



IRS in Europe

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Content

- Company Background and IRS related set up in Germany
- Involvement of DLR and Euromap in the Indian EO Satellite Program
- GMES initiative and some applications based on IRS
- In Europe
- Data acquisition and delivery for the USDA



Company

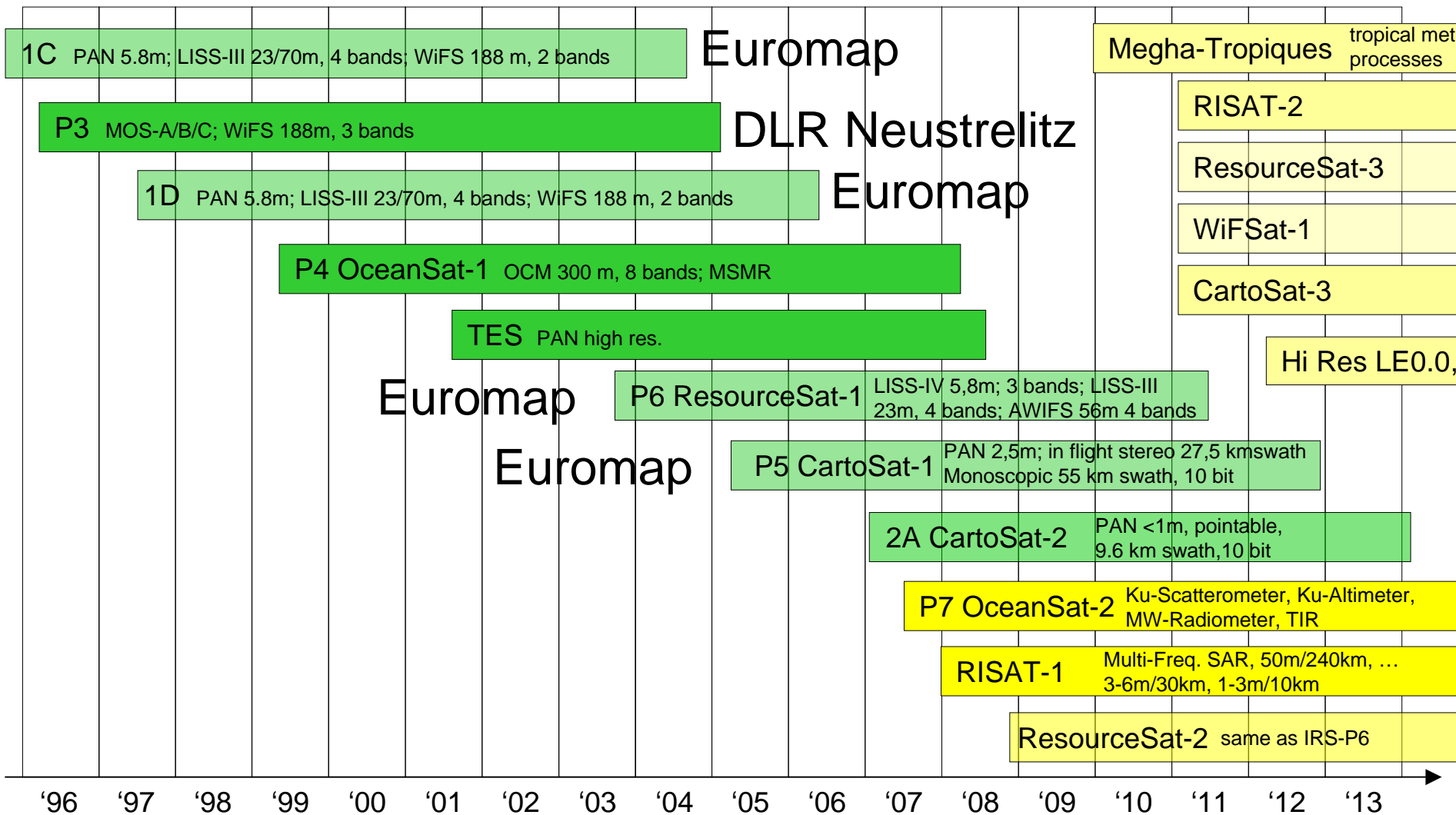


- 10 employees
- data reception and standard processing
- 100% subsidiary of GAF AG
- 10 years experience in data distribution and handling (reception, processing) of Indian EO Satellite data
- 130 staff (80% permanent)
- 20 years experience in remote sensing, software development and project management world wide
- ortho processing, mosaicing, enhancement
- is GAF's sole shareholder



- Euromap has been formed on the basis of a contract with Antrix/EOSAT to receive and to distribute IRS 1C and 1D data having in mind to become the recognized outlet for Indian EO data in Europe.
- Since 1996 a Europe wide marketing arm for IRS data has been implemented
- The IRS activities of Euromap are based on a close cooperation with the German Aerospace Center DLR. DLR is providing Euromap with technical support and the Infrastructure for data reception and archiving on a contractual basis.
- The commercial risk is covered by Euromap.

Past and current participation in the Indian EO Satellite Program (IRS)

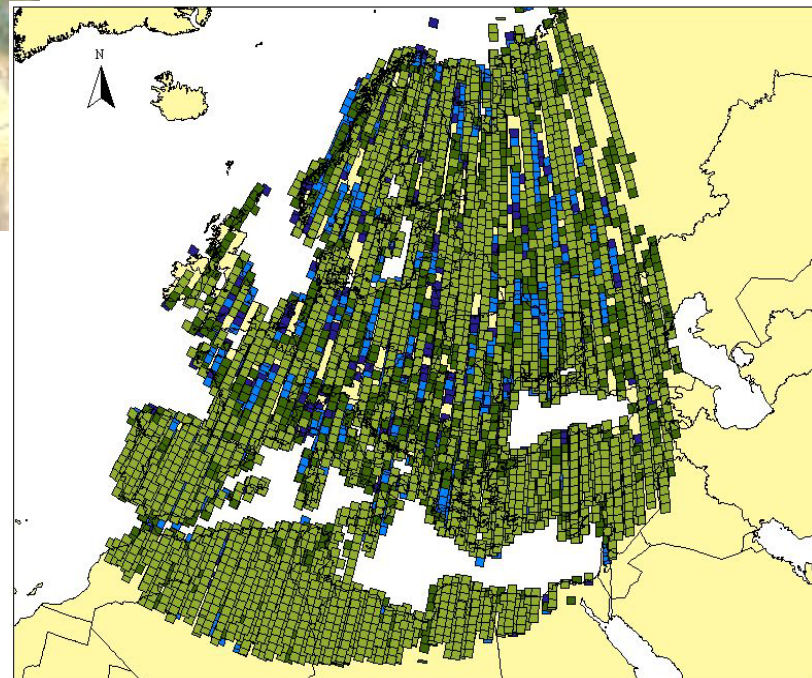


Source: ANTRIX Oct 1996, ISRO SAC Jun 1997, Ground Station Operators Meeting Goa Feb 2001, NDC Feb 2005, press releases, 10th 5 year plan



