

Astrium Services / Spot Infoterra

Solutions for Risks and Crises Management

UN-SPIDER

Regional Workshop – Africa

Addis Ababa, Ethiopia

July 9, 2010



Agenda

- Overview
- Capacity Building
- Space-based Solutions in Risk & Crisis Management
- Initiatives in Africa

Spot Infoterra Group within Astrium and EADS



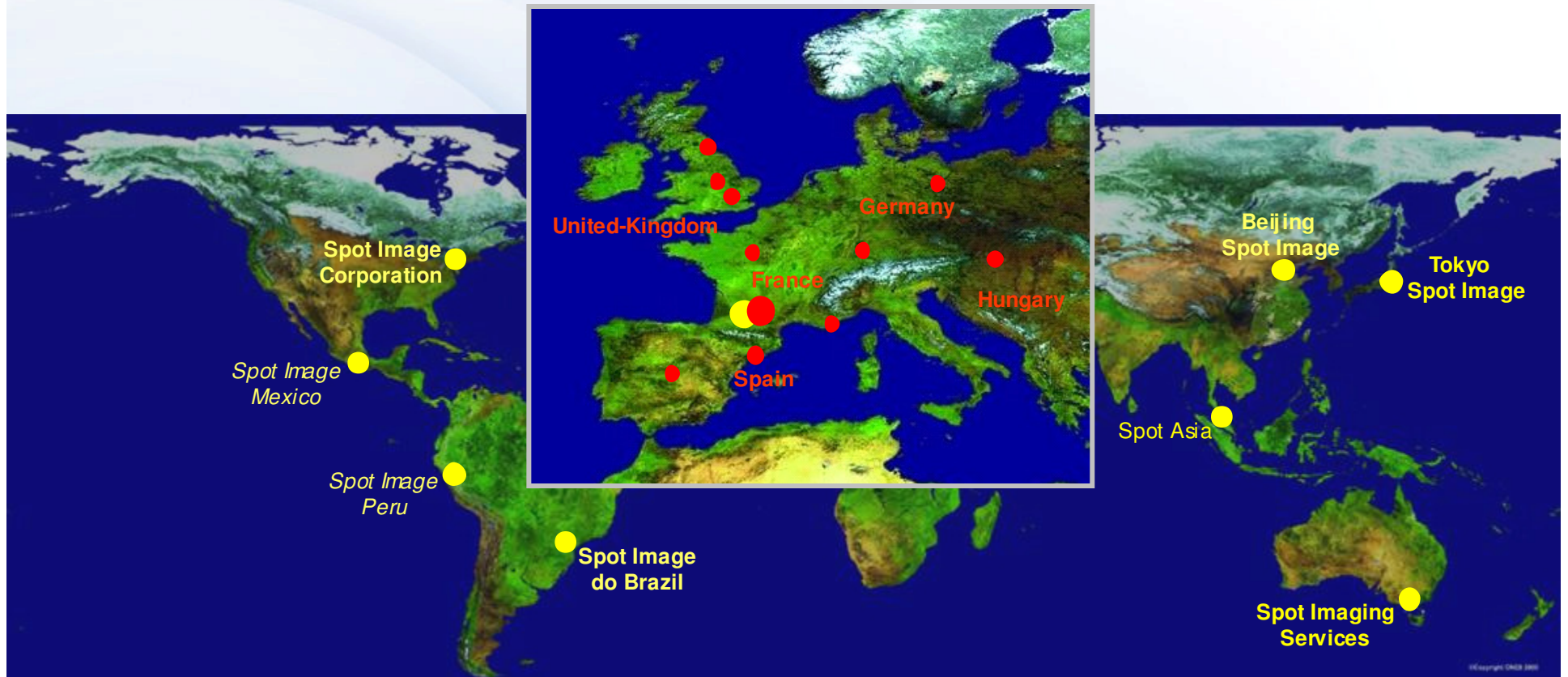
* France, Germany, UK, Spain, Netherlands



Spot Infoterra Group: key facts & figures

■ The Geo Information division of Astrium Services

- An international network of partners & customers
- Staff: +800 staff (2008), located in 13 countries



Spot Infoterra Group

Oil, Gas & Mineral Services



Defense & Security



Disaster Management



Direct Receiving Stations Equipment, telemetry

Agriculture, Forestry & Environment



Mapping & Cadastre



Services for managing the development, the environment & the security of our changing world



Telecoms Planning



Maritime & Coastal surveillance

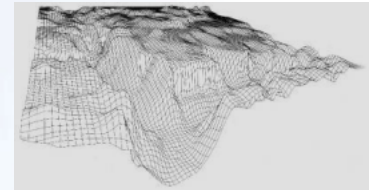
Spot Infoterra Group: Corporate mission

Our mission

To bring Earth observation imagery and geo-information products & services to private and public sector **worldwide**, for managing the **development, environment & security** of our changing world.

The group aims at:

- developing the use of Earth observation imagery and services
- establishing **capability** in all aspects of value-added geo-information services;
- building a **sustainable business** in Earth observation



Covering the Whole Value Chain

Data Acquisition

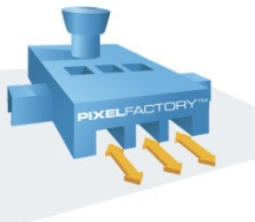


Unique range of capabilities

Multi-platform spaceborne and airborne

Multisensor optical, radar, lidar, thermal, hyperspectral

Reference Data production



Innovative and powerful systems

DEM production from all sensors

Orthorectified imagery nationwide seamless coverages

Access to the information



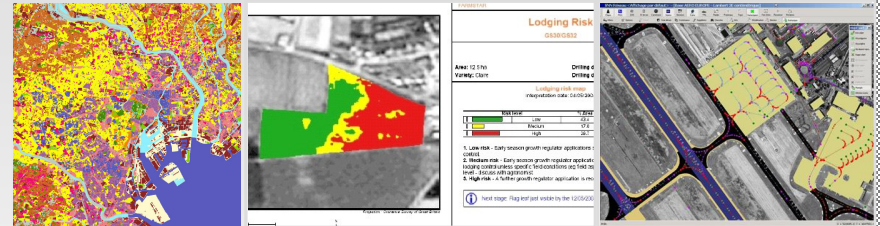
On-line access services

for leveraging access to data and products

Data standardisation for data sharing and interoperable processes

Geo-Information Products & Services

Turning imagery into business information



Serving an extensive range of business segments in public and private sectors:

Disaster Management, Civil Security, Local Authorities, Mapping, Forestry and Environment, Agriculture, Telecommunications, Oil & Gas, Insurance...

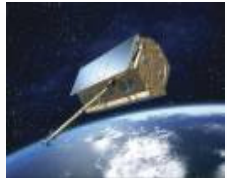
With:

- Application-specific datasets
- Information services
- GIS software
- Consultancy, training and customer support

Data Acquisition



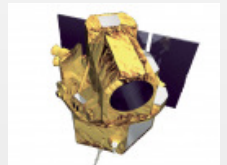
SPOT



TerraSAR-X



KOMPSAT-2



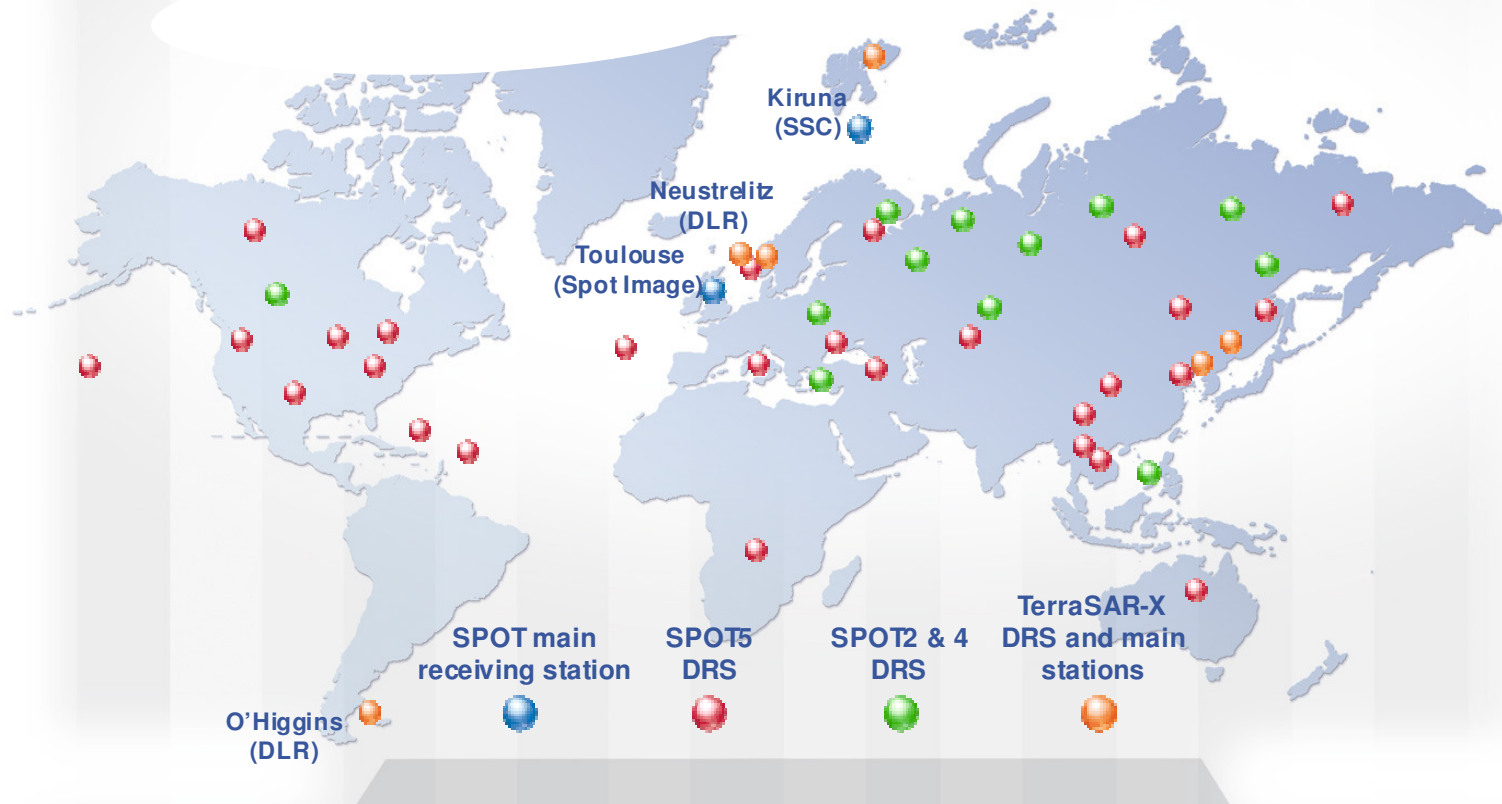
FORMOSAT 2



Airborne operations

■ The most extensive network of Direct Receiving Stations (DRS) in the world, with Optical and SAR satellites

- a unique revisit capacity
 - more to come in 2010 with **TanDEM-X**, 2011 with **Pléiades**, 2012/13 with **SPOT 6 / 7**
- Complemented with:
- airborne acquisition capabilities (digital cameras)
 - mobile laser for field data collection (**RapidSurveyor™**)



SPOT satellites

- **Unique capacity to capture large amount of images**
 - images 60 km wide
 - 5 simultaneous images from SPOT 5
 - Panchromatic : 2.5m, 5m & 10m
 - Multispectral: 10m/20m
 - 2 pointable Cameras per satellite
 - Target Revisit 2-3 days/satellite

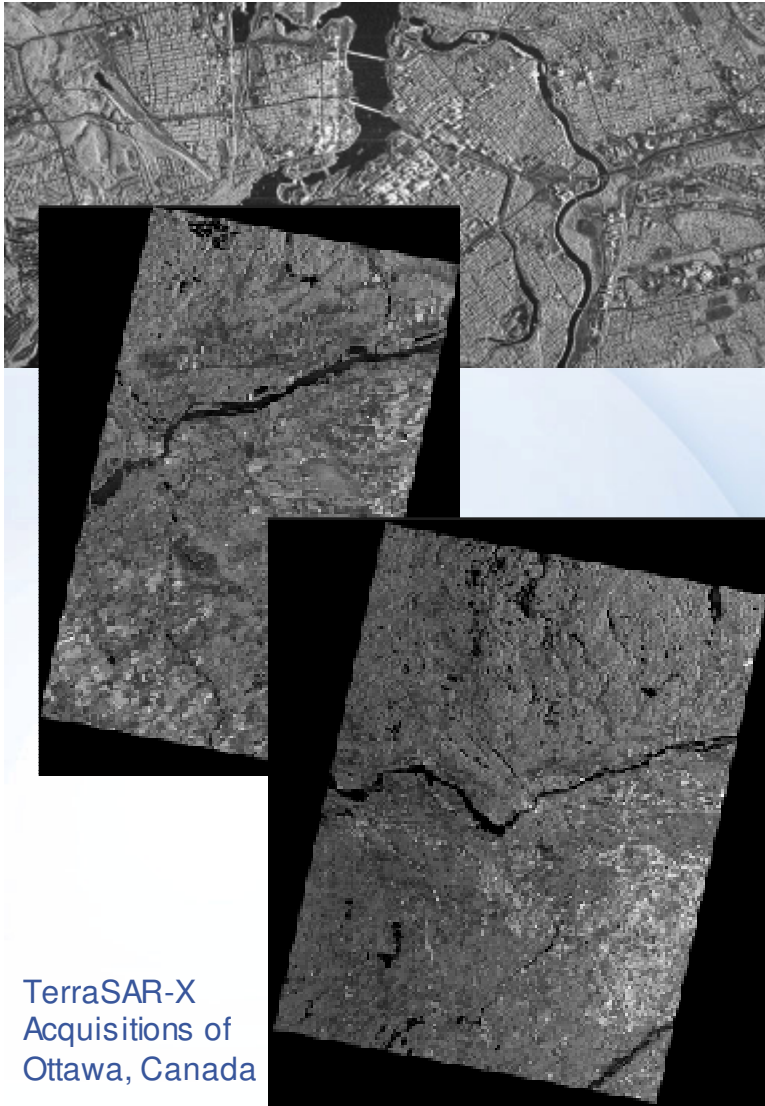


TerraSAR-X : Unique Features



- Image acquisition at all times – independent of cloud cover
- High resolution of up to 1 meter
- High revisit rate:
with a 95% probability any place on the earth can be imaged within 2.5 days
- Highest orbit accuracy of a commercial satellite worldwide

TerraSAR-X - Operational Imaging Modes



TerraSAR-X
Acquisitions of
Ottawa, Canada

SpotLight:

- most sophisticated radar imagery available on market
- up to 1m resolution
- scene size 10 km (width) x 5 km (length)

StripMap:

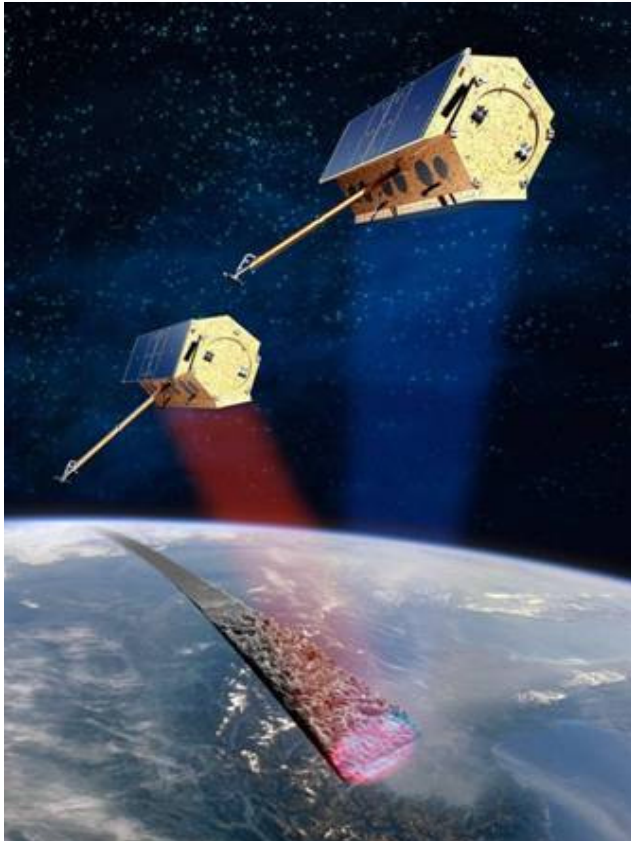
- up to 3m resolution
- scene size 30 km (width) x 50 km (length*)

ScanSAR:

- up to 18 m resolution
- scene size 100 km (width) x 150 km (length*)

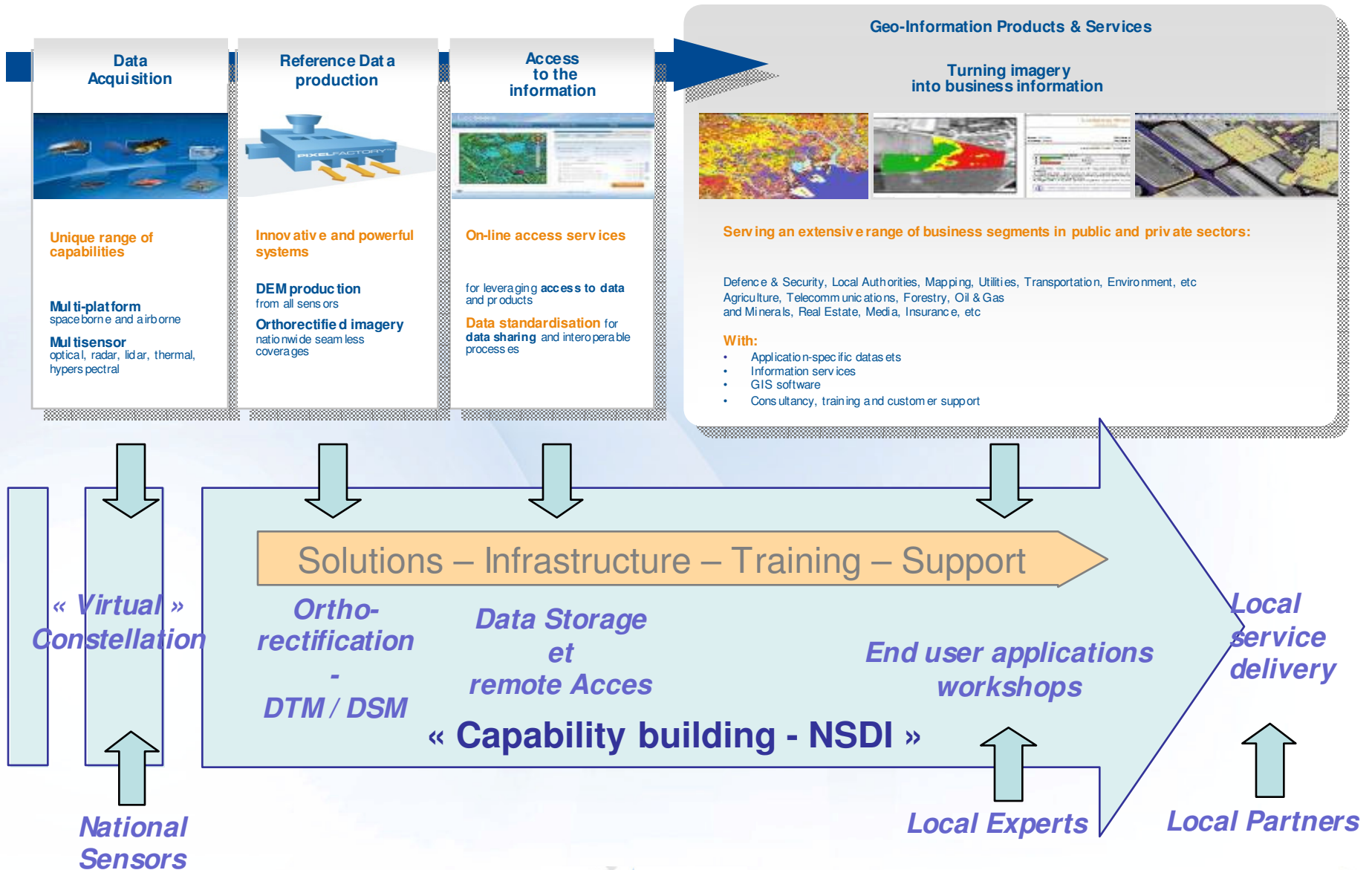
*StripMap & ScanSAR: acquisition length extendable to up to 1,650 km.

Heavy investments into TanDEM-X Mission (TerraSAR-X add-on for Digital Elevation Measurements)



- twin satellite constellation: TerraSAR-X and TanDEM-X
- launch: 2010
- mission goal: global coverage with HRTI 3 standard (12 m posting, z-accuracy < 2 m)
- consistent mapping of the Earth's land surface in ~3 years

Benefitting from our whole value chain



Capability building with Spot Infoterra

■ Thanks to more than 20 years of experience in Earth Observation Services and applications, Spot Infoterra Group as partner to set up new national capability:

- Know how transfer from existing operational services organisation
- Training thanks to highly skilled engineers
- Technology transfer based upon State of the art turnkey solutions

■ Immediate benefit from

- More than 10 years of R&D in agri-environment services
- More than 20 years in satellite imagery marketing
- More than 20 years in cartography applications

■ Smooth and well adapted transfer thanks to pilot projects as required

→ One of the quickest and more effective path towards locally mastered operational services for the nation and the region

■ Training local team

- Technical training (ex. TerraSAR-X training)
- Marketing training (for specific applications such as Agriculture..)

