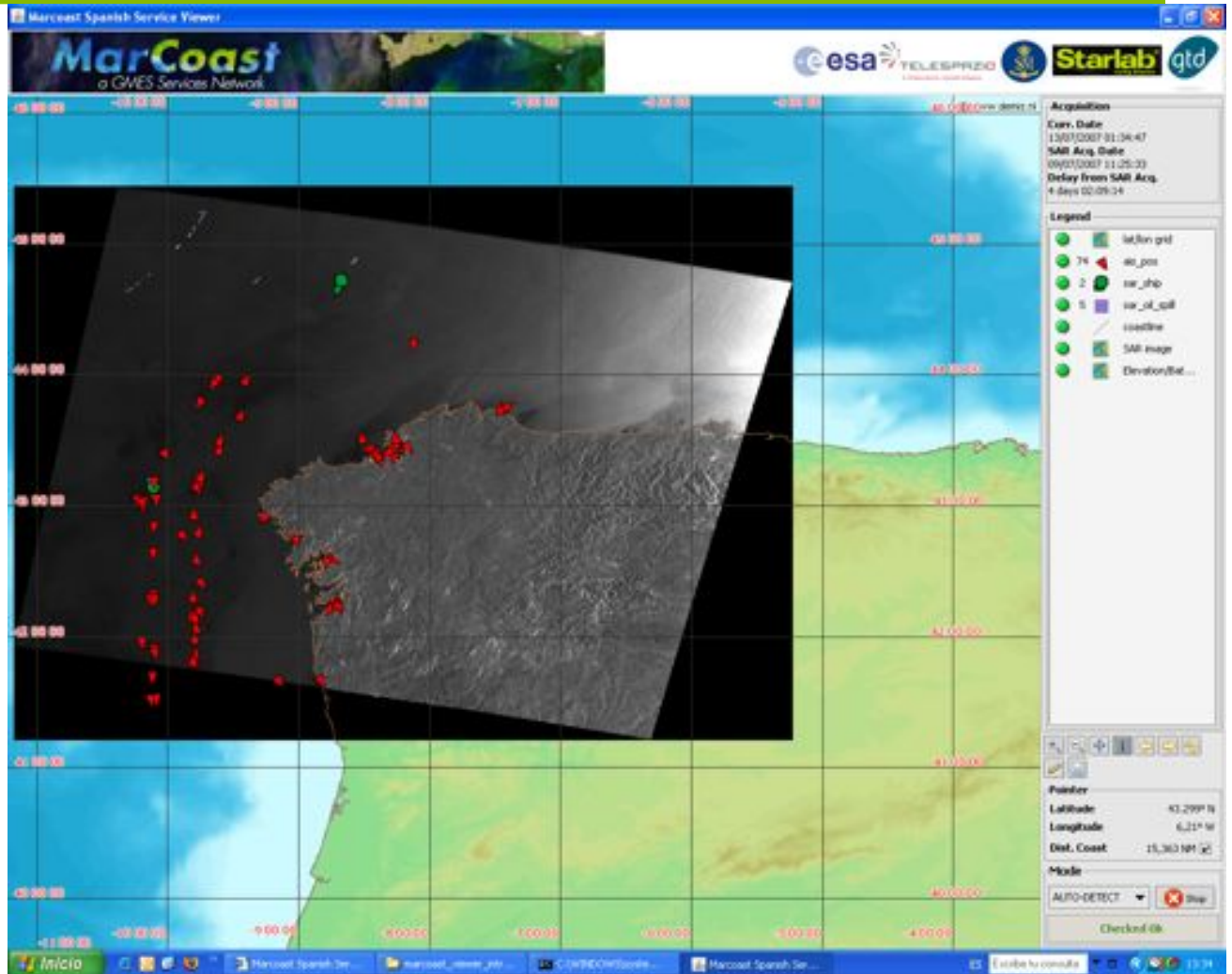
But oil is not the only menace for the oceans. The proliferation of toxic algae, harmful algae blooms (HABs), affects the equilibrium of the marine ecosystems and can be harmful to people through ingestion of affected fish or shellfish.