**DLR Station Neustrelitz –
Cone for IRS-1C and 1D**

**Typical Acquisition Pattern of LISS-IV
mono over 2 vegetation cycles**

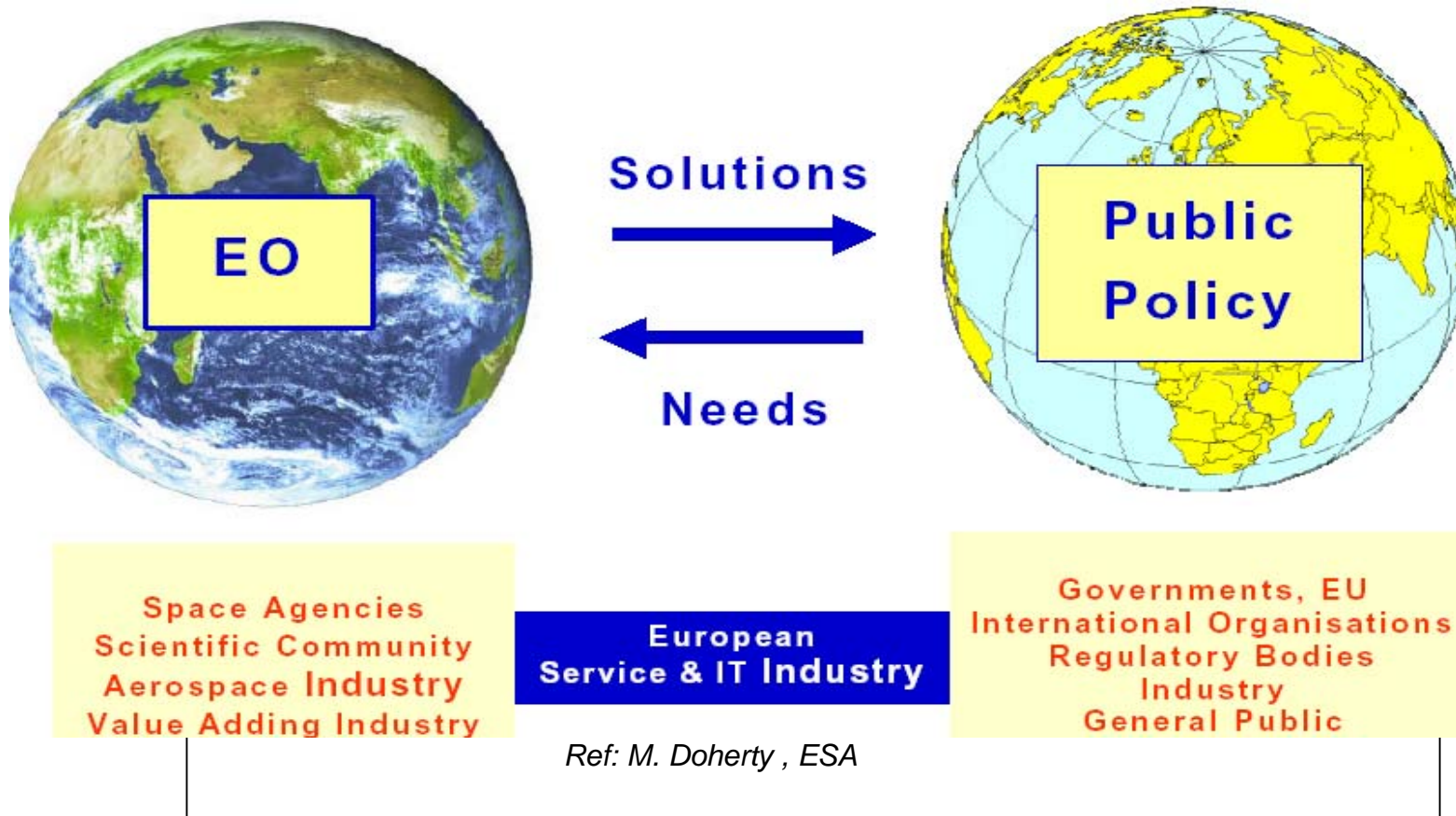


Layer Stacking:

- [cc] = 0
01-Apr - 31-Oct '06
- [cc] <= 10
01-Apr - 31-Oct '06
- [cc] = 0
01-Apr - 31-Oct '05
- [cc] <= 10
01-Apr - 31-Oct '05

Data considered until:
03-Nov-2006

An Autonomous European Capacity for Earth Observation by 2008



Major Observations: High Demand for EO Supported Services but no Market!

Some preliminary financial key data for the EU/ESA GMES program

- 2007-2013 ESA financing planned 1,2 bn €, yet confirmed 255 mio (31% D, 30% I), all for space and upstream comp.
- 2007-2013 EU financing only via FP7 with known restrictions, except preop. services (Fasttracks), 75-100?%
- 2007-2013 EU financial support to ESA for space and upstream comp. via FP7 630 mio €, in total for space comp. 1,83 bn €!
- 2007-2013 EU FP7 preop. services (fasttracks) about 80 mio €/ year for all segments (land,atmo, marine, risk, security..)
- **2007-2013 EU FP7 financial support to ESA for data procurement to support Fasttracks and research: 140 mio €- 20% ESA overhead = 115 mio €**
- 2007-2013 EU FP7 financial support to EEA for in-situ data provision