■ Conference days

- Main application of satellite and aerial imagery
- Practical examples, case studies
- Workshops

■ Business tour to Ministries

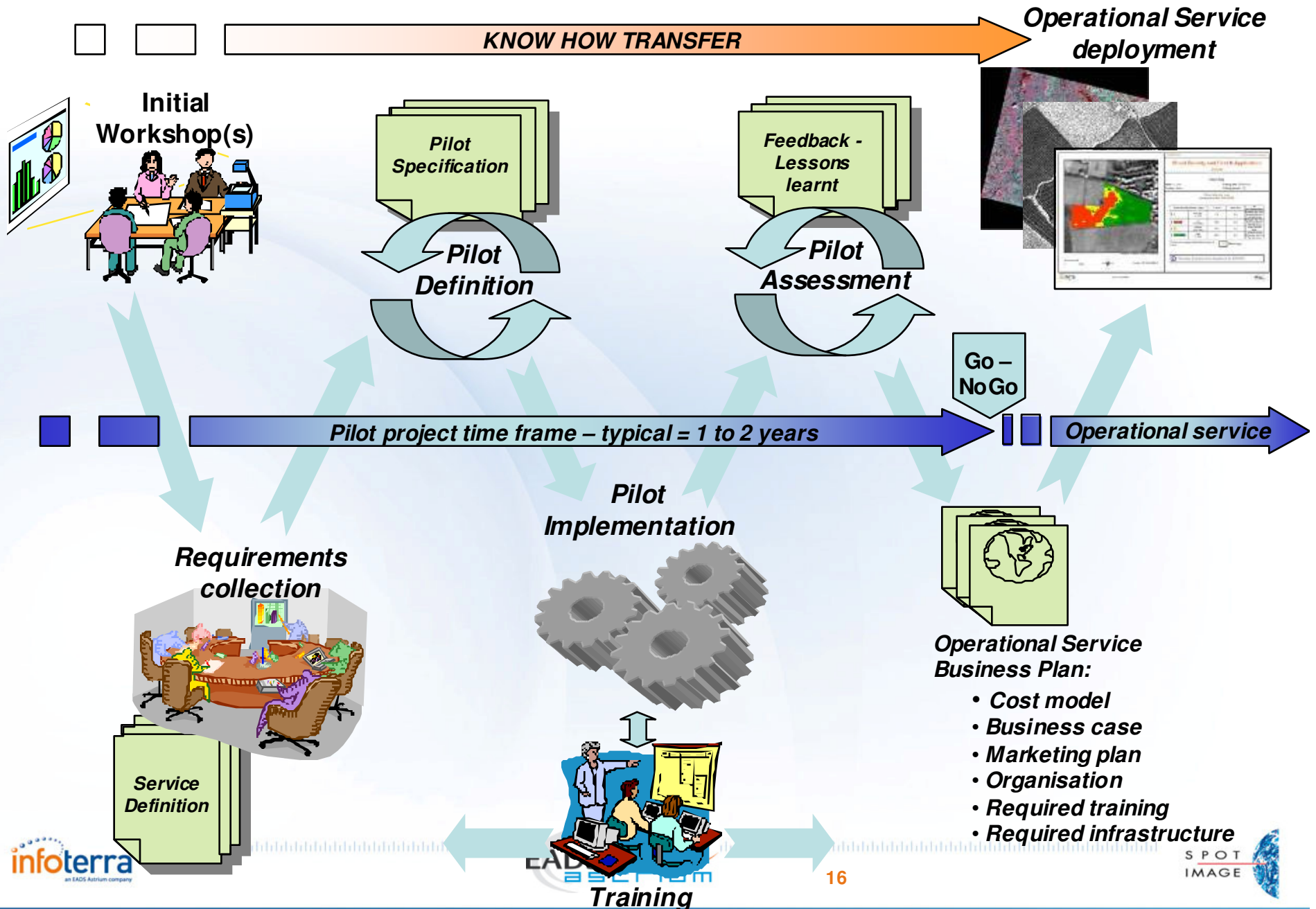
- Better understand the needs of your countries
- Define general projects and pilots

■ Development of Pilot Project

- Support of Spot Infoterra Group
- Local acquisition & processing

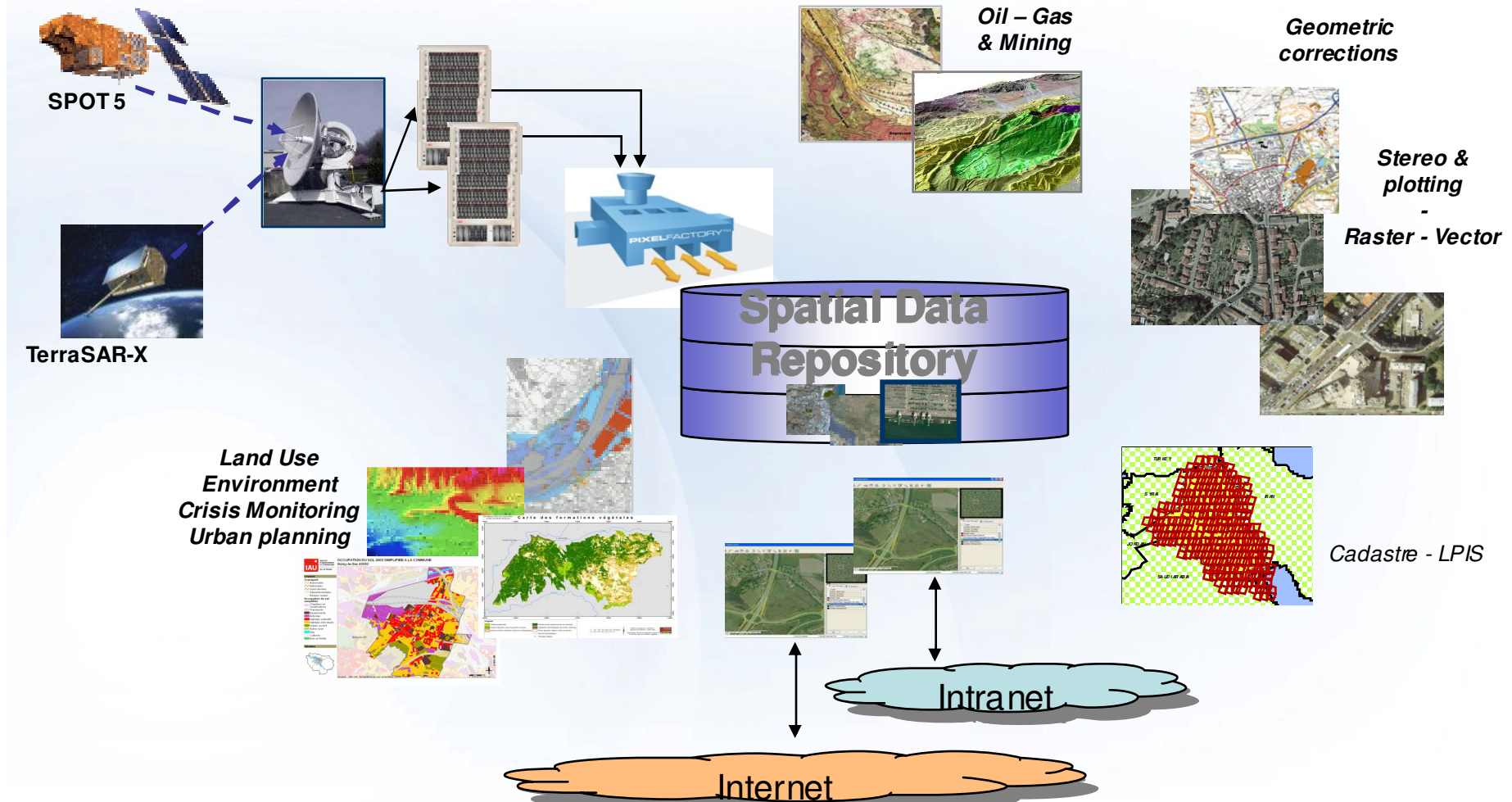
=> Detailed action plan to be set up together during early program stages

Pilot Project = establish service and transfer know how



Know how transfer & support to grow services locally

- **Baseline Data & infrastructure as a core start for future business**
- **Pilot projects to grow end users services**



■ Agriculture and Environment Services

- Focus on territory to support rural development
- Land Sustainability
- Support policies and economical development
- Pressure of agriculture on the environment

■ Oil Spill Pollution Monitoring Services

- On shore and Off shore

■ Natural Disaster Management Services

- On shore and Off shore

■ Civil Security Services

- Collaborative tool - CHORUS
- Telecommunications

Agricultural and Environmental Services

- Geo-information services for monitoring land & natural resources at different scales

1. Crop Management

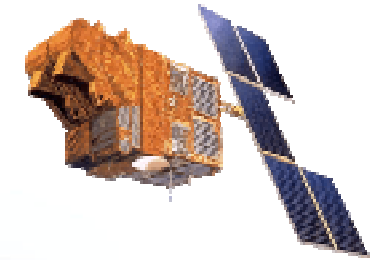


3. Land Sustainability

2. Agricultural Statistics

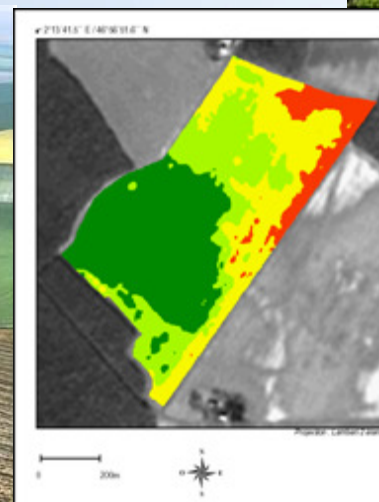
Geo-Information Services to Serve Agricultural Actors

The following charts depict the full range of services which can be implemented to boost agricultural development for the benefit of public and private actors



According to priorities, services can be deployed independently in time ...

Keeping in mind that costs can be saved thanks to resources mutualisation



FARMISTAR Conseil COGEX

Préconisation Azote

Surface : 52,0 ha Semis : 28/06/2003
Variété : AVISO Densité : 70

Carte de modulation

Conseil au 11/02/2004

Variation des besoins dans la parcelle par rapport à la dose recommandée		% Surface
1	[200, -10]	39,4
2	[120, -10]	25,3
3	[240, 50]	26,2
4	[10, 30]	5,3
5	[0, 50]	6,0

Préconisation satisfaisant les besoins de la parcelle			
Déficit de rendement (t/ha)	30	35	40 et +
Préconisation (1) sans modulation organique	110	150	180
Préconisation (2) sans modulation organique	70	110	140

Agriculture & environment: 3 main lines of activities

■ Crop management service

- Focus on territory to support rural development
- Crop-specific agronomic data at the field level

■ Cropland management

Agricultural Statistics

- Local to regional
- Support agriculture policy and economical development

■ Natural Environment Management

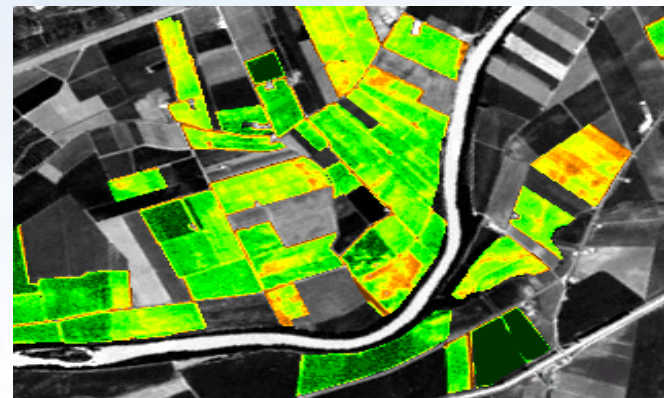
Land Sustainability (land reform & land planning perspective)

- Land cover / land use mapping and change monitoring
- Potential of regions to accommodate crop growing
- Pressure of agriculture on the environment
- Climate change effects mitigation

1. Crop Management Service (at field level)

An agronomic service to effectively support crop management at the field level

- **Based on the sharp and regular observation of fields and their intra-field variability with space borne images**
- **Service features :**
 - **Growers to get maps for each field along the growing season, indicating crop status and/or recommendations for crop management**
 - **Cooperatives and mills to get territorial maps (production area) providing a synthetic view about crop distribution or crop maturity (for each type of crop)**



Crop management & precision farming

Crop status is estimated from satellite images at the field level ...

Information & Recommendation Products for Crop Management

- ▶ Crop Development monitoring
- ▶ Input Management
- ▶ Water Stress Detection

... to generate a bespoke package of maps delivered at key growth stages...

....dedicated to farmers to improve their farming practices

Different Types of Crops

- ▶ Wheat, Barley, Canola, Corn
- ▶ Soybean, Sugar beet, Potatoes
- ▶ Rice, cotton, vineyards, etc.

Benefit for Growers

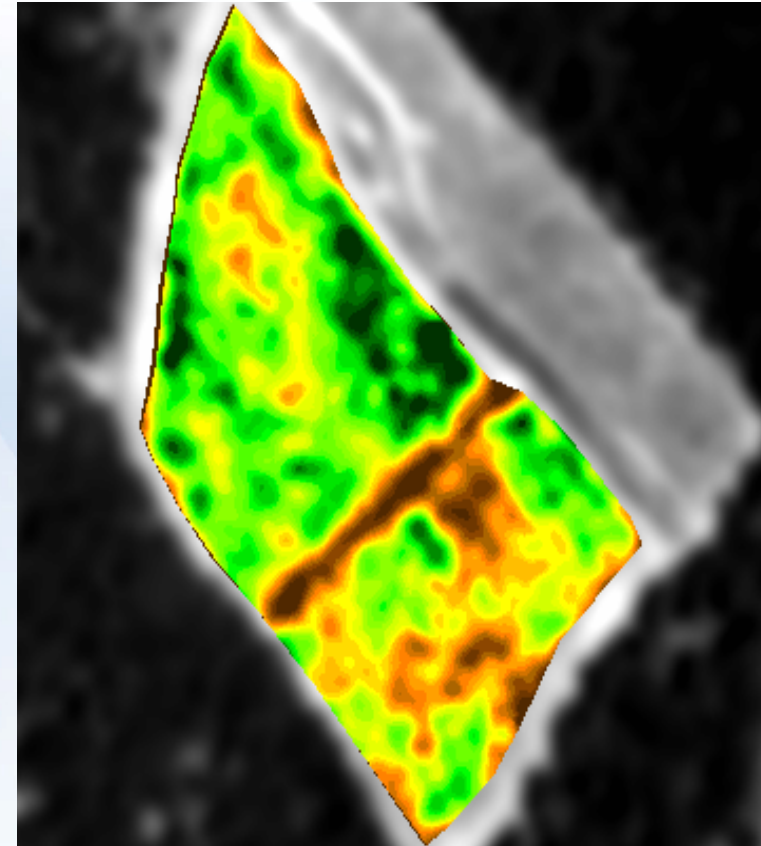
- ▶ Yield Increase & Better Quality
- ▶ Input Optimisation
- ▶ Time Saving

To move back to better view !

Canopy status cannot be seen by farmers at ground level
or even by flying over the field ...
optical sensors can see what human eyes can not !



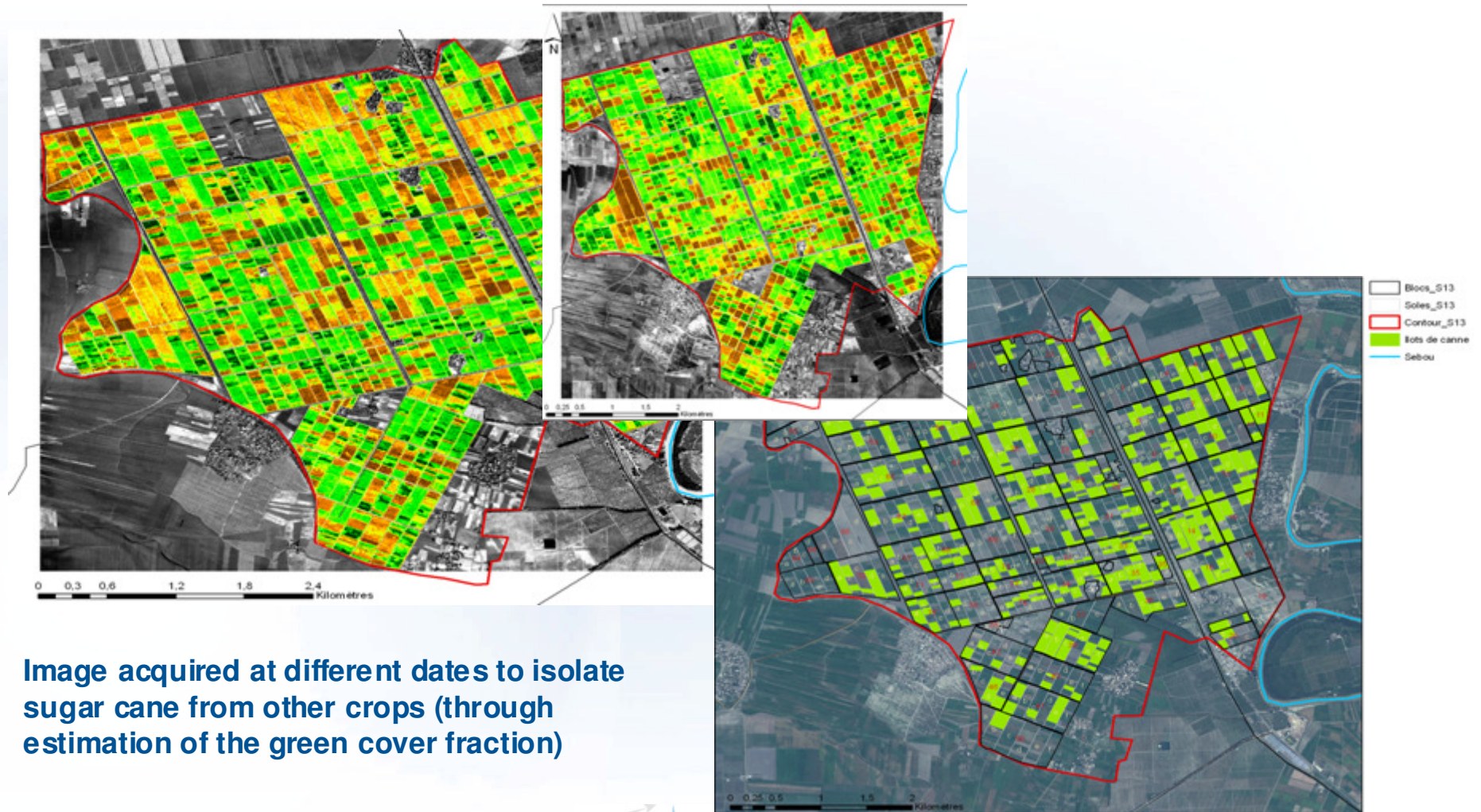
Field as seen from above



Vegetation variability as measured by
processing applied on Formosat image

Ex : Crop Monitoring

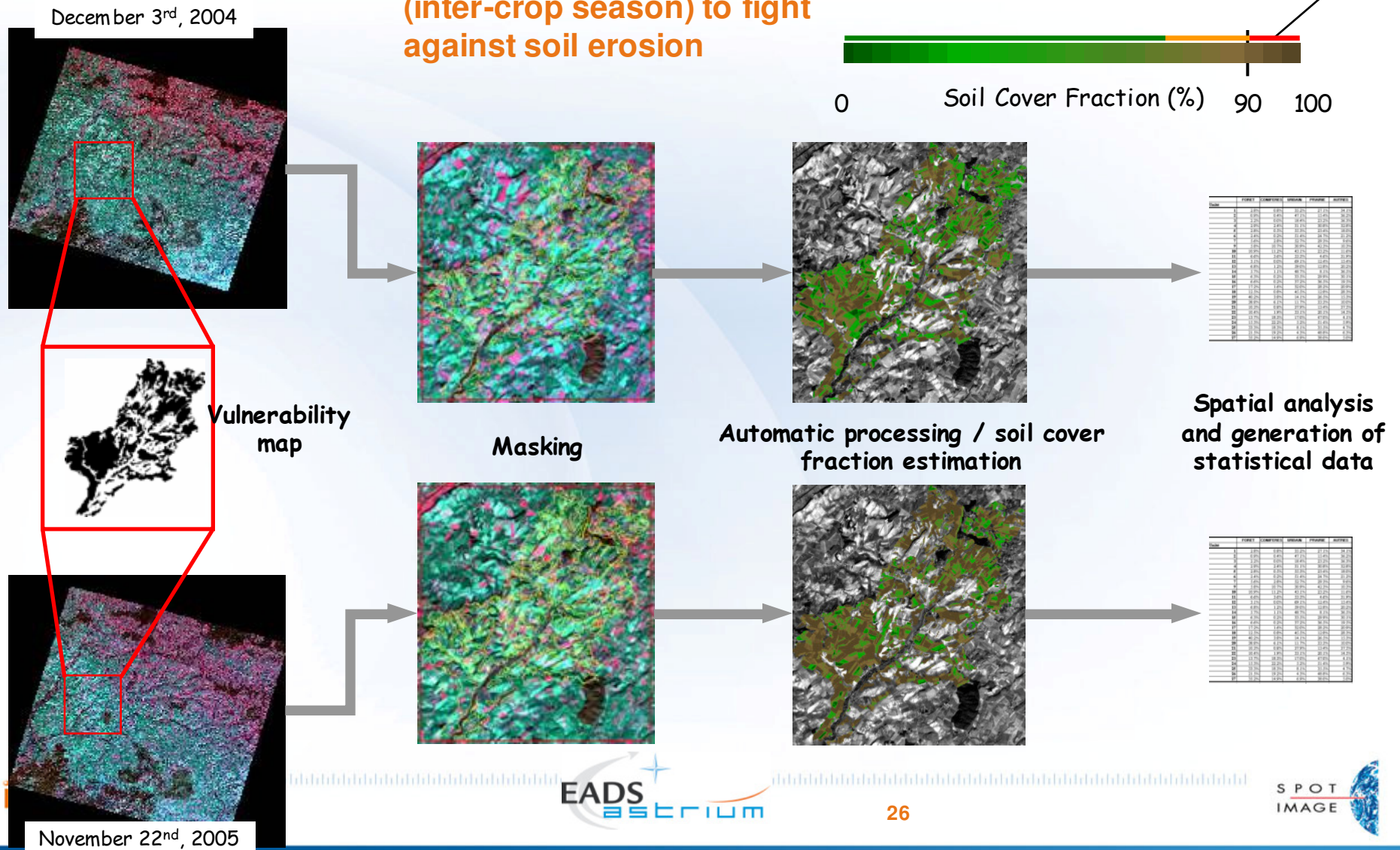
➤ Sugar crop monitoring in Morocco, production ilots identification with 2m resolution imagery (Formosat 2)



Ex : Monitoring of sensitive area (soil erosion)

Minimum vegetation cover (inter-crop season) to fight against soil erosion

Risk level = bare soil with less than 10 % of vgt cover



Cost Model: Elements

- Service cost differ according to the package proposed to the growers / distributors (i.e. number of acquisition period, added value of the geo-information products, etc.)
- Initial investment to set-up operational services often are partially funded by the government as far as :
 - Services fit with agricultural policies related to development of this sector
 - Economical model be analysed during the pre-operational phase (2/3 years) to ensure service cost is justified by ROI and therefore affordable for growers
- Priorities to be discussed with Min Agriculture and with industries, in particular about crops to focus on (cotton, cereals, horticulture, etc.)

