

WHAT CAN SENTINELS DO FOR REGIONS?

Three thematic workshops
by NEREUS Regions and the European Space Agency

28.09.2015 | Ponta Delgada, Azores
20.10.2015 | Milan, Lombardy
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#Copernicus4U



Linking Copernicus Sentinel Missions 1 and 2 to the development of land policies in the Azores

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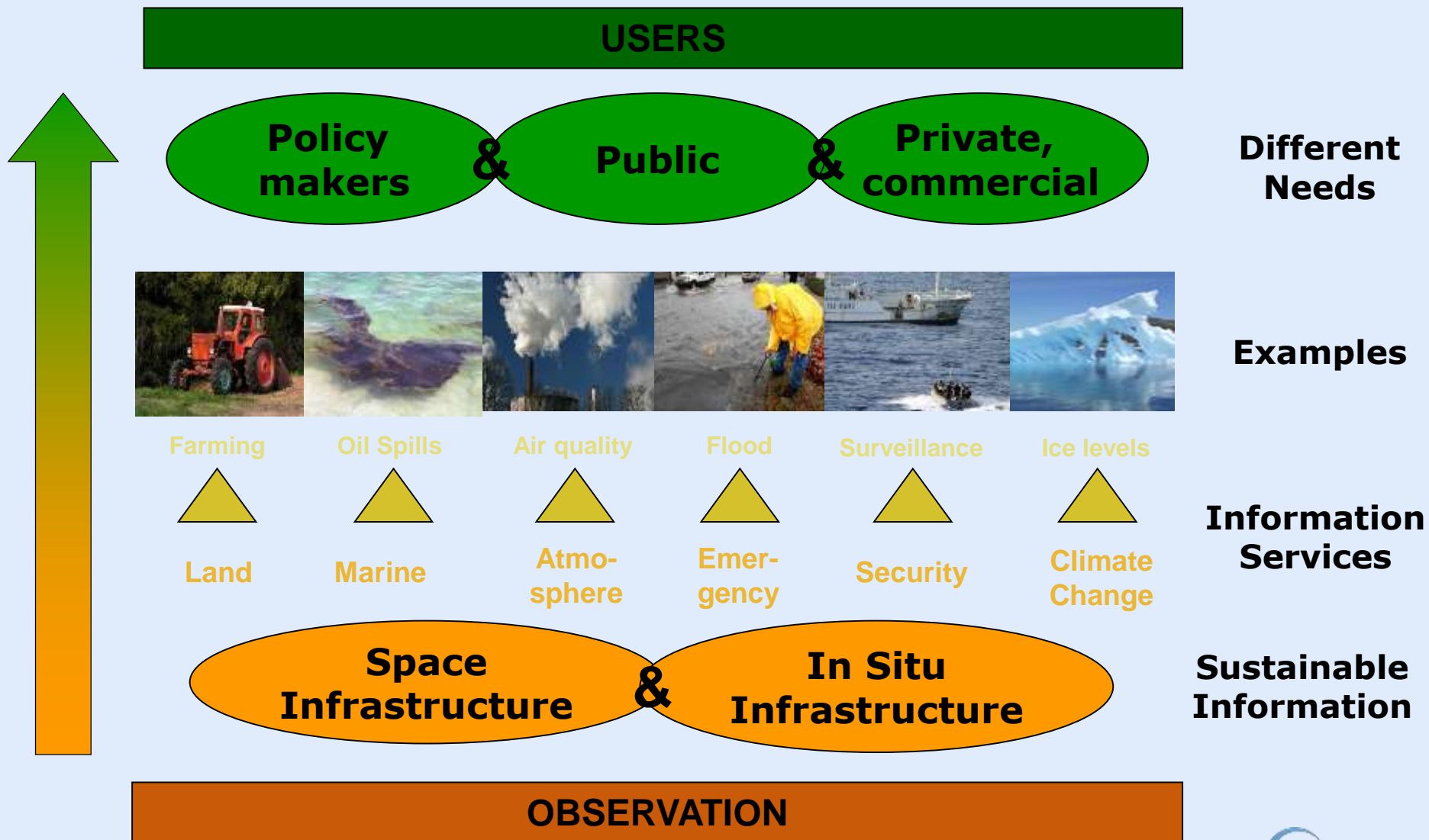
Outline

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- III. Sentinel-1 Mission in brief
- IV. Potential Sentinel-1 applications for the Azores
- V. Sentinel-2 Mission in brief
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- IX. What about the *in situ* Copernicus Data Infrastructure for the Azores?

