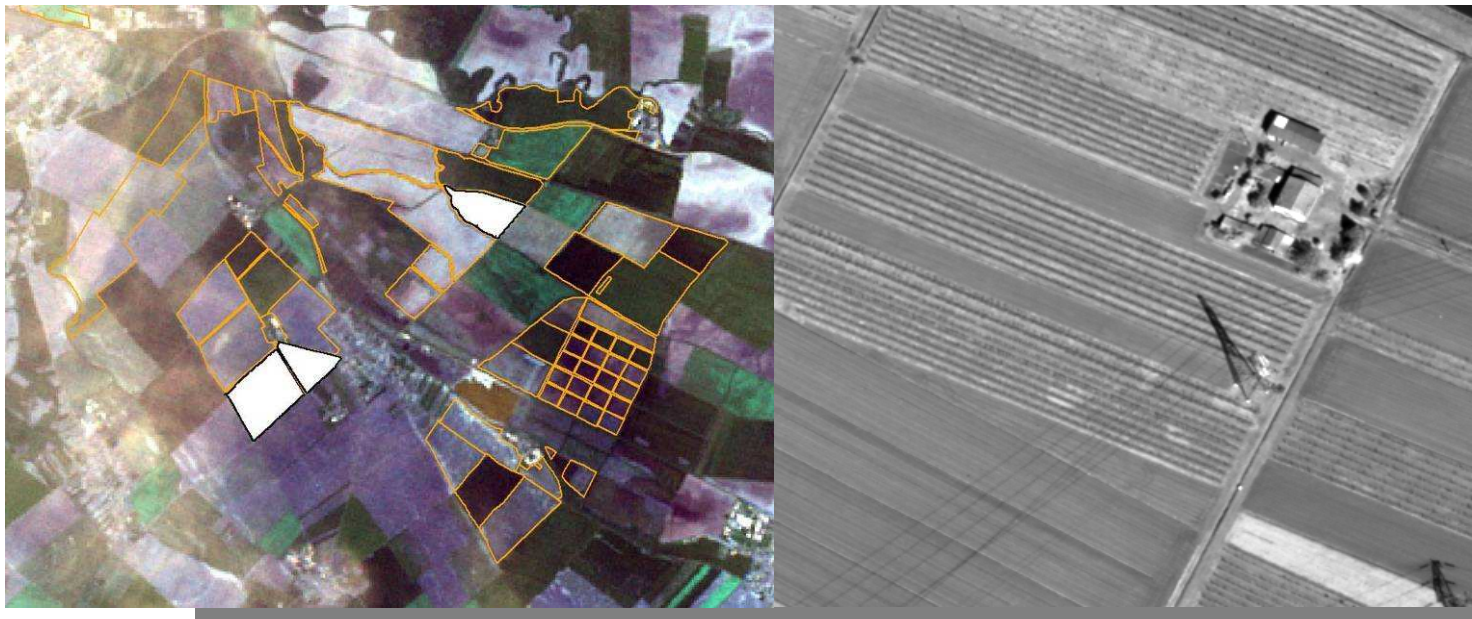



## Monitoring of Agricultural Resources Institute for Environment and Sustainability (IES)

Beata Hejmanowska, Simon Kay Head of Unit, Philippe Loudjani GeoCAP team leader,  
Csaba Wirnhardt, Pavel Milenov,




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European Commission


# Joint Research Centre

MARS



European Commission > JRC > IES > MARS Unit

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MARS RSS feeds 



### The Monitoring Agricultural Resources (MARS) Unit Mission

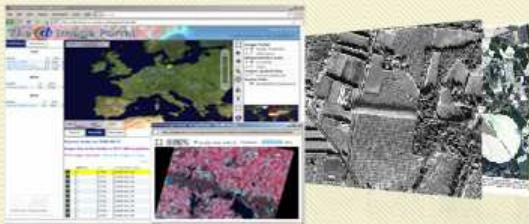
We provide scientific and technical support on EU Agriculture and Food Security policies.

- In Europe, the Unit addresses key issues related to the management and control of the Common Agriculture Policy: independent crop yield forecasts, agricultural insurances, standard control methods of area based subsidies, compliance with environment, and effect of climate change. It supports EU projects related to Land Administration, the enlargement process, and the GMES Space Component.
- In developing countries, assistance is given to the EU Food Security Thematic Program with special emphasis on Africa, and to providing building blocks for an European capacity for Global Agriculture Monitoring. The activities of the Unit are based on expertise in agro- meteorological crop modelling, sampling methods, econometric, geomatics (GIS, GPS and ICT), and satellite & airborne remote-sensing (the Unit manages the EC Framework Contracts for the provision of Satellite Remote Sensing data and manages the access/dissemination of EU image data archives). [read more>>](#)

**In Focus**

**MARS moves from IPSC to IES**

On the 1st Jan 2011, the four actions (GeoCAP, Agri4Cast, CID and FoodSec) of the MARS Unit



**The CID Portal**

An online archive containing > 10 TByte of satellite images

### Latest News & Events

**Job openings for a GH30 & GH40**  
The MARS Unit has 1 opening for a GH (Grant Holder) Cat.30 and 1 opening for a GH Cat.40  
Deadline: June 1st, 2011

**Job openings for SNEs and GH40**  
MARS Unit has 3 openings for 2 SNE (Seconded National Experts) and 1 GH (Grant Holder) Cat. 40 under the Enlargement and Integration program (not EU27 experts).  
Deadline: June 15th, 2011

**Control Methods Workshop 2011**  
Every year, at the beginning of the agricultural subsidies control campaign, MS administrations, JRC/MARS and DG AGRI meet to discuss about control sites and control methods.

**LPIS\_2011\_WS\_Amsterdam**  
This is the website for the 2011 LPIS Workshop in Lijnden, Shiphol, Amsterdam

**Call for Interest for Grantholders at the IES-MARS Unit**

European Commission  
**Joint Research Centre**  
MARS


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The MARS Unit

- AGRI4CAST
- CID
- FOODSEC
- GeoCAP
- Unit Staff

## About us



### Our Mission

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### Our History

The MARS project, started in 1988, was initially designed to apply emerging space technologies for providing independent and timely information on crop areas and yields. Since 1993, driven by user requirements, the team has contributed towards a more effective and efficient management of the Common Agricultural Policy through the provision of a broader range of technical support services to DG Agriculture and Member-State Administrations. Since 2000, the expertise in crop yields has been applied outside the EU. Services have been developed to support EU aid and assistance policies and provide building blocks for a European capability for global agricultural monitoring and food security assessment.