2. Agricultural Statistics

➤ Benefits (*focus on cereals*)

- **Agricultural statistics** enable to reduce from 20% to less than 10% the uncertainties about production estimates

■ Simulation

- ➔ 4Mtons of wheat to export $\pm 10\%$ (with Ag. Stats) to $\pm 20\%$ (without Ag. Stats)
- ➔ Speculative positioning on future markets (with a standard volatility of 20%)
 - ➔ Risk is to sale more than what domestic production is able to supply & then to offset loss of production in buying grain on the export market at a higher price than selling price
- According to the scenario (date)
Agricultural Statistics allow to save 100 to 200MEuros (yearly)



■ What is it:

- Information products allowing to know
 - Crop distribution (and then relative acreages)
 - Productivity level of cropped areas
- The continuous monitoring of the crop development to estimate final production

■ Usefulness:

- Knowledge about cropped areas to
 - Cropland evolution analysis (inter-annual)
 - Fragile areas identification (e.g. loss of fertility), ag. policies follow-up
 - Productivity estimate for each crop industry
- Input information to estimate
 - Production level
 - Water consumption for irrigated crops
- Crop development monitoring to:
 - Anticipate production levels and then import/expert strategy
 - Early warning system about potential threats (drought)

3. Land Sustainability : context & issues

Fragile environment, agriculture threatened by water scarcity, soil erosion and loss of fertility

- **Severe climatic conditions**

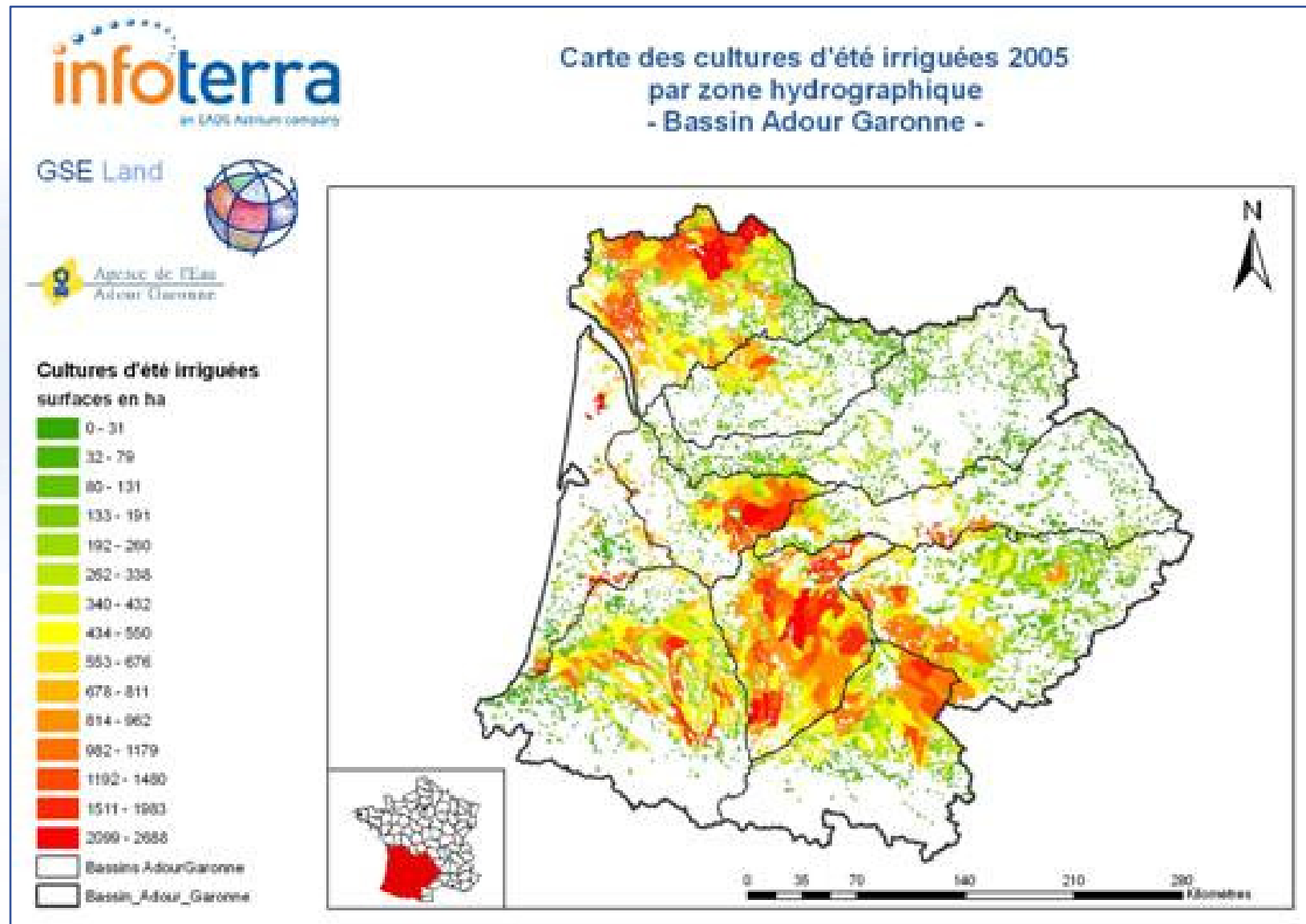
- Continental & fairly dry climate
- Climate change to worsen situation

- **Crop management being adapted to reduce pressure of agriculture on the environment**

- Irrigation (water scarcity), pesticides & fertilizers (diffuse pollution)
- Overgrazing (desertification)



Piloter et optimiser l'usage de la ressource en eau



Gestion de la ressource en eau : Périmètres irrigués



Calcul des volumes d'irrigation

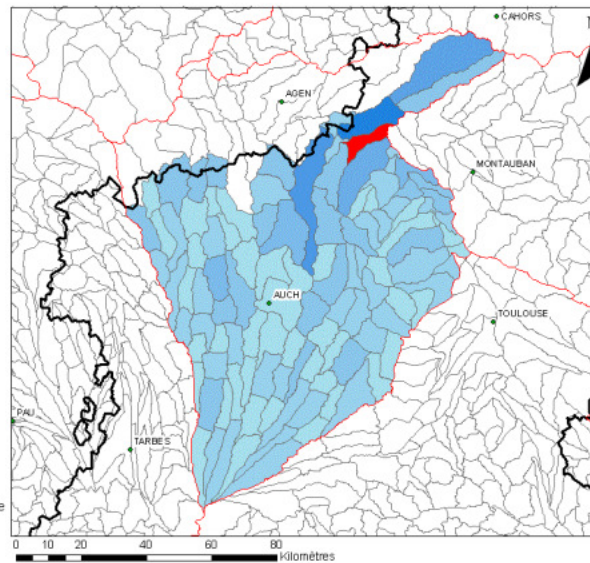
Cartes de distribution de cultures + modèle d'irrigation
= cartes des volumes utilisés pour l'irrigation

infoterra
an EADS Astrium company

Agence de l'Eau Adour Garonne



Carte des volumes d'eau utilisés pour l'irrigation en Midi-Pyrénées. Bassin Garonne gasconne



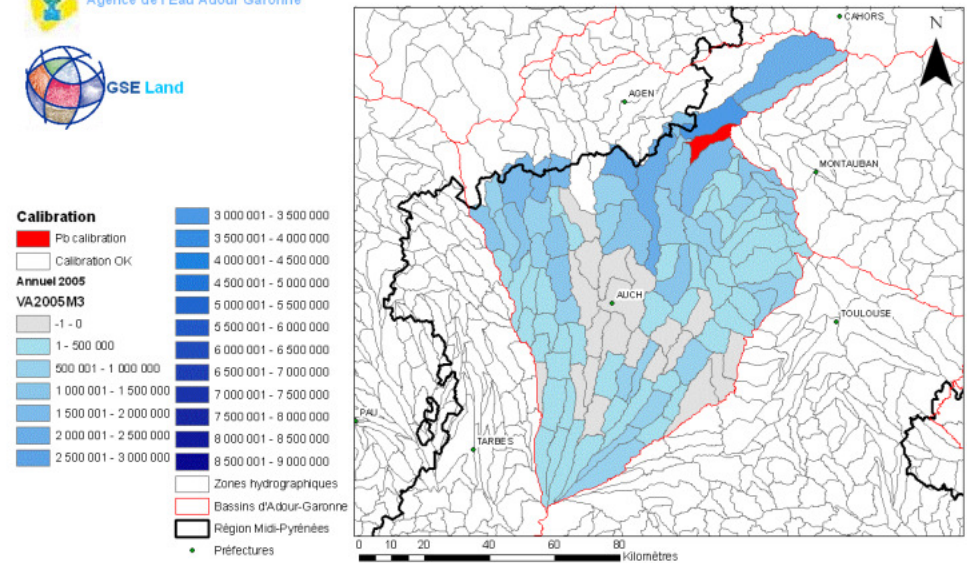
Volumes d'eau 2004
Total: 85,39 Mm³
Moyenne hauteur: 107 mm

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an EADS Astrium company

Agence de l'Eau Adour Garonne



Carte des volumes d'eau utilisés pour l'irrigation en Midi-Pyrénées. Bassin Garonne gasconne



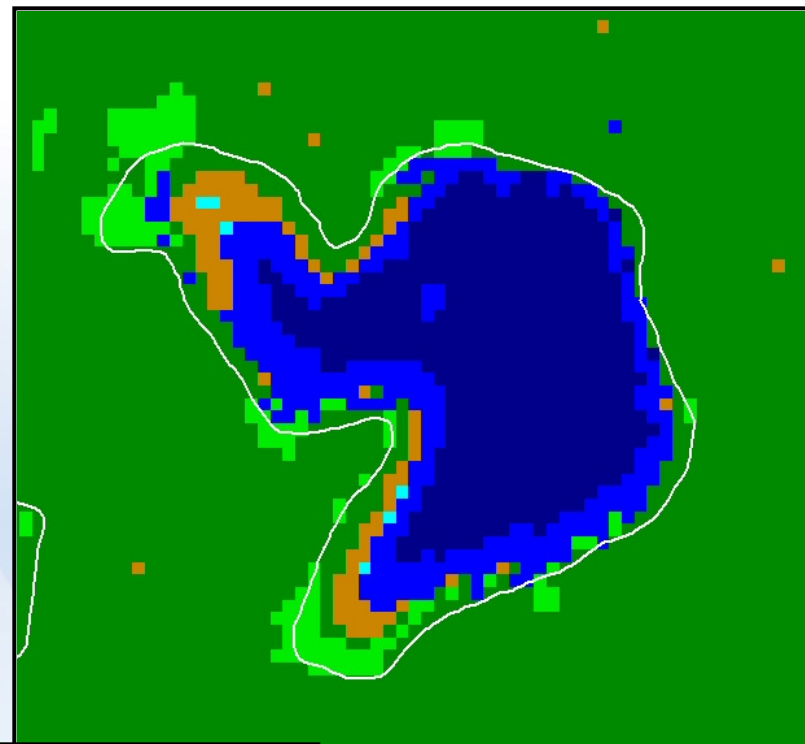
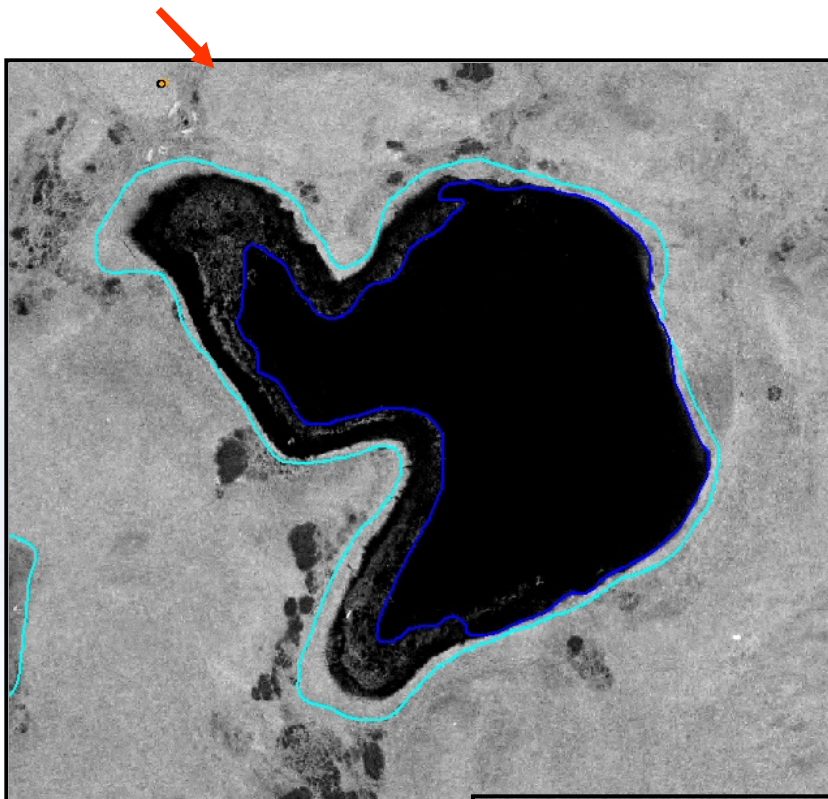
Volumes d'eau 2005
Total: 56,68 Mm³
Moyenne hauteur: 77 mm

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EADS
ASTRIUM



Gestion de la ressource en eau : Cartographie de zone humide



1:40k, Interprétation Zone humide

Surface : 11 hectares
Orthophoto : Mai 2003
Photo: Avril 2004

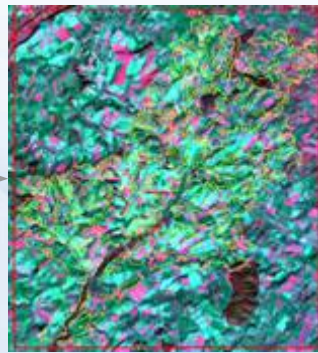
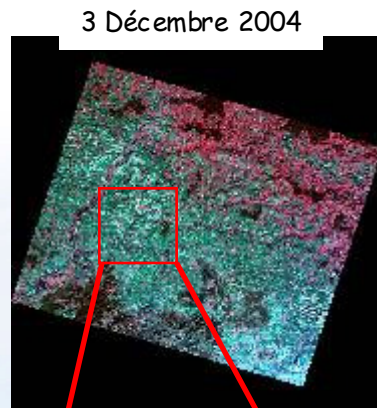


Végétation spécifique
de zone humide

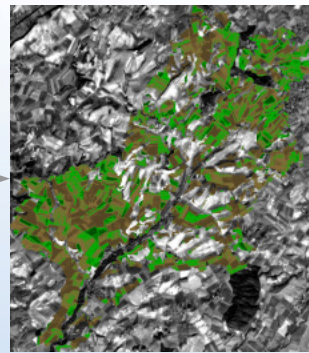
- Scirpe aigue
(*Scirpus acutus*)
- Carex épi-de-blé
(*Carex atherodes*)

Surveiller les zones sensibles (érosion)

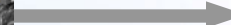
■ **Seuil minimum de couverture en végétation pour limiter les risques d'érosion = 10%**



Filtrage / masque

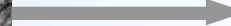
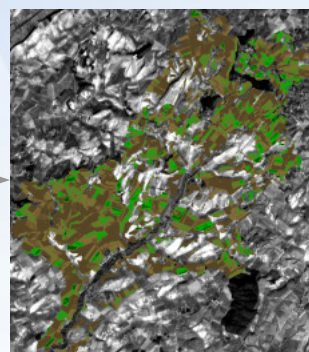
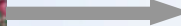
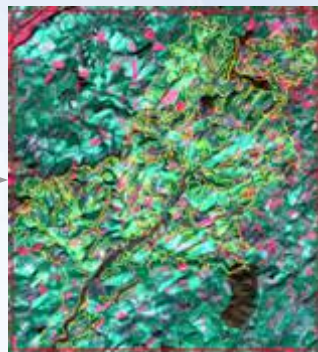
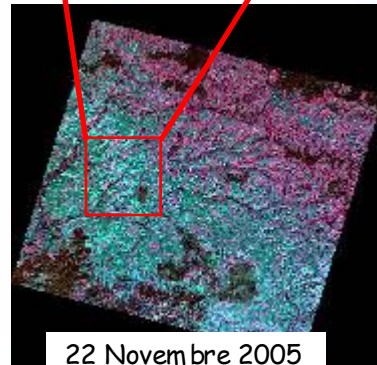


Traitement automatisé:
Détection de la fraction de sol couvert



Parcelle	TYPE	COUVERTURE	SEUIL	PROBLEME	DATE
1	1	100	10		2004
2	1	100	10		2004
3	1	100	10		2004
4	1	100	10		2004
5	1	100	10		2004
6	1	100	10		2004
7	1	100	10		2004
8	1	100	10		2004
9	1	100	10		2004
10	1	100	10		2004
11	1	100	10		2004
12	1	100	10		2004
13	1	100	10		2004
14	1	100	10		2004
15	1	100	10		2004
16	1	100	10		2004
17	1	100	10		2004
18	1	100	10		2004
19	1	100	10		2004
20	1	100	10		2004
21	1	100	10		2004
22	1	100	10		2004
23	1	100	10		2004
24	1	100	10		2004
25	1	100	10		2004
26	1	100	10		2004
27	1	100	10		2004
28	1	100	10		2004
29	1	100	10		2004
30	1	100	10		2004
31	1	100	10		2004
32	1	100	10		2004
33	1	100	10		2004
34	1	100	10		2004
35	1	100	10		2004
36	1	100	10		2004
37	1	100	10		2004
38	1	100	10		2004
39	1	100	10		2004
40	1	100	10		2004
41	1	100	10		2004
42	1	100	10		2004
43	1	100	10		2004
44	1	100	10		2004
45	1	100	10		2004
46	1	100	10		2004
47	1	100	10		2004
48	1	100	10		2004
49	1	100	10		2004
50	1	100	10		2004

Analyse spatiale,
Génération de
rapports
Statistiques...



Parcelle	TYPE	COUVERTURE	SEUIL	PROBLEME	DATE
1	1	100	10		2005
2	1	100	10		2005
3	1	100	10		2005
4	1	100	10		2005
5	1	100	10		2005
6	1	100	10		2005
7	1	100	10		2005
8	1	100	10		2005
9	1	100	10		2005
10	1	100	10		2005
11	1	100	10		2005
12	1	100	10		2005
13	1	100	10		2005
14	1	100	10		2005
15	1	100	10		2005
16	1	100	10		2005
17	1	100	10		2005
18	1	100	10		2005
19	1	100	10		2005
20	1	100	10		2005
21	1	100	10		2005
22	1	100	10		2005
23	1	100	10		2005
24	1	100	10		2005
25	1	100	10		2005
26	1	100	10		2005
27	1	100	10		2005
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29	1	100	10		2005
30	1	100	10		2005
31	1	100	10		2005
32	1	100	10		2005
33	1	100	10		2005
34	1	100	10		2005
35	1	100	10		2005
36	1	100	10		2005
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42	1	100	10		2005
43	1	100	10		2005
44	1	100	10		2005
45	1	100	10		2005
46	1	100	10		2005
47	1	100	10		2005
48	1	100	10		2005
49	1	100	10		2005
50	1	100	10		2005

Tools to Support Land Planning

■ Indicators and maps to measure and simulate

- Agriculture pressure on the environment
- Land suitability on a territorial approach
- Climate change impact

■ Benefits : to support ag. policies implementation & reinforcement in a sustainable development perspective

- Feasibility to set-up new productive systems on a given region
 - land reallocation, new industry development, new management strategies, e.g. irrigation
- Land use conflict (land and water) identification
- Agriculture pressure on the environment mitigation
- Policy making to anticipate climate change effects

■ Definition : a combination of maps & simulation tools

- Land use / land use change mapping (to be further turned into natural habitat and ecosystem maps)
- Land accounting system
- Simulation tools to address desertification, soil salinisation, etc.

