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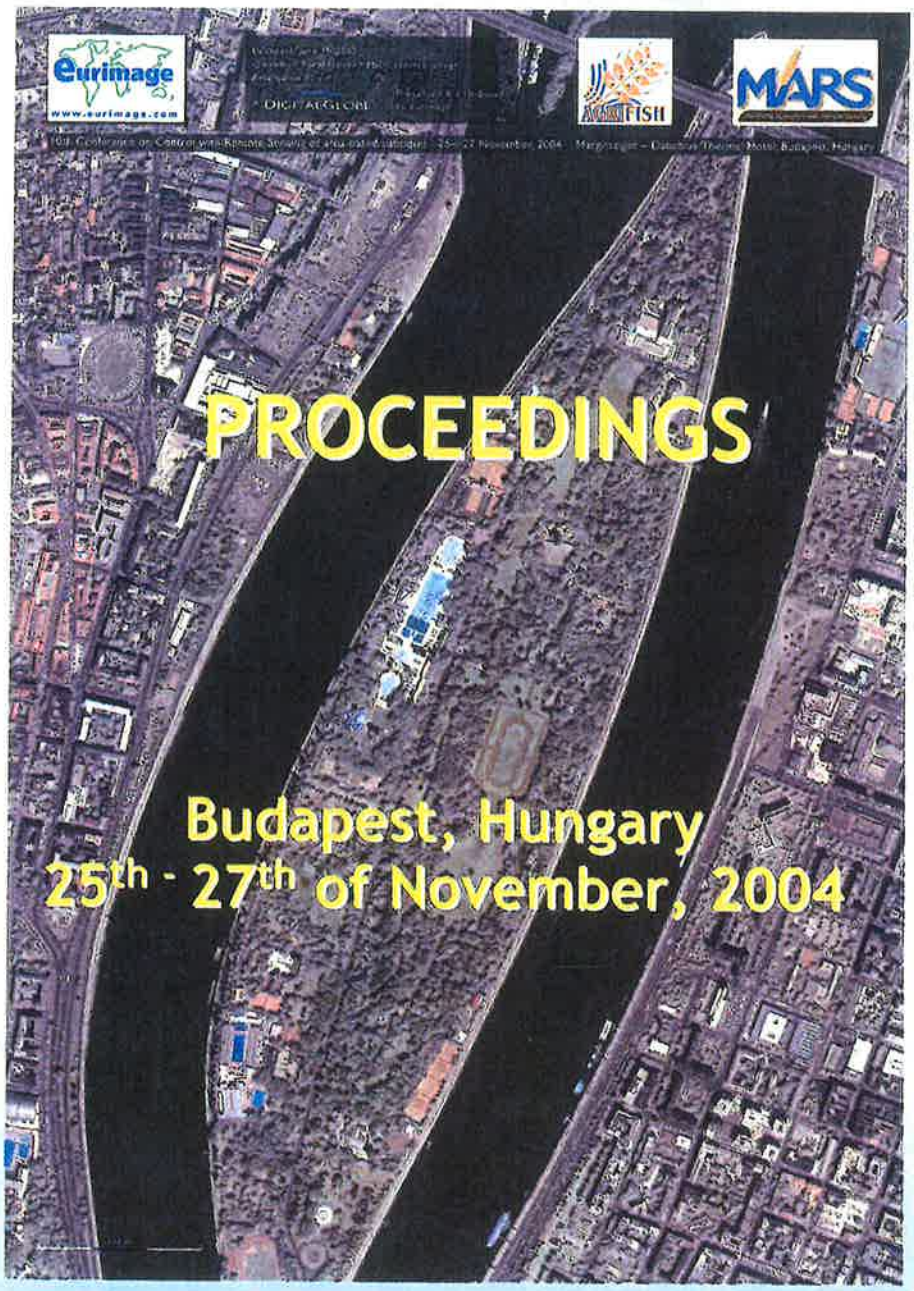
10TH ANNUAL CONFERENCE ON CONTROL WITH REMOTE SENSING OF AREA-BASED SUBSIDIES



S.P.I. 66502

AGRIFISH

MARS

MINISTRY OF AGRICULTURE AND
RURAL DEVELOPMENT

CelikCenter

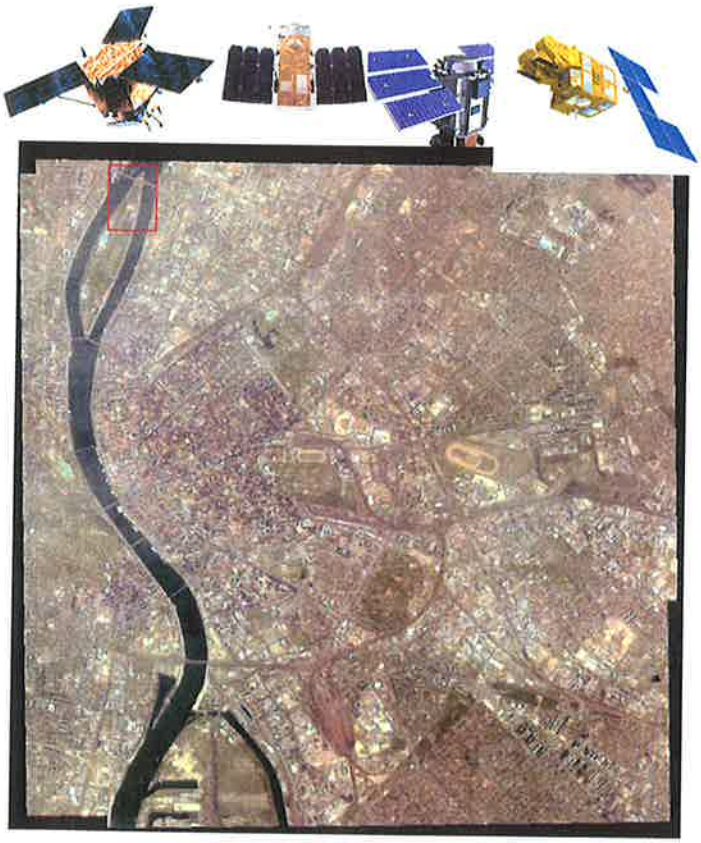
EUROPEAN COMMISSION
DIRECTORATE GENERAL JRC
JOINT RESEARCH CENTRE – ISPRA
Institute for the Protection and Security of the Citizen
Agrifish Unit

10th Annual Conference on Control with Remote Sensing of Area-based Subsidies
25th – 27th of November, 2004
Margitsziget Hotel, Budapest, Hungary

10th Annual Conference on Control with Remote Sensing of Area-based Subsidies Budapest, Hungary

25th - 27th of November, 2004

and 24th of November
- Restricted meetings with the MS Administrations -



Prepared by:	**Mihaela Fotin**	**Status:**	**Proceedings of Conference**
Approved by:	**Pär-Johan Åstrand, Jacques Delincé**	**Diffusion:**	**Internal: JRC, Agrifish Unit/ DG AGRI National Administrations Participants to the Conference**
Date: September 2005		**Ref: S.P.I. 66502**	

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LIST OF CONTENTS

Wednesday, 24th of November, 2004 (morning)

Restricted meeting for all 10 new MS Administrations and Candidate Countries as observers

Review of 2004's campaign in the new Member States

(Chairman: Tamás PRIBELA, HU Paying Agency ARDA; Co-chairman: Olivier LÉO, JRC)

Welcome and objective of the meeting

Presentation by the new MS (10 min each)

- Hungary (hosting Country);
- Cyprus, Czech Rep., Estonia, Lithuania, Latvia, Poland, Slovak Republic (SAPS);
- Malta, Slovenia (Full IACS);
- Discussion / Questions.

Discussion on common issues of the campaign (*Tamás Pribela, Olivier LÉO*)

- Quality of declarations, of LPIS; IACS data entry/administrative controls;
- Problems related to Image acquisition, ortho-rectification;
- General calendar / contractor, coordination with local offices;
- On the SPOT checks (rapid field visit) after CwRS;
- Control of GAECs (Good Agricultural and Environmental Conditions);
- Summary statistics, feed back from field quality checks;
- Discussion / Questions.

Wednesday, 24th of November, 2004 (afternoon)

Restricted meeting for all MS Administrations

(Restricted session for National Administrations of the 25 MS and Candidate Countries as observers).

(Chairman: Jacques DELINCÉ - HoU AgriFish Unit; Co-chairman: Pär ÅSTRAND - AgriFish Unit)

2004 Years Campaign

- Closure of 2004 – missing data for QC, results of QC, statistics, contractors reports, image return *(Hervé Kerdiles);*
- VHR Image orthocorrection – QB, IK, EROS, GCPs, DEM, SW suites (*Pär Åstrand);*
- Radar – use of SAR, future *(Hervé Kerdiles)*
- Discussions/ Questions and MS comments

Preparing 2005 Years Campaign

- ITT, participation to the 2005 Years campaign (*Pär Åstrand)*
- Image Provision – Recommandations 1 (*Pär Åstrand)*
- Common Technical Specifications *(Hervé Kerdiles)*
- MS National Addendums *(Philippe Loudjani)*
- Site selection and risk analysis *(Simon KAY, Csaba Wirnhardt)*
- Cross compliance (Olivier Léo)
- IACS/GIS (*Simon Kay)*
- Training *(Philippe Loudjani)*
- Discussions/ Questions

Future trends

- CwRS in medium term 2005+ *(Jacques Delincé)*
- Image acquisition in medium term 2005+ *(Jacques Delincé)*
- Discussion/ Questions

Posters/ SW demonstrations setup (Jazmin I/II, Magnolia)

For further details on this reastricted meeting, please consult

http://agrifish.jrc.it/marspac/CwRS/conferences.htm,

or contact directly Pär-Johan Åstrand (Par-Johan.Astrand@jrc.it)

Jacques Delincé, Olivier Léo, Pär Åstrand

INTRODUCTION

The 10th European Conference on *"Controls with Remote Sensing of area-based subsidies"* was held in Budapest on 24th - 27th of November 2004, organised by the JRC (Institute for the Protection and Security of the Citizen, AGRIFISH Unit, MARS) in collaboration with the Hungarian Ministry of Agriculture and Rural Development (MoARD) and Department of Lands and Mapping and the Central European Land Knowledge Centre (Celk).

A high number of participants attended this event (286), from 32 different countries including the EU25, 4 Candidate Countries, Switzerland, Israel, and Macedonia, 26 presentations (of which 10 were from the JRC), 33 posters and 7 software demonstrations. Such a high number of participants (image providers, competent authorities, paying agencies, contractors, software companies etc.) demonstrated the interest, the importance and the crucial role of the conference. Members of senior management participated from both the MoARD and JRC: András Pásztohy, State Secretary MoARD (HU), Norbert Berczi, Under State Secretary MoARD (HU), Jacques Delincé, Agrifish Unit Head, JRC, IPSC, lead qualified team representatives from the respective organisations. Key officials from Directorates General for Agriculture were also represented.

This Conference demonstrated the active participation of all Member States to the EU integration process and is an important achievement in the Community Policy Support.

The Conference was especially important because had offer the opportunity to discuss issues concerning;

- the 1st year of Control with Remote Sensing (CwRS) in an Enlarged EU (22 out of 25 MS used CwRS in 2004)
- the Single Area Payment Scheme (SAPs) which was adopted by 8 out of 10 New MS in 2004
- the Single Payments Scheme (SPS) of the CAP Reform which will be adopted by 10 out of the 15 former MS in 2005
- the image acquisition, where the Very High Resolution (VHR) data has increased in use from a successful 15,000 km² coverage in a test phase 2003, to a successful 50,000 km² coverage in an operational program in 2004, and with the aim of reaching approximately 130,000 km² in 2005.

The Conference was structured into 6 sessions, focusing on:

- The Implementation of the new regulations of CAP Reform and 1st year of SAP,
- Results of the 2004 Campaign,
- Image pre-processing, CAPI and classification,
- Definition of GAECs and possible control of Cross Compliance,
- IACS GIS and Remote sensing,
- Preparation of the 2005 campaign,
- High Resolution Airborne digital sensors, to which has been dedicated a podium discussion,

The MARS program now ended its 10th year of Controls. The goal is to continue working for a sound implementation of the CAP. It can only do so through a good collaboration with all the Member States, such we experienced with the Hungarian Ministry of Agriculture and Rural Development.

In conclusion, I would like to thank MoARD for their contribution to the success of the conference and for their warm hospitality. My particular thanks go to CELK Center and I would also like to include my thanks to the Institute of Geodesy, Cartography and Remote Sensing (FÖMI).

Jacques Delincé,
AGRIFISH Unit Head

	EUROPEAN COMMISSION DIRECTORATE GENERAL JRC JOINT RESEARCH CENTRE – ISPRA Institute for the Protection and Security of the Citizen Agrifish Unit	10th Annual Conference on Control with Remote Sensing of Area-based Subsidies 25th – 27th of November, 2004 Margitsziget Hotel, Budapest, Hungary

FINAL AGENDA

Thursday, 25th of November 2004

08:00-09:00	**Registration**
09:00-09:30	**Opening address and welcome** *(Norbert Berczi - Under State Secretary MoARD, HU)* *(Jacques Delincé - Agrifish Unit Head, JRC)* **Introduction** *(Pär Åstrand - Coordinator of CwRS Project)*
Session 1	**Chairman: Norbert Berczi - MoARD, HU**
09.30-11.00	The implementation of the new regulations of CAP reform, and 1st year of SAP
20'	Implementation of the CAP Reform - state of play *(Daniele Bianchi - DG AGRI H.1)*
20'	Reflections on the new CAP, Italy *(Maurizio PiomponI - AGEA, IT)*
20'	The German implementation *(Axel Heider - BMVEL, DE)*
25'	Implementing SAPS and controls in Hungary *(Tamás Pribela, Gabor Csornai - Paying Agency ARDA FÖMI, HU)*
11:00-11:30	**Coffee break**
Session 2	**Chairman: Philippe Loudjani – JRC, Agrifish Unit**
11.30-13.00	**Review of the 2004 CwRS Campaign**
20'	Summary Statistics 2004 *(Paolo Pizziol – JRC, Agrifish Unit)*
25'	Results of QC by JRC *(Hervé Kerdiles – JRC, Agrifish Unit)*
15'	Summary of 2004 HR, RADAR image acquisition *(Paolo Pizziol – Agrifish Unit)*
15'	Summary of 2004 VHR image acquisition campaign *(Pär Åstrand - JRC, Agrifish Unit)*
13:00-14:30	**LUNCH [sponsored by ImageSat (EROS A)], *Platán Restaurant***
	[press conference 13.00 – 14.30 Magnolia]
Session 2	**Chairman: Philippe Loudjani – JRC, Agrifish Unit**
14.30-15.05	**Review of the 2004's CwRS Campaign**
15'	Pilot study on the Control with Remote Sensing in Bulgaria *(Pavel Milenov - BASA, BG)*

Thursday, 25th of November 2004

20'	Pilot project and strategy for the implementation of the LPIS in Romania *(Alexandru Badea - ROSA / CRUTA, Vasile Grigorescu - National Agency for Cadastre & Land Registration, RO)*
Podium Discussion	**Chairman: Jacques Delincé – JRC, Agrifish Unit; Co-chairman: Simon Kay - JRC, Agrifish Unit**
15.15 - 16.45	**"Space and Aerial VHR imagery - competition or complement"** • Satellite Image Provider *(Adrian Zevenbergen – EUSI)* • Aerial Flight Company *(Rolf Becker – MAPs)* • Instruments *(Arthur Rohrbach – Leica)* • Contractor *(Klaus Komp – Eftas)* • MS Administrations *(V. Ortiz - Junta de Andalucia, ES, J-C. Graciette - ONIC, FR)*
16.45 - 17.15	**Coffee break**
16.45 - 18:45	**Posters / SW demonstrations (with best poster/sw demo contest)**
19:00	**Gala Dinner - 19.00 bus departure for the Historical Museum of the Buda Castle, Budapest (*MoARD*)** **Key Note:** Dr.Miklós Szőke, Director of the Hungarian Paying Agency ARDA

Friday, 26th of November 2004

Session 3	**Chairman: Gabor Csornai - FÖMI, HU** **Co-Chairman: H Kerdiles - JRC, Agrifish Unit**
08.30 - 10.30	**Image Pre-Processing, CAPI, and classification**
15'	Identification of Nuts eligible parcels using satellite VHR: an Italian experiment *(Livio Rossi - Agrisian, IT)*
15'	1st results of control of nuts with RS in France *(Fleur Francois-Chemery - ONIC-ONIOL, FR)*
20'	Assessing the use of low elevation angle imagery and multiple image blocks with reduced ground control *(Simon Kay – JRC)*
20'	Image Fusion without Changes in Spectral Characteristics: FFT Based Filtering and IHS Transform *(Manfred Ehlers - GiN, DE)*
20'	Comparison of different methods for supervised digital classification of VHR images *(Jerzy Chmiel - ARIMR; Uni. of Technology Warsaw, PL)*
20'	Test of classification with VHR data in the Spanish Remote-sensing Control of Arable & Forage Land (2004 campaign) *(Charo Escudero - Tragsatec, ES)*

Friday, 26th of November 2004

10.30 – 11.00	**Coffee break**
Session 4	**Chairman: Axel Heider – BMVEL, DE** **Co-chairman: Olivier Léo – JRC, Agrifish Unit**
11.00 – 13.00	**Definition of GAECs and possible Control of Cross Compliance**
30'	Definition of GAECs and possible Control of Cross Compliance with Remote Sensing *(Olivier Léo – JRC)*
20'	Implementation and control of GAECS in 2004 in Hungary I. László - FÖMI, HU *(Istvan László - FÖMI, HU)*
20'	Definition of GAECs in France and possible control with RS *(Fleur Francois-Chemery - ONIC-ONIOL, FR)*
20'	Implementation and control of GAECS in 2004 in Czech Republic *(Lucie Šavelkovà - SZIF, CZ)*
13.00-14:30	**LUNCH - [sponsored by Eurimage, and DigitalGlobe (Quickbird)], *Platán Restaurant***
Session 5	**Chairman: Lucie Šavelkovà - SZIF, CZ** **Co-chairman: Simon Kay – JRC, Agrifish Unit**
14.30 – 15.30	**IACS GIS and Remote Sensing**
20'	An independent evaluation of the SPOT Image Référénce3D digital elevation model and orthoimage products *(Simon Kay – JRC, Agrifish)*
20'	On the spot controls in Poland *(Jacek Podlewski - ARIMR, PL)*
20'	GRmap: A modern, GIS enabled, on-line data capture system for the submission of subsidy applications in Greece *(Gregory Stefanakos - OPEKEPE, GR, Glen Millar - eSpatial, IE)*
15.30-16.00	**Coffee break**
Session 6	**Chairman: Pär Åstrand – JRC, Agrifish Unit**
16.00 – 17.00	**Preparation of the 2005 Campaign**
15'	Common Technical Specifications *(Hervé Kerdiles - JRC, Agrifish)*
15'	Image Provision 2005, Recommendations. 1 *(Pär Åstrand - JRC, Agrifish)*
15'	Image Server - An Application for Archiving CwRS Imagery *(A. Burger – JRC, Agrifish)*
	A.O.B. – future trends, QC, image return, questions, discussion
17.00	**Conference closure**

OPENING ADDRESS AND WELCOME

Norbert Berczi - Under State Secretary MoARD
Jacques Delincé - Agrifish Unit Head, JRC

Pär Åstrand, Norbert Berczi, Jacques Delincé

OPENING ADDRESS AND WELCOME – Jacque DELINCÉ, Agrifish Unit Head

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Conference Introduction

J. Delincé

Head of AGRIFISH Unit

10th Annual CwRS Conference, November 2004, Budapest, HU

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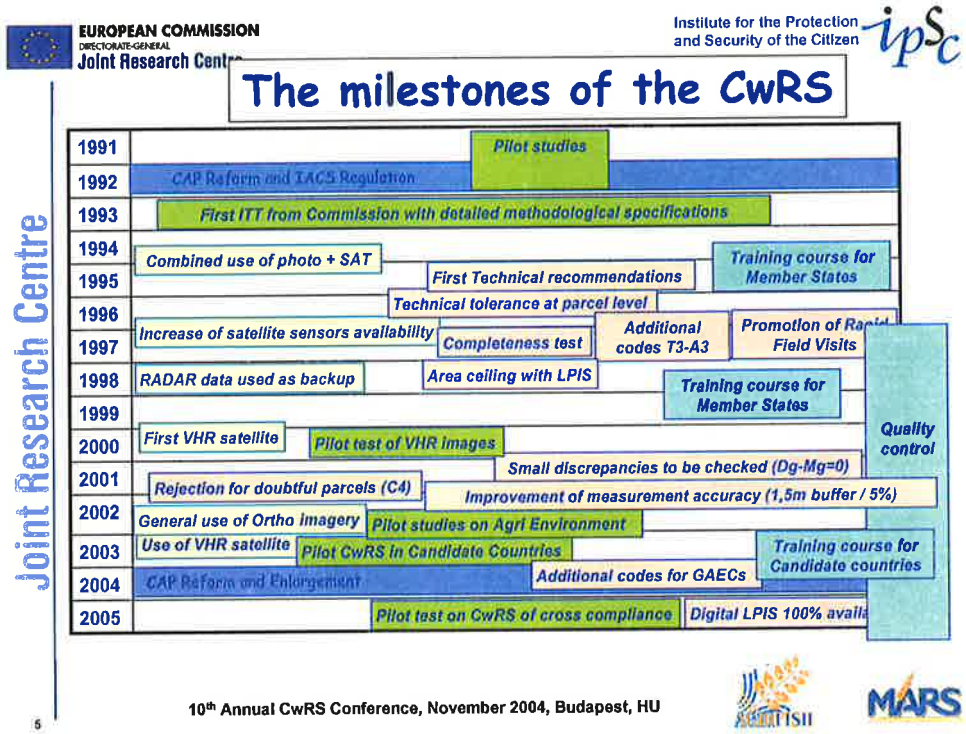
The coordination by the JRC

- Member states are responsible of CAP implementation & control.
- AGRI (1997) requested the JRC to ensure the CwRS technical coordination

This involves:

- Establishment of Common technical specifications and recommendations in conformity with EC regulations;
- Acquisition of satellite images on behalf and real time provision to MS;
- Technical watch on new sensors, new technologies;
- Technical support to MS and best practices workshops & trainings;
- Performance of external Quality Control of national contractors;
- Support to DG AGRI in the auditing of national Administrations.

MARS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The milestones of the CwRS
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1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Pilot studies
CAP Reform and IACS Regulation
First ITT from Commission with detailed methodological specifications
Combined use of photo + SAT
First Technical recommendations
Training course for Member States
Technical tolerance at parcel level
Increase of satellite sensors availability
Completeness test
Additional codes T3-A3
Promotion of Rapid Field Visits
RADAR data used as backup
Area ceiling with LPIS
Training course for Member States
Quality control
First VHR satellite
Pilot test of VHR images
Small discrepancies to be checked (Dg-Mg=0)
Rejection for doubtful parcels (C4)
Improvement of measurement accuracy (1,5m buffer / 5%)
General use of Ortho Imagery
Pilot studies on Agri Environment
Use of VHR satellite
Pilot CwRS in Candidate Countries
Training course for Candidate countries
CAP Reform and Enlargement
Additional codes for GAECs
Pilot test on CwRS of cross compliance
Digital LPIS 100% avail
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10th Annual CwRS Conference, November 2004, Budapest, HU
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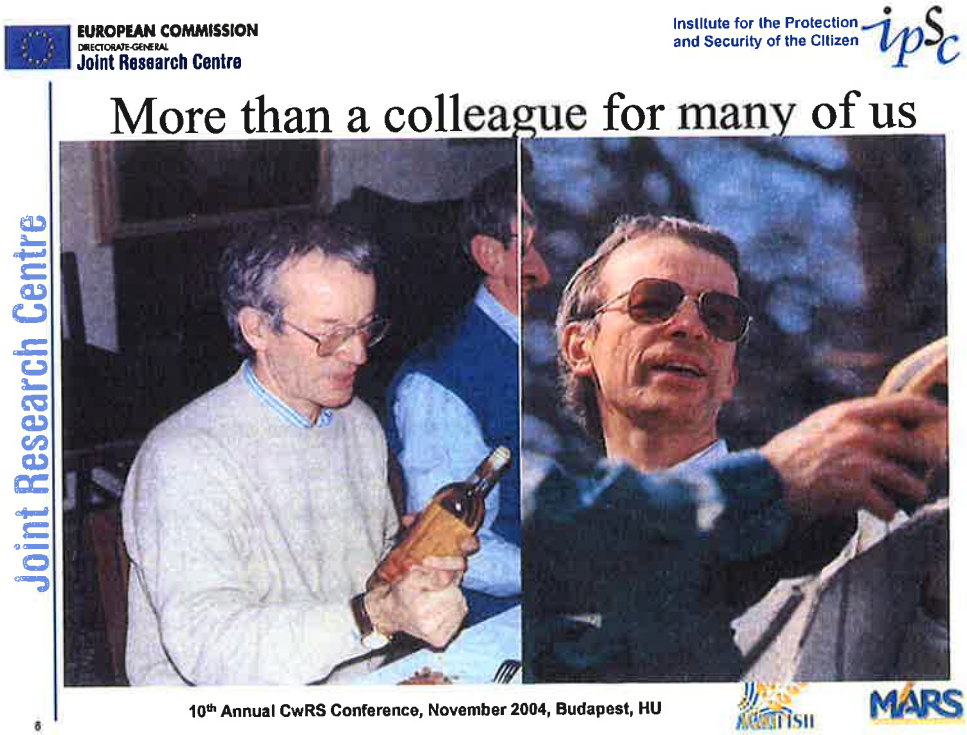
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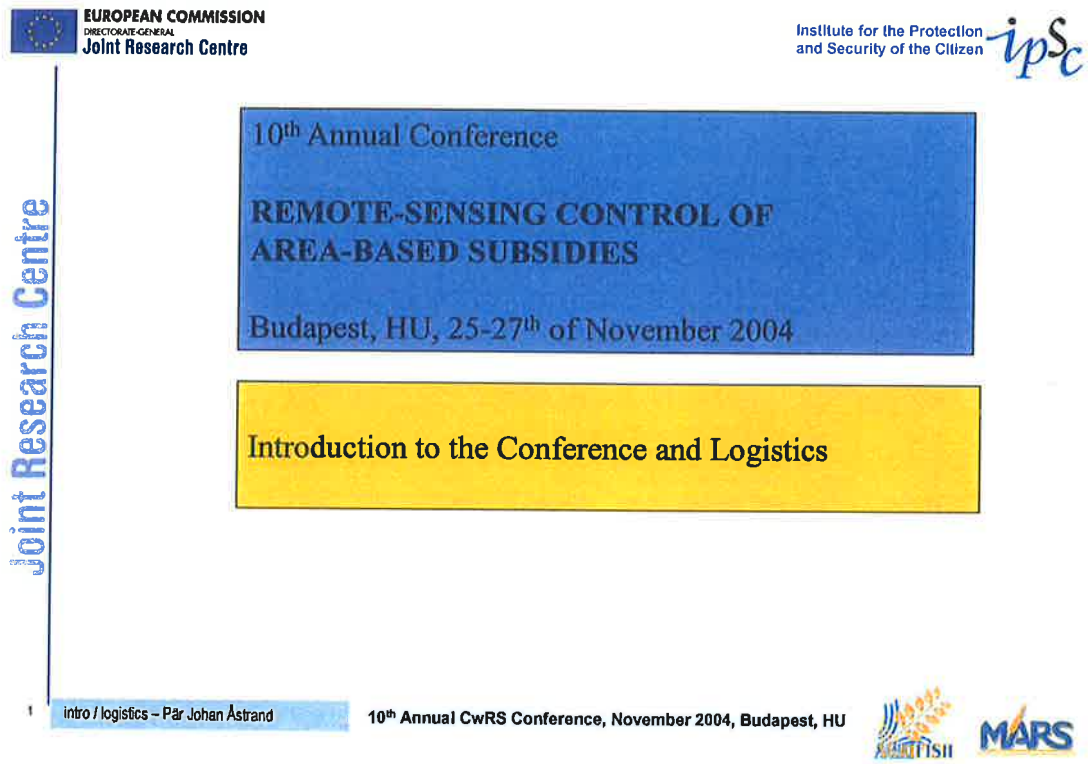
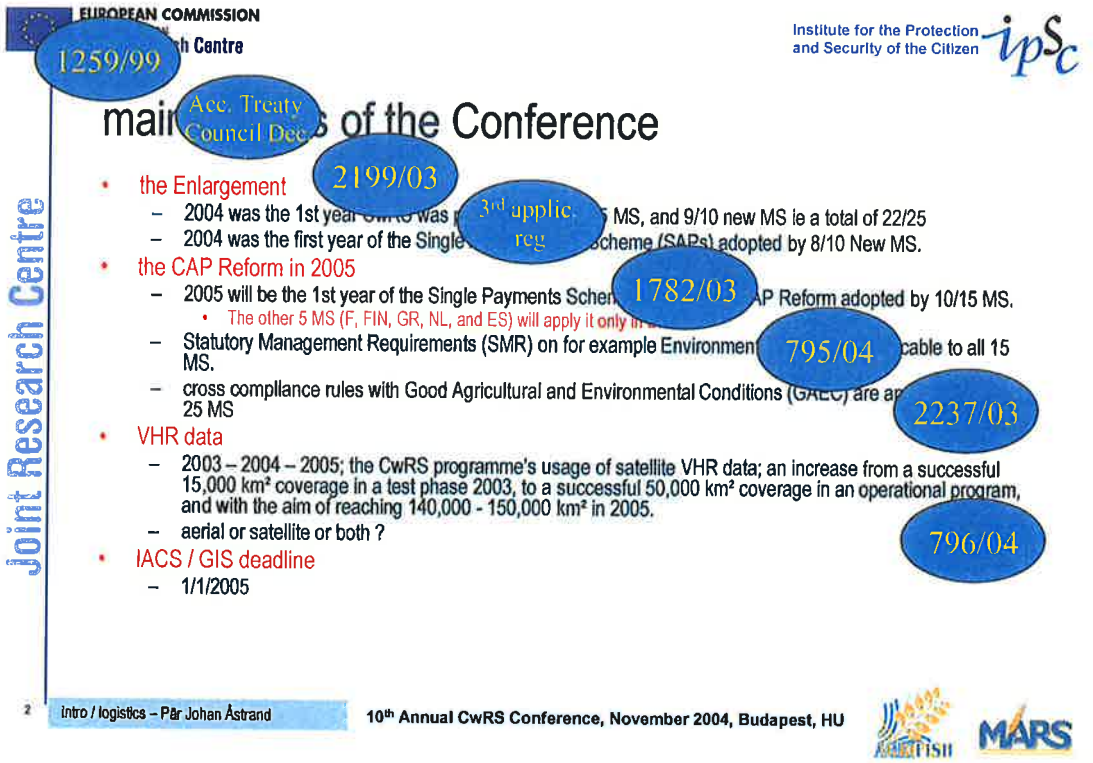
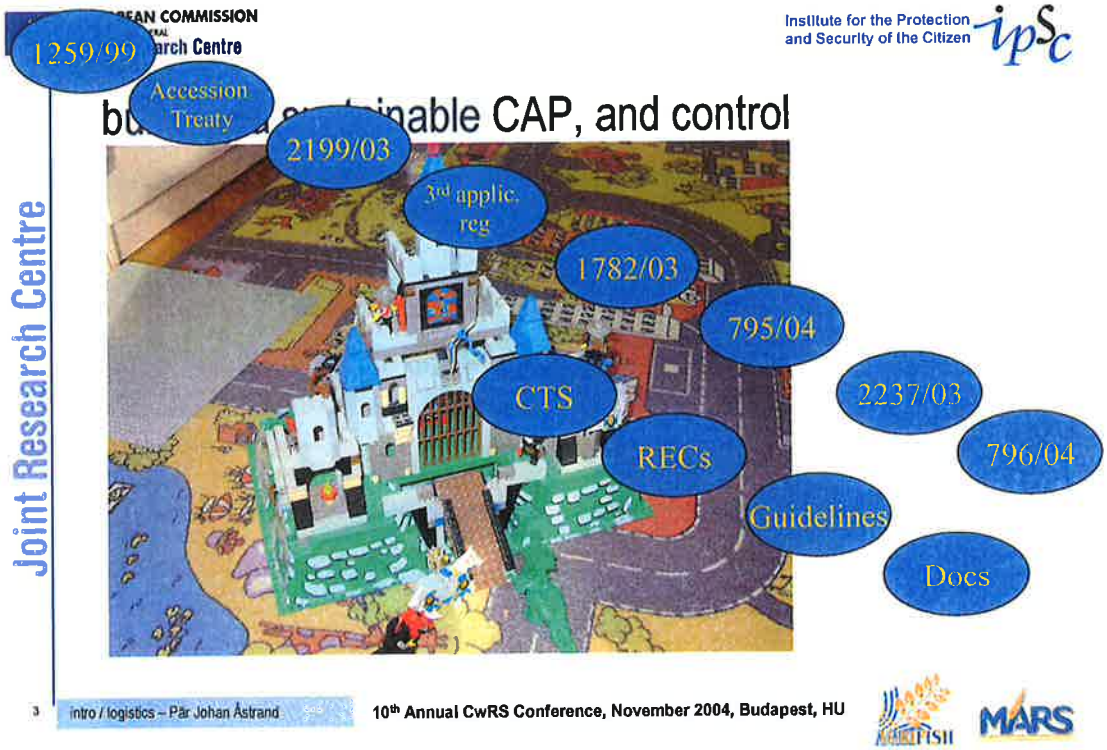
INTRODUCTION TO THE CONFERENCE – Pär Åstrand, Agrifish Unit, JRC



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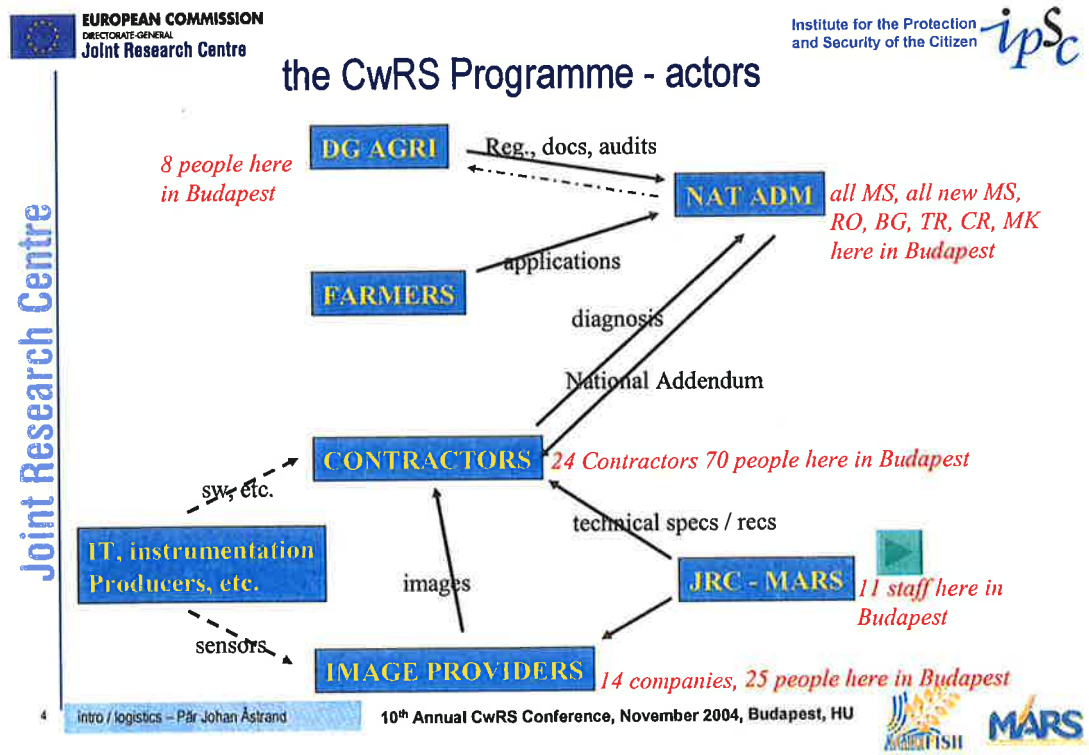
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the CwRS Programme - actors
Joint Research Centre
8 people here in Budapest
DG AGRI
Reg., docs, audits
NAT ADM
all MS, all new MS, RO, BG, TR, CR, MK here in Budapest
FARMERS
applications
diagnosis
National Addendum
CONTRACTORS
24 Contractors 70 people here in Budapest
sw, etc.
IT, instrumentation Producers, etc.
technical specs / recs
JRC - MARS
11 staff here in Budapest
images
sensors
IMAGE PROVIDERS
14 companies, 25 people here in Budapest
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participants

- ±286 participants !!!
  - 115 (96), 126 (97), 140 (98), 135 (99), 174 (00), 160 (01), 160(02), 216(03)
  - registration deadline – next year please be in time…
- 35 Invited experts from 29 countries
  - EU15, new MS 10, CCs (BG, RO, CR, TR)
  - 2 professors
- 19 Commission representatives
  - 8 DG-AGRI
  - 11 DG JRC MARS
- 32 countries total
  - Macedonia (5), Switzerland (2), Israel (1)

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program – 6 sessions plus Podium Discussion

Session 1 - "The implementation of the new regulations of CAP reform, and 1st year of SAPS" *(chair: Dr. N Berczi, HU) (4 presentations)*

Session 2 – "Review of the 2004 CwRS Campaign" *(chair P Loudjani) (6)*

Podium Discussion – "Podium Discussion – "Space and Aerial VHR imagery - competition or complement" *(chair J Delincé, S Kay)*

Session 3 – "Image Pre-Processing, CAPI, and classification" *(chair G Csornai, HU) (6)*

Session 4 – "Definition of GAECs and possible control of cross-compliance" *(chair A Heider) (4)*

Session 5 - "IACS GIS and Remote Sensing" *(chair L Savelkova) (3)*

Session 6 – "Preparation of the 2005 Campaign" *(chair P Åstrand) (3)*

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program – cont.

- 26 presentations
- 40 poster/sw presentations
  - 33 posters
  - 7 computer sw demonstrations
    - best poster /sw demo contest
    - see bags for voting rules
- proceedings a.s.a.p.
  - all abstracts on website

if you have not provided us with a digital copy of your presentation contact chairman of your session or Pär Åstrand a.s.a.p.

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logistics - reimbursement

- Administration Delegates from current and new MS, invited experts (35)
  - please go to registration desk: Nathalie MAGONETTE, Ulrike WINTER
  - please bring your
    - pre-filled reimbursement and financial forms
    - ticket and BOARDING PASS (for copy)

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logistics at the Margitsziget

- all conference presentations, plenary sessions
  - STAR Auditorium (> 200p), video transfer to Jazmin I/II (100p)
- posters
  - Jazmin I/II, number given by registration desk
- sw demonstrations
  - Magnolia, number given by registration desk
  - wireless high-speed Internet access (contact C Wirnhardt), 2 PC available for browsing, printing etc.
- press conference
  - Magnolia 13.00 – 14.15; 25/11/2004
- lunches
  - Platán restaurant, Szechenyi restaurant (check which on your lunch ticket)
- gala dinner 25/11/2004
  - Historical Museum of the Buda castle (host MoARD, HU)
- sightseeing - Wednesday (24/11/2004), Saturday(27/11/2004) (payment to CELK)

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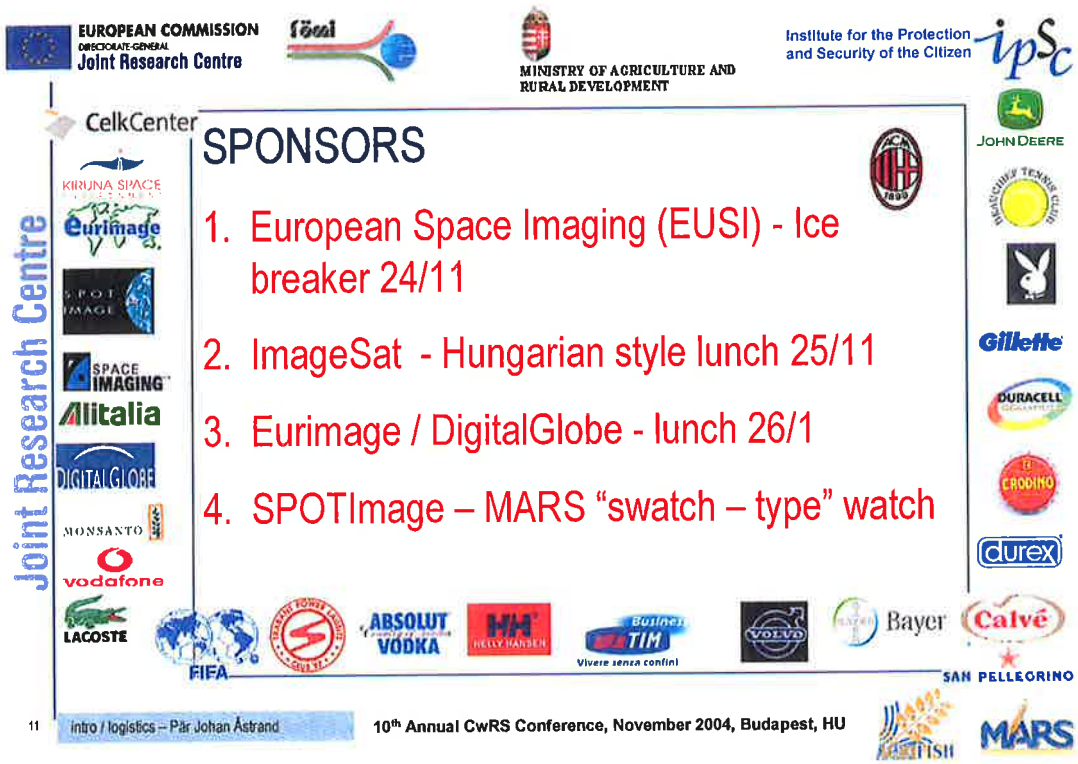
logistics - translation

- translation
  - 5 spoken languages: EN, FR, DE, ES, IT
  - 3 translated languages: EN, FR, DE
  - please be careful with the equipment
  - please do NOT talk with headphones on!
  - Headphones available also in Jazmin, but no questions from Jazmin, interpreters need to see you...

- please, try to follow schedule...

- please, switch off cell phones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SPONSORS
1. European Space Imaging (EUSI) - Ice breaker 24/11
2. ImageSat - Hungarian style lunch 25/11
3. Eurimage / DigitalGlobe - lunch 26/1
4. SPOTImage – MARS "swatch – type" watch
JOHN DEERE
Gillette
DURACELL
durex
KIRUNA SPACE
Eurimage
SPOT IMAGE
SPACE IMAGING
Alitalia
DIGITALGLOBE
MONSANTO
vodafone
LACOSTE
FIFA
ABSOLUT VODKA
HH HELLY HANSEN
TIM
Vivere senza confini
VOLVO
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Calvé
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thank you !!!
– and thank you to the Hungarian Ministry of Agriculture and Rural Development (MoARD) for hosting us
– and thank you to the CELK (Central European Land Knowledge Centre) for their help in organising this event
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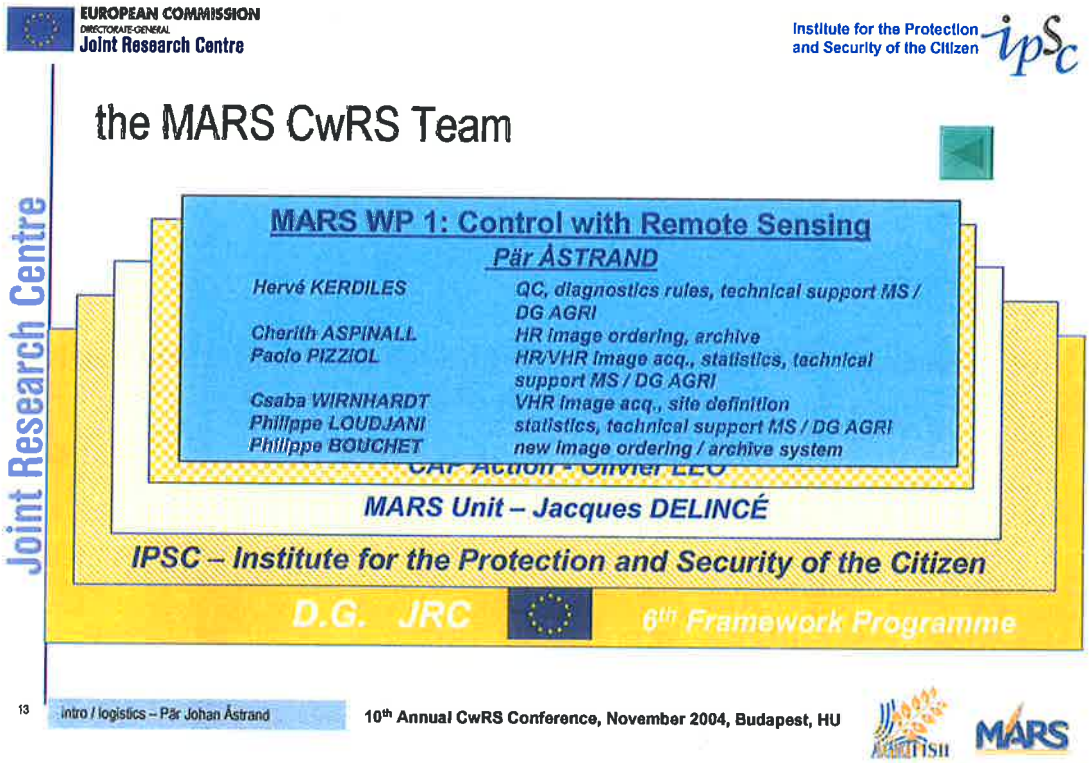
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the MARS CwRS Team
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MARS WP 1: Control with Remote Sensing
Pär ÅSTRAND
Hervé KERDILES
QC, diagnostics rules, technical support MS / DG AGRI
Cherith ASPINALL
HR image ordering, archive
Paolo PIZZIOL
HR/VHR image acq., statistics, technical support MS / DG AGRI
Csaba WIRNHARDT
VHR image acq., site definition
Philippe LOUDJANI
statistics, technical support MS / DG AGRI
Philippe BOUCHET
new image ordering / archive system
MARS Unit – Jacques DELINCÉ
IPSC – Institute for the Protection and Security of the Citizen
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Session 1 – The implementation of the new regulations of CAP reform, and 1st year of SAPS

Chairman: Norbert BERCZI, Ministry of Agriculture and Rural Development (MoARD), HU

Presentation 1 – Implementation of the CAP Reform - state of play

(Daniele BIANCHI
European Commission/
DG AGRI, H.1)

Abstract

After the recent adoption of the CAP Reform and one month before its application (1.1.2005) this presentation gives and overview of the implementation of the reform in the different Member States. A first part focuses on the implementation of the single payment scheme (SPS) in the "old" Member States stressing the different choices made: regional/historical model, decoupling/recoupling.

A second part focuses on the implementation of the single area payment scheme (SAPS), the simplified transitional regime for the "new" Member States underlining its differences from the single payment scheme.

Keywords: CAP Reform, Single Payment Scheme (SPS), single area payment scheme (SAPS), decoupling/recoupling.

IMPLEMENTATION OF THE CAP REFORM
State of play

Budapest, November 2004

• European Commission
Directorate General for Agriculture
Daniele Bianchi
DG AGRI - Agricultural Law Unit

COUNCIL REGULATION (EC) No 1782/2003

establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers* (OJ L 270, 21.10.2003, p. 1)

- Implementing rules = corpus iuris direct payments
  - Reg. 795/2004 (OJ L 141, 30.4.2004) (+ modif Reg. /2004 (OJ L , .11.2004) (SPS)
  - Reg. 796/2004 (OJ L 141, 30.4.2004) (Cross comp./ IACS) (+/ modif being adopted)
  - Reg. 2237/2003 (OJ L 339, 24.12.2003) (other direct payments 2004) (repealed)
  - Reg. / 2004 (OJ L , .11.2004) (all other direct payments + SAPS)
  - Reg. 2199/2003 (SAPS) + decisions top-ups
  - transitional rules modulation (reg. 1655/2004)

*modified by CR21/2004, CR 583/2004, CDec 281/2004, CR 864/2004

Part I

Implementation of the CAP Reform in Member States

Single payment scheme (SPS)

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When will the reform be implemented?

Year	Member States
2005	Austria, Belgium, Denmark, Germany, Ireland, Italy, Luxemburg, Portugal, Sweden, UK
2006	Finland, France, Greece, Netherlands, Spain
2007	Malta, Slovenia
2009 at the latest	Cyprus, Czech Republic, Hungary, Latvia, Lithuania, Poland, Slovakia

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How will the reform be implemented?

Historical model	Regional model	
	Static Hybrid	Dynamic Hybrid
Austria, Belgium, *France*, Ireland, Italy, Netherlands, Portugal, Spain, UK-Scotland, UK-Wales	Denmark, Luxemburg, Sweden, UK-Northern Ireland	*Finland*, Germany, UK-England

The text in *italics* are based on informal information

Member States opting for the transitional period will communicate their choices one year before the implementation of the SPS.

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(1) How will the historical models be implemented?

Member States	Regions	Re-coupling/ National envelop (art 69 of R.1782/2003)
Austria	No	-suckler cow premium 100% -slaughter premium for bovine 40% -slaughter premium for calves 100% -hops payments 25%
Belgium	Flanders + Brussels	-suckler cow premium 100% -slaughter premium for calves 100% -seeds (partial) 100%
Belgium	Wallonia	-suckler cow premium100% -seeds (partial) 100%
France	*No*	*-suckler cows 100%* *-slaughter premium for bovine 40%* *-slaughter premium for calves 100%* *-ewe premium 50%* *-cereals 25%* *-outermost regions excluded*
Ireland	No	None

The text in *italics* are based on informal information

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(2) How will the historical models be implemented?

Member States	Regions	Re-coupling/National envelop (art 69 of R. 1782/2003)
Italy	No	-seeds 100% Art 69: for quality production (7% in arable, 8% in bovine and 5% in ovine sector)
Netherlands	No	-slaughter premium for bovine 100% -slaughter premium for calves 100% -seeds for linseed 100%
Portugal	No	-suckler cow premium 100% -slaughter premium for bovine 40% -slaughter premium for calves 100% -ewe premium 50% -seeds 100% -outermost regions 100% -Art 69: 1% (arable crops, rice, animal sector)
UK	Scotland	None -Art 69: 10% in bovine sector
	Wales	None

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(1) How will the static/hybrid models be implemented?

Member States	Regions	Model	Re-coupling National envelop (art 69)
Denmark	One region	Lower amounts for permanent pasture Historical basis for top-ups: -ewe premium 50% -suckler cow premium 64% -special premium 9% -dairy premium 59.5% in 2005 and 73% in 2006	-special premium 75% -ewe premium 50%
Luxem burg	One region	Historical basis for top-ups: -area payments 65% -special premium 65% -slaughter premium 65% -additional payments for bovines 65% -ewe premium 65% -seeds 65% -suckler cow premium 85% -dairy payments 85%	None

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(2) How will the static/hybrid models be implemented?

Member States	Regions	Model	Re-coupling National envelop (art 69)
Sweden	5 Regions	Lower amount for pasture land Historical basis for top-ups: -dairy 67.5% -suckler cows 50% -extensification premia 50% -slaughter premium 40% -supplementary area payment 100%	-special premium 74.55% -Art 69: 0.45% for all sectors
UK	Northern Ireland	Historical basis for top-ups: -suckler cow premium 100% -special premium50% -slaughter premium adults 50% -slaughter premiums calves 100% -dairy premium -ewe premium 65% -ewe premium LFA top-up 20% -area payments 80% -dried fodder 80%	None

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(1) How will the dynamic/hybrid models be implemented?

Member State	Regions	Model	Re-coupling/ National envelop (art 69)
Germany	Bundes-länder	Moving to a total flat rate Different amount for grassland initially Historical basis in 2005 for top-ups: -suckler cow premium 100% -special premium 100% -slaughter premiums for calves 100% -extensification premium 50% -ewe premium 100% -dairy premium 100% -de-coupled part of dried fodder -de-coupled part of starch 25%	-hop payments 25% -tobacco payment (until 2009) 60% -potato starch 60% -dried fodder 50%

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(2) How will the dynamic/hybrid models be implemented?

Member States	Regions	Model	Re-coupling/National envelop (art 69)
UK	England normal	Moving to a total flat rate starting with 90% historical to be 0% in 2012	None
UK	England SDA non moorland	A lower flat rate than England normal	None
UK	England SDA moorland	A lower flat rate than England non moorland	None
Finland	*3 Regions*	*-Historical basis for top-ups:* *-Special premium 25%* *-Dairy payments 70%* *To be transferred to flat rate later*	*-special premium 75%* *-ewe premium 50%* *-Art 69: 10% for quality beef*
The text in *italics* are based on informal information			

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When will the Dairy premium be decoupled?

Year	Member States
2005	Denmark, Germany, Ireland, Luxemburg, UK
2006	Belgium, Finland, France, Italy, Spain
2007	Austria, Netherlands, Portugal, Sweden,

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Part II

Implementation of the CAP Reform in Member States

Single Area payment scheme (SAPS)

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SAPS transitional scheme

- **Applying SAPS**
  - Cyprus
  - Czech Republic
  - Hungary
  - Latvia
  - Lithuania
  - Poland
  - Slovakia
- **Not applying SAPS**
  - Malta
  - Slovenia

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Comparison main rules (1)

- **SAPS**
- transitional (3y+1+1) then SPS
- area based payment
- (no entitlements, no transfert of rights, no Nat. Reserve)
- single amount

- **SPS**
- transitional period (2005-2007) then permanent
- area based payment (via payment entitlements)
- variable amount (historical/regional)

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Comparison main rules (2)

- **SAPS**
- eligible land: arable land, permanent grassland, permanent crops, kitchen garden
- 1 ha limit
- use of land: no set aside, fruit & veg allowed

- **SPS**
- eligible land: arable land and permanent pasture
- 0.3 ha limit
- use of land: set aside, fruit & veg (limited exclusion)

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Comparison main rules (3)

- **SAPS**
- cross compliance
  - G.A.E.C.: yes
  - statutory manag. Requirements: optional

- **SPS**
- cross compliance
  - G.A.E.C.: yes
  - statutory manag. Requirements: yes

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Presentation 2 – Reflections on the new CAP, Italy

Maurizio PIOMPONI
AGEA, IT

Abstract

The CAP reform (Reg. 1782/03) is changing the European point of view of the agricultural policy by partially abandoning direct crop payments (decoupling) and adding the cross compliance components such as the Statutory Management Requirements (SMR) for Council Directives and Regulations and the Good Agricultural and Environmental Conditions (GAEC).