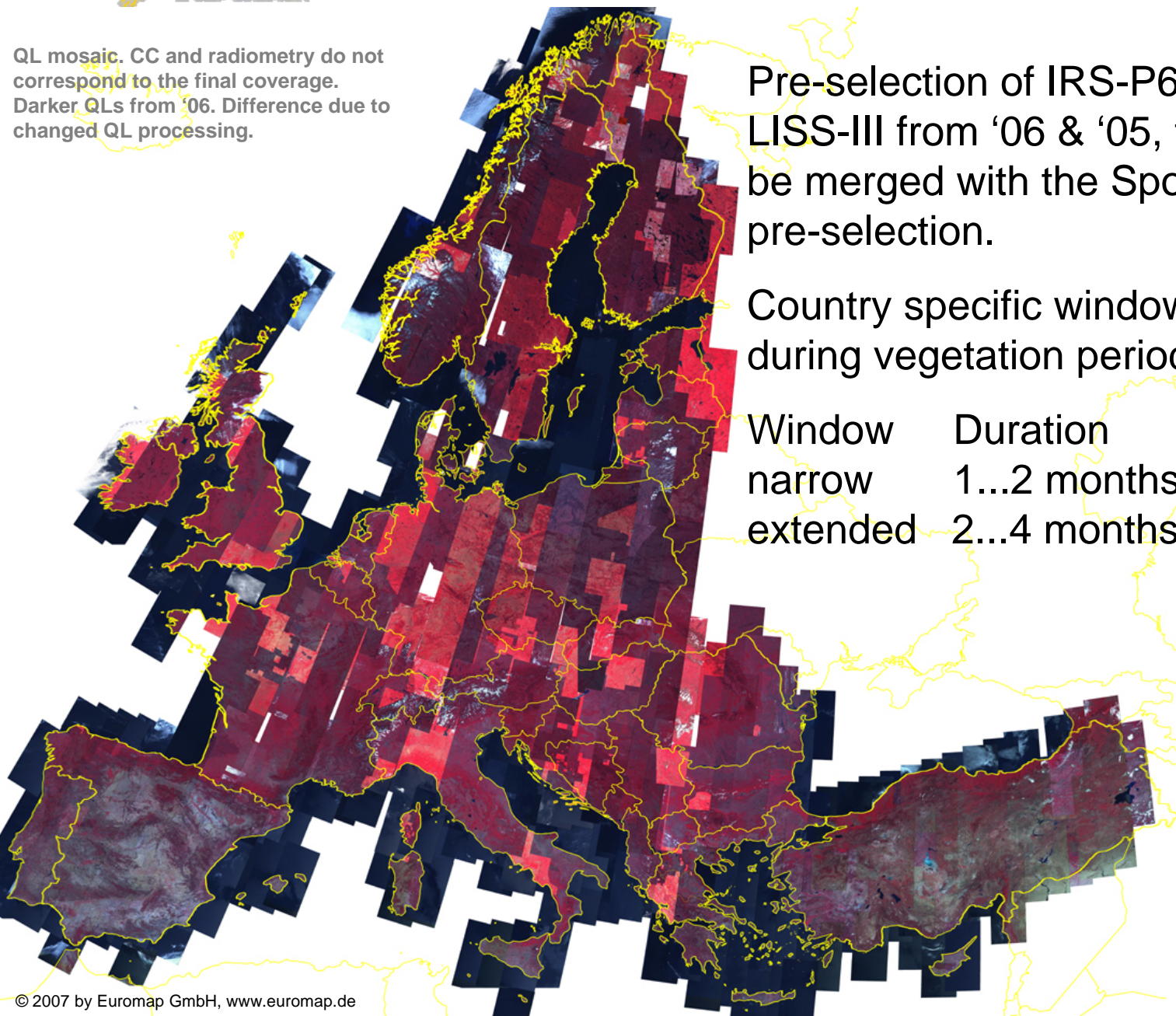
GMES Fast Track Data requirements and applications

First time provision of larger volumes of IRS data to ESA/EU in conjunction with Spot Image

- Two coverages of EU25 + 13 countries with multispectral data from IRS-P6 LISS-III, Spot 4 and Spot 5
- IMAGE2006: ortho-rectified satellite images, reference year 2006 (+/- 1 year)
- Corine Land Cover changes 2000-2006
- High resolution land cover data 2006 for selected number of classes (i.e. built up area including degree of soil sealing, forest).

FTSP, 1st Coverage IRS Pre-Selection

QL mosaic. CC and radiometry do not correspond to the final coverage. Darker QLs from '06. Difference due to changed QL processing.



Pre-selection of IRS-P6 LISS-III from '06 & '05, to be merged with the Spot pre-selection.

Country specific windows during vegetation period

Window	Duration
narrow	1...2 months
extended	2...4 months



Data Provision

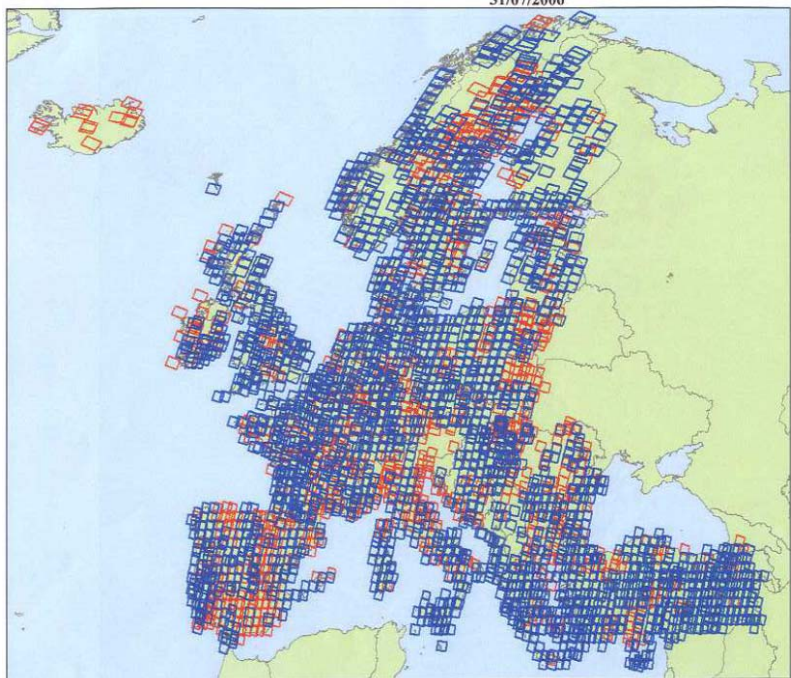


Processing



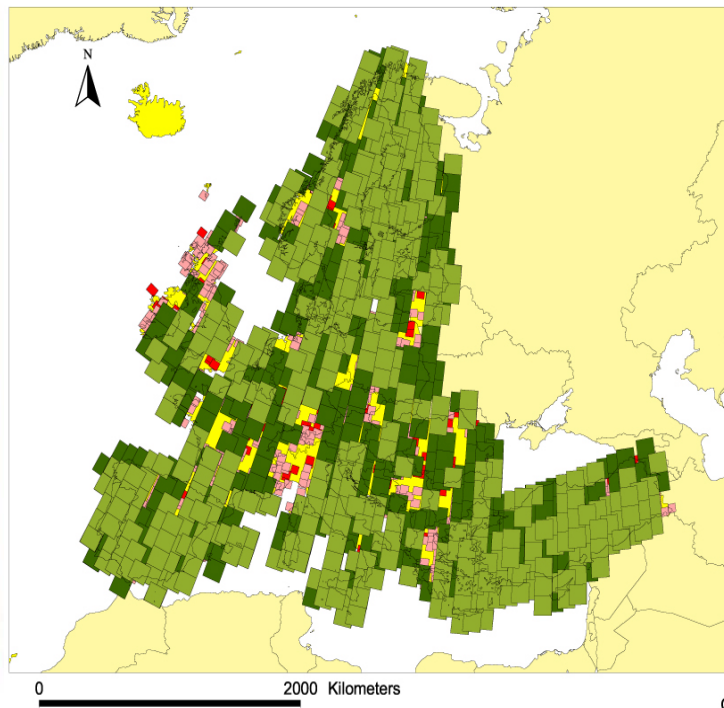
Status Spot and IRS in August 06

Spot 31.7.2006 (2005/2006)



~50% cloudfree, 50% clouds10

IRS 15.8.2006 (2006)



Layer Stacking:

- IRS-P6 [cc]=0%
01-Apr - 15-Aug '06
- IRS-P6 [cc]<=10%
01-Apr - 15-Aug '06
- Spot4 [cc]<=10%
01-Apr - 30-Jun '06
- Spot5 [cc]<=10%
01-Apr - 30-Jun '06

Data considered until:
15-Aug-2006 for IRS
30-Jun-2006 for Spot

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GMES Forest Monitoring

AWiFS
CC < 10 %, but GB
Acq. year 2005
RMS < 60 m

Planned result:
5-ha-resolution forest
area map of EU25

Min. mapping unit:
4 ha +/- 1 ha

Classes:

- deciduous forest
- coniferous forest
- mixed forest
- shrub
- non-forest

User



Project



Part of



Funded by



Lead



Partners



Geoapikonsis Ltd.