Today, the scientific and technical means are in place to deploy systems which can detect the appearance of oils spills or HABs. However, technologically-capable entities have not acted in a coordinated manner in the past. Perhaps more importantly, responsible authorities have been largely unaware of the technical possibilities now available.



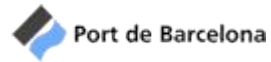
Oil spill detection

- Oil spill detection
- Ship detection
- Coupling AIS+SAR



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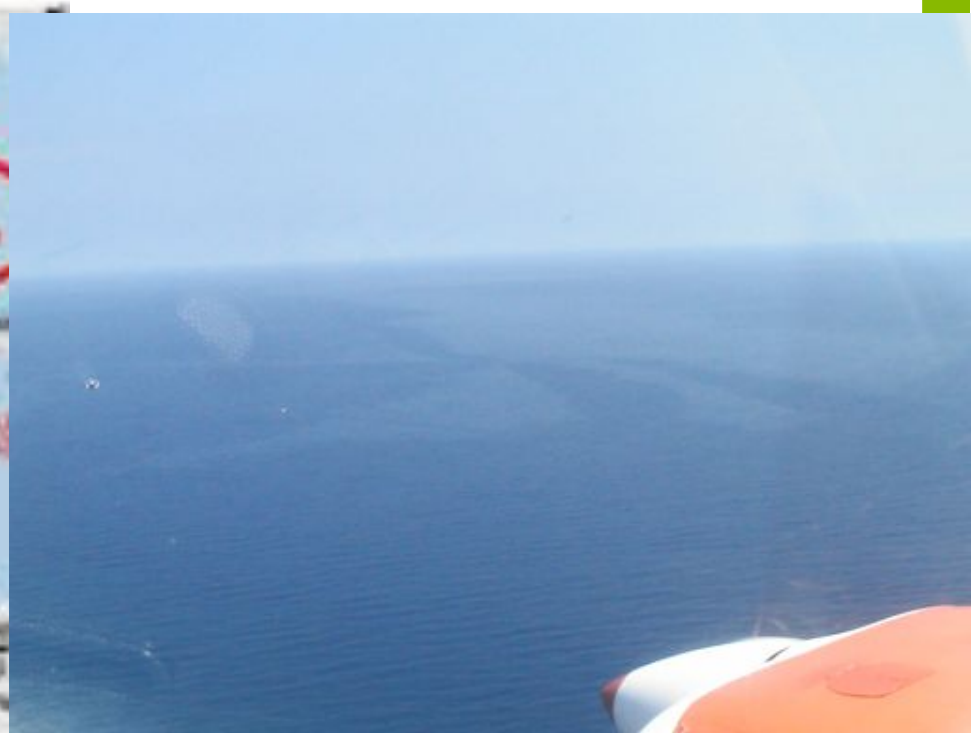
Users



METEOGALICIA



Generalitat de Catalunya
www.gencat.cat




User's feedback

"Powerful tool to dissuade potential polluters in a next future. An effective dissemination and good practice shall dramatically reduce illegal discharges in the area monitored by satellites." Jaime Zaragoza, Sasemar



"This application represents the higher level of integration. We found it indispensable in order to reduce the time of response and to save the costs of monitoring." Pablo Carracedo, Meteogalicia **METEOGALICIA**

"The Spanish Marcoast service offers a tool that will become central to the management of the seas and coasts." Joaquín Cortés, Barcelona Port Authority 

"MarCoast is a very interesting complement to our marine monitoring activities". Marta Manzanera, Catalan Water Agency 