Main land-based threats for Azores islands environmental sustainability

- Climate variability and changes
- Scarcity and overexploitation of natural resources
- Loss of biodiversity
- Proliferation of invasive exotic species
- Increasing growth of tourist activity
- Pollution and residue management
- Natural catastrophes

Copernicus Integrated EO Program



Copernicus Integrated EO Program



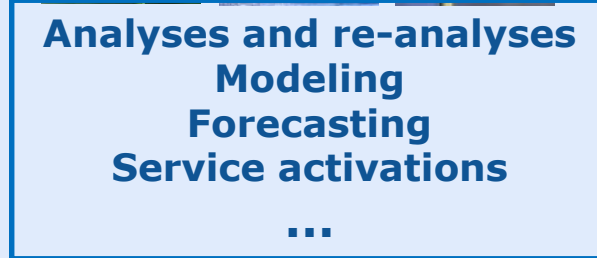
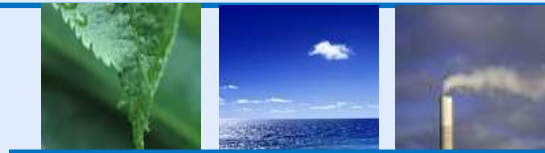
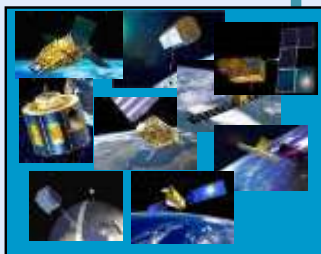
**in-situ
measurements**



**EU and global
sources:**

- WMO /EUMETNET
- EuroGeographics
- EuroGOOS
- EuroArgo
- ICOS
- EARLINET
- ...

**Contributing
satellite
missions**



...added-value products

Sentinel-1 Mission in brief

- The Sentinel-1 mission is a polar-orbiting satellite system operating a C-band synthetic aperture radar (SAR) at 5.405 GHz.
- The SAR sensor will operate in four modes: (1) Interferometric wide-swath mode (250 km and 5×20 m resolution); (2) Wave-mode (images of 20×20 km and 5×5 m resolution at 100 km intervals); (3) Strip map mode (at 80 km swath and 5×5 m resolution); and (4) Extra wide-swath mode (400 km and 20×40 m resolution).
- Its revisit time will be of six days from two-satellite constellation (Sentinel 1A and 1B).



Potential Sentinel-1 applications for the Azores

- Most interesting Sentinel-1 applications for the Azores may be related to Ocean/Coastal Monitoring (e.g. oil spills detection) and Natural Hazards Monitoring, Assessment and Emergency Planning (e.g. floods, landslides).
- Further potential environmental and land-based Sentinel-1 applications for the Azores:
 - Land-use/Land-cover change detection (e.g. land monitoring and policy decision-support);
 - Above Ground Biomass determination - up to 75 Mg/ha with C-Band, according to literature (e.g. forest inventorying);
 - Soil Moisture monitoring and assessment (e.g. agricultural monitoring).