Screenshot of unfinished mosaic. CC and radiometry do not correspond to final product.

Service Description

- Service Providers: GAF AG, Geoapikonisis, Metria
- End User: European Environmental Agency (EEA)

Target Policy Sectors:

- **Ministerial Conference on the Protection of Forests in Europe (MCPFE)**
- **Convention on Biological Diversity (CBD)**
- **Streamlining European 2010 Biodiversity Indicators (SEBI2010)**

List of AWIFS Products

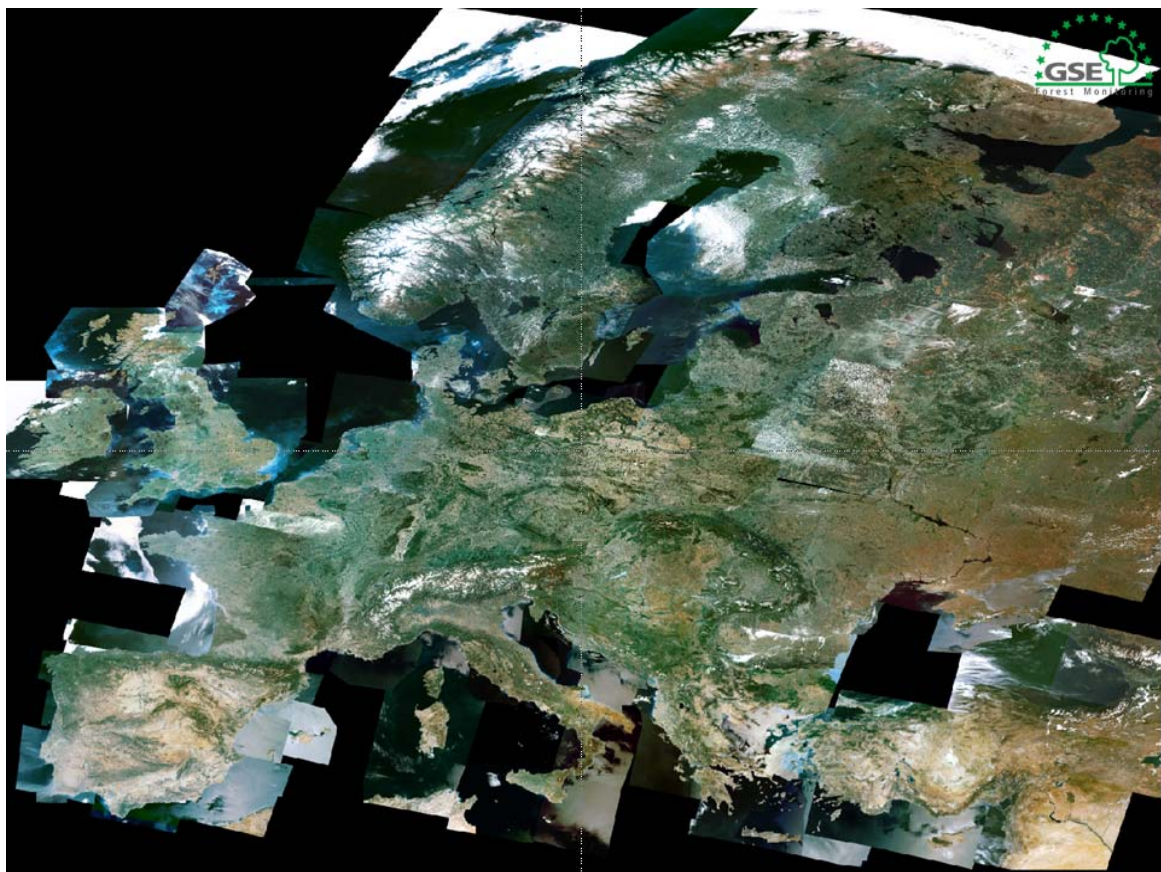
Product Code	Product Name
GSE-FM-60m - OIM	60 m Resolution Ortho Rectified Image Map
GSE-FM-5ha-FA	5 Ha Resolution Forest Area Map
GSE-FM-5ha-FATI	5 Ha Resolution Forest Area and Type Based Indicators

60 m Resolution Ortho Rectified Image Map

Product Code: GSE-FM-60m-OIM

Description:

- European-wide multi-spectral EO mosaic based on 158 (AWIFS ortho rectified quarter scenes with 60 m ground resolution. (2005-2006)
- Rectified to one reference system, positional accuracy better than 90m RMS

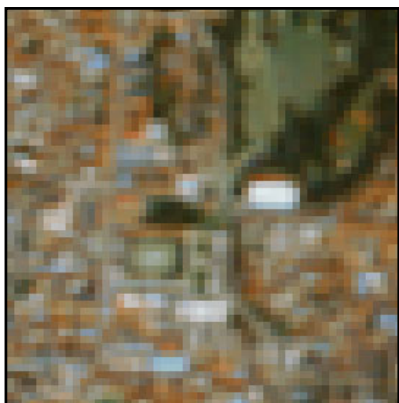


High End Standard Data Product of Euromap

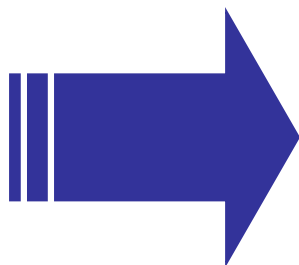
Merge-Pack = Pan sharpened natural color simulated LISS data



IRS Pan



IRS LISS natural color



Euromap - MergePack



Fully automatically generated IRS PAN/LISS
Merge through a proprietary processing chain

Product Code: GSE-FM-5ha-FA

Main data sources:

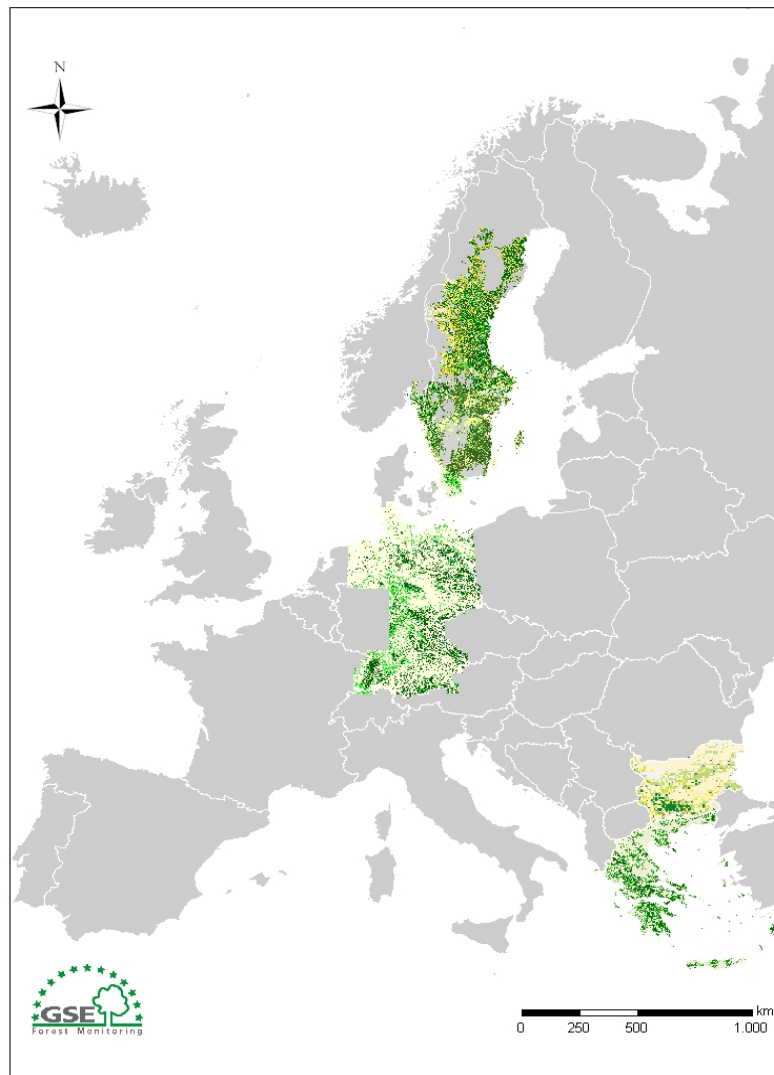
- 60 m Resolution Ortho Rectified Image Map, single AWIFS scenes
- Training and Verification: "EUROMAPS"* IRS Mosaic, 5m resolution, Standard Topographic Maps

*) Euromaps is a series of countrywise mosaiked and orthorectified 5 m IRS data sets

Product Code: GSE-FM-5ha-FA

Description:

- Classes: Coniferous Forest, Broadleaved Forest, Mixed Forest, Shrub and Non Forest.
- Specification and accuracy acceptability 85% (+/- 10%) for thematic mapping of the forest area and a minimum mapping unit of 5 ha.
- Three areas have been processed covering respectively Boreal, Moderate Temperate and Mediterranean Regions: Sweden, Southern Germany and Bulgaria. For Southern Germany 174,183 km² have been processed



5 Ha Resolution Forest Area and Type Based Indicators

Product Code: GSE-FM-5ha-FATI

Description:

mapping patch density and patch size according to pre-defined grid cells of 1x1 km

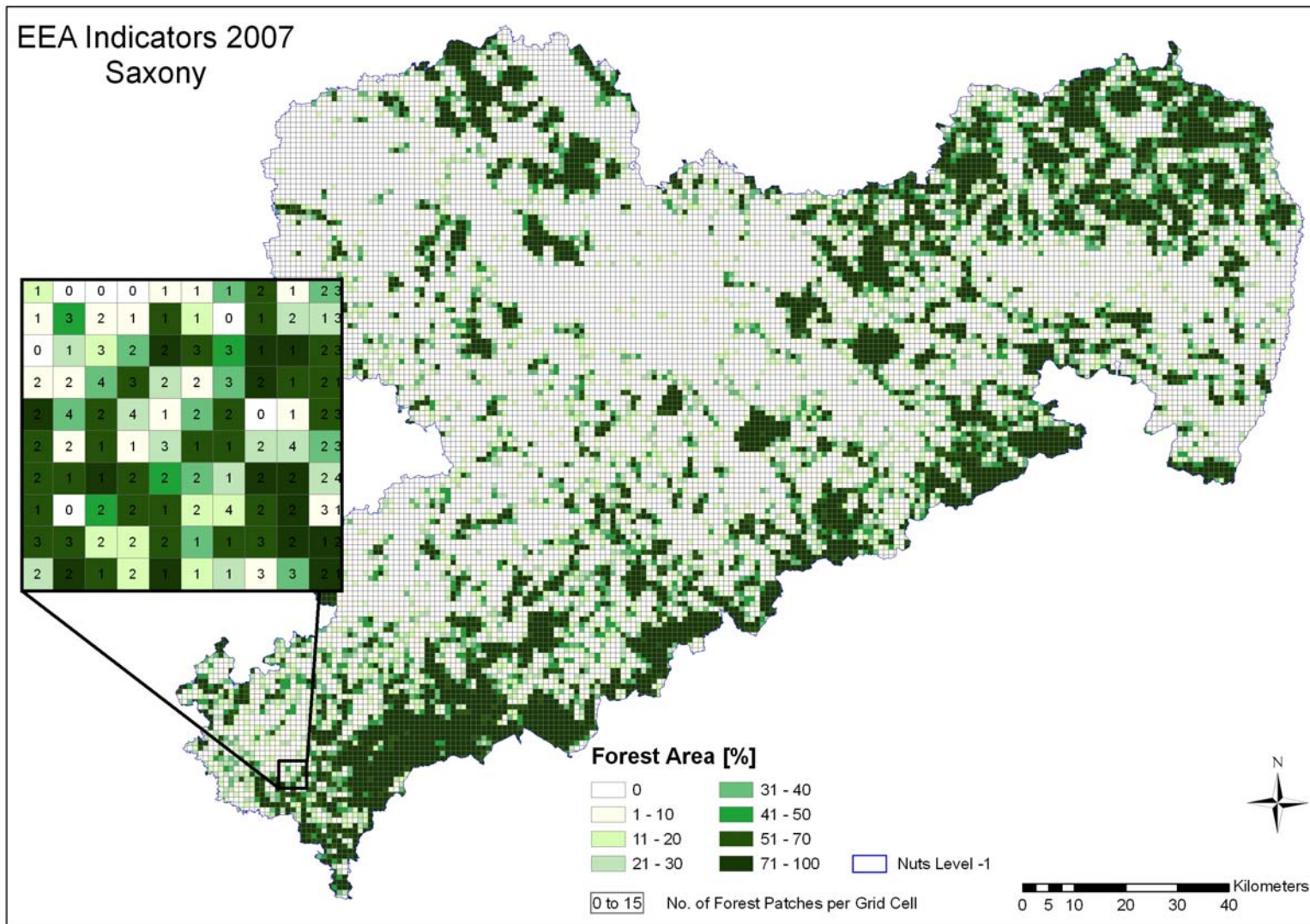
For each cell the following two indicators were assessed:

- Patch Density/cell: Number of patches/cell.
- Patch Area/cell: Percent forest area/cell. Gradation were as follows: 1-10%; 11-20 % etc.

