EO Institutional Perspective

Emilio Vez Rodríguez
CDTI

8th September 2014
Agenda

- Global overview
  - Figures, markets and main actors

- The European landscape:
  - Development models
  - Copernicus
  - The role of ESA and EC

- Prospects:
  - Potential areas of growth
  - Potential technology breakthroughs or game changers

- Food for thought
Agenda

- Global overview
  - Figures, markets and main actors

- The European landscape:
  - Development models
  - Copernicus
  - The role of ESA and EC

- Prospects:
  - Potential areas of growth
  - Potential technology breakthroughs or game changers

- Food for thought
GENERAL VIEW — EO SERVICES INDUSTRY

Rapidly evolving and growing market

- 5,087 Employees
- New commercial missions
- Crowd Sourcing
- 319 Companies
- 757 M€ Revenues
- Google Earth & Cloud Computing & Big Data
VALUE CHAIN

It’s important to be able to cover all levels of the Activities (from basic R&D to commercialization):
National Independency, Knowledge and Competitiveness

- 50%/50% : images + products / satellite + GS + launcher.
- Increasing share of added value market (Copernicus).
MAIN ACTORS

Growing market expected to maintain growth in the forthcoming years

• Three operators cover 2/3 of the market:
  • Geo Eye and Digital Globe (USA)
  • ADS-GEO Information Services (Europe)

• Added value companies:
  • Market scattered among many companies (SME and micro)
  • Potential trend towards vertical integration

• Satellite primes:
  • TAS, ADS and OHB in Europe
  • Ball Aerospace and Lockheed Martin in USA + many others
  • Other countries (India, Japan, ...)

• Public and private R&D entities.
MARKET SIZE

Growing market expected to maintain growth in the forthcoming years

EO satellite images per region

- Remarkable growth in the last years and expected to follow.
- From 800 M$ in 2008 to 4.000 M$ in 2018
- Commercial market is following a trend towards High and Very High Resolution
- Optical imagery clearly remains as the leading market.
MARKET SHARE

Growing market currently driven by defence & security (USA) and public civil market (Europe)

- Defence and security (USA and lesser extent in Europe).
- Governmental (environment, cartography, water management, ...)
- Private (energy, oil, Google Earth, Microsoft Virtual Earth, Apple, ...)

- EO imagery from space has competitors: e.g. UAVs aerial remote sensing:
  - UAVs: higher resolution, lower cost, fast response, ...
  - Space: global coverage, revisit, no air traffic limitations, ...
REVENUES

Growing revenues with stable profit and increasing efficiency

- Steady growth of revenues (stabilized in the existing companies due to the crisis).
- Maximum profit in micro companies.
- Average profit of 8%.
- Ratio revenues vs. employees has been increased by 13% in 5 years.
Agenda

- Global overview
  - Figures, markets and main actors

- The European landscape:
  - Development models
  - Copernicus
  - The role of ESA and EC

- Prospects:
  - Potential areas of growth
  - Potential technology breakthroughs or game changers

- Food for thought
DEVELOPMENT MODELS - EUROPE

Europe is global key player in the world market.
Copernicus should consolidate and boost this role.

- Most missions rely on an important public budgetary support.
- Public support may consist of:
  - Becoming stake holder of the company
  - Funding development of the satellite (fully or partially)
  - Assurance of bulk /quota procurement of images
- Examples:
  - USA:
    - GEO Eye: Government data buy by 7,3 bn$ in 10 years
    - Skybox, ...
  - Europe:
    - Terrasar-X: shared funding by DLR and ADS.
    - ADS GEO Services: CNES developed Spot-5 and former stakeholder of Spot Image.
    - DMC ii, ...
DEVELOPMENT MODELS - SPAIN

Spain is using different approaches to the development model.

- **SEOSAT/INGENIO:**
  - Funded by MINETUR and managed by CDTI with ESA as technical responsible.
  - Exploitation and operations HISDESAT/INTA.
- **PAZ:**
  - Funded by HISDESAT with credit line by MINETUR and data buy quota assured by MINISDEF.
  - Remaining quota for public and private market users.
  - Potential constellation approach with Terrasar-X and Tandem-X.
- **DEIMOS (Deimos-1 and Deimos-2):**
  - Private initiative with public support.

All but Deimos-1 are High or Very High Resolution satellites.
MAIN SPANISH INVESTMENTS

Spain is investing for its future (and present) role on the EO Market

- **DEIMOS II – VHR** Optical Satellite
- **INGENIO – VHR** Optical Satellite
- **PAZ – SAR Satellite**
- **PNOTS Operations Centre**
- **Torrejón Antena**
Main drivers of EO in Spain: PNOT, PNOTS, PNE, Contribution to ESA, EU (H2020, ...) and private investments.

- PNOT (National Plan for the Observation of the Territory):
  - Intends to provide users and researches with coverages of Spain.
  - Coordinated by National Geographical Institute.
  - Origin of PNOTS

- PNOTS (Satellite Earth Observation National Programme):
  - Includes:
    - high resolution optical satellite
    - high resolution SAR
  - Interministerial agreement (MINISDEF-MINETUR)
  - Will provide data to PNOT, but also to Copernicus, private users, researchers, ...
Main drivers of EO in Spain: PNOT, PNOTS, PNE, Contribution to ESA, EU (H2020, ...) and private investments.

- PNE (Space National Research Plan):
  - Science programme.
  - Covers all areas of space research:
    - Major share to astrophysics.
    - Activities on EO (e.g. support to SMOS).