Italy has decided to accept this challenge, starting from 2005. AGEA (National Agency for Payments in Agriculture) coordinates on behalf of the Minister of Agriculture, the OPR (Regional Organizations for Payments). In addition, AGEA uses Agrisian, a value adding Company both for IACS - national GIS maintaining and implementing and farmer declaration controls

The presentation will mainly show the administrative path to carry out the Reform, and in particular:

- The national and regional rules for establishing farm guidelines for GAEC and SMR
- The selected verification indexes to apply, considering regional limitations
- The updated control methodology, on the basis of an integrated use of the available data, tools and skills ; the new approach for a new collaboration to farmers
- The Remote Sensing contribution: multi-temporality, spatial integration and risk analysis
- The new environmental parameters to be considered and their integration into the GIS-AGEA, already operational at national level

The aim and the challenge of AGEA is to find an approach towards a competitive, environmentally friendly and quality-oriented farming sector in Italy

Keywords: New CAP, GAEC, VHR, decoupling

Reflections on the new CAP, Italy

Maurizio Piomponi
AGEA
m.piomponi@agea.gov.it

Implementation of the Single Farm Payment and definition of the Cross-compliance approach

Implementation of the new CAP: Italian Government decisions

Start time	**January 1, 2005**
Decoupling system	**Data history at national level**
Production sectors	
Arable crops	**Total decoupling**
Certified seeds	**Decoupling 0%**
Cattle	**Total decoupling**
Sheep and goats	**Total decoupling**
Oil	**From 2006 – Decoupling 90%**
Tobacco	**From 2006 – Decoupling 40%**
Dairy	**From 2006 – Total decoupling**
Administration of reserves	**Centralised**

New CAP and SFP
Key players and regulations

- **Ministero delle Produzioni Agricole e Forestali – MiPAF**
- **AGEA**
  - **OPR**
    (Organismi Pagatori Regionali- Regional Paying Agencies)
  - **CAA**
    (Centri di Assistenza Agricola - Agricultural Help Centres)
- **Farmers and their associations**
- **EU – JRC**

AGEA

- **Italian agency coordinates both the implementation of the PAC reform and the creation the SFP system**

Procedure:

- Initial Analysis to define Provisional Titles
- Definition of the rules for accessing to single payment procedure
- Definition of Definitive Titles

Timescale

November 2004

- Validation of rules for determining provisional titles
- Definition of forms for assignment of titles
- Single code for Use and Production Guidelines (ex Reg. 1444/03)
- Farm dossier and manual

15 December 2004

- Definition of aid request form
- Definition of the rules of cooperation with Payment Agencies' Organisations

Agea Procedure: Initial analysis – 1

- Scope:
- Communicate to growers the reference period defined by the SIAN (National Agricultural Information System)system
- Identify title-holders according to art. 33 of CE reg. 1782/2003
- Register changes during and after the three-year reference period, such as:
  - Inheritance
  - Changes fo ownership or type of administration
  - Mergers and divisions
  - Exceptional circumstances
- Timing:
  - Approx. 890.000 registered letters sent between August and September
  - Conclusion of registraion of changes by December 2004

Initial analysis – 2

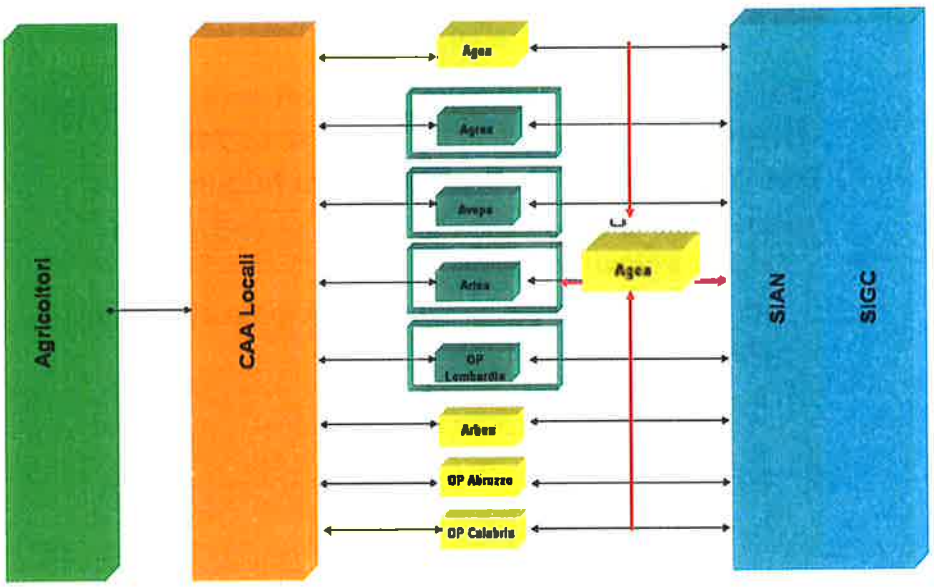
- **The creation of new application software to manage reference data and farm changes is underway**
- **Training courses for the CAA have begun**
  - 300 technicians of the CAA have already taken courses given in Rome
  - Another 300 technicians will participate in training courses at local premises

AGEA Procedure

Request for access to single payment procedure

- **When:**
  - By 15 May 2005
- **How:**
  - Through CAA associated with OPR
  - OPR procedures vary

Information flow from local to national level



Information flow – 1

- New information to transmit to farmers
- New rights to subsidy
- Farm dossier as central document for subsidy requests
- Single code for Use and Production Guidelines
- New eligibility conditions
- New conditions for cross-compliance (awareness raising);
- New functions of SIAN for integration of information

Information flow – 2

- Elements of change in Italy
- Growing presence of OPR (4 in 2004; 7 in 2005) and coordination needs
- Intervention of the Regions in defining GAECs and, particularly, SMRs
- Increased role of CAAs, both national and local

Towards cross-compliance in Italy

- National and regional regulations
- How the laws are arrived at:
  - The Ministry of Agriculture decrees the norms and the minimum level of application
  - The Regions adapt the national norms in local contexts
  - AGEA, with the OPR, selects the indexes of verification
  - AGEA establishes its own checking rules and coordinates with the OPR to produce
    - *Homogeneity of approach*
    - *Respect of local conditions*

GAEC – Norms

Agea

1. Soil erosion *protect soil through appropriate measures*	1.1 Temporary channelling of surface water on sloping terrain
2. Soil organic matter *maintain soil organic matter levels through appropriate practices*	2.1 Ban on burning of stubble and vegetable residue
3. Soil structure *maintain soil structure through appropriate practices*	3.1 Defence of ground structure through maintenance of surface water drainage
4. Minimum level of maintenance *ensure a minimum level of maintenance and avoid deterioration of habitats*	4.1 Management of grass cover and pasture 4.2 Management of set-aside areas 4.3 Maintenance of olive groves 4.4 Maintenance of distinguishing landscape and habitat features

VHR data- surface water drainage temporary channeling need...

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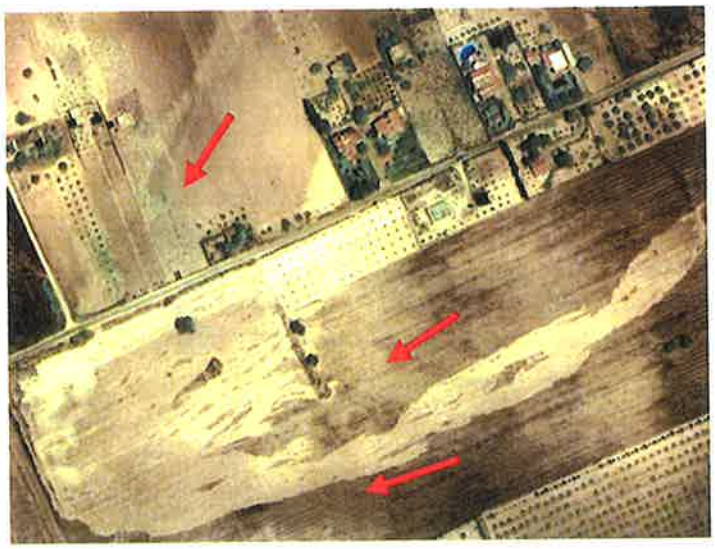
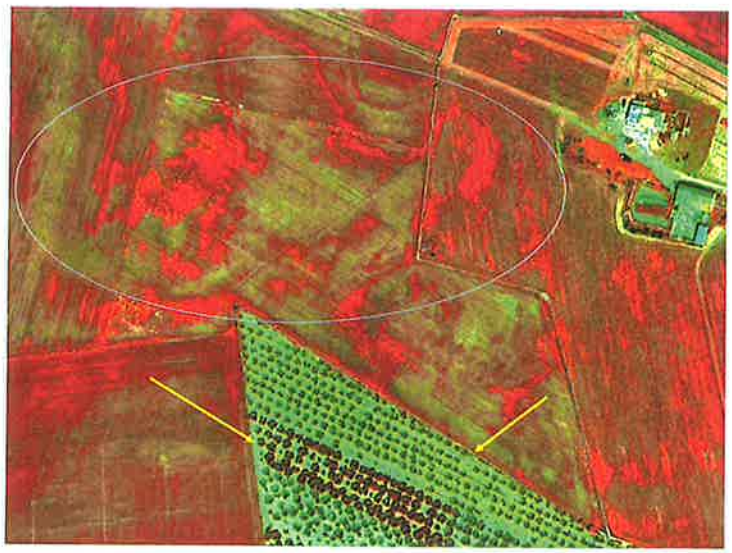
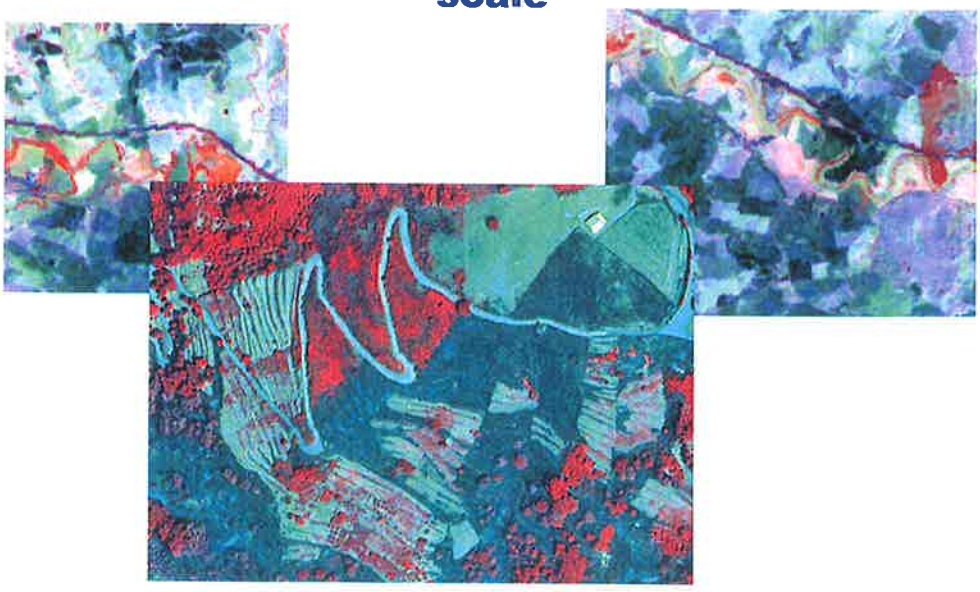


Soil maintaining and correct olive groves pruning activity

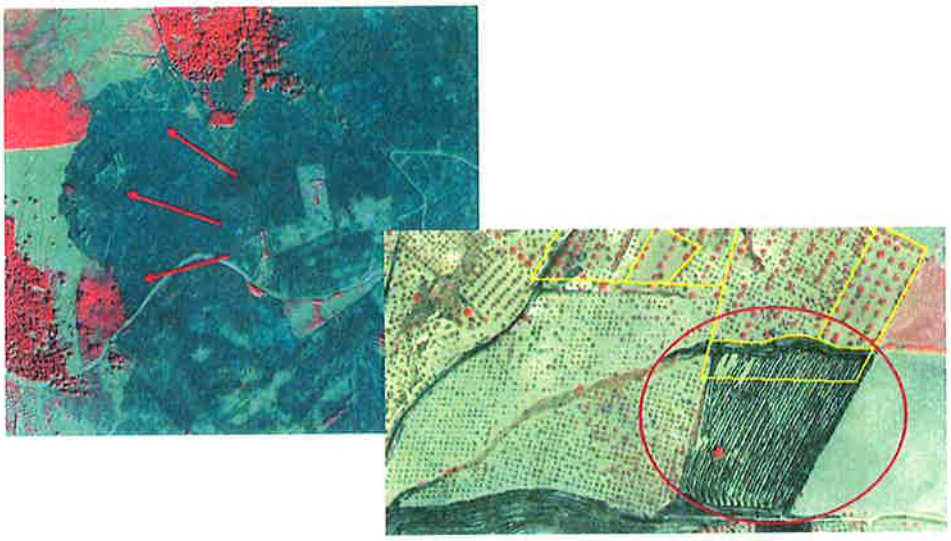


Burnt stubbles detection and monitoring using satellite HR and VHR at different scale



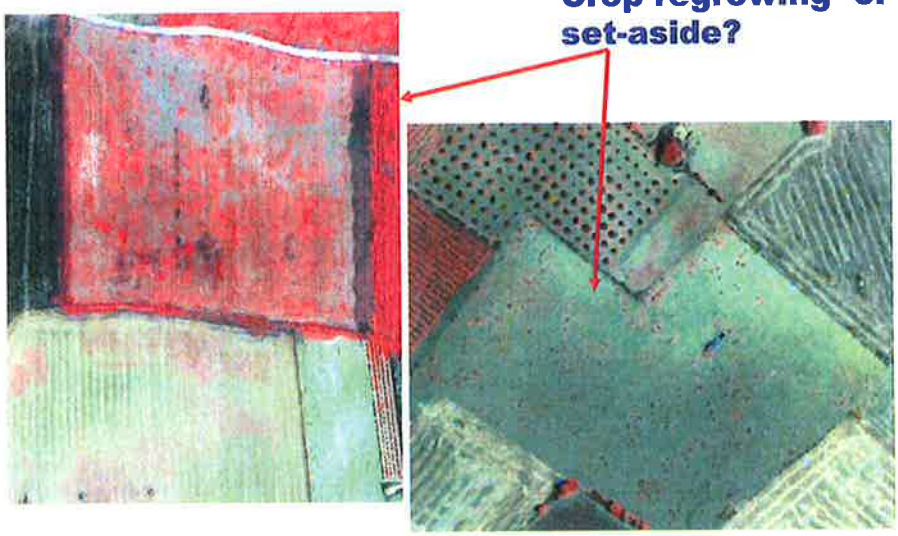
Burnt pastures/stubbles detection and monitoring using VHR at large scale

Agea



Agea

Crop regrowing or set-aside?



Italian CwRS 2004 - soil erosion over different crop fields

Verification indices – 1
Selection criteria

- **The verification indices are chosen to assure:**
  - Better understanding of relevant norms
  - Objectivity in detecting violations
  - Simple control mechanisms
  - Immediate reference to: extent, seriousness and duration

Verification indices – 2
Cross-compliance verification

The index system is the basis for cross-compliance verification

For all indices, checks highlight three elements:

- **Extent** (where this is less than the minimum, a warning is given, which involves no sanctions but establishes a precedent)
- **Seriousness**
- **Duration** (including repeated violations)

Verification indices – 3
Application of sanctions

- **The application of sanctions are subject to "remedial actions".**
- **The farmer can reduce the sanction by work remedying the violation**
- **The corrective work is subject to further controls**

Single Integrated Control Methodology – down to farm level

- **Information and declarations extracted directly from the single request for subsidy**
- **Direct checks on farms (July–August)**
- **Remote sensing support**
  - Airborne
    - *Orthophoto (April–June)*
    - *Multi-spectral imaging (multi-temporal across seasons)*
  - VHR satellite
    - *10 significant areas (May–June)*
  - HR satellite
    - *national territory (multi-temporal across seasons)*

Methodology success factors

- **Correct and timely information to farmers**
- **Introduction of cross-compliance check list in farm dossier**
- **Integrated single method of control extensible from single farms to global area**
- **Overall control of farm, to establish global behaviour in both production and environmental safeguards.**

Cross-compliance data integration with SIAN

- Construction of environmental database at farm level
- New information layers for current AGEA GIS (national, at cadastral level)
- New geo-referenced data will define "Environmental sustainability in productive areas"
- Cross-compliance and agri-environment schemes exploitable in a single context

Conclusions – 1

- The objectives and principal benefits to the Italian State of Reform application:
  - Effective results for environmental protection
  - Meeting market demands in terms of production quality, health and respect for environment
  - Continued simplification of subsidy procedures

Conclusions – 2

- **Challenges and issues**
  - Short timescale for demanding choices
  - Correct and timely information to farmers
  - Management of set-aside areas
  - Homogeneity of control mechanisms nation-wide
  - Need for effective coordination of key players
  - Possibility of consistently objective controls
  - Costs of new control systems
  - Effective integration of different existing regulatory regimes for environmental protection in agriculture

Presentation 3 – The German implementation

Axel HEIDER

Federal Ministry of Consumer Protection, Food and agriculture (BMVEL), DE

Abstract

Implementation of the CAP-Reform in Germany

Implementation of decoupling in Germany: general beginning of decoupling, maximum use of the existing options of decoupling, limited redistribution of the payment volume among the regions.

Implementation of cross-compliance in Germany: Basic requirements for farm management in 2005, maintaining agricultural land in good agricultural and environmental condition, Maintenance of land withdrawn from production, preserving landscape features, preserving permanent pasture

Control questions:

- Central IACS database in Munich,
- Control aspects in detail: parcel identification: LPIS/ GIS; remote sensing or traditional on-the-spot check on 5 % of the farms, use of agricultural parcels, in particular

Remote sensing

- Selection of control zones (Strategy I): Select control zones on the basis of a risk analysis according Reg. 796/2004 Art. 32.
- Selection of control zones (Strategy II): Two zones selected according to the traditional IACS risk aspects with 1,5 % of the applicants respectively

Keywords: CAP-Reform, cross-compliance, good agricultural and environmental condition (GAEC), LPIS/ GIS, on-the-spot check, IACS, decoupling

Implementation of the CAP-Reform in Germany

10th CwRS-Conference in Budapest 24. – 27. November 2004

Dr. A. Heider, Federal Ministry of Consumer Protection, Food and Agriculture

Outline

1. **Implementation of decoupling in Germany**
2. **Implementation of cross-compliance in Germany**
3. **Control questions**

1. Implementation of decoupling in Germany

- General beginning of decoupling 2005[1)]
- Maximum use of the existing options of decoupling[1)]
- Limited redistribution of the payment volume among the regions

1) In the case of tobacco 40% decoupling as from 2006; as of 2010 decoupling of a further 10 % of the coupled tobacco aid as well as transfer of the remaining 50 % of the coupled aid to a restructuring aid

Hybrid model with the following key elements:

- According to the regional model
  - aid payments for arable crops, for seed and 75 % of the decoupled share of the starch potato aids => as a regionalized payment entitlement for arable land (Federal Government Ø approx. 300 €/ha)
  - slaughter premiums for heavy cattle, national envelopes for cattle as well as 50 % of the extensification payments for cattle => as a regionalized payment entitlement for grassland (Federal Government Ø approx. 80 €/ha)

- According to the COM standard model (i.e. farm-based)
  - 100 % of the dairy premium, suckler cow premium, ewe premium, slaughter premium for calves, special premium for bovines
  - 50 % of the extensification payments for cattle
  - 25 % of the decoupled share of the starch potato aid
  - 100 % of the decoupled share of the dried fodder aid

  => as a top-up on payment entitlements for arable land and grassland

- **Adjustment of payment entitlements** over time to regionally uniform premium rights per hectare starting in 2010 and ending in 2013

Year	2005 until 2009	2010	2011	2012	2013
Differenz beetween initial value and target value in %	100	90	70	40	0

=> From 2013 pure **regional model**

2. Implementation of cross-compliance in Germany

- **Basic requirements for farm management in 2005**

- Environmental rules in the fields of

  = Nitrate (e.g. safety and minimum storage capacity of storage facilities for organic manure)

  = Sewage sludge (e.g. requirement to keep records and books for the nutrient comparison; ban on spreading on areas under fruit and vegetable cultivation)

  = Groundwater protection (e.g. appropriate storage of mineral oil products and specific active substances in pesticides)

  = FFH Directive
  = Wild Birds Directive
  } (e.g. compliance with specific orders for protected areas)

- Provisions for animal identification and registration

- **Maintaining agricultural land in good agricultural and environmental condition**

- Preventing erosion
  - = Ground cover with respect to at least 40 % of the arable land between 1 December and 15 February
  - = Ban on the removal of terraces

Preserving the organic substance in the soil and protection of the soil structure

- = Ban on the burning of stubble fields
- = compliance with a cultivation ratio of at least three crops; each crop must cover at least 15 % of the arable land[2)]

2) Compiling an annual humus balance in case of non-observance of the requirements for the cultivation ratio

- **Maintenance of land withdrawn from production**

- Arable land
  - = planting greenery or allowing natural grass regeneration
  - = chopping up growing crop and spreading it over the entire area
- Permanent pasture land
  - = chopping up growing crop at least once a year and spreading it over the entire area or
  - = mowing every two years and removing mowing residues

- **Preserving landscape features**

- Hedges as of 20 m
- Tree rows as of 50 m
- Woodlots (≥100 m2 ≤2000 m2)
- Wetlands under particular protection (≤2000 m2)
- Single trees under particular protection

- **Preserving permanent pasture**

- annual regional determination of the permanent pasture share on the basis of applications
- annual comparison with the basic dimension
- if reduction at least 5 % → introduction of an authorization procedure for the ploughing up of permanent pasture
- if reduction > 8 % the authority can, if > 10 % the authority must oblige all recipients of direct payments that have ploughed up permanent pastures in a specific period to sowing seed again or to newly plant permanent pasture on other areas

3. Implementation and control

- **Central IACS database in Munich**
  - cross checks of datas about farmers
  - cross checks of agricultural parcels among the *Länder*
  - administering payment entitlements
  - data exchange between premium and specialized authorities (cross-compliance)
  - monitoring the ceilings
  - monitoring the modulation
  - statistical reports, if required

Control aspects in detail

- Parcel identification
  - LPIS / GIS
  - remote sensing or traditional on-the-spot check on 5 % of the farms
- Use of agricultural parcels, in particular
  - set-aside (special payment entitlements)
  - areas under fruit/vegetable/ware potato cultivation (special payment entitlements)
  - specific coupled crops (e.g. energy crops, starch potatoes, etc.)
  - cross-compliance (e.g. landscape features, preservation of permanent pasture, requirements for areas withdrawn from production)

Remote sensing

Selection of control zones (Strategy I)

Risk 75-80%

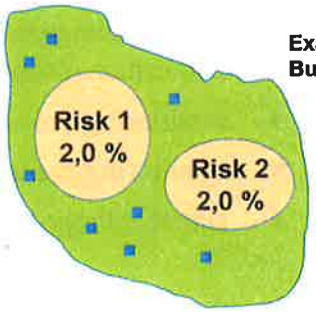
randomly 20-25 % (by traditio-nal on the spot check)

Select control zones on the basis of a risk analysis according Reg. 796/2004 Art. 32.
All applicants, having at least 80 % of the area for which aid is requested within the zone are controlled

Within these farmers, one can choose 20-25 % of the farmers that have to be controlled in accordance with **CC**

Within these farmers, another risk analysis can be carried out considering the risk factors for **CC Annex IV** to select 75-80% of the farmers that have to be controlled in accordance with CC

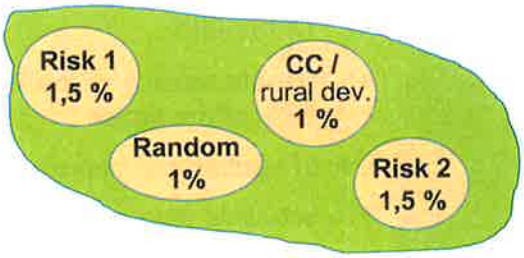
Example of one Bundesland



Remote sensing

Selection of control zones (Strategy II)

Example of another Bundesland



- Two zones selected according to the traditional IACS risk aspects with 1,5 % of the applicants respectively
- One zone with 1 % of the applications selected according to pure random aspects
- One zone with 1 % of the applications that has been chosen in a targeted way according to cross-compliance aspects/rural area aspects

Alongside: **traditional on-the-spot check**

- where remote sensing has revealed dubious cases
- up to 0.5 % area controls in cases intended for checks due to violations in the previous year, for instance, but that lie outside of the remote sensing zones

Within the framework of cross-compliance:

- 1 % of controls of each standard that cannot be controlled with remote-sensing, e.g. compliance with the Nitrates Directive, the Sewage Sludge Directive, the Groundwater Directive
- 5 % control concerning animal identification and registration

→ pooling of these cross-compliance-controls performed by the specialized authorities, if possible

Conclusions:

- complexity of the control systems rises as well as the complexity of agricultural policy
- pooling of the controls is required more than ever
- also after the CAP reform, remote sensing remains a key control instrument
- As far as possible, remote sensing should also be used for controls within the cross-compliance framework (especially for landscape features; maintenance of permanent pasture; requirements for maintaining land in good agricultural and environmental condition)

- If remote sensing is perform this task, we require
  - = different recording times (in the case of satellite images and ortho-photographs), to be able to better illustrate the vegetative periods
  - = satellite images of very high resolution
  - = further intensification of studies/research projects to broaden the options of using remote sensing

Thank you for your attention

Presentation 4 - Implementing SAPS and controls in Hungary

Tamás PRIBELA
Paying Agency ARDA, HU

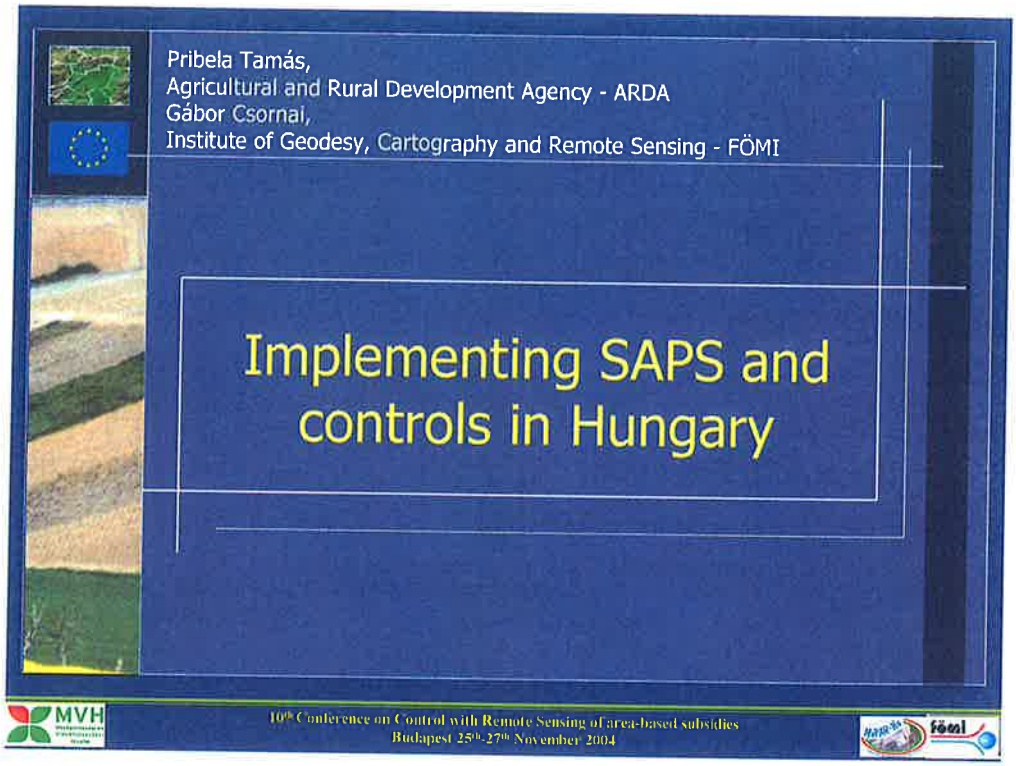
Gábor CSORNAI
FÖMI, HU

Abstract

The first 6 months of EU-membership was a great challenge for all of the New Member States. The implementation of the Common Agricultural Policy (CAP) – especially the establishment of the Integrated Administrative and Control System (IACS) – has been going on for years in all Candidate Countries, but by the introduction of the Single Area Payments Scheme (SAPS) only in the final period of preparation the picture of problems to be solved by the date of the accession became even more coloured. The eight countries which had chosen the SAPS for CAP payments had to implement the rules for SAPS so they had to reconsider not only the initial methodology of application handling in IACS, but also the way of using the key tools like Land Parcel Identification System (LPIS) and Control with Remote Sensing (CwRS). The objective was to simplify, although in certain countries problems simply arose from the fact that a change had to be made. Furthermore, there was another big block to solve: the implementation of national top-ups, much more attractive from political than from implementation point of view. How the simplification could be reached by using all the available support elements at the same time? That was the challenge, and there was not too much time to hesitate. The strategy had to be chosen immediately. And there was an another new issue to be handled: Good Agricultural and Environmental Conditions (GAEC), a tool given to the New Member States in order to ensure that the aid is given to those who perform at least the minimum level of agricultural activity and ensure the minimum environmental conditions. The requirements had to be regulated quickly, so that farmers and other implementation bodies could apply them.
The regulation was supposed to be strict as it was necessary. So, there were many aspects to harmonize.

One of these aspects we face every day. The development of the control systems and the control of the above mentioned payments required enormous work from the institutions involved including the readiness for various changes forced by external or internal reasons. For instance, the LPIS in Hungary (LPIS-Hu) has been built up by the end of 2003, but after the shift in the concept for SAPS for Hungary, it had to be adjusted to the new requirements, especially in the determination of eligible areas. The situation was the same with the methodology of CwRS program, which had to be reviewed taking into account the requirements of SAPS, especially the control of measures for GAEC. New Member States are still in progress to fulfill 100 % of the requirements of the IACS. The institutions are in place, the procedures are being implemented, the IT systems are working, and the controls are about being finished. However, we do not think that this is the end of the process we have started several years ago. We learned a lot from the development phase, much more from the first half-year of the implementation, we achieved, that the set of uncertainties is contracting, but it still exists. One of the issues we are able to answer in conviction is that, if we want to have good control quality for great number of applications efficiently the CwRS has to be one of the key tools.