Main data sources:

- 5 Ha Resolution Forest Area Map derived from AWIFS
- EEA standard grid (cell size: 1km²)
- NUTS Levels (Nomenclature of Territorial Units for Statistics)

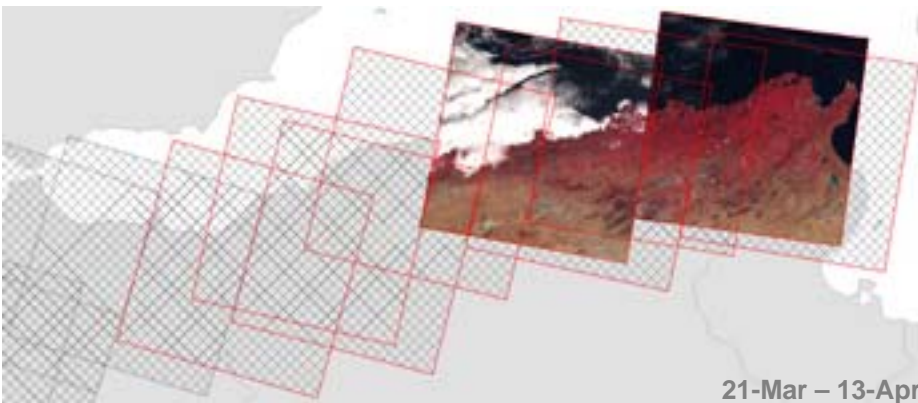
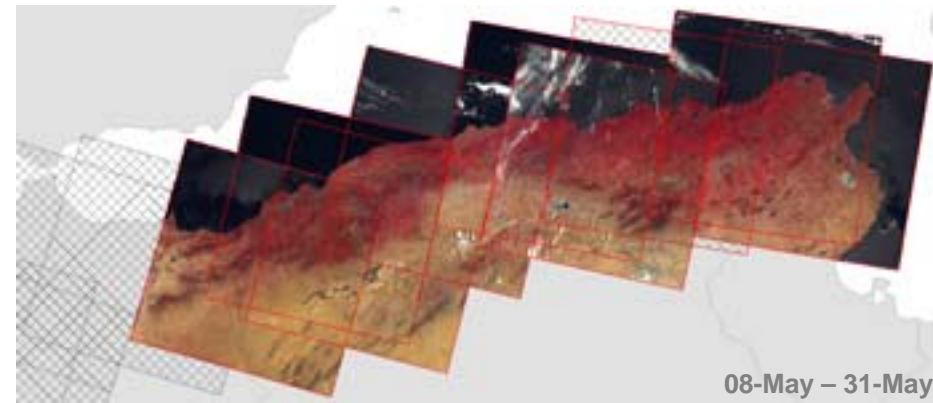
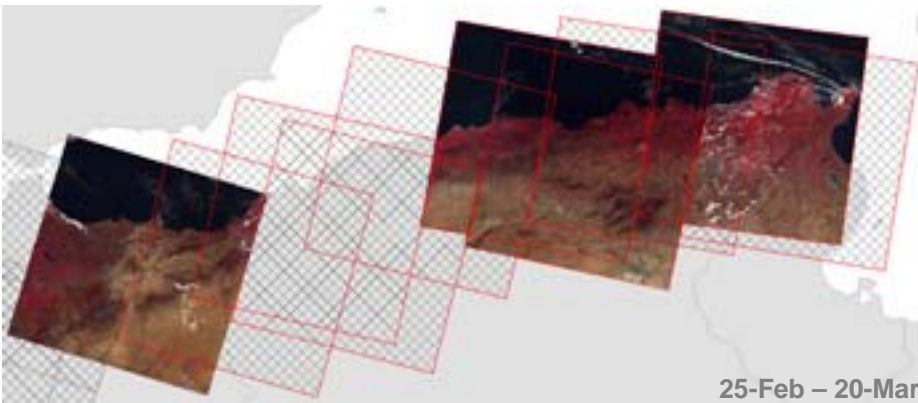
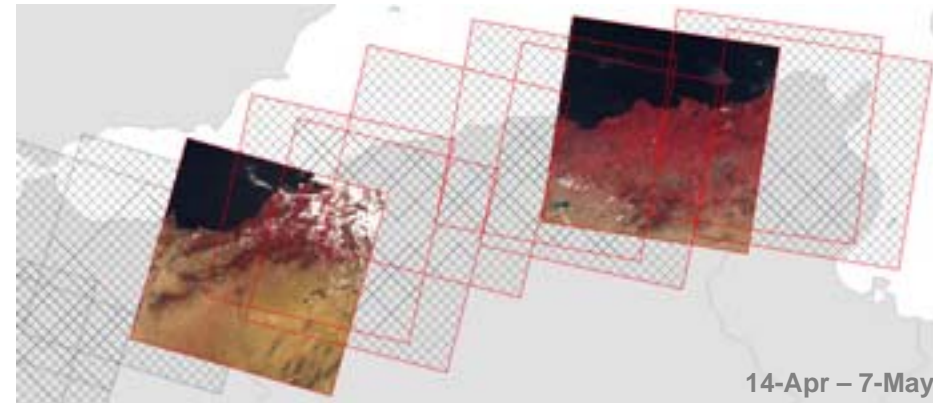
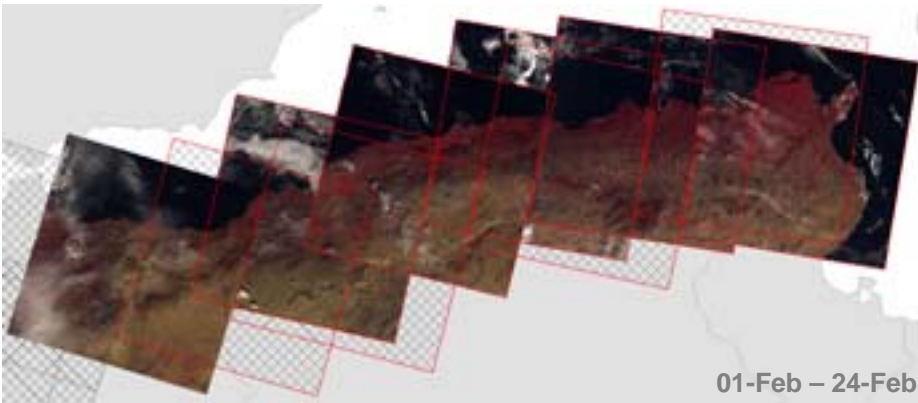
ESA Indicators