- Private investments:
  - Service companies (e.g. Starlab, ...)
  - Satellite operators and developers: DEIMOS:
    - DEIMOS-1 satellite
    - DEIMOS-2 satellite
  - Products, services and added value
Main drivers of EO in Spain: PNOT, PNOTS, PNE, Contribution to ESA, EU (H2020, ...) and private investments.

- ESA:
  - Key contributor with important share on:
    - EOEP (Earth observation envelope programme)
    - Earthwatch (CCI/ECV, Fuegosat, GSE, ...)
    - GMES/Copernicus
    - Meteorological programmes
  - Some key successes on Earthwatch:
    - Leadership of ECV Fuego (E. Chuvieco)
  - Some key successes on GMES/Copernicus:
    - Leadership of instrument MWR (ADS-Madrid)
    - Key elements of Sentinels
    - Operational elements: PAC, G/S, POD
Main drivers of EO in Spain: PNOT, PNOTS, PNE, Contribution to ESA and private investments.

- **ESA:**
  - Some key successes on Meteorological programmes:
    - Leadership of instrument ICI (ADS-Madrid)
    - Key elements of MTG (scanner, electronics, ...)
  - Some key successes on EOEP
    - Leadership (scientific and industrial) of SMOS: J. Font, Indra and ADS-Madrid
    - Key players on GS
    - FLEX PI (finalist in the selection process for EE-8): J. Moreno
EO has been a priority area for Spain in ESA

INDUSTRIAL CONTEXT – SERVICES

Highly distributed sector with high peaks in large countries

- Larger number of companies in large countries: global services.
- Highly geographically distributed industry: local knowledge is important and public sector is a key customer.
- Spain is the sixth country with the largest number of companies.
INDUSTRIAL CONTEXT – SERVICES

50% increase in the last five-year period but reduced and stable number of large and medium size companies

Companies Profile

- Large (>250): 1%
- Medium (50-249): 4%
- Small (10-49): 28%
- Micro (<10): 67%

Number of Companies

- Large
- Medium
- Small
- Micro

2007: 0 50 100 150 200 250 300 350
2008: 2007
2009: 2008
2010: 2009
2011: 2010
2012: 2011

50% increase in the last five-year period but reduced and stable number of large and medium size companies
EMPLOYMENT

Steady growth of highly qualified employment expected to be dramatically boosted by Copernicus

Number of Employees

Employment Distribution

- 50%-50% share between micro-small and medium-large companies.
- 55% of employees between 20-40 years old against 35% in space industry as a whole.
- Highly qualified employment with 90% of graduates.
Copernicus is meant to become the new paradigm in Earth Observation for operational use but also for R&D

- **Data policy:**
  - (GPS/Landsat approach) “Full, free and open access to data and information” in Europe (helps the European services and added value companies) ... and worldwide (potential threat of promoting foreign competitors).
  - Security restrictions a need (MMEE)... and a risk (costs and uncertainties).

- **Sentinels:**
  - Shall remain as “gap fillers” not to harm past, current and future investments.
  - Shall secure certain kind of data (quality, continuity, frequency, ...) to service providers and final users.

- **Data buy (contributing missions and G/S):**
  - Implies a reliable source of income to operators.
ROLE OF ESA, EU & MEMBER STATES

Roles of all parts shall be clearly established and respected

- ESA:
  - R&D and first unit developer entity (also in Copernicus)
  - Operator for “one shot” satellites and certain Sentienls.
- EU:
  - Overall responsible of the Copernicus programme.
  - Horizontal R&D activities (H2020).
  - Funding source for operations of Copernicus.
- Member States:
  - Funding via ESA and EU.
  - National missions and R&D programmes.
  - Not to interfere with the commercial market.
- Commercial entities:
  - Own investment and market growth.
  - Other more specific entities like EUMETSAT, ...
Agenda

- Global overview
  - Figures, markets and main actors

- The European landscape:
  - Development models
  - Copernicus
  - The role of ESA and EC

- Prospects:
  - Potential areas of growth
  - Potential technology breakthroughs or game changers

- Food for thought
POTENTIAL AREAS OF GROWTH

The market is still in its early stages (e.g. compared to navigation and telecom)

- Extensive use of geospatial information and images in mobile services like Apple and Google.
- Emergency services user uptake (firemen, international crisis, ...).
- Bring EO closer to the general public (e.g. NRT images on google maps, jelly fish detection in beaches, ...)
- Create new pulls of customers and their reliance in EO data:
  - IMF, WB, ...
  - Oil industry, energy industry
- Increase needs for security information.
POTENTIAL TECHNOLOGY BREAKTHROUGHS

R&D in satellite, launch, operations, services... are the only way to maintain the momentum and make of EO “a new navigation space programme”

- Launch costs reduction.
- (Near) real time video from space.
- High resolution images from GEO.
- Use of formation flying to increase systems’ capabilities.
- Optical transmission of data (ERS and others)
- Miniaturization
- New added value products and services:
  - New technologies for exploitation, distribution, archiving:
    - Big data.
    - Cloud computing.
    - Sustainable long term data preservation approach.

R&D is the only way to reach the objectives in this area!
Agenda

- **Global overview**
  - Figures, markets and main actors

- **The European landscape:**
  - Development models
  - Copernicus
  - The role of ESA and EC

- **Prospects:**
  - Potential areas of growth
  - Potential technology breakthroughs or game changers

- **Food for thought**
FOOD FOR THOUGHT

- EO expectations in the short, medium and long-term.
- Role of Europe.
- Impact of Copernicus in R&D, EO usage and market.
- Most probable technological breakthroughs.
- Potential impact of big data, cloud computing, thematic platforms, ...
- Bottlenecks and risks in the EO market & R&D.
- Priorities of ESA in EO.
THANK YOU FOR YOUR ATTENTION