Keywords: CAP, SAPS, CwRS, top-up, GAEC


Pribela Tamás,
Agricultural and Rural Development Agency - ARDA
Gábor Csornai,
Institute of Geodesy, Cartography and Remote Sensing - FÖMI
Implementing SAPS and controls in Hungary
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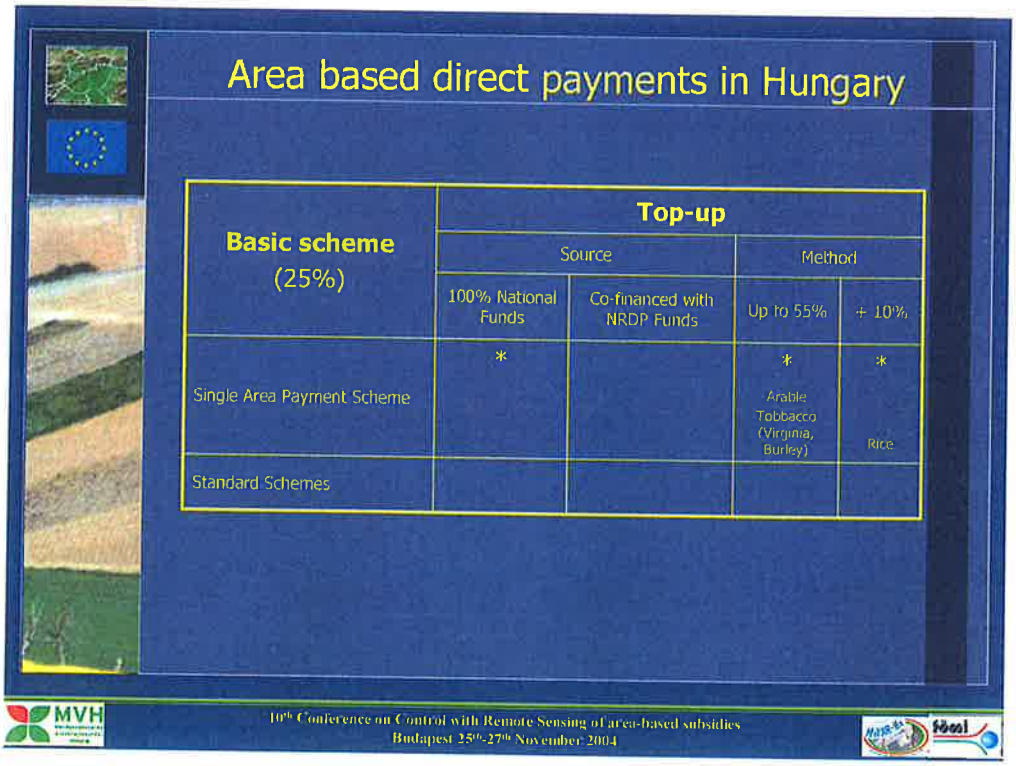
Area based direct payments in Hungary
Basic scheme (25%)
Top-up
Source
Method
100% National Funds
Co-financed with NRDP Funds
Up to 55%
+ 10%
Single Area Payment Scheme
*
*
Arable
Tobbacco (Virginia, Burley)
*
Rice
Standard Schemes
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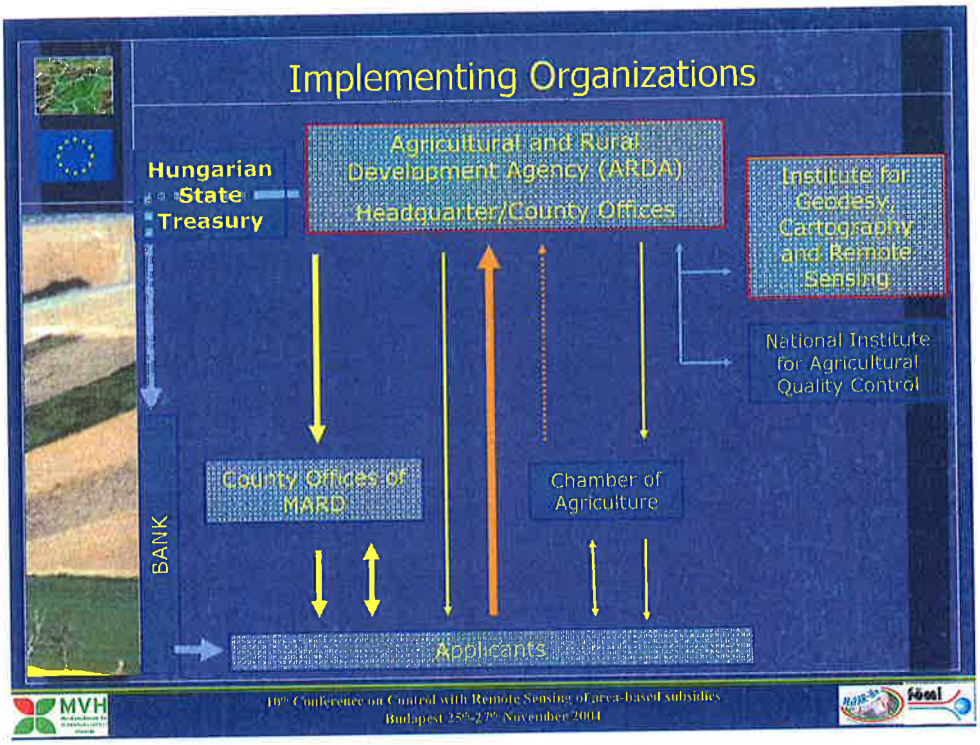
Implementing Organizations
Hungarian State Treasury
Agricultural and Rural Development Agency (ARDA) Headquarter/County Offices
Institute for Geodesy, Cartography and Remote Sensing
National Institute for Agricultural Quality Control
County Offices of MARD
Chamber of Agriculture
BANK
Applicants
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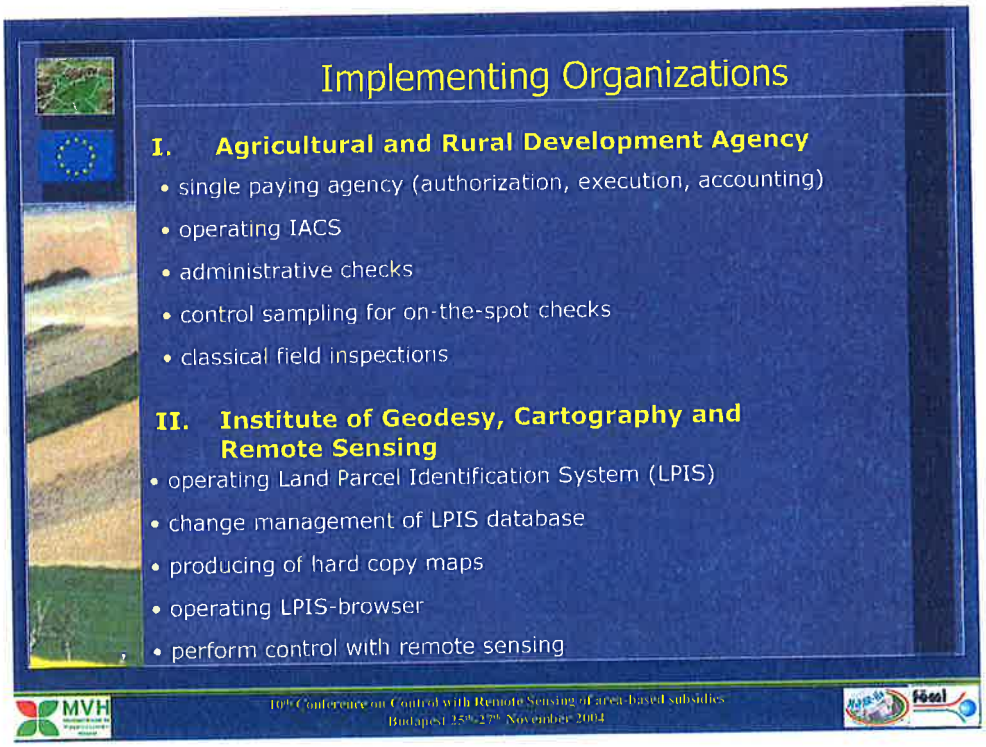
Implementing Organizations
I. Agricultural and Rural Development Agency
• single paying agency (authorization, execution, accounting)
• operating IACS
• administrative checks
• control sampling for on-the-spot checks
• classical field inspections
II. Institute of Geodesy, Cartography and Remote Sensing
• operating Land Parcel Identification System (LPIS)
• change management of LPIS database
• producing of hard copy maps
• operating LPIS-browser
• perform control with remote sensing
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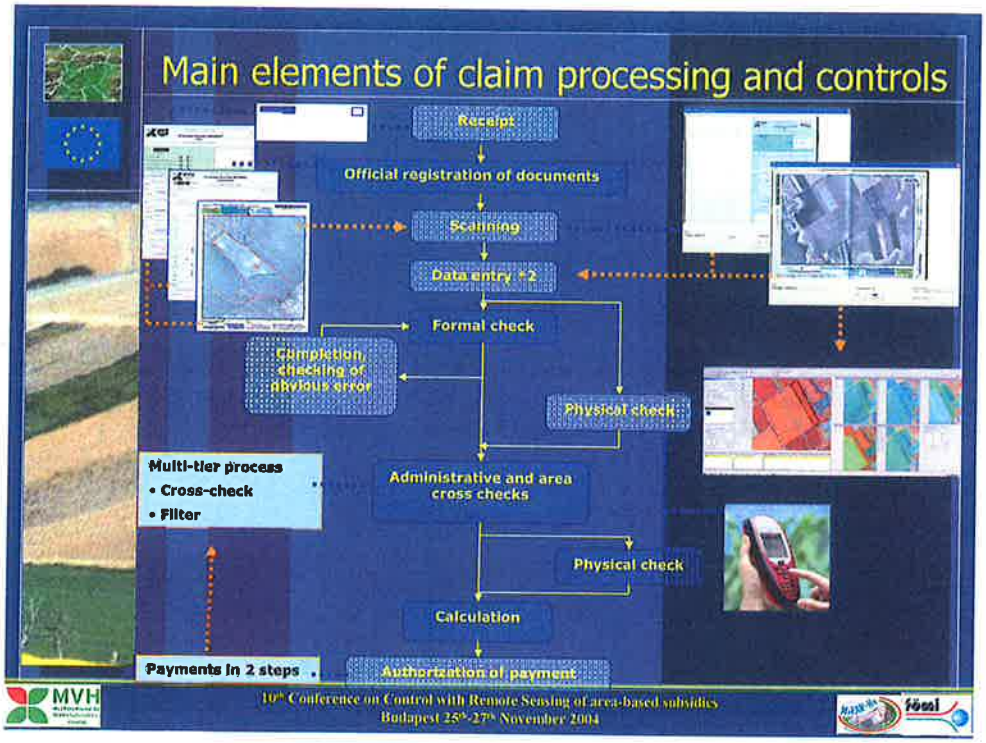
Main elements of claim processing and controls
Receipt
Official registration of documents
Scanning
Data entry *2
Formal check
Completion, checking of obvious error
Physical check
Multi-tier process
• Cross-check
• Filter
Administrative and area cross checks
Physical check
Calculation
Payments in 2 steps
Authorization of payment
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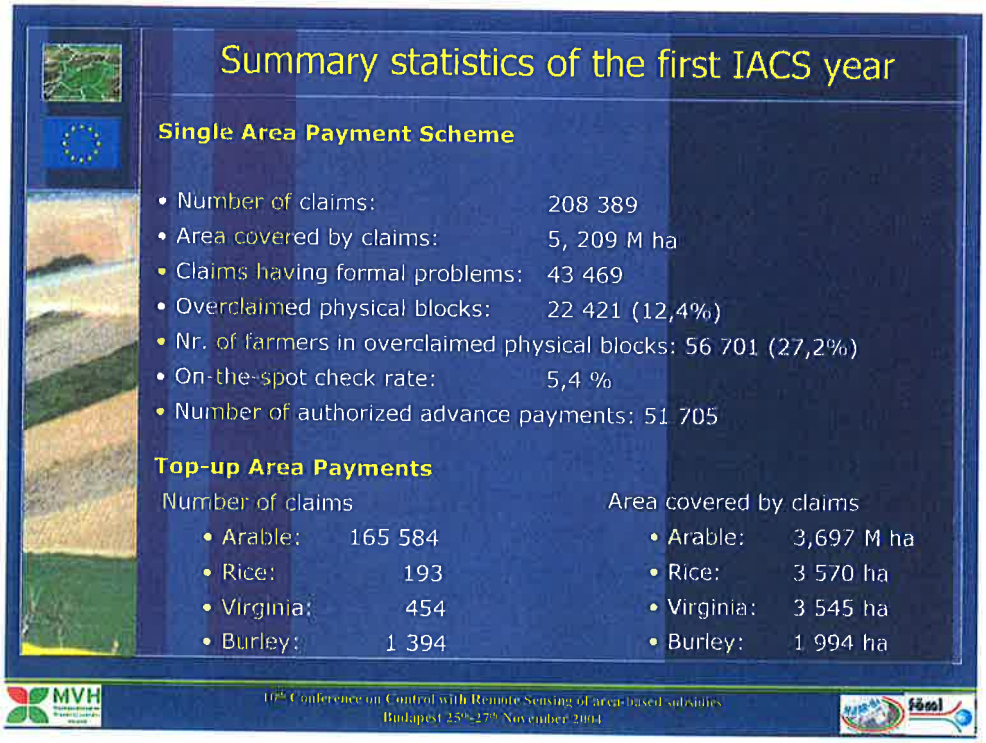
Summary statistics of the first IACS year
Single Area Payment Scheme
• Number of claims: 208 389
• Area covered by claims: 5, 209 M ha
• Claims having formal problems: 43 469
• Overclaimed physical blocks: 22 421 (12,4%)
• Nr. of farmers in overclaimed physical blocks: 56 701 (27,2%)
• On-the-spot check rate: 5,4 %
• Number of authorized advance payments: 51 705
Top-up Area Payments
Number of claims
• Arable: 165 584
• Rice: 193
• Virginia: 454
• Burley: 1 394
Area covered by claims
• Arable: 3,697 M ha
• Rice: 3 570 ha
• Virginia: 3 545 ha
• Burley: 1 994 ha
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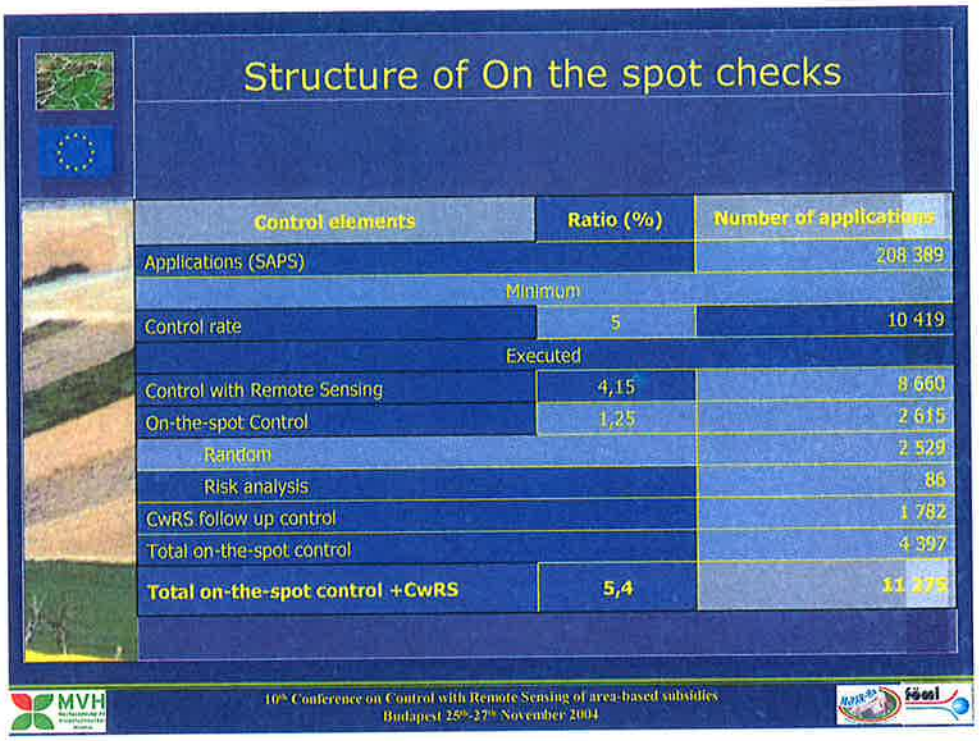
Structure of On the spot checks
Control elements
Ratio (%)
Number of applications
Applications (SAPS)
208 389
Minimum
Control rate
5
10 419
Executed
Control with Remote Sensing
4,15
8 660
On-the-spot Control
1,25
2 615
Random
2 529
Risk analysis
86
CwRS follow up control
1 782
Total on-the-spot control
4 397
Total on-the-spot control +CwRS
5,4
11 278
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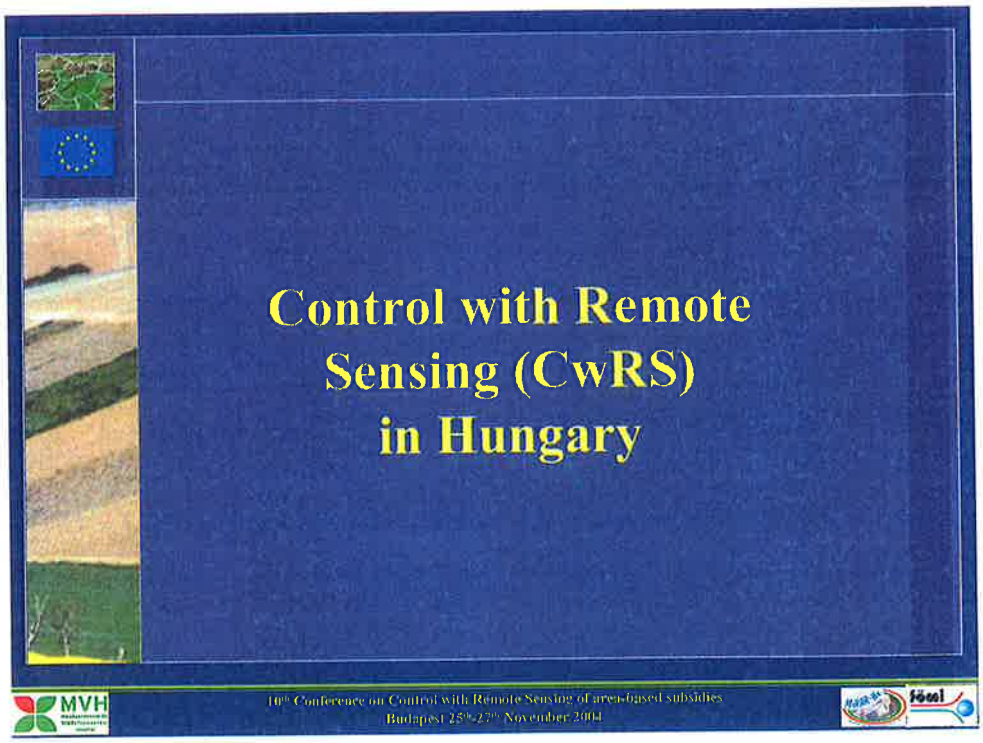
Control with Remote Sensing (CwRS) in Hungary
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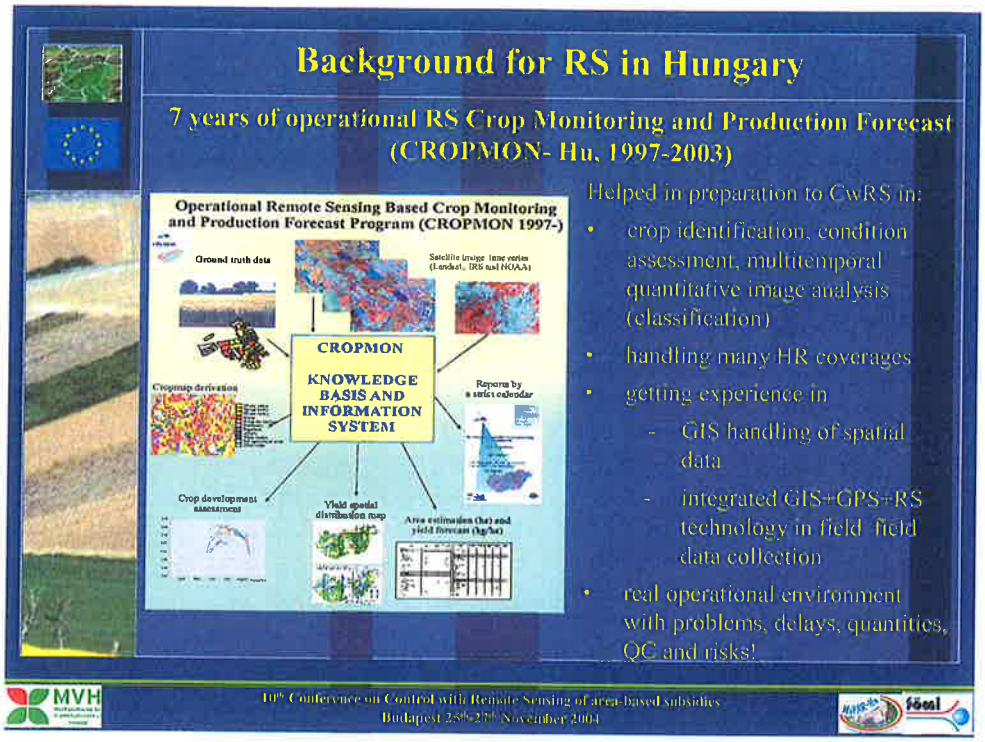
Background for RS in Hungary
7 years of operational RS Crop Monitoring and Production Forecast (CROPMON- Hu, 1997-2003)
Operational Remote Sensing Based Crop Monitoring and Production Forecast Program (CROPMON 1997-)
Ground truth data
CROPMON
KNOWLEDGE BASIS AND INFORMATION SYSTEM
Crop development assessment
Yield spatial distribution map
Helped in preparation to CwRS in:
• crop identification, condition assessment, multitemporal quantitative image analysis (classification)
• handling many HR coverages
• getting experience in
- GIS handling of spatial data
- integrated GIS+GPS+RS technology in field data collection
• real operational environment with problems, delays, quantities, QC and risks!
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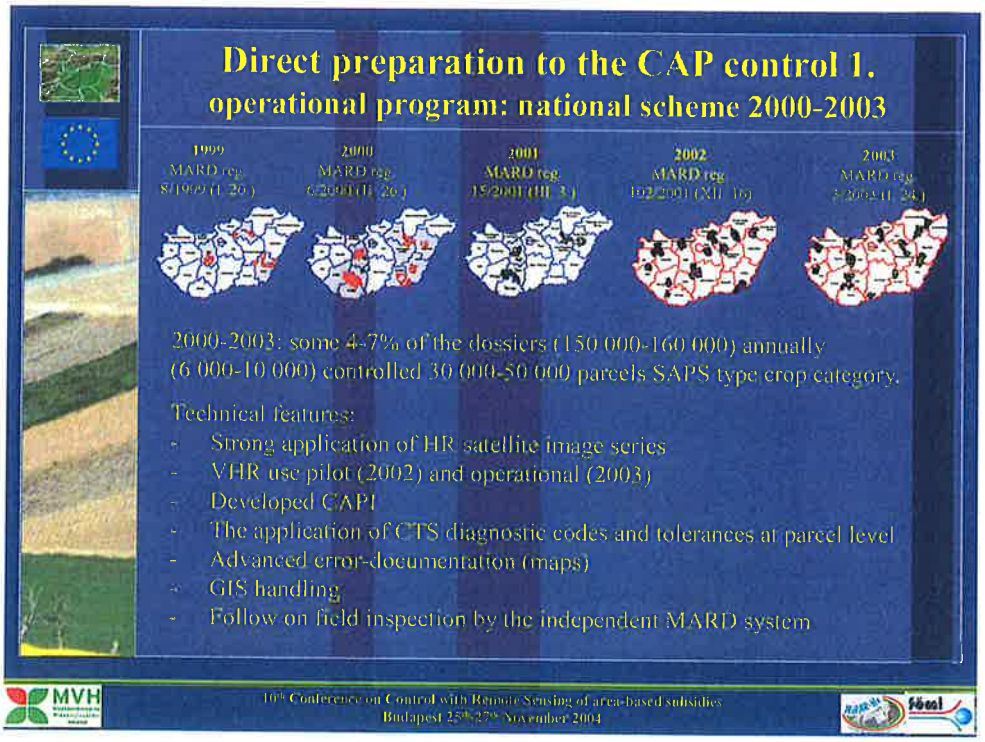
Direct preparation to the CAP control 1.
operational program: national scheme 2000-2003
1999
MARD reg.
2000
MARD reg.
2001
MARD reg.
2002
MARD reg.
2003
MARD reg.
2000-2003: some 4-7% of the dossiers (150 000-160 000) annually (6 000-10 000) controlled 30 000-50 000 parcels SAPS type crop category.
Technical features:
- Strong application of HR satellite image series
- VHR use pilot (2002) and operational (2003)
- Developed CAPI
- The application of CTS diagnostic codes and tolerances at parcel level
- Advanced error-documentation (maps)
- GIS handling
- Follow-on field inspection by the independent MARD system
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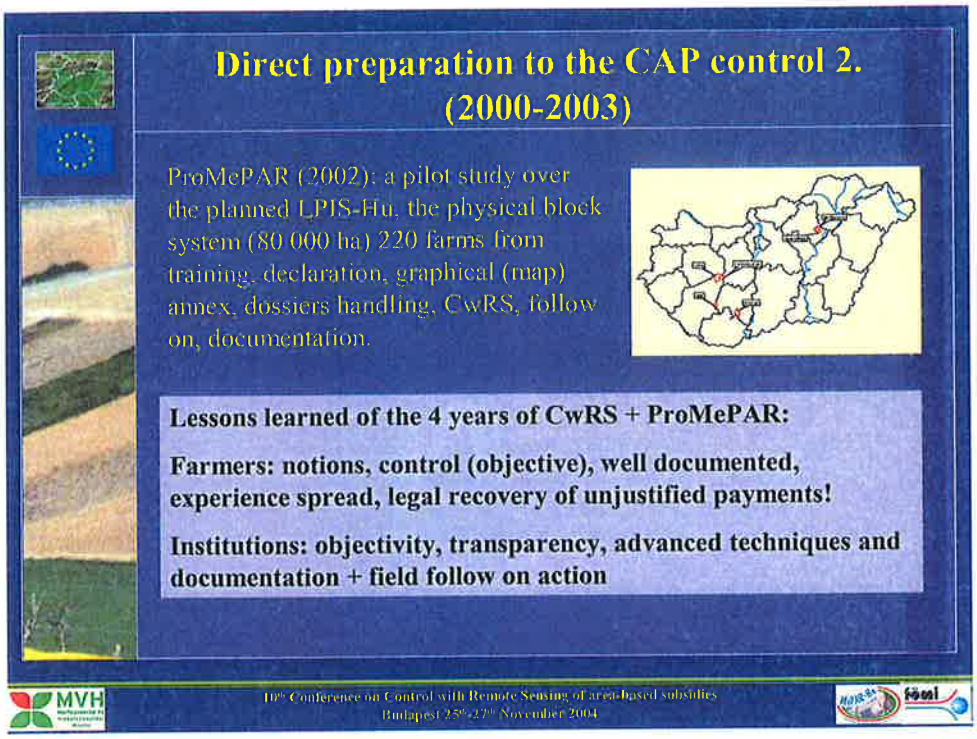
Direct preparation to the CAP control 2. (2000-2003)
ProMePAR (2002): a pilot study over the planned LPIS-Hu, the physical block system (80 000 ha) 220 farms from training, declaration, graphical (map) annex, dossiers handling, CwRS, follow on, documentation.
Lessons learned of the 4 years of CwRS + ProMePAR:
Farmers: notions, control (objective), well documented, experience spread, legal recovery of unjustified payments!
Institutions: objectivity, transparency, advanced techniques and documentation + field follow on action
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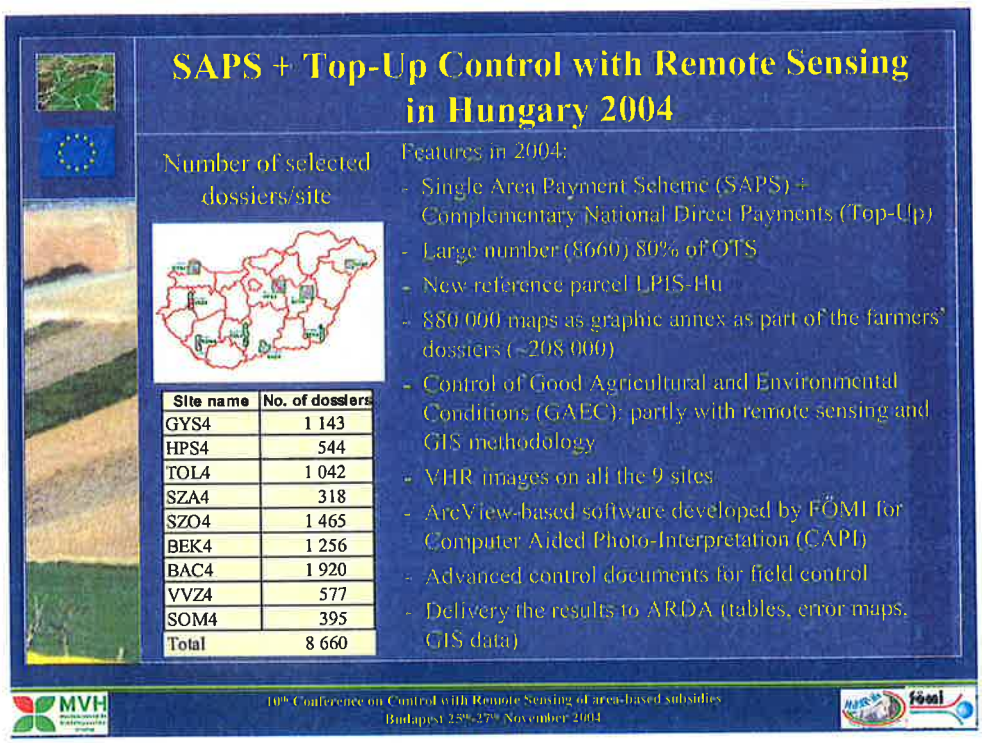
SAPS + Top-Up Control with Remote Sensing in Hungary 2004
Number of selected dossiers/site
Site name | No. of dossiers
GYS4 | 1 143
HPS4 | 544
TOL4 | 1 042
SZA4 | 318
SZO4 | 1 465
BEK4 | 1 256
BAC4 | 1 920
VVZ4 | 577
SOM4 | 395
Total | 8 660
Features in 2004:
- Single Area Payment Scheme (SAPS) + Complementary National Direct Payments (Top-Up)
- Large number (8660) 80% of OTS
- New reference parcel LPIS-Hu
- 880 000 maps as graphic annex as part of the farmers' dossiers (~208 000)
- Control of Good Agricultural and Environmental Conditions (GAEC): partly with remote sensing and GIS methodology
- VHR images on all the 9 sites
- ArcView-based software developed by FÖMI for Computer Aided Photo-Interpretation (CAPI)
- Advanced control documents for field control
- Delivery the results to ARDA (tables, error maps, GIS data)
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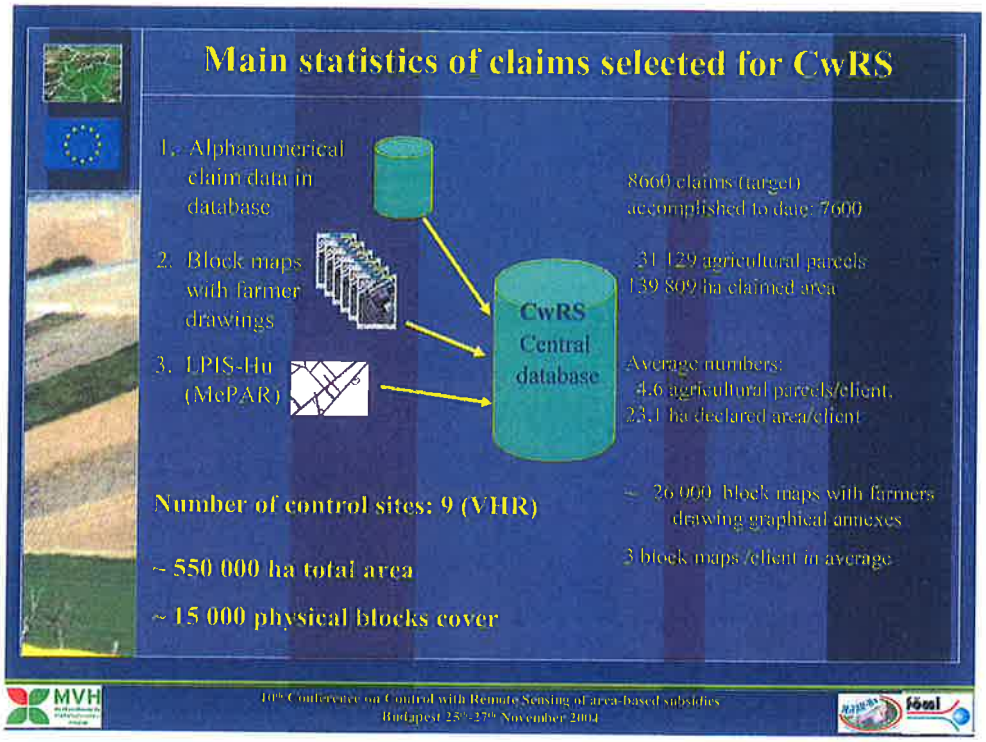
Main statistics of claims selected for CwRS
1. Alphanumerical claim data in database
2. Block maps with farmer drawings
3. LPIS-Hu (MePAR)
CwRS Central database
8660 claims (target) accomplished to date: 7600
31 129 agricultural parcels
139 809 ha claimed area
Average numbers:
4.6 agricultural parcels/client,
23.1 ha declared area/client
~ 26 000 block maps with farmers drawing graphical annexes
3 block maps /client in average
Number of control sites: 9 (VHR)
~ 550 000 ha total area
~ 15 000 physical blocks cover
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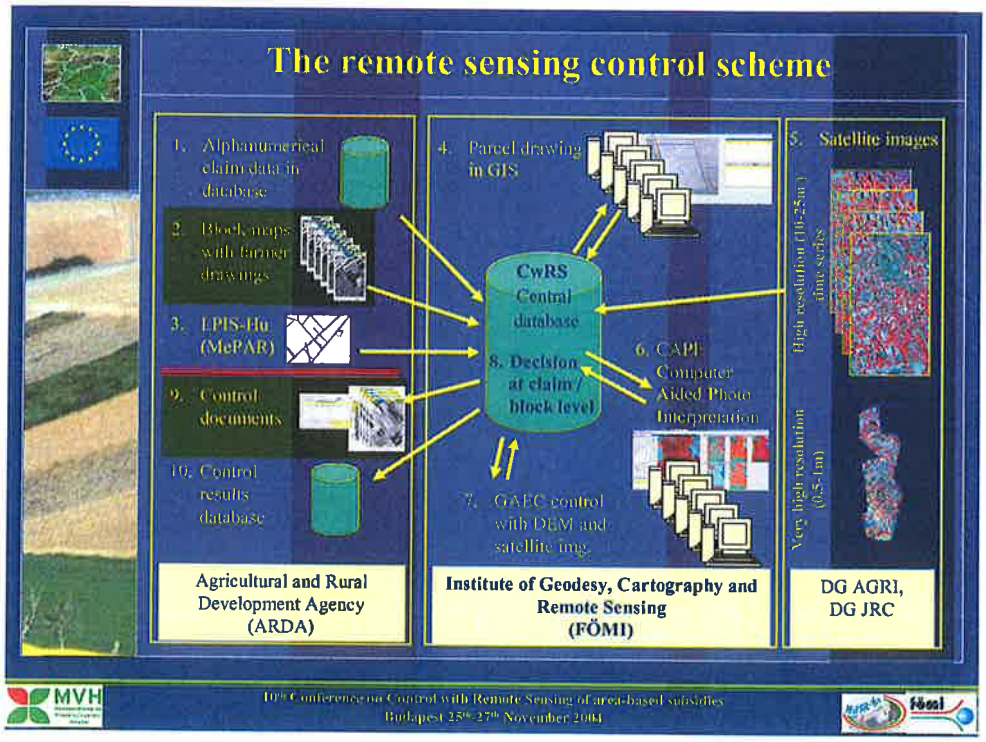
The remote sensing control scheme
1. Alphanumerical claim data in database
2. Block maps with farmer drawings
3. LPIS-Hu (MePAR)
9. Control documents
10. Control results database
4. Parcel drawing in GIS
CwRS Central database
8. Decision at claim / block level
6. CAPI Computer Aided Photo Interpretation
7. GAEC control with DEM and satellite img.
5. Satellite images
High resolution (10-25m) time series
Very high resolution (0.5-1m)
Agricultural and Rural Development Agency (ARDA)
Institute of Geodesy, Cartography and Remote Sensing (FÖMI)
DG AGRI, DG JRC
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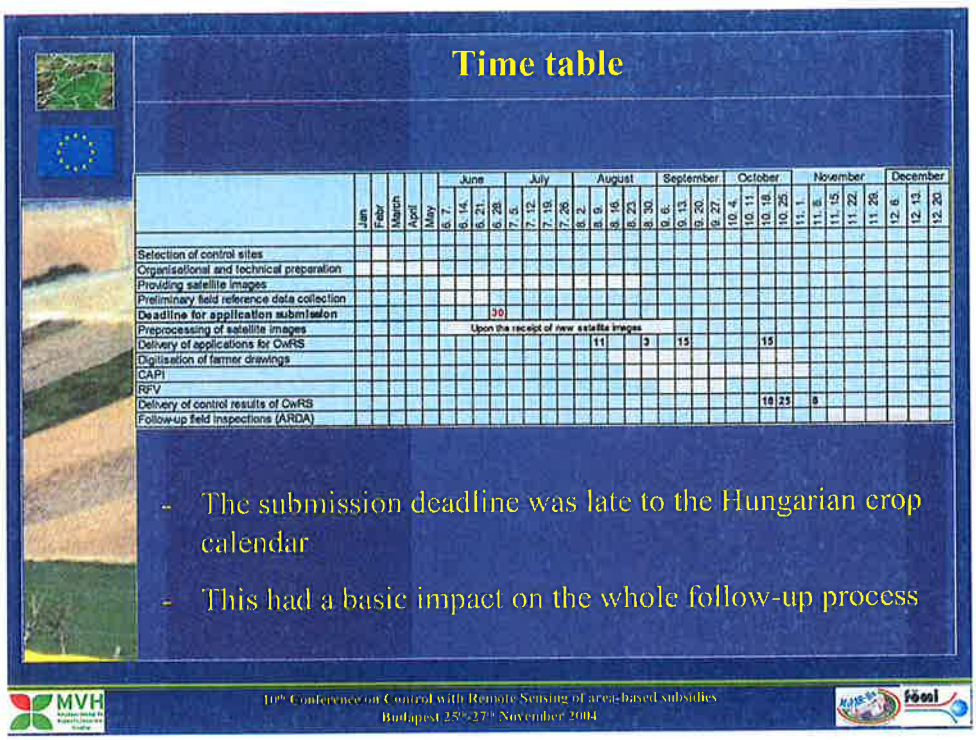
Time table
June
July
August
September
October
November
December
Selection of control sites
Organisational and technical preparation
Providing satellite images
Preliminary field reference data collection
Deadline for application submission
30
Preprocessing of satellite images
Upon the receipt of new satellite images
Delivery of applications for OwRS
11
3
15
15
Digitisation of farmer drawings
CAPI
RFV
Delivery of control results of OwRS
18
25
8
Follow-up field inspections (ARDA)
- The submission deadline was late to the Hungarian crop calendar
- This had a basic impact on the whole follow-up process
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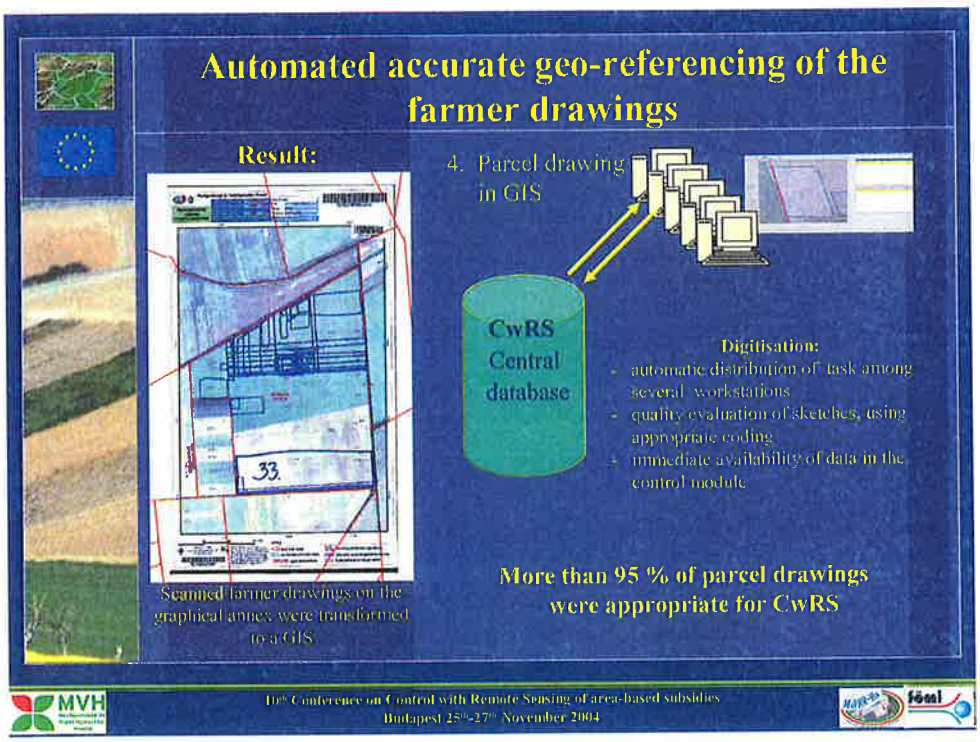
Automated accurate geo-referencing of the farmer drawings
Result:
4. Parcel drawing in GIS
CwRS Central database
Digitisation:
- automatic distribution of task among several workstations
- quality evaluation of sketches, using appropriate coding
- immediate availability of data in the control module
Scanned farmer drawings on the graphical annex were transformed to a GIS
More than 95 % of parcel drawings were appropriate for CwRS
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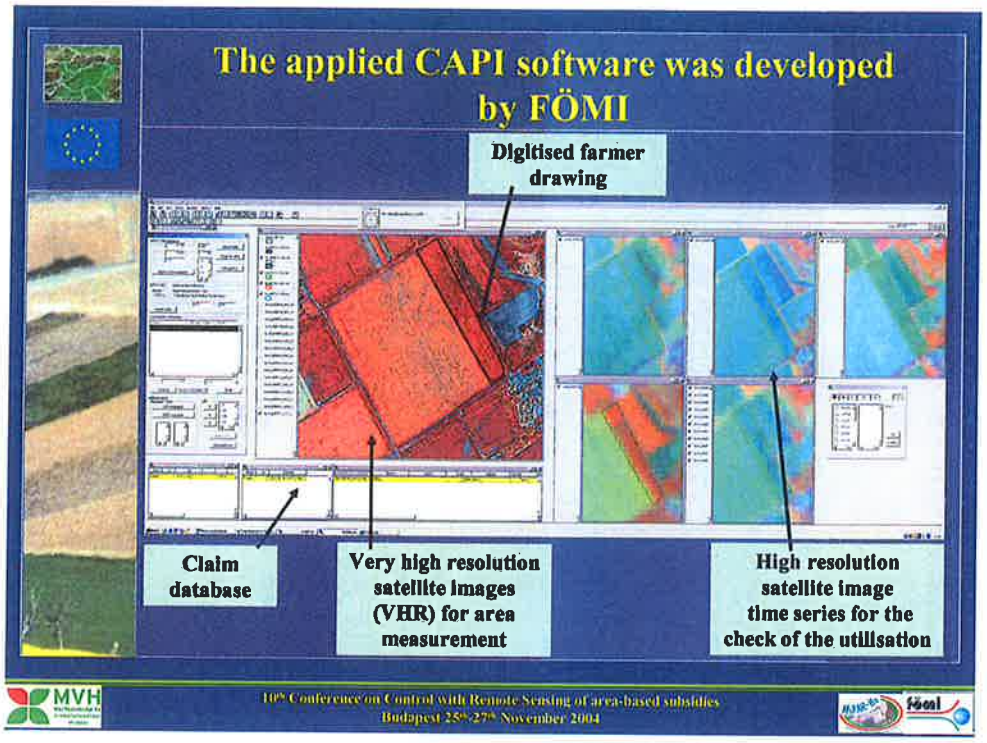
The applied CAPI software was developed by FÖMI
Digitised farmer drawing
Claim database
Very high resolution satellite images (VHR) for area measurement
High resolution satellite image time series for the check of the utilisation
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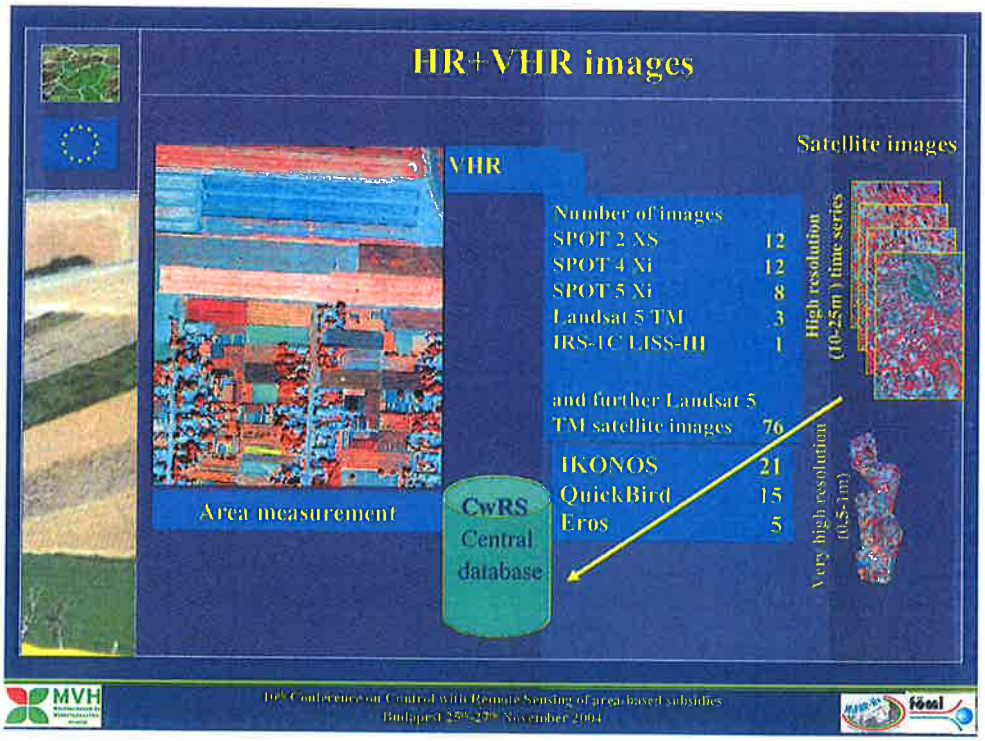
HR+VHR images
Satellite images
VHR
Number of images
SPOT 2 XS 12
SPOT 4 Xi 12
SPOT 5 Xi 8
Landsat 5 TM 3
IRS-1C LISS-III 1
and further Landsat 5 TM satellite images 76
IKONOS 21
QuickBird 15
Eros 5
High resolution (10-25m) time series
Very high resolution (0.5-1m)
Area measurement
CwRS Central database
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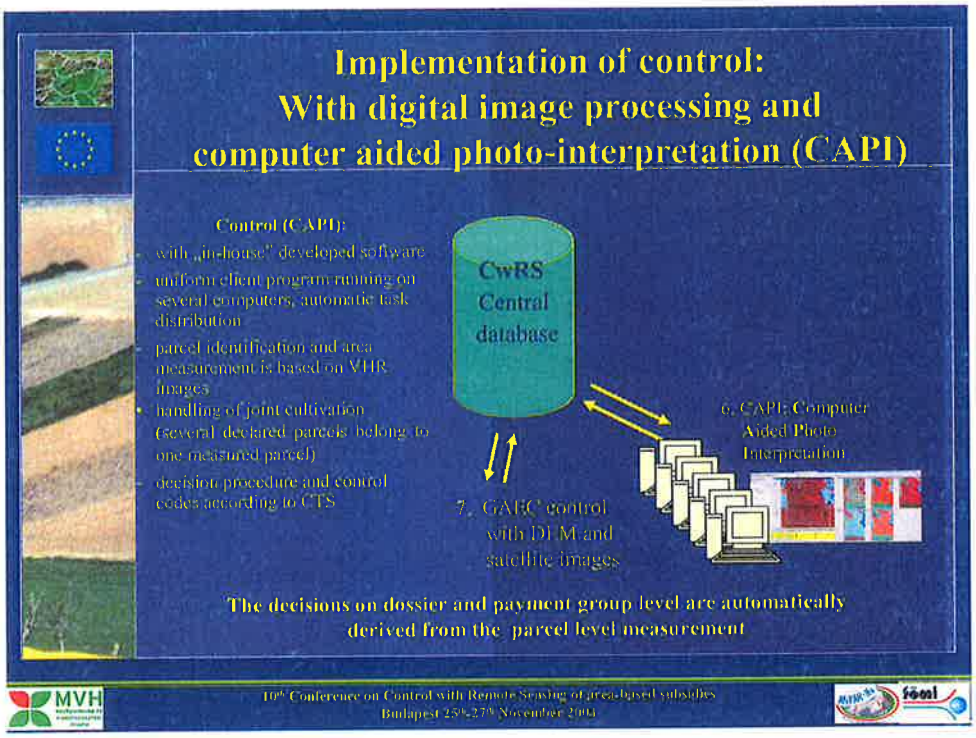
Implementation of control:
With digital image processing and computer aided photo-interpretation (CAPI)
Control (CAPI):
with „in-house" developed software
uniform client program running on several computers, automatic task distribution
parcel identification and area measurement is based on VHR images
handling of joint cultivation (several declared parcels belong to one measured parcel)
decision procedure and control codes according to CTS
CwRS Central database
6. CAPI: Computer Aided Photo Interpretation
7. GAEC control with DEM and satellite images
The decisions on dossier and payment group level are automatically derived from the parcel level measurement
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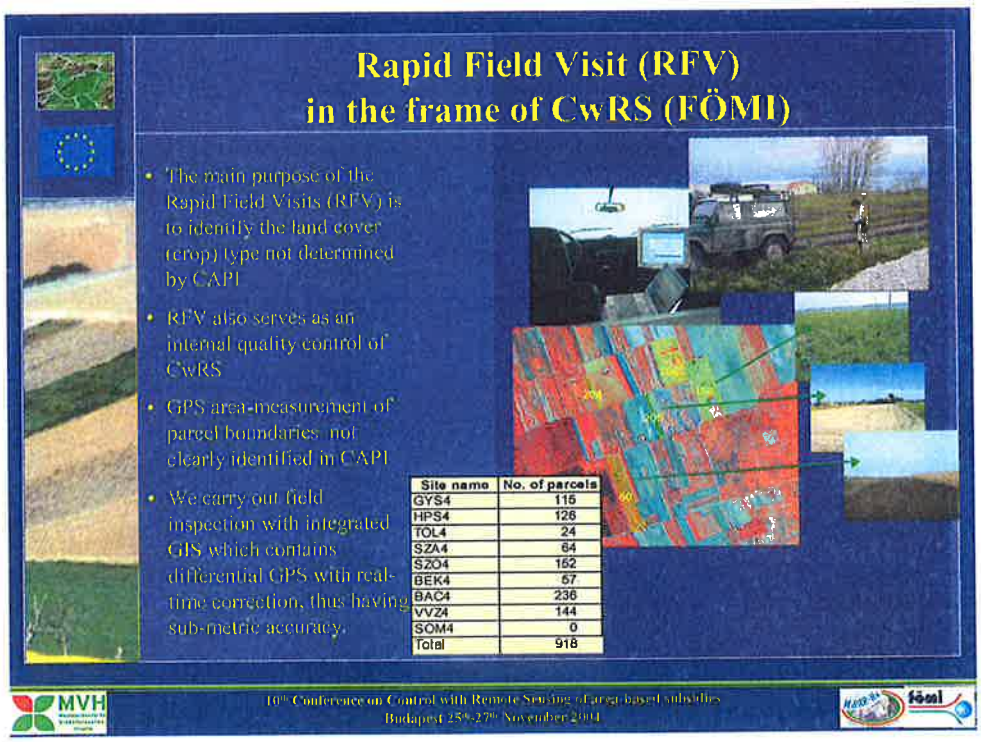
Rapid Field Visit (RFV)
in the frame of CwRS (FÖMI)
The main purpose of the Rapid Field Visits (RFV) is to identify the land cover (crop) type not determined by CAPI
RFV also serves as an internal quality control of CwRS
GPS area-measurement of parcel boundaries not clearly identified in CAPI
We carry out field inspection with integrated GIS which contains differential GPS with real-time correction, thus having sub-metric accuracy.
Site name | No. of parcels
GYS4 | 115
HPS4 | 126
TOL4 | 24
SZA4 | 64
SZO4 | 152
BEK4 | 57
BAC4 | 236
VVZ4 | 144
SOM4 | 0
Total | 918
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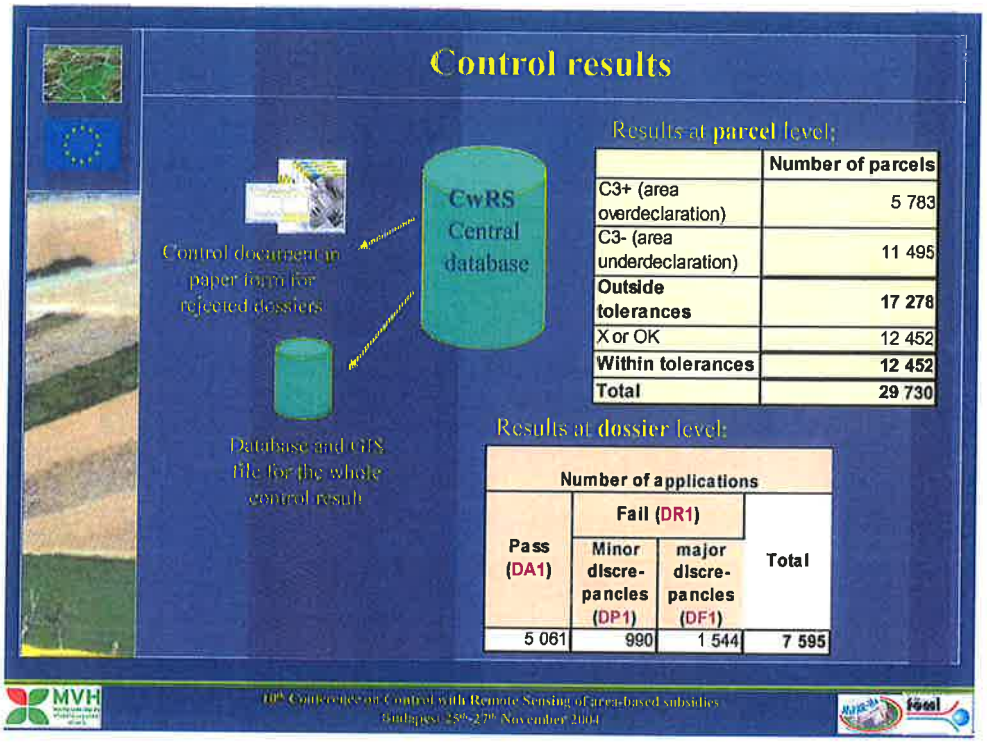
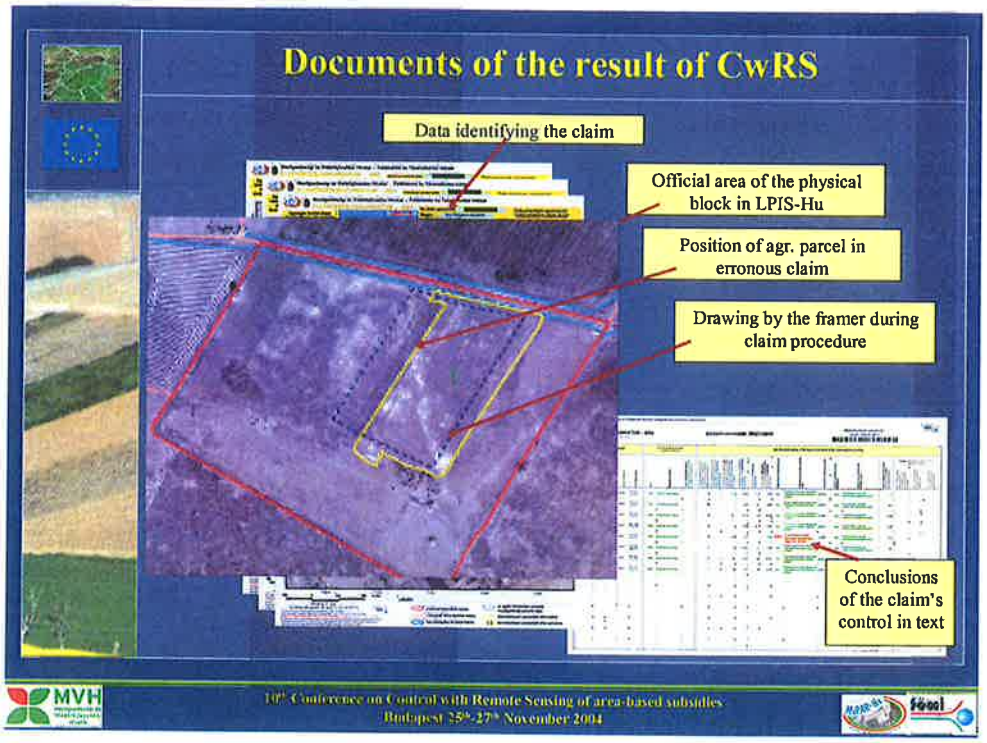
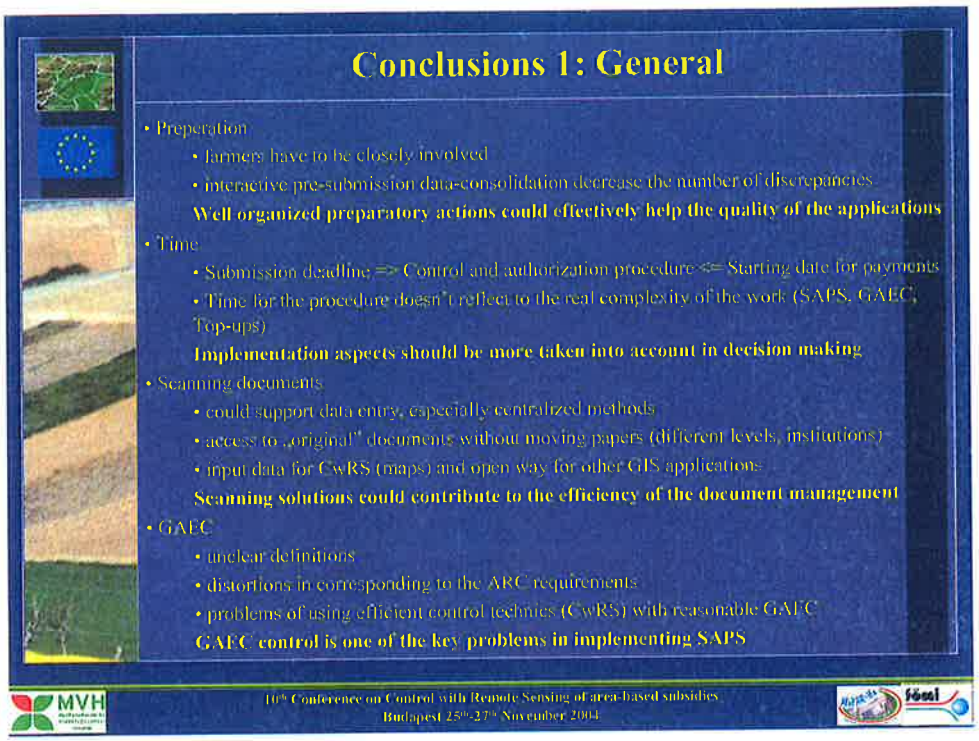


	Number of parcels
C3+ (area overdeclaration)	5 783
C3- (area underdeclaration)	11 495
Outside tolerances	**17 278**
X or OK	12 452
Within tolerances	**12 452**
Total	**29 730**




Conclusions 1: General
• Preperation
• farmers have to be closely involved
• interactive pre-submission data-consolidation decrease the number of discrepancies
Well organized preparatory actions could effectively help the quality of the applications
• Time
• Submission deadline => Control and authorization procedure <= Starting date for payments
• Time for the procedure doesn't reflect to the real complexity of the work (SAPS, GAEC, Top-ups)
Implementation aspects should be more taken into account in decision making
• Scanning documents
• could support data entry, especially centralized methods
• access to „original" documents without moving papers (different levels, institutions)
• input data for CwRS (maps) and open way for other GIS applications
Scanning solutions could contribute to the efficiency of the document management
• GAEC
• unclear definitions
• distortions in corresponding to the ARC requirements
• problems of using efficient control technics (CwRS) with reasonable GAEC
GAEC control is one of the key problems in implementing SAPS
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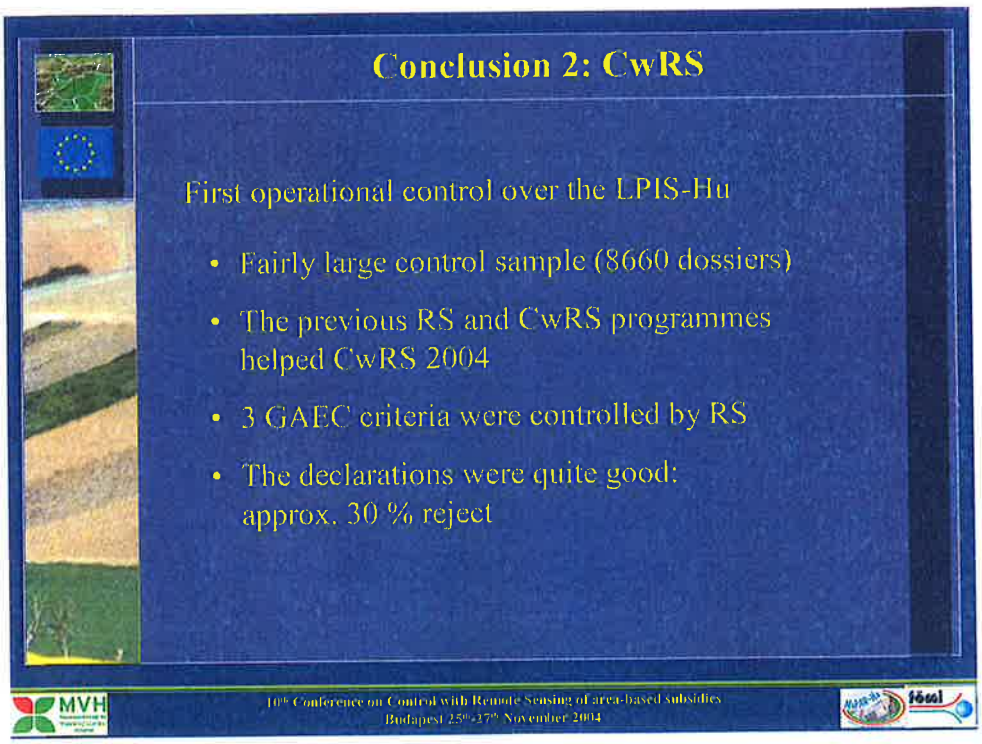
Conclusion 2: CwRS
First operational control over the LPIS-Hu
• Fairly large control sample (8660 dossiers)
• The previous RS and CwRS programmes helped CwRS 2004
• 3 GAEC criteria were controlled by RS
• The declarations were quite good: approx. 30 % reject
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Session 2 – Review of 2003 years CwRS Campaign

Chairman: Philippe LOUDJANI –JRC, IPSC, Agrifish Unit

Presentation 1 - Summary Statistics 2004

Paolo PIZZIOL
JRC, IPSC, Agrifish Unit)

Abstract

The CwRs Campaign 2004 has concerned 164 000 applications over 288 sites all over the enlarged European Union, involving 22 Member States (including 9 New MS) and 25 contractors. This campaign has been also characterised by the operational use of VHR images that have partially replaced the use of aerial orthophotos.

To date, complete data are not yet available, especially referring to data on feedback field inspection. This presentation will make comments on data received so far from a part of the MS involved.

However, at EU-15 level, CwRS have increased in terms of applications controlled. Results seem to report stabilised parameters and homogeneity between EU-15 and EU-25.

Keywords: CwRS campaign, summary statistics, VHR, orthophotos, field inspections

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Review of the CwRS Campaign 2004

Summary Statistics

Paolo Pizziol, Philippe Loudjani, Hervé Kerdiles

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Outline of presentation

- General
- Status of tables delivery
- Main charts
- Preliminary conclusions

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General

- 21 MS involved in the program (AT, FI, EE and SI out)
- 25 contractors (1 each, '2' BE,2 DE, 2 ES, 3 FR)
- More than 165 000 applications checked over "287" sites (128 not using satellite imagery e.g. 100 Italian sites)
- Novelties respect to previous campaign:
  - 7 NMS participating + 1 pilot site in LV
  - Operational use of VHR satellites imagery
  - All sites provided with at least 1 VHR (aerial or sat) image
  - HR Pan products not provided

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Status of Summary Statistics delivery

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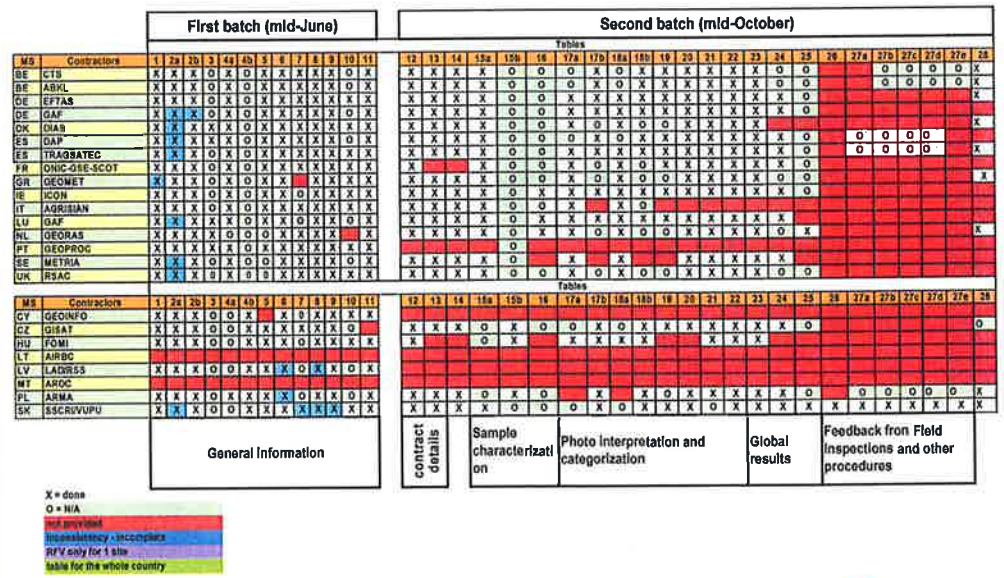

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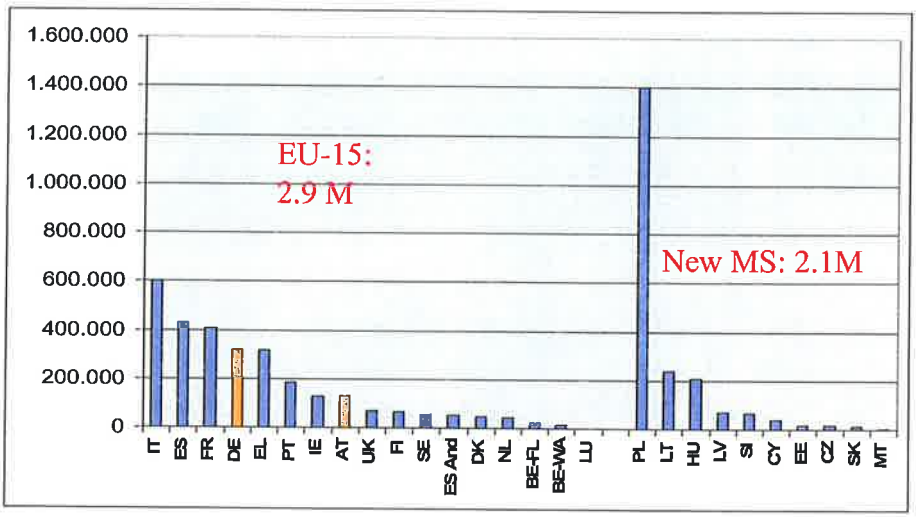
Total number of applications



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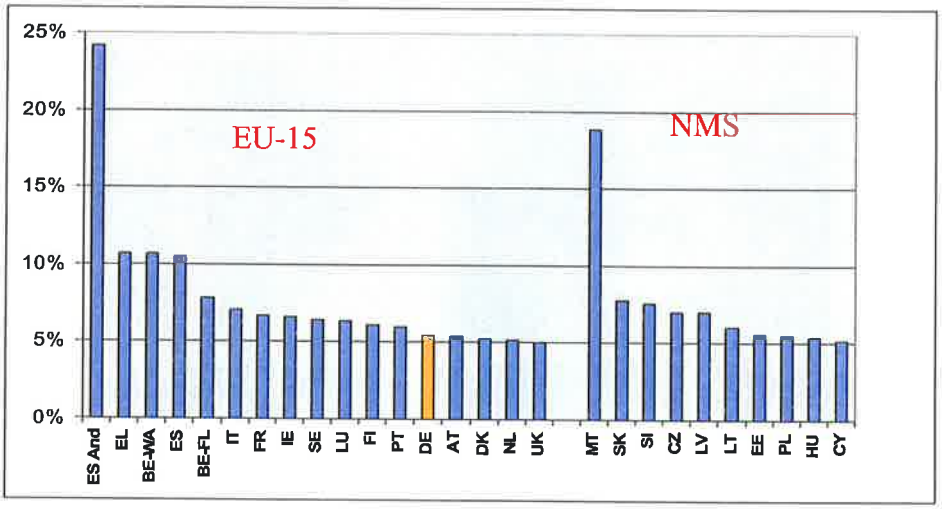
% OTS on total applications



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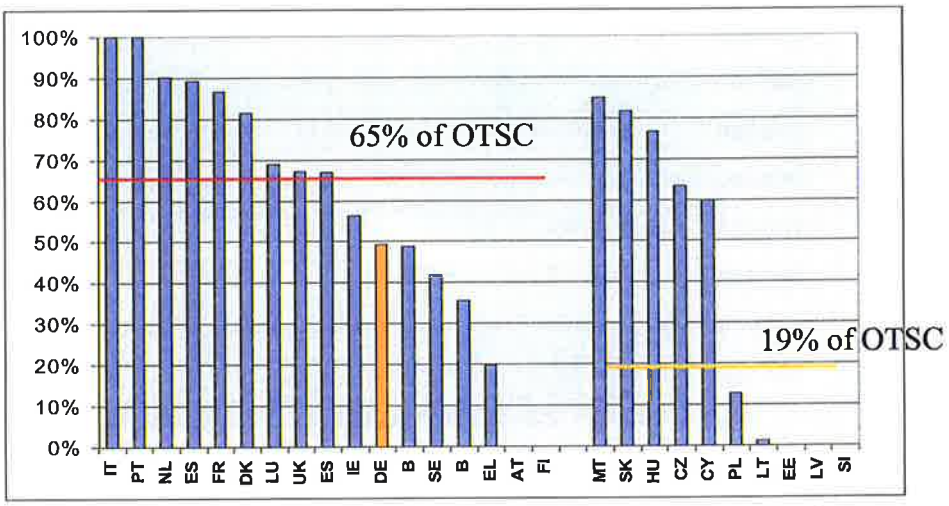
% CwRS on total OTS



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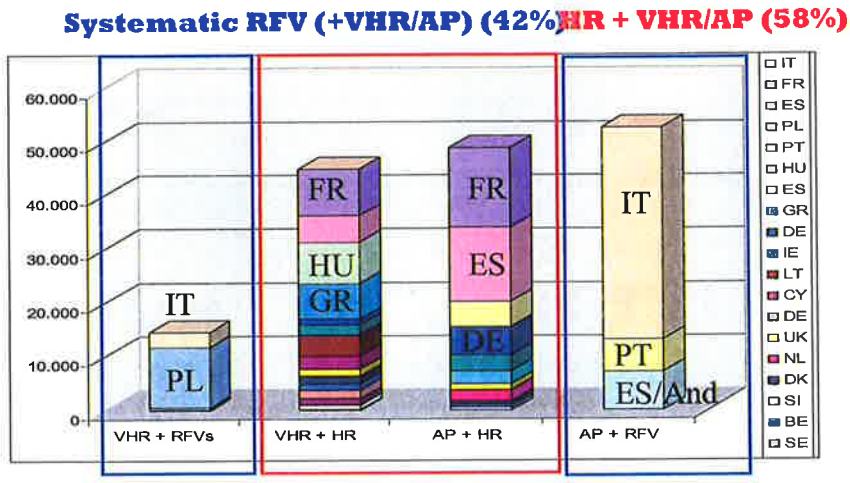
160 000 applications: distribution per method of control (RFV or CAPI)



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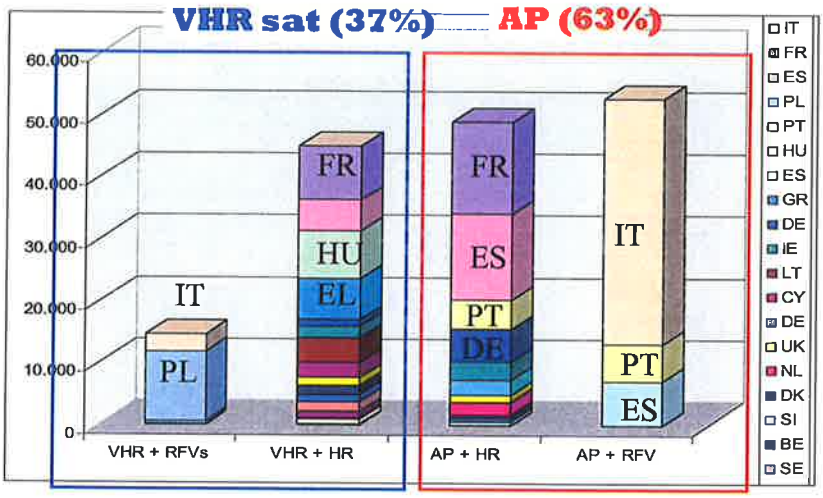
160 000 applications: controls per image type (VHR sat / aerial photo)



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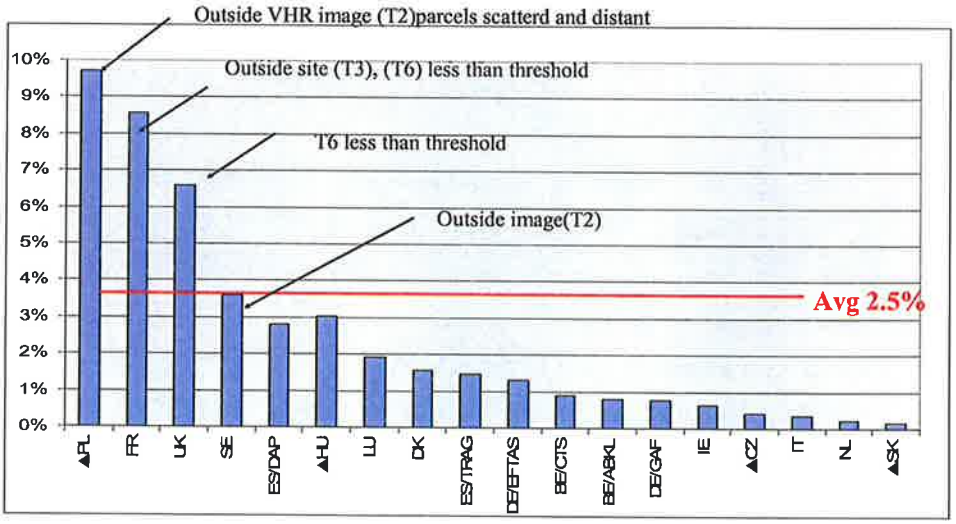
% of parcels not checked with RS in 2004 (%T codes)



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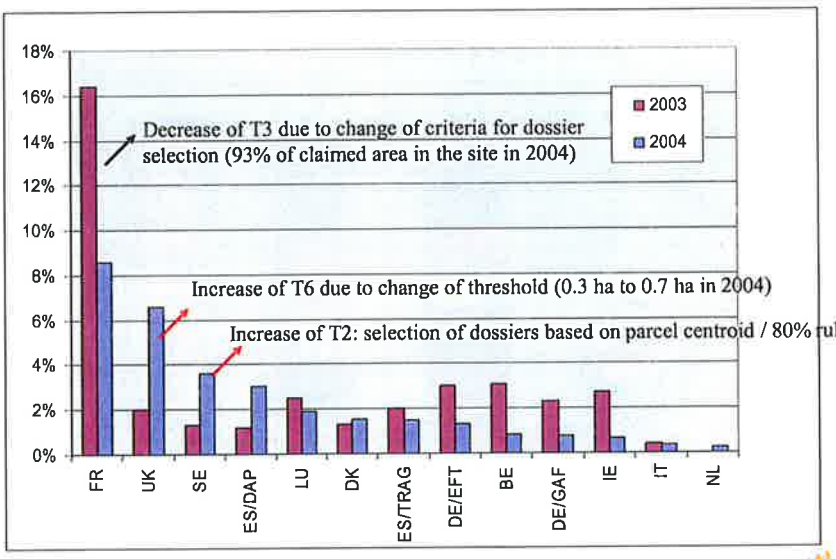
'T' codes: comparison 2004 - 2003



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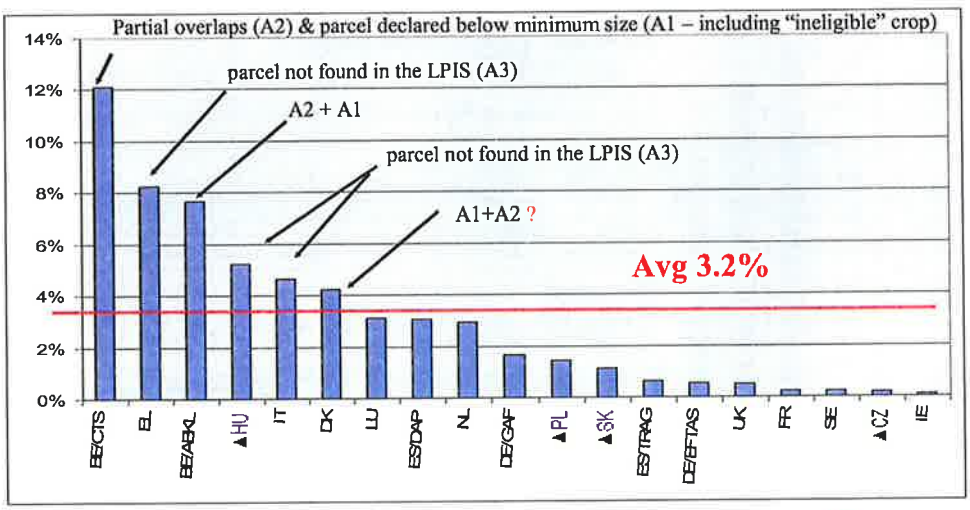
% of codes 'A' on total parcels



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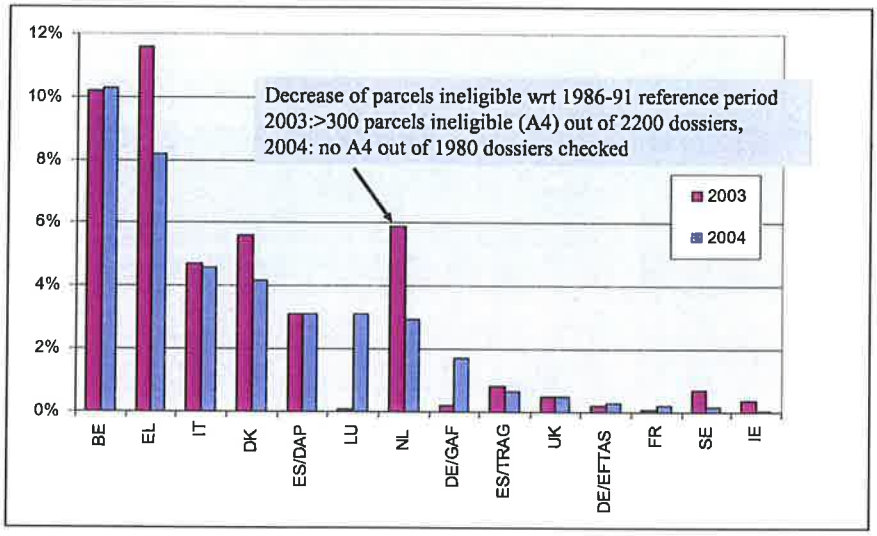
'A' codes: comparison 2003-2004



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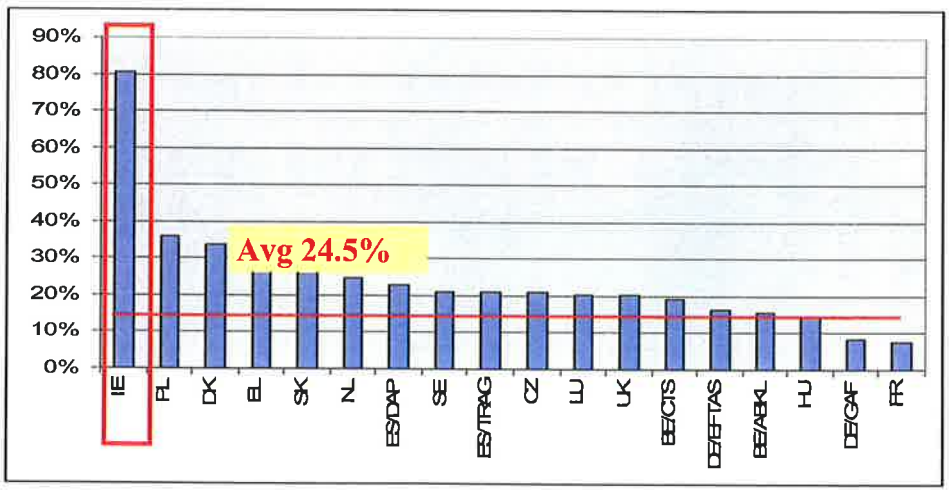
Area check at parcel level: % parcels outside tolerance (C3 / OK+C3)



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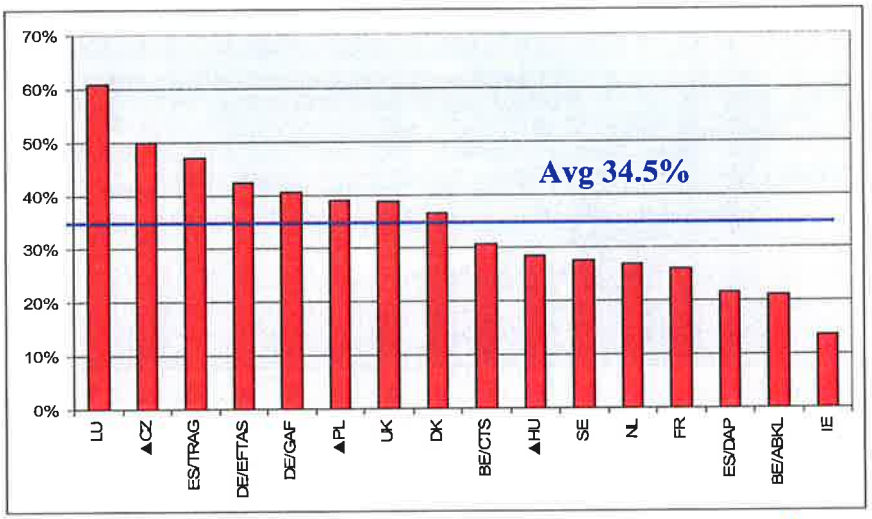
Results of CwRS: % groups rejected (conformity test)



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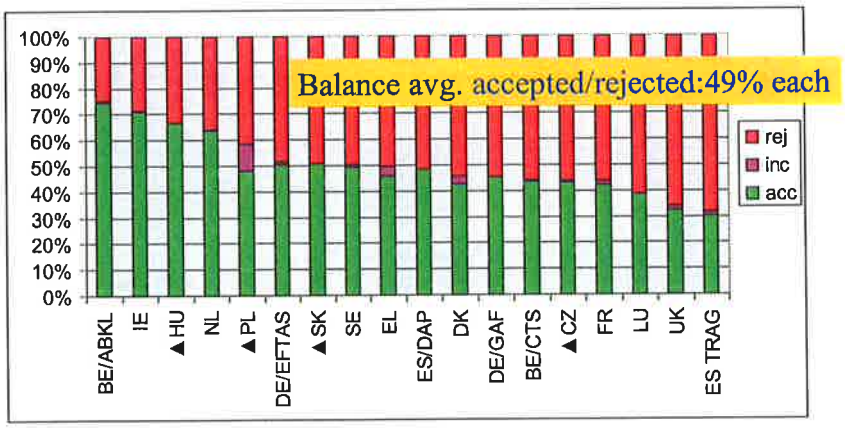
Distribution of dossiers in Accept, Incomplete and Rejects



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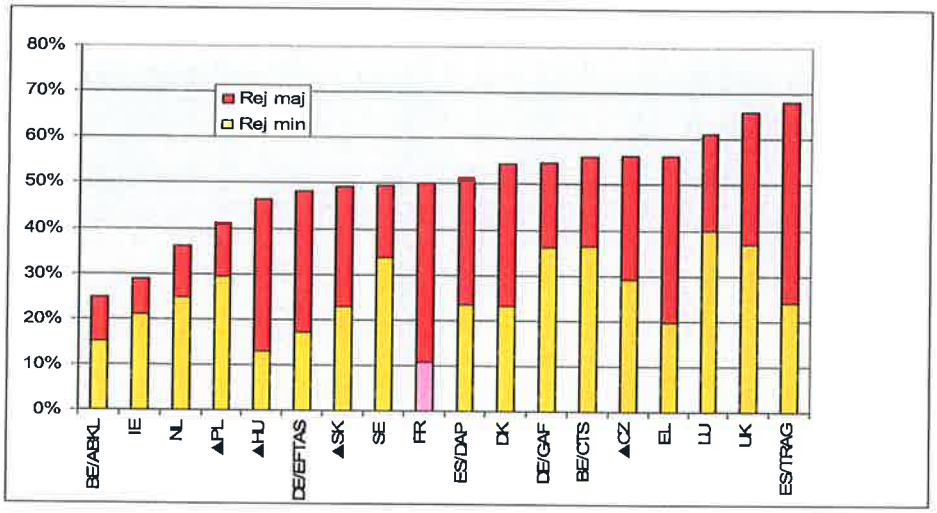
Distribution of rejects in 'minor' & 'major'



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Preliminary conclusions

- Full dataset is still missing, especially from NMS.
- The number of controls wRS increased, also in EU-15 only (some 10%).
- VHR imagery seem having increased the rate of rejection
- Preliminary results suggest a stabilisation of parameters compared with 2003
- Results in NMS appear homogeneous with the results in EU-15 MS.