Is our best customer for AWIFS

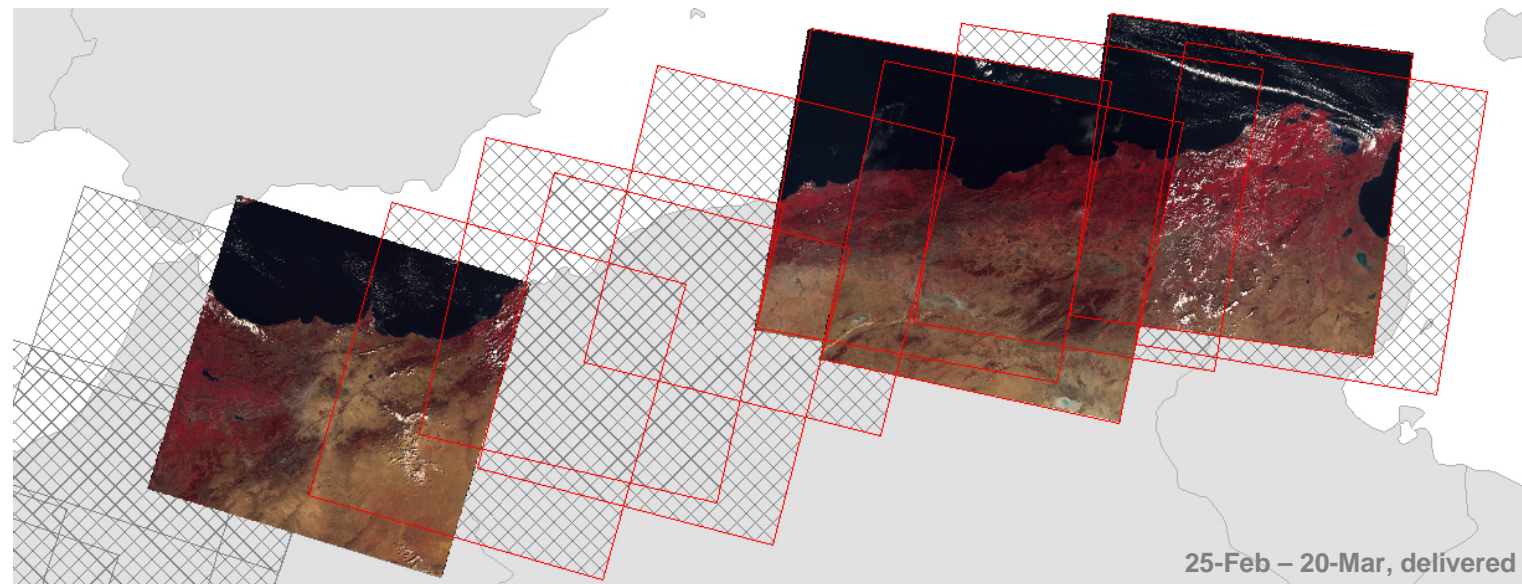
Some remarks related to a possible improvement of services and data acquisition

Monitoring with AWiFS

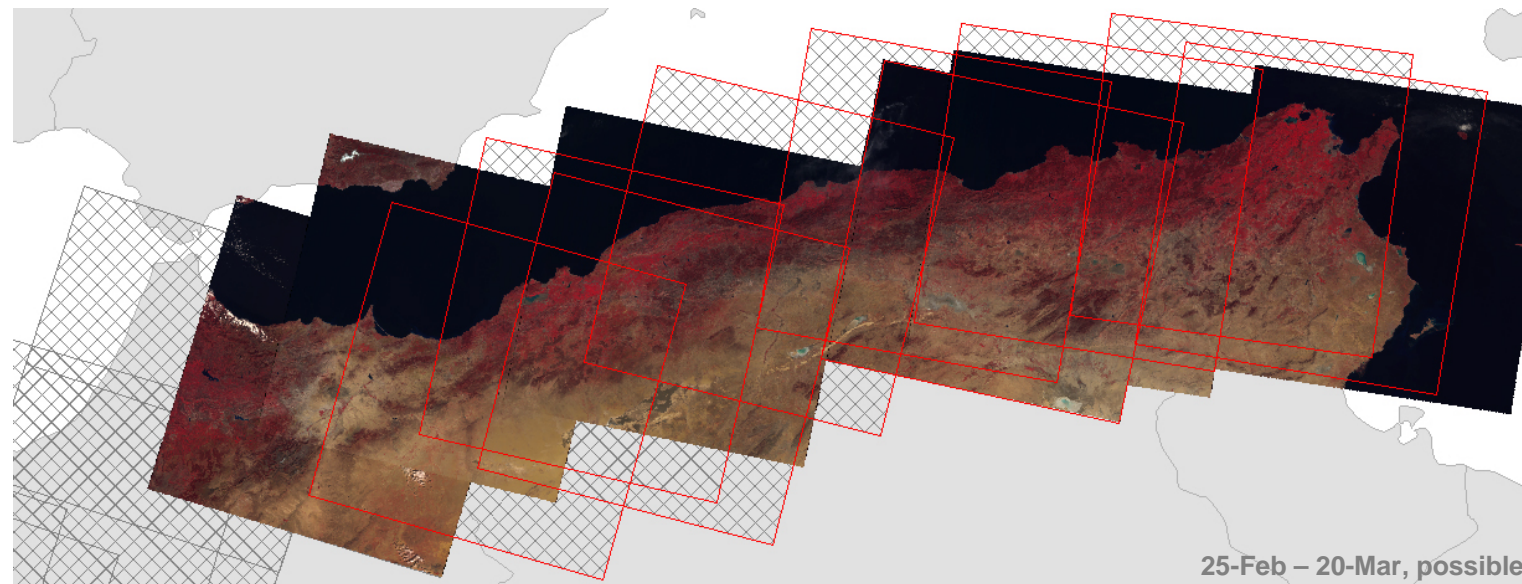


- Repetition rate of 5 days
- 5 complete cycles a 24 days
- Why poor results in 3 cycles?