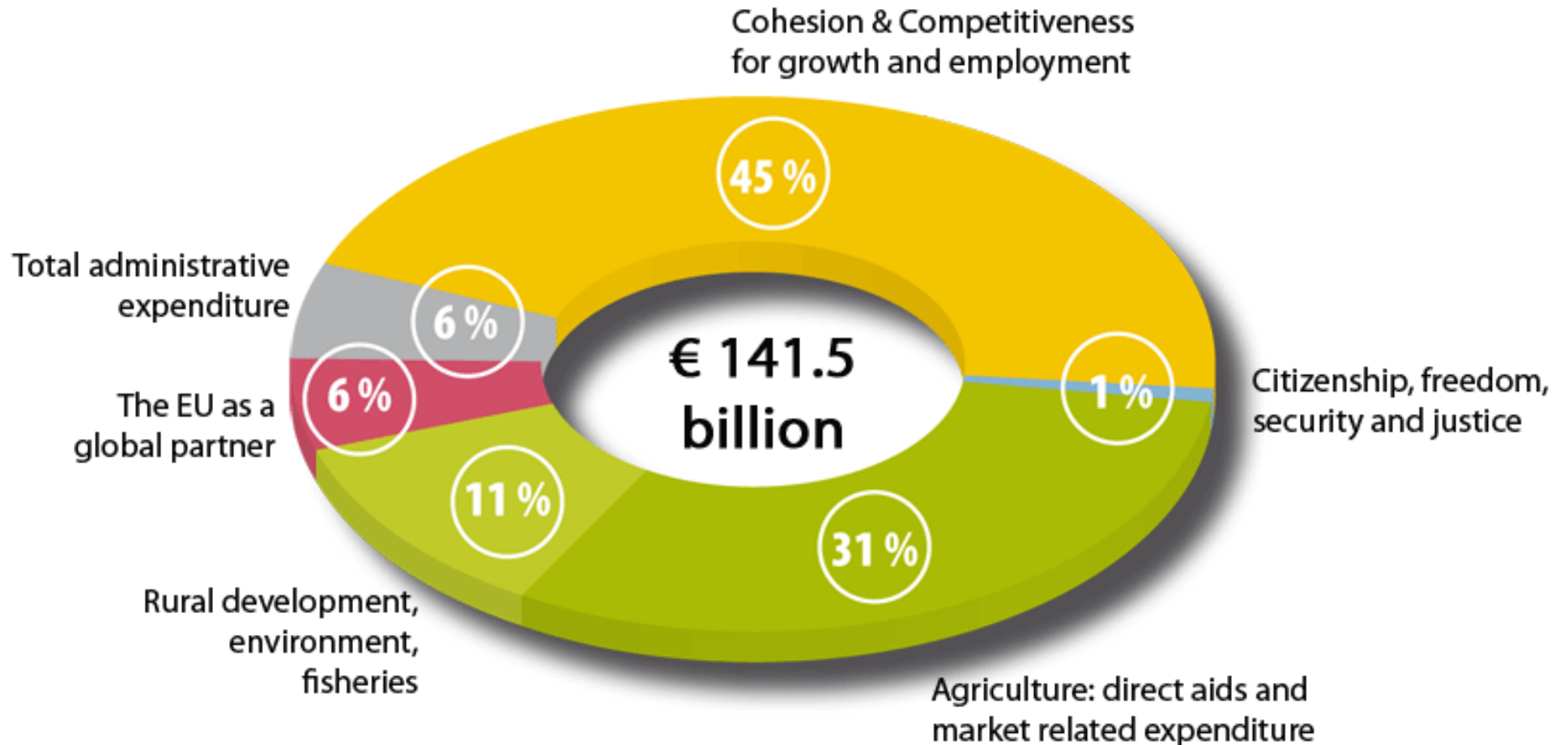
Today, the Monitoring Agricultural ResourceS Unit is made up of four Actions: GeoCAP (ex-MARS PAC), AGRI4CAST (ex-MARS STAT), FOODSEC and CID

**Crop Forecasting System**

**Community Image Data portal**

**Crop monitoring and early warning**


**Geo-Information Management  
Development of Controls Methods  
Agricultural Policy Instruments**




- Since 2005, the majority of aid to farmers is paid *independently* of production – **Direct Payments (€43B in 2010)**
  - Other payments are made under the **Rural Development** program
- In addition, farmers have to respect environmental, food safety, phytosanitary and animal welfare standards.
  - **Cross Compliance** - Farmers who fail to do this will face reductions in their direct payments

- Land Parcel Identification System (LPIS)
- Control measurements (area, crop)
  - In-situ
  - Remote sensing
- Good Agricultural and Environmental Condition (GAEC) control
- Quality Control
  - LPIS Quality Assessment
  - GPS, orthoimagery area measurements validation

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Monitoring Agricultural Resources

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## Welcome to WikiCAP

This site brings together the consolidated reference to be used for on the spot checks, linked to Regulation 1122/09, Articles 33 - 35 (most easily identified by the tag **Art30** in reference to Art 30 of R.796/04 which is now Art 34 in R.1122/09, visible in the "tag-cloud" below), supporting the management and control of data collected for **CAP direct payments**, with other information relevant to geoinformation management under the CAP.

This means that today, most of the information you will see **is derived from the existing series of Word documents and PDF files** that either were already on our main web site - or buried in our archives off-line.

### Getting the information you need

Below you can find links to top-level subjects:

- **On the spot checks:** control methods used for the on the spot (OTS) checks may use a variety of approaches and tools:
  - **CwRS:** Main start page for Control with Remote Sensing - note that this is a direct link to many of the technical aspects associated with the OTS checks using [this tool](#).
  - **GNSS:** GNSS is the other main tool used for OTS checks - click [here](#) to go directly to this technical area.
- **LPIS:** These pages start you on the process of creating and maintaining Land Parcel Identification System LPIS, the main geo-database in **IACS**.
- **Cross Compliance:** Main page for the implementation, management and monitoring/control of Cross Compliance

Other ways to get into the information presented in these pages:

- **Glossary:** this page should try and keep track of the most relevant technical terms and TLA's (*three letter acronyms*)
- **Description of Terms:** Description of the most common terms used
- **Multilingual Vocabulary:** A multilingual vocabulary of terms used in Control with Remote Sensing

