Earth Observation Capacities in Greece

Ioannis A. Daglis
Director of the Institute
for Space Applications & Remote Sensing
National Observatory of Athens
Ioannis A. Daglis
Director of the Institute for Space Applications & Remote Sensing
National Observatory of Athens
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Earth Observation milestones in Greece

- In the mid 1990’s the Hellenic National Space Committee with support from GSRT organized several working meetings on Earth Observation in Greece.

- In 1998 Space Imaging Europe was established in Athens with the objective to provide IKONOS data to the Greek and European market; its operation terminated in 2001.

- Since 2002: Greek organizations participate in EO programmes of ESA (through a Cooperation Agreement).
Earth Observation milestones in Greece

- In 2005 Greece became the 16th member of ESA. First call for ideas by the ESA-Greece Task Force.

- In 2005 Greece signed participation in HELIOS-2 (high resolution multispectral data) along with France, Belgium, Spain, Italy and Germany.

- In February 2006, GSRT announced the participation in GEO and GEOSS initiatives. The Greek GEO office started its operation in 2007.
Greek Organizations have participated in a large number of European R&D and preparatory projects paving the way for GMES, which is the European contribution to GEOSS - the Global Earth Observation System of Systems.
Up to now, Greek participation has involved mostly public entities addressing R&D aspects. The participation of the private sector is still rather limited.
Examples of early Greek participation in GSE (GMES Services Element)

- **Forest Monitoring**
  - *Geoapikonisis, Qualisys*
  - *National Observatory of Athens (user)*

- **Marcoast (Oil-spill drift forecasting)**
  - *Hellenic Centre for Marine Research*
  - *Ministry of Mercantile Marine (user)*

- **PROMOTE (Air Quality)**
  - *Aristotle U. Thessaloniki; National Univ. Athens*
  - *Region of Central Macedonia (user)*

- **Terrafirma (Land motion)**
  - *Earthquake Planning & Protection Office (user)*
  - *Institute of Geology & Mineral Exploitation (user)*

- **MARI SS (MARI time Security Service)**
  - *Ministry of Mercantile Marine (user)*
EC FP6 and FP7 Space Calls

- In FP6 most of the participants were research institutes and universities.
- Very limited participation of companies and public bodies as end-users.
- In FP7 we have an increasing participation of companies in proposals but not yet in successful projects.
- Greece has participated in
  - GEOLAND2
  - MyOcean
  - SAFER
  - MACC
  - COSMOS

<table>
<thead>
<tr>
<th></th>
<th>1st call</th>
<th>2nd call</th>
<th>3rd call</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total budget of the call</td>
<td>37.12 M€</td>
<td>52.92 M€</td>
<td>45.49 M€</td>
</tr>
<tr>
<td>Budget for Greek organizations</td>
<td>0.78 M€ (2.1% of total EU funding)</td>
<td>3.78 M€ (7.1% of total EU funding)</td>
<td>0.83 M€ (1.8% of total EU funding)</td>
</tr>
<tr>
<td>Number of projects</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
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The ESA-Greece Task Force was set-up in September 2005 in order to implement transitional measures for the adaption of Greek industry to ESA requirements.

The Task Force has announced 2 Calls addressed exclusively to Greek entities.

In the 1st Call 330 proposals were submitted.

Companies participated in 37% of the proposals.

The overall success rate was 10%.

The success rate for EO-related proposals was 17%.
### EO projects funded by the Task Force 1st Call

#### 8 projects (6 relevant for GSE)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Greek Partner</th>
<th>Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring &amp; Control of Greek Borders and Coastline</td>
<td>Space Hellas</td>
<td>MARISS</td>
</tr>
<tr>
<td>Burnt Scar mapping in Greek territory</td>
<td>NOA/ISARS</td>
<td>Risk-EOS</td>
</tr>
<tr>
<td>EO and Coastal surveillance vehicles for tracing polluting ships</td>
<td>MARAC Electronics</td>
<td>Marcoast</td>
</tr>
<tr>
<td>Risk assessment of structures &amp; plants in areas susceptible to ground deformation</td>
<td>Harokopio University of Athens</td>
<td>Terrafirma</td>
</tr>
<tr>
<td>Comparison between NO$_2$ Columnar measurements from ground and satellite</td>
<td>National &amp; Kapodistrian University of Athens</td>
<td>Promote</td>
</tr>
<tr>
<td>EO for monitoring of water use in Greece</td>
<td>Aristotle University of Thessaloniki</td>
<td>GSE-Land</td>
</tr>
<tr>
<td>High-res imagery for flood-plain mapping</td>
<td>Technical University of Crete</td>
<td></td>
</tr>
<tr>
<td>Survey of Greek capabilities in EO</td>
<td>IridaLabs</td>
<td></td>
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</tbody>
</table>
In the 2nd Call of the Task Force 4 EO-related proposals were successful.

The projects can be classified into 6 different categories: maritime, natural hazards, atmosphere, land, new methods and other.

~50% of the projects are coordinated by public entities and ~50% by companies.
Greece has also been participating in optional EO-related programmes of ESA, including the Earth Observation Envelope Programme (EOEP-3), the GMES Service Element (GSE), GMES Space Component (GSC) and the EarthWatch Climate Change Initiative (CCI).