Cycle 2: Actual & Possible

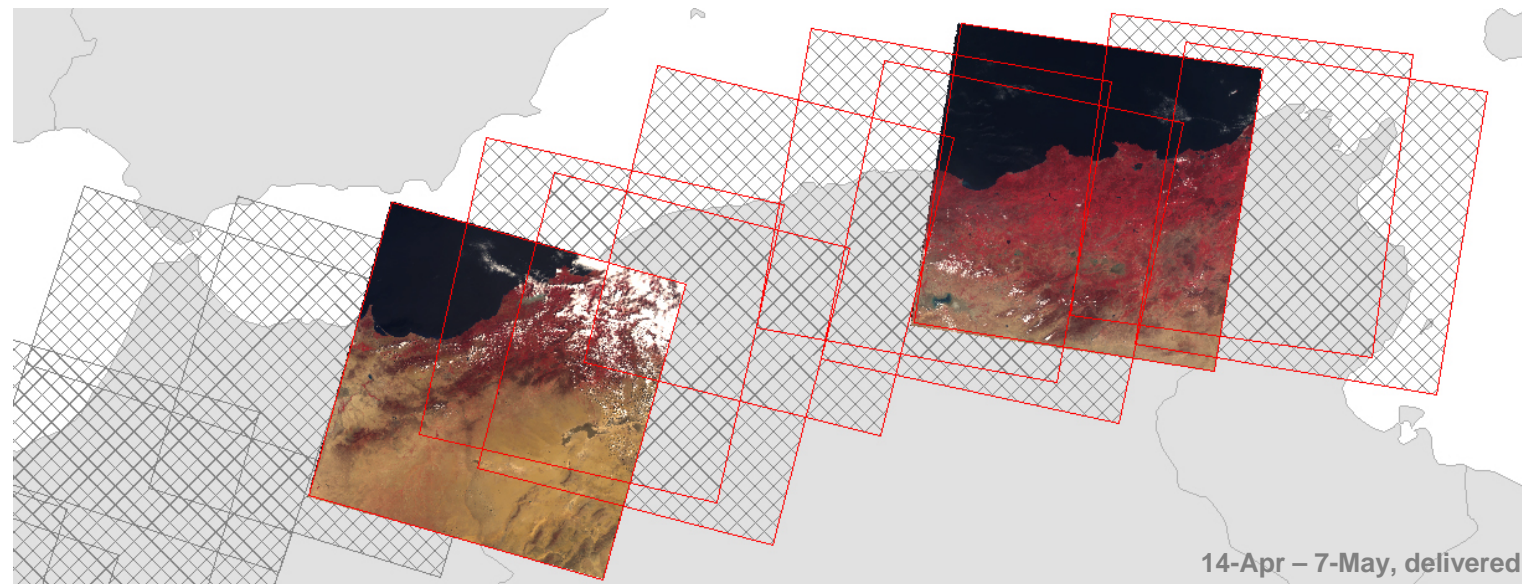


Actually
delivered:
4 quadrants

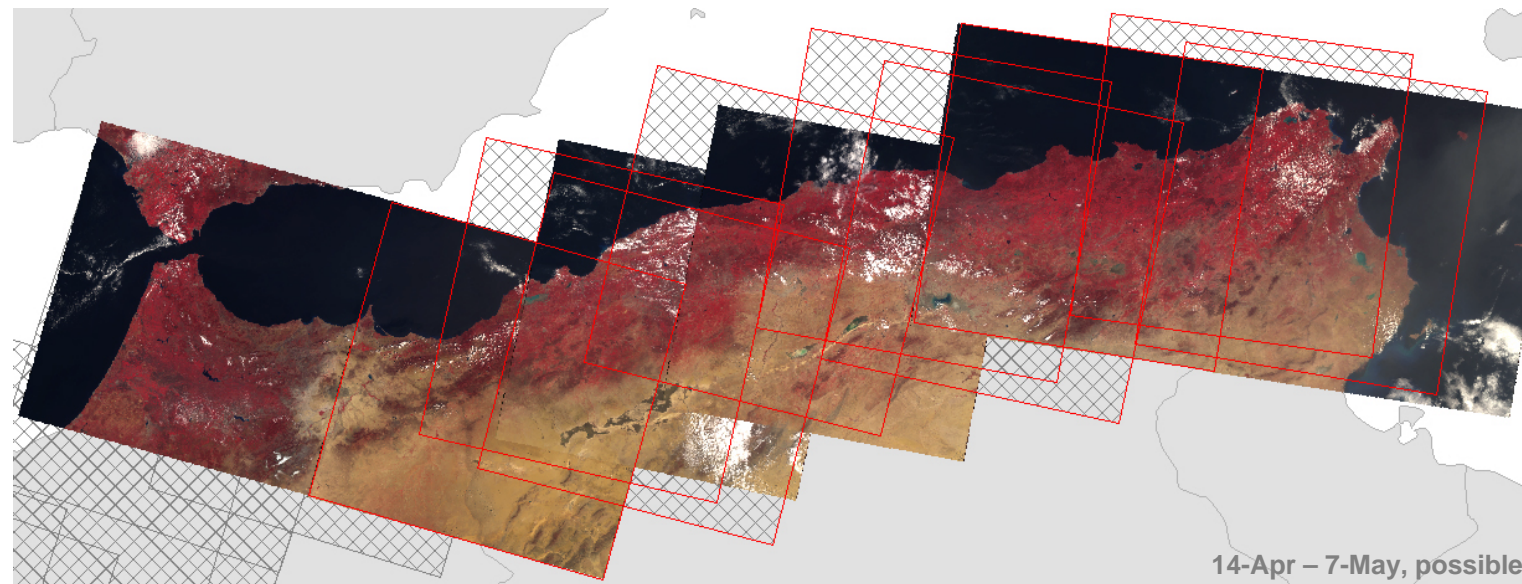


Possible:
6 quadrants
All from
passes acq.
for the client

Cycle 4: Actual & Possible



Actually
delivered:
2 quadrants



Possible:
6 quadrants

Current Approach

Reasons :

- Specific scenes are ordered before the acquisition
- In most cases only one camera is being considered
- Complicated set up of supply chain (Euromap acts as sub-sub-supplier)

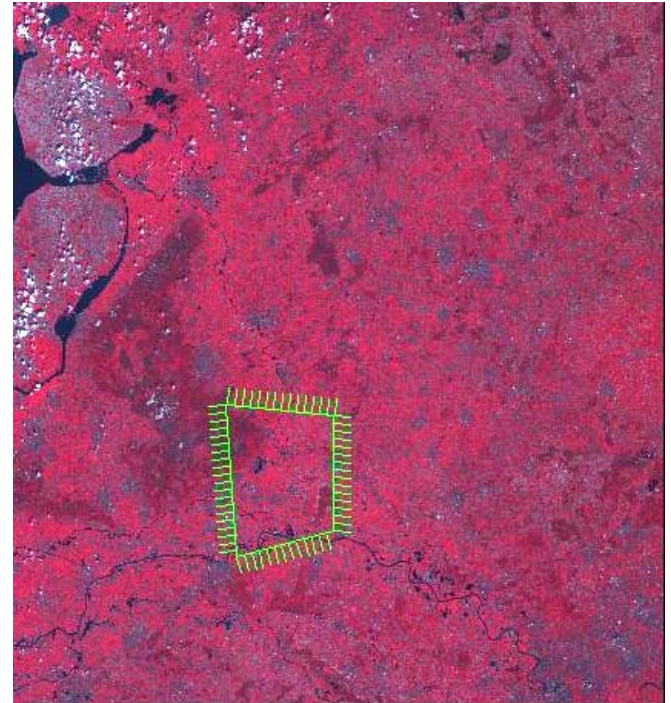
Consequences:

- good scenes acquired, but not matching the pre-selected path, row and quadrant are not considered (probably bad for the client's application)
- satellite resources are spend (hinders other requests of clients')
- resources aren't used optimally

Solution of Problem

Vegetation or acquisition season:

- Better coverage could be achieved by selecting scenes more flexible after acquisition
- **Quicklook push service, triggered by polygon describing the AOI, monitored by the client or the supplier**



 **euromap**
A GAF COMPANY
IRS-P6 LISS-III
path: 021 row: 031
23-MAY-2007
Netherlands

Off-season:

- Knowingly considering both cameras leads to more homogeneous coverage and frees satellite resources
- Combination with vegetation-season approach increases the amount of considered acquisitions