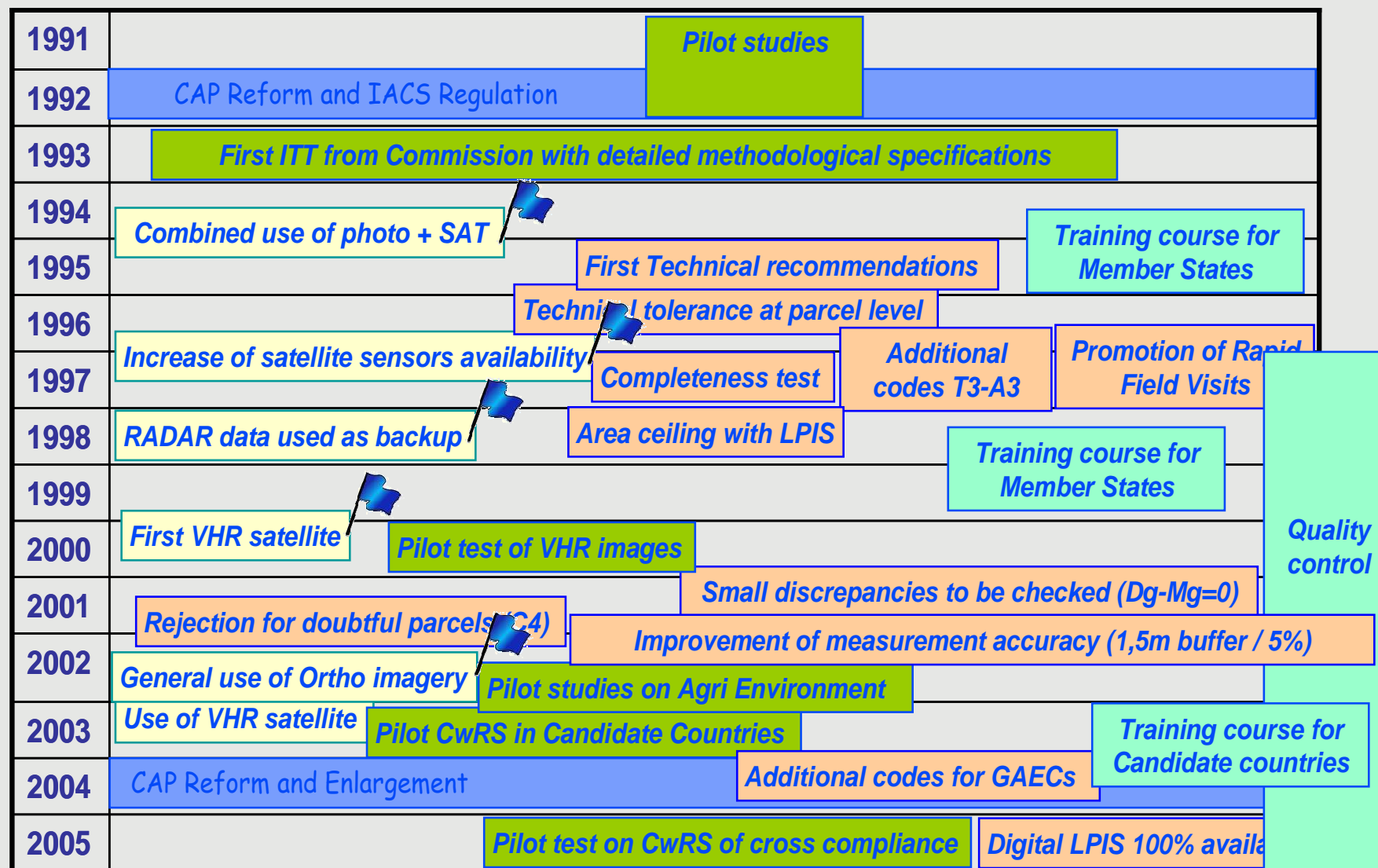
You can search for keywords in the field on the left side of this window. The **Go** button will take you to a page with that keyword name, the **Search** button will give you a list of pages most relevant.

The "**Tag cloud**" below represents a way of showing which pages are most often "tagged" with a keyword (category). For example, lots of pages on this site are tagged with the keyword CwRS - so it appears big. Click on a keyword to get a list of all the pages tagged with that key word.

60363Rev1 Agriculture Area measurement Art34 Art6 ATS AVEMAC CAPI CAPRESE Categorization of dossiers Climate Change Conceptual Model Cross compliance CTS **CWRS** Diagnostics Digital elevation model Dossier selection ETS EU Exclude in print Farm Advisory System (FAS) GPS Ground control points Image acquisition Image fusion Image processing Inspire INSPIRE LCM

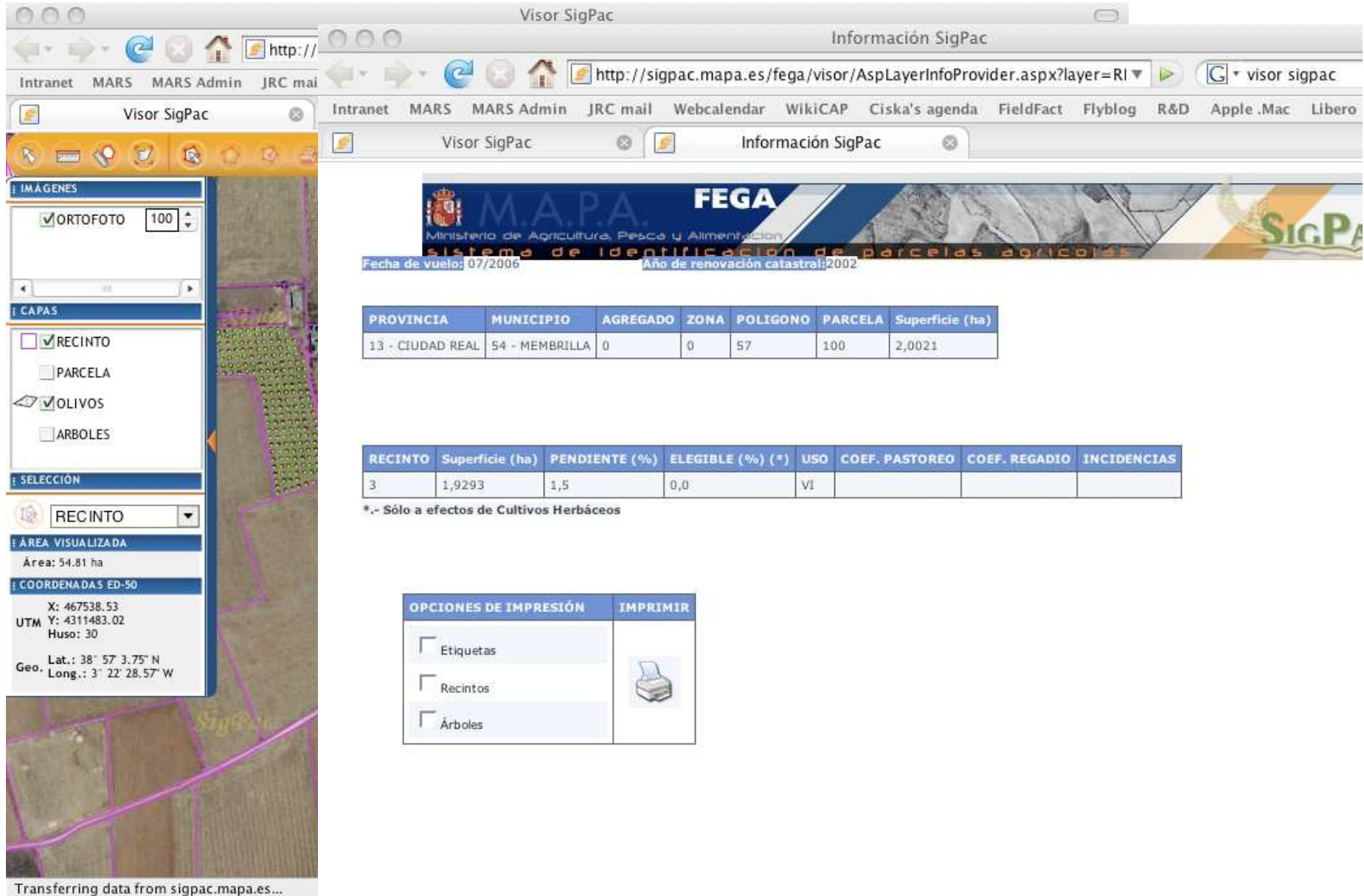
**LPIS** LPIS QA LPIS QA archive Meeting minutes Metadata OLICOUNT 2000 Olive Trees Ortho Guidelines OTS otsc Quality control Random selection Rapid field visits Recs 1 Recs 2 Recs 3 Recs 4 Reference parcel Reports Revise for 2008 REVISE for 2009 Risk analysis Sdic SDIC Summary Statistics Technical tolerance Thurs23 Vineyard Guidance-A/16864 Wiki WikiCapDevelopment WP