Forestry and Climate Change: Co2 emissions

■ Climate change and the role which forests play require new tools in order to answer the high stakes of large scale monitoring

■ Deforestation contributes to 20% of CO2 emissions and requirements include:

- Mapping of natural zones
- Identification of evolution in terms of afforestation, reforestation, deforestation

■ Forest monitoring included in the **REDD « Climate Package »** which follows the Kyoto Protocol (Reduced Emission due to Deforestation & Forest Degradation).

■ Forests are complex natural environments difficult to characterise

■ Satellite imagery is used for certain operations such as forest inventory, plantation follow-up and burn scar mapping

■ Satellite imagery can be used to develop services in response to global needs:

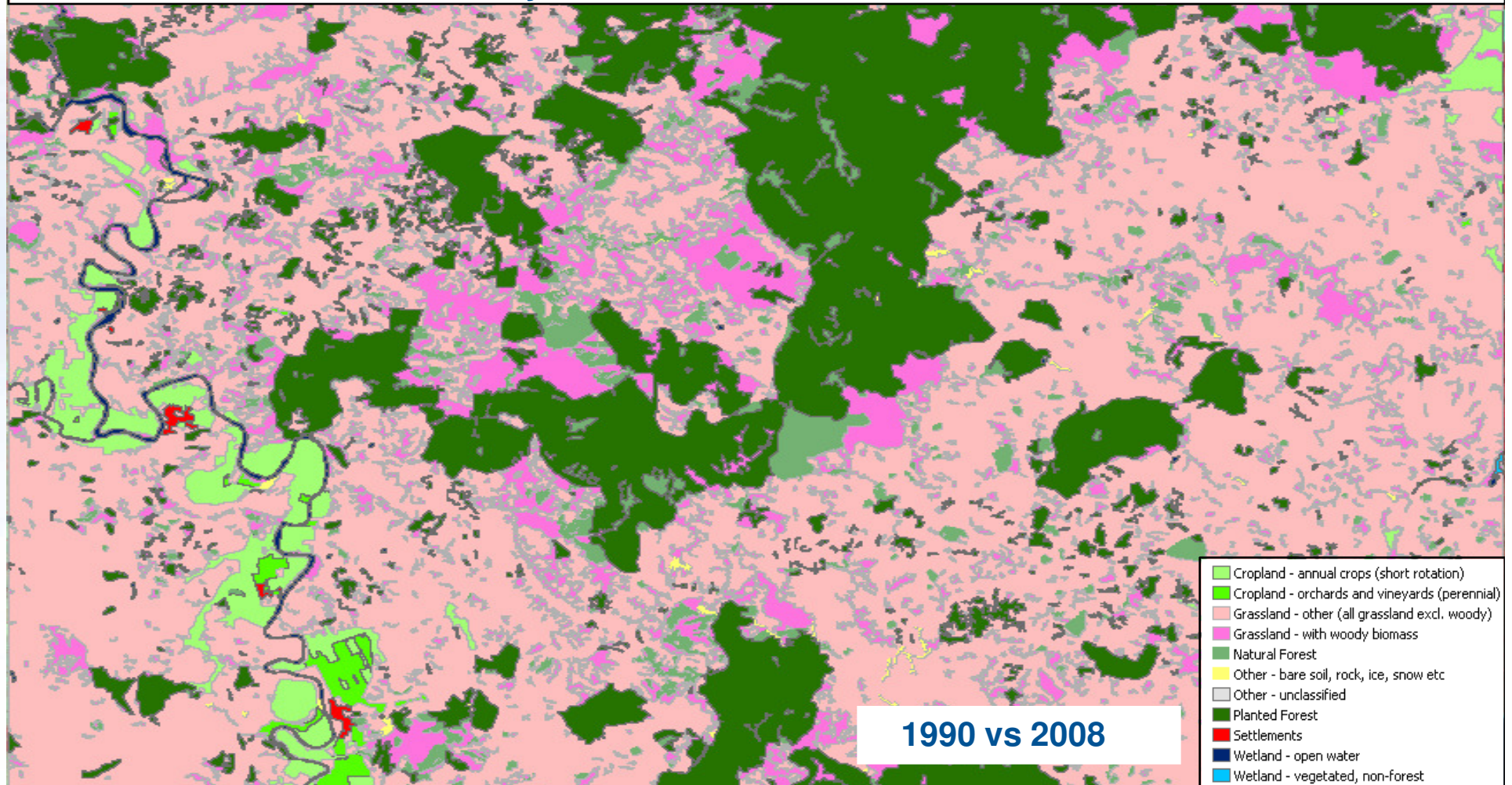
- Reference scenario (status at reference date), eligibility of forest areas (carbon credits)
- Stratification and optimization of operational areas (carbon stock estimation..)
- Follow-up on identified forest zones indication degradation or deforestation



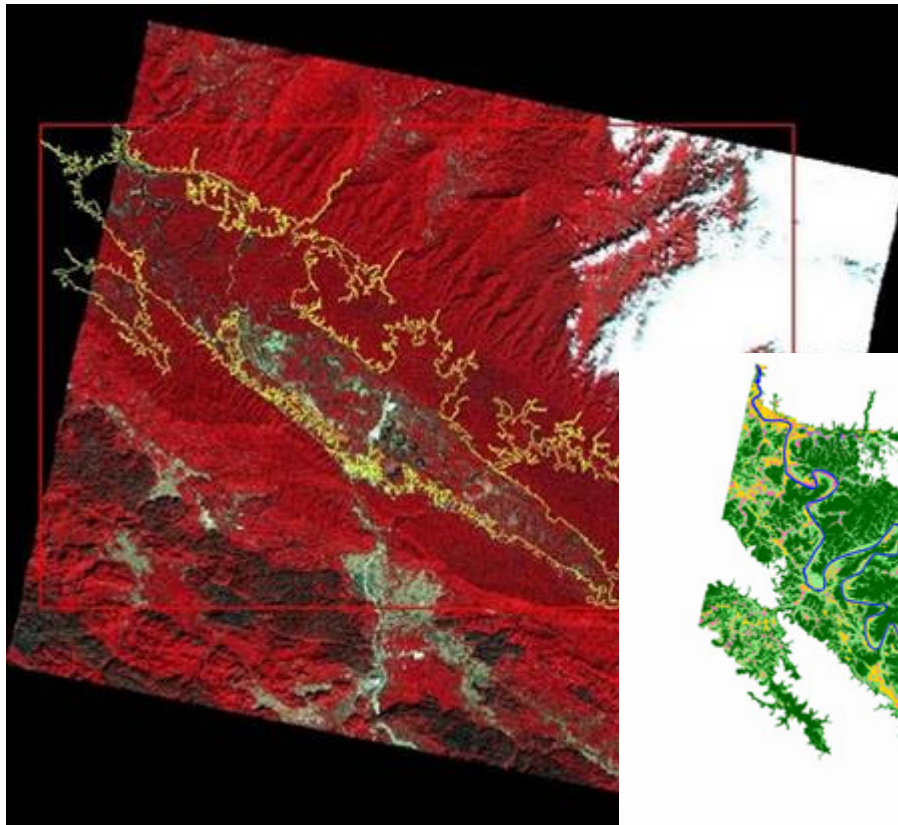
Example : Climate Change - Kyoto Protocol - LULUCF

LULUC (Land Use and Land Use Change) : Countries having ratified the Kyoto Protocol must report on Co2 emissions

→ What is the method used by France?



Example : Forest Mapping



Nam Theun river - Laos

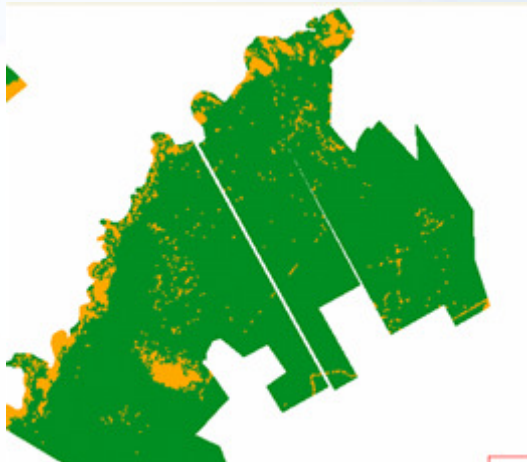
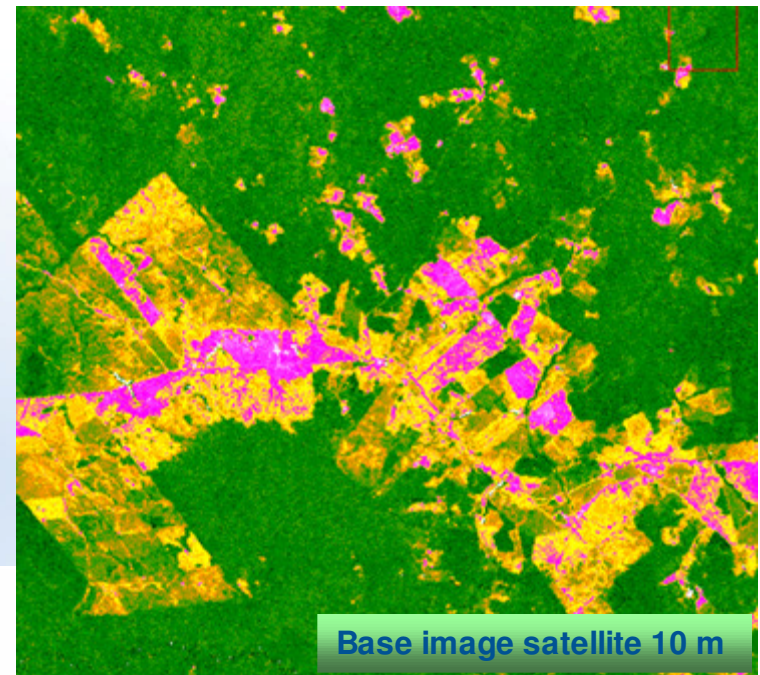
flooding of forest zones following the startup of a hydro-electric dam can lead to massive GES emissions and make the installation more polluting than a thermal factory. A study must be undertaken to limit/eliminate this risk. A forest map was done in order to optimize biomass estimation.



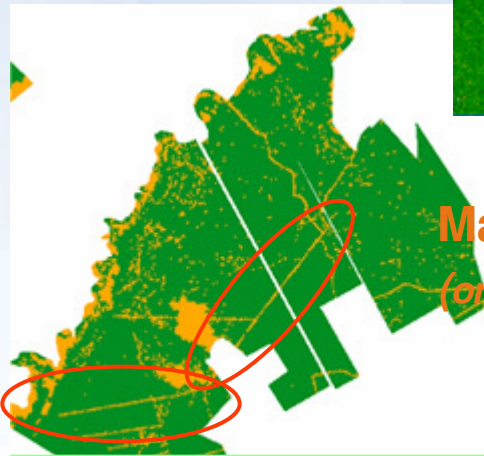
- Water
- Soil
- Swamp
- Agricultural soils
- Degraded Forest
- Primary Forest
- Light Forest
- Mixed Forest
- Ripisylve

Example : Forest Change Detection

Analyse damage to forest canopies caused by clear cutting or accidents, such as fires (pink to yellow indicates degree of degradation, green indicates preserved forest)



Base image satellite 10 m (2000)



Base image satellite 10 m - 2001

Mato Grosso : damage evolution
(orange indicates degree of degradation, green indicates preserved forest)

Oil Pollution Services

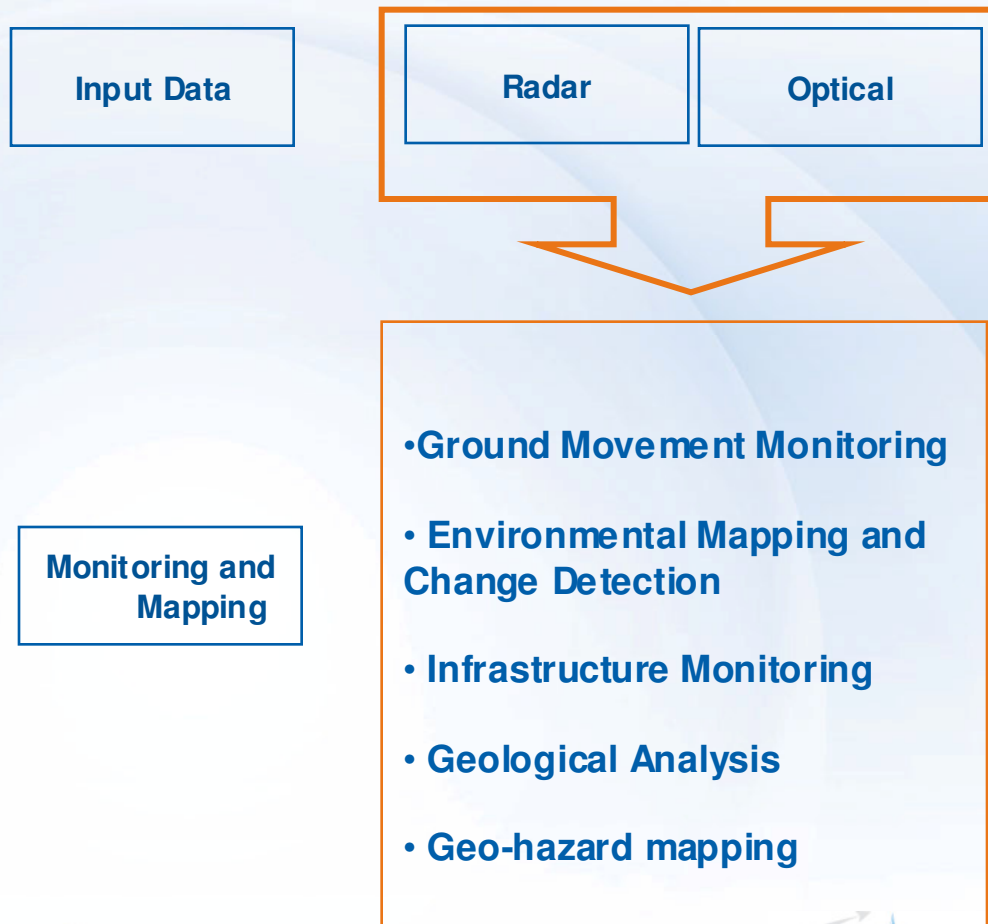
- combining optical, radar and hyperspectral data with DEM's for environmental monitoring :

1. On shore



2. Off shore

Satellite Imagery and Oil Spill Monitoring



Prevention:

- Risk Assessment
 - Geo-hazard Risk
 - Critical Infrastructure
 - Security

Control:

- Remediation Audit
- Audit of Legal Compliancy
- Penalization of Offending Companies

Surface Movement Mapping



- TerraSAR-X technology is able to measure the vertical movement of the ground with sub centimetre accuracy.
- These measurements can be repeated in 11 day intervals.
- The result is a monitoring of the subsidence or uplift movements of the ground over time.
- This delivers vital early warning tool

In Oil-/Gas field monitoring for example, surface movement mapping serves as:

- information for optimization
- early warning if critical infrastructure is threatened

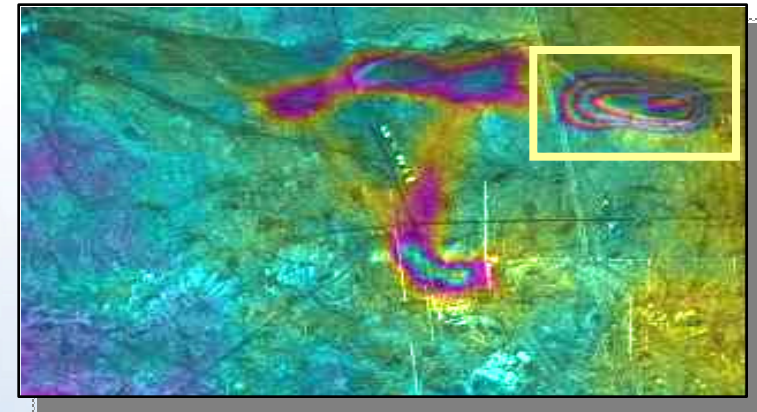
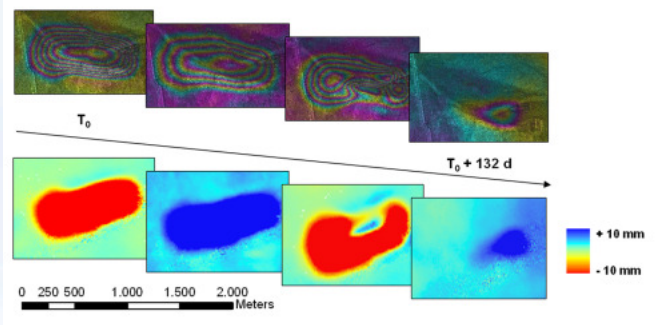
Profiting Sectors

- **Infrastructure Monitoring**
 - Hydroelectric Facilities
 - Embankment Dams
 - Railways
 - Pipelines
- **Oil- / Gas Field Monitoring**
 - Optimization of Exploitation
 - Hazard prevention
 - Reservoir Modelling
- **Subsurface Mining**
 - Hazard prevention
- **Crisis Analysis & Management**
 - Earthquakes
 - Landslides

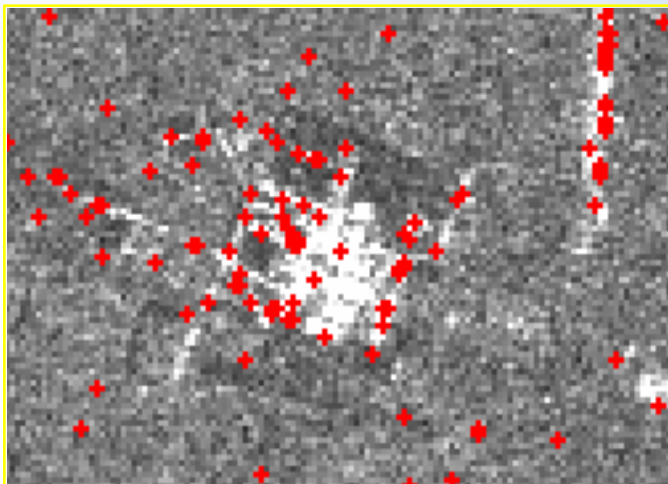
TerraSAR-X for Subsidence monitoring

Monitoring of Surface Movement

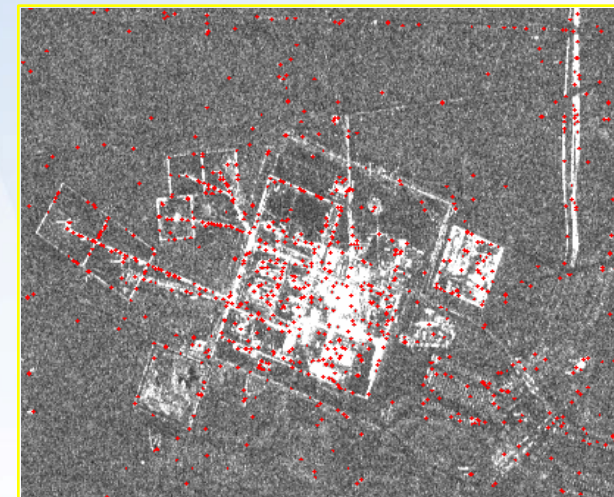
- High-resolution TerraSAR-X identifies substantially more persistent scatterers than other SAR sensors