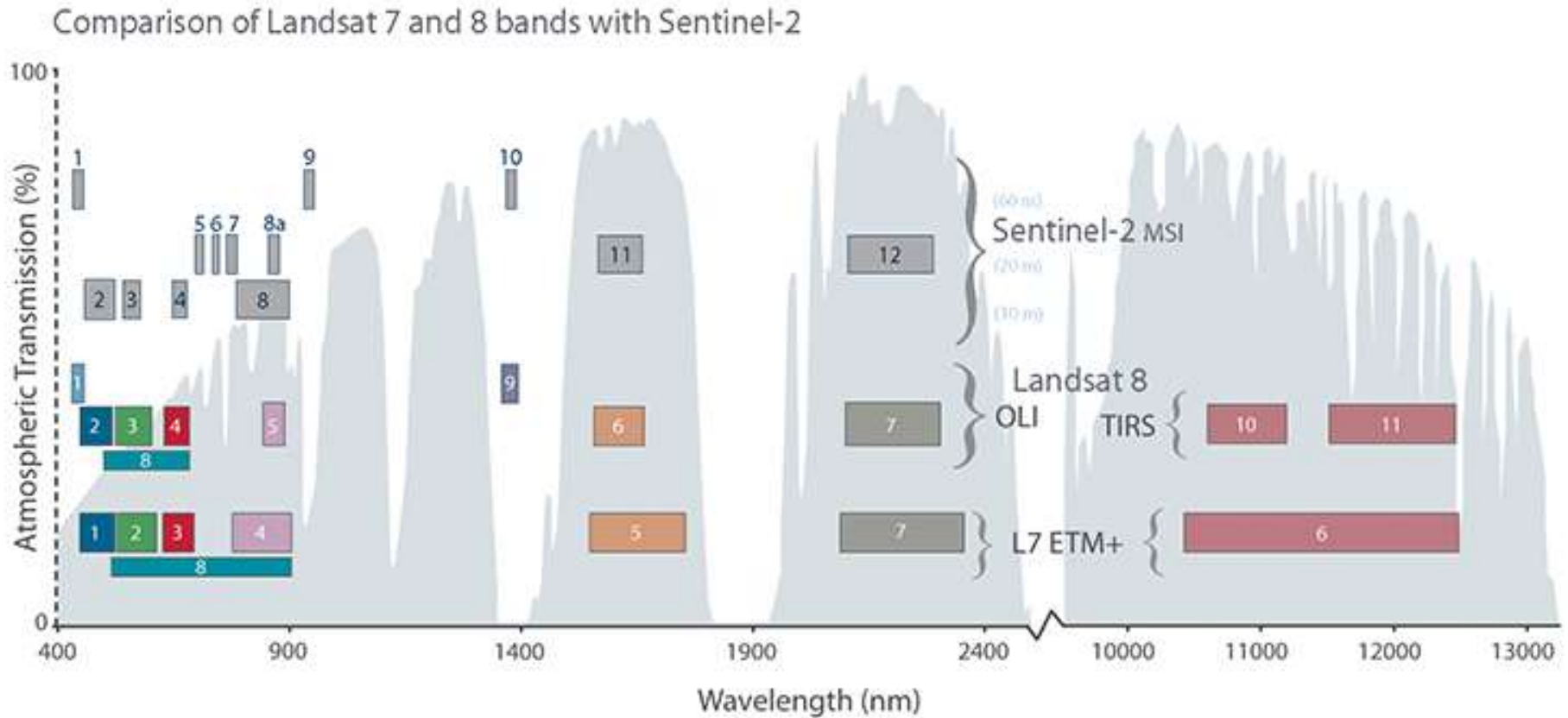
Sentinel-2 Mission in brief

The Sentinel-2 Mission consists of a multispectral imager:

- covering 13 spectral bands in the visible/near infrared (VNIR) and short wave infrared spectral range (SWIR);
- with a swath width of 290 km;
- with spatial resolutions of 10 m (4 visible and near-infrared bands), 20 m (6 red-edge/shortwave-infrared bands) and 60 m (3 atmospheric correction bands);
- revisiting every 5-10 days.



Sentinel-2 Mission in brief



Source: NASA / Landsat Science Program

Potential Sentinel-2 applications for the Azores

Potential environmental and land-based Sentinel-2 applications for the Azores:

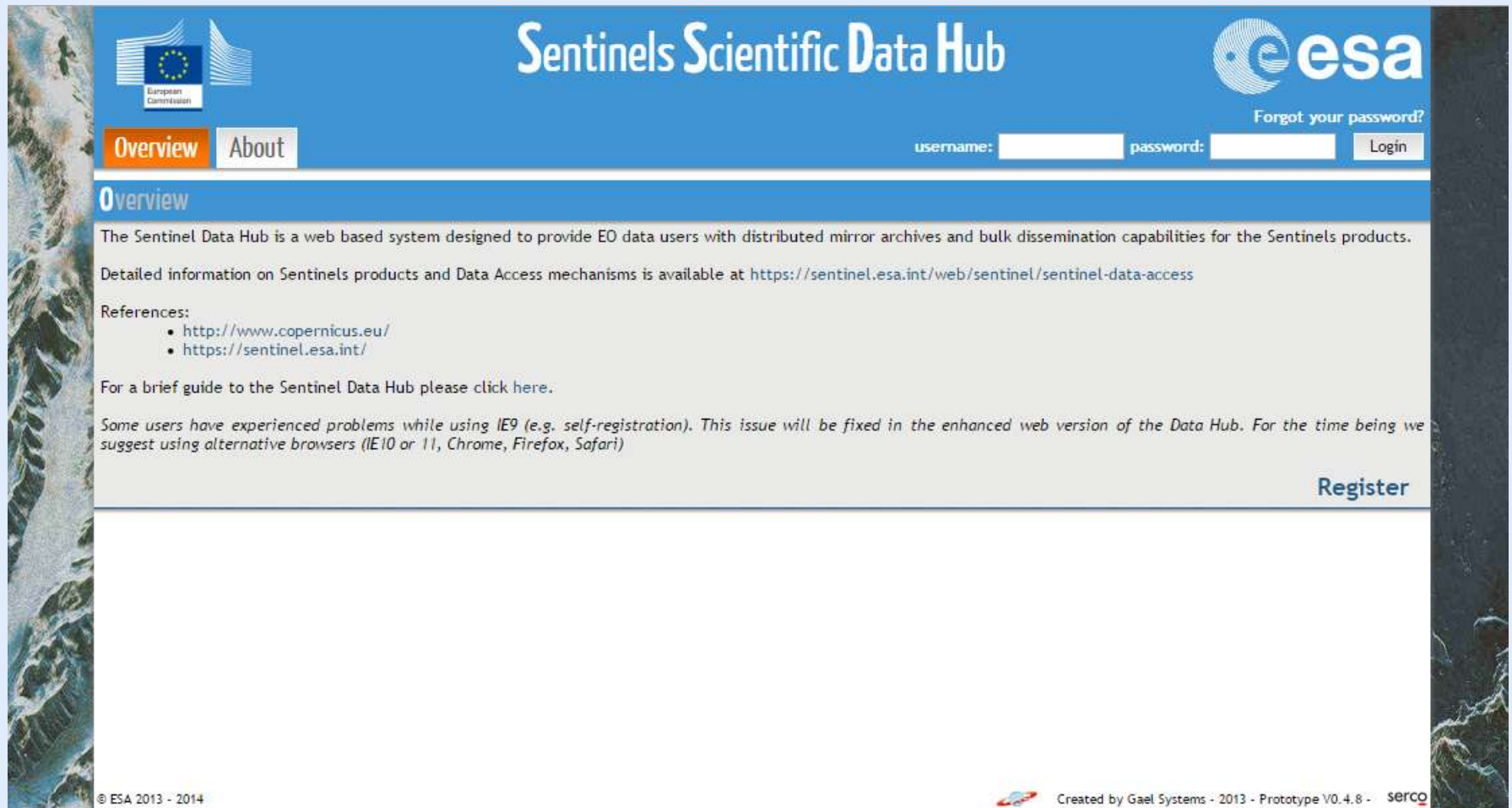
- Land-use/Land-cover mapping, monitoring and change detection (e.g. law enforcement and policy decision-support);
- Agricultural applications (e.g. plant health assessment, crop monitoring, yield forecasting);
- Detailed vegetation and forest monitoring and parameter/vegetation indices generation (e.g. leaf area index, chlorophyll concentration)
- Inland water monitoring (e.g. turbidity assessment).

Integration means success

A multi-source approach integrating satellite (Sentinel-1, Sentinel-2 and Landsat-8), airborne (both multispectral and LIDAR); UAS and ground-based remote sensing data is recommended in order to reach the full potential for cost-effective land monitoring in the Azores, by minimizing most constraints (e.g. weather, surface roughness, high costs).

How to access Copernicus Sentinel Data for the Azores?

Currently: Sentinels Scientific Data Hub (<https://scihub.esa.int/>)



The screenshot shows the homepage of the Sentinels Scientific Data Hub. The header is blue and features the European Commission logo on the left, the title "Sentinels Scientific Data Hub" in the center, and the ESA logo on the right. Below the header, there are navigation tabs for "Overview" (highlighted in orange) and "About". To the right of the tabs is a login section with fields for "username:" and "password:", a "Login" button, and a link for "Forgot your password?".

The main content area is titled "Overview" and contains the following text:

The Sentinel Data Hub is a web based system designed to provide EO data users with distributed mirror archives and bulk dissemination capabilities for the Sentinels products.