Zone selection



(J. Delincé, MARS 2004 conference, Budapest)





The screenshot displays the SIGPAC web application interface. On the left, there is a navigation panel with sections for 'IMÁGENES' (Ortofotografía), 'CAPAS' (Recinto, Parcela, Olivos, Árboles), 'SELECCIÓN' (Recinto), 'ÁREA VISUALIZADA' (54.81 ha), and 'COORDENADAS ED-50' (X: 467538.53, Y: 4311483.02, Huso: 30, Lat.: 38° 57' 3.75" N, Long.: 3° 22' 28.57" W). The main content area shows a map of agricultural parcels with a table of data below it. The table includes columns for Provincia, Municipio, Agregado, Zona, Poligono, Parcela, and Superficie (ha). Below the table, there is a summary table with columns for Recinto, Superficie (ha), Pendiente (%), Elegible (%), Uso, Coef. Pastoreo, Coef. Regadío, and Incidencias. At the bottom, there is a section for 'OPCIONES DE IMPRESIÓN' (Etiquetas, Recintos, Árboles) and an 'IMPRIMIR' button with a printer icon.

**Fecha de vuelo:** 07/2006 **Año de renovación catastral:** 2002

PROVINCIA	MUNICIPIO	AGREGADO	ZONA	POLIGONO	PARCELA	Superficie (ha)
13 - CIUDAD REAL	54 - MEMBRILLA	0	0	57	100	2,0021

RECINTO	Superficie (ha)	PENDIENTE (%)	ELEGIBLE (%) (*)	USO	COEF. PASTOREO	COEF. REGADÍO	INCIDENCIAS
3	1,9293	1,5	0,0	VI			

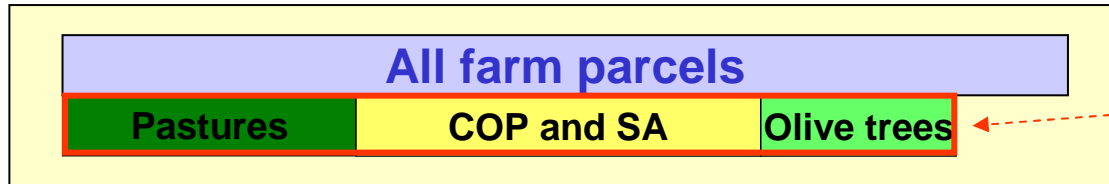
\*.- Sólo a efectos de Cultivos Herbáceos

**OPCIONES DE IMPRESIÓN**

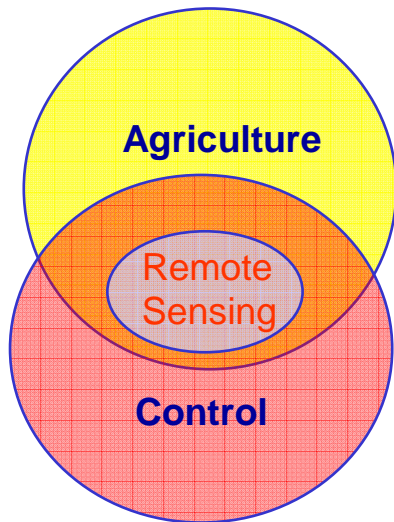
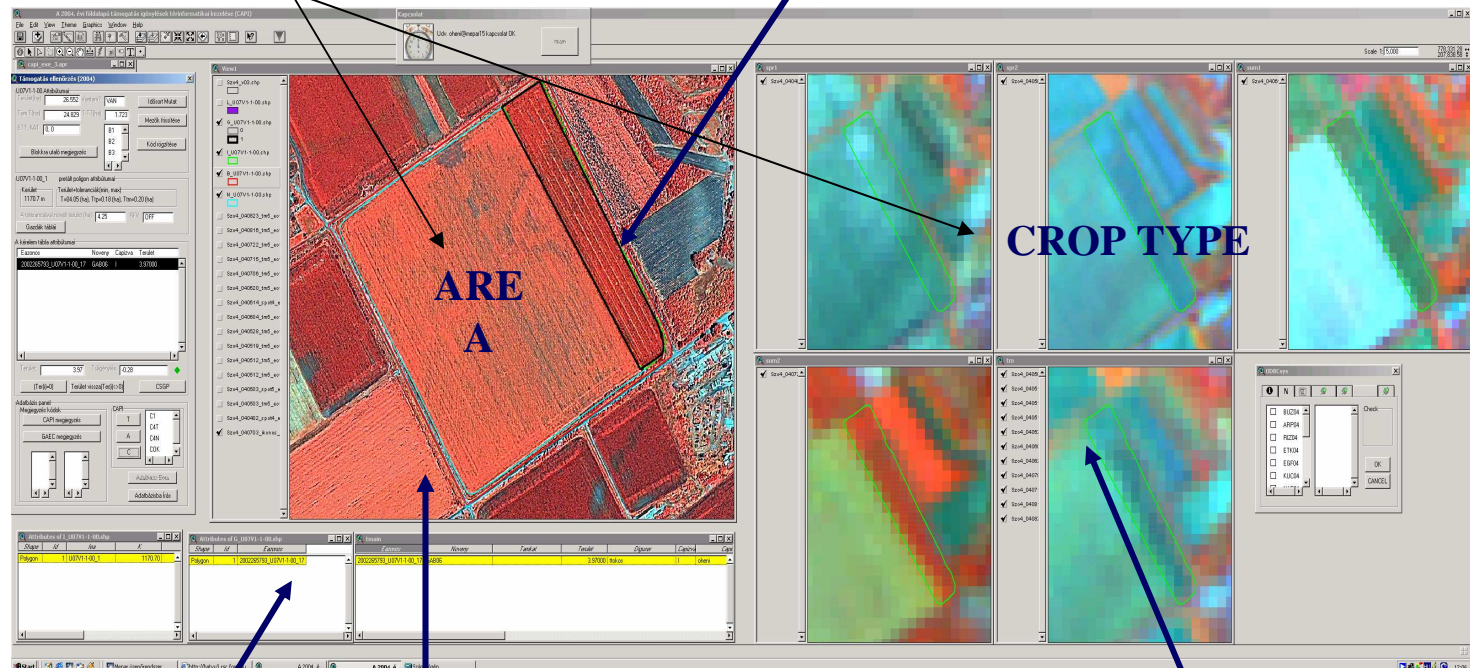
- Etiquetas
- Recintos
- Árboles

**IMPRIMIR**

Transferring data from sigpac.mapa.es...