TerraSAR-X flattened interferogram



Oil field infrastructure

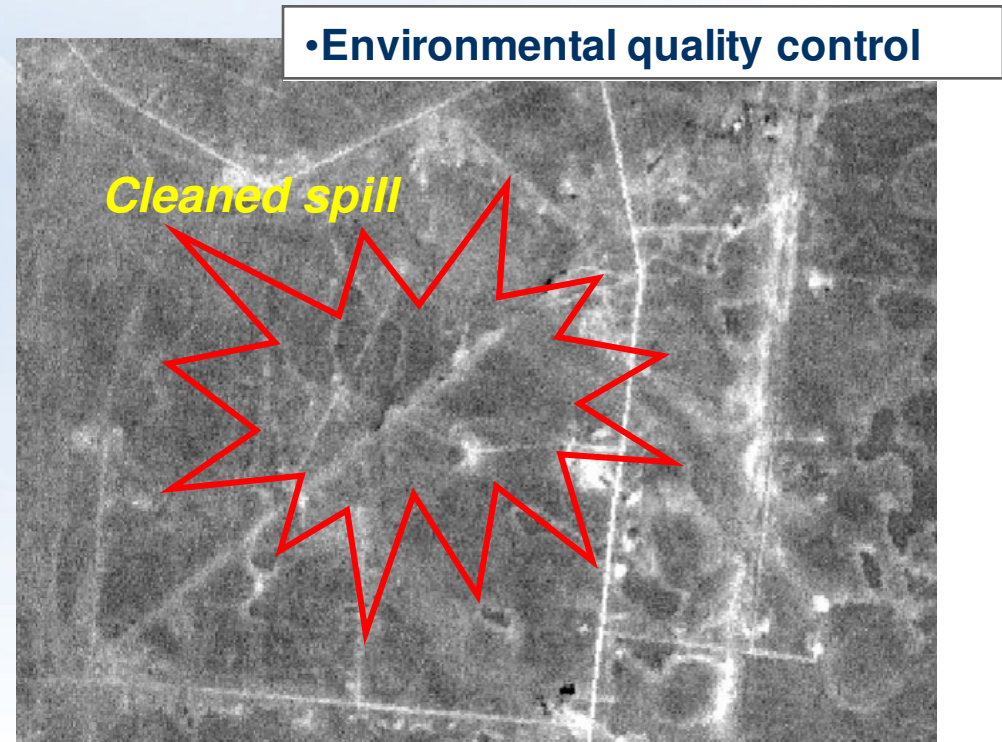
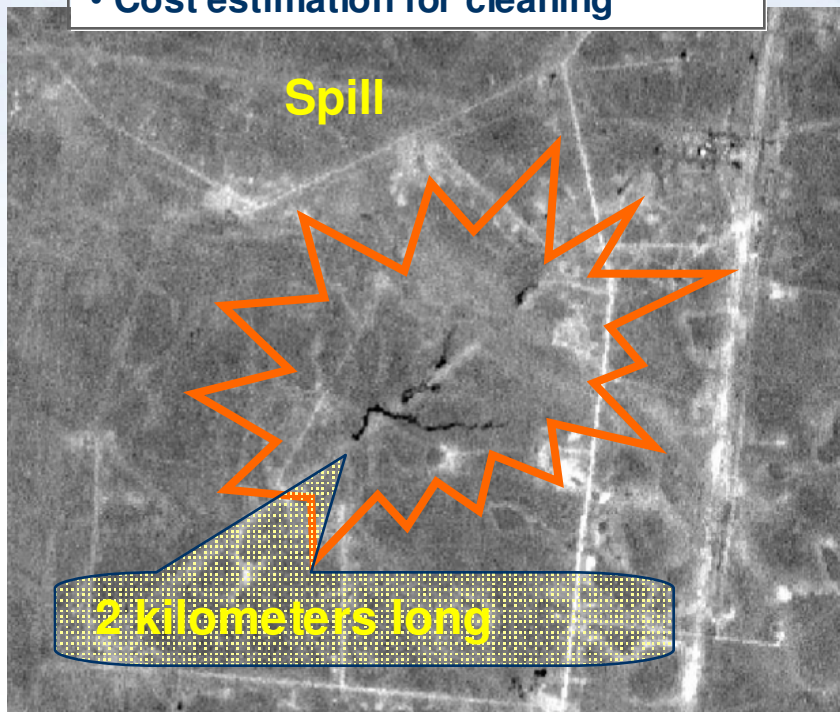


TerraSAR-X (resolution 3 m)

Environmental Monitoring

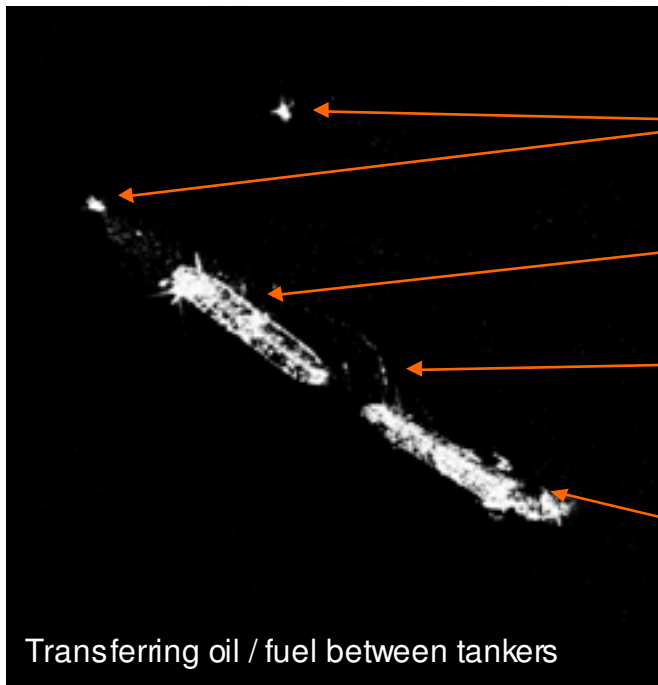
Pipeline monitoring

- Environmental Impact
- Spill extension
- Contaminated areas
- Cost estimation for cleaning



Assessing Off-shore and Coastal Activities

Shipping activities, oil production platforms, pollution mapping



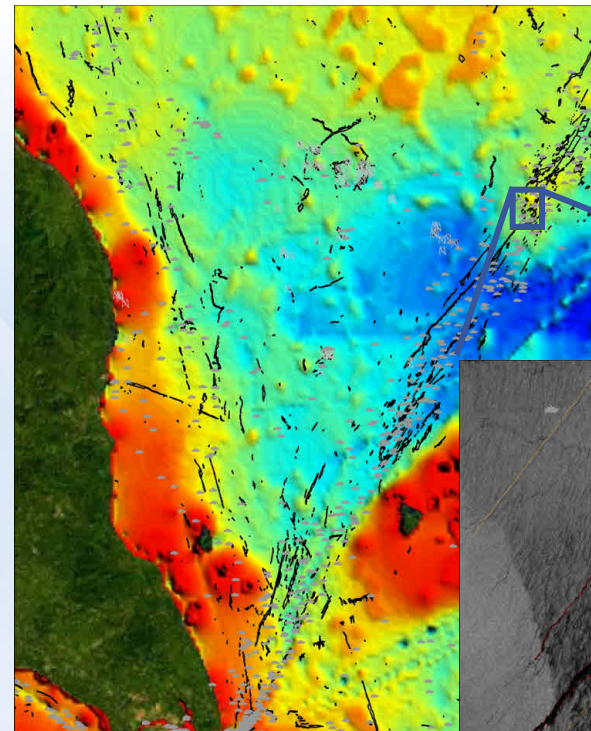
Small support vessels

Tanker

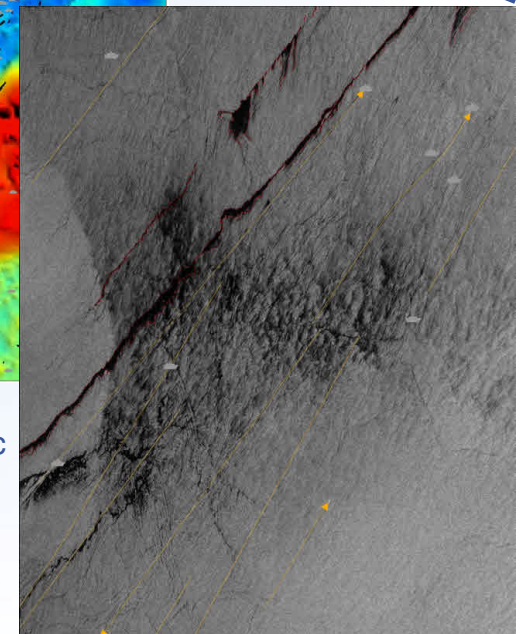
Fuel hose

Tanker

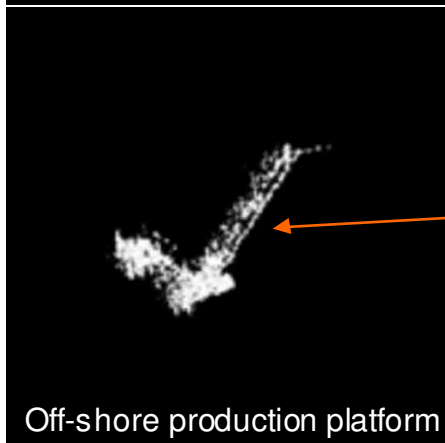
Transferring oil / fuel between tankers



Ships, rigs and pollution slicks detected on SAR data mapped against bathymetry



Regional view of ship traffic and movement, offshore platforms, and pollution slicks, as detected on SAR data.



TerraSAR-X Imagery (3m)

Derrick

Off-shore production platform



- **Man-made oil slicks are mapped within the Global Seeps database**
 - **But clearly discriminated from natural oil**
- **Often individual ships or rigs can be associated with a particular slick**
 - **Especially if current and wind information is included**
- **Global Seeps database provides a unique historical baseline of “background” pollution in most coastal areas across the globe**
 - **Used as a key baseline reference whenever new spills are reported**
 - **Provides input to Infoterra’s rapid response services**

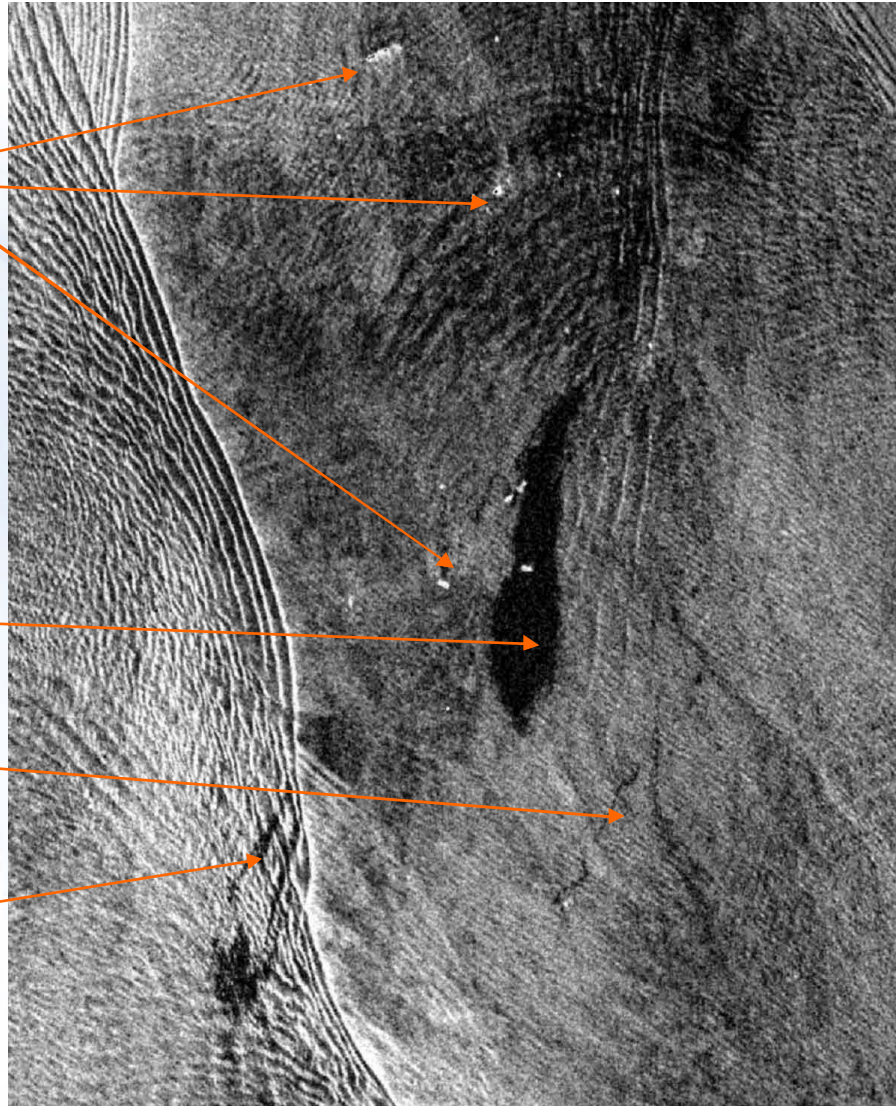
Example : Oil Spill event

Production
platforms

Oil slick caused
by discharge
from rigs

Probable slick

Spill, being
dispersed by
ocean waves



Off-shore Angola spill event
Radarsat example (25m
resolution)

- Oil spills detectable as dark areas on imagery.
- Production platforms and vessels appear as bright targets

Example : Post Tanker Accident

Eastern Crimea (Ukraine) - Post-Tanker Accident Situation 2007-11-30

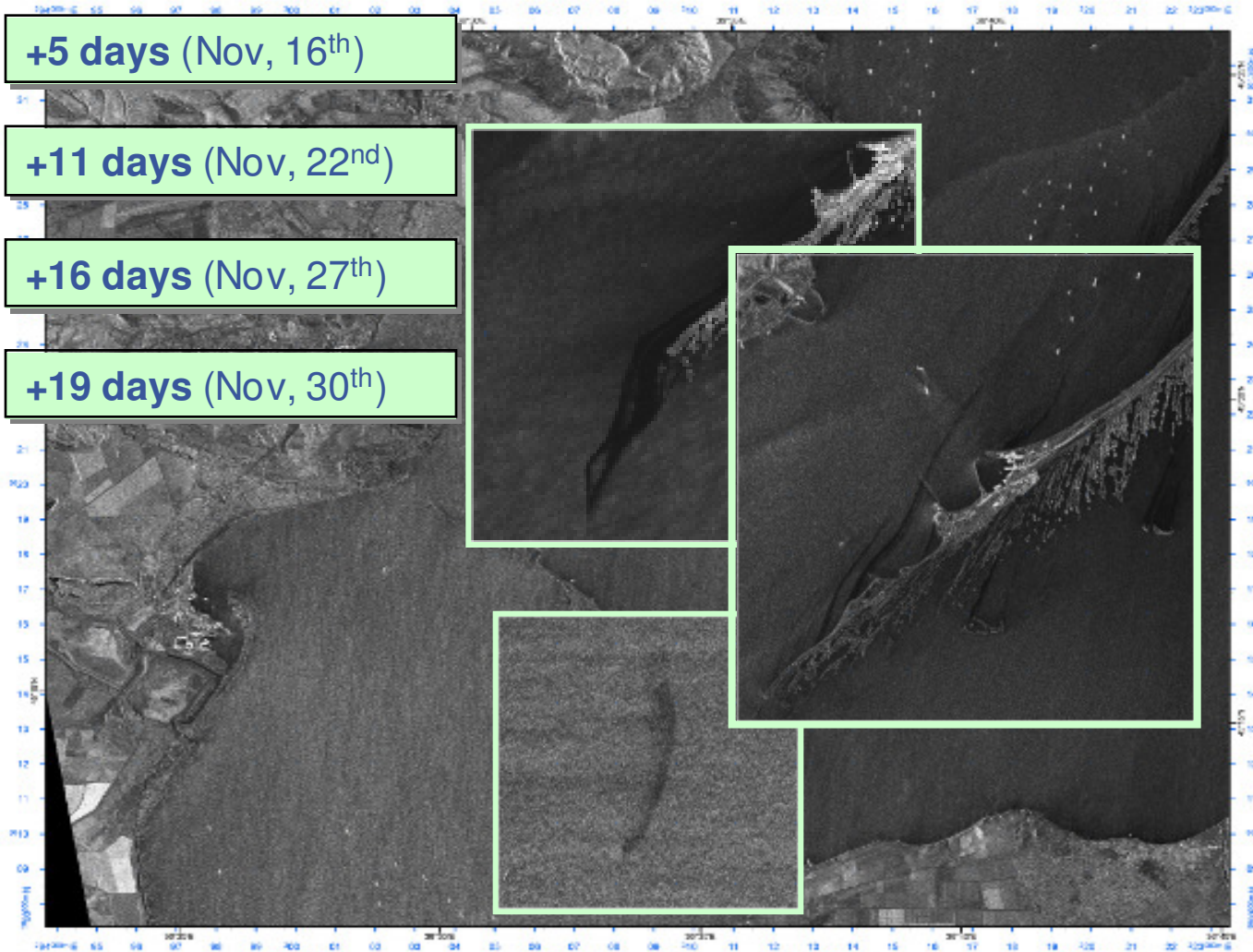


+5 days (Nov, 16th)

+11 days (Nov, 22nd)

+16 days (Nov, 27th)

+19 days (Nov, 30th)



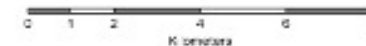
TerraSAR-X StripMap Acquisition

Location of Crimea:



Satellite Information

Satellite:	TerraSAR-X
Imaging Mode:	StripMap
Ground Range Resolution:	3m
Polarisation:	VV
Pass Direction:	Ascending
Acquisition Date:	2007-11-30
Acquisition Time:	15:15:36 to 15:16:46 UTC
Product Type:	Geocoded Ellipsoid Corrected
Resolution Mode:	Spatially Enhanced



Map Projection	
Geographic	Universal Transverse Mercator
Ellipsoid: WGS 84	Ellipsoid: WGS 84
Datum: WGS 84	Datum: WGS 84
	Zone: 37N



Proposed Disaster Management Services

- to provide civil protection forces & the humanitarian relief community with:
 - emergency responses solutions
 - reference mapping data, specialise
 - delivery of crisis management centres

1. Prevention

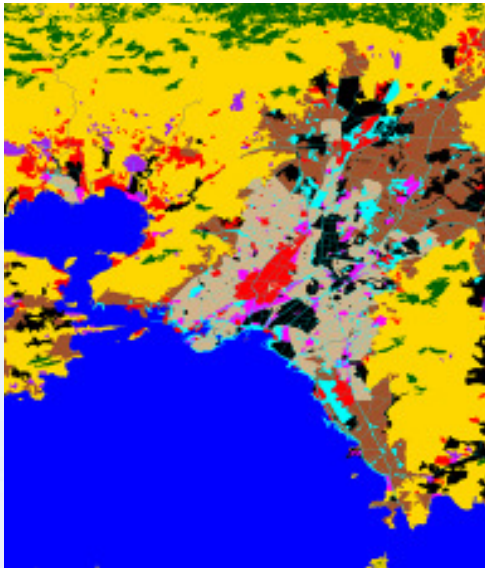


4. Post-Response

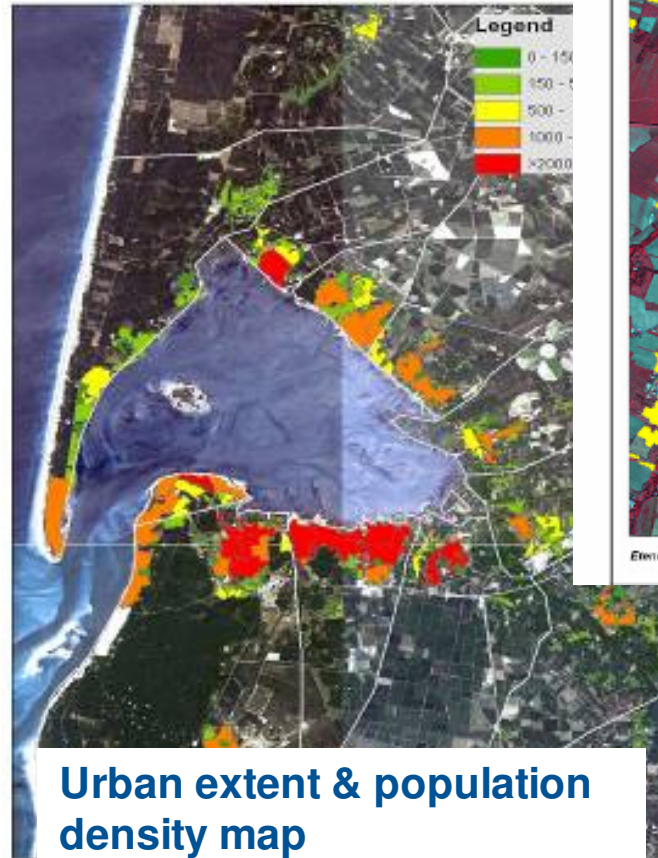
2. Anticipation

3. Response

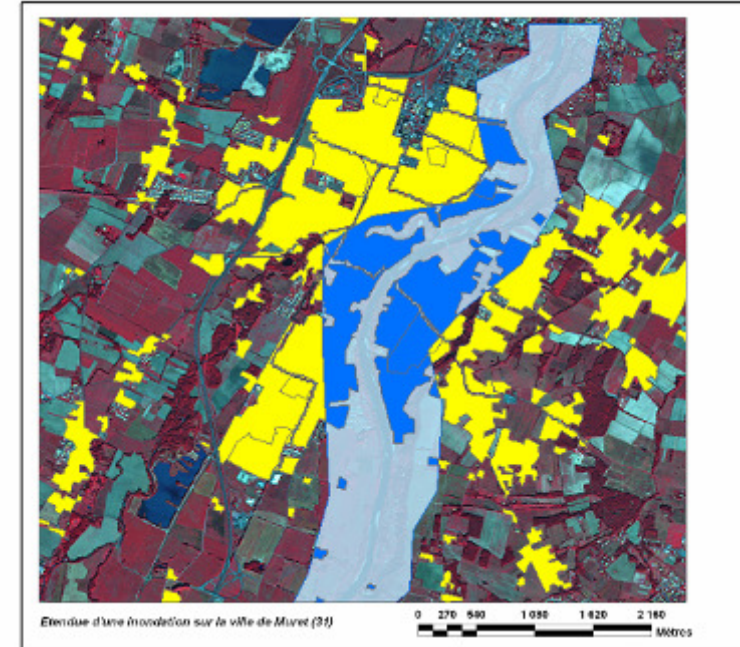
1. Prevention - Assets and Vulnerability Mapping