EMSA involvement

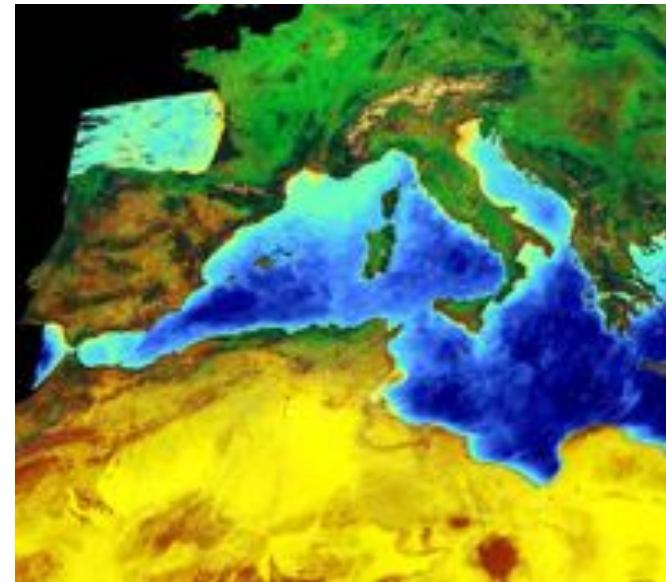
The screenshot shows the EMSA website homepage. At the top left is the EMSA logo, which includes the European Union flag and the text 'EMSA'. To the right of the logo, the word 'Europe' is partially visible. Below the logo, a breadcrumb trail reads 'You are here: EMSA Homepage'. A left-hand navigation menu lists various sections: 'EMSA Homepage', 'About us' (with sub-items like 'Origins & Tasks', 'The Situation Today', 'Operational Activities', 'Administrative Board', 'Vacancies', 'Procurement', 'Personal Data Protection'), 'Maritime Safety' (with sub-items like 'Visits & Inspections', 'Classification Societies', 'Maritime Security', 'Port Reception Facilities', 'Port State Control', 'Training of Seafarers', 'Implementation of EU Legislation'), 'Pollution Preparedness & Response' (with sub-item 'Vessel Oil Recovery Service'), and 'Technical Cooperation' (with sub-items 'Accident Investigation', 'EU Vessels Traffic Monitoring', 'Technical Assistance'). The main content area features a large image of a ship at sea. Below the image, the text reads: 'Welcome to the EMSA Website'. The main text states: 'Maritime transport is of fundamental importance to Europe and the rest of the world. To put this in perspective, over 90% of European Union external trade goes by sea and more than 3.7 billion tonnes of freight a year are loaded and unloaded in EU ports. This means that shipping is the most important mode of transport in terms of volume. Furthermore, as a result of its geography, its history and the effects of globalisation, maritime transport will continue to be the most important transport mode in developing EU trade for the foreseeable future. In this context, European citizens have the right to expect their maritime passenger and goods transport to be safe, secure and clean. So, in support of these goals, and particularly in the wake of the Erika and Prestige oil tanker accidents, the set up of EMSA (under Regulation (EC) No 1406/2002 of 27 June 2002) is one of the key EU level initiatives aimed at improving the situation. The Agency's main objective is to provide technical and scientific assistance to the European Commission and Member States in the proper development and implementation of EU legislation on maritime safety, pollution by ships and security on board ships. To do this, one of EMSA's most important supporting tasks is to improve cooperation with, and between, Member States in all key areas. In addition, the Agency has operational tasks in all pollution preparedness, detection and response. As a body of the European Union, the Agency sits at the heart of the EU maritime safety network and collaborates with many industry stakeholders and public bodies, in close cooperation with the European Commission. Welcome to the EMSA website.' The date '30/06/2008 11:24' is displayed in the bottom right corner.

Case Study 2. Regional water management

The image shows a screenshot of the Nature News website. At the top, the "naturenews" logo is displayed in white on a red background. Below the logo is a navigation bar with links for "nature news home", "news archive", "specials", "opinion", "features", "news blog", and "events blog". The "specials" link is highlighted. Below the navigation bar, the word "Specials" is written in a large, bold font. To the right of "Specials" is a button that says "See all specials". The main content area features a large headline "Water: Under Pressure" in a blue, serif font. Below the headline is a photograph of a hand holding a red pipette, with a single drop of water falling into a small, brown, textured object held in another hand. The background of the photograph shows a landscape with smokestacks emitting smoke. Below the photograph is a paragraph of text: "As of World Water Day in March 2008, more than billion people around the world still lack access to safe drinking water and two billion have little or no sanitation. As water is sucked up by demands for food and energy, and its distribution on the planet is changed by climate change, what can be done to ensure water availability for the future?"