**Digitised farmer drawing**

**AREA A**

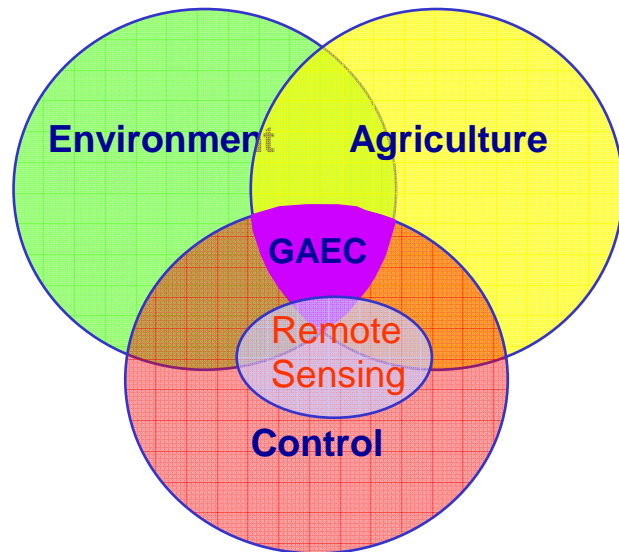
**CROP TYPE**

**Claim database**

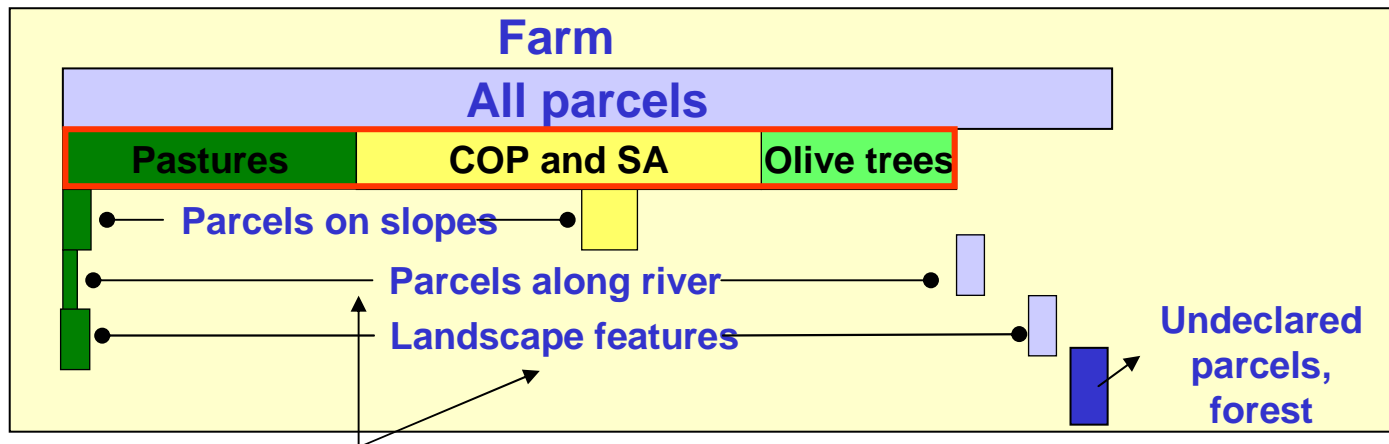
**VHR images**

**HR satellite image time series**

## Cross compliance



- More spatial check (slope, riverside, undeclared area ...)
- More 'objects' to identify (fire, erosion, bush, tree lines, isolated trees ...)
- More temporal checks (winter, fixed date, reference period ...)



Except few cases, **VHR images needed (less and less HR images and Radar too coarse)**

**Good agricultural and environmental condition referred to in Article 6**

Issue	Compulsory standards	Optional standards
Soil erosion: Protect soil through appropriate measures	— Minimum soil cover	— Retain terraces
	— Minimum land management reflecting site-specific conditions	
Soil organic matter: Maintain soil organic matter levels through appropriate practices	— Arable stubble management	— Standards for crop rotations
Soil structure: Maintain soil structure through appropriate measures		— Appropriate machinery use
Minimum level of maintenance: Ensure a minimum level of maintenance and avoid the deterioration of habitats	— Retention of landscape features, including, where appropriate, hedges, ponds, ditches trees in line, in group or isolated and field margins	— Minimum livestock stocking rates or/and appropriate regimes
	— Avoiding the encroachment of unwanted vegetation on agricultural land	— Establishment and/or retention of habitats
	— Protection of permanent pasture	— Prohibition of the grubbing up of olive trees
Protection and management of water: Protect water against pollution and run-off, and manage the use of water	— Establishment of buffer strips along water courses <sup>(1)</sup>	— Maintenance of olive groves and vines in good vegetative condition
	— Where use of water for irrigation is subject to authorisation, compliance with authorisation procedures	