Land cover map



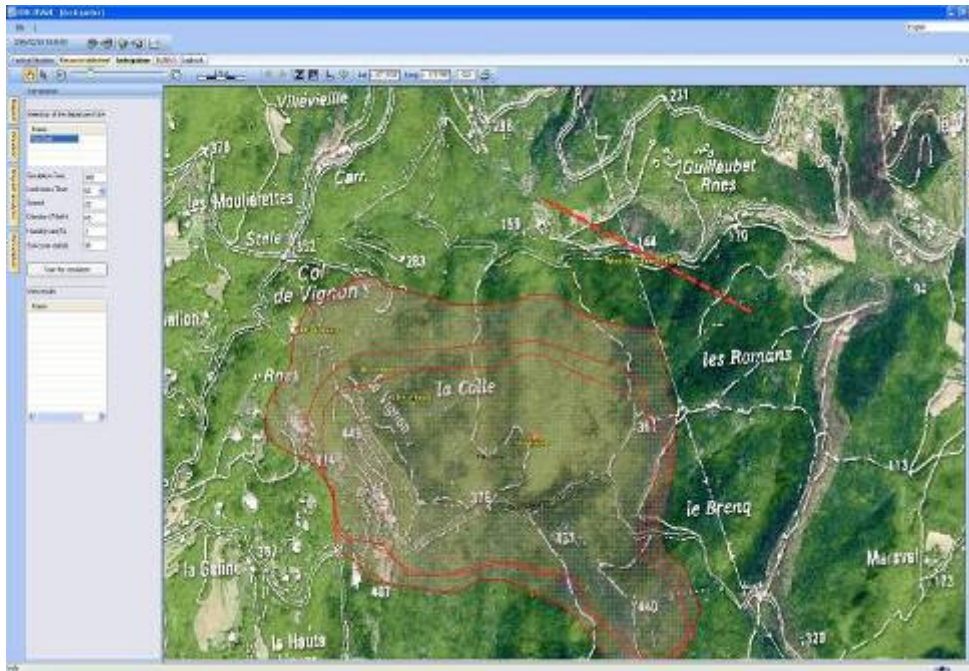
Urban extent & population density map



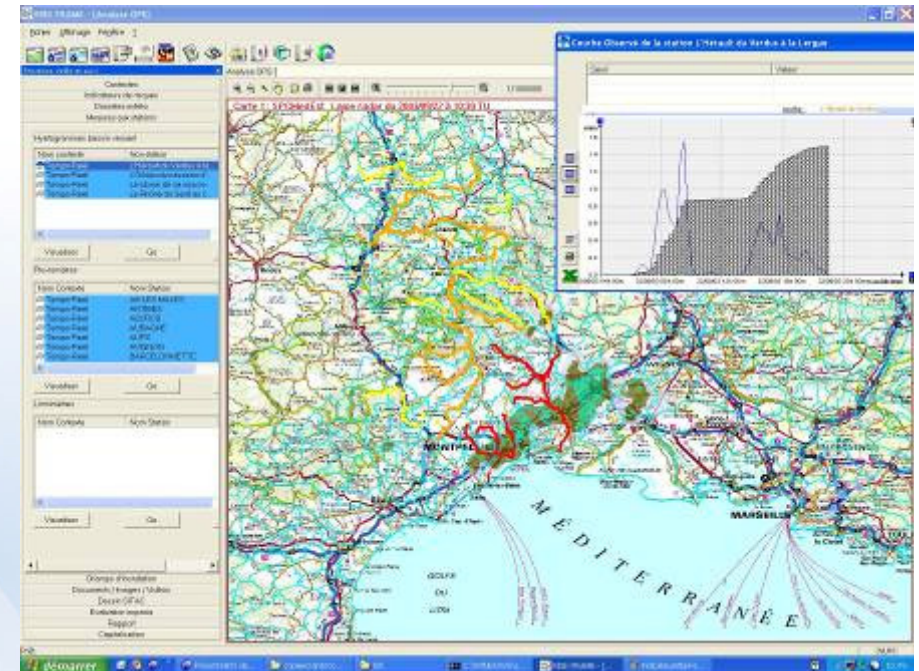
Analysis of flood impact

- LC analysis based on biophysical parameters (OVERLAND)
- Combination of EO data and socio-economic data
- Spatial analyses (GIS)

2. Anticipation - Early Warning



Forest fire propagation simulator



Flood Monitoring and anticipation

- Satellite data : DTM, land cover, vegetation cover
- Simulation models
 - Fire
 - Flood (with Meteo France International)
 - Other

3. Response - Rapid Mapping

Example 1: flood mapping

- using radar imagery



Example 2: Flood Modelling & Rapid Response

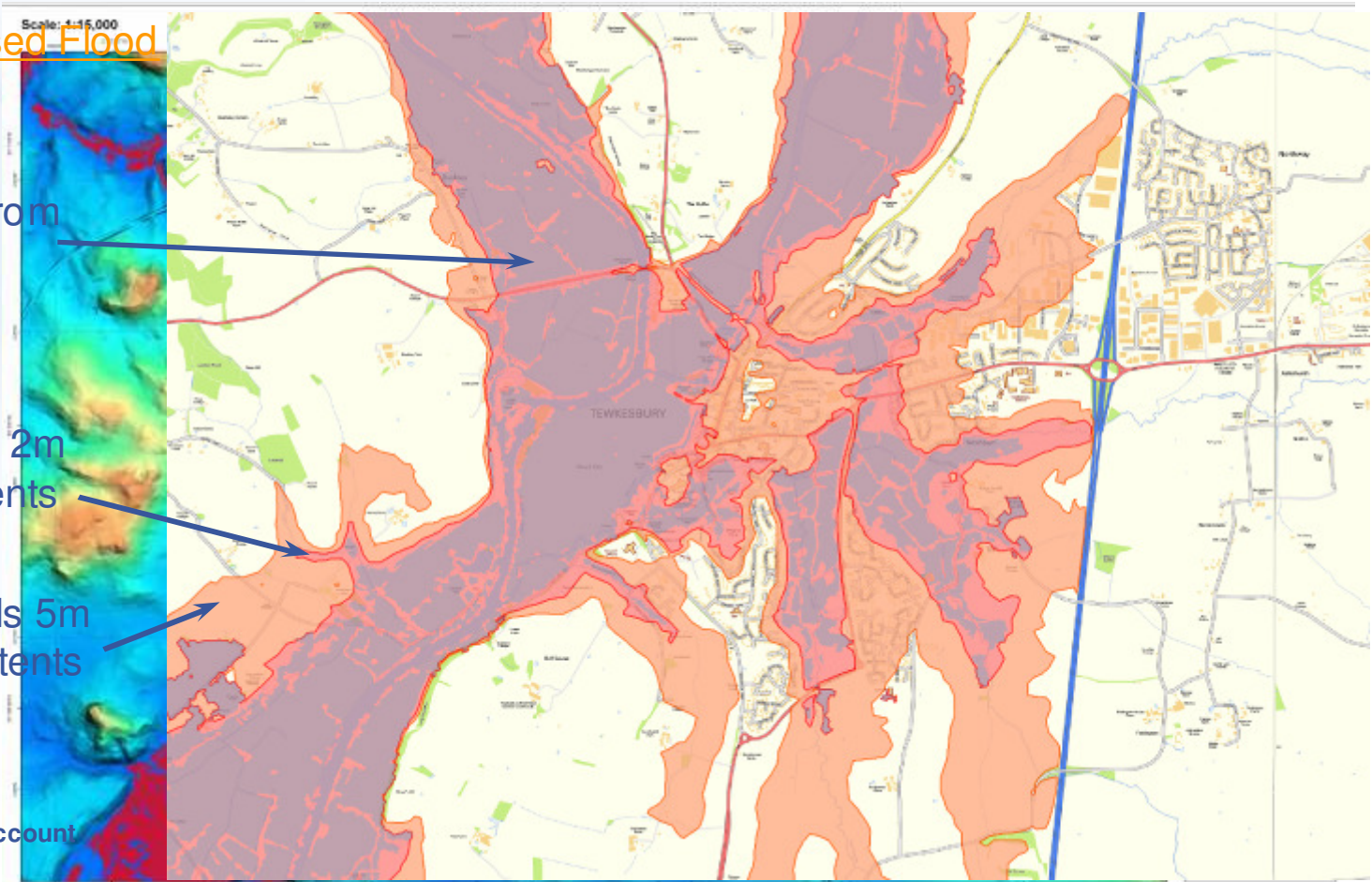
➤ Extent of flooding over Tewkesbury, derived from a TerraSAR X image

Simulations – Increased Flood Depth Extents

Flood extents from TerraSAR-X

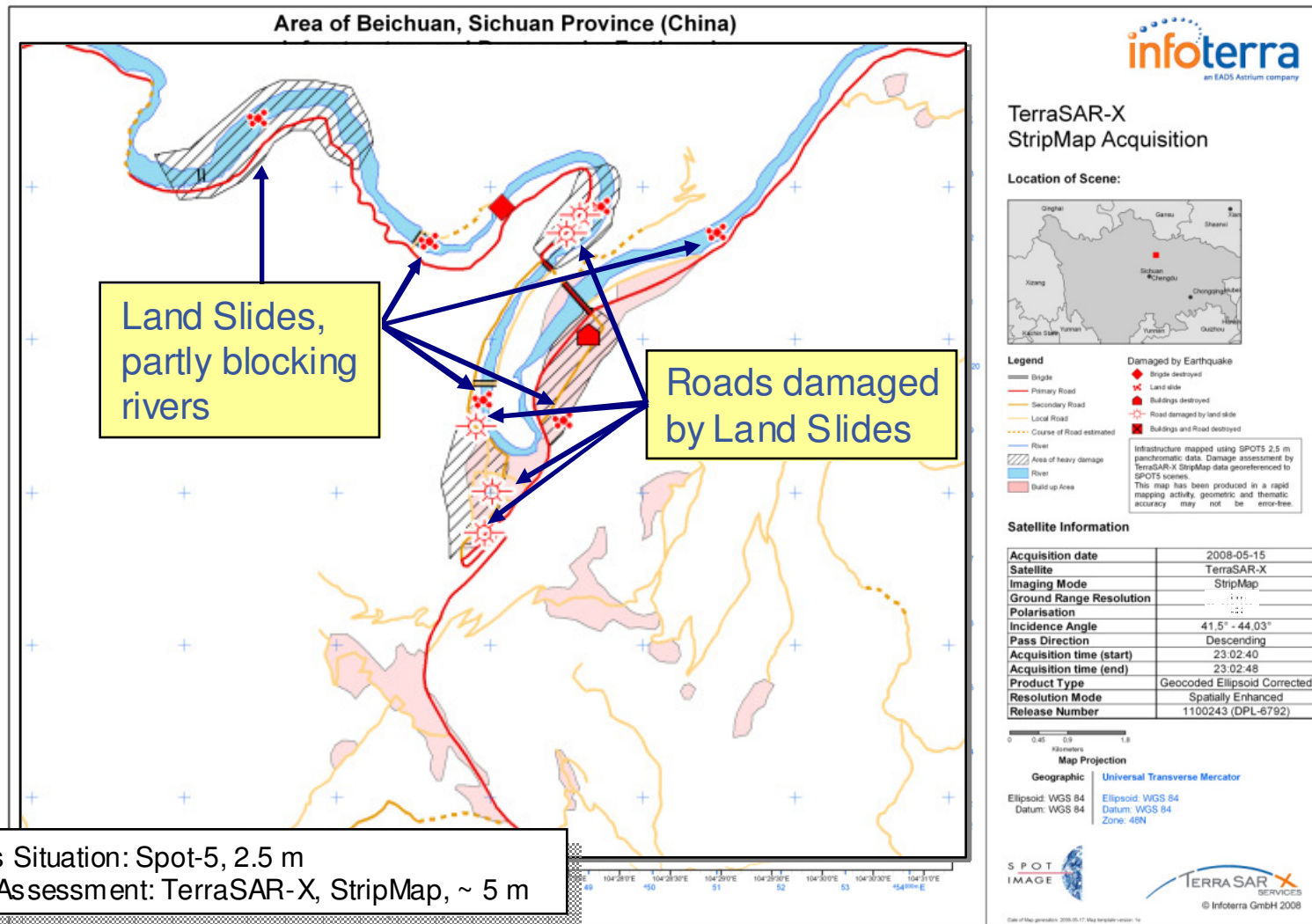
Simulated flood levels 2m over TerraSAR-X extents

Simulated flood levels 5m over TerraSAR-X extents



These extents do not take into account flow modelling
OS Licence No: 200016034

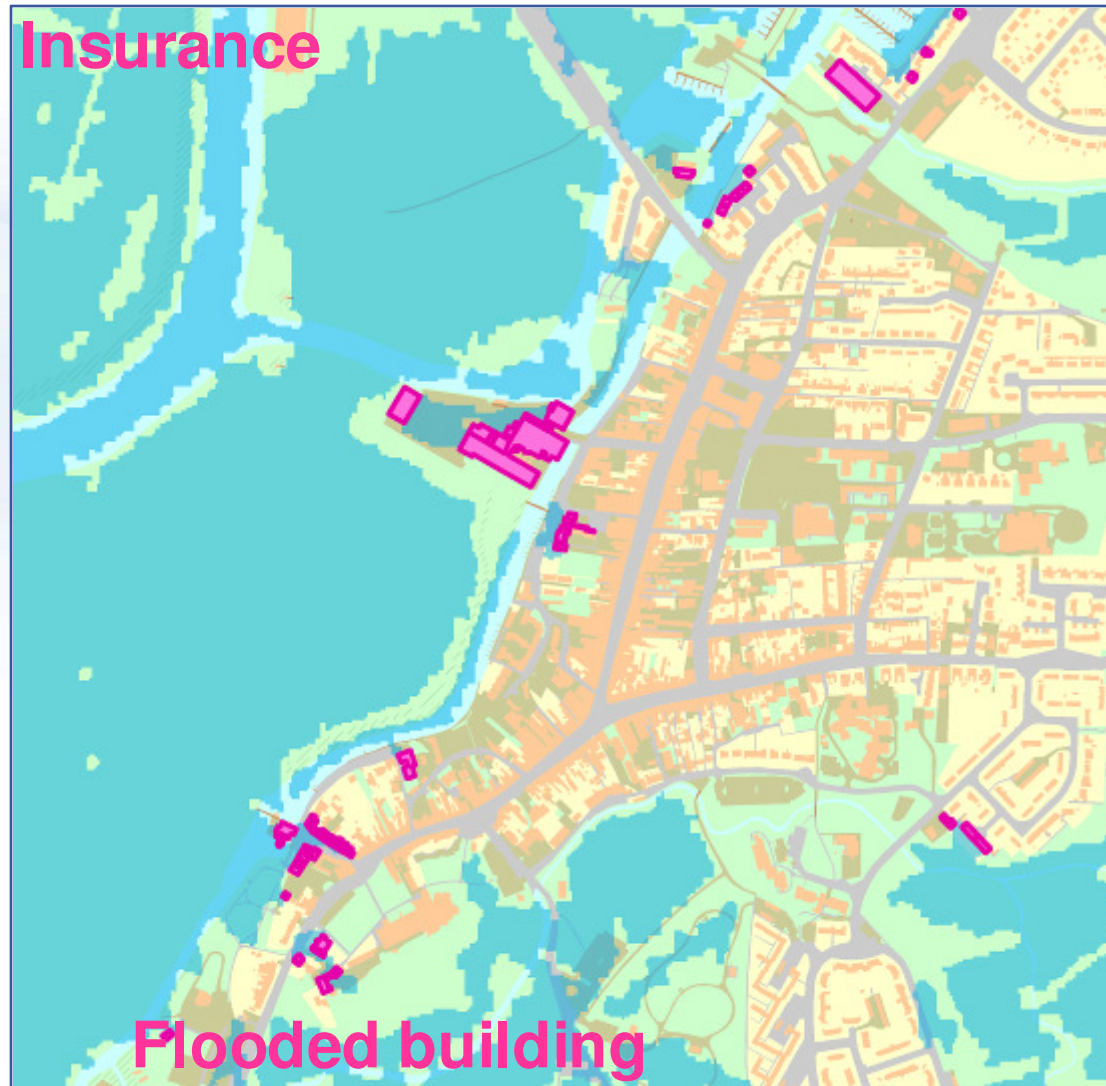
Example 3: Earthquake Damage Assessment



4. Post Response - Damage Assessment

Example 1: flood mapping

- using radar imagery



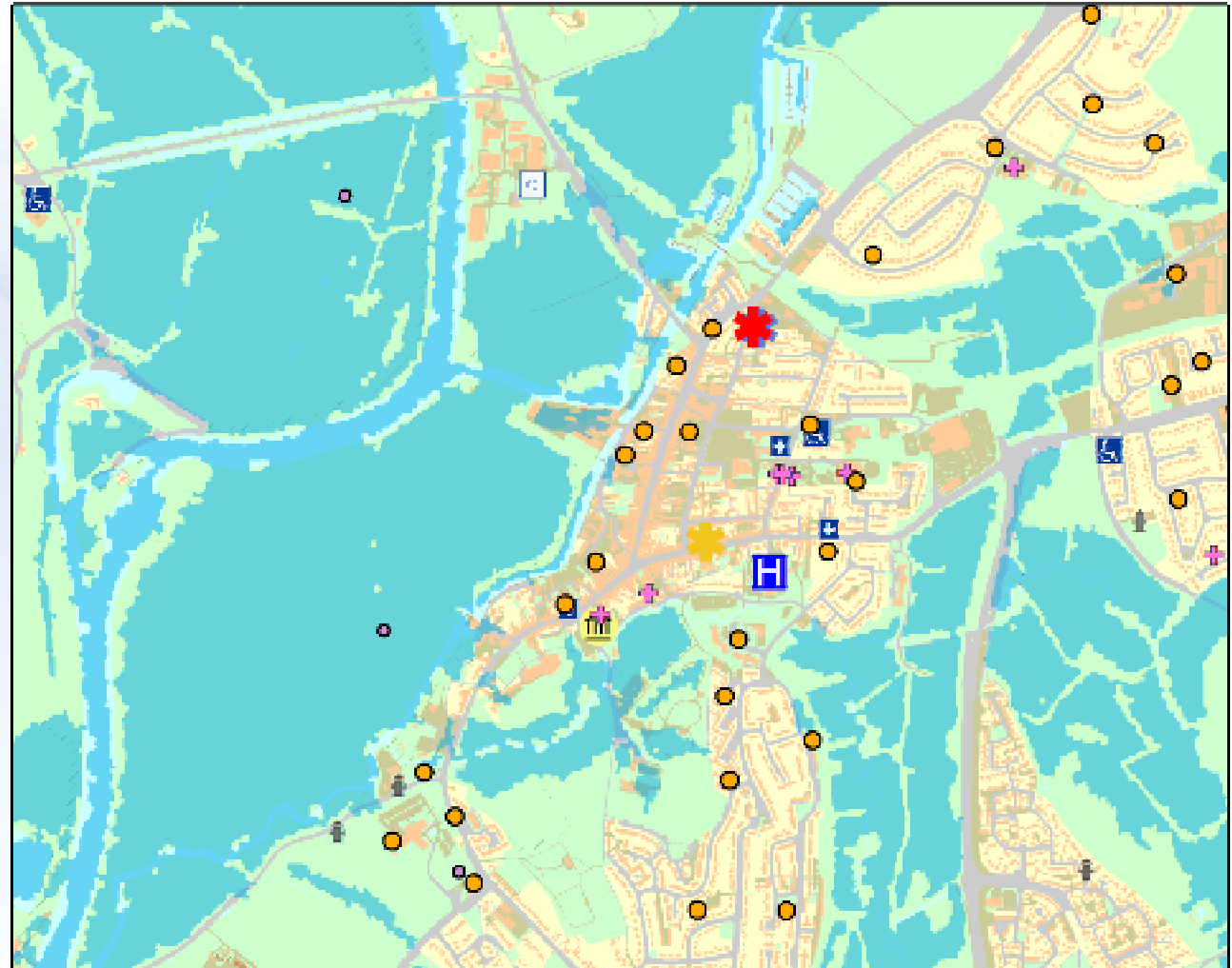
Example 2: Critical Infrastructure Analysis

➤ flood mapping using radar imagery

Example highlighting buildings impacted by flood waters

Flood extents mapped on 25th July, from TerraSAR X, superimposed on GeoPerspectives photography