Thanks for your attention!

Presentation 2 – Results of the Quality Control 2003 by JRC

Hervé KERDILES
JRC, IPSC, Agrifish Unit

Abstract

Since the 1996 campaign, each CwRS contractor has to provide the data used and his results (imagery, vectors and DB in a predefined format) every year on a site selected by the Administration. A quality control (QC) of the contractors' work is then performed on a sample of QC sites by the MARS group in support to the MS Administrations. For the 2003 campaign a sample of four contractors has been quality checked using for the first time a simplified QC for two of these contractors. These two contractors were selected because the complexity of their system did not allow the standard QC to fully check their diagnosis.

This simplified QC consisted of the standard analysis of the QC database followed by a 3-4 day visit at the contractor's premises to clarify any anomalies found and check a sample of parcels/dossiers on the contractor's system. Although the time spent was not significantly reduced with respect to the standard QC, and although the CAPI checks are more limited than in the standard QC, the simplified QC provides a better understanding of the contractors' system and better exchanges on all issues related to CwRS (even issues which may not be of the contractor's responsibility such as risk analysis and dossiers selection, follow-up of RS checks...).

The results of the QC 2003 will be presented to show all MS non optimal practices and potential problems due to particular systems so that corrective action can be taken where relevant.

Keywords: QC, CwRS.

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Results of Quality Control of the 2003 campaign

H. Kerdiles
JRC IPSC AGRIFISH

AGRIFISH MARS

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MARS

Data requested and delivery date

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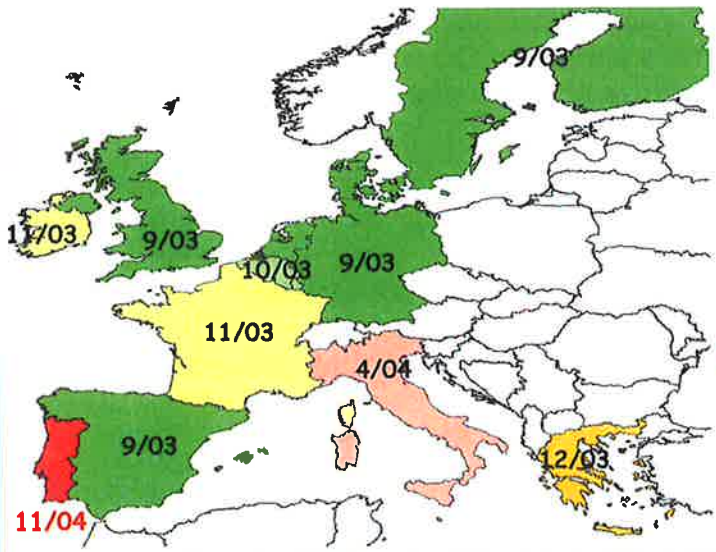

QC data requested

- **images** (satellite and aerial photo) + QCRs for geometry assessment
- **vectors** before (LPIS) and after check (AV format or compatible)
- **anum DB** with predefined structure
  contact us if problem
- **ancillary data** (crop nomenclature, crop calendar, rules if ≠ from CTS)

For the 2003 campaign, all 15 MS delivered QC data

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Simplified QC vs Standard QC

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- ✓ **Common part: Automatic queries** run on the QC DB at JRC
  - control of anomalies
  - consistency checks (e.g. sum of decl parcel area = group decl area)
  - diagnosis checks (at parcel, group, dossier level)
- ✓ **Difference**
  - ✓ **Standard QC: CAPI checks on a sample of min 1500 parcels**
  - ✓ **Simplified QC: 3-5 days visit at the contractor's premises**
    - ↳ clarification of anomalies found with contractor (lighter reporting)
    - ✓ CAPI checks (diagnosis at parcel level) on a sample of dossiers/parcels on the contractor's system
  - ✓ Check on image geometry: only if obvious problem

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Contractors selected for QC 2003

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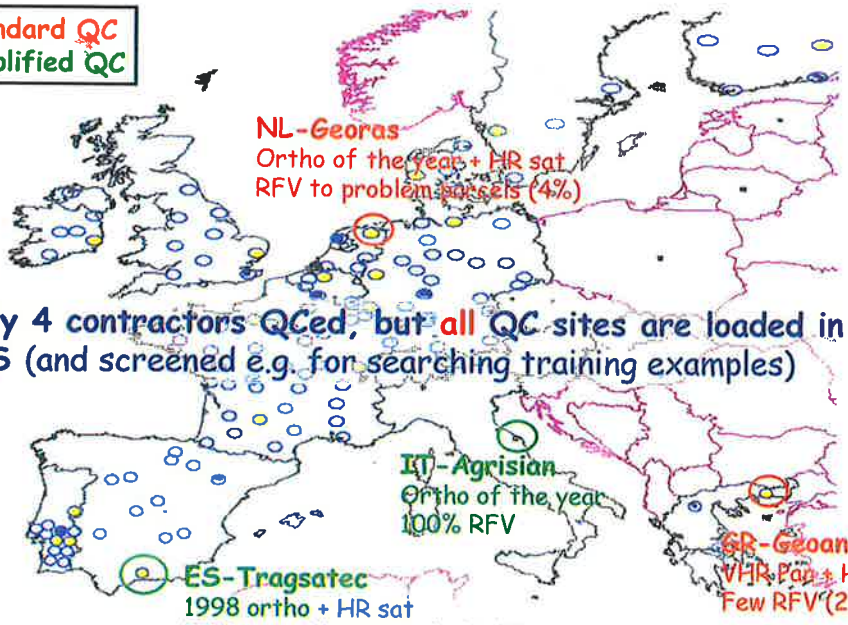
Standard QC
Simplified QC



Only 4 contractors QCed, but all QC sites are loaded in our GIS (and screened e.g. for searching training examples)

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2003 QC findings (1/2)

MARS

- **Data input errors** (GR): **invalid crop codes & crop-group combinations** (e.g. oats in durum wheat group): use drop-down lists if Admin SW is not available
- **CAPI obvious errors, lack of consistency** (between operators ?), **interpreted crop in contradiction with ground truth** (GR)
- **Area not checked for parcels visited** (50/141 of OK parcels are outside tolerance - GR): check area after RFV check of crop
- **ceiling to reference area not performed** (NL, GR)
- **Lack of consistency at categorization level** (GR - incorrect retained area for 5 parcels, errors in completeness test: 13 dossiers incomplete -> complete): not acceptable for automatic rules

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CAPI obvious error

MARS

0.19 ha of maize declared and accepted by contractor (trees)

0.25, 0.36 and 1.30 ha of maize declared and accepted by contractor (perm. crops)

Incorrect land use check, insufficient use of VHR image

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CAPI obvious error

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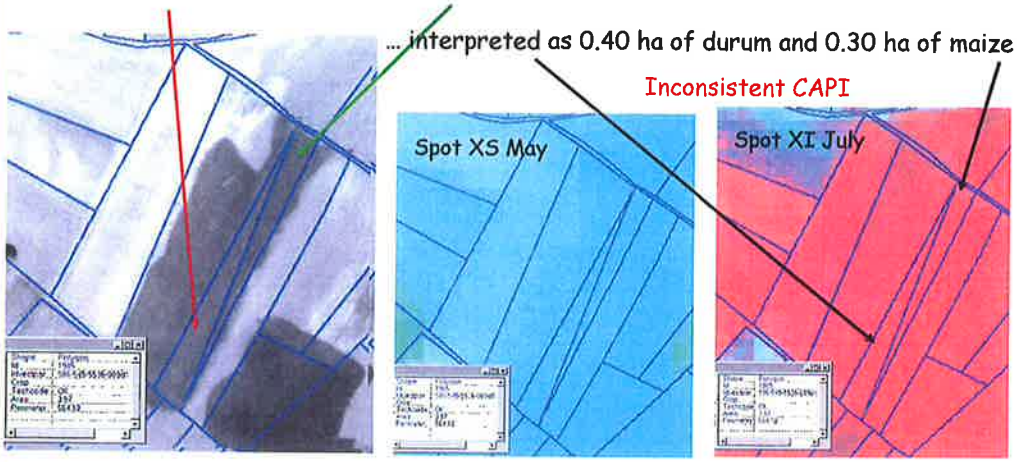
0.70 ha of durum wheat and 0.70 ha of maize declared

... interpreted as 0.40 ha of durum and 0.30 ha of maize

Inconsistent CAPI



Poor declaration map and poor control (0 ha of durum, 0.70 of maize)

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Ground truth vs interpretation

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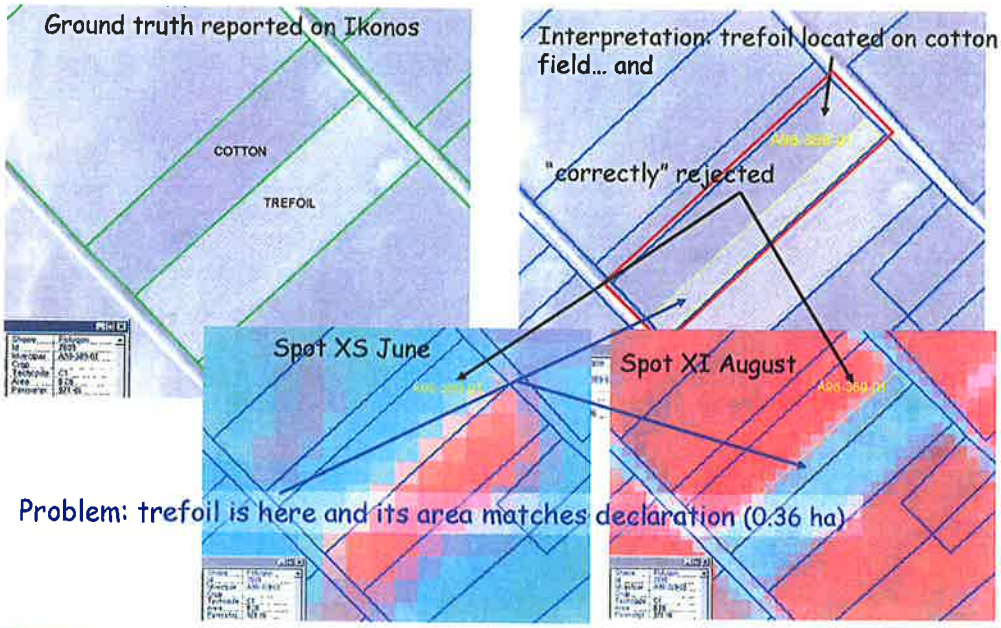
Ground truth reported on Ikonos

COTTON

TREFOIL

Interpretation: trefoil located on cotton field... and

"correctly" rejected



Problem: trefoil is here and its area matches declaration (0.36 ha)

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2003 QC findings (2/2)

- **Problems with measurement**
  - **poor control of parcel boundaries** (GR - limits not adjusted to actual crop area, ineligible areas not removed) **in context of poor declaration maps/VHR Pan only**

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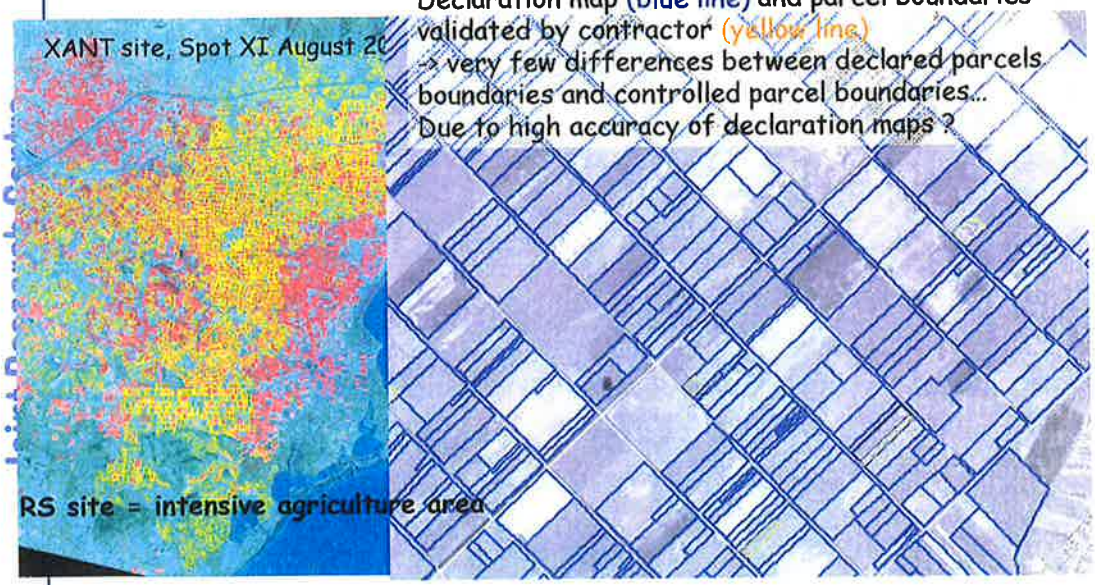
Context



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Incorrect parcel boundaries

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Some flagged by contractor (A5)
-> Declaration maps not fully reliable

Reminder: incorrect LPIS boundaries or declaration maps should be flagged (for correction by Admin) - case with A5 coded parcels here

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Accuracy of declaration / Quality of check ?

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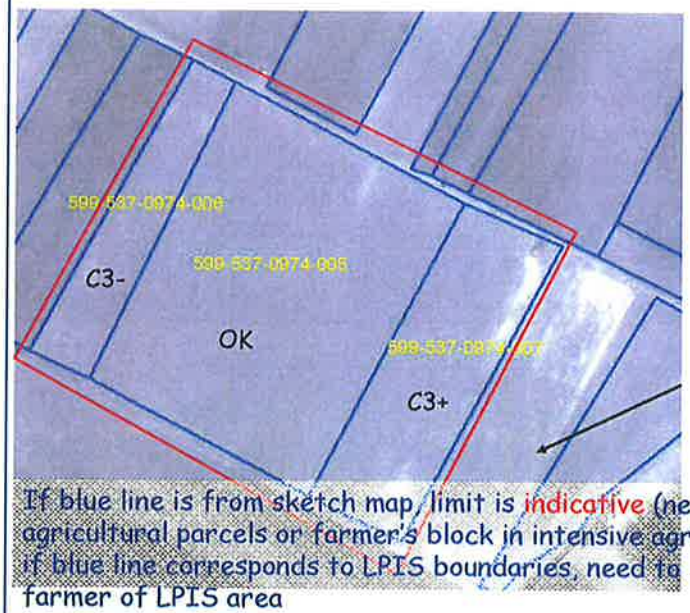

3 parcels declared with durum wheat (by same dossier) and drawn on declaration map (blue line)

Map & crop accepted by contractor -> 3 different codes, yet no physical boundaries visible on VHR. In such a case, 1 measurement should be made

Same use (from other farm not in sample?)

If blue line is from sketch map, limit is indicative (need for LPIS based on agricultural parcels or farmer's block in intensive agricultural areas?)
if blue line corresponds to LPIS boundaries, need to review LPIS and inform farmer of LPIS area

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2003 QC findings (2/2)

MARS

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- **Problems with measurement**
  - **poor control of parcel boundaries** (GR - limits not adjusted to actual crop area, ineligible areas not removed) **in context of poor declaration maps/VHR Pan only**
  - **excessive perimeter** (NL, GR)

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Tolerance overestimated due to rudimentary GIS software

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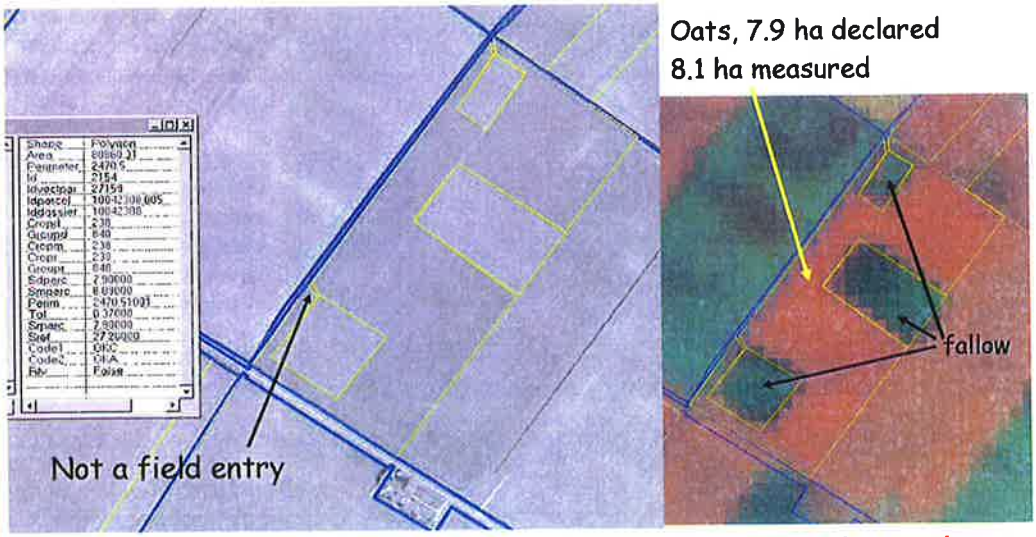

Perimeter overestimated (2500 m instead of 1500 m) **but declared area close to measured area** (parcel still OK with correct tolerance)

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Tolerance overestimated due to rudimentary GIS software

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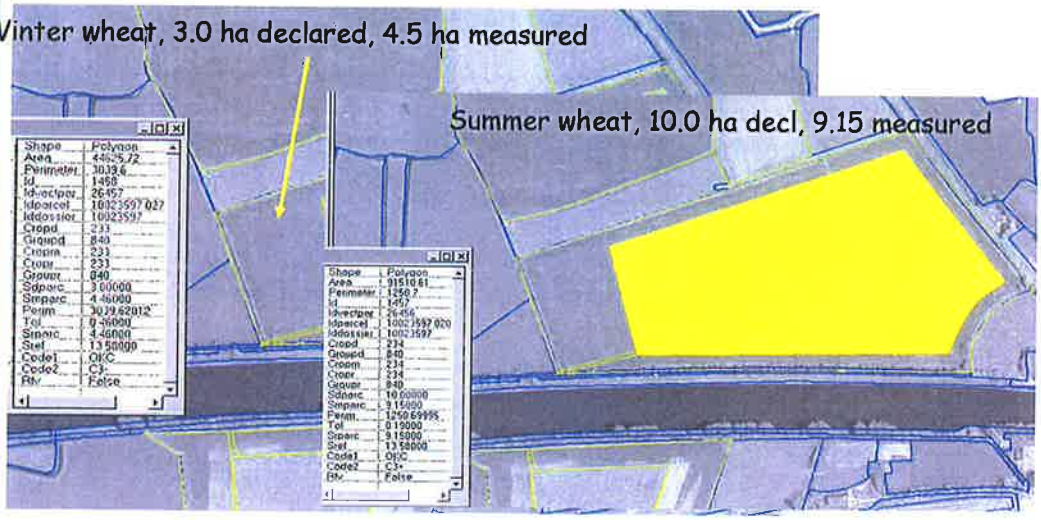

Perimeter overestimated (3000m instead of 1600m for LPIS parcel) **but declared area far from measured area** (for both parcels)

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Erroneous outer perimeter

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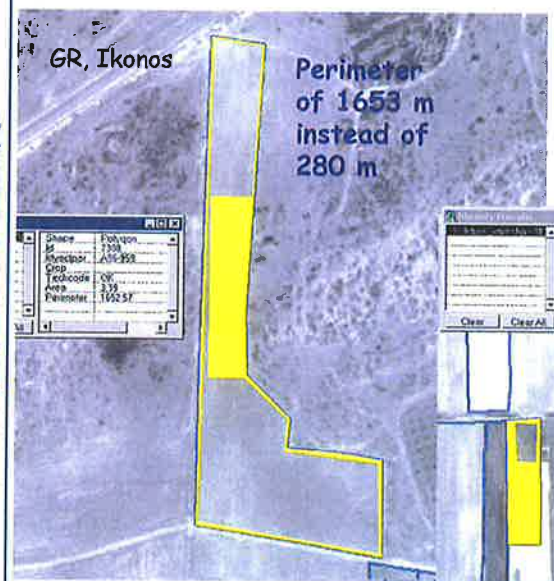

To subdivide parcel or to remove ineligible area, a "hole" is made in the original parcel... hence preserving the outer perimeter (of declared parcel) **-> wrong understanding of recommendation ?**

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2003 QC findings (2/2)

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- Problems with measurement
  - poor control of parcel boundaries (GR - limits not adjusted to actual crop area, ineligible areas not removed) in context of poor declaration maps/VHR Pan only
  - excessive perimeter (NL, GR)
  - probable excess retained area due to lack of sketch map (ES - system not fully operating at agricultural parcel level)

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Lack of sketch map at contractor level

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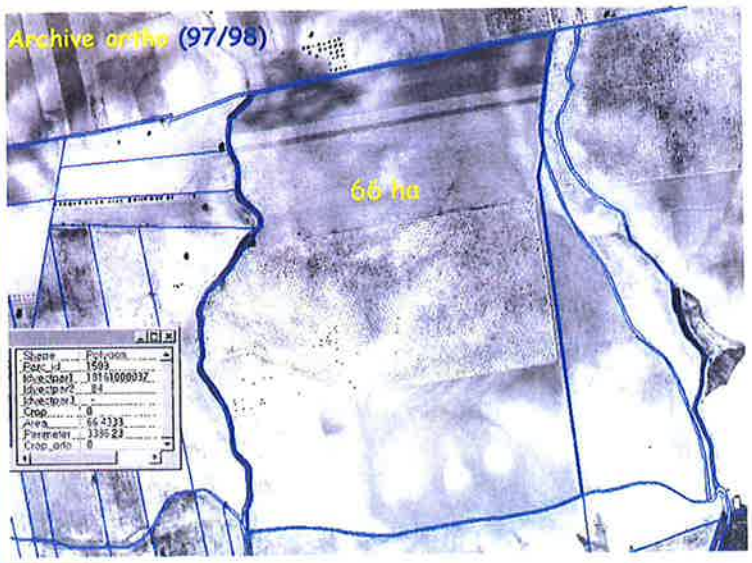
- operator has to guess location of declared agricultural parcels inside reference parcel



Declaration: 3 uses, 5 lines:

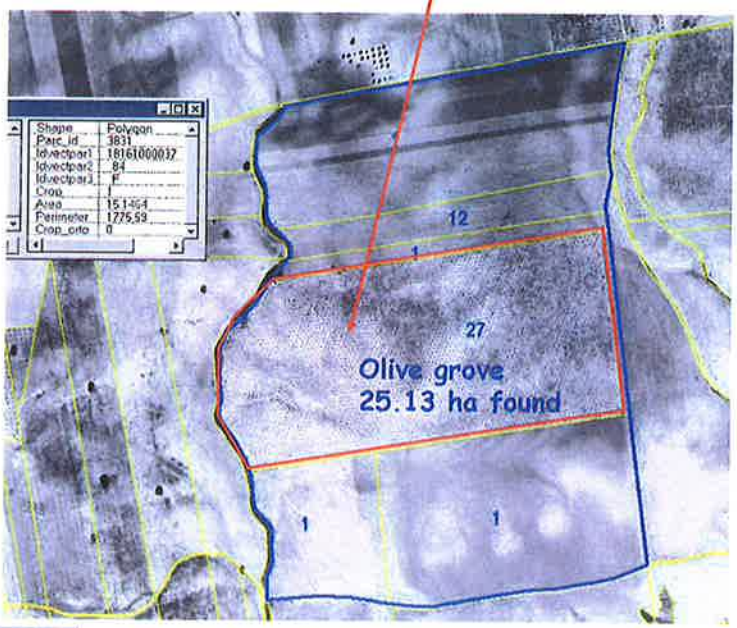
Durum Wheat: 25.55
(20.70; 2.60; 2.25)

Other Graminaceae
Not eligible: 16.30

Olive grove: 24.50

Total declared: 66.35

Identification of permanent uses on archive ortho



Need to identify arable & forage uses on current year HR satellite imagery

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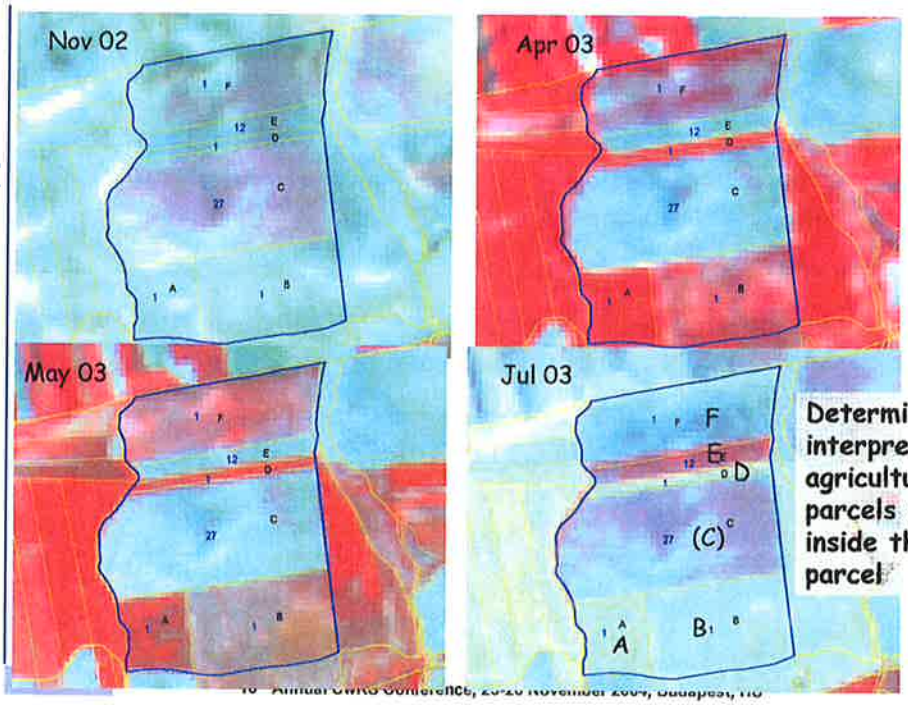
Identification of other uses on 2003 HR data



Determination of interpreted agricultural parcels ("recintos") inside the LPIS parcel

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matching of declared and measured uses => possible excess retained area

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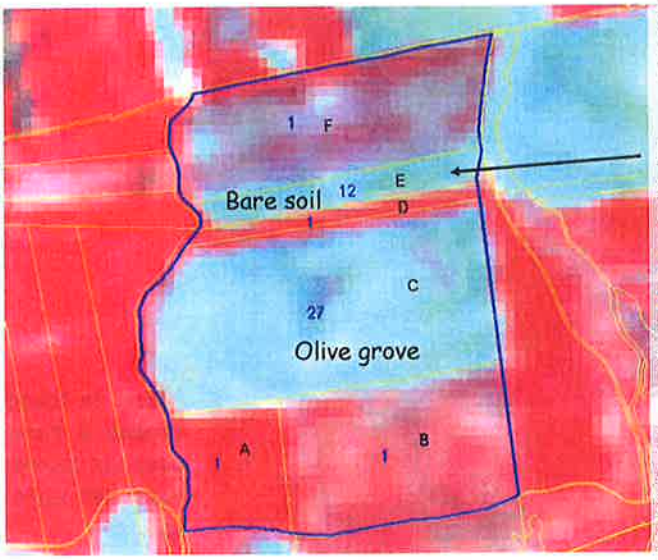

F, D, A, B: 37.30 ha of Cereals
Interpreted use valid for durum Wheat -> retain 37.3 ha
>> 25.6 ha declared

Declared 16.30 ha of non eligible graminaceae not fully found
(E: 4 ha of bare soil)

Difficult matching of declared and measured areas
removal of F (15.15 ha) => lack of durum wheat area

Decl. crops not fully checked
Risk: possible excess retained area for durum wheat may compensate over-declaration of other durum wheat parcel of this dossier (not the case here)

2003 QC findings (2/2)

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- **Problems with measurement**
  - **poor control of parcel boundaries** (GR - limits not adjusted to actual crop area, ineligible areas not removed) **in context of poor declaration maps/VHR Pan only**
  - **excessive perimeter** (NL, GR)
  - **probable excess retained area due to lack of sketch map** (ES - system not fully operating at agricultural parcel level)
  - **Measurement inaccuracies due to gross adjustment of orthophoto to LPIS** (IT cadastre)

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Mismatch between LPIS (cadastre) & ortho

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QC data
- Red = LPIS (cadastre),
- Yellow = interpretation

- Overlaps between cadastral parcels at border between 2 cadastral maps
- need for some adjustment !
- IT Solution: shift ortho and focus on 1 cadastral parcel at a time

-> Parcel boundaries difficult to check with standard QC

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QC measurement

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2.22 ha of durum wheat declared on 2 cadastral parcels from 2 maps

Total cadastral area: 2.01 ha

Total area of crop measured by QC on ortho : 2.23 ha

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contractor's measurement

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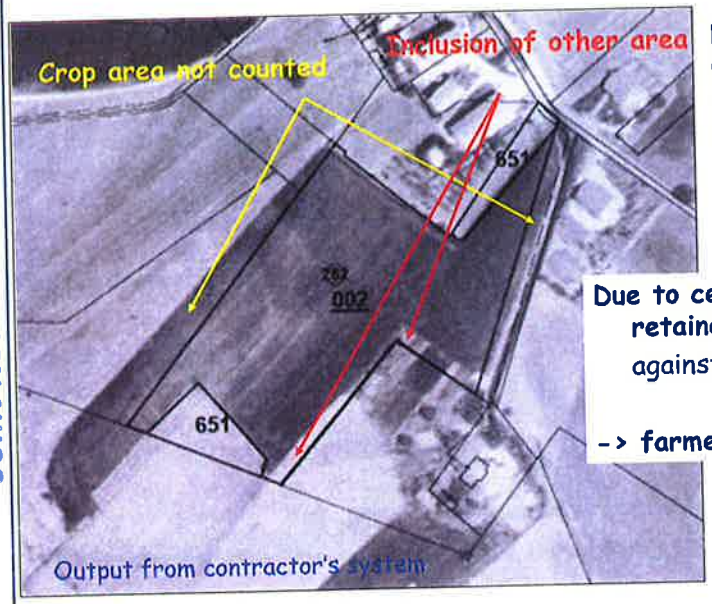

Despite shift of ortho image, still some mismatch between ortho and cadastre

Due to ceiling to LPIS area, retained area = 2.01 ha
against 2.23 ha measured by QC

-> farmer penalised ?

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Mismatch between LPIS and ortho

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Interpretation of contractor -> Not verifiable without applying their shift to the ortho

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QC measurement vs contractor's measurement

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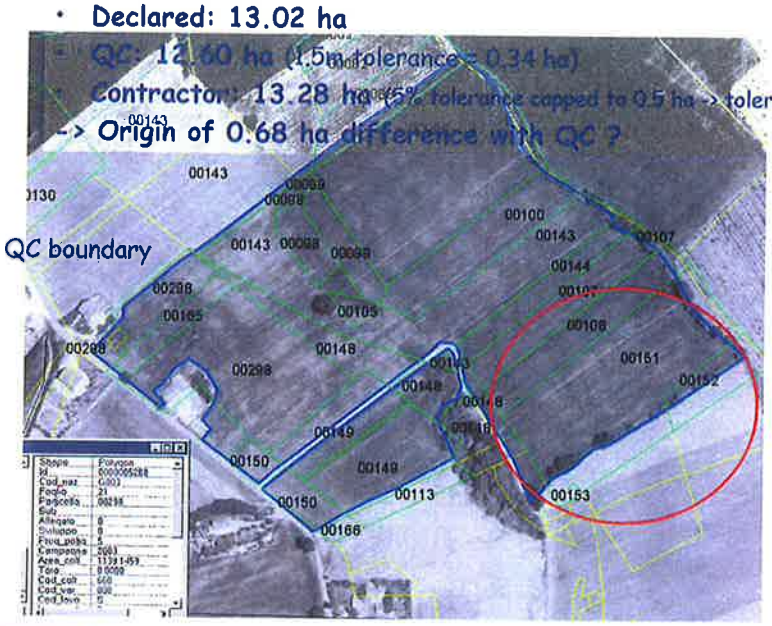
- Declared: 13.02 ha
- QC: 12.60 ha (1.5m tolerance = 0.34 ha)
- Contractor: 13.28 ha (5% tolerance capped to 0.5 ha -> tolerance = 0.5 ha)
- -> Origin of 0.68 ha difference with QC ?



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Contractor's measurement

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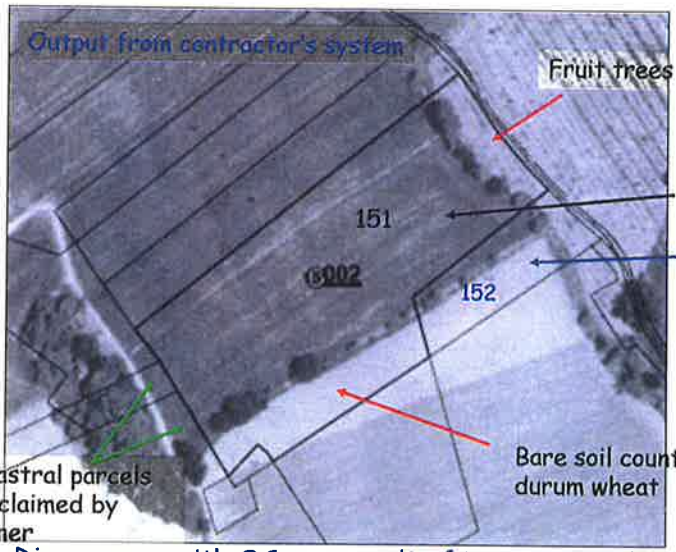

Fruit trees included as durum wheat

No shift of ortho for parcel 151
In contrast with parcel 152 (ortho shift of 29 m to the west) which was fully declared for 0.34 ha of durum wheat and accepted

Bare soil counted as durum wheat

Cadastral parcels not claimed by farmer

Discrepancy with QC as a result of inaccuracies (excess & omission of area)
For parcel 151, contractor's area = 2.01 ha > QC area = 1.84 ha

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2003 QC findings (2/2)

- Problems with measurement
  - poor control of parcel boundaries (GR - limits not adjusted to actual crop area, ineligible areas not removed) in context of poor declaration maps/VHR Pan only
  - excessive perimeter (NL, GR)
  - probable excess retained area due to lack of sketch map (ES - system not fully operating at agricultural parcel level)
  - Measurement inaccuracies due to gross adjustment of orthophoto to LPIS (IT cadastre)
- Underestimation of rate of parcels not checked

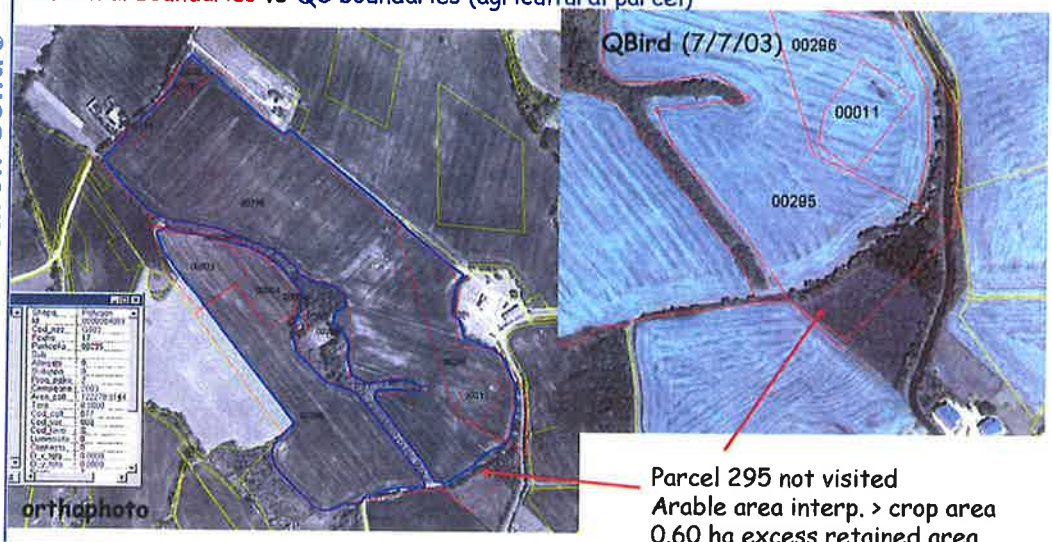
Underestimation of rate of parcels not checked

- IT method based on systematic RFV for land use check
- Arable crop parcels that could not be checked in the field are interpreted. The min of (declared area, arable area interpreted) is retained
- ↳ Recommendation: measure crop area on current year VHR ortho imagery
  - if not possible, parcel should be considered as not checked
- Parcel not found on cadastral map but for which farmer presents proof of possession/rent should be considered as not checked

Arable area interpreted

- 21.42 ha of durum wheat declared by 2 dossiers on 8 cadastral parcels, 21.18 ha measured by Contractor, 20.58 ha by QC

cadastral boundaries vs QC boundaries (agricultural parcel)



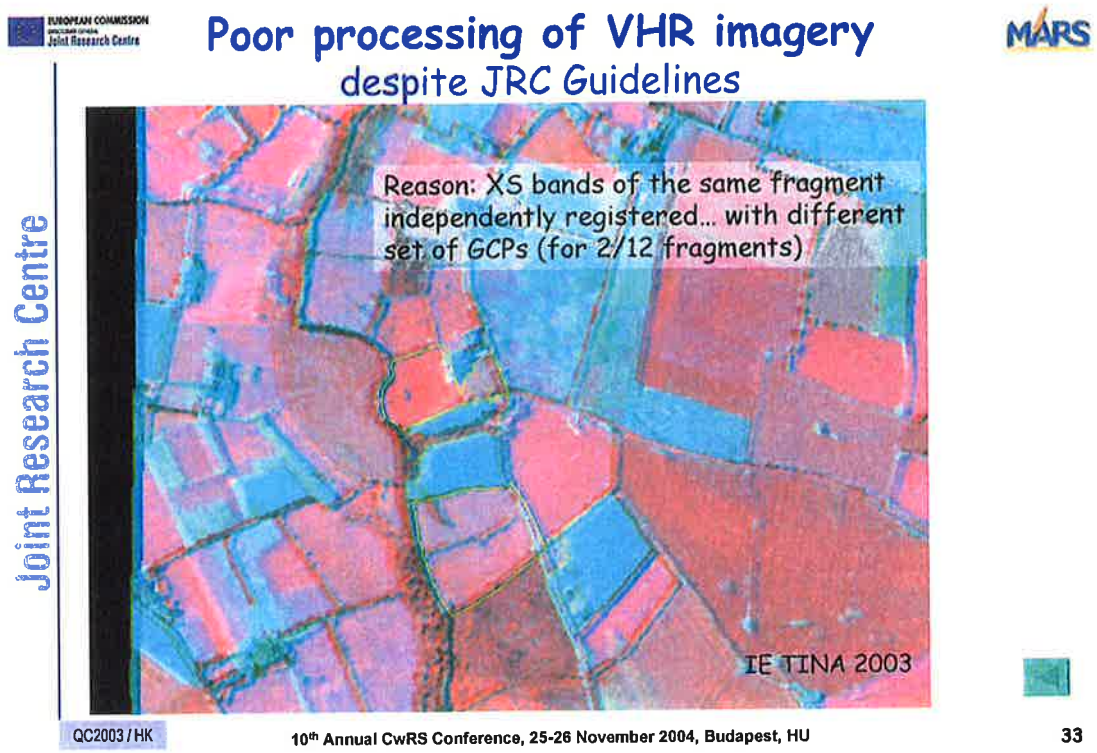
Parcel 295 not visited
Arable area interp. > crop area
0.60 ha excess retained area

QC2003 / HK

Conclusion on QC 2003

- QC still needed esp. for new contractors
- Simplified QC (tested on 2 sites):
  - Not found much quicker than standard QC (due to visit preparation) despite lighter reporting
  - particularly appropriate for complicated systems
  - better understanding of the whole system (including sites & dossiers selection, declarations and sketch maps) -> QC findings related to the system/control strategy
  - better interaction with contractor
- QC of 2004 campaign: still 2 standard QC but increase of simplified QC from 2 to 6 contractors
- Even if QC is not performed on all contractors, QC data are loaded for visual check

QC2003 / HK


Poor processing of VHR imagery
despite JRC Guidelines
MARS
Joint Research Centre
Reason: XS bands of the same fragment independently registered... with different set of GCPs (for 2/12 fragments)
IE TINA 2003
QC2003 / HK
10th Annual CwRS Conference, 25-26 November 2004, Budapest, HU
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Presentation 3 – Summary of 2004 HR, RADAR image acquisition

Paolo PIZZIOL

JRC, IPSC, Agrifish Unit)

Abstract

In 2004, the CwRS campaign has covered 149 HR sites (54% of them located in France, Germany and Portugal) with 545 (11 archive) optical images acquired, plus 145 SAR images (over 54 sites, including 4 sites cancelled) as a backup for certain countries. The total HR expenditure was 1,667,274 €.

The majority of the acquired 690 HR images are SPOT multispectral (66%) and Synthetic Aperture Radar Radarsat (21%), but Landsat Thematic Mapper (9%) and IRS LISS (4%) images were also acquired.

The presentation provides financial details and time delay analyses related to the images acquisition. Specific technical and administrative problems encountered will be mentioned as well.

The campaign can be reckoned as successful. However, the overall success rate for acquiring multispectral images in the different acquisition windows in 2004 was somewhat lower than in 2003 (94% as compared to 98%) due to cloudy weather. The quite low rate of use of SAR images (25%) suggests a revision in the acquisition system for this type of images.

Keywords: CwRS – Controls with Remote Sensing, HR – High Resolution, SAR - Synthetic Aperture Radar - VHR - Very High Resolution

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Review of the CwRS Campaign 2004

High Resolution Data

Paolo Pizziol, Csaba Wirnhardt, Cherith Aspinall

1 Title / author 10th Annual CwRS Conference, November 2004, Budapest, HU

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Outline of the presentation

- General
- HR data
- SAR data
- Problems
- Conclusions

2 Title / author 10th Annual CwRS Conference, November 2004, Budapest, HU

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General

- The campaign 2004 was characterized by an increase of HR sites compared to 2003, due to Enlargement (124 to 149 sites)
- The delayed release of the specific Commission budget, resulted in late availability of data for NMS
- The budget devoted to HR data acquisition was € 1 665 000 (€1 661 000 in 2003)

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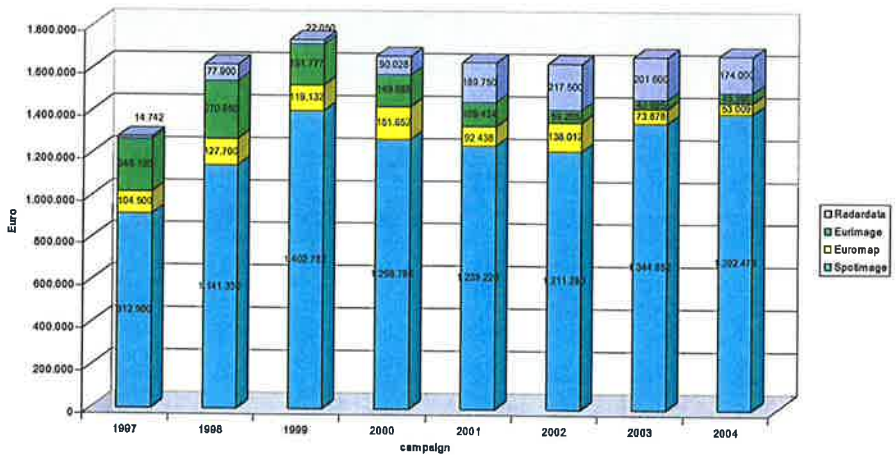
Cost analysis – Total cost last 8 campaigns



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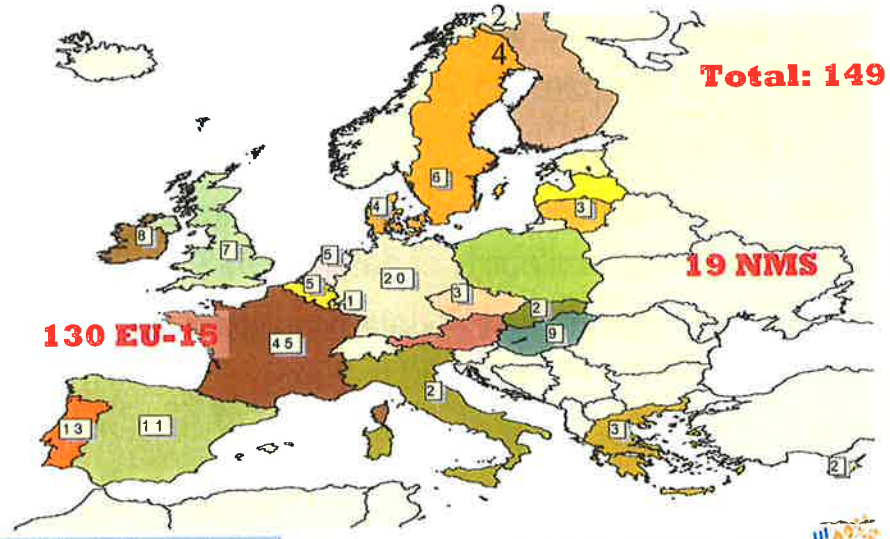
Distribution of HR Sites per MS



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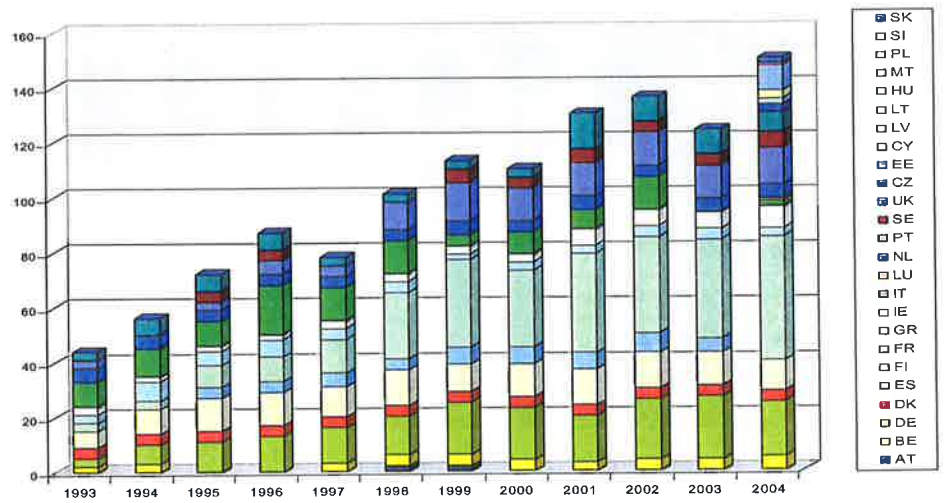
Evolution of number of HR sites : 1993-2004



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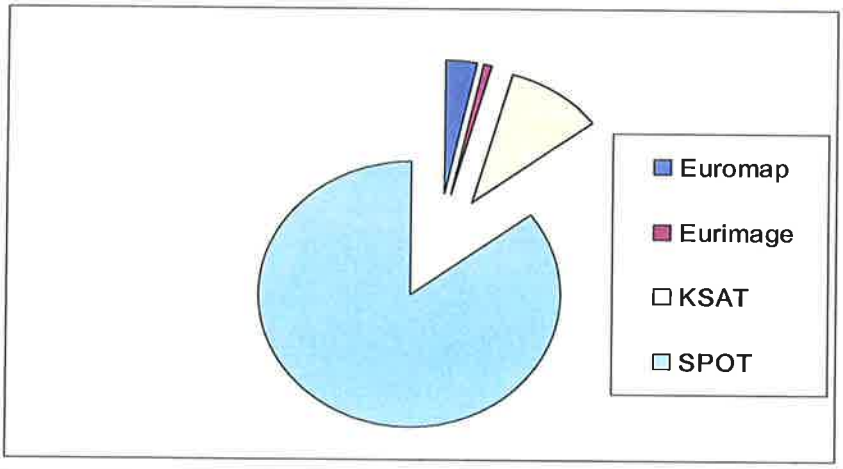
HR sites: 690 images acquired

680 in 2003, so the increase was much less than expected!



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Success rate per window

Window	Planned	Acquired	Success rate
Autumn	114	113	99%
Spring1	139	138	99%
Spring2	143	132	92%
Summer1	141	125	89%
Summer2	25	22	88%
All	562	530	**94%**

Despite increase of 25 sites in 2004 with respect to 2003, only 10 images more:
lower success rate of acquisition in Summer windows
6 HR windows closed by VHR images (2 in BE, 2 in FR,1 in LU and 1 in UK)

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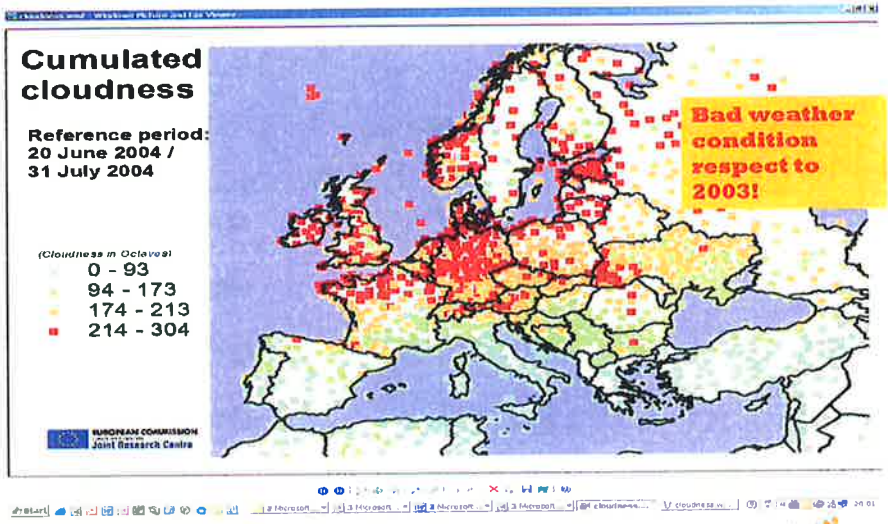
HR data: overall success rate 94% (98% in 2003)



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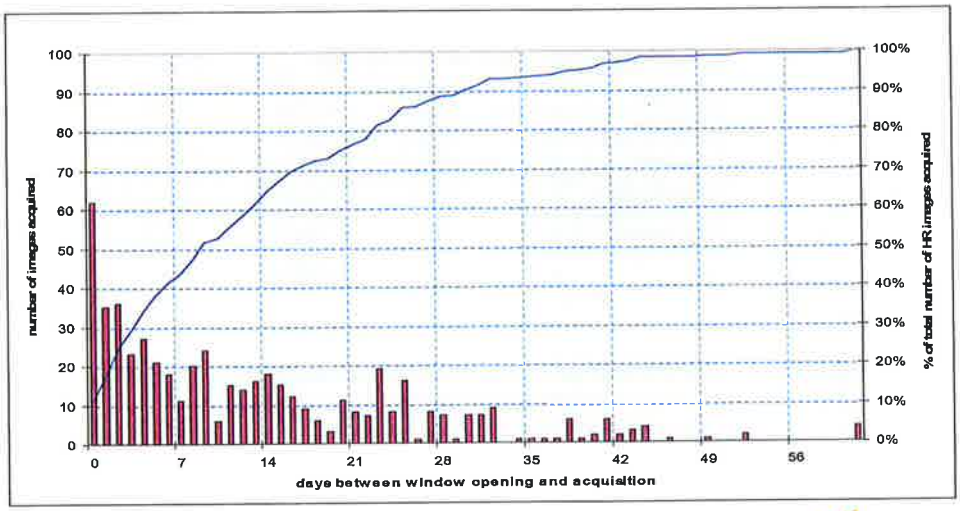
Delay between window opening and acquisition



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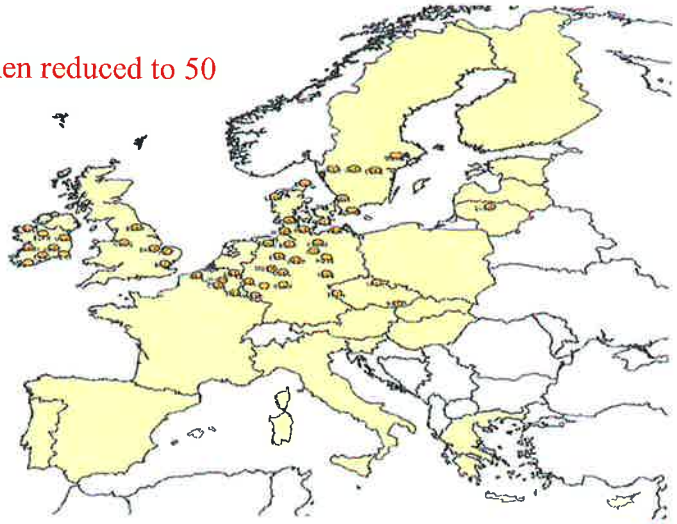
Distribution of sites with SAR image back-up

54 sites then reduced to 50



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Use of SAR images

Member State	Purchased	Used
BE	15	6
DE	51	0
DK	11	3
IE	21	9
LU	2	0
SE	18	0
UK	15	0
CZ	9	0
LT	3	0
Total	145	18

12% !