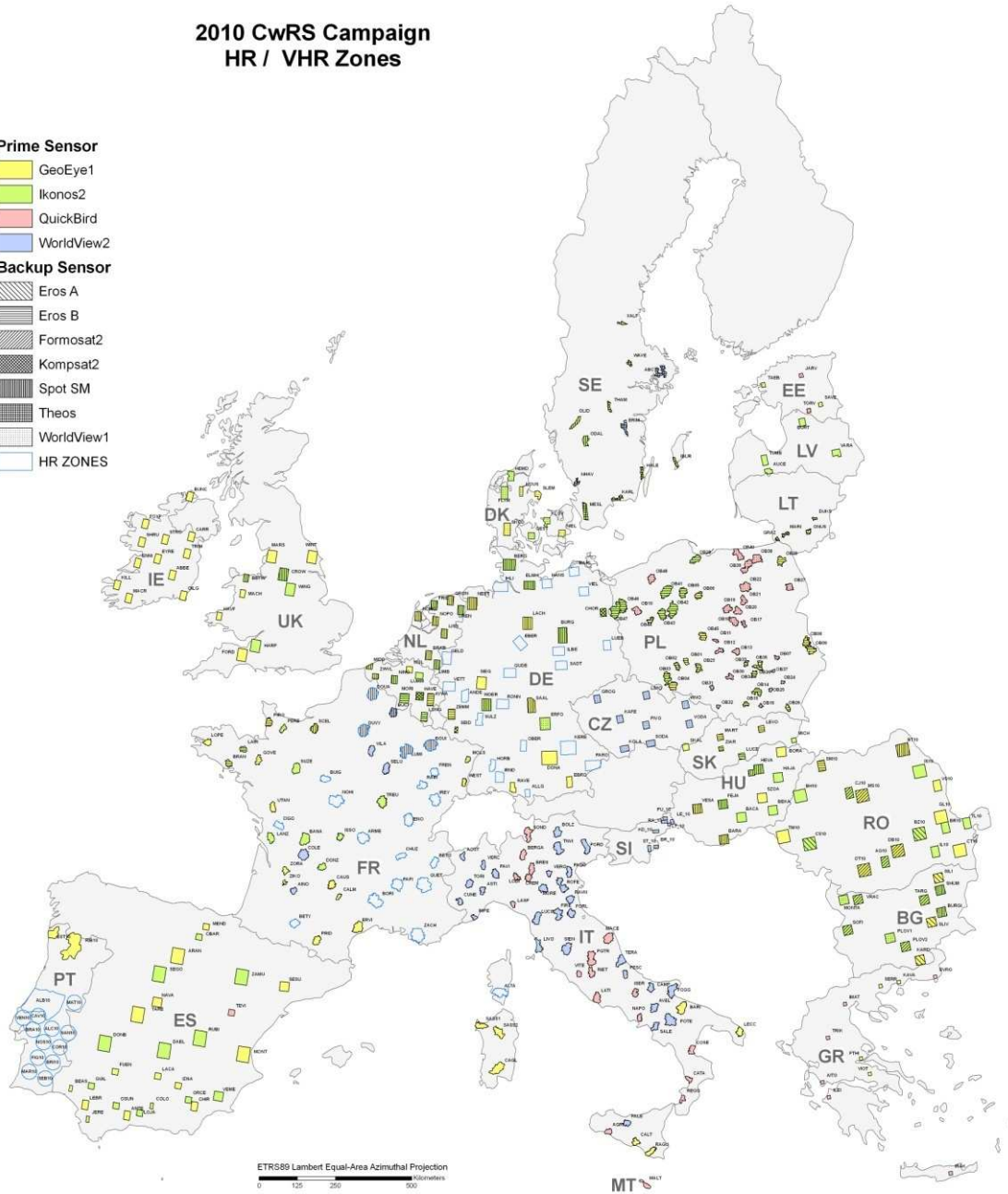
**Council Reg 73/2009**

<sup>(1)</sup> Note: The GAEC buffer strips must respect, both within and outside vulnerable zones designated pursuant to Article 3(2) of Directive 91/676/EEC, at least the requirements relating to the conditions for land application of fertiliser near water courses, referred to in point A.4 of Annex II to Directive 91/676/EEC to be applied in accordance with the action programmes of Member States established under Article 5(4) of Directive 91/676/EEC.



**2010 CwRS Campaign  
HR / VHR Zones**


- Prime Sensor**
- GeoEye1
  - Ikonos2
  - QuickBird
  - WorldView2
- Backup Sensor**
- Eros A
  - Eros B
  - Formosat2
  - Kompsat2
  - Spot SM
  - Theos
  - WorldView1
  - HR ZONES




ETRS89 Lambert Equal-Area Azimuthal Projection  
0 125 250 500 Kilometers

Reference Date: 09.04.2010

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European Commission  
**Joint Research Centre**  
Institute for Environment and Sustainability



Community Image Data portal


European Commission > Joint Research Centre > IES > MARS Unit > CID > Image Archive login


**About CID Portal**

The CID Portal is a Web portal to search and access Remote Sensing data and derived products hosted at JRC. Search and preview is open to the public. Access to the image data via a variety of online services is limited to authorized and registered users.

Staff of institutions of the European Union can be granted access to most of the archive data after registration. Please [see here for details](#).

Sample image from the archive:






Base Layer

- NASA Bluemarble
- Google Hybrid
- Google Satellite
- Countries

Overlays


- OpenStreetMap
- Image Footprints

Scale = 1 : 7M

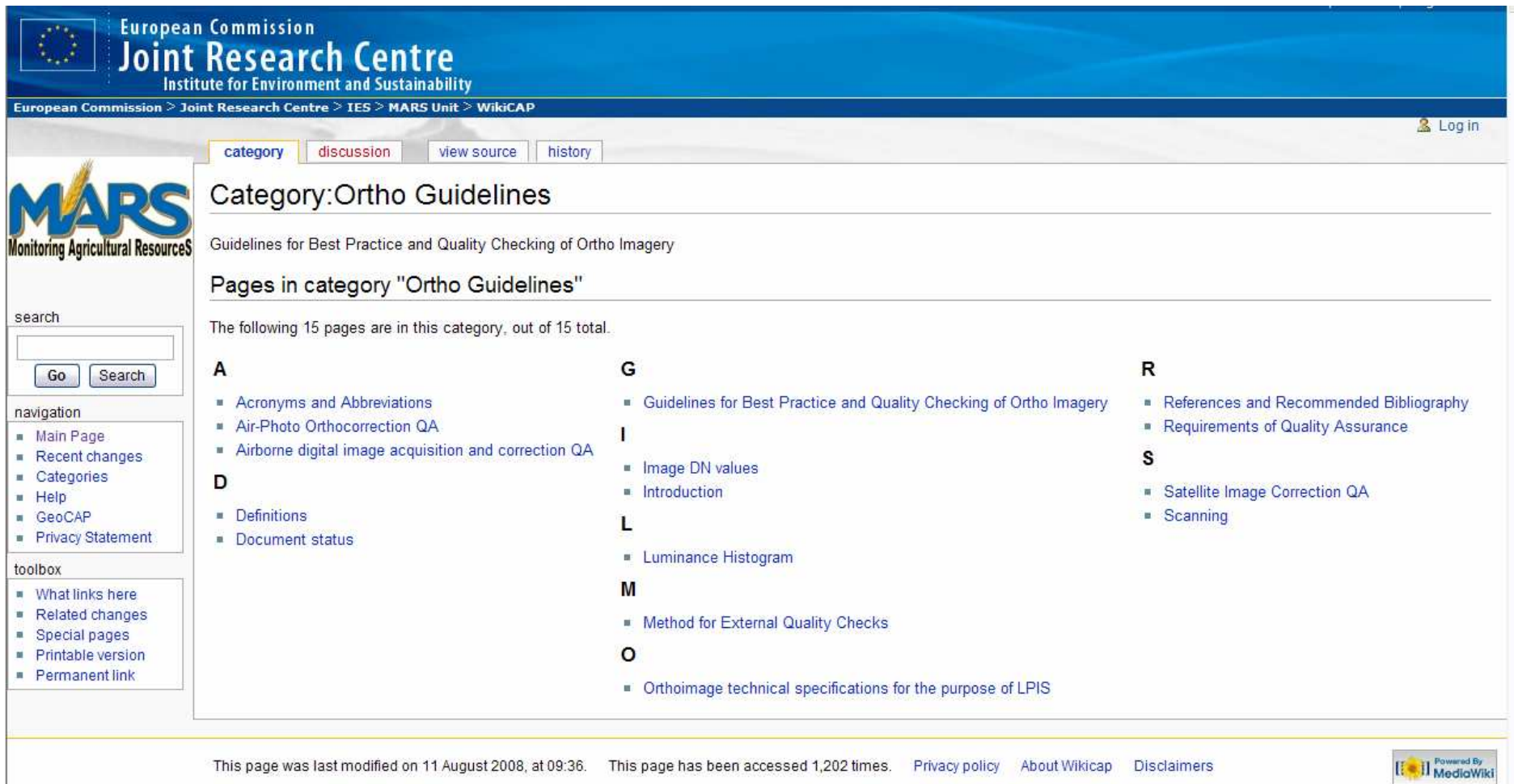


Search **Results** Messages [New search](#) [Preferences](#)