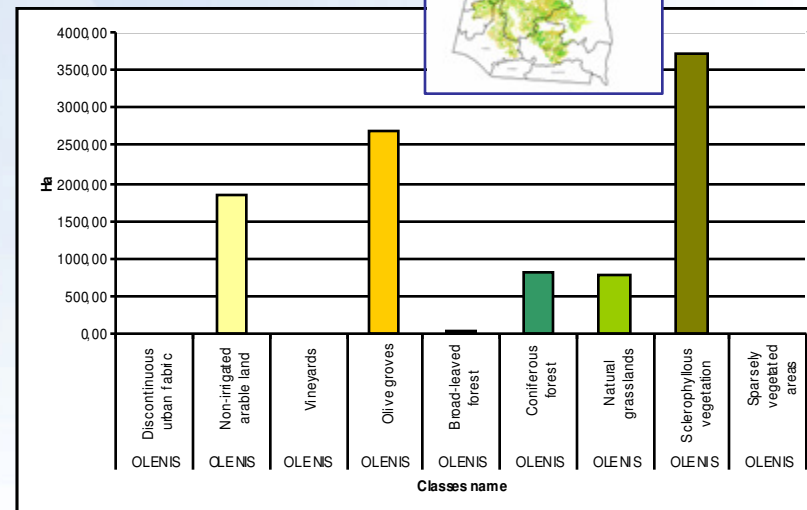
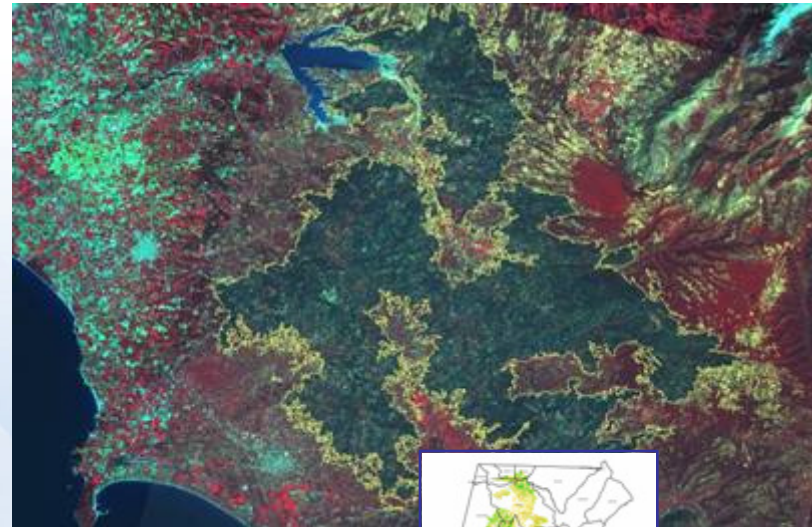
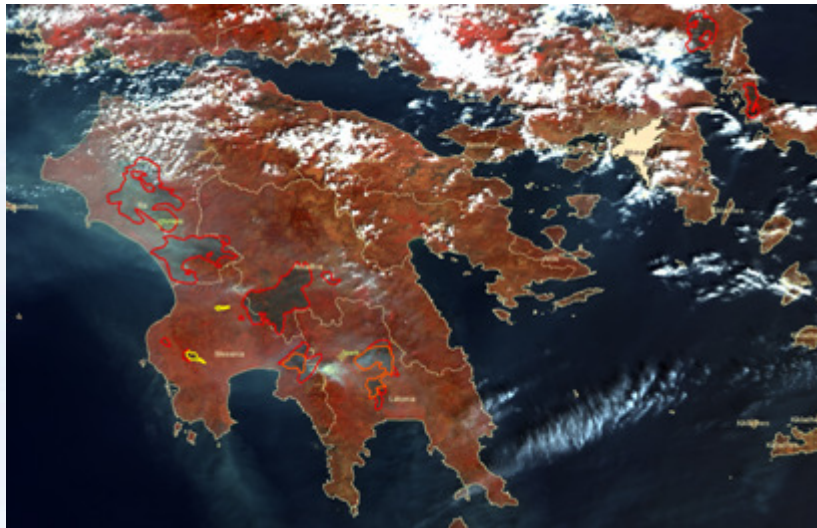
- Ambulance Station
- Care Home
- Courts
- Doctors Surgery
- Fireworks Sub Station
- Fireworks Transmission Line
- Fire Station
- Hospital
- Police Station
- Pumping House
- Pumping Station
- School
- Water Treatment Works



OS Licence No: 200016034

Example 3: Fire Mapping

➤ using optical imagery (Greece fires)



Risks and Crises management system : RISK-FRAME

Application suite for operational centres

Prevention

- Operational geographical data management
- Risks simulation & scenarios analysis

Anticipation / Early Warning

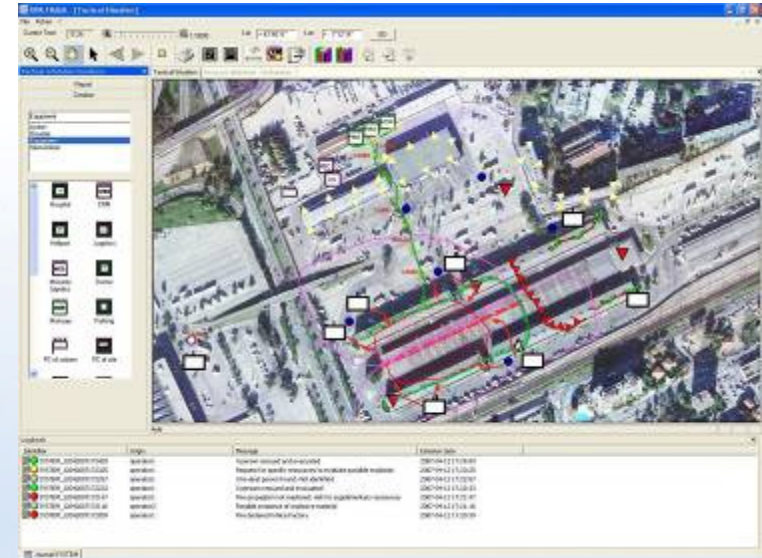
- Real-time situation monitoring
- Anticipation

Crisis

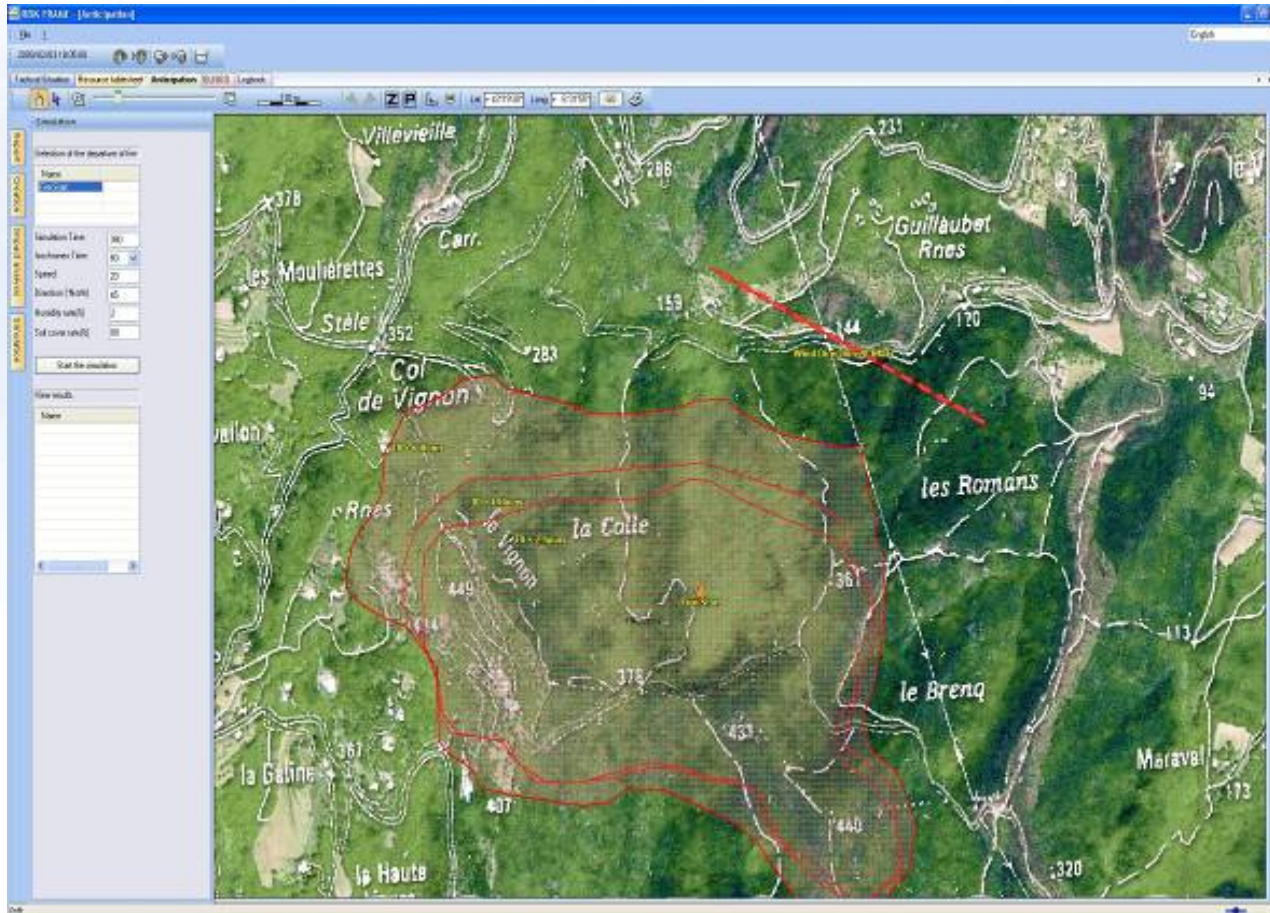
- Tactical Situation management & monitoring
- Resource management
- Anticipation

Post-Crisis

- Capitalisation



Simulation of forest fire propagation



Interactive Simulation of fire propagation

For hypothetical event or for real alert

State-of-the art operational approach

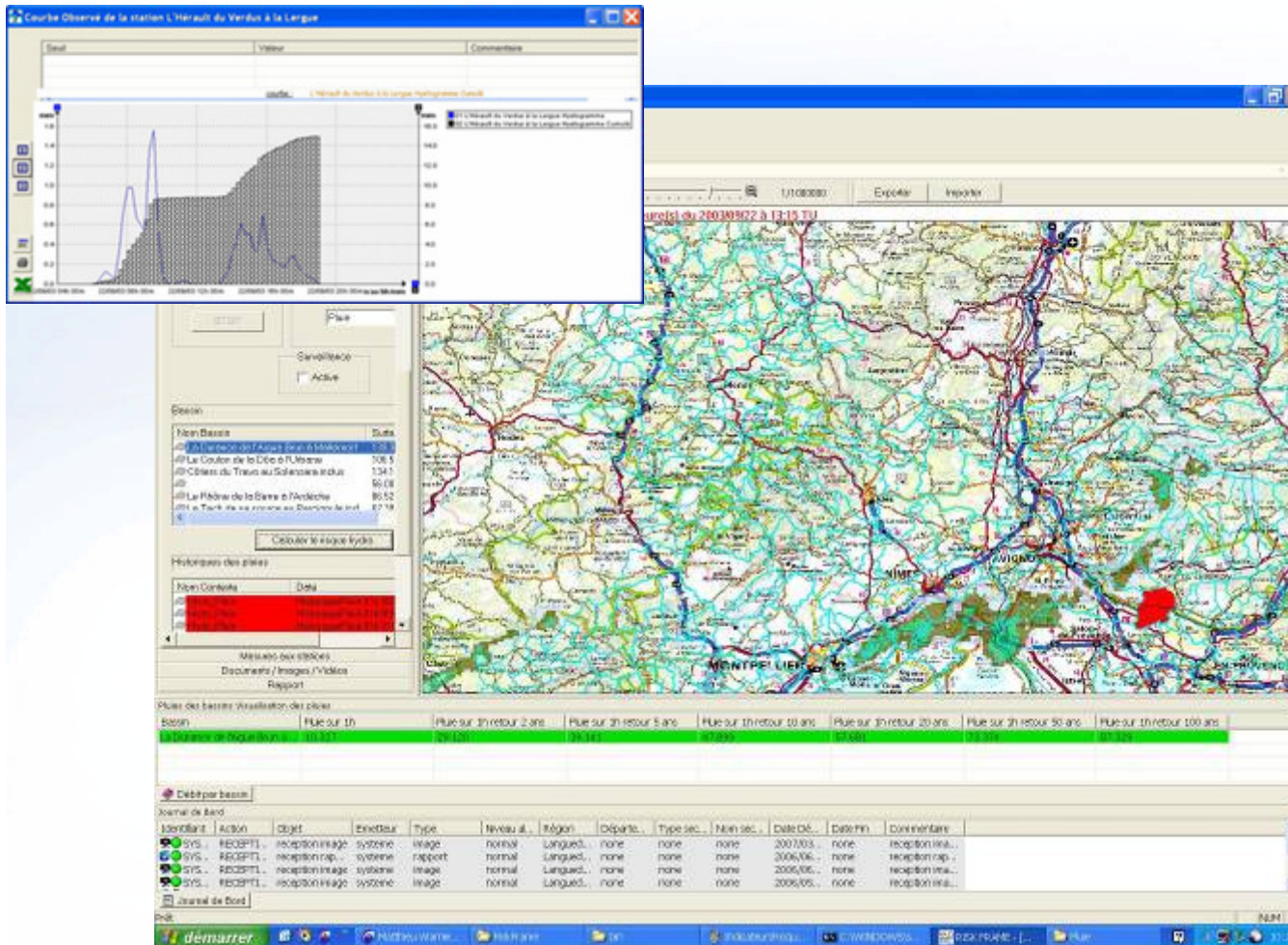
Takes into account : vegetation types, topography, wind, vegetation moisture

Rapid (a few seconds for 6 hours scenario)

Simple to use

RISKFRAME - Monitoring and Anticipation module (floods)

• Flood monitoring and early warning



Real-time display of sensor values and models outputs

Automatic computation of alert indicators

Synthetic blackboards for easy monitoring

Interactive access to historical values for comparison to present situation

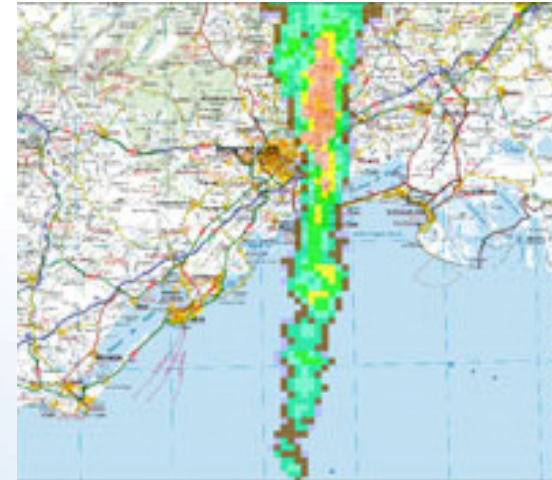
Spatial analyses for analysis of potential impacts

Generation of situation reports

Flash Flood management services : PREDICT

predict
services

- JV started in 2006, 3 shareholders



- Commercial services towards local communities, for management of floods

- Before event : prepare “Community safeguard plan” (PCS)
- During event : real-time monitoring of situation, anticipation of impact, advice on rescue plan

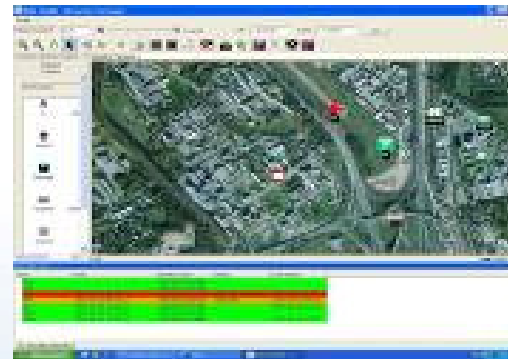
- Operational centre based in Montpellier

- Expertise and capacity transfer towards other countries



Tracking and communication with mobile units : ELISEO

- Real-time vehicles/ pedestrians tracking and display of their positions and status from the commanding centre



- In-field terminals providing cartographic data, routing support and access to supporting operational information



In-field pedestrian kit

- Bidirectional communication between the commanding centre and the vehicles : messages and geographical information



Vehicle on-board terminal



Portable device for positioning and satellite communication



Satcom Solutions for Security - examples

- Redundant telecommunication networks – using satellite links as backup

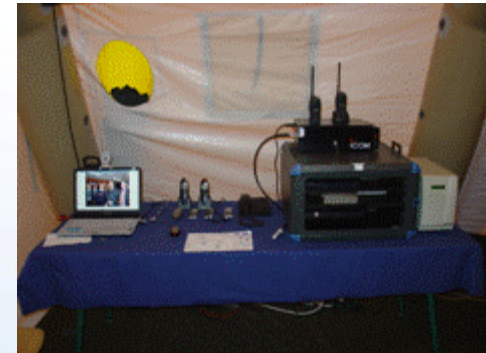
- Tetra Backhaul via Satellite for coverage expansion

- Mobile Communication Nodes

:

- Wifi Services
- GSM Services
- PMR Tetra Services

- Highspeed link to Mobile Command Post



CHORUS concept

■ A new offer

- For risks & crisis management centres
- More globally : *geo-collaboration solution in a user friendly Web environment*

■ Key features & benefits

■ A service offer

- Off-the-shelf, Turnkey solution, available at once
- No customer burden on software or hardware admin, or even GIS management

■ Real-time collaboration between operational centres

- Through shared Web server : straightforward deployment
- Information sharing before and during crisis

■ Integration of services and fusion of information from multiple sources

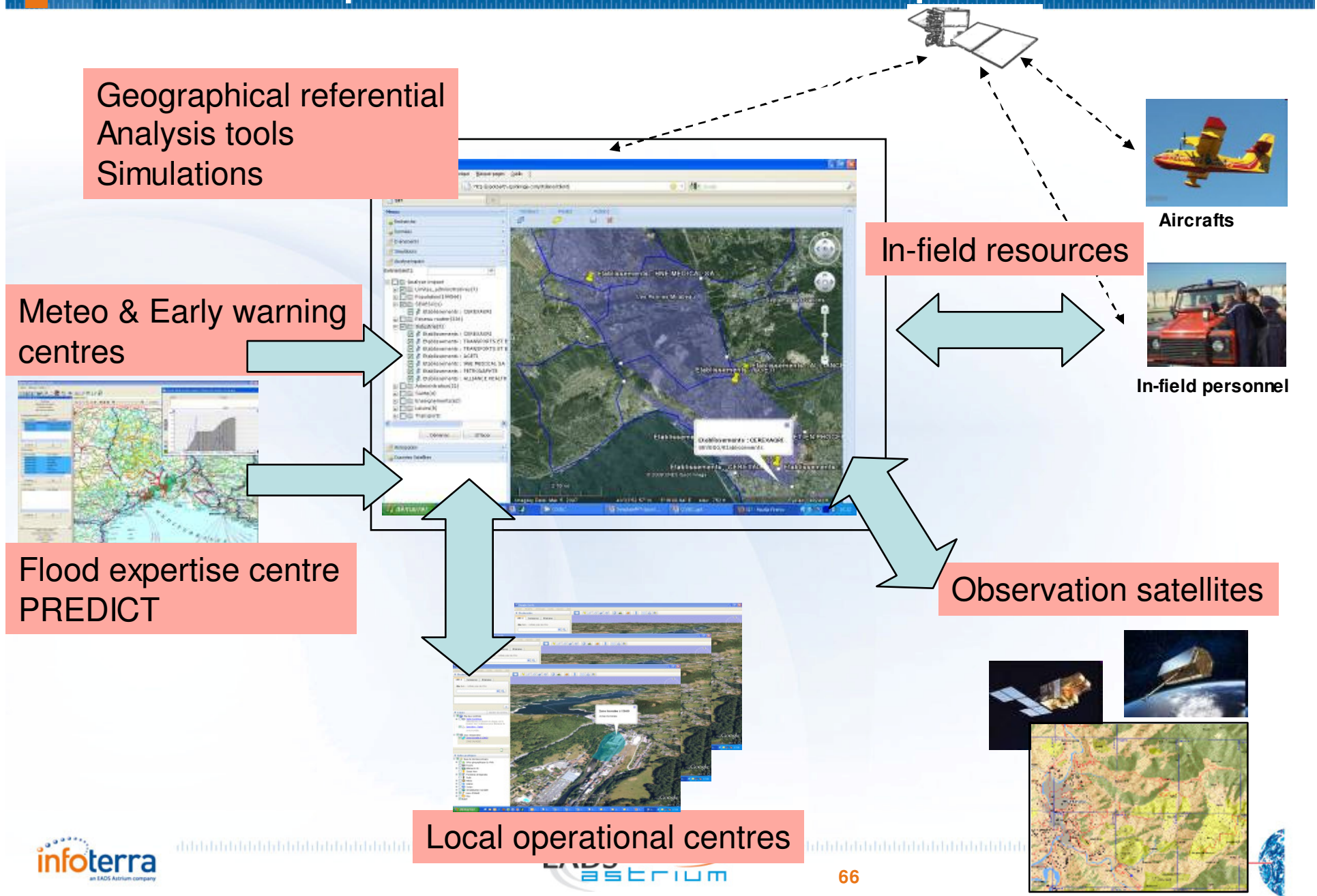
- Early warning centres
- In-field data
- Information from local centres
- Global observation from satellites and third-party sources