Detailed information on Sentinels products and Data Access mechanisms is available at <https://sentinel.esa.int/web/sentinel/sentinel-data-access>

References:

- <http://www.copernicus.eu/>
- <https://sentinel.esa.int/>

For a brief guide to the Sentinel Data Hub please click [here](#).

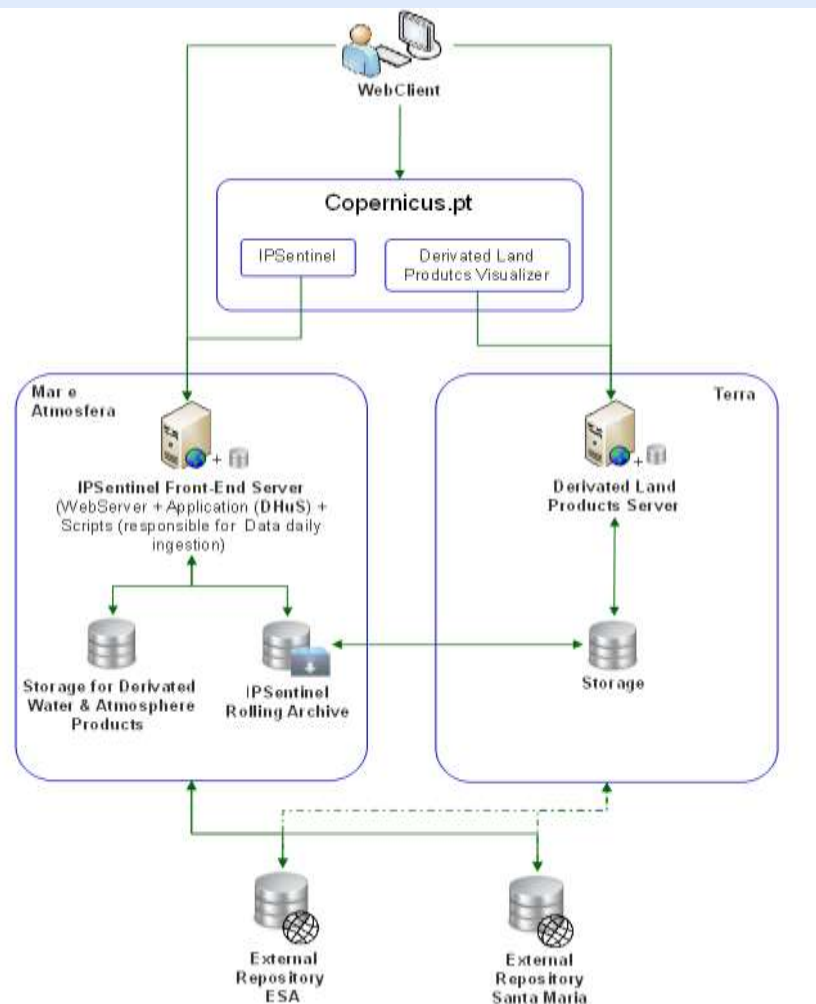
Some users have experienced problems while using IE9 (e.g. self-registration). This issue will be fixed in the enhanced web version of the Data Hub. For the time being we suggest using alternative browsers (IE10 or 11, Chrome, Firefox, Safari)

A "Register" button is located at the bottom right of the main content area.

At the bottom of the page, there is a copyright notice: "© ESA 2013 - 2014" and a footer with the text "Created by Gael Systems - 2013 - Prototype V0.4.8 - serco" next to a small logo.

How to access Copernicus Sentinel Data for the Azores?

In the future: *IPSentinel* Portuguese Infrastructure



1. *Copernicus.pt* portal
2. *IPSentinel Front-End Server* (webserver)
3. *IPSentinel Rolling Archive* (repository of images from ESA and S. Maria station)
4. *Storage for derivated Water & Atmospheric Products*
5. *Derivated Land Products Server* (processing of land derivated products)
6. *Storage for Land Products*

Source: Direção Geral do Território (Portugal)

What about the *in situ* Copernicus Data Infrastructure for the Azores?

A relevant collective effort at regional scale must be made in order to set up, feed, manage and update periodically the “Azorean section” of the *in situ* Copernicus Data Infrastructure, with the direct support and effective contributions of the University of the Azores; regional, national and international R&D centers; NGOs and the Regional and Local Public Administrations.

This infrastructure may constitute a game changer for the whole regional scientific community!

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THANKS FOR YOUR ATTENTION. QUESTIONS?

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