ID	Acquisition date	Pixel size [meters]
I30020	2010/05/27	0.51
I30021	2010/05/27	0.509
I30022	2010/05/27	0.509
I30023	2010/05/27	0.509
I30024	2010/05/27	0.509
<b>I30025</b>	<b>2010/05/27</b>	<b>0.509</b>
<a href="#">View Metadata</a>	2010/05/27	0.51
I30027	2010/05/27	0.507
I30028	2010/05/27	0.495
I30029	2010/05/27	0.497
I30030	2010/05/27	0.498



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The screenshot displays the Wikicap website interface. At the top, the European Commission logo and 'Joint Research Centre Institute for Environment and Sustainability' are visible. A breadcrumb trail reads 'European Commission > Joint Research Centre > IES > MARS Unit > WikiCAP'. A 'Log in' link is in the top right. Below the header, there are tabs for 'category', 'discussion', 'view source', and 'history'. The main heading is 'Category:Ortho Guidelines'. Below this, a description reads 'Guidelines for Best Practice and Quality Checking of Ortho Imagery'. A section titled 'Pages in category "Ortho Guidelines"' states 'The following 15 pages are in this category, out of 15 total.' The pages are listed in three columns under alphabetical headings: A (Acronyms and Abbreviations, Air-Photo Orthorectification QA, Airborne digital image acquisition and correction QA), D (Definitions, Document status), G (Guidelines for Best Practice and Quality Checking of Ortho Imagery), I (Image DN values, Introduction), L (Luminance Histogram), M (Method for External Quality Checks), O (Orthoimage technical specifications for the purpose of LPIS), R (References and Recommended Bibliography, Requirements of Quality Assurance), and S (Satellite Image Correction QA, Scanning). On the left side, there is a search box with 'Go' and 'Search' buttons, and two navigation toolboxes: 'navigation' (Main Page, Recent changes, Categories, Help, GeoCAP, Privacy Statement) and 'toolbox' (What links here, Related changes, Special pages, Printable version, Permanent link). At the bottom, a footer contains the text 'This page was last modified on 11 August 2008, at 09:36. This page has been accessed 1,202 times.' followed by links for 'Privacy policy', 'About Wikicap', and 'Disclaimers'. A 'Powered By MediaWiki' logo is in the bottom right corner.



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## Guidelines for Best Practice and Quality Checking of Ortho Imagery

- Document status
- Introduction
- Requirements of Quality Assurance
- Scanning
- Air-Photo Orthorectification QA
- Airborne digital image acquisition and correction QA
- Satellite Image Correction QA
- Method for External Quality Checks
- References and Recommended Bibliography
- Acronyms and Abbreviations
- Definitions
- Orthoimage technical specifications for the purpose of LPIS

Categories: [Image processing](#) | [LPIS](#) | [Digital elevation model](#) | [Ground control points](#) | [Quality control](#) | [CwRS](#) | [Ortho Guidelines](#)

search

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2007 application on  
2005 orthophoto and LPIS