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Specific problems encountered

- 2 cases of contractors changing sites coordinates after acquisition
- 5 cases of scenes not covering the site (images produced with wrong SAT): reproduced with correct SAT very fast correction
- Partial coverage of 3 sites with radar: re-processing of images required, successful in 2 cases

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Conclusions

- Successful campaign: all sites covered with quite high success rate
- Shorter delay in image delivery due to the FTP download option for SPOT and SAR imagery (except LT, IT,PT,CY and FR-SCOT)
- Difficult campaign from administrative point of view:
  - 2 contractors appointed very late in campaign
  - Budget delivered in 2 steps: doubling of some administrative procedures
  - Budget for NMS delivered late: peak of activity in mid July
  - LIO database upgrade/development to include VHR sat images acquisitions and statistics
- Low rate of use of SAR images: revision of the specific strategy required.

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- **Thanks for your attention!**

Presentation 4 – Summary of 2004 VHR image acquisition campaign

Pär Johan Åstrand

AgriFish Unit, IPSC, JRC

Abstract

Since 1993, the EC DG Agriculture has promoted the use of "Controls with Remote Sensing" (CwRS) as appropriate control system within the Common Agricultural Policy (CAP). CwRS is considered suitable to check if agricultural area-based subsidies (yearly > 25 billion euro EC expenditure) are correctly granted. On the basis of the Council Regulation (EC) 165/94 and of the Commission Regulation (EC) 601/94, the Commission Services are required to centralize the satellite images acquisition. This task has been managed by the MARS Project at the JRC since 1999, where the whole controls activity is coordinated. The activity also includes the setting up of specifications, recommendations, performing Quality Controls (QC) and auditing of the selected contractors, and evaluation of new methods. Satellite image acquisition involves the control site definition within each Member State, and the subsequent chain of image acquisition over the defined sites including feasibility with image providers, acquisition, validation, ordering, delivery and final archiving of the imagery. In summary the 2004 years campaign involved a budget of approximately 3.2 M euro financed by the EC DG Agriculture to cover some 150 High Resolution (HR) sites and 71 Very High Resolution (VHR) sites. The objective of this presentation is to describe the VHR CwRS image acquisition for 2004 involving the Ikonos, Quickbird, EROS A, and SPOT supermode satellites, to give preliminary results, recommendations and some future trends.

Keywords: DG Agriculture – Directorate General Agriculture, CwRS – Controls with Remote Sensing, CAP – Common Agricultural Policy, MARS – Monitoring Agriculture with Remote Sensing, HR – High Resolution, VHR - Very High Resolution

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10th Annual Conference

REMOTE-SENSING CONTROL OF AREA-BASED SUBSIDIES

Budapest, HU, 25-27th of November 2004

Summary of 2004 years VHR image acquisition campaign
or
"the operational management of the acquisition of >50.000 km² of VHR data in a limited timeframe with relatively bad weather"

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outline of presentation

- VHR image acquisition 2004
  - budget, sites, acquisition windows, process flow, cloud cover
- results
  - success rates, expenditure
- conclusions, and future...

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VHR image acquisition 2004 – budget, sites

DG AGRI finances imagery through - Council Regulation (EC) 165/94, and Commission Regulation (EC) 601/94

- HR/VHR Image Budget (DG-AGRI) — 3.700.000 euro
  - VHR budget — 2.040.000 euro
- MS participants — 22 (13, 9)
- sites to be controlled with VHR data — 71 (50,21)

Total No of sites	VHR RFV	HR VHR	HR Aerial Photos	Aerial only RFV	RADAR (backup)
212	9	62	88	53	54
100%	4%	29%	42%	25%	25%

Total No RS dossiers (nearest 100s)	VHR RFV	HR VHR	HR Aerial photos	Aerial only RFV
179900	20200	41100	63200	55400
100%	11%	23%	35%	31%

Statistics from KO Meeting April 2004

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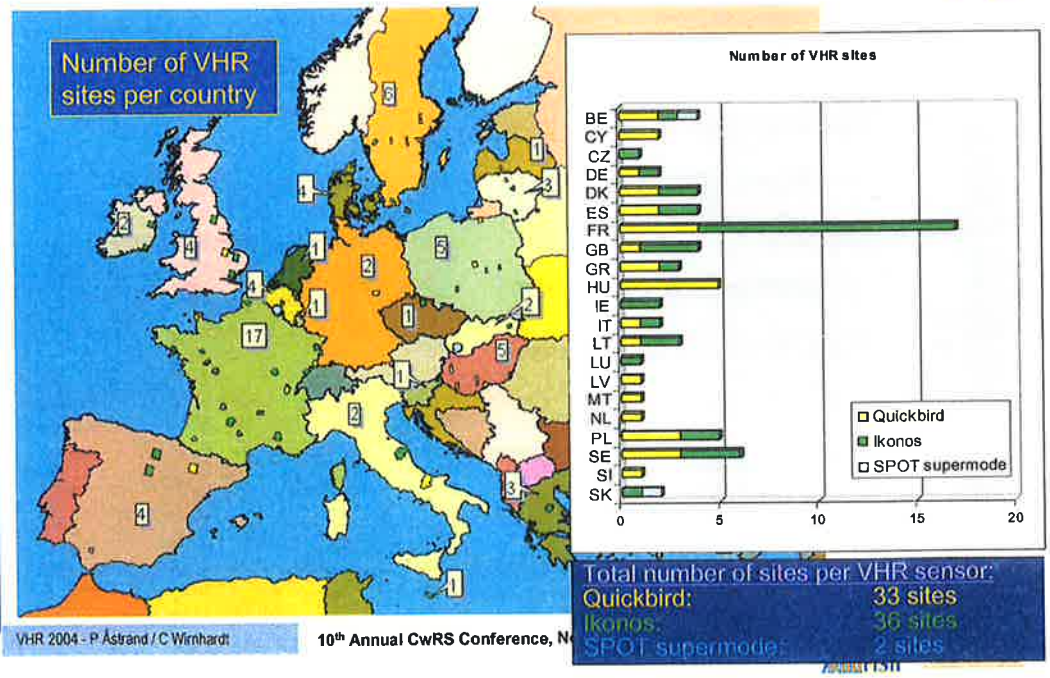

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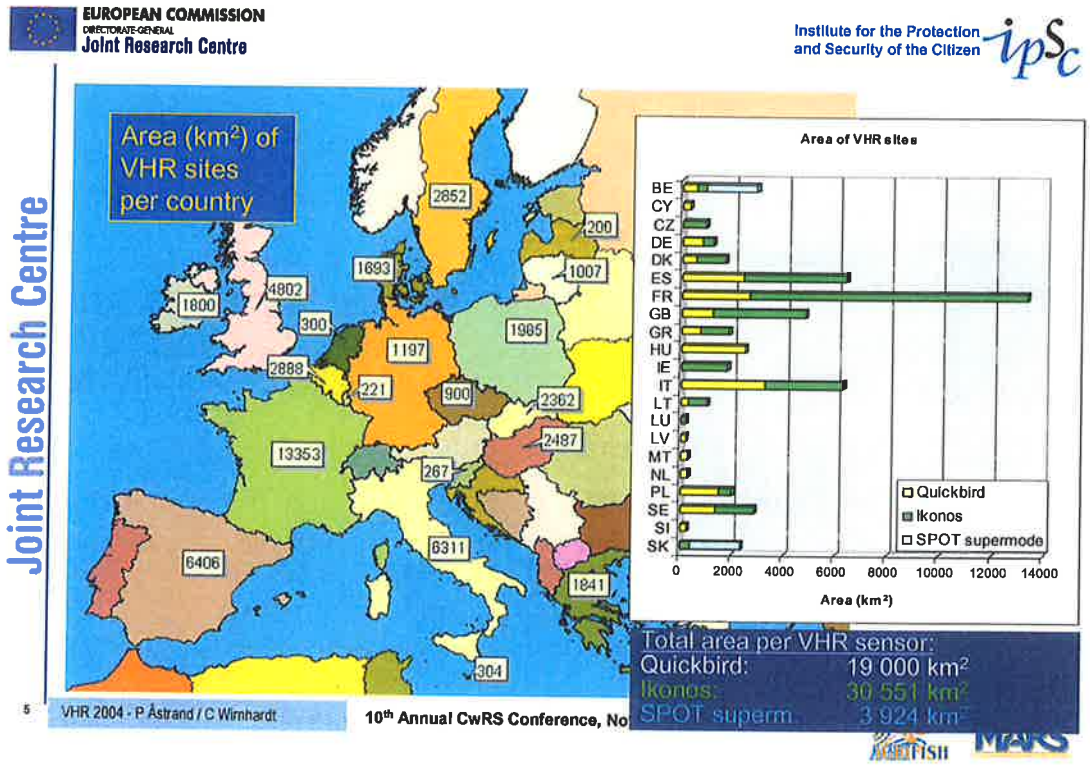
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Area (km²) of VHR sites per country
2852
200
1693
1007
4802
1800
300
1985
1197
2888
221
900
2362
2487
13353
267
6311
6406
1841
304
Area of VHR sites
BE
CY
CZ
DE
DK
ES
FR
GB
GR
HU
IE
IT
LT
LU
LV
MT
NL
PL
SE
SI
SK
0
2000
4000
6000
8000
10000
12000
14000
Area (km²)
Quickbird
Ikonos
SPOT supermode
Total area per VHR sensor:
Quickbird: 19 000 km²
Ikonos: 30 551 km²
SPOT superm. 3 924 km²
5
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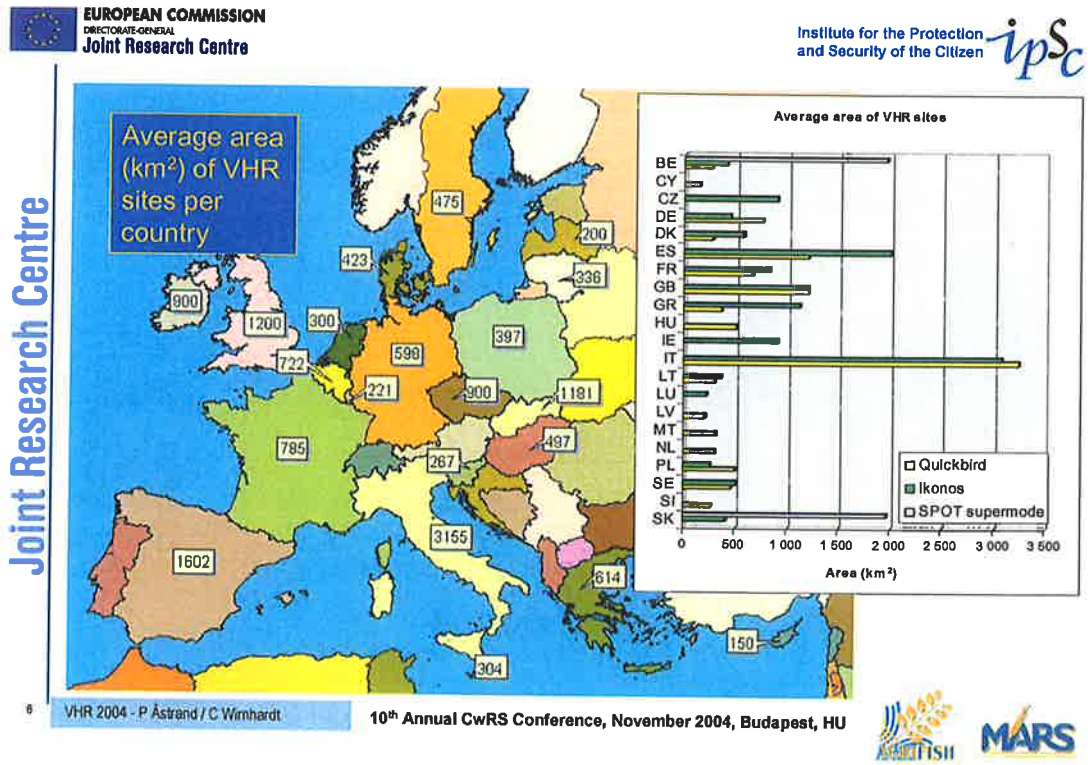
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Average area (km²) of VHR sites per country
475
200
423
336
900
1200
300
397
598
722
221
900
1181
785
497
267
3155
1602
614
150
304
Average area of VHR sites
BE
CY
CZ
DE
DK
ES
FR
GB
GR
HU
IE
IT
LT
LU
LV
MT
NL
PL
SE
SI
SK
0
500
1 000
1 500
2 000
2 500
3 000
3 500
Area (km²)
Quickbird
Ikonos
SPOT supermode
6
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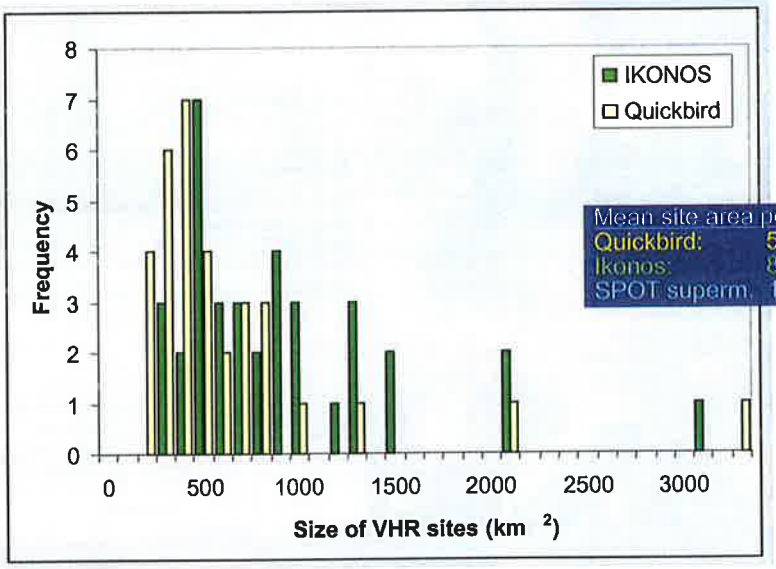

Average site area (km²) per dedicated sensor

Mean site area per VHR sensor:
Quickbird: 576 km²
Ikonos: 849 km²
SPOT superm. 1 962 km²

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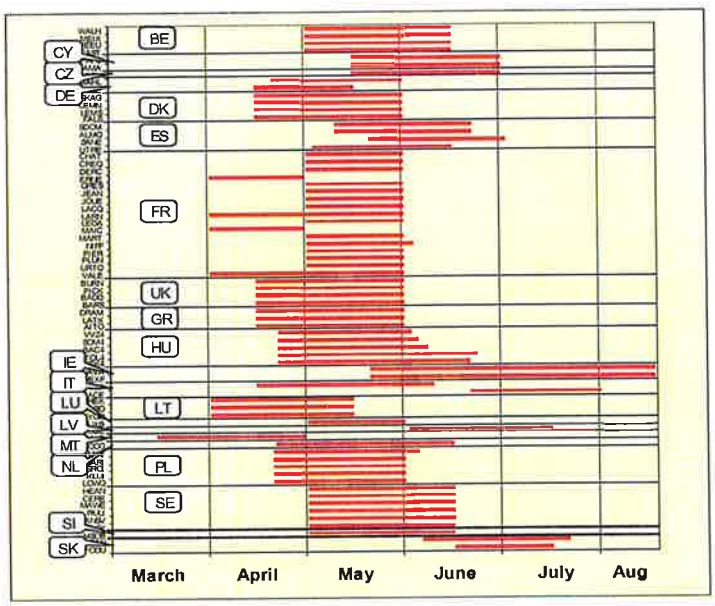

Acquisition windows 2004

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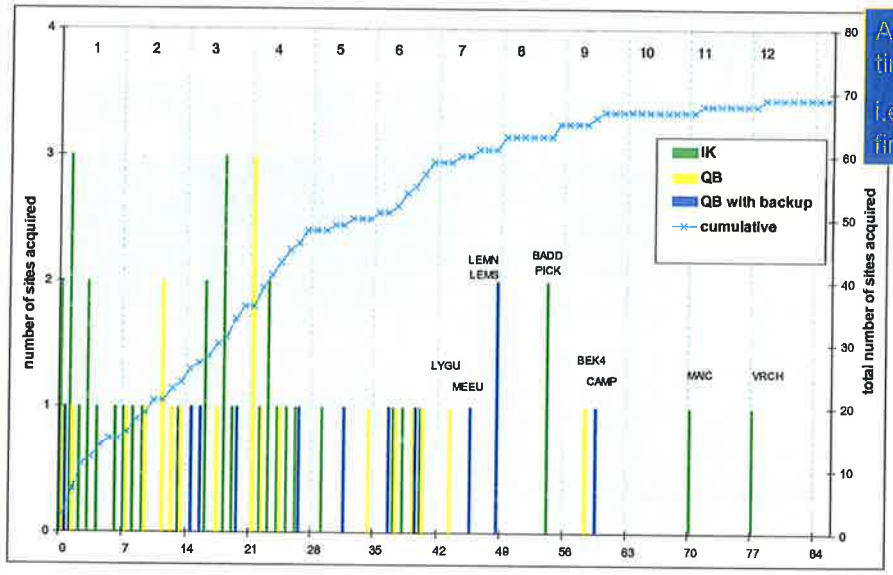

Acquisition time
i.e., time to finish a site

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VHR image acquisition – process, 2004

- acquisition
  - validated whole AOI
  - validated partial AOI
  - proposed
  - backup
    - dedicated, speculative

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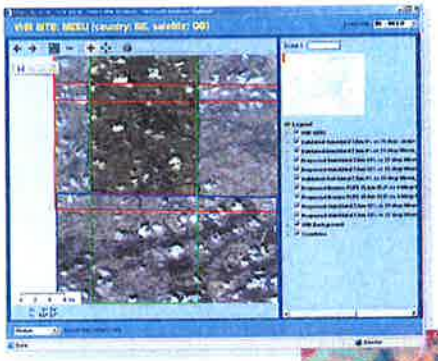
VHR image acquisition – Cloud Cover (CC)

- CC <10%
- CC <5%
  - 85% of <10% is <5%



- 2005 < 10%
  - floating acquisition frame within strip

Image Courtesy: Eurimage QUICKBIRD

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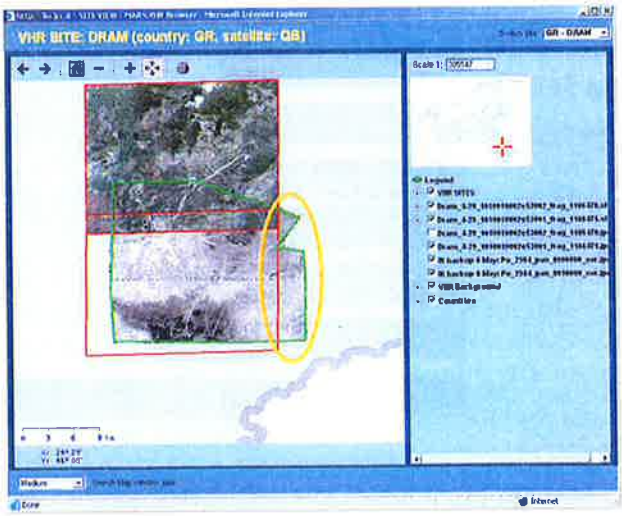
examples - GR DRAM QB site

IKONOS speculative



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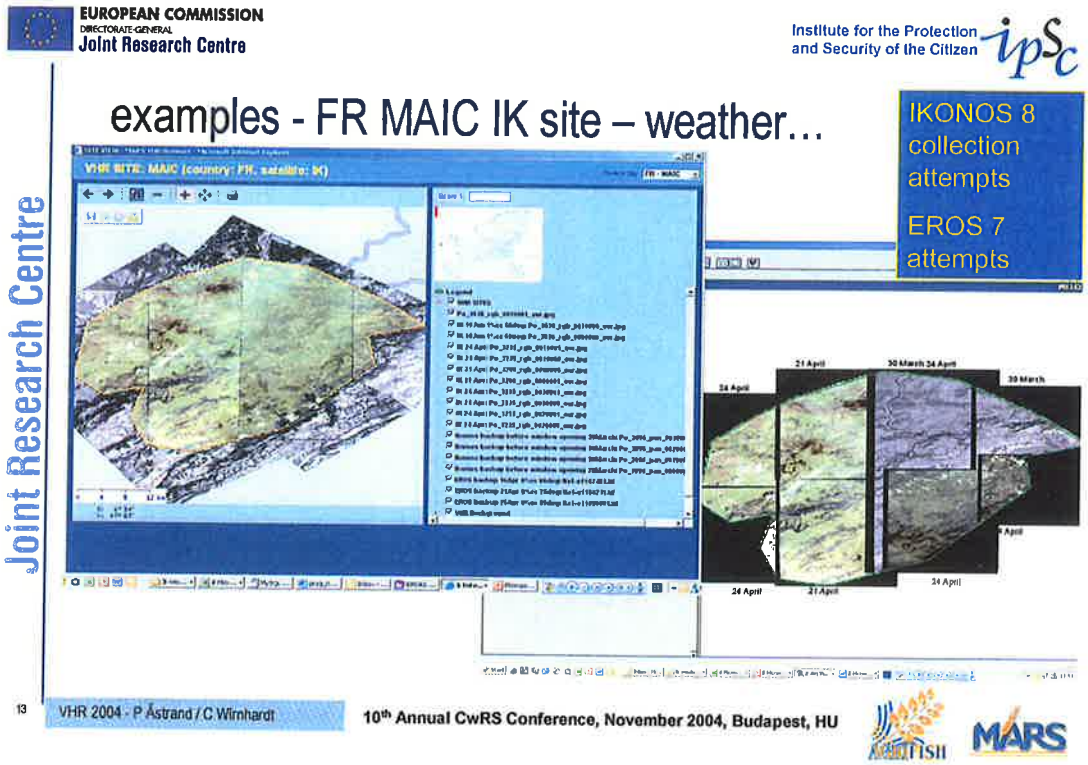
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examples - FR MAIC IK site – weather…
IKONOS 8 collection attempts
EROS 7 attempts
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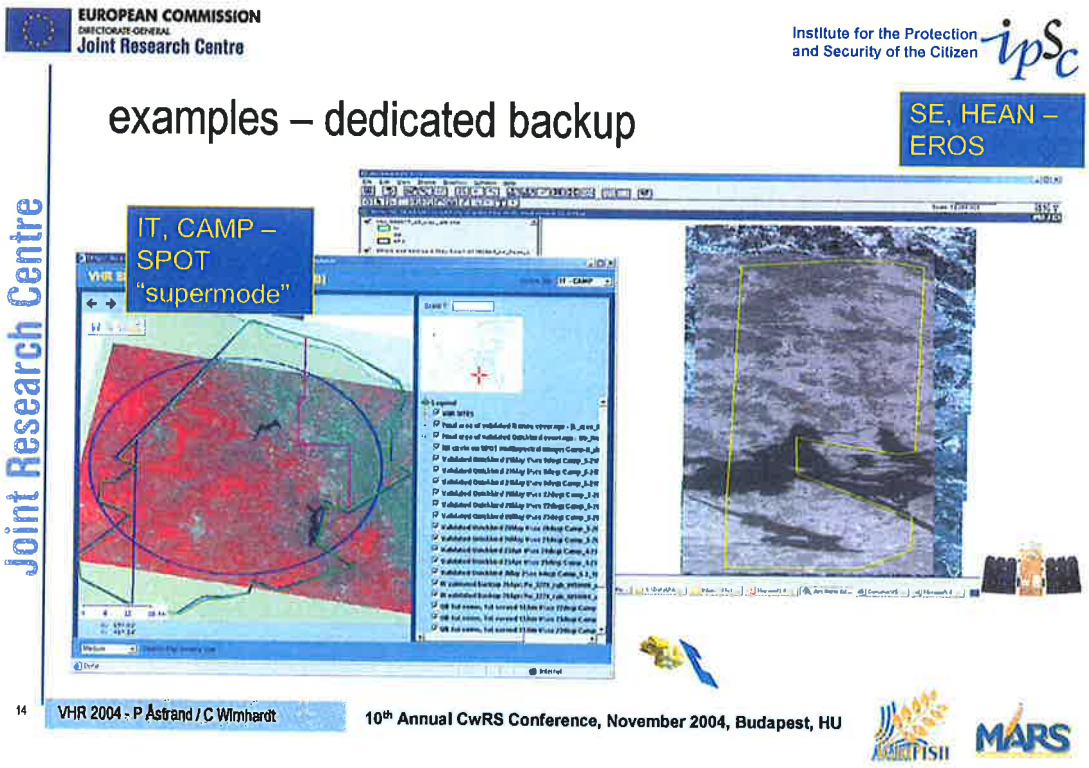
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examples – dedicated backup
SE, HEAN – EROS
IT, CAMP – SPOT "supermode"
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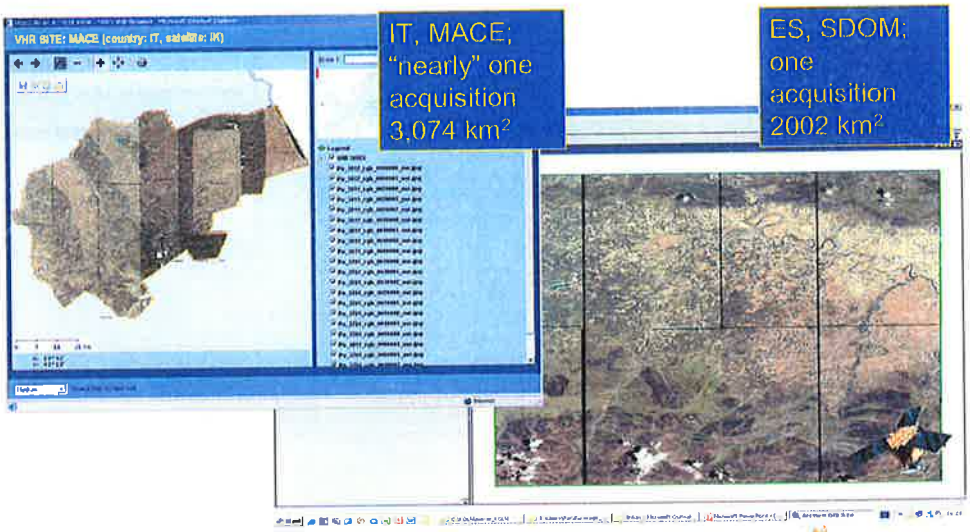
examples – IKONOS large sites



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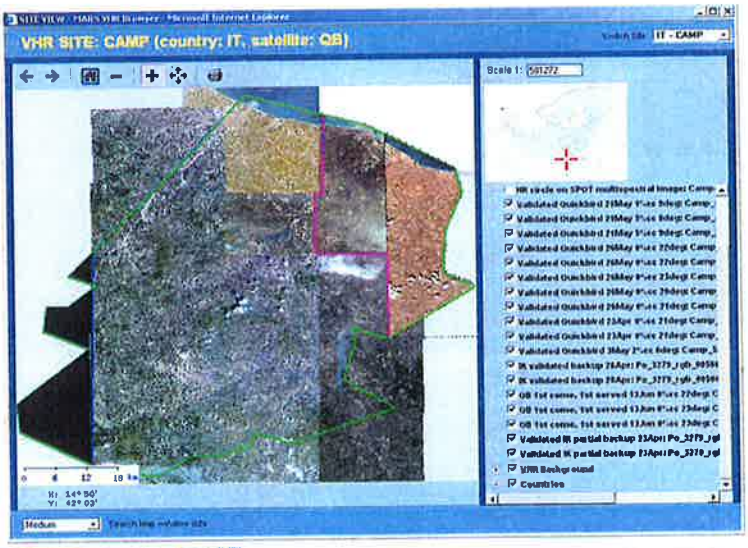
examples – QUICKBIRD large site

IT, CAMP QB 3,237 km²

approx. 60 days



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Results - success rates, IK & QB

DESCRIPTION	number of sites	area (km²)	area covered (%)	average area per site (km²)
IK sites completely acquired by IK sensor	36	30 551	100%	849
QB sites completely acquired by QB sensor	20	10 963	100%	548
QB sites completely acquired by QB+IK	8	QB: 1 980 IK: 1 243	100%	403
QB sites completely acquired by IK	2	375	100%	188
QB sites partially acquired by QB	1	690	91%	690
QB sites partially acquired by QB+IK	2	QB: 2 587 IK: 842	93%, 97%	1 715
Total	69	49 231	99%	713

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Results - success rates, IK & QB

- IK
  - Total validated area acquired (and purchased by JRC) 33,011 km²
    - IK acquired approx 10,000 km² of speculative backup of QB sites (17 complete and 4 partial)
    - JRC purchased < 22%
- QB
  - Total validated area acquired (and purchased by JRC) 16,220 km²

33,011
+ 16,220
49,231 km²

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Results - success rates, EROS, SPOT (*)

Sensor	dedicated sites	Successful sites	Area planned	Area covered	Success rate
EROS back-up	42	26	26 806 km²	12 557 km²	47% (on area)
SPOT dedicated 'prime'	2	2			100%
SPOT back-up	17	9			53%

- EROS
  - 100% AOI coverage 13/42 sites
  - > 50 % AOI coverage 26/42 (purchase agreement with JRC)
  - total number of attempts 227 (single or strip)
  - no weather forecast, will be introduced in 2005
- (*) SPOT 5 supermode
  - more dedicated to HR


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Results - expenditure

• VHR budget	2.040.000 euro
• expenditure VHR	1,593,500 euro
– IKONOS	988,500
– QUICKBIRD	405,500
– EROS	127,500
– SPOT 5 "supermode"	72,000

- success at a lower cost..
  - less area to be covered than budgeted
  - EROS less coverage than expected
  - price budget / price received better (CC)

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Conclusions

- satellite VHR Campaign 2004 successful
  - 50.000 km2 acquired in limited timeframe even with relatively bad weather
- advantages
  - flexibility, digital data, fast and easy orthocorrection (with right sw suites and right ancillary data)
- disadvantages
  - costs, limited number of operational satellites (security)
  - specific problems of the Campaign – late budget release, difficult to order speculative backup due to "locked" budget, weather, CC assessment not homogeneous...

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Future

- see presentation Session 6 on Image Provision, Recs 1
- still dedicated site approach, in future First Come First Served (FCFS) (?)
- availability of operational VHR satellites will give less technical constraints
  - Rocsat 2, OrbView 3 (?), Pleiades...
- imagery costs down...
- budget 2005 onwards stable...
- backup solution still required
  - EROS, SPOT supermode, aerial photography (current year, recent archive), traditional OTS
- compulsory IACS GIS 2005
  - early access to parcel structure
  - better/suitable risk analysis

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- thank you !

- par-johan.astrand@jrc.it
- Csaba.wirnhard@jrc.it

- http://agrifish.jrc.it/marspac/CwRS/default.htm

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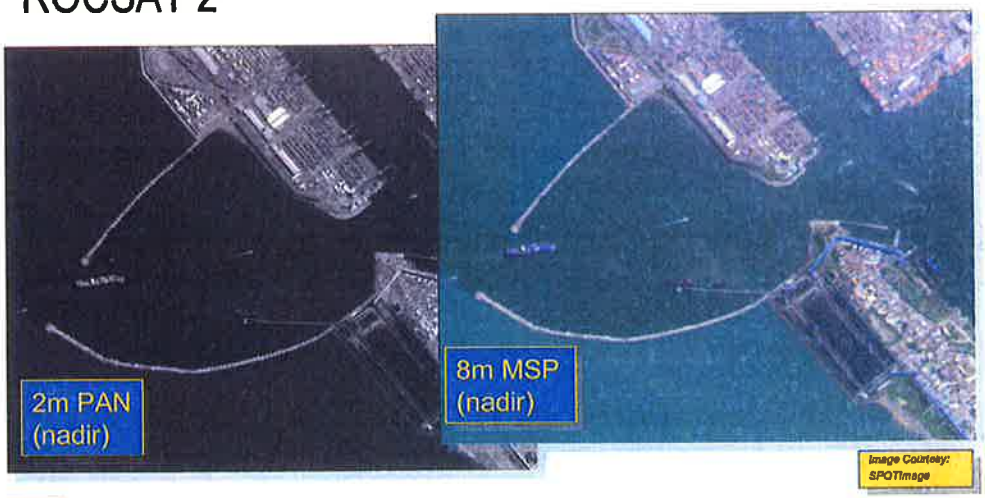
ROCSAT 2



Presentation 5 – Pilot study on the Control with Remote Sensing in Bulgaria

Pavel Milenov, BASA, BG

Abstract

This pilot study is focused on real co-operation in the domain of LPIS and control by remote sensing. It has to initiate a national reflection on the LPIS and control, consistent with the EU recommendations and the new CAP reform by collaboration with EU leader companies for a transfer of know how. The duration of the project is 12 months, starting from January 2004. It is financed by JRC/IPSC/MARS unit at ISPRA, Italy and is implemented under the supervision of State Fund Agriculture (SFA) in Bulgaria. The pilot study is elaborated by RESABU consortium, established between the Bulgarian Aerospace Agency - Remote Sensing Application Centre (Bulgaria), AIRE/CTS (France, Spain) and Intelgeo (Bulgaria).

The Municipality of Isperih, situated in Northeastern part of Bulgaria is chosen for the study. The examined territory is 402 sq. km. 100 farmers participate in the simulation of the campaign and more than 700 agricultural parcels are processed. VHR satellite images from IKONOS are used for the delineation of the parcels; HR satellite images from SPOT are used for the identification of the crops. Detailed DTM from large-scale topomaps (1:5 000) is generated for the purpose of the orthorectification of the VHR satellite data. CAPI is used for the interpretation of the HR satellite images. The following crops are interpreted: wheat, barley, oats, maize (for grain and for forage), sunflower, pumpkin (seeds are used for oil production in the aircraft industry), alfalfa, coriander, vegetables and tobacco. The measured area and contour of the vectorized parcels are compared with the official data from the cadastre of the agricultural lands. Less than 40 % of the agricultural parcels could be easily referred to a particular cadastral parcel or group of parcels. In more than 60 % of the cases, the cadastre layer doesn't correlate with the actual land use and the distribution of the agricultural parcels. Less than 30% of the parcels have difference between the declared and measured area within the initially accepted tolerance (1.5 meter buffer zone). This is mainly because farmers calculate the declared area on the base of the figures given in the cadastre. The HR satellite images, combined with the VHR image, acquired in April, give enough information for proper interpretation of the crops. Interpretation keys are generated for each crop on the base of the ground truth, collected during field trips in the area of Isperih. In approx. 90% of the cases the declared crop, coincide with the observed one.

The results of the pilot project help Bulgaria to find a solution for a rapid LPIS and IACS implementation before the integration deadline and to identify a technique compatible with the EU norms, regulations and recommendations. The elaborated methodology also sets the technical specifications (tolerances, categorization, reference parcels, software, etc.) for the future campaigns for control by remote sensing of the arable and forage land area based subsidies in Bulgaria.

Keywords: LPIS, Control by Remote Sensing, CAP, CAPI, technical tolerances, categorization rules

Pilot study on the Control with Remote Sensing of Area Based Subsidies in Bulgaria

Contract No. - 21615-2003-12 F1ED ISP BG

Dipl. Eng. Pavel Milenov

Remote Sensing Application Center (ReSAC) at the Bulgarian Aerospace Agency

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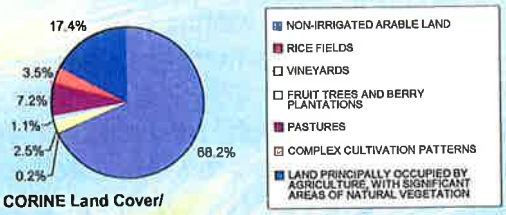
Agriculture in Bulgaria

Total area of Bulgaria: 11 100 000 ha
Total agricultural area: 5 800 000 ha (52%)



Agricultural land /Data is based on CORINE Land Cover/

According to the national counting held in 2003, there is data for 678 825 entities, which are occupied with agriculture in Bulgaria.
Bulgaria made good progress in the field of agriculture, according to the last progress report on the EU accession, prepared in September 2004. The country is on schedule, regarding the creation of the necessary structures. A twinning project for Establishment of a Paying agency and preparation for setting up of IACS in Bulgaria is on the way. The creation of LPIS for the whole country is very important for the proper operation of IACS. The formal decision on the creation of LPIS has not yet been taken.

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Project Overview
RESABU consortium was established between the Bulgarian Aerospace Agency - Remote Sensing Application Center (Bulgaria), AIRE/CTS (France, Spain) and Intelgeo (Bulgaria)
The project is funded by JRC, MARS Unit
February 2004 – Start of the project
December 2004 – End of the project
The project is implemented under the supervision of
State Fund Agriculture (SFA)
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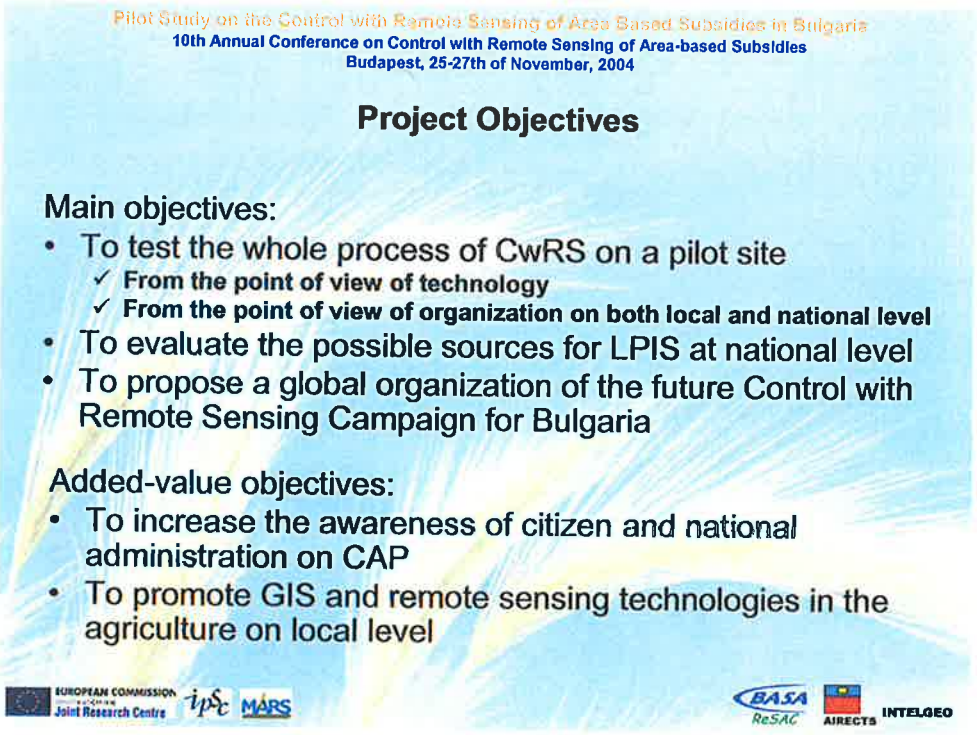
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Project Objectives
Main objectives:
• To test the whole process of CwRS on a pilot site
✓ From the point of view of technology
✓ From the point of view of organization on both local and national level
• To evaluate the possible sources for LPIS at national level
• To propose a global organization of the future Control with Remote Sensing Campaign for Bulgaria
Added-value objectives:
• To increase the awareness of citizen and national administration on CAP
• To promote GIS and remote sensing technologies in the agriculture on local level
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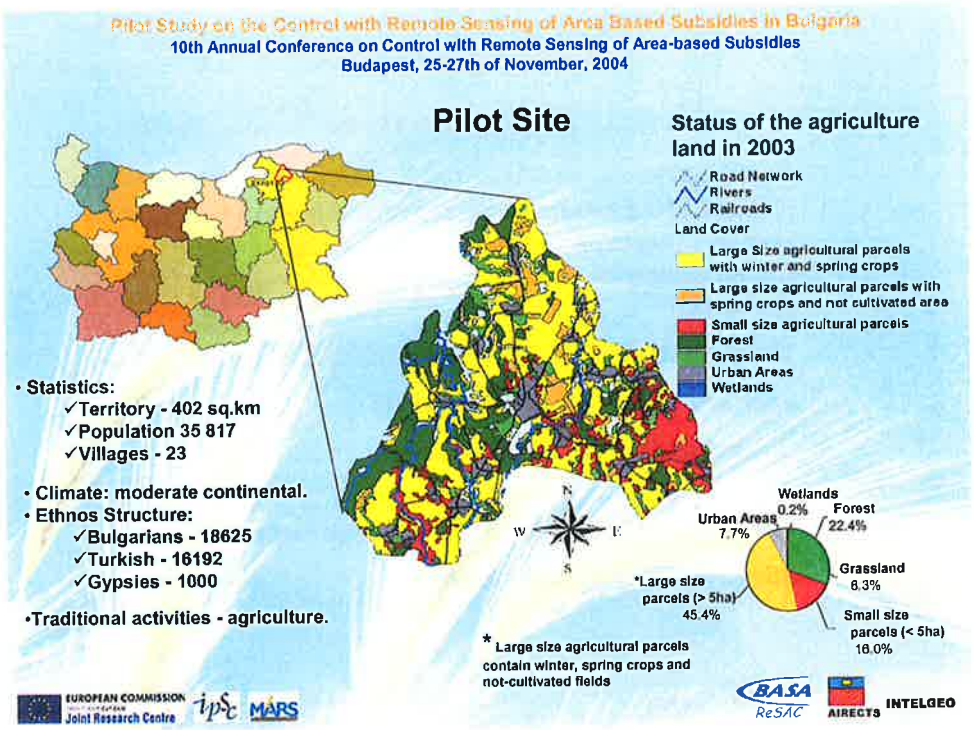

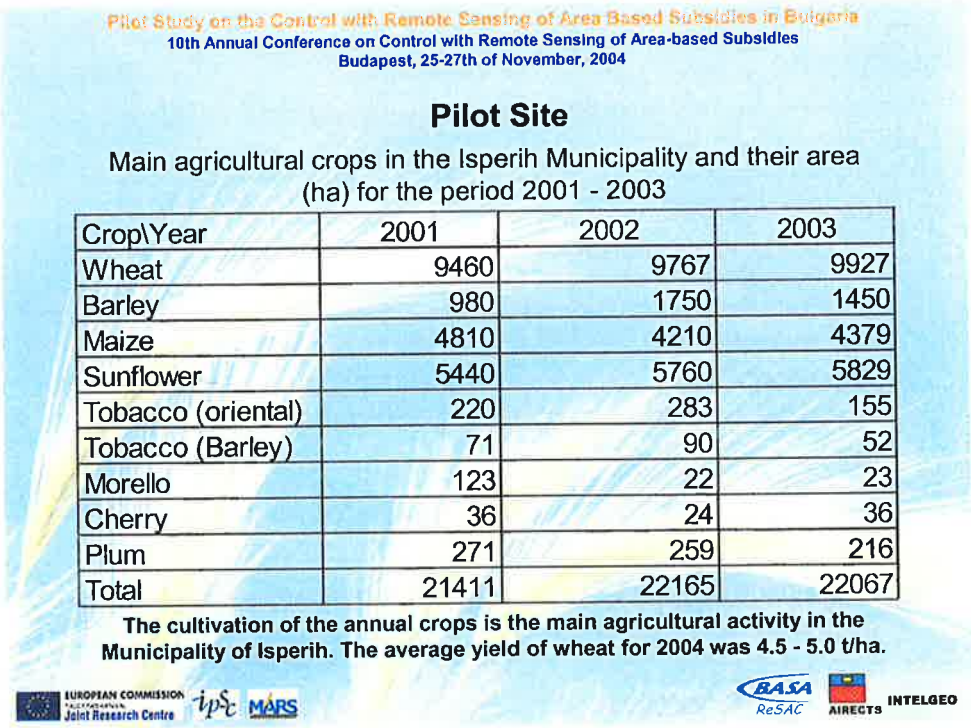

Crop\Year	2001	2002	2003
Wheat	9460	9767	9927
Barley	980	1750	1450
Maize	4810	4210	4379
Sunflower	5440	5760	5829
Tobacco (oriental)	220	283	155
Tobacco (Barley)	71	90	52
Morello	123	22	23
Cherry	36	24	36
Plum	271	259	216
Total	21411	22165	22067

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Image Acquisition and Processing

Acquisition Window	Acquisition Date	Satellite	Level	Type	Angle of acquisition	Geometric Correction Method
Sep-Oct 2003	19.9.2003	Landsat TM	1G	Multi	0	Ortho
April 2004	08.05.2004 (1) 13.04.2004 (2) 13.04.2004 (3)	IKONOS	Geo Ortho Kit	Bundle	19.61 deg 23.83 deg 25.22 deg	Ortho (using RPC)
May 2004	03.5.2004	SPOT 5	1A	Multi 10m	12.96 deg	Polynomial wrap
July 2004	02.7.2004	SPOT 4	1A	Multi 20m	26.5 deg	Ortho

The first acquisition of IKONOS on 13.04.2004 didn't cover the whole test site. A new acquisition was made on 08.05.2004 in order to complete the area.

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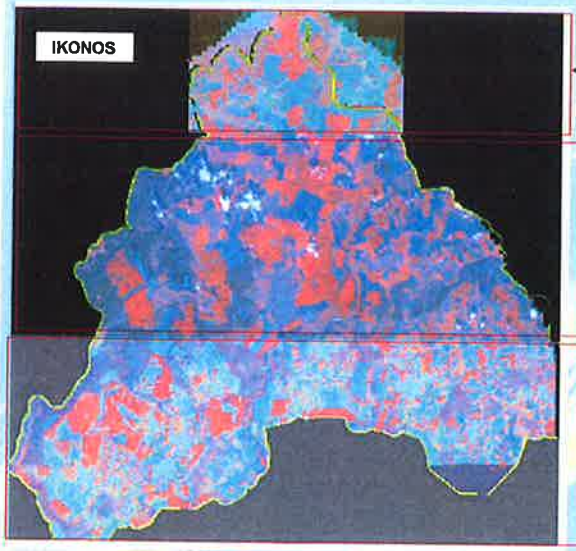
Image Acquisition and Processing



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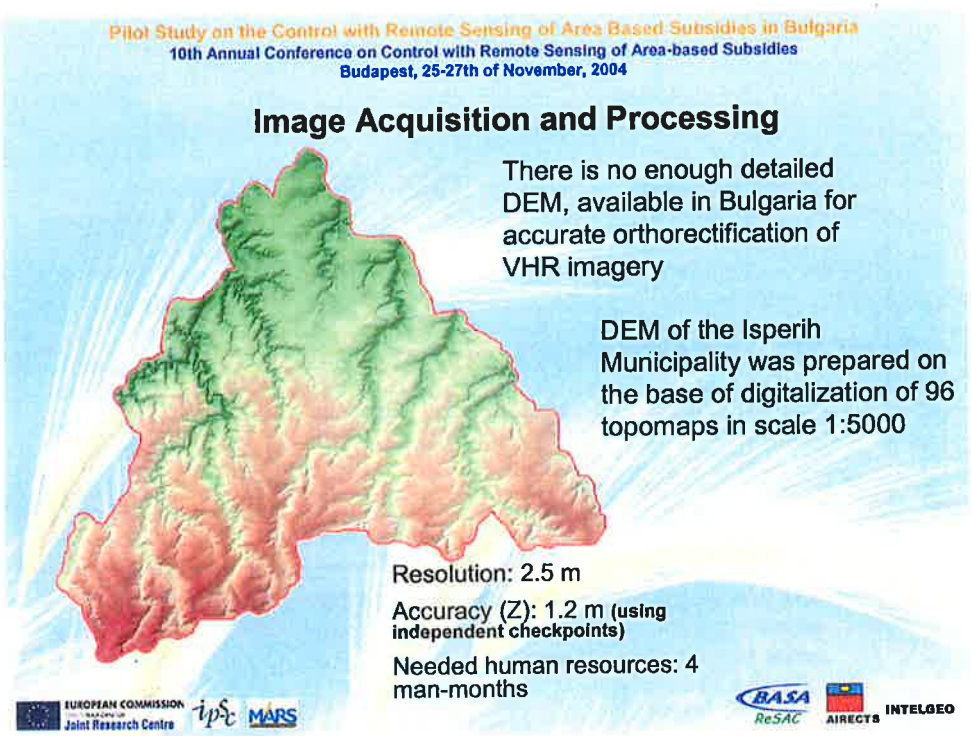


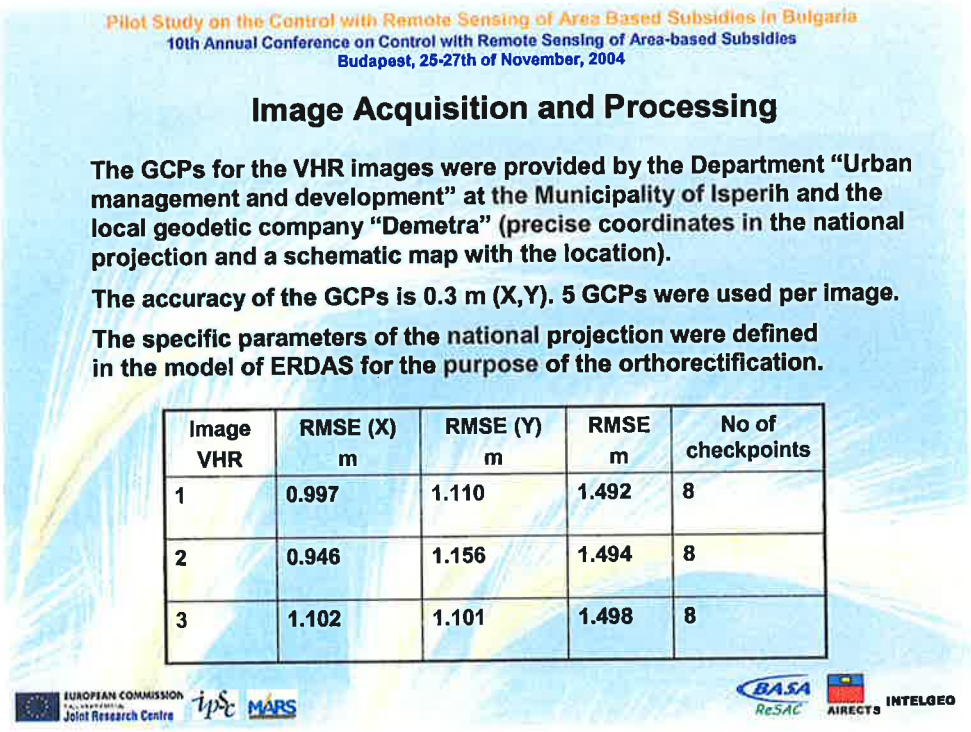
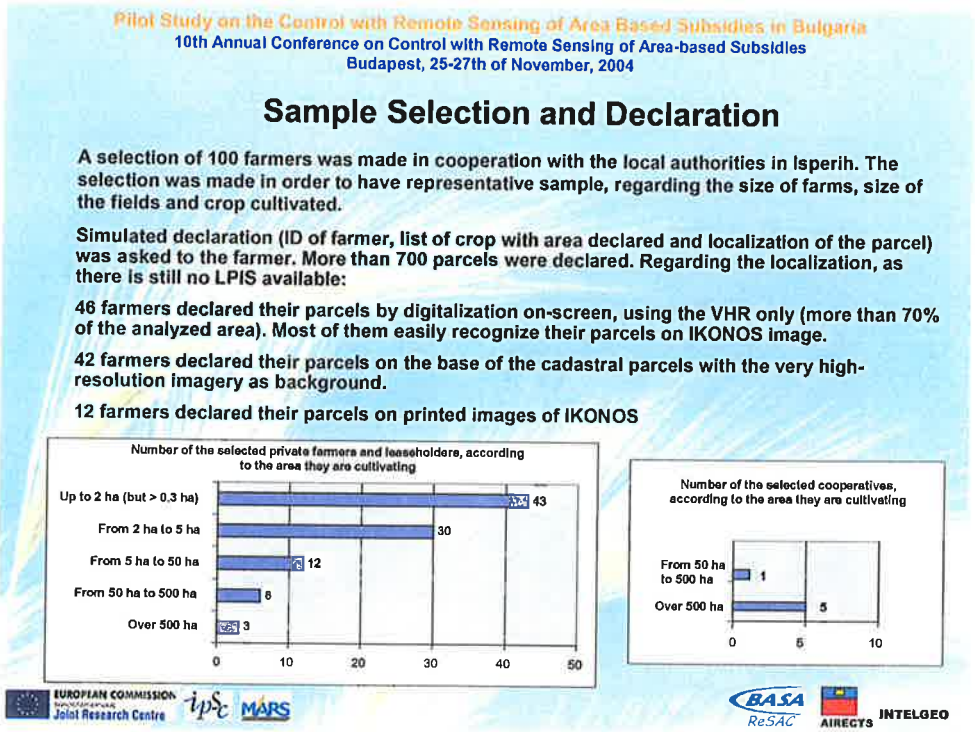