<table>
<thead>
<tr>
<th>Programme</th>
<th>Greek subscription (in MEuros)</th>
<th>Percentage of Greek participation</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EOEP-3</td>
<td>2.50</td>
<td>0.16%</td>
<td>2008-2012</td>
</tr>
<tr>
<td>GMES SE</td>
<td>1.43</td>
<td></td>
<td>up to 2009</td>
</tr>
<tr>
<td>GMES SC</td>
<td>0.50</td>
<td>0.14%</td>
<td>2008-2012</td>
</tr>
<tr>
<td>ESA CCI</td>
<td>0.17</td>
<td>1.47%</td>
<td>2009-</td>
</tr>
</tbody>
</table>
The evolution of Greek EO community has been mainly related to opportunities within FP6, FP7 and ESA.

Accession to ESA has provided a strong boost, mainly in the number of projects.

Large FP7 projects have contributed significantly to the budget evolution.
EO landscape in Greece (1/2)

Public authorities
High level
EO landscape in Greece (2/2)

Public research organizations

- National Observatory of Athens (N.O.A.)
- Greek Biotape / Wetland Centre (EKBY)
- Hellenic Centre for Marine Research (H.C.M.R.)
- Hellenic National Meteorological Service (H.N.M.S.)
- Institute of Geology & Mineral Exploration (I.G.M.E.)
- International Geosphere - Biosphere Programme (I.G.B.P.)
- National Center for the Environment and Sustainable Development
- National Agricultural Research Foundation (N.A.G.RE.F.)
Topical classification

### Top 5 applications

<table>
<thead>
<tr>
<th>Companies</th>
<th>Research Organizations</th>
<th>Public Authorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topographic mapping / geodesy</td>
<td>Land environment</td>
<td>Topographic mapping / geodesy</td>
</tr>
<tr>
<td>Coastal zones / Oceanography</td>
<td>Hazards</td>
<td>Hazards</td>
</tr>
<tr>
<td>Land environment</td>
<td>Development of new methods</td>
<td>Atmosphere</td>
</tr>
<tr>
<td>Hazards</td>
<td>Atmosphere</td>
<td>Land environment</td>
</tr>
<tr>
<td>Climate</td>
<td>Coastal zones / Oceanography</td>
<td>Climate</td>
</tr>
</tbody>
</table>

**Greek EO topical classification**

*IRIDA Labs*  
*Study to map Greek EO*
IRIDA Labs study findings

<table>
<thead>
<tr>
<th>Top 5 strengths</th>
<th>Top 5 challenges</th>
</tr>
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<tbody>
<tr>
<td>• Greek organizations have already developed results and services in EO related RTD projects.</td>
<td>• There is a strong need for determination of EO policy in national level.</td>
</tr>
<tr>
<td>• Land monitoring, atmosphere - climate change, natural hazards and coastal monitoring are key applications for Greece.</td>
<td>• The potential role of Greece in regional or European level needs to be defined.</td>
</tr>
<tr>
<td>• Greek organizations have acquired a sufficient volume of EO data during the past five years.</td>
<td>• There is limited amount of national funding in EO-related activities.</td>
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<td>• There are small scientific and technical teams with qualified EO personnel both in public and private organizations.</td>
<td>• The necessary auxiliary infrastructure (e.g. telecom) is limited.</td>
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<td>• Greece has profits from its participation in ESA and the public awareness is now increased.</td>
<td>• The Greek EO organizations fail to transform good research results in innovative and sustainable products and services.</td>
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</table>
IRIDA Labs study findings

The Greek EO industry

| The Greek EO service industry has already shown a large portfolio of activities. It will probably achieve a fair georeturn in the context of ESA activities after the special transition period. | Public bodies and local authorities are the main EO customers. | Market is not yet mature to support large companies with EO as their primary activity. | The Greek EO industry seems to consist of mainly small, fragmented, expert consultancies offering niche services to public and local authorities. |
### IRIDA Labs study findings

#### Public organizations

| Digital satellite data are available in different public organizations. | Public authorities face problems to share and exchange EO data. Most of the times, only metadata are exchanged between different organizations. The new GMES data policy may provide a solution. | There is lack of telecommunication and related infrastructure that slows down the operational use of EO services. | There aren’t any standards for metadata and service development concerning Earth Observation of natural hazards. | Most public organizations have reported problems with data share and exchange. |
ISARS/NOA has participated in the GMES project RISK-EOS. RISK-EOS maps the consequences of forest fires in Greece in a systematic way, harnessing the full potential of satellite Earth Observation technology and data.

ISARS/NOA has developed the BSM_NOA service which was technically and qualitatively certified according to the specifications of the GMES SERVICE ELEMENT of ESA.

The results are provided to several national authorities and organizations, such as the Ministry of Rural Development and Food, the GSCP, the Greek Biotope / Wetland Center, the National Agricultural Research Foundation, etc.
EOEP-3 / Data User Element:
Urban Heat Islands and Urban Thermography

10 European cities, 6 organizations from 5 countries
ISARS/NOA
UHI major objectives

- Design and build an information system able to integrate and assimilate EO data and ground data into urban meteorological and climate modeling (tool for UHI monitoring and forecasting)
- Establish the mission requirements for a high-resolution TIR satellite sensor (re-orientate the FuegoSat Consolidation Element of the ESA Earth Watch Programme)
- Elaborate how TIR space observations can support the implementation of urban energy efficiency policies
STUDY TO MAP GREEK REQUIREMENTS AND CAPABILITIES IN EARTH OBSERVATION
The Greek EO capacities have largely evolved during the last 10 years.

A Key point for the future of EO in Greece is the inclusion of public end users and the successful transformation of research results or pre-operational services to fully operational and daily needed services. Not too different from the rest of Europe.

Greece can produce valued added solutions for specific public sector needs through its participation in optional ESA programmes like EOEP or Climate Change Initiative. This is especially true for needs related to:
- coastal monitoring
- natural hazards
- forest mapping and monitoring.
Thank you for your attention!