■ Decision support for strategic management of crisis

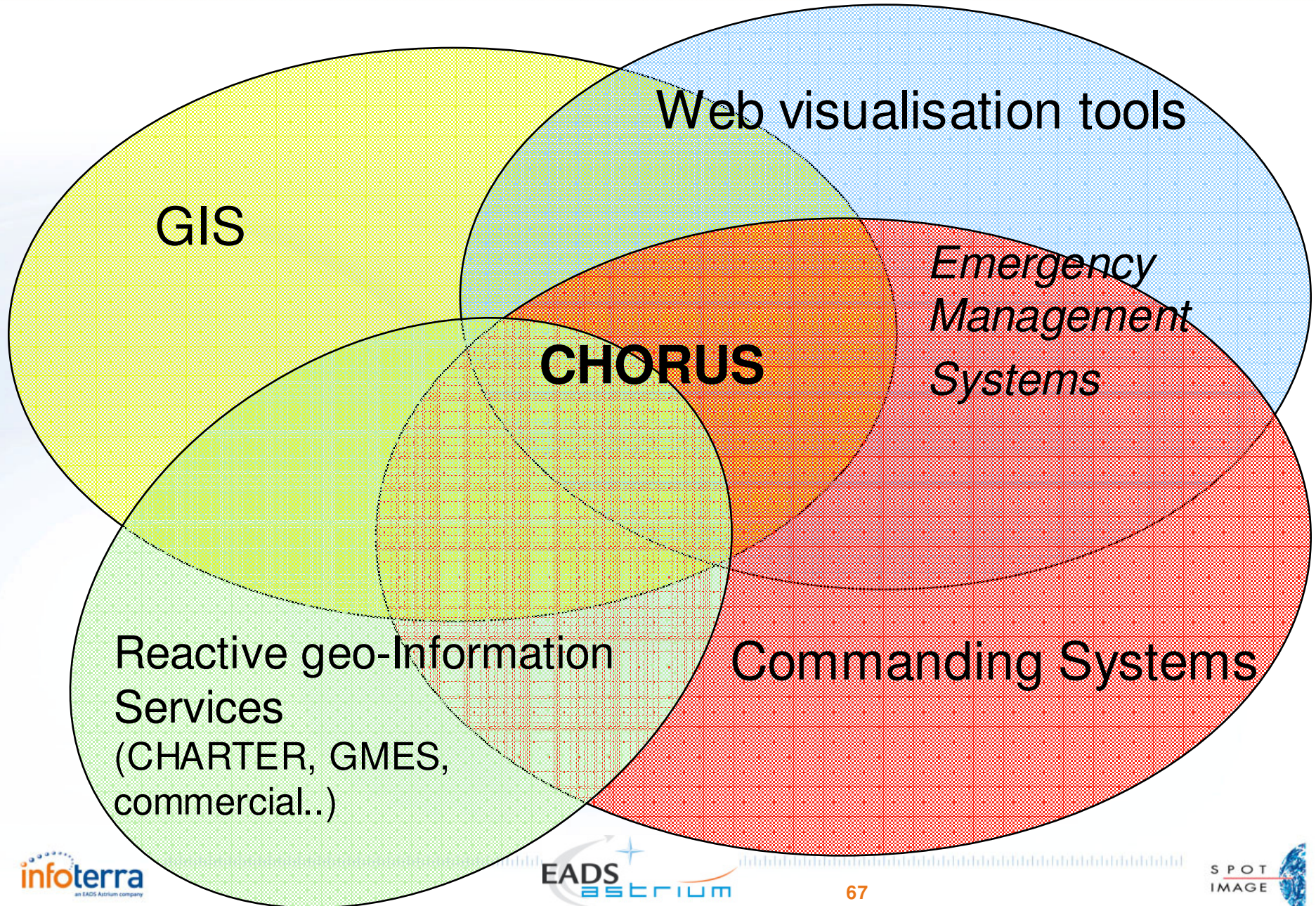
- On-line tools : impact analysis, operations planning, simulation, ...

■ Google Earth as user-friendly interface and information federation platform

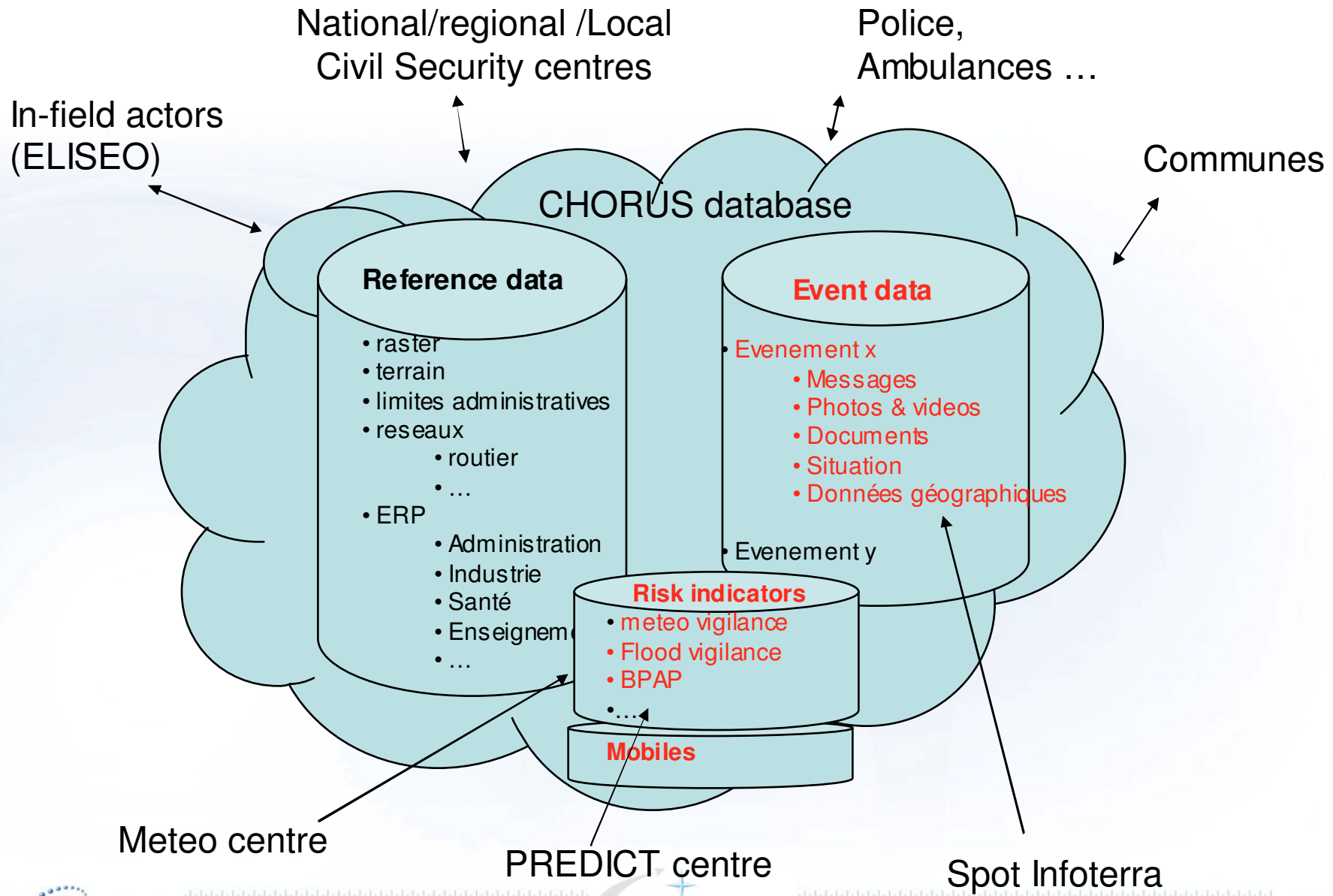
CHORUS concept : information fusion from multiple sources



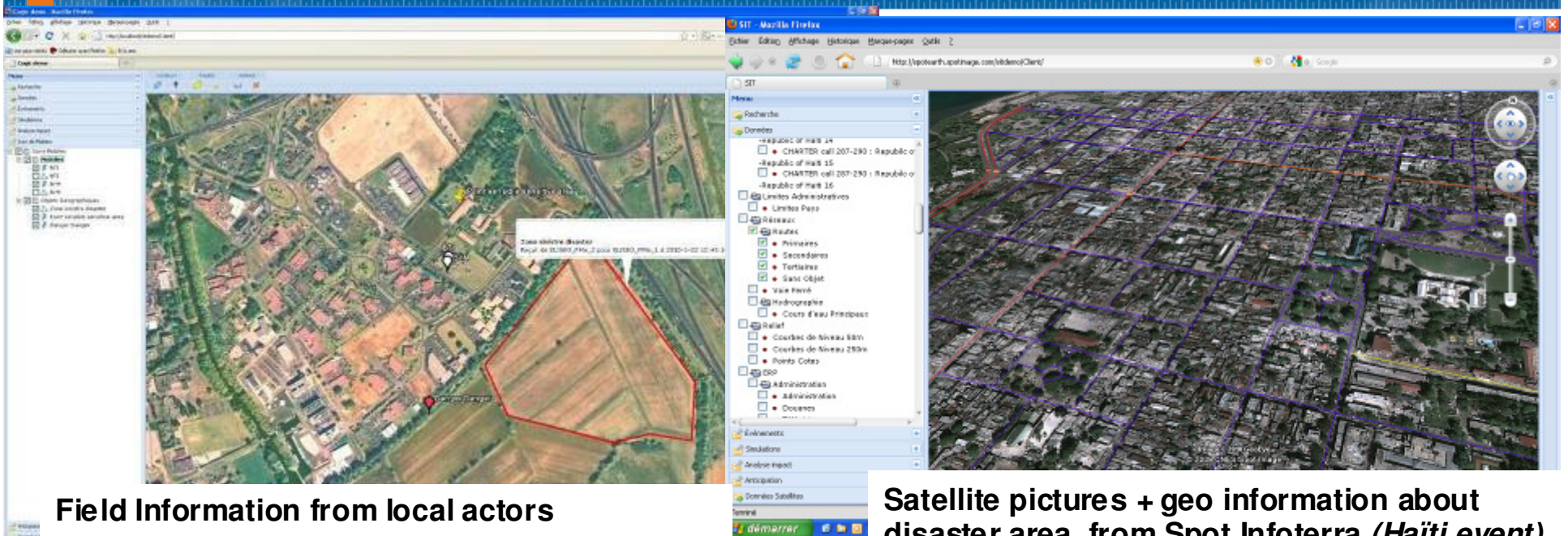
CHORUS positioning



CHORUS : Real-time collaboration

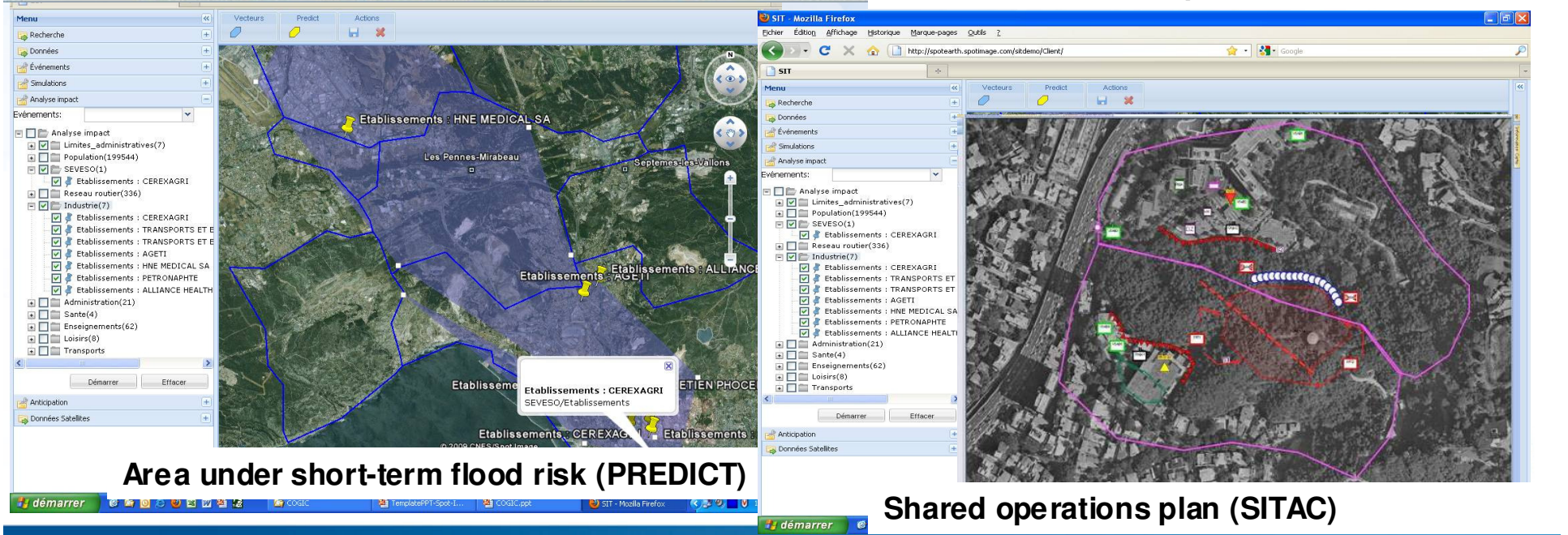


Real-time collaboration in CHORUS - illustrations



Field Information from local actors

Satellite pictures + geo information about disaster area, from Spot Infoterra (*Haïti event*)



Area under short-term flood risk (PREDICT)

Shared operations plan (SITAC)

CHORUS : strategic decision-making for National Centre

- **A complete solution for National Civil Security Centre**
 - Monitoring of situation over large territory
 - Detection of incidents
 - Information access and gathering from multiple sources
 - Analysis of situation, possible evolutions, damage assessment
 - Overall coordination of crisis
 - Experience capitalisation
- **Dedicated to**
 - with local civil security centres
 - Immediately interoperable with them
- **Taking benefit of**
 - Advanced geo-information technologies : Google Earth Enterprise
 - Satellite services : geo-information and communications

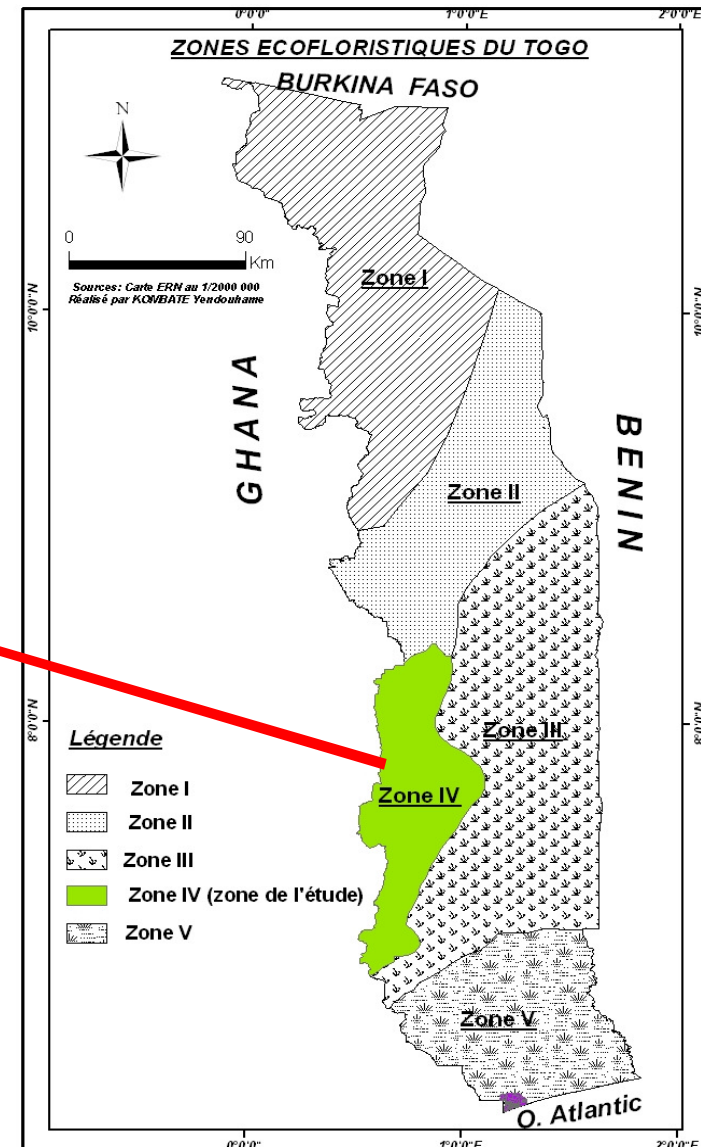
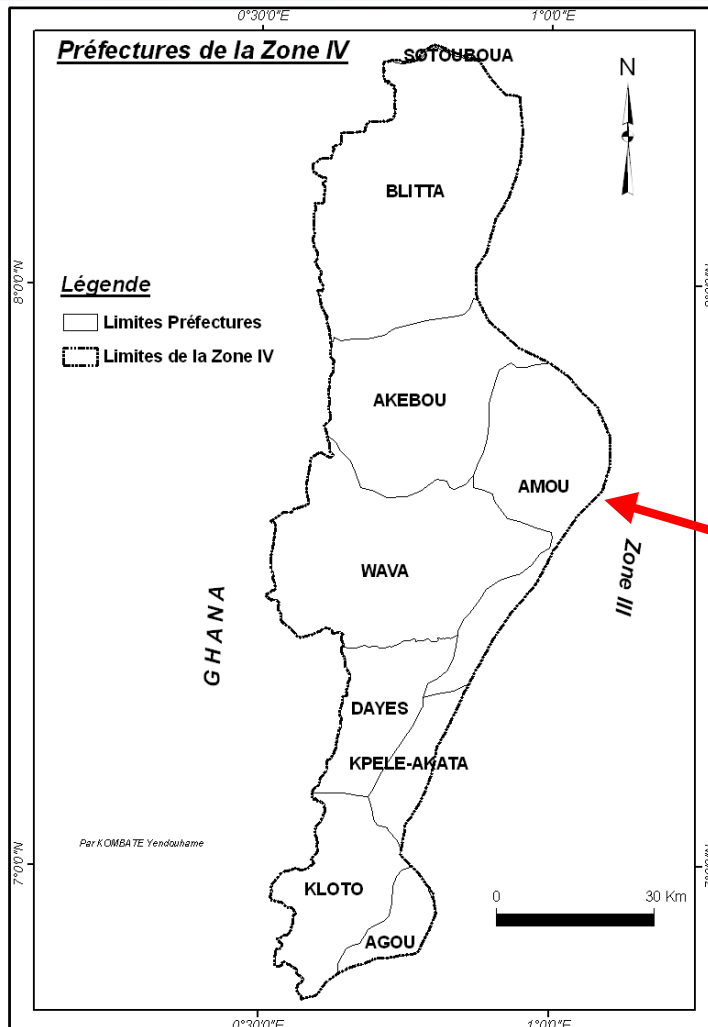
Spot Infoterra : some of our on going activities in Africa

- **SUJALA in Senegal: Rural development program funding by World Bank in India**
- **Green Morocco Plan: accompaniment of a politic of agriculture reorganisation**
- **AFD Framework contract in Congo Basin for Carbon trading (REDD)**
- **Nigeria: Signature of a MoU with NASRDA (NSDI + SAR + training)**
- **Tunisia: Agri NSDI pilo**
- **Mauritius: LAVIM (Land Administration program)**
- **Planet Action : Togo (Vegetation, Biodiversity & Ecosystem)**

Planet Action : Project Titre :

« Dégradation du couvert végétal de la Zone écofloristique IV et son impact sur les phénomènes naturels »

Project area : 4500 Km²



Planet Action : Project Logo :



PLANET - ACTION

Planet-Action theme: Vegetation, Biodiversity & Ecosystem

Expected output:

- The survey zone forest cartography is actualized,
- The forest statistics of the survey zone are known,
- The natural phenomena lately recorded reasons are known
- The area resources management plans are established,

Target groups which are embodged in the project

This project will be achieved with the participation of actors intervening in:, CCNUCC office in Togo and national plate-form of disaster management the management of such:

- The natural resources protection (MERF, Ministry of agriculture, etc.)
- Climatic change domaine (meteorological scientists from DGMN, Universty of Lomé, CCNUCC office in Togo, etc.)

<http://www.planet-action.org/web/85-project-detail.php?projectID=6257>

The screenshot shows the Planet Action website interface. On the left is a vertical sidebar with the Planet Action logo (a stylized figure with arms raised inside a red circle) and the text "PLANET ACTION Spot the impacts, engage in action" and "A Spot Image initiative". Below this, it lists the "Project Leader" as Yendouhame KOMBATE and includes a "Logo" section with a circular emblem featuring the Togolese flag and the words "Travail" and "Paix" flanking a central banner with "Liberté".

The main content area has a dark header with the question "Are you active in fighting climate change?" in white and green script. To the right of the header are a "SEARCH" button with an "OK" icon and a "Sign in" button with a dropdown arrow. Below the header is a navigation bar with links for "About Planet Action", "Projects", "Working together", and "Outreach", followed by a "Submit your project!" button with a right-pointing arrow.

The main content area features a large white box with a close button (an 'x' in a square) in the top-left corner. The title "ZONE ÉCOFLORISTIQUE IV" is displayed in black, with "Togo" underneath in orange. Below the title is the section "In Depth Coverage" in orange, followed by the main heading "Dégradation du couvert végétal de la Zone écofloristique IV et son impact sur les phénomènes naturels" in bold black text. At the bottom of this section, a paragraph of text reads: "La zone écofloristique IV du Togo est une zone jadis boisée. De nos jours on assiste à une déforestation très rapide de la zone pour la recherche de bois d'œuvre, de services".

On the right side of the main content area, there is a green button with the text "Explore the map".

Thank you very much for your attention.

Further details:

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Astrium Services - Geo Information Division

Business Development - Risk & Crisis Management

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M: +33 6 23 02 19 13

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www.astrium.eads.net