Image VHR	RMSE (X) m	RMSE (Y) m	RMSE m	No of checkpoints
1	0.997	1.110	1.492	8
2	0.946	1.156	1.494	8
3	1.102	1.101	1.498	8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Sample Selection and Declaration
A selection of 100 farmers was made in cooperation with the local authorities in Isperih. The selection was made in order to have representative sample, regarding the size of farms, size of the fields and crop cultivated.
Simulated declaration (ID of farmer, list of crop with area declared and localization of the parcel) was asked to the farmer. More than 700 parcels were declared. Regarding the localization, as there is still no LPIS available:
46 farmers declared their parcels by digitalization on-screen, using the VHR only (more than 70% of the analyzed area). Most of them easily recognize their parcels on IKONOS image.
42 farmers declared their parcels on the base of the cadastral parcels with the very high-resolution imagery as background.
12 farmers declared their parcels on printed images of IKONOS
Number of the selected private farmers and leaseholders, according to the area they are cultivating
Up to 2 ha (but > 0.3 ha)
From 2 ha to 5 ha
From 5 ha to 50 ha
From 50 ha to 500 ha
Over 500 ha
43
30
12
8
3
0
10
20
30
40
50
Number of the selected cooperatives, according to the area they are cultivating
From 50 ha to 500 ha
Over 500 ha
1
5
0
5
10
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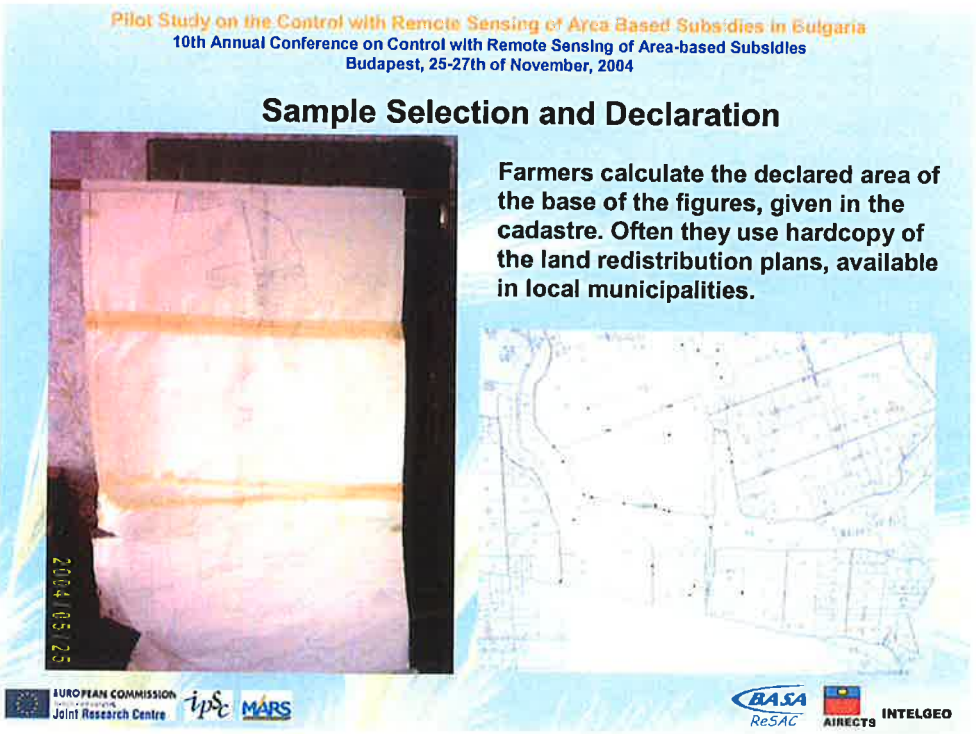
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Sample Selection and Declaration
Farmers calculate the declared area of the base of the figures, given in the cadastre. Often they use hardcopy of the land redistribution plans, available in local municipalities.
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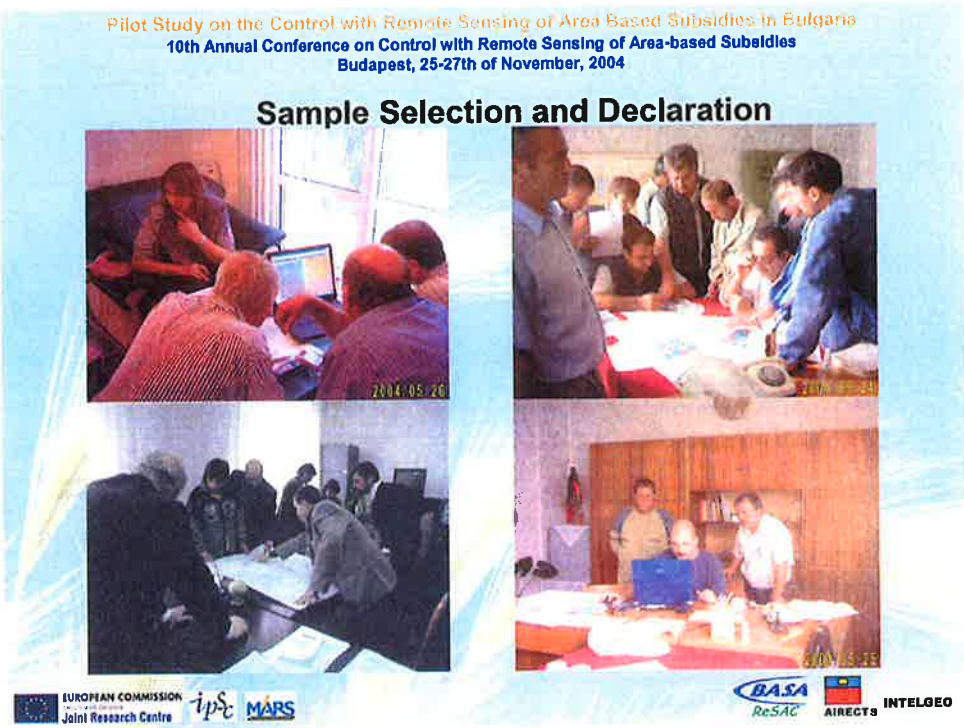
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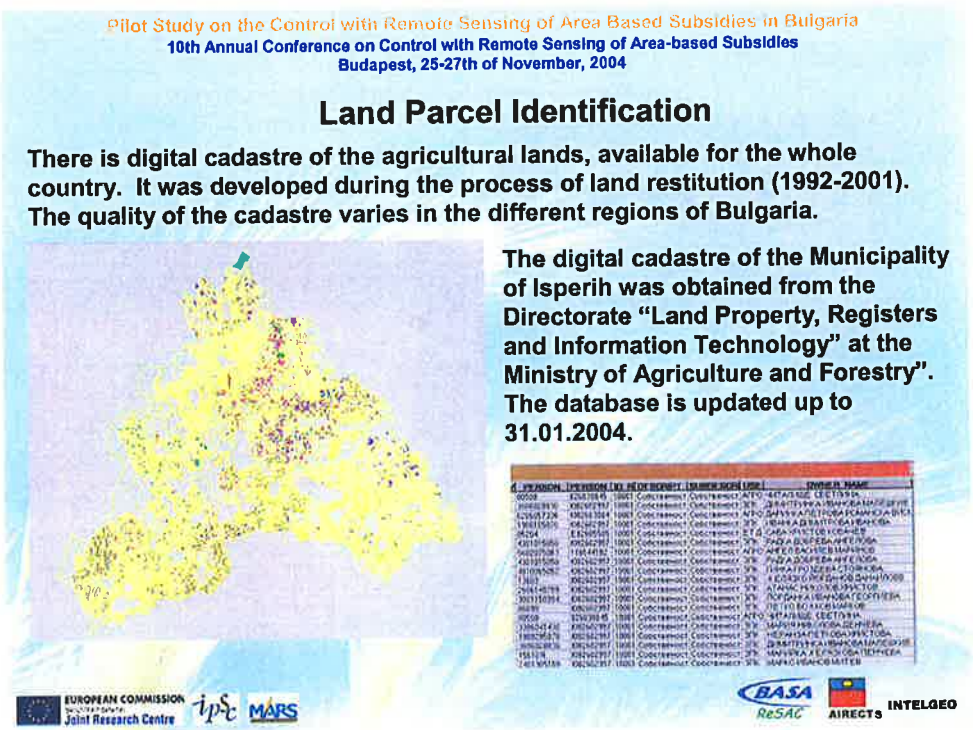
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Land Parcel Identification
There is digital cadastre of the agricultural lands, available for the whole country. It was developed during the process of land restitution (1992-2001). The quality of the cadastre varies in the different regions of Bulgaria.
The digital cadastre of the Municipality of Isperih was obtained from the Directorate "Land Property, Registers and Information Technology" at the Ministry of Agriculture and Forestry". The database is updated up to 31.01.2004.
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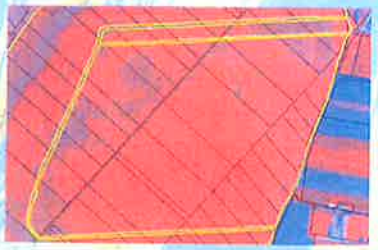
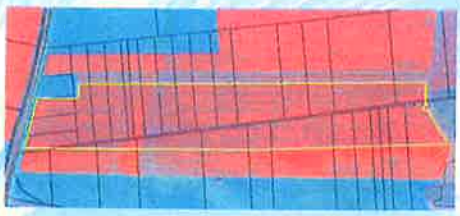
Land Parcel Identification

The measured area and contour of the vectorized parcels were compared with the official data from the cadastre of the agricultural lands.

Less than 40 % of the agricultural parcels could be easily referred to a particular cadastral parcel or group of parcels.

In more than 60 % of the cases, the cadastre layer doesn't correlate with the actual land use and the distribution of the agricultural parcels.





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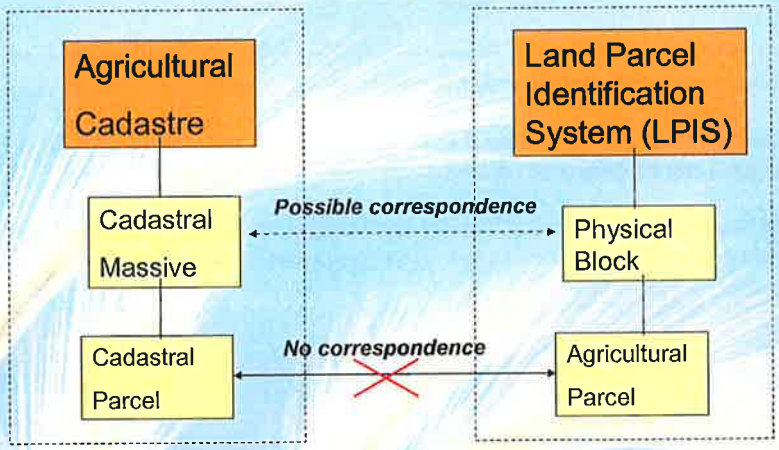
Land Parcel Identification

	LPIS	Agricultural Cadaster in Bulgaria
Graphical Unit	Agricultural Parcel	Cadastral Parcel
Definition	An agricultural parcel is a continuous area of land on which an individual farmer cultivates a single crop.	A cadastral parcel is a continuous area of land owned by an individual owner.
Graphical information needed	Vector boundaries of agricultural parcels.	Vector boundaries of the property of the parcels.

Land Parcel Identification



The cadastre could facilitate the localization of the physical block (massive), which contains the agricultural parcels declared in the application form. Due to the annual changes in the position and shape of the agricultural parcels, the LPIS in Bulgaria could be based on physical blocks, which follow permanent natural or artificial boundaries.

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Land Parcel Identification

VHR images proved to be valuable for the identification of the parcels. They provide enough accuracy, regarding the definition of the agricultural parcel, on condition that detailed DEM and accurate GCPs are available. An overall analysis of the scope of work for the elaboration of orthophotos, necessary for the creation of LPIS in Bulgaria is given bellow:

Procedures	*Organization of the work for digital orthophotos, based on aerial photos*	*Organization of the work for digital orthophotos, based of satellite images*
Image Capturing	Tenders should be launched. Flight campaign should be planned after the contract signature. Specific permits should be obtained from the national authorities, which could significantly delay the flight campaigns.	Technical specifications should be sent to limited number of image providers. Acquisition schedule should be programmed. The requirements of cloud-free scenes could delay the acquisition and delivery.
Scanning	Needs time to process. Professional digital cameras are still relatively expensive.	Satellite images are delivered in standard digital format. No efforts are needed for scanning.
Ground Control Points/ Aerotriangulation	GCPs could be derived from existing datasets and field measurements. Aerotriangulation is necessary.	GCPs from the existing datasets (urban cadastre) could be used. The field work is relatively limited.
Digital Elevation Model (DEM)	DEM is generated from the stereo pairs.	DEM should be available in advance. It could be generated from the large-scale topomaps. Another option could be the possibility of using SPOT 5 HRS stereoscopic data (needs assessment).
Mosaicking	1000 km2 are covered by approx. 300 photos, depending on the height of flight and camera type.	The number of scenes is significantly reduced, as the scenes cover larger territories.

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CAPI and Categorization

CAPI was used for the interpretation of the crops on the base of VHR and HR satellite images. Automated classification didn't give good results. The main problem was the early acquisition of the second SPOT image for the proper identification of some crops (maize, pumpkin, tobacco). Interpretation keys are generated for each crop on the base of the ground truth, collected during field trips in the area of Isperih. In approx. 90% of the cases, the declared crop coincides with the observed one.

The software was based on ArcView. The database was designed to be compatible with the one proposed by JRC.

The following major crops are interpreted: wheat, barley, millet, oats, maize (for grain and for forage), sunflower, pumpkin (seeds are used in the aircraft industry), alfalfa, coriander, vegetables and tobacco. For the categorization, there was only one scheme applied, which is a generalization of the Simplified Scheme without upper threshold of the farmer area.

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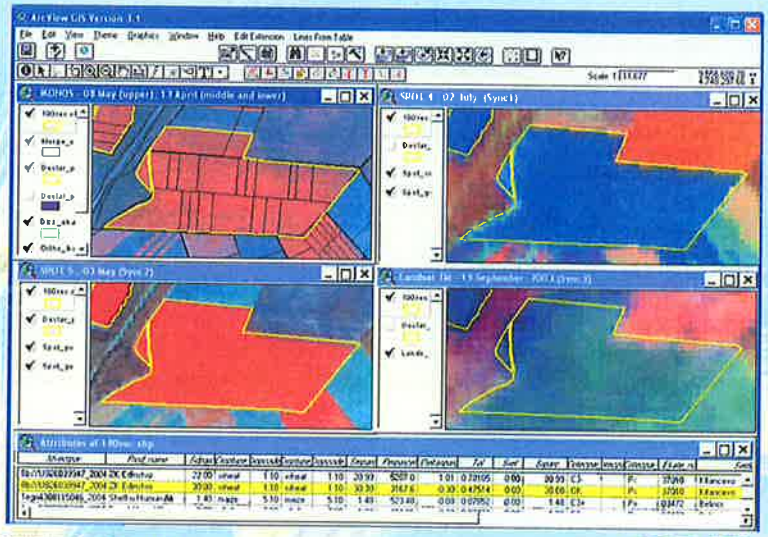
CAPI and Categorization



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Intermediate Statistics

The declared area covers more than 50% of the agricultural land in the Municipality of Isperih. More than 700 parcels were processed. The categorization and diagnostics were made on the accepted tolerance of 1.5 meters.

Declared parcels, which have code C2	32
Number of parcels after the division (code C2)	78

Declared parcels, which overlap (code A2)	61
Number of dossiers, which have parcels with code A2	36

Analysis of ΣSdpacr-ΣSmparc in hectares

Code	C3+	C3-
ΣSdparc - ΣSmparc	721	-272.8

Results of crop check at parcel level in number of parcels

Code	OK		C1		C3+		C3-		C4		T6		A1	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
	152	21.3	87	12.2	264	37.1	172	24.2	21	2.9	7	1.0	9	1.3

Results of crop check at parcel level in hectares (measured area)

Code	OK		C1		C3+		C3-		C4		T6		A1	
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
	1863	18.9	244	2.47	4492	45.5	3248	32.9	26.6	0.27	2.07	0.02	2.16	0.02

Number of the disputed areas (code A2), according to the size of overlapping

Code A2	< 2 ha	2- 5 ha	5 – 50 ha	50 – 500 ha	> 500 ha
Num.	40	18	10	0	0

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Conclusions

The project is not yet finished and the results are still to be discussed with the local and national authorities.

The team received significant support from the national and local authorities during the whole implementation of the project.

Farmers were very interested and very active in the declaration process. They are intending to use satellite imagery to better know their agriculture area and to better plan the crop management.

The real bottleneck of this pilot was the lack of LPIS. The cadastre is too far from reality in order to be update rapidly up to 2007. The LPIS should be created on the base of a new dataset.

Despite the fact that the Municipality of Isperih was very active during the project and showed high level of land management, we should not expect such involvement in all regions of Bulgaria.

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Thank you for your attention!
Dipl. Eng. Pavel Milenov
Remote Sensing Application Center (ReSAC) at the
Bulgarian Aerospace Agency
resac@techno-link.com
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Presentation 6 – Pilot project and stategy for the implementation of the LPIS in Romania

Alexandru Badea, ROSA/ CRUTA, RO

Vasile Grigorescu, National Agency for Cadastre & Land Registration, RO

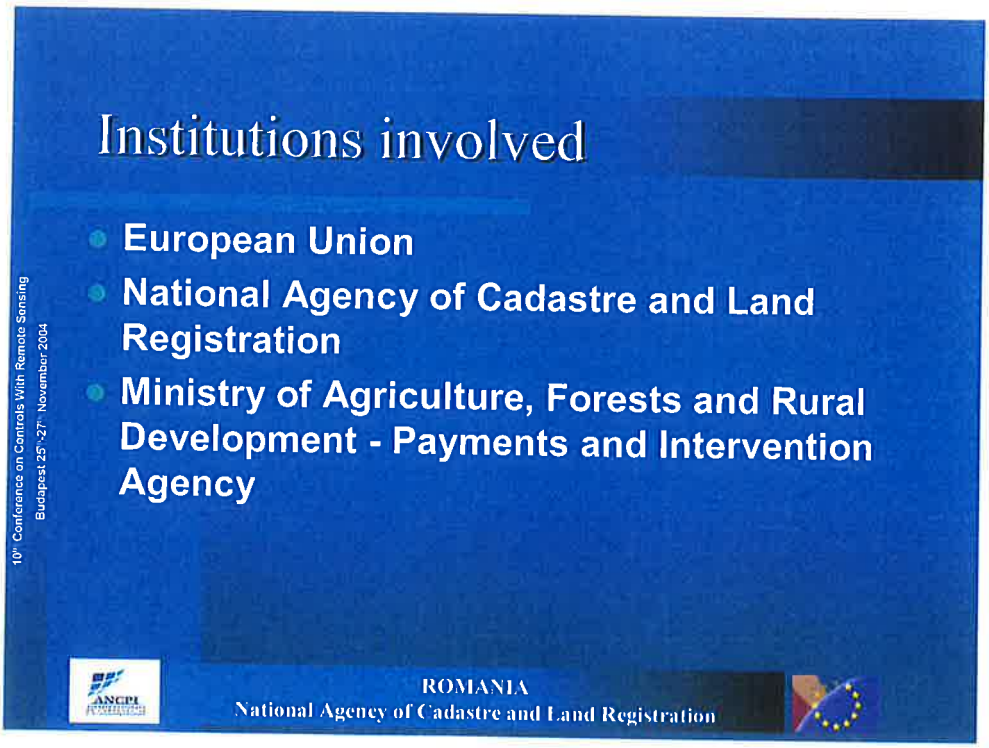
Abstract

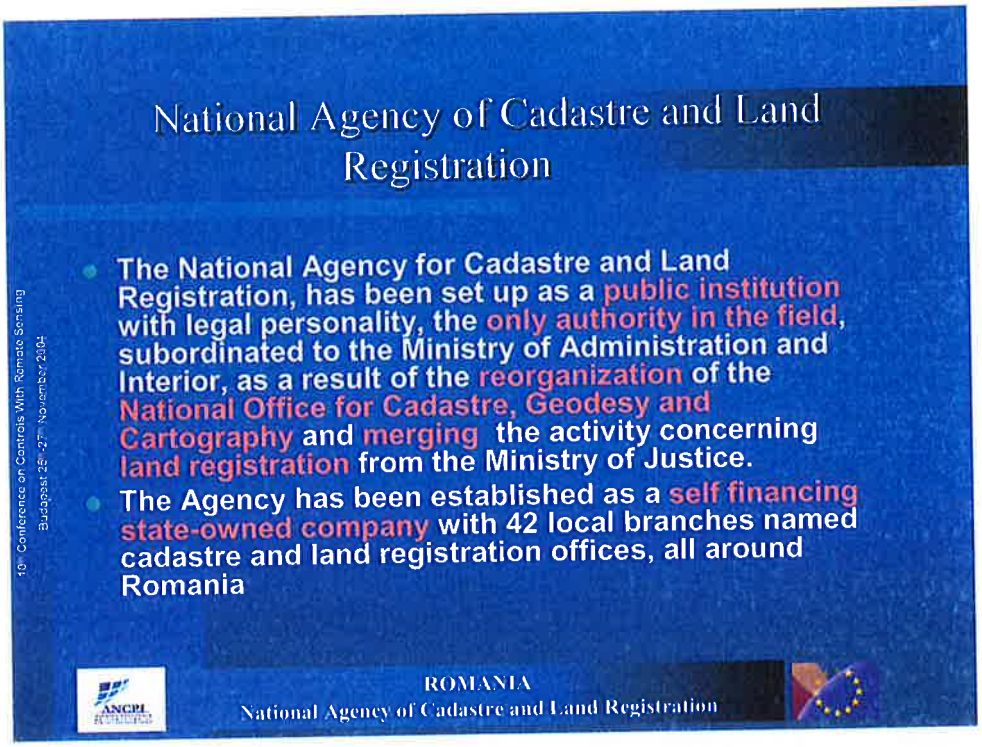
Started at the beginning of 90's, the land redistribution process generated a very complicate and, sometimes, uncontrollable agricultural landscape. In view of creation of a national LPIS, JRC financed a pilot project focussed on three representative territories. The consortium in charge with the realisation of the application (GEOSYS-FR, CRUTA and INTERGIS –RO) tested the use of VHR and existing cartographic data as well as the interaction with the farmers. The preliminary results allow the authorities to start an objective analysis concerning the real situation of the agricultural land.

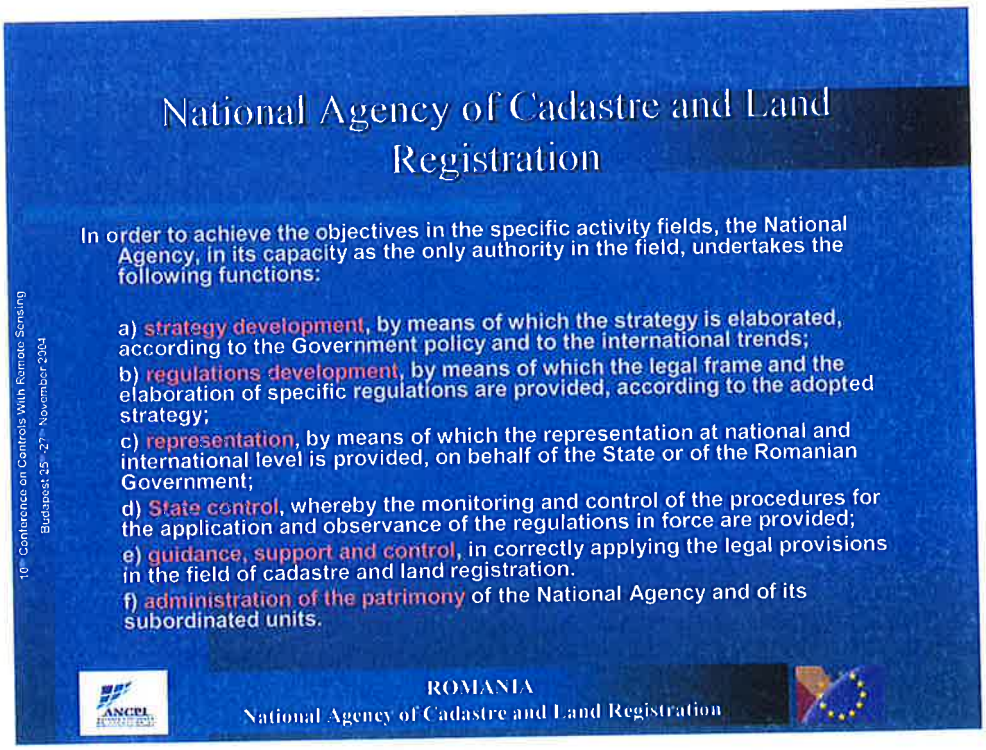
The reorganization of the Romanian cadastre and the decision to charge the new agency with the realisation of the LPIS could be the engine for the implementation of a future modern system. Associate European twinning projects are also an important support for this real challenge for the authorities.

Keywords: LPIS, remote sensing, orthophoto, cadastre

Vasile Grigorescu, National Agency for Cadastre & Land Registration, RO




National Agency of Cadastre and Land Registration
The National Agency for Cadastre and Land Registration, has been set up as a public institution with legal personality, the only authority in the field, subordinated to the Ministry of Administration and Interior, as a result of the reorganization of the National Office for Cadastre, Geodesy and Cartography and merging the activity concerning land registration from the Ministry of Justice.
The Agency has been established as a self financing state-owned company with 42 local branches named cadastre and land registration offices, all around Romania
10th Conference on Controls With Remote Sensing Budapest: 25th-27th November 2004
ROMANIA
National Agency of Cadastre and Land Registration


National Agency of Cadastre and Land Registration
In order to achieve the objectives in the specific activity fields, the National Agency, in its capacity as the only authority in the field, undertakes the following functions:
a) strategy development, by means of which the strategy is elaborated, according to the Government policy and to the international trends;
b) regulations development, by means of which the legal frame and the elaboration of specific regulations are provided, according to the adopted strategy;
c) representation, by means of which the representation at national and international level is provided, on behalf of the State or of the Romanian Government;
d) State control, whereby the monitoring and control of the procedures for the application and observance of the regulations in force are provided;
e) guidance, support and control, in correctly applying the legal provisions in the field of cadastre and land registration.
f) administration of the patrimony of the National Agency and of its subordinated units.
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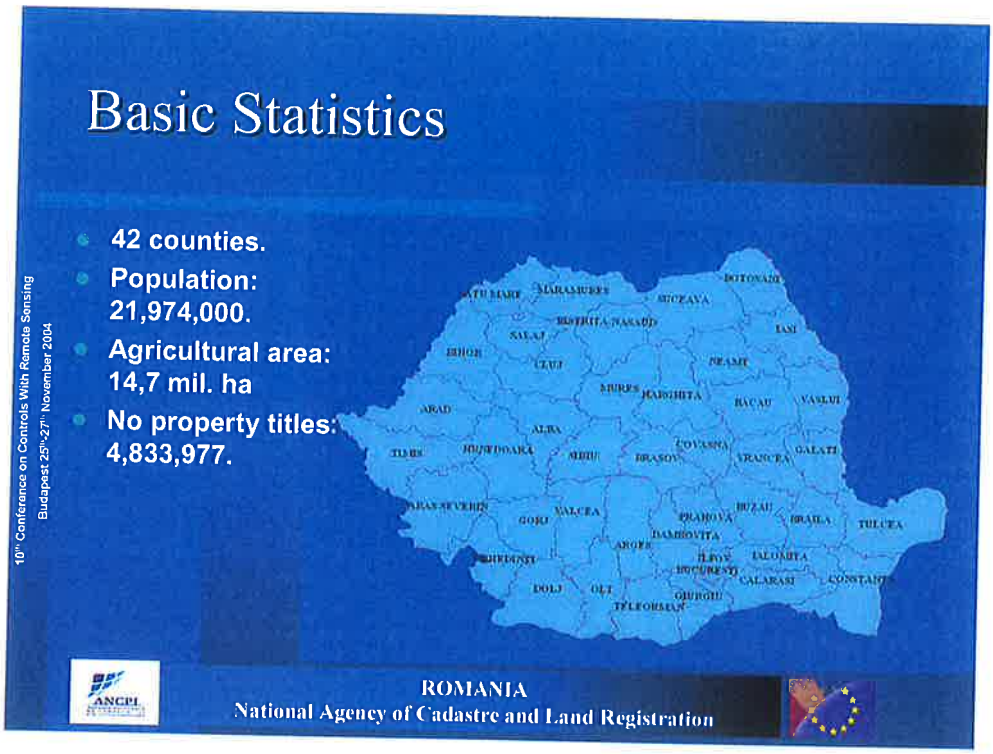
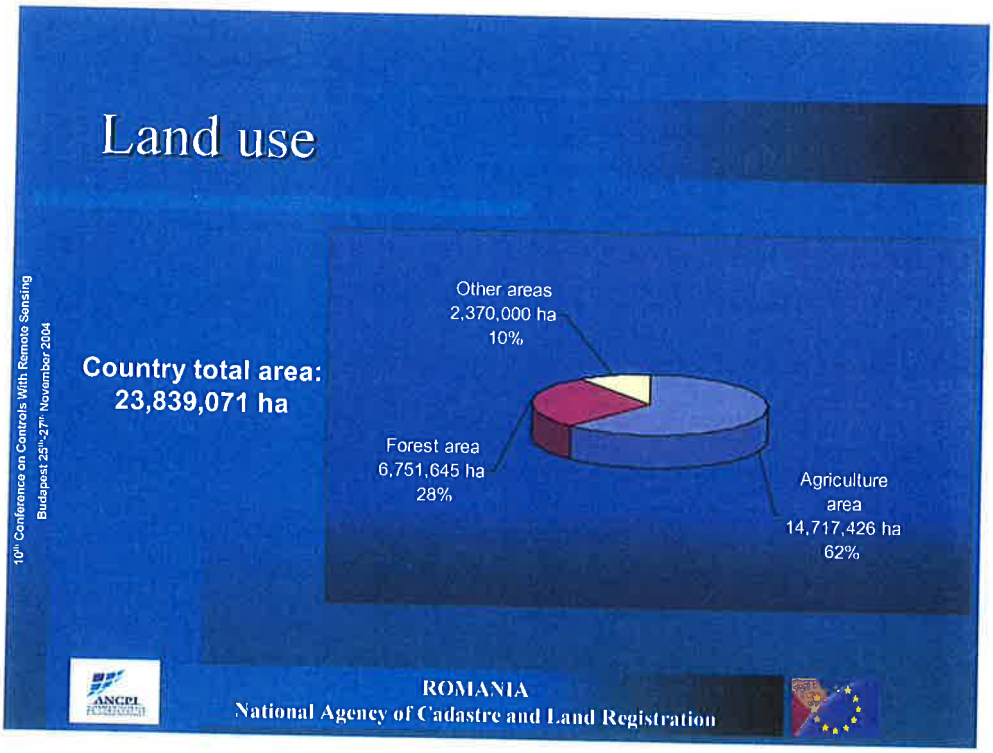
ROMANIA
National Agency of Cadastre and Land Registration


Basic Statistics
42 counties.
Population: 21,974,000.
Agricultural area: 14,7 mil. ha
No property titles: 4,833,977.
10th Conference on Controls With Remote Sensing Budapest 25th-27th November 2004
ANCPI
ROMANIA
National Agency of Cadastre and Land Registration


Land use
Country total area: 23,839,071 ha
Other areas 2,370,000 ha 10%
Forest area 6,751,645 ha 28%
Agriculture area 14,717,426 ha 62%
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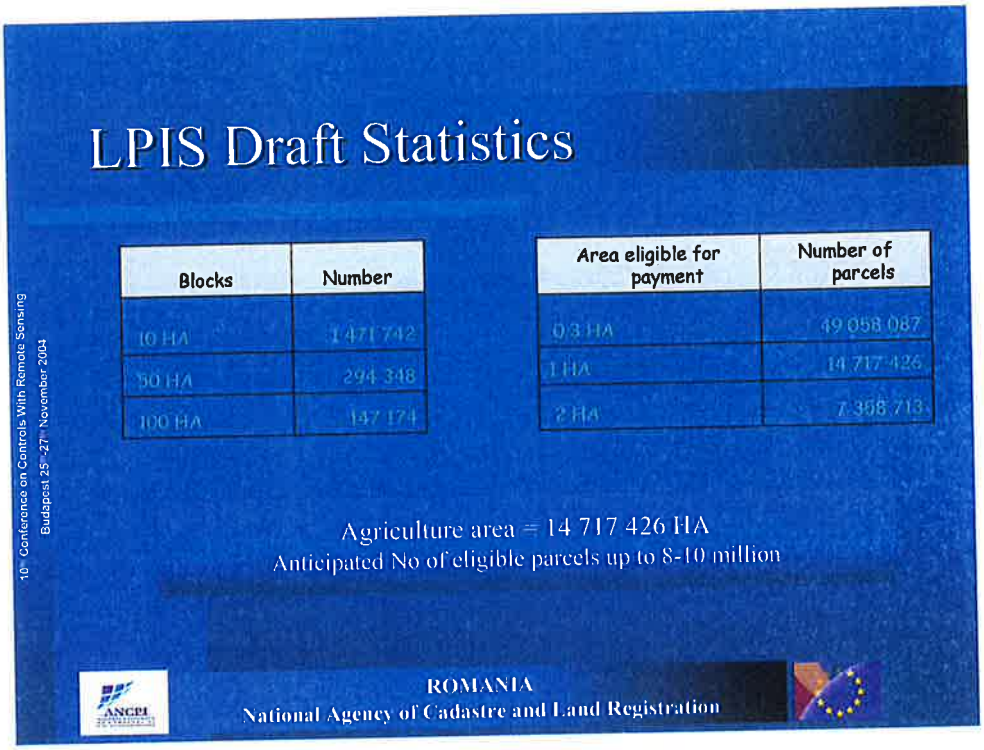
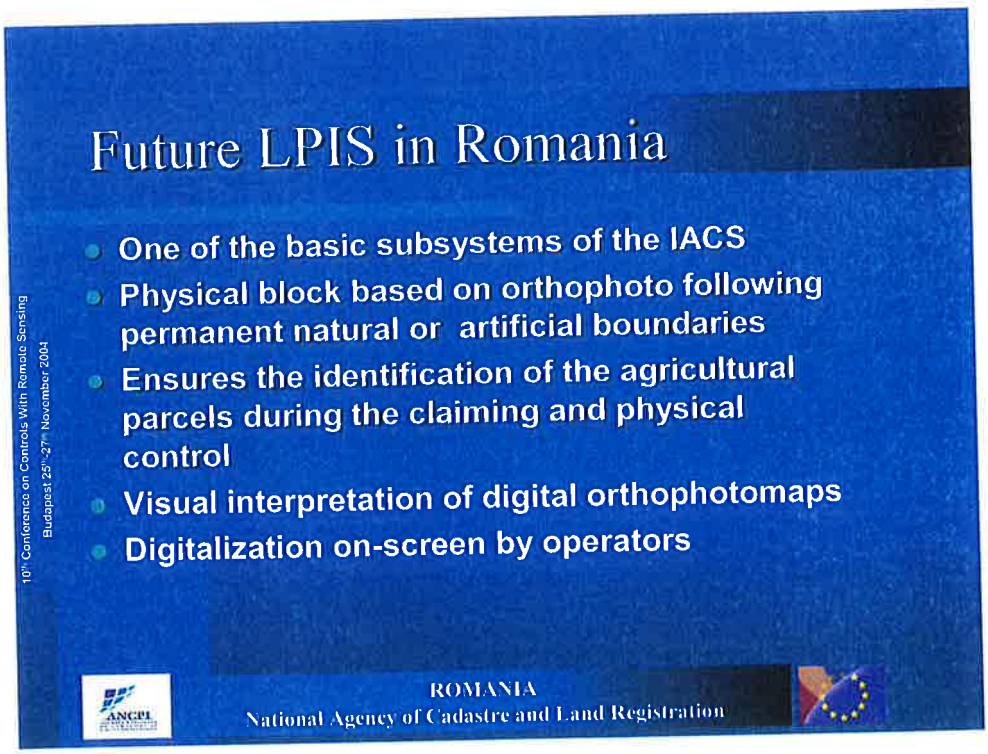
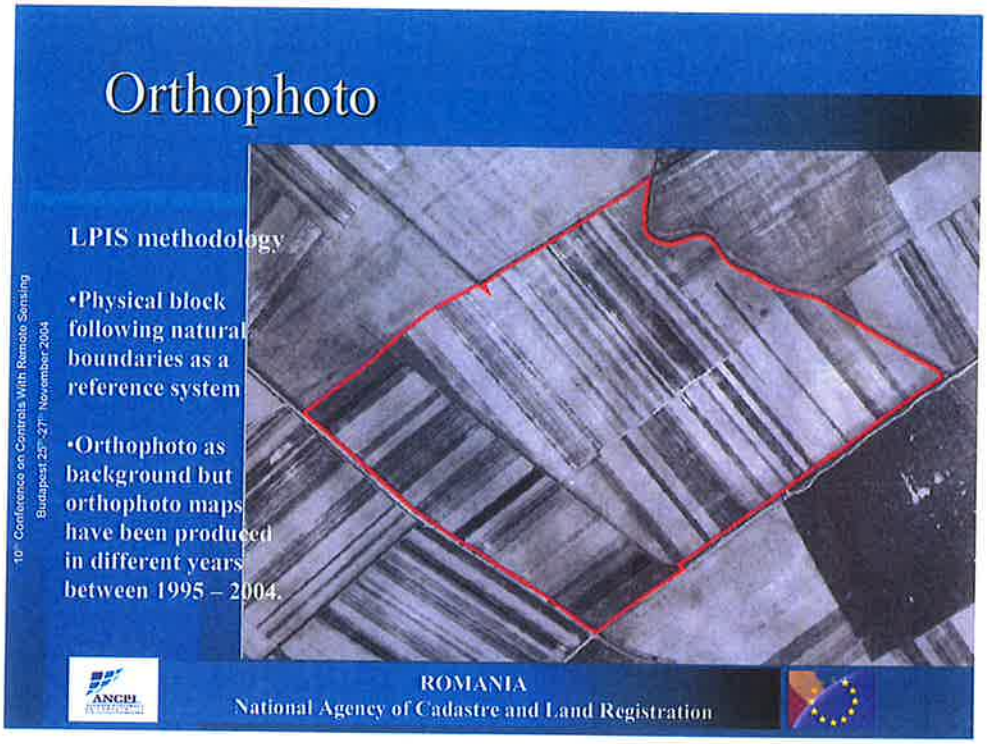
ANCPI
ROMANIA
National Agency of Cadastre and Land Registration


LPIS Draft Statistics
Blocks
Number
10 HA
1 471 742
50 HA
294 348
100 HA
147 174
Area eligible for payment
Number of parcels
0.3 HA
49 058 087
1 HA
14 717 426
2 HA
7 358 713
Agriculture area = 14 717 426 HA
Anticipated No of eligible parcels up to 8-10 million
ROMANIA
National Agency of Cadastre and Land Registration
10th Conference on Controls With Remote Sensing
Budapest 25th-27th November 2004


Future LPIS in Romania
One of the basic subsystems of the IACS
Physical block based on orthophoto following permanent natural or artificial boundaries
Ensures the identification of the agricultural parcels during the claiming and physical control
Visual interpretation of digital orthophotomaps
Digitalization on-screen by operators
ROMANIA
National Agency of Cadastre and Land Registration
10th Conference on Controls With Remote Sensing
Budapest 25th-27th November 2004


Orthophoto
LPIS methodology
•Physical block following natural boundaries as a reference system
•Orthophoto as background but orthophoto maps have been produced in different years between 1995 – 2004.
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Orthophoto physical block
10th Conference on Controls With Remote Sensing Budapest 25th -27th November 2004
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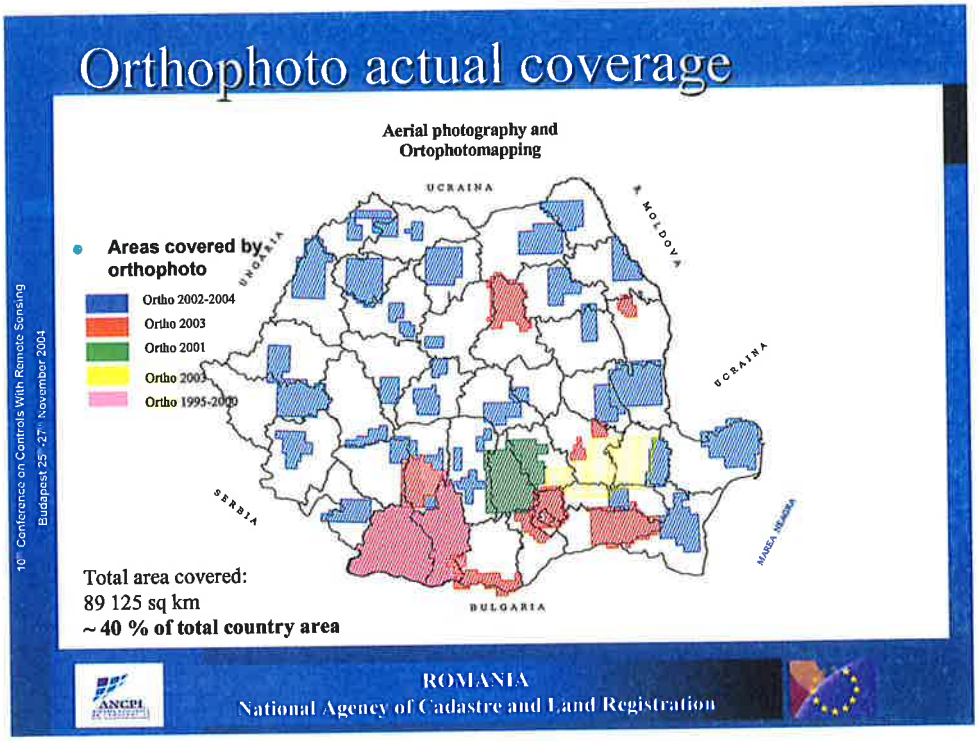
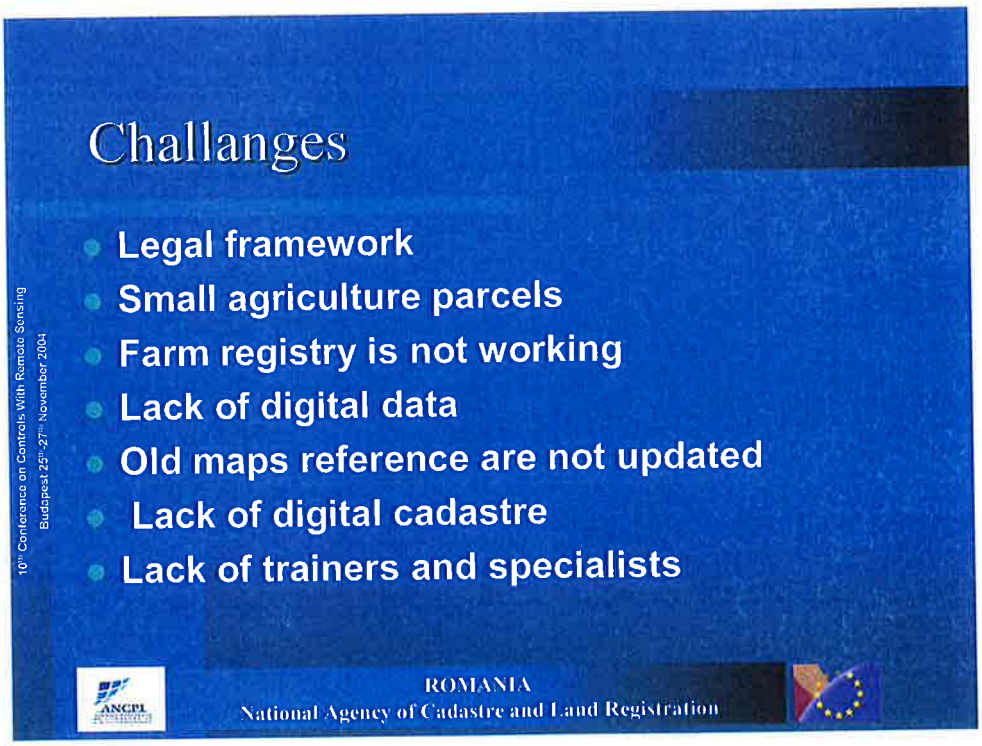
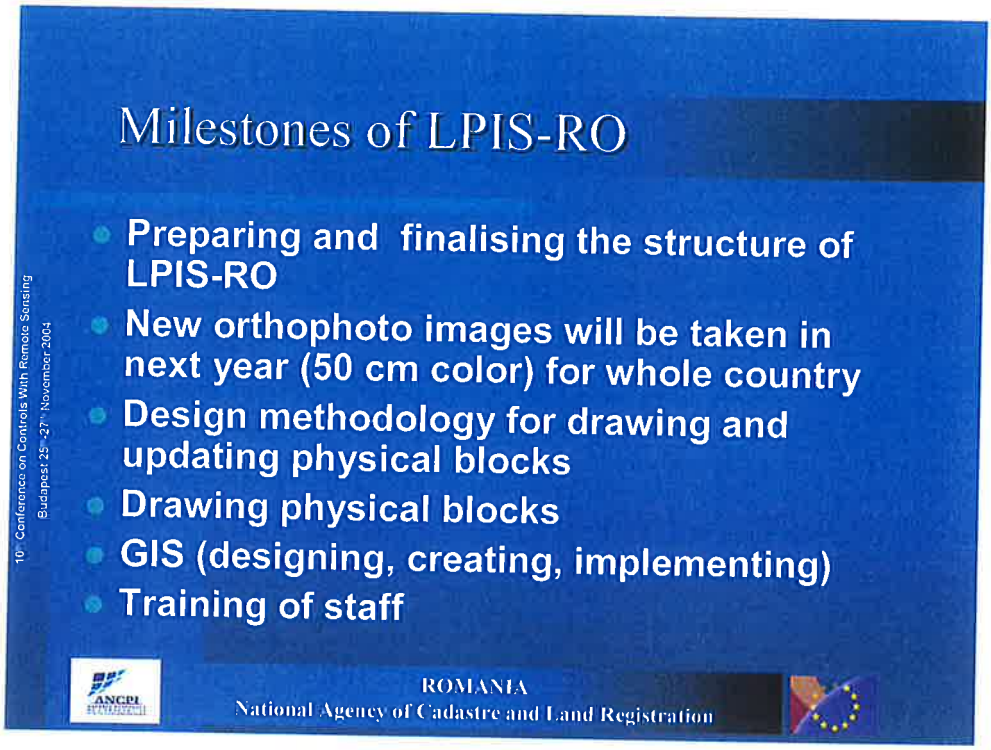
ROMANIA
National Agency of Cadastre and Land Registration


Orthophoto actual coverage
Aerial photography and Ortophotomapping
Areas covered by orthophoto
Ortho 2002-2004
Ortho 2003
Ortho 2001
Ortho 2003
Ortho 1995-2000
UCRAINA
MOLDOVA
UNGARIA
SERBIA
BULGARIA
Total area covered:
89 125 sq km
~40 % of total country area
ROMANIA
National Agency of Cadastre and Land Registration
10th Conference on Controls With Remote Sensing
Budapest 25th-27th November 2004


Challanges
Legal framework
Small agriculture parcels
Farm registry is not working
Lack of digital data
Old maps reference are not updated
Lack of digital cadastre
Lack of trainers and specialists
ROMANIA
National Agency of Cadastre and Land Registration
10th Conference on Controls With Remote Sensing
Budapest 25th-27th November 2004


Milestones of LPIS-RO
Preparing and finalising the structure of LPIS-RO
New orthophoto images will be taken in next year (50 cm color) for whole country
Design methodology for drawing and updating physical blocks
Drawing physical blocks
GIS (designing, creating, implementing)
Training of staff
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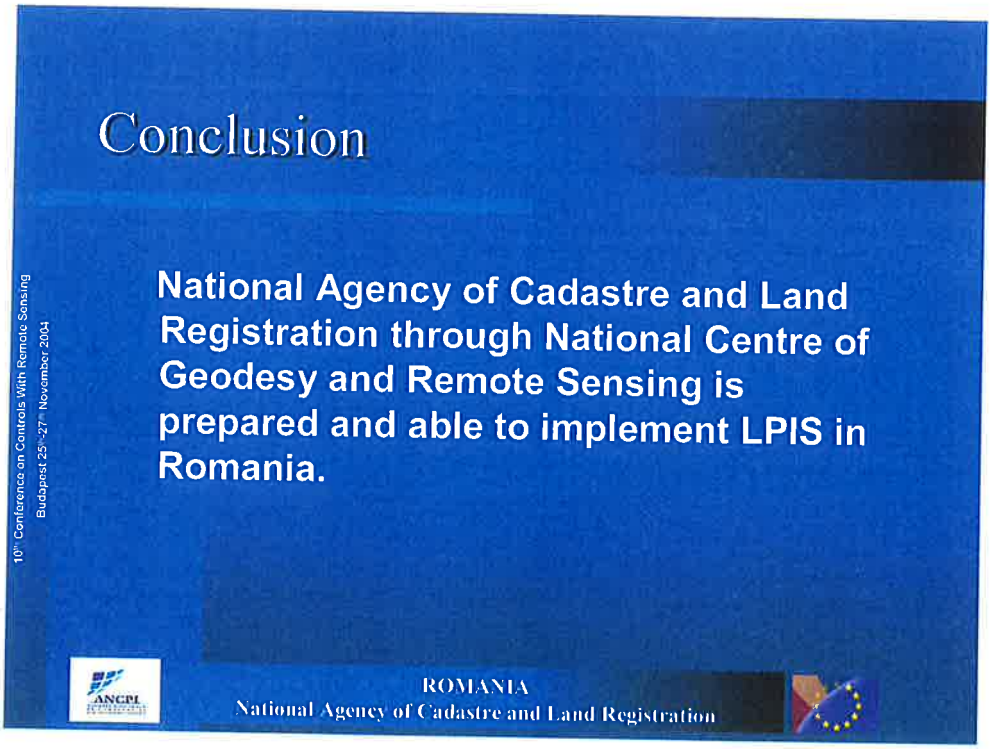
National Agency of Cadastre and Land Registration


Conclusion
National Agency of Cadastre and Land Registration through National Centre of Geodesy and Remote Sensing is prepared and able to implement LPIS in Romania.
10th Conference on Controls With Remote Sensing Budapest 25th -27th November 2004
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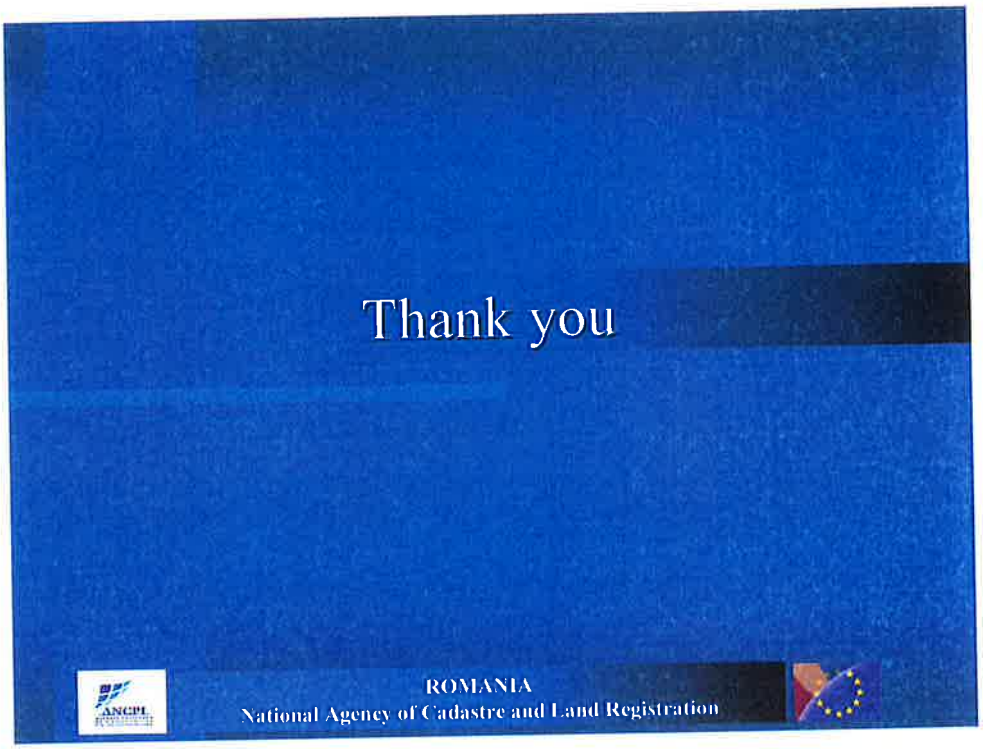
National Agency of Cadastre and Land Registration


Thank you
ROMANIA
National Agency of Cadastre and Land Registration

Alexandru Badea, ROSA/ CRUTA, RO

10th Annual Conference on Control with Remote Sensing of Area-based Subsidies
25-27th of November 2004 - Budapest

Pilot project and strategy for the implementation of a Land Parcel Identification System in Romania

Alexandru BADEA
Romanian Space Agency / CRUTA
Tel: +40 21 212 87 22
Fax:+40 21 312 88 04
alexandru.badea@rosa.ro
www.rosa.ro

Victor GRIGORESCU
National Agency of Cadastre and Land Registration
Tel: +40 21 2222902
Fax:+40 21 222 52 24
victor.grigorescu@ancpi.ro
www.ancpi.ro

PART 1

Pilot project for the setup of a Land Parcel Identification System in Romania - JRC AO N° G03/11/03 –

GEOSYS (FR), **CRUTA** (RO),
INTERGIS (RO) with the support of
ROSA and **AIRECTS** (FR/ES)

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MOTIVATION

- THE NEGOTIATION WITH THE EUROPEAN COMMISSION CONTAINS THE "AGRICULTURE" FILE CONSIDERED TO BE THE MOST SENSITIVE BECAUSE THE SOCIAL AND ECONOMIC EFFECT
- ROMANIAN AGRICULTURE / LANDSCAPE HAVE BEEN ALREADY PASS OVER AN IMPORTANT CHANGE OF STRUCTURE
- THE EUROPEAN INTEGRATION IS PRODUCING FUNDAMENTAL CHANGES FOR THE OCUPATIONAL STRUCTURE OF THE ROMANIAN RURAL SPACE

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BACKGROUND

•2001 **First audit on the necessity of an LPIS in Romania financed by the decentralized cooperation (Midi-Pyrénées Région-AIRECTS) ;**

•2003 **Pilot operation of the French cooperation (AIRECTS+CRUTA, ROSA, Environment Agency Ploieşti)** – to be concluded early 2005 by an international workshop);

•2003-2005 **Support research operation realised in the framework of the National R&D Programme «Aeronautics and Space» (ROSA, CRUTA, INTERGIS)**

•2004 **Pilot project for the setup of a Land Parcel Identification System in Romania - JRC AO N° G03/11/03 – (GEOSYS, CRUTA, INTERGIS)**

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PURPOSE

- TEST THE METHODOLOGY TO IMPLEMENT AN EFFICIENT AND FLEXIBLE LPIS ;
- FORMULATE RECOMMENDATIONS (TECHNICAL, ORGANISATION, FINANCIAL, PLANNING) FOR A NATIONAL SYSTEM

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WORKING METHOD

HAS TO BE IN ACCORD WITH THE EUROPEAN REGULATION :

3508/1992, 1593/2000 and 1782/2003

WORKING TECHNIQUES

- IMAGE PROCESSING – ERDAS IMAGINE
- GIS – ArcView 3.3, ArcView 8.3 (9)