Vegetation Index

- Quantify the photosynthetic capacity of the vegetation in a given pixel → productivity, health of the vegetation in a given area
- Good indicator for drought since vegetation growth is limited by water



*AVHRR vegetation Index
on land. Courtesy of ESA*

Snow Cover

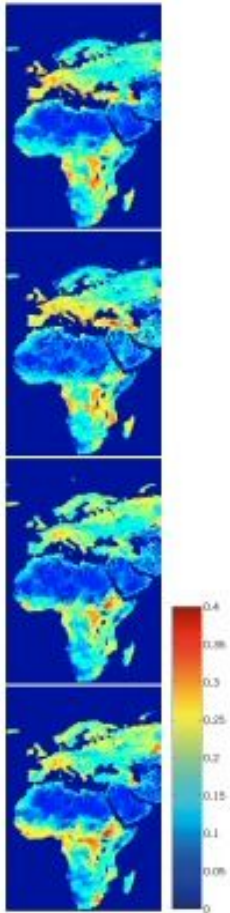
- Main input for river runoff prediction in certain areas
- Snow melt as a source of freshwater
- Related to floods and drought periods

▶ **Snow Cover Area (SCA)**



*MERIS snow
extension,
Courtesy of
ESA*

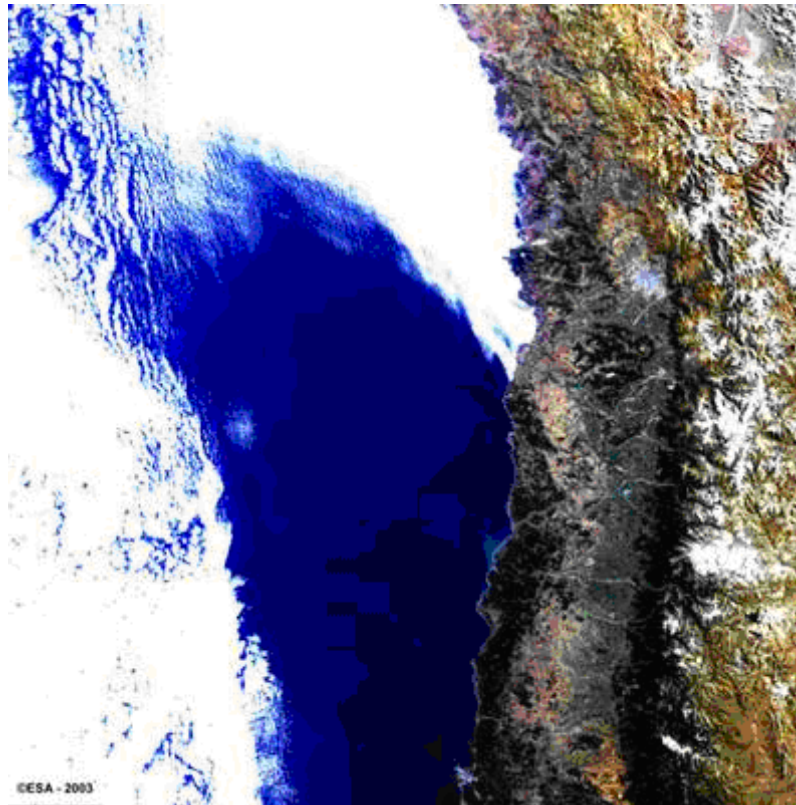
Soil moisture



- Irrigation water management
- Good drought indicator
 - ▶ “A drought is defined by rainfall, crop productivity, soil moisture, and reservoir levels among other factors”
 - ▶ **Soil Moisture**
 - ▶ **Soil Moisture Anomaly**

*Simulated Soil Moisture Maps.
Courtesy of ESA*

Inland water management



Conclusions

- EO is an excellent tool for the most important challenges of the century.
- EO Applications are taken off and market is starting to arise.
- EO Sector is maturing and GMES is contributing to operational.
- Data integration and listening to user's needs are key to success.

Thank you for your attention

For more information:

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