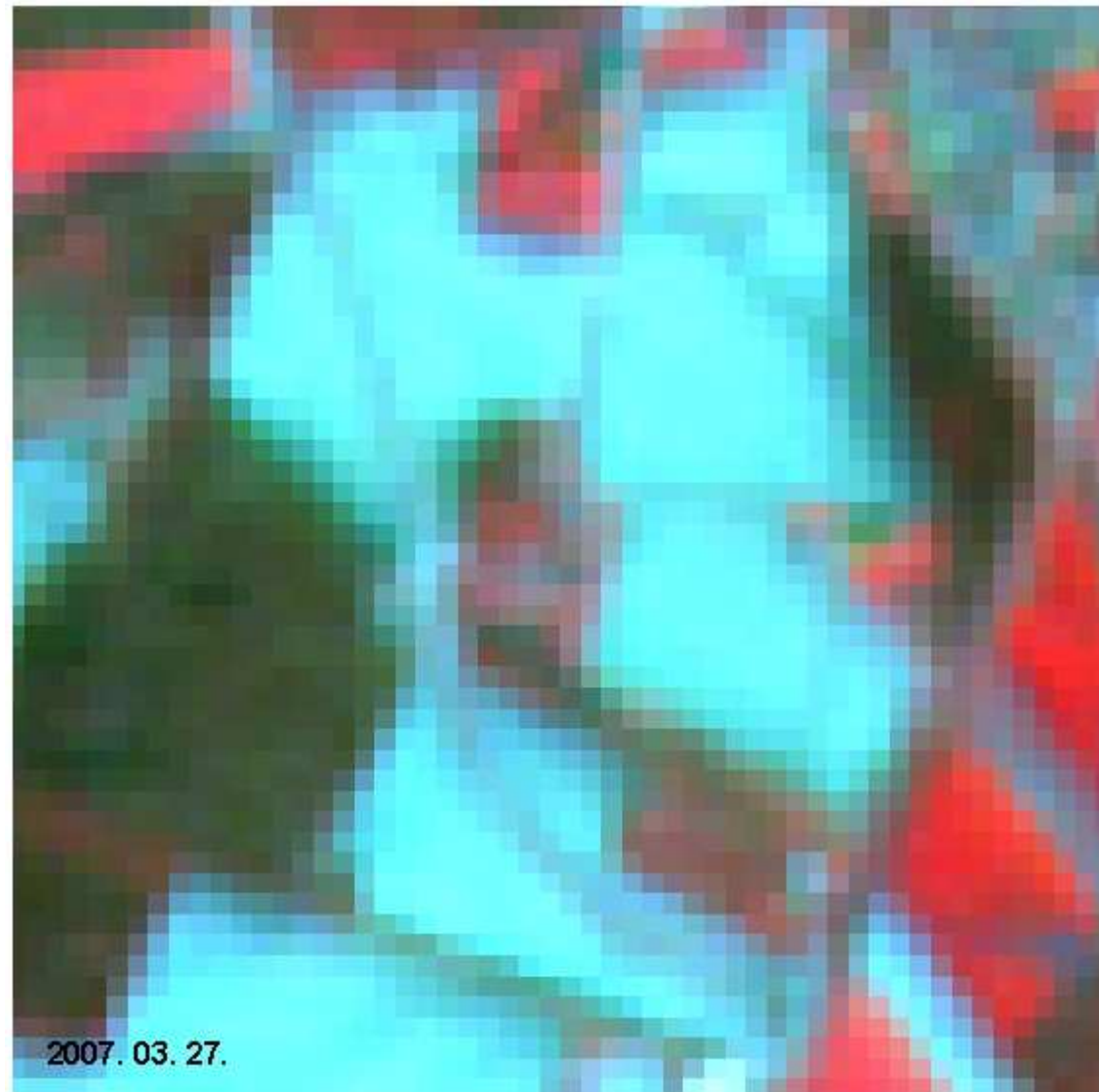
— Farmer's sketch 2007

Farmer claims that the  
road was built **after** he  
submitted his application  
(i.e. after 15/05/2007)



Farmer claims that the road was built **after** he submitted his application (i.e. after 15/05/2007)

Road construction has started well before the application was submitted: It can already be detected on High Resolution satellite images early 2006



## FEASIBLE STANDARDS TO BE CHECKED USING REMOTE SENSING (IX)

STANDARD GAEC08: MAINTENANCE OF RETAIN TERRACES, KEEPING THEIR DRAINAGE CAPACITY AND AVOIDING THE RISK OF SILTING UP AND GULLY FORMATION



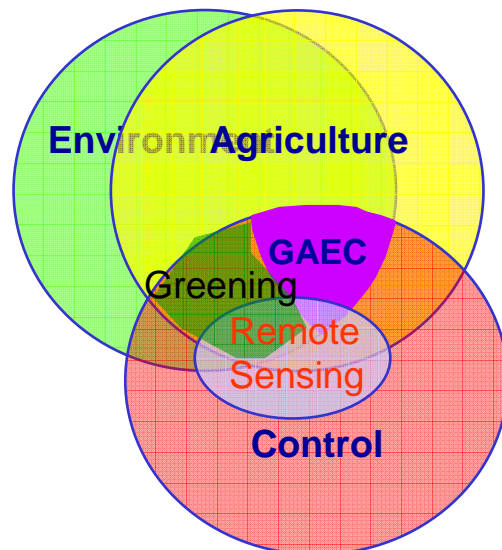
NON ELIMINATION OF TERRACES, BOUNDARIES, ETC IS CHECKED BY COMPARISON BETWEEN THE ORTHOPHOTO AND THE VHR IMAGE [Ref. Sardon, MARS PAC Annual Conf. 2007]



## Ortho-imagery use:

- orthoimagery acquired with off-nadir angles less than 30 degrees.
- use, if possible, orthoimagery with spatial resolution better than 1 meter.
- use the full spectral range of the imagery. If infrared channels are available, they should be used. the full use of the spectral information

- Extent of environmental concern and area concerned...
  - Greening of the CAP (crop diversification, winter cover, permanent pasture ...)
  - Intrinsic link between GMES and agriculture



- Simplification of payments  
but
- More complex land use-land cover management
- Almost all areas to consider but urban

## What's for the future?

### Landscape features (location, type)

- Hedgerow
- Group of trees
- Isolated trees
- Pond
- Ancient monument
- ...

### Land use / land cover

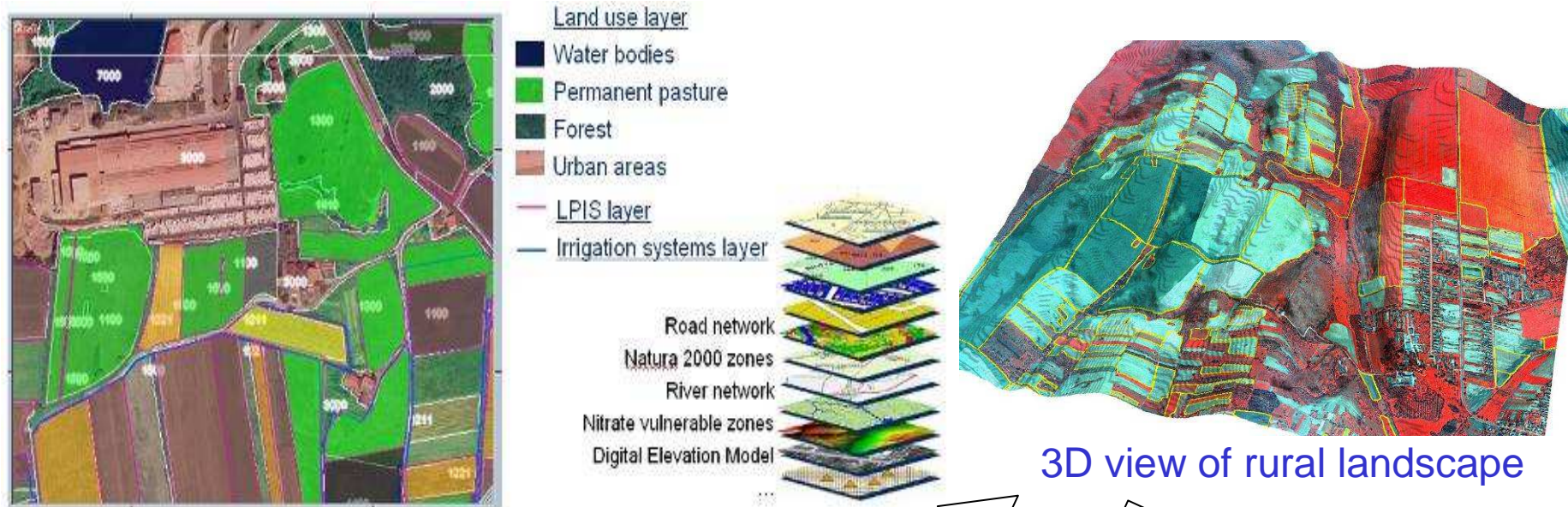
- Arable land
- pasture
- Forest
- Permanent crop
- ...

### Eligibility of land

100% eligible



## What's for the future?



**Provide relevant information** to farmers (digital, paper)  
**Increase awareness** on Cross Compliance (**Advice: FAS**)  
**Reduce risk** of infringements

But also all activities linked to GMES

→ **Sound management of rural areas (LPIS as cornerstone)**

Can also be derived from  
Remote sensing data



1. **Regular 3 years coverage of EU territory with VHR (0.5 m)  
< 0.5 m not necessary  
Aerial – LPIS QA  
Satellite – control**
  
2. **Multi spectral data**
  
3. **Very good ortho rectification  
Rapid availability  
Accurate DEM  
Close to nadir acquisition angle  
Very good ortho rectification**
  
4. **VHR Radar data (need of technical knowledge) winter, cloud, water ...**

*Thank  
you*