FIELD DATA

- GPS POSITIONNING
- INTERVIEWS WITH FARMERS

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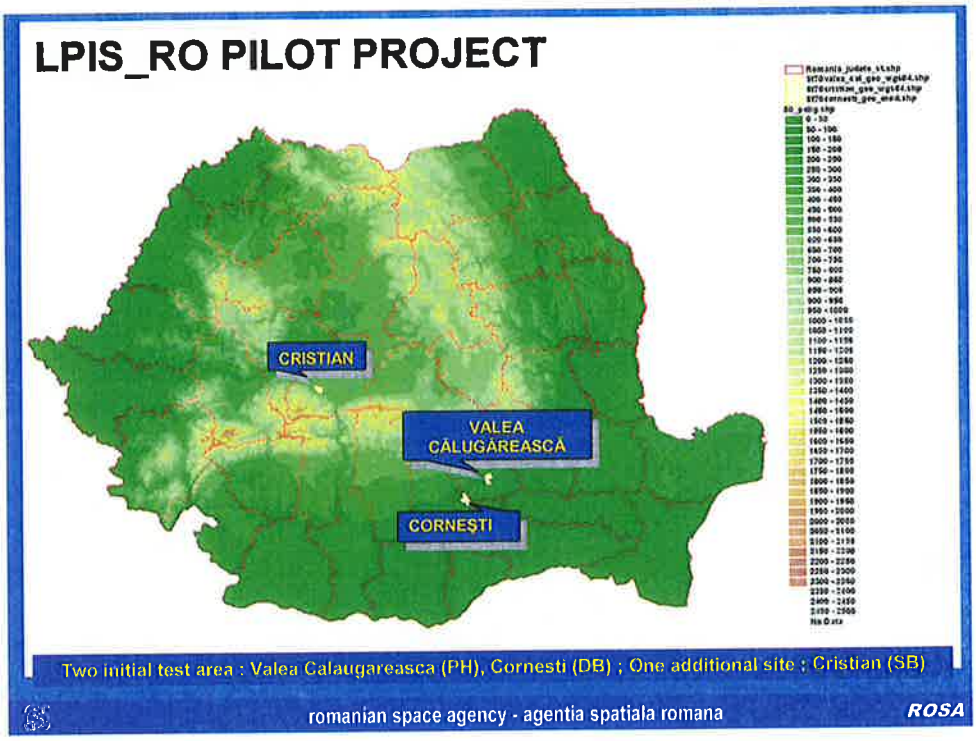
LPIS_RO PILOT PROJECT
CRISTIAN
VALEA CĂLUGĂREASCĂ
CORNEŞTI
Two initial test area : Valea Calaugareasca (PH), Cornesti (DB) ; One additional site : Cristian (SB)
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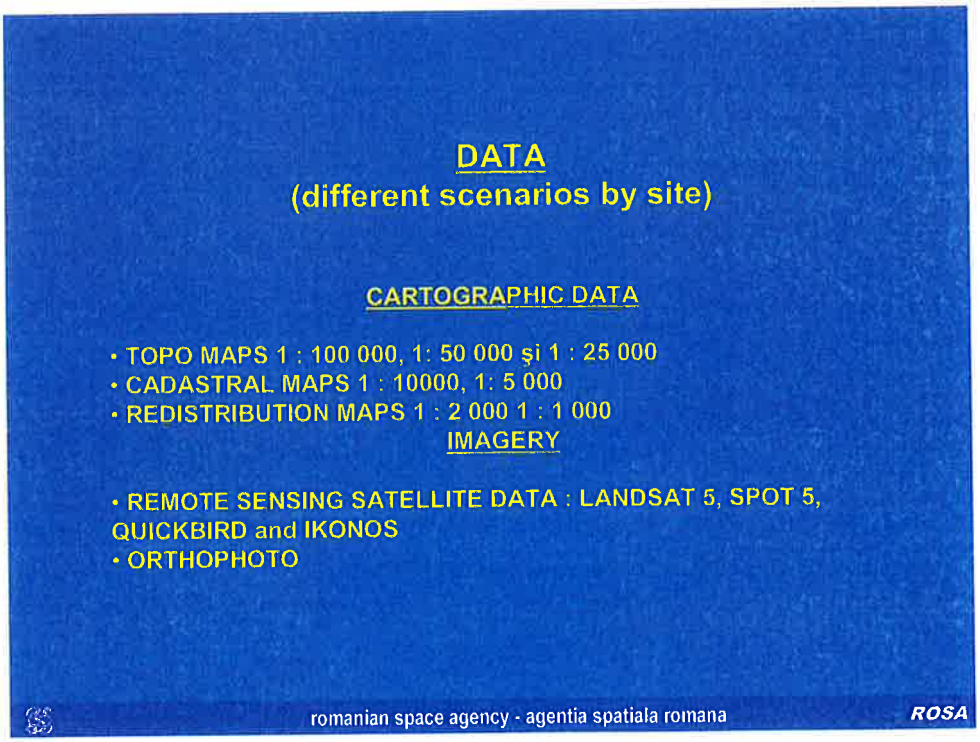
ROSA


DATA
(different scenarios by site)
CARTOGRAPHIC DATA
• TOPO MAPS 1 : 100 000, 1: 50 000 şi 1 : 25 000
• CADASTRAL MAPS 1 : 10000, 1: 5 000
• REDISTRIBUTION MAPS 1 : 2 000 1 : 1 000
IMAGERY
• REMOTE SENSING SATELLITE DATA : LANDSAT 5, SPOT 5, QUICKBIRD and IKONOS
• ORTHOPHOTO
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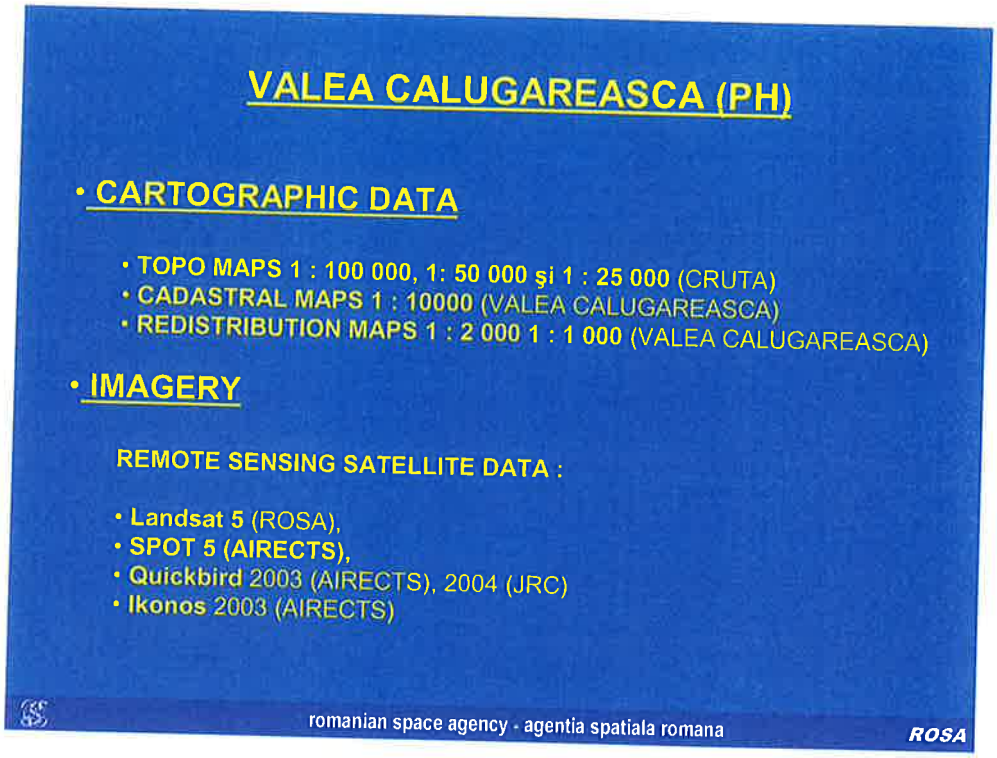
ROSA


VALEA CALUGAREASCA (PH)
• CARTOGRAPHIC DATA
• TOPO MAPS 1 : 100 000, 1: 50 000 şi 1 : 25 000 (CRUTA)
• CADASTRAL MAPS 1 : 10000 (VALEA CALUGAREASCA)
• REDISTRIBUTION MAPS 1 : 2 000 1 : 1 000 (VALEA CALUGAREASCA)
• IMAGERY
REMOTE SENSING SATELLITE DATA :
• Landsat 5 (ROSA),
• SPOT 5 (AIRECTS),
• Quickbird 2003 (AIRECTS), 2004 (JRC)
• Ikonos 2003 (AIRECTS)
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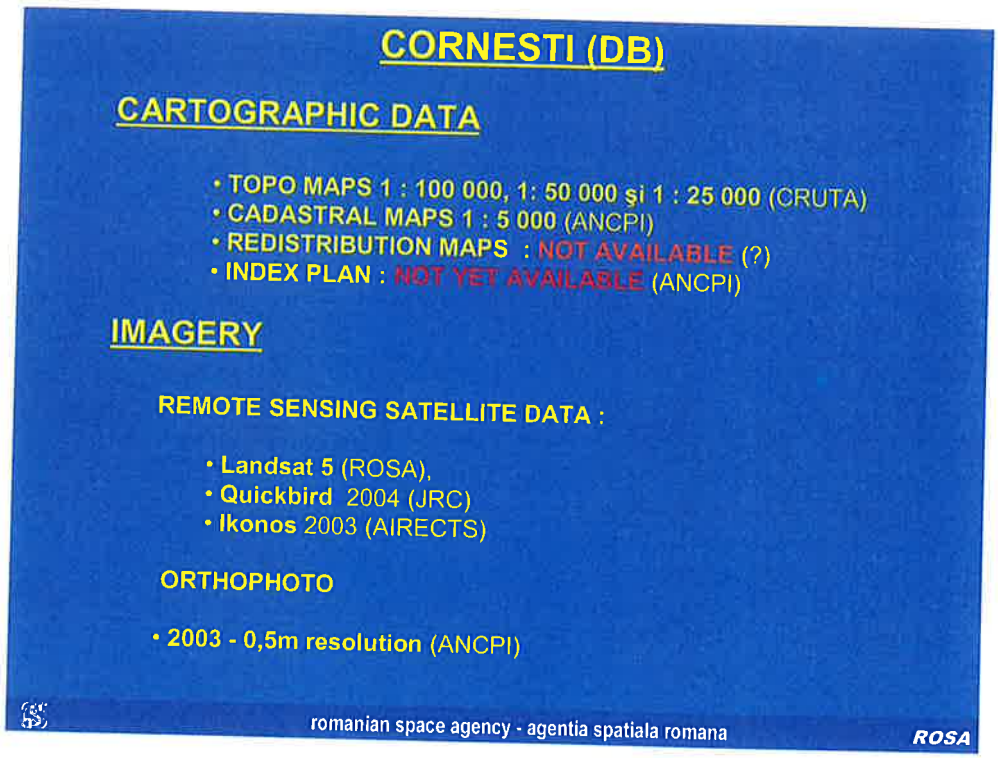
ROSA


CORNESTI (DB)
CARTOGRAPHIC DATA
• TOPO MAPS 1 : 100 000, 1: 50 000 şi 1 : 25 000 (CRUTA)
• CADASTRAL MAPS 1 : 5 000 (ANCPI)
• REDISTRIBUTION MAPS : NOT AVAILABLE (?)
• INDEX PLAN : NOT YET AVAILABLE (ANCPI)
IMAGERY
REMOTE SENSING SATELLITE DATA :
• Landsat 5 (ROSA),
• Quickbird 2004 (JRC)
• Ikonos 2003 (AIRECTS)
ORTHOPHOTO
• 2003 - 0,5m resolution (ANCPI)
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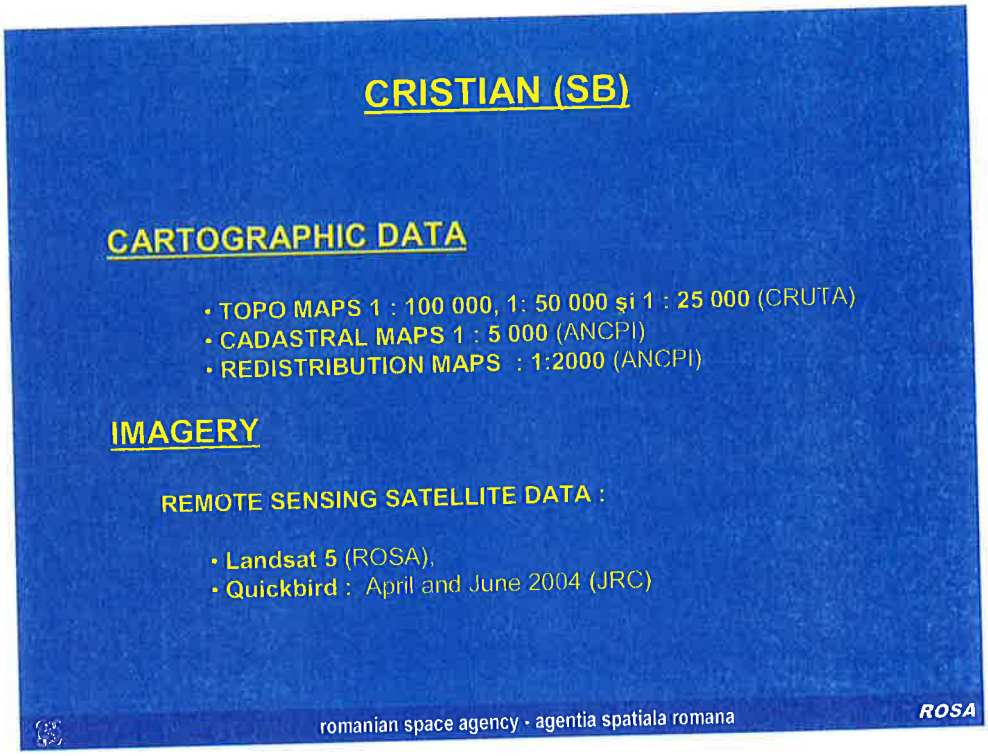
ROSA


CRISTIAN (SB)
CARTOGRAPHIC DATA
• TOPO MAPS 1 : 100 000, 1: 50 000 şi 1 : 25 000 (CRUTA)
• CADASTRAL MAPS 1 : 5 000 (ANCPI)
• REDISTRIBUTION MAPS : 1:2000 (ANCPI)
IMAGERY
REMOTE SENSING SATELLITE DATA :
• Landsat 5 (ROSA),
• Quickbird : April and June 2004 (JRC)
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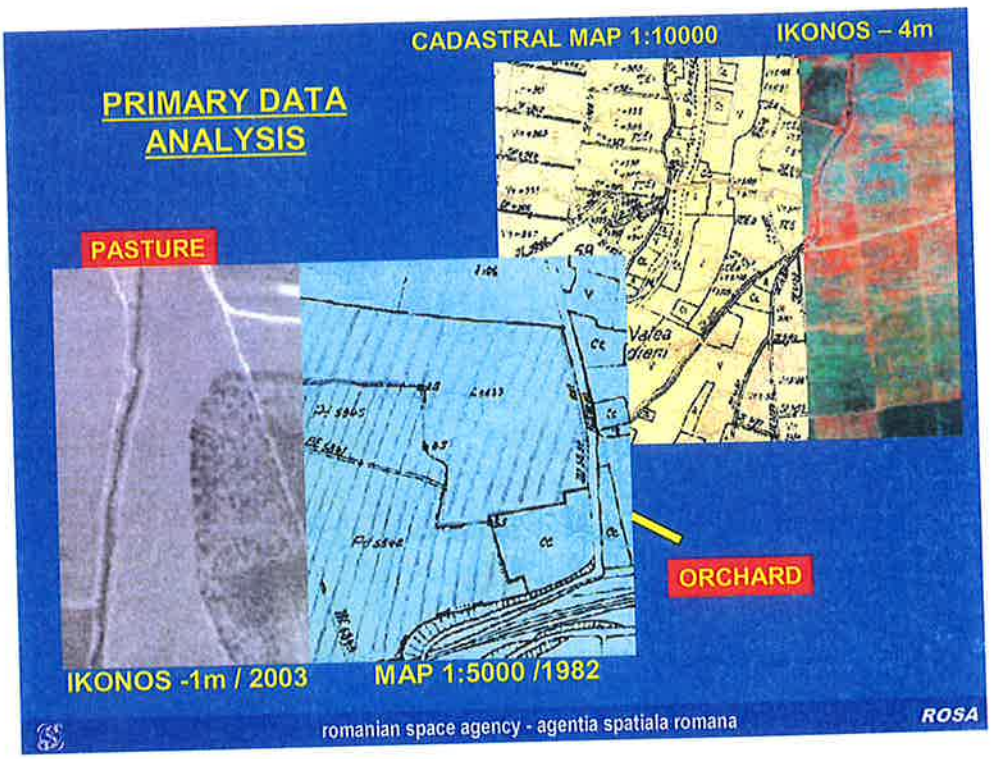
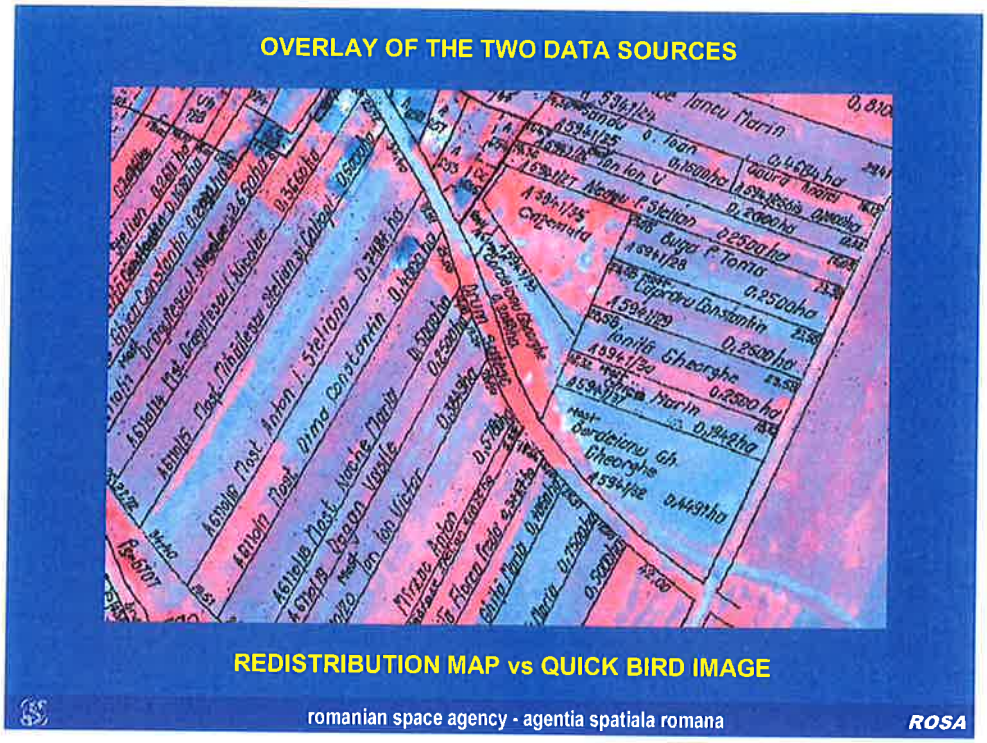
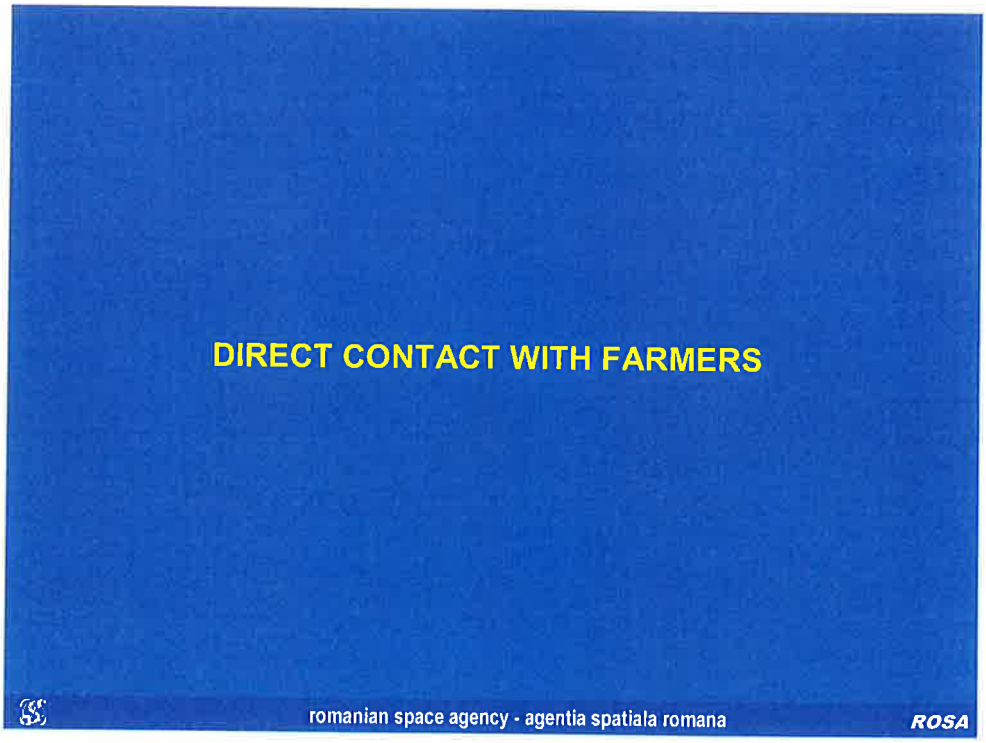
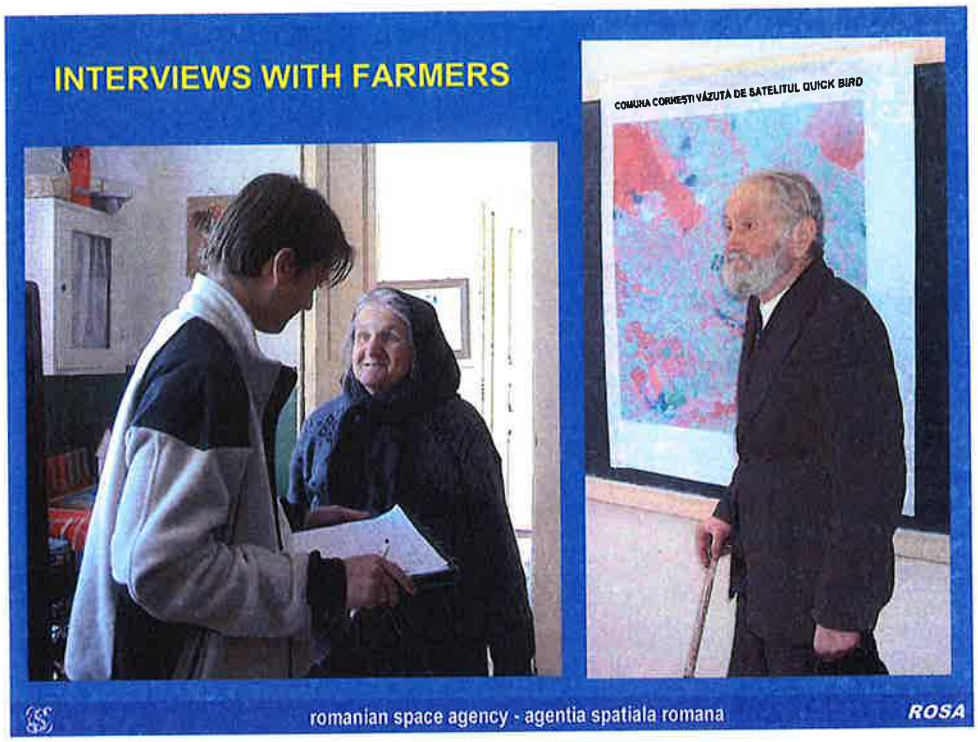
ROSA


CADASTRAL MAP 1:10000
IKONOS – 4m
PRIMARY DATA ANALYSIS
PASTURE
ORCHARD
IKONOS -1m / 2003
MAP 1:5000 /1982
romanian space agency - agentia spatiala romana
ROSA


OVERLAY OF THE TWO DATA SOURCES
REDISTRIBUTION MAP vs QUICK BIRD IMAGE
romanian space agency - agentia spatiala romana
ROSA


DIRECT CONTACT WITH FARMERS
romanian space agency - agentia spatiala romana
ROSA


INTERVIEWS WITH FARMERS
COMUNA CORNESTI VĂZUTĂ DE SATELITUL QUICK BIRD
romanian space agency - agentia spatiala romana
ROSA


VALEA CALUGAREASCA
CORNESTI
CRISTIAN
PARCEL IDENTIFICATION BY FARMERS
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ROSA


FROM FARMER TO GIS
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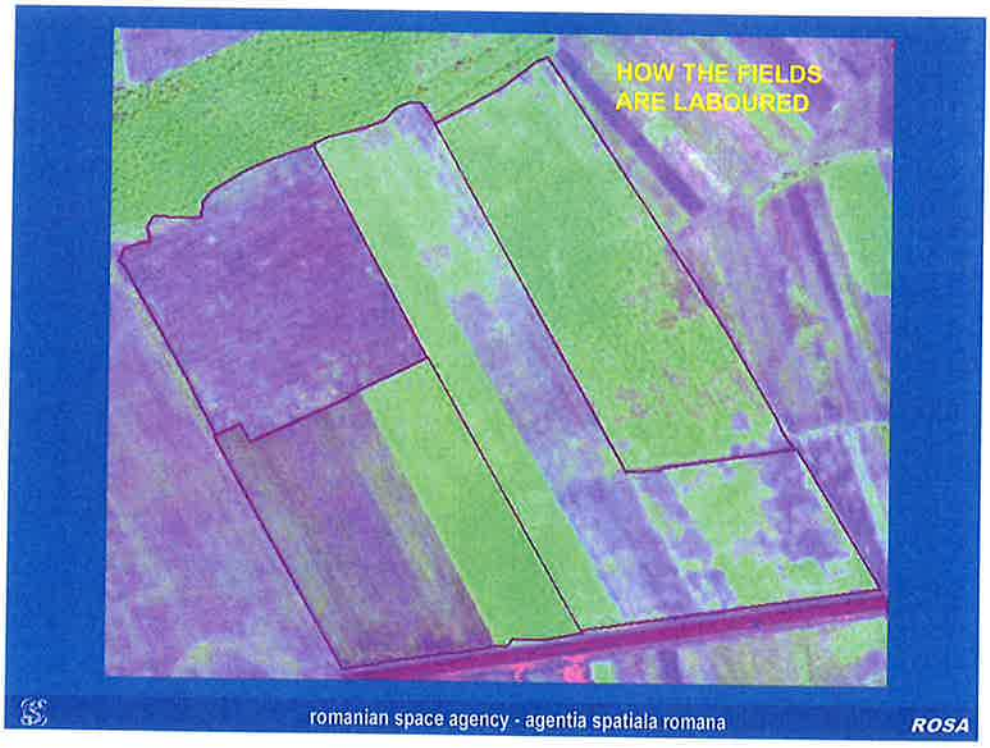
ROSA


HOW THE FIELDS ARE LABOURED
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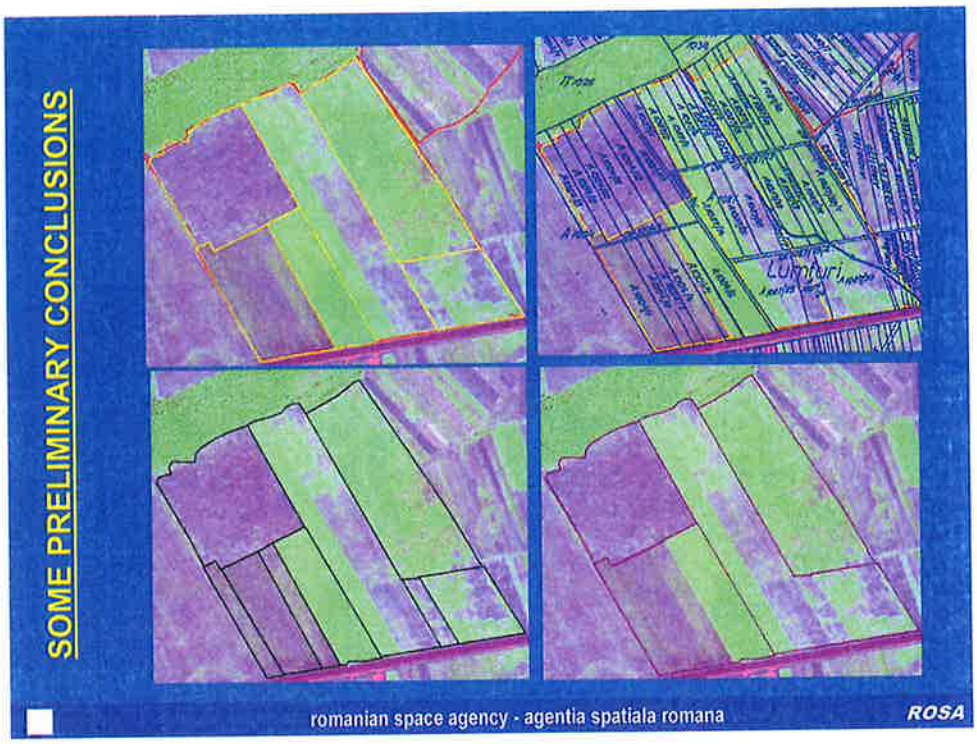
ROSA


SOME PRELIMINARY CONCLUSIONS
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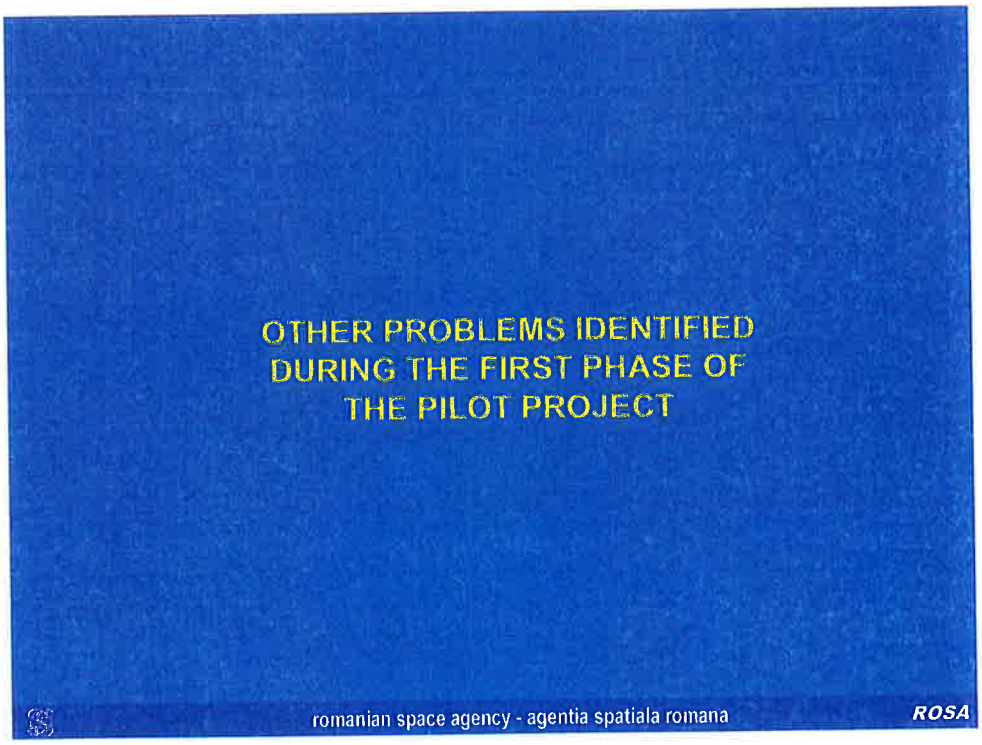
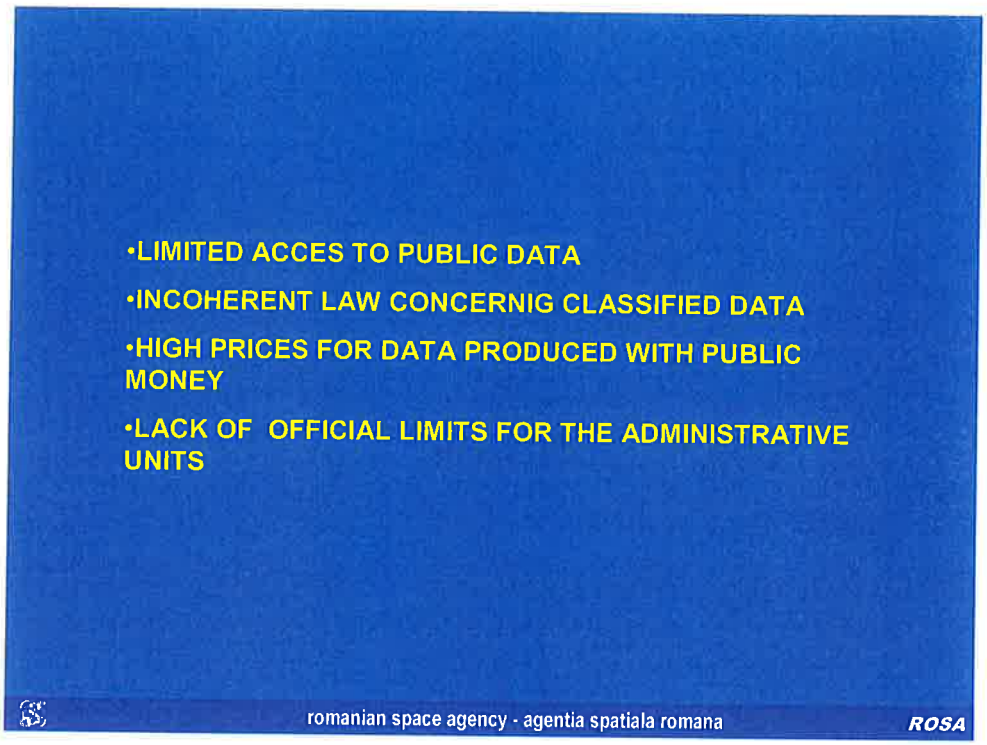
ROSA


OTHER PROBLEMS IDENTIFIED
DURING THE FIRST PHASE OF
THE PILOT PROJECT
romanian space agency - agentia spatiala romana
ROSA


•LIMITED ACCES TO PUBLIC DATA
•INCOHERENT LAW CONCERNIG CLASSIFIED DATA
•HIGH PRICES FOR DATA PRODUCED WITH PUBLIC MONEY
•LACK OF OFFICIAL LIMITS FOR THE ADMINISTRATIVE UNITS
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ROSA


WHERE WE ARE ...
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ROSA


A a Ă â Â â B b
C c D d E e F f
G g H h I i Î î
J j K k L l M m
... AT THE BEGINNING OF THE LPIS ALPHABET...
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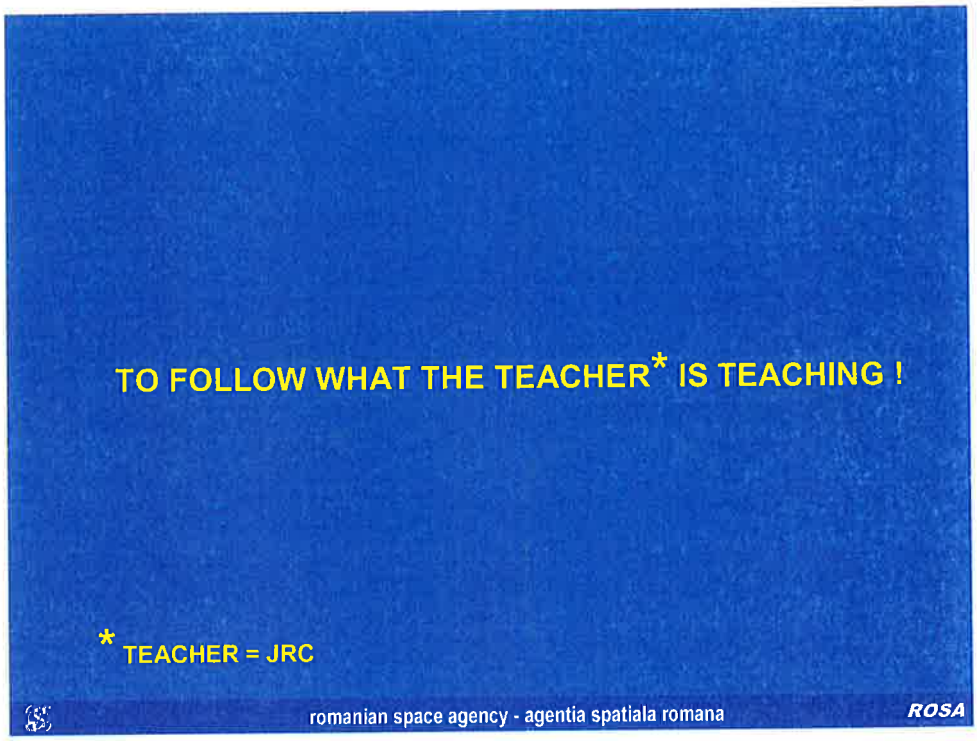
ROSA


m ma ma
Ma am
... WE HAVE TO PRACTICE ....
romanian space agency - agentia spatiala romana
ROSA


... IN ORDER TO ARRIVE AT THE END OF THE ALPHABET !
BUT WE HAVE TO ACCEPT....
romanian space agency - agentia spatiala romana
ROSA


.....AN IMPERATIVE CONDITION ...
romanian space agency - agentia spatiala romana
ROSA


TO FOLLOW WHAT THE TEACHER* IS TEACHING !
* TEACHER = JRC
romanian space agency - agentia spatiala romana
ROSA


THANKS !
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ROSA

Podium discussions – "Space and aerial VHR Imagery – competition or complement"

Chairman: Jacques Delincé - Agrifish, IPSC, JRC
Co-chairman: Simon Kay - Agrifish, IPSC, JRC

Adrian Zevenbergen - Eusi
1.) Comparison of pricing
2.) Availability of VHR satellites for the future

Rolf Becker – MAPs
Coverage of large areas versus coverage of many small sites – comparing aerial and satellite acquisition

Arthur Rohrbach
1.) aerial digital scanning (ADS40) compared to satellite VHR acquisition
2.) implementing best sw suites for ortho correcting above data (difficulties, best approaches etc.)

Klaus Komp
user preference – space or aerial?

Victor Ortiz
Comparing aerial with VHR satellite data for control (in Andalucia); managing many small sites

Panel discussion
VHR Satellite vs airborne

Chair: Jacques Delincé
Co-chair: Simon Kay

VHR: Satellite vs airborne

- A market battle?
- Or synergistic use?
  - Either way, the right tool must be chosen for each jib

Some issues…

- Comparing aerial with VHR satellite data for control
  - Managing many small sites – better which which system?
- VHR satellite data for control, and airborne for LPIS creation
  - A false division of labour?
- Backup solution
  - Airborne for Satellite – or vice versa?
- Aerial digital scanning (eg ADS40) compared to satellite VHR acquisition
  - Isn't just the same thing?

Fundamental choices

- User preference
  - What does the user want?
- Implementing software suites for orthocorrection of airborne data
  - Satellite is much easier...
- Availability of VHR satellites for the future
  - Do we have enough?
- The bottom line:
  - Comparison of all-inclusive cost: which gives better value for money?

Our panel

- Satellite Image Provider
  - Adrian Zevenbergen, EUSI
- Aerial Flight Company
  - Rolf Becker, MAPS Geosystems
- Instruments
  - Arthur Rohrbach, Leica Geosystems
- CwRS Contractor
  - Klaus Komp, Eftas
- Member States:
  - JeanClaude Graciette (ONIC, FR)
  - Victor Ortiz, (Junta de Andalucia, ES)

Satellite Image Provider - Adrian Zevenbergen, EUSI

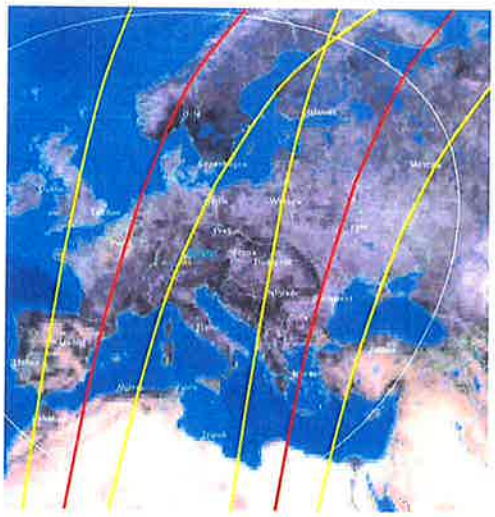
Podium Discussion
« Space and Aerial VHR imagery – competition or complement »

Adrian W. Zevenbergen
General Manager
European Space Imaging

Budapest, November 25, 2004

VHR satellites - Ability to select from multiple sites

- Typical 'reach' on one day
- Total VHR collection capacity is more than 100,000 km² per day
- Assuming 'typical' MARS sites, total capacity is approx. 25,000 km² per day
- Weather is the only issue
  - Advantage to have multiple sites to select from



2

Data acquisition potential

- Feasibility study for maximum capacity
  - Scenario run for JRC in 2003
  - 25 sites for France (with 1 satellite)
- France 2004
  - 28 aerial sites
  - 17 VHR sites
  - VHR: maximum capacity was not reached
  - All VHR sites collected in time despite prolonged poor weather

VHR Satellites and the future

2005	2006	2007	2008
IKONOS	IKONOS	IKONOS/Block II	IKONOS/Block II
QuickBird	QB / WorldView	QB / WorldView	WorldView
EROS A	EROS A + B	EROS B	EROS B
OrbView 3	OrbView 3	OrbView 3 + 5	OrbView 3 + 5
	Pleiades	Pleiades	Pleiades
Cosmo-Skymed	Cosmo-Skymed	Cosmo-Skymed	Cosmo-Skymed
	TerraSar	TerraSar	TerraSar

Aerial Flight Companiy - Rolf Becker, MAPs

Space and Aerial VHR Imagery

Competition or Complement?

Rolf Becker

MAPS Group of Companies

rolf.becker@maps-geosystems.com

MARS CwRS, Budapest 2004 MAPS geosystems

What is best, a Mercedes or a Toyota ?

MARS CwRS, Budapest 2004 MAPS geosystems

Significant differences

- Contrary to Aerial photography, VHR Satellites have a fixed operation modus that cannot be adapted to specific application requirements,
- Aerial photography is bought, where as satellite imagery is licensed. This has a significant impact on the accessibility of the data

MARS CwRS, Budapest 2004

MAPS geosystems

Aerial photography can be adapted to the specific requirement of an application.

This is not possible with satellite imagery. Here we have to do with what we can get.

MARS CwRS, Budapest 2004

MAPS geosystems

System Criteria

- Resolution, panchro
- Resolution, color
- Frame size
- Geometry
- Acquisition time
- Georeferencing
- Stereo capacity
- Image quality
- Cloud cover
- Frame size
- Cost

MARS CwRS, Budapest 2004

MAPS geosystems

Identification/classification Criteria

- Shape/neighbourhood
- Stereo viewing
- Pattern
- Colour/ spectral signature
- texture

MARS CwRS, Budapest 2004

MAPS geosystems

Time Factor

Acquisition

Processing

Evaluation

Operational Imperatives

- Weather conditions
- Flight permits
- Processing time
- Aircraft availability
- Access to airspace

Data Accessibility

- Aerial photography still highly regulated in many countries
- Satellite imagery freely accessible

Cost

- For large area aerial photography and Orthophoto production is significantly cheaper than satellite imagery.
- This situation might be reversed for small area where aircraft position cost account for large part of the cost.
- Due to increasing automation, the prices for image processing will become less and less significant in relation to the data acquisition cost.

Today vs. tomorrow

Today decisions have to make in view of tomorrow possibilities

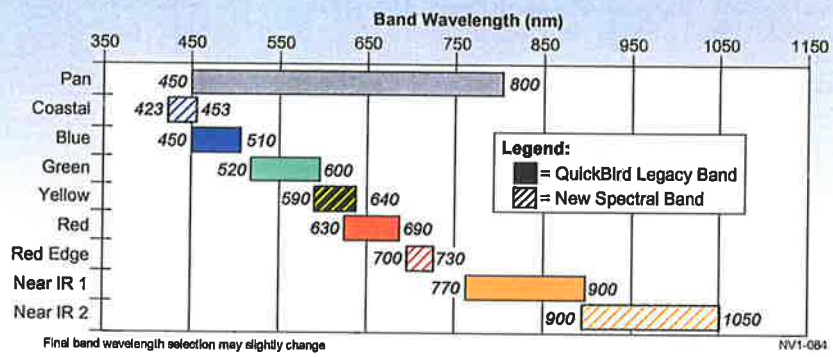
- After many year of stagnation, Aerial photography has received important impulses from the remote sensing sector as we can witness in the development of digital cameras, the full impact of this development is still ahead of us.
- Likewise, satellite image systems are continually improving

MARS CwRS, Budapest 2004 MAPS geosystems

What is in store?

- Higher performing satellite systems are not expected for an other 2 years
- Digital aerial survey cameras are just entering the market. However it it my prediction, that these systems will not make an impact before software becomes available that can exploit their outstanding capabilities (ie. Automated detail recognition?)
- The technology of these new digital cameras have much in common with satellite system and it is likely that their will be an synergy effect that accelerates such a development.

MARS CwRS, Budapest 2004 MAPS geosystems



- WorldView satellites will incorporate the industry standard four multispectral bands (Red, Blue, Green, Near-Infrared) and adds four new bands (Coastal, Yellow, Red Edge, Near-Infrared).

- Added spectral diversity provides ability to perform change detection/surveillance, camouflage detection, mission planning/simulation.

MARS CwRS, Budapest 2004

MAPS geosystems

System Availability

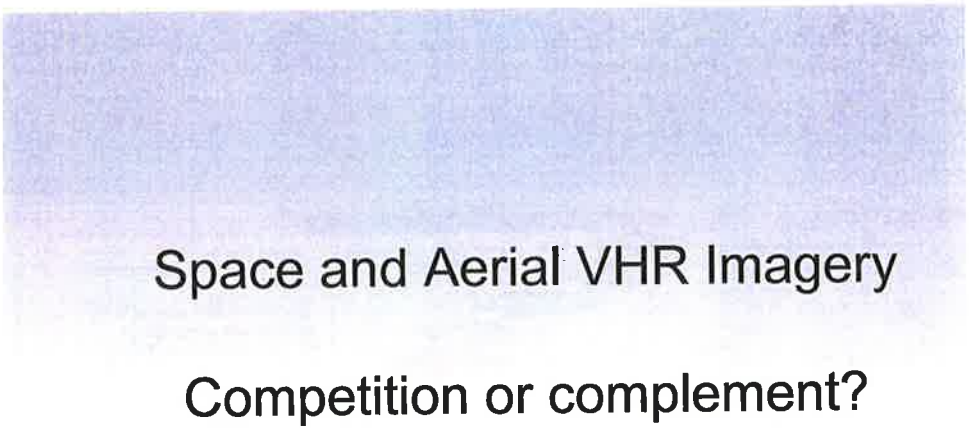
Today

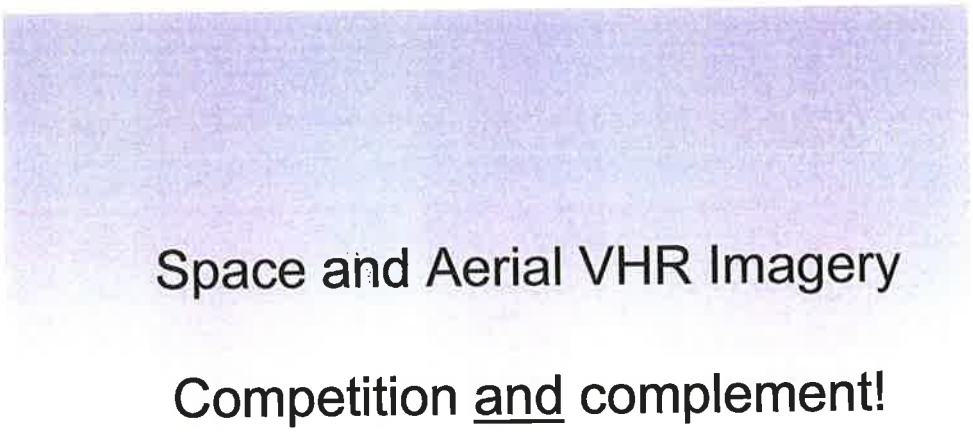
- 2-3 satellites
- Hundreds of survey aircraft and cameras

Tomorrow?

MARS CwRS, Budapest 2004

MAPS geosystems


Space and Aerial VHR Imagery
Competition or complement?
MARS CwRS, Budapest 2004
MAPS geosystems


Space and Aerial VHR Imagery
Competition and complement!
MARS CwRS, Budapest 2004
MAPS geosystems

Instruments - Arthur Rohrbach, LEICA

Monitoring of Agriculture with RS

Use of VHR - Imagery Spaceborne or Airborne or Both?

Arthur Rohrbach, Dir, Sensor Sales EMEA

CwRS - Meeting, Budapest, 24-26 Nov 2004

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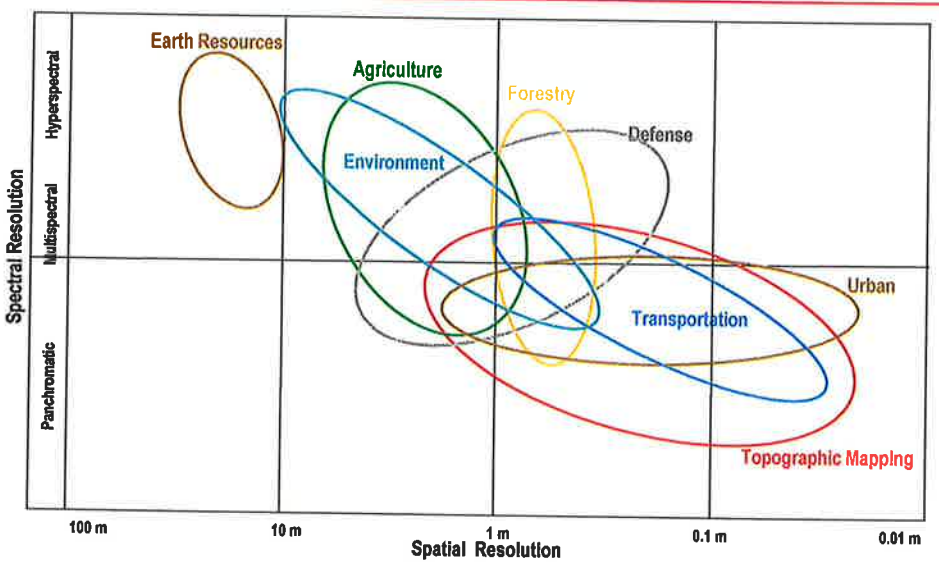
Leica Geosystems

Airborne sensor application segments



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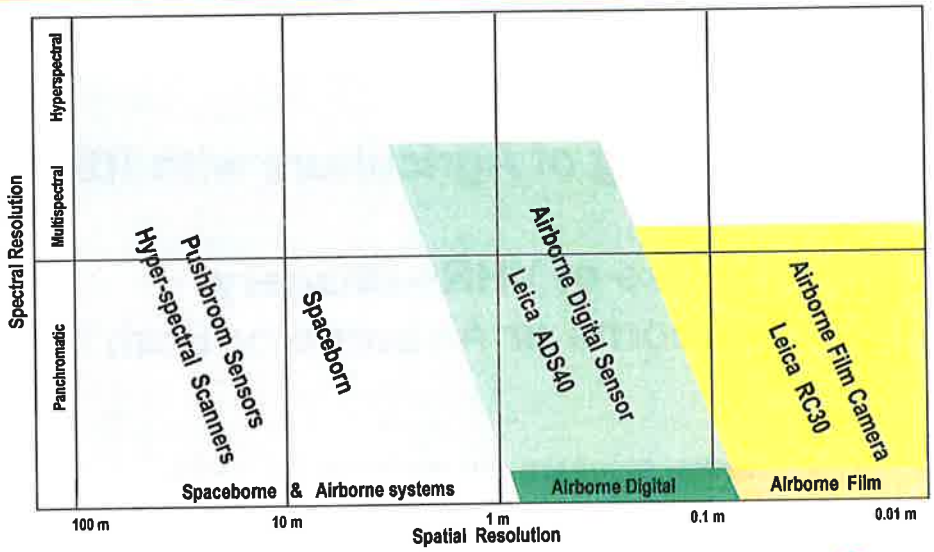
Available Sensors Systems



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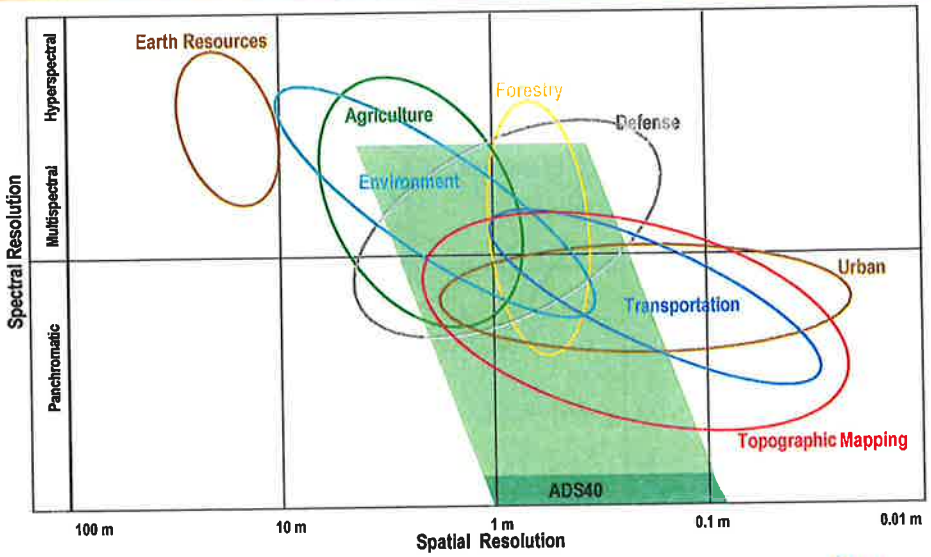
Applications covered by the ADS40



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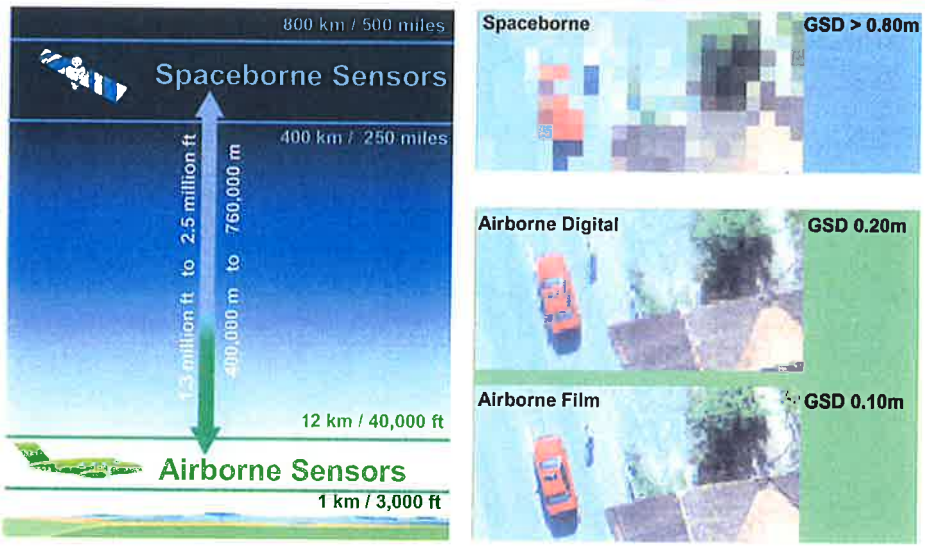
Airborne and Spaceborne imagery



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Complementing strengths

Airborne digital sensors (ADS40)	Spaceborne sensors (Hi-Resolution)
■ Data on demand (1-12 km)	■ Fixed orbit (450-650 km)
■ Can operate in adverse weather conditions (e.g. flying under high clouds)	■ Availability is weather dependent
■ Very high and adaptable resolution – GSD (function of flying height / Gnd) 0.05 – 1.0 m Pan 0.15 – 1.0 m Multi-spectral	■ Fix resolution - GSD 0.8 m Pan 4.0 m Multi-spectral
■ Stereo imagery is inherent	■ Known cost per scene
	■ Stereo on demand only

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Airborne Cameras / Sensors

Leica RC30 , ADS40

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Leica Geosystems

RC30 Aerial Film Camera

- **RC30**
  Aerial Film Camera
- **PAV30**
  Gyro Mount
- **ASCOT**
  GPS Navigation

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Leica Geosystems

ADS40 Airborne Digital Sensor

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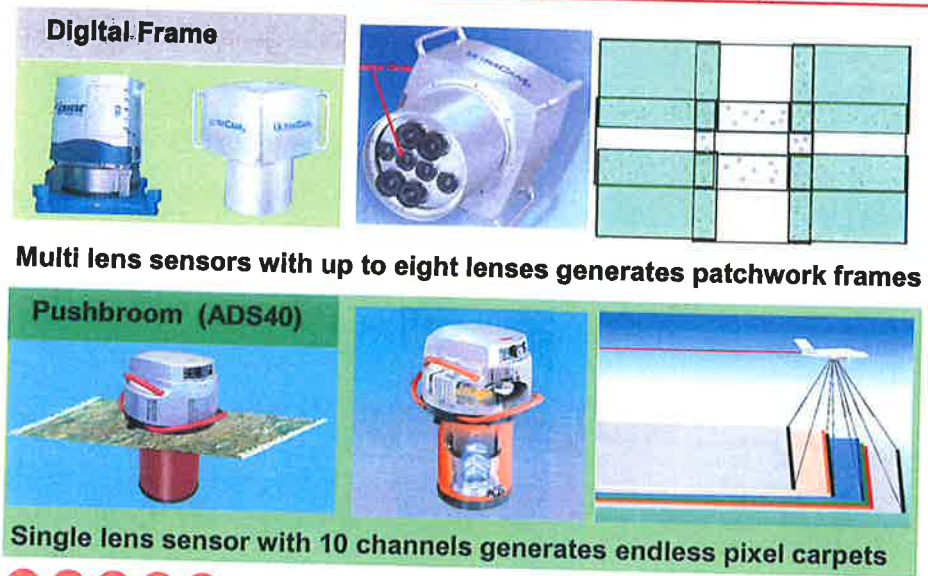
Airborne Digital Sensor – Different Concepts



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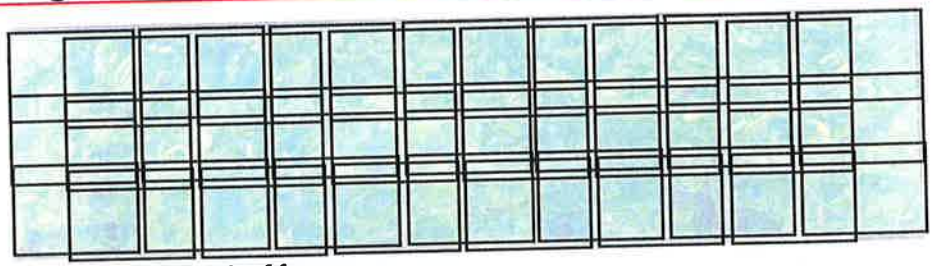
Migration from film cameras to digital sensors



Digital „ patchwork of frames „

Digital „ pixel carpets „

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Airborne Digital Sensors

Mapping Applications

GSD vs. Map Scale

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GSD of Imagery < vs > Map Scale (Map Accuracy)

Average GSD with ADS40	Map Scale	Map standard		Comparable film photographs	
		x-y accuracy RMSE	contour interval	photo scale	pixel size on ground of scanned film
5 - 10 cm	1 : 500	0.125 m	0.25 m	1 : 3,000 to 1 : 5,500	2.5 - 5 cm
10 - 15 cm	1 : 1000	0.25 m	0.5 m	1 : 5,000 to 1 : 8,000	5 - 7.5 cm
15 - 20 cm	1 : 1,500	0.4 m	0.75 m	1 : 6,500 to 1 :10,000	7.5 - 10 cm
20 - 30 cm	1 : 2,000	0.5 m	1 m	1 : 8,000 to 1 : 11,000	10 - 15 cm
25 - 35 cm	1 : 2,500	0.60 m	1.25 m	1 : 8,500 to 1 : 13,000	12.5 - 17.5 cm
30 - 50 cm	1 : 5,000	1.25 m	2.5 m	1 : 12,000 to 1 : 18,000	15 - 25 cm
40 - 60 cm	1 : 10,000	2.50 m	5 m	1 : 17,000 to 1 : 27,000	20 - 30 cm
50 - 70 cm	1 : 20,000	5 m	10 m	1 : 25,000 to 1 : 35,000	15 - 35 cm
50 - 80 cm	1 : 25,000	6.25 m	12.5 m	1 : 28,000 to 1 : 42,000	25 - 40 cm
50 - 100 cm	1 : 50,000	12.5 m	20 m	1 : 40,000 to 1 : 60,000	25 - 50 cm
50 - 100 cm	1 : 100,000	25 m	50 m	1 : 60,000 to 1 : 90,000	25 - 50 cm

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Airborne Digital Sensors

Remote Sensing Applications

GSD <> PAN vs. MS

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Spectral resolution across track *when Pan GSD = 20 cm*

Reference	Leica ADS40	Intergraph Z(I DMC	Vexcel UltraCam
Panchromatic 12,000 pixels	Multi-spectral 12,000 pixels	Multi-spectral 3,000 pixels	Multi-spectral 4,000 pixels
			
20cm GSD	20cm GSD Same resolution as panchromatic	95cm GSD 4.8 x worse than panchromatic	70cm GSD 3.5 x worse than panchromatic

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Spatial Resolution: PAN vs. MS bands

Space based Sensors (HR) *(from their fix orbit H in space)*	PAN *[m]*	MS *[m]*	Ratio
• SPOT-5	2.5	10.0	4.0 x
• IKONOS-2	1.0	4.0	4.0 x
• OrbView-3	1.0	4.0	4.0 x
• QuickBird-2	0.6	2.5	3.3 x

Airborne Digital Sensors *(example at GSD 20cm)*	PAN *[m]*	MS *[m]*	Ratio
• DMC (Intergraph Z(I)	0.2	1.0	4.8 x
• UltraCam (Vexcel)	0.2	0.7	3.5 x
• ADS 40 (Leica Geosystems)	0.2	0.2	1.0 x

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Airborne Digital Sensors

US Dept of Agriculture (USDA)

National Agriculture Imagery Program (NAIP)

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USDA-FSA (Farm Service Agcy) <> NAIP

- **USDA US Dept of Agriculture major target / plan:**
  - **implement a Geographical Information System (GIS)**
  - **assist the administration of farm programs**
  - **geo-reference any natural disasters, animal or plant diseases to support decision making**

Products needed:

- **Annual color / false colour imagery for**
  - **farm field boundaries measurement**
  - **farm compliance monitoring (imagery flown during peak growing seasons)**
- **New Digital Imagery to support USDA migration to a GIS based environment**
- **Replacement of current orthophotography base on a given 5-yrs cycle**

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Environmental, Land-use, Agriculture Monitoring

- **Spaceborne Imagery? Airborne Imagery?**

  complementing technologies

  > overview from Digital Imagery from Space Sensors
  > accuracy & detail from Digital Airborne Imagery

- **Airborne when higher image quality and resolution is requested (e.g. with GSD between 10-50 cm, in precision farming, agriculture-environmental- and disaster-monitoring for insurance companies)**
- **Airborne for fast, flexible acquisition on given schedules (e.g. at specific dates / season / stage of vegetation, if needed below clouds or after environmental impact assessments, e.g. tornados)**
- **Airborne when fast availability of end-product / colour orthophotos or / and in false colour are requested (e.g. for yield forcasting, water / irrigation management, etc…)**

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Environmental, Land-use, Agriculture Monitoring

- **Airborne when no pan sharpening/ colorizing of imagery is allowed (e.g. for accurate, computer assisted classifications, land use and vegetation maps, environmental monitoring)**
- **Airborne when costs is an issue (e.g. when budget is limited or more monitoring is to be finalized with a same given budget)**
- **Airborne when fast availability of end-product / orthophoto in colour or and false colour is requested**
- **Airborne when licensing rules would prohibit placing imagery in public domain**

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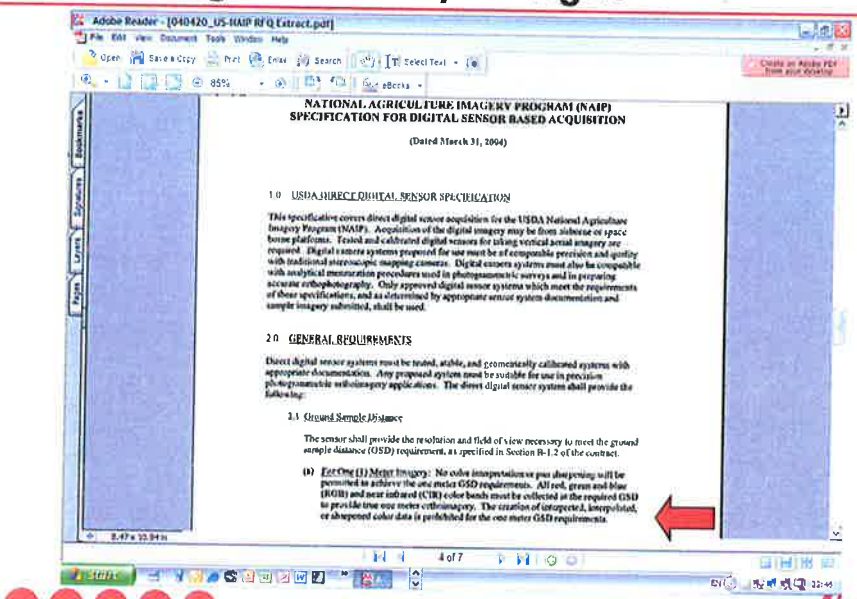
NAIP – Program / US Dept of Agriculture



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ADS40 in Learjet 25C - CGR, Italy 1/3

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ADS40 in Learjet 25C - CGR, Italy 2/3

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ADS40 in Learjet 25C - CGR, Italy 3/3

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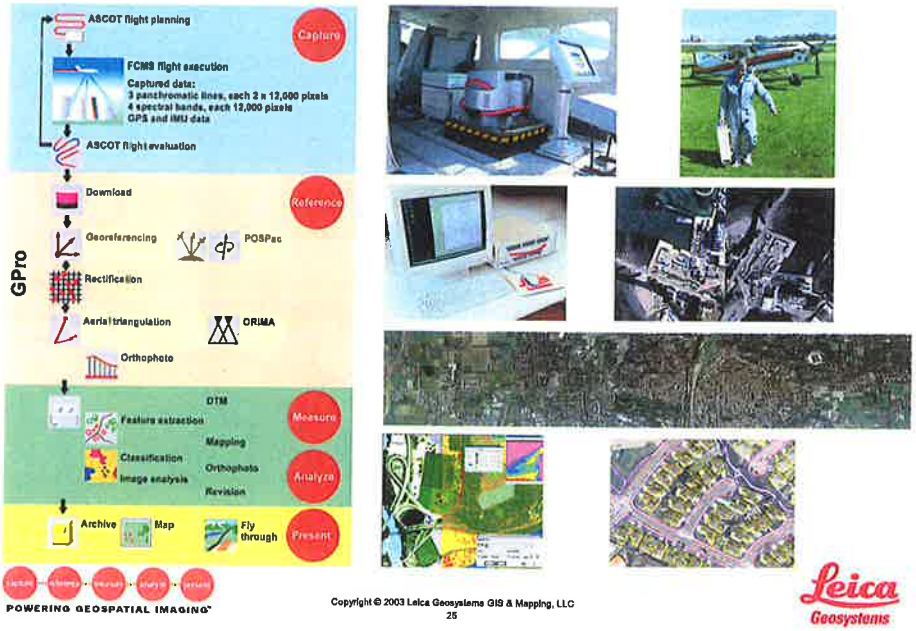
Leica ADS40 workflow from flight to end-product



Outlook - Future
Airborne Sensor Solutions ?

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Dual Sensor System (ADS40 & ALS-LIDAR)

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Thank you

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CwRS Contractor – Klaus Komp, EFTAS

EFTAS ISO 9001 zertifiziert

CwRS 2004 – Kontrolle durch Fernerkundung

Conference CwRS 2004 in Budapest 25-26 Nov. 2004

Space and Aerial VHR imagery - competition or complement

The contractor's view

Klaus Komp
EFTAS (DE)

Folie 1

EFTAS ISO 9001 zertifiziert

CwRS 2004 – Kontrolle durch Fernerkundung

Conference CwRS 2004 in Budapest 25-26 Nov. 2004

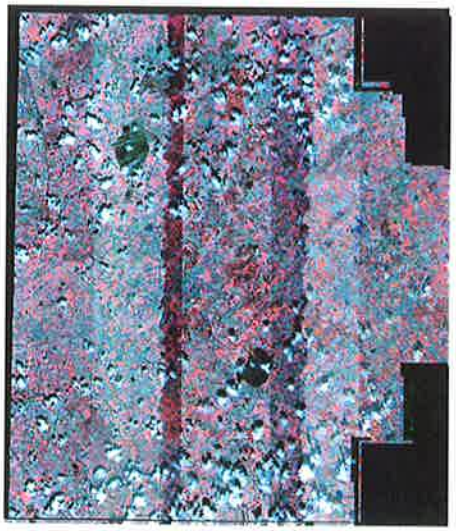
Experience with VHR-Data in 2004

IKONOS:

three Fragments in HOLL (DE)

Problem:
up to 20% cloud cover has to be accepted

07.07.

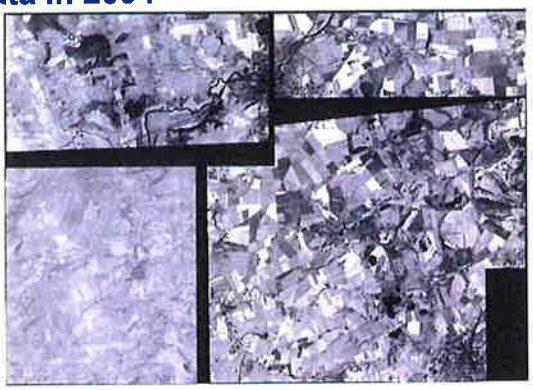


Folie 2

Experience with VHR-Data in 2004

QuickBird:

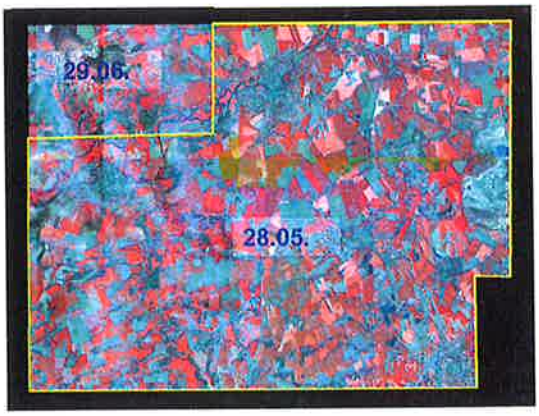
four Fragments in TEUE



Folie 3

QUICKBIRD Acquisition

Delivery



Problem:
Partial very long delay in delivery

Folie 4

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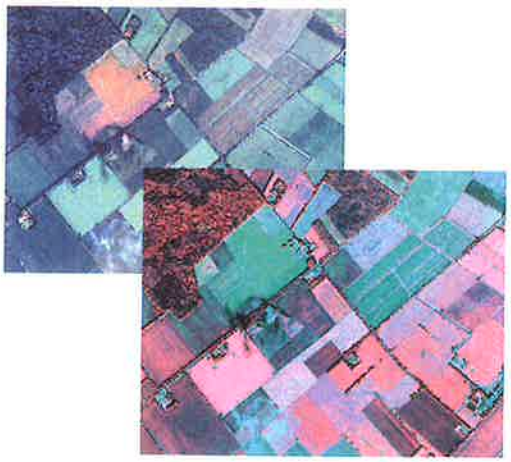
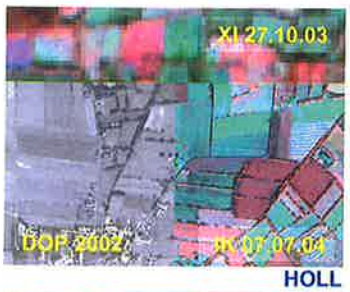
CwRS 2004 – Kontrolle durch Fernerkundung

Conference CwRS 2004 in Budapest 25-26 Nov. 2004

Advantages
- geometric resolution like DOP
- choice of CIR or natural colour display





Folie 5

EFTAS ISO 9001 zertifiziert

CwRS 2004 – Kontrolle durch Fernerkundung

Conference CwRS 2004 in Budapest 25-26 Nov. 2004

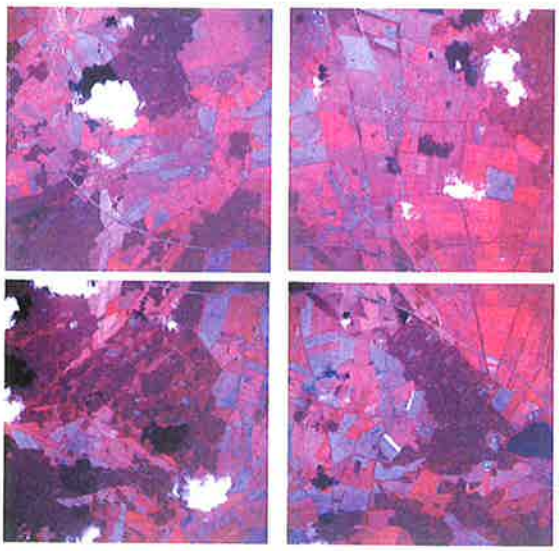
Flexibility of airborne data processing in 2004

KUMM (DE)

CIR 1:40.000
03.06.2004

1,0 m resolution

Flight interrupted due to clouds developing



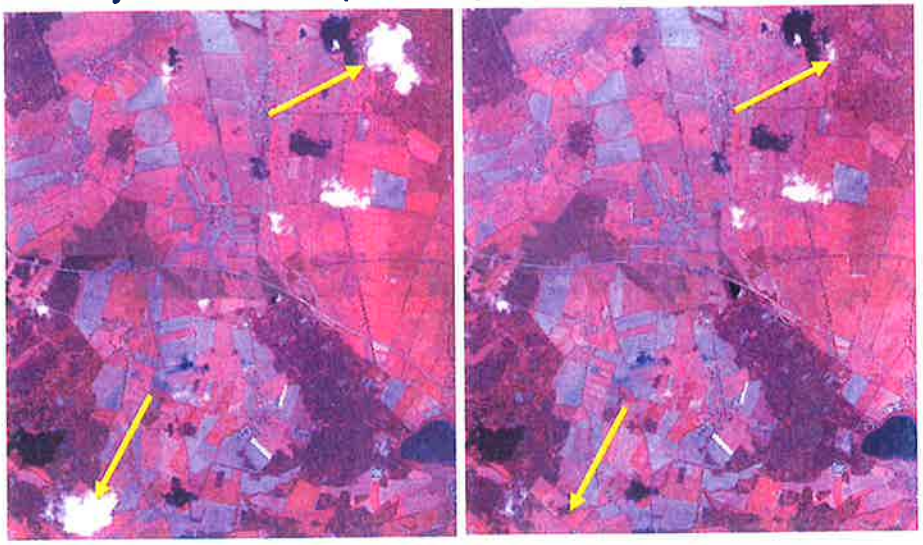
Folie 6

EFTAS ISO 9001 zertifiziert

CwRS 2004 – Kontrolle durch Fernerkundung

Conference CwRS 2004 in Budapest 25-26 Nov. 2004

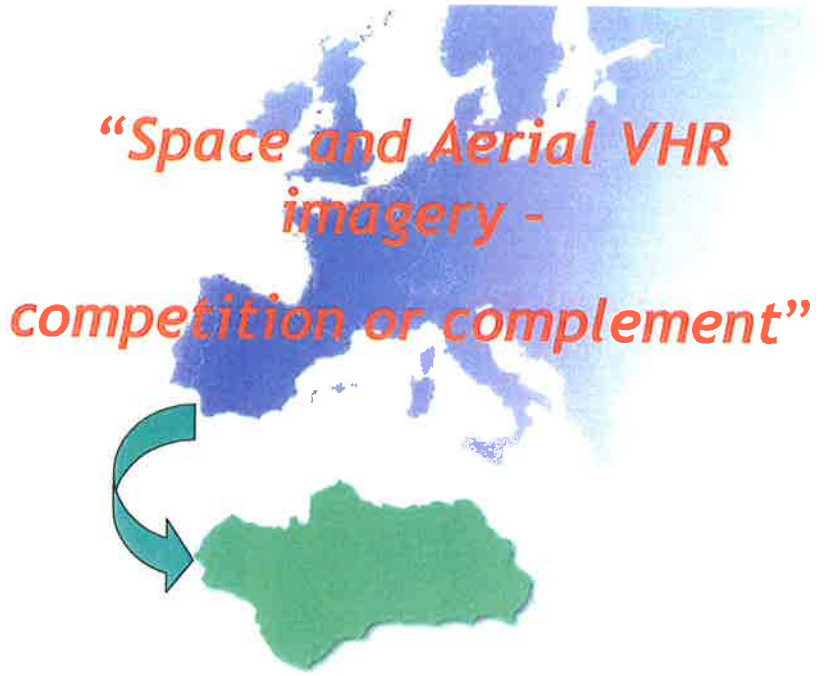
Flexibility of airborne data processing in 2004



Folie 7

MS Administrations – Victor Ortiz – Junta de Andalucia, ES

CONSEJERÍA DE AGRICULTURA Y PESCA
FONDO ANDALUZ DE GARANTÍA AGRARIA



BUDAPEST, 24 TH – 27 TH NOVEMBER 2004

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FONDO ANDALUZ DE GARANTÍA AGRARIA

NOWADAYS. CAMPAING 2004/2005

- **SATELLITE HR + ARCHIVE ORTHOPHOTOGRAPHY**
  - 1 PANCROMATIC IMAGE (PIXEL = 5 m)
  - 3 MULTISPECTRALS IMAGES (PIXEL = 10 m)
  - ARCHIVE ORTHOPHOTOGRAPHY (PIXEL = 1 m)
- **ORTHOPHOTOGRAPHY + FIELD VISIT (FV)**

(1 IMAGEN: TRUE COLOR, E=1:40.000, PIXEL=1m)

- **SATELLITE VHR + FIELD VISIT (FV)**

(1 IMAGE: PANSHARPENED, PIXEL = 1 m)

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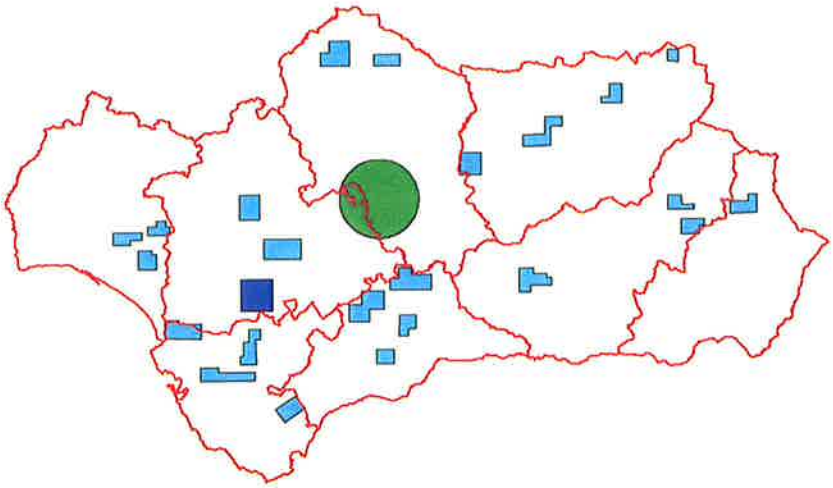
FONDO ANDALUZ DE GARANTÍA AGRARIA

ANDALUCÍA. AREAS OF CwRS. CAMPAING 2004/05



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FONDO ANDALUZ DE GARANTÍA AGRARIA

NOWADAYS. CAMPAING 2004/2005

- **FIELD VISIT (FV), NOT RAPID FIELD VISIT**

-CHECKING ON THE SPOT 100 % PARCELS

-DETERMINATION OF LAND USE, LIMITS AND DISCOUNTS

-DETERMINATIONS OF GROWING CONDITIONS

-COLLECTION OF SAMPLES (DURUM WHEAT, LUPIN)

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CONSEJERÍA DE AGRICULTURA Y PESCA
FONDO ANDALUZ DE GARANTÍA AGRARIA

NOWADAYS. CAMPAING 2004/2005

- **FIELD VISIT (FV)**

-DETERMINATIONS OF SOME AGROENVIROMENTAL REQUIREMENTS:

- PROHIBITION OF BURNING OF STUBBLE
- PROHIBITION OF PLOUGHING ON SLOPE PARCELS
- CONDITIONS AND PRACTICS OF IRRIGATION
- PLASTIC WASTES

BUDAPEST, 24 TH – 27 TH NOVEMBER 2004

CONSEJERÍA DE AGRICULTURA Y PESCA
FONDO ANDALUZ DE GARANTÍA AGRARIA

NOWADAYS. CAMPAING 2004/2005

- **FIELD VISIT (FV)**

-MAKING AT LEAST 1 DIGITAL PHOTOGRAPHY FOR ALL SUBDIVISIONS FIND IN EACH CADASTRAL PARCEL

-USE OF GPS TO POSITIONING THE DIGITAL PHOTO

-USE OF MICROCOMPUTER

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FONDO ANDALUZ DE GARANTÍA AGRARIA

SOME RATIOS OF FIELD VISIT

PARCELS VISITED IN FIELD = 42.136 parcels

SURFACE VISITED IN FIELD= 229.663 ha

SURF. VISITED / GROUP (2 people)= 134,6 ha/day

PARCELS VISITED / DAY = 439 parcels/day

PARCELS VISITED/ DAY - GROUP = 24,7 parc/day-gr

Nº PHOTOS IN FIELD = 153.829 photographs

Nº PHOTOS IN FIELD/DOSSIER = 20,5 photo/dossier

Nº PHOTOS IN FIELD/PARCEL = 3,65 photo/parcel

Nº OF SAMPLES PICK UP = 6.438 samples

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CONSEJERÍA DE AGRICULTURA Y PESCA
FONDO ANDALUZ DE GARANTÍA AGRARIA

1ST CONCLUSION:

WE PREFER A METHOD OF CONTROL WITH **FIELD VISIT** AND **VHR IMAGEN** (SATELLITE OR PHOTOGRAPH)

1.- OBTAINING OF EVIDENCES IRREFUTABLES.

2.- IT SERVES FOR THE CONTROL OF SOME REQUIREMENTS OF OTHER REGIMES OF AID

3.- IN A PART OF THE CASES OF CONTROL WITH HR-MULTITEMPORAL IMAGES (REJECTED DOSSIERS) THE INCIDENCE MUST BE VERIFIED IN THE FIELD. IT CAN BE LATE.

BUDAPEST, 24 TH – 27 TH NOVEMBER 2004

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JUNTA DE ANDALUCIA

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CONSEJERÍA DE AGRICULTURA Y PESCA
FONDO ANDALUZ DE GARANTÍA AGRARIA

1ST CONCLUSION:

WE PREFER A METHOD OF CONTROL WITH **FIELD VISIT** AND **VHR IMAGEN** (SATELLITE OR PHOTOGRAPH)

4.- THE FIELD VISIT REDUCES WEAK POINT OF THE CONTROL WITH A MONOTEMPORAL IMAGE. IT IS POSSIBLE TO VERIFY THE TOTALITY OF THE CULTURES BEFORE THE HARVEST (WINTER AND SPRING SOWN CROPS)

THE DATE OF THE FIELD VISIT IN THE CONTROL AREAS CAN BE PROGRAMMED, ACCORDING TO THE POTENTIAL RISKS OF EACH ONE OF THEM AND THE DATES OF SOWING AND HARVESTING

BUDAPEST, 24 TH – 27 TH NOVEMBER 2004

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CONSEJERÍA DE AGRICULTURA Y PESCA
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COMPARISON VHR IMAGERY PHOTOGRAPH VERSUS SATELLITE.

(CONSIDERING ONLY THE POINT OF VIEW OF THE WORK AND COST THAT SUPPOSES FOR THE JUNTA DE ANDALUCÍA)

1. – IMAGES:

GEOMETRIC = SIMILAR

PROCESSING AND ORTHORRECTIFICATION = EASIER SATELLITE VHR

2. - MANAGEMENT ACQUISITION IMAGES:

GREAT JOB OF THE JRC. BETTER SATELLITE

3. - ECONOMIC COST:

THE COMMISSION ONLY PAYS SATELLITE IMAGES

BUDAPEST, 24 TH – 27 TH NOVEMBER 2004

CONSEJERÍA DE AGRICULTURA Y PESCA
FONDO ANDALUZ DE GARANTÍA AGRARIA

COMPARISON BETWEEN VHR IMAGENES PHOTOGRAPH VERSUS SATELLITE.

(CONSIDERING ONLY THE POINT OF VIEW OF THE WORK AND COST THAT SUPPOSES FOR THE JUNTA DE ANDALUCÍA)

4.- OPPORTUNITY COST: BETTER AERIAL PHOTO. MORE FLEXIBLE AS MUCH IN PROGRAMMING, AS OPENING OF THE WINDOW. 8 WEEKS IS A LONG TIME.

5. -FACILITIES TO THE DESIGN OF CONTROL ZONE (SHAPE AND DIMENSIONS): BETTER AERIAL PHOTOGRAPH

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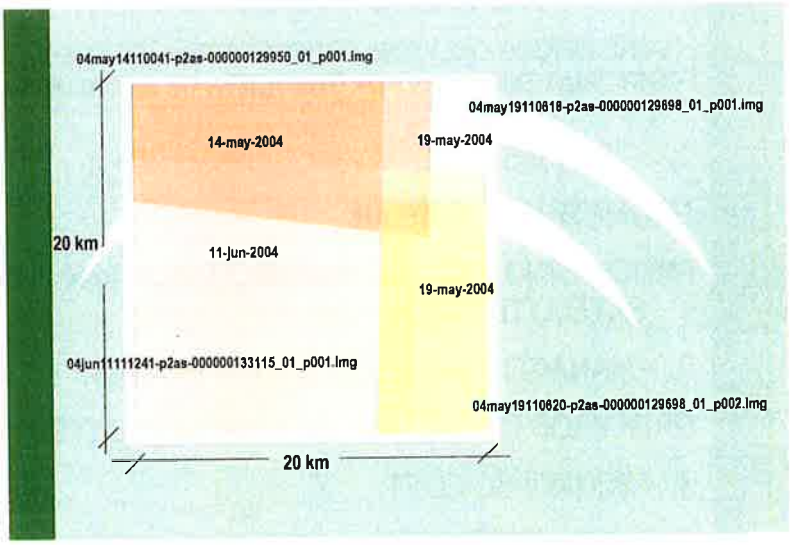

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DIFFERENCE OF DATES BETWEEN IMAGENES OF A SAME ZONE

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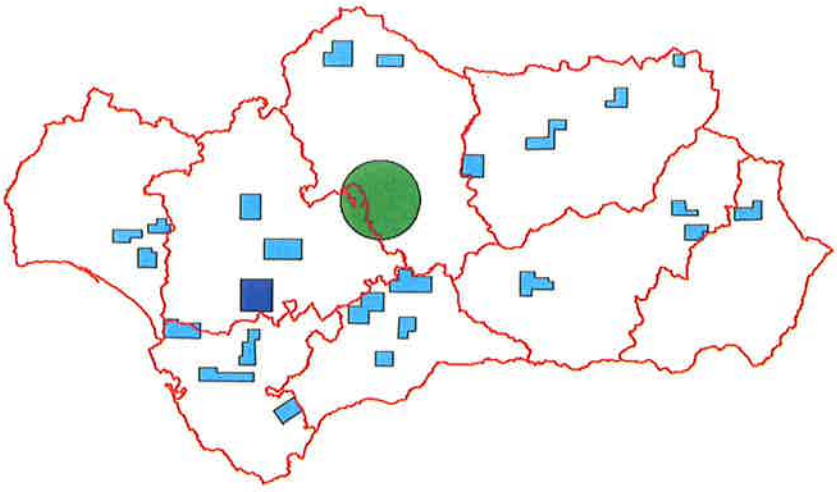
ANDALUCÍA. AREAS OF CwRS. CAMPAING 2004/05



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2ND CONCLUSION:

BOTH TYPES OF IMAGENES FULFILL THE REQUIREMENTS DEMANDED FOR THE CwRS.

WHAT TYPE OF IMAGE?

IT DEPENDS ON THE COST, CALENDAR OF CULTURES, FORMS AND SIZE OF THE ZONE, ETC.

THE TRUELY IMPORTANT THING IS

THE FIELD VISIT

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SECOND FIELD VISIT

USED TO:

-CHECK SOME COMPULSORY CONDITIONS (HARVEST OF GRAIN LEGUMES)

- VERIFY SOME AGROENVIROMENTAL REQUIREMENTS. FROM 2005 CHECK SOME GOOD AGRICULTURAL AND ENVIRONMENTAL CONDITIONS (GAECs)

IS POSSIBLE TO REPLACE THE SECOND VISIT BY AN AUTUMN IMAGE HR?

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MS Administrations – J-C. Graciette, ONIC, FR


FRENCH IMAGE SYSTEM FOR THE REALISATION CONTROLS BY REMOTE SENSING
Image material strategy in 2004
• The use of different kinds of image material to facilitate the smooth running of the operation
– 28 Aerial Photographs (AP) of the year supplied by 3 contractors
– 17 « VHR » satellite images supplied by the JRC
• The setting up of 2 contracts
– Acquisition of aerial photographs
– Data preparation (HR, VHR, land registry digitalization)
• Specific training for the photo-interpretators


FRENCH IMAGE SYSTEM FOR THE REALISATION OF CONTROLS BY REMOTE SENSING
Comparison between aerial photographs and VHR
AP : Possible acquisition in a shorter window
However, be careful about difficulties in obtaining flight authorizations
VHR : More reduced mobility but more open angles of acquisition thus increasing the possiblity of obtaining images
Note : lower processing time for VHR
Conclusion : Priority programming of AP for the areas with early crops


FRENCH IMAGE SYSTEM FOR THE REALISATION CONTROLS BY REMOTE SENSING
Comparison between aerial photographs and VHR
• Quality of both kinds of image material
• AP: obligatory mosaicking with necessity of acquisition in stable conditions
• VHR : If the site area is larger than the image area, acquisitions for several dates are systematically required involving complex mosaicking and longer processing time
• Note : Angle of acquisition of AP lower (increased reliability of MNT necessary for VHR)
• Conclusion : Priority programming of AP on the largest areas or presenting stable conditions.


FRENCH IMAGE SYSTEM FOR THE REALISATION OF CONTROLS BY REMOTE SENSING
Comparison between aerial photographs and VHR for use by Photo-interpretors
• Geometrical quality : Equal facility of use for the same quality of acquisition
• Radiometric quality: More difficulties with multi-date acquisitions due to different radiometric responses for the same crop


FRENCH IMAGE SYSTEM FOR THE REALISATION CONTROLS BY REMOTE SENSING
2005 outlook
The 2004 result has been positive thanks to the involvement and the technical quality of the different partners, necessary conditions to reach the objectives set :
– JRC
– Contractors
– National controls teams
With one wish for 2005, to receive knowledge of the common technical specifications earlier


FRENCH IMAGE SYSTEM FOR THE REALISATION CONTROLS BY REMOTE SENSING
2005 outlook
• The system will be continued
– Same percentage of control by remote sensing level, number of areas and principle of distribution between contractors and ONIC
– Continued adaptation of the tools and training of teams
• Mixed method maintained but with a view to increasing research to more VHR
• VHR used more the north of France (weather forecast less favorable), in smaller areas (risk of images taken over a number of dates is smaller) and in military areas (flights not permitted)

Session 3 – Image pre-processing, CAPI and classification

Chairman: **Gábor Csornai, FÖMI, HU**

Co-chairman: **Hervé Kerdiles, JRC, IPSC, Agrifish Unit**

Presentation 1 – Identification of Nuts eligible parcels using satellite VHR: an Italian experiment

Livio Rossi
Agrisian, IT

Abstract

The aim of the pilot study was to investigate the potential of VHR satellite imagery for the control of subsidized nuts trees at parcel level. The achieved results after an "ad hoc" satellite interpretation of typical Italian areas were compared with traditional ground survey data, aided by B/W ortho-photos and obtained by the 2004 subsidies control sample campaign.
Seven Italian areas covering 5 nuts species were selected for this pilot: Viterbo for hazelnuts and walnuts; Foggia for almonds; Agrigento for almonds, Messina for hazelnuts; Enna for almonds; Siracuse for almonds and carobs; Catania for pistachios.
VHR multi-spectral imagery (QuickBird for its highest resolution) was selected from the existing archive, considering different phenological periods (full vegetation season, transitional, absence of leaves) in order to compare the different capabilities. The following results were observed:

- On winter images, almond trees were well discriminated from olive trees (permanent leaf trees). Winter images appear very useful when both permanent crops are mixed on the same parcel
- Summer images proved very useful to discriminate almonds from carobs and olives, but this investigation needs attention and ground survey in some cases. Using spring satellite acquisitions, more confusion between the species was detected due to the higher crown shadow / vegetation ratio.
- Good spectral signature differentiation was observed between hazelnuts and other orchard species, but some problems arose when the cultivars are falling into disuse.
- For pistachio, mainly grown on the west slope of mountain Etna in Italy, the VHR winter-spring images seem very useful for detecting trees due to their small crown and their absence of leaves during that season.

The next issues will regard:

- The possible operational use of this methodology for the 2005 campaign for the control of nut claims; in particular the number of ground surveys (both for interpretation training and checking doubtful parcels) to be addressed per area, considering the different species and rates of confusion between species.
- The possible use of VHR satellite imagery for the mandatory Nuts register to be prepared at national level. VHR satellite imagery may be cost-efficient for this task due to the fact that nuts presence on the Italian territory is scattered and concentrated on already known areas.

Keywords: VHR satellite imagery, Nuts detection, Nuts Register

Identification of eligible Nut parcels using satellite VHR: an Italian experiment

Livio Rossi, Ernesto Catapano
AGRISIAN

www.sian.it

EC 2237/03 objectives

✓Avoid the potential disappearance of nut production in traditional European areas
✓Ensure the multifunctional role (environmental, rural, social and economic) of nut cultivation

EC 796/04 purposes

✓Elaboration of national GIS before 2006 January 1st (art. 6.3 of regulation)

✓Different selection of technologies (Remote sensing , RFV…) for eligible parcel definition (boundaries, surface, type) and/or position and number of trees per parcel

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Nut subsidies control

Thresholds of eligibility

- Detection of species
- Tree count
- Density
- Area
- Homogeneity and contiguity (non promiscuous with arable crops)
- Predominant species detection (not dominant trees too)
- Productivity
- Declared/measured area
- Not isolated and not on single rows of trees (140% of the mean spacing beteween rows as threshold :12 m for hazelnuts, 20 m for almonds, walnuts and pistachios, 25 m for carobs)

VHR already operational in Italy for arable crops, successfully using both Ikonos and Quickbird (Macerata and Campobasso provinces)

- Ikonos appears more agile and is better for fast wide acquisitions
- Quickbird, due to the higher resolution, is suited to larger scale applications

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Italian VHR nuts area test: purposes

- Selection of 7 italian traditional test sities, covering all the existing different nut types in Italy and fitting the control sample for 2004
- VHR interpretation by sw GISclient (the same as for arable crops) of nut parcel declaration
- Comparison between traditional (ground survey and airborne data) and VHR (generally without ground survey) results
- Result analysis for 2005 campaign and GIS creation

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Italian VHR nuts area test: data

- Selection and acquisition from Quickbird archive over the test areas for 2002, 2003 and 2004, due to higher stability of nut orchards
- Tiepoints from airborne photogrammetry and DTM as ancillary data for satellite ortho-rectification; processing in false and natural colours, fusion with panchromatic at 0,6 m
- Declaration data base for 2004 over the selected areas
- Digital cadaster, associated at AGEA GIS (graphic, alphanumeric)
- Software GISclient; ingestion and integration into AGEA GIS; interpretation by experts of the complete land use of each parcel

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Specific eligibility conditions for Nuts (art.19-20 EC 2237/03)

- Only homogeneous and geographically continuous groves
- Isolated trees and single rows of trees not eligible
- Mixed orchard (>10% trees other than nuts) not eligible
- Minimum plot size <= 0.1 ha
- Minimum density of Nut trees per ha
  - ✓125 hazelnuts
  - ✓50 almonds, walnuts, pistachios
  - ✓30 locust bean (carobs)

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define the orchards define limits and measure area

Reg 2237/03 states: an orchard is an homogeneous and cohesive area planted with nut trees, which is not intersected by other crops or plantations and which is geographically continuous

1) Identification and intersetction with cadastral parcels (Italian LPIS) to locate the orchard
2) Farmer declaration analysis
3) Orchards with regular shape: external buffer from the centre of the bordering trees (4m for hazelnuts, 7m for almonds, pistachios and walnuts, 9m for carobs as maximum row spacing considered)
4) Irregular shape: external buffer from the position of all the trees creating the boundaries as above
5) Isolated trees when spacing > 12m for hazelnuts, 20m for almonds etc., 25m for carobs from the orchards

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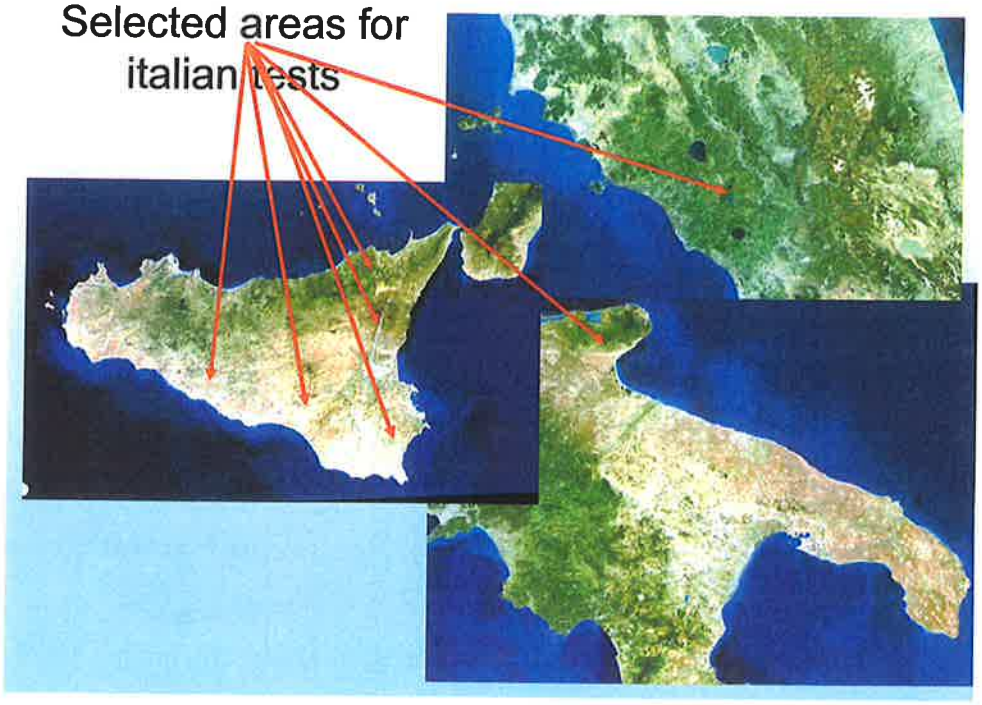

Italian VHR nuts area test for 2004

- **Viterbo** province (municipality area of Ronciglione, Caprarola, etc.) for *hazelnuts/walnuts*
- **Foggia** province (mun. S. Giovanni Rotondo) for almonds
- **Agrigento** province (mun. Agrigento, Favara, etc.) for *almonds/walnuts*
- **Enna** province (mun. Barrafranca, Mazzarino, etc.) for *almonds*
- **Siracusa** province (mun. Noto, Avola) for *almonds* and *carobs*
- **Catania** province (municipality of Bronte) for *pistachios/almonds*
- **Messina** province (mun. Tripi, Sinagra, etc) for *hazelnuts*

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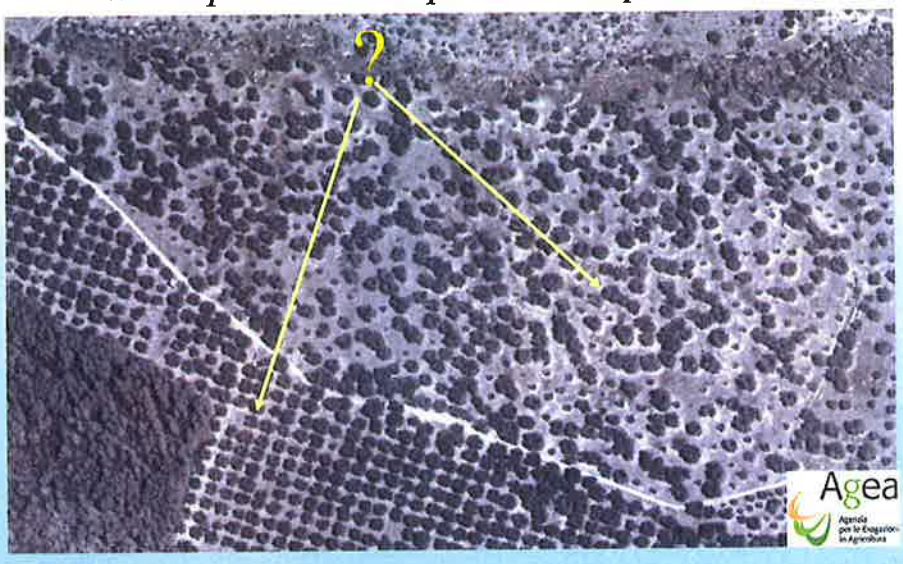
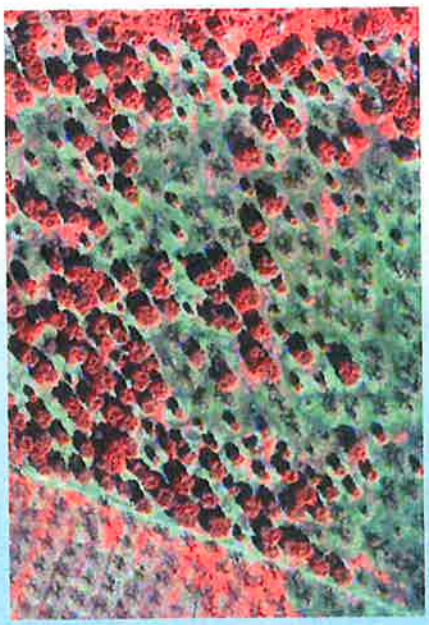
Why VHR test? Traditional tool:
Which permanent crops are in the parcels?

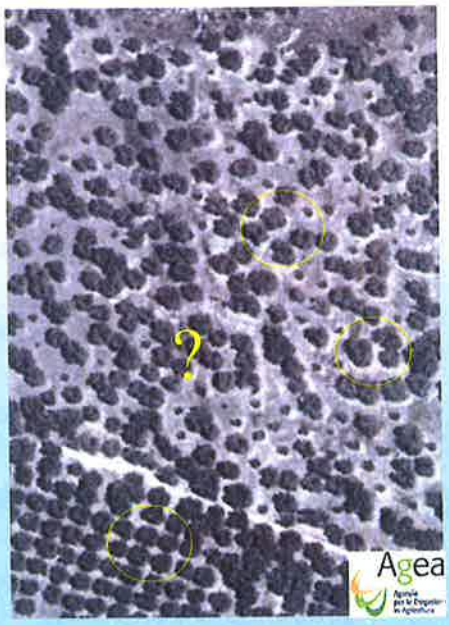


Orthophoto, Puglia- Spring-summer imagery

Nut detection capability: comparison

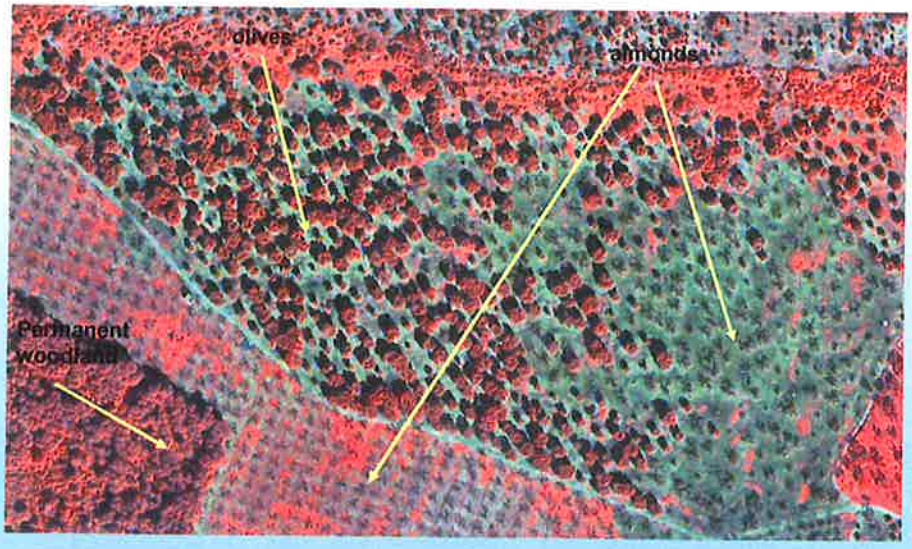


QuickBird February



Ortophoto spring-summer

Multispectral winter imagery for complete single tree detection



VHR –QuickBird 432 pansharpened 0,6m ; end of February 2004

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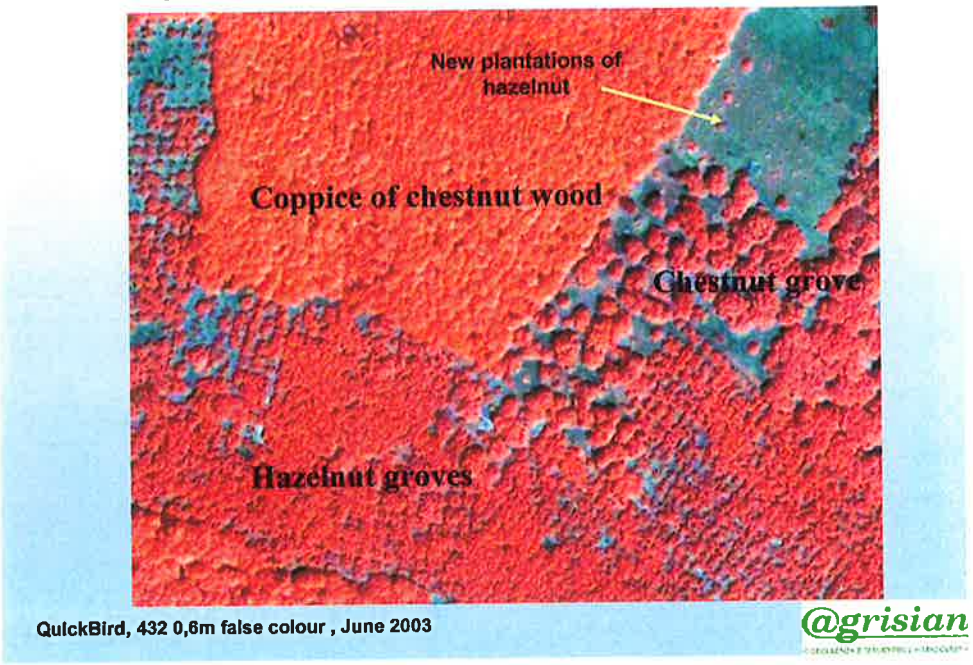
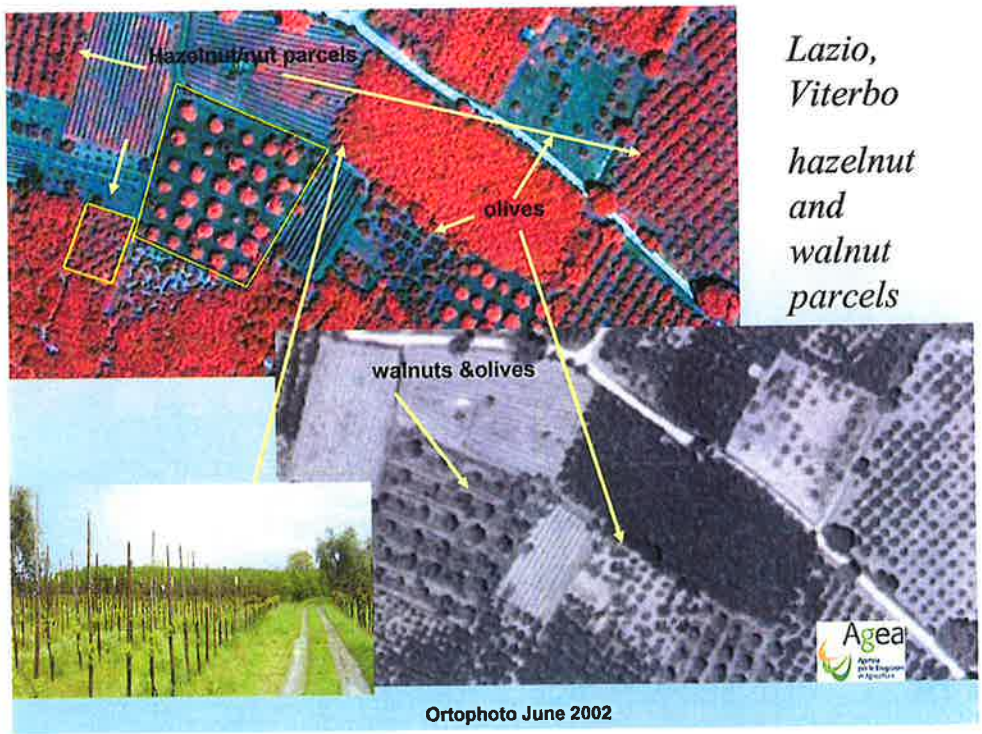
Lazio Region, area test Viterbo

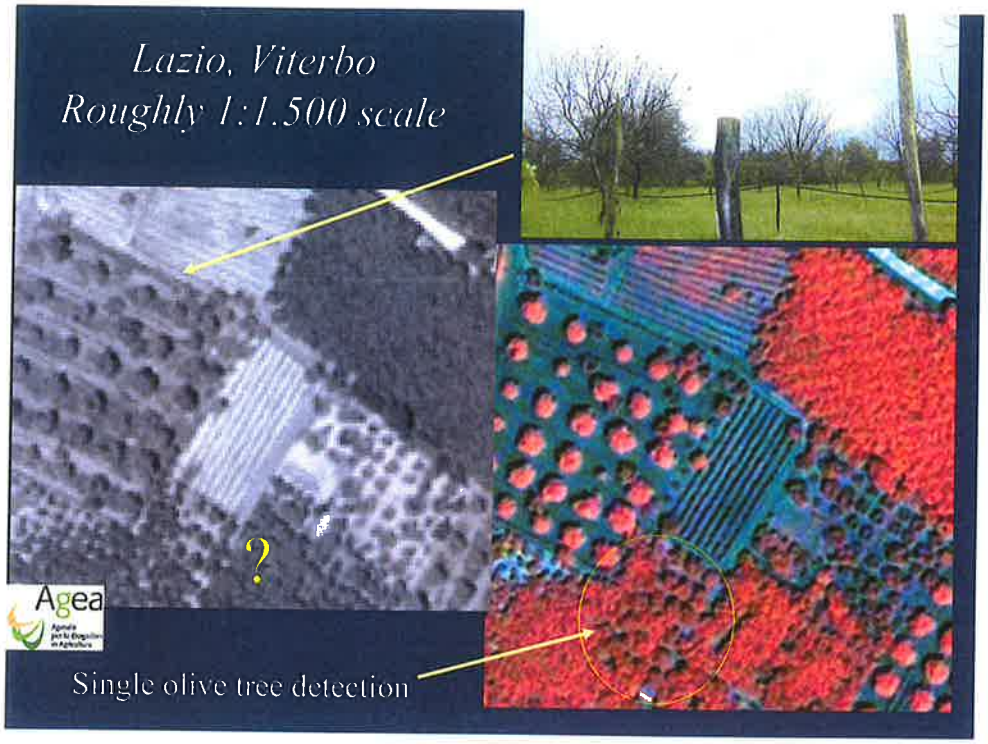
Lazio Region - Viterbo Prov., detection of hazelnuts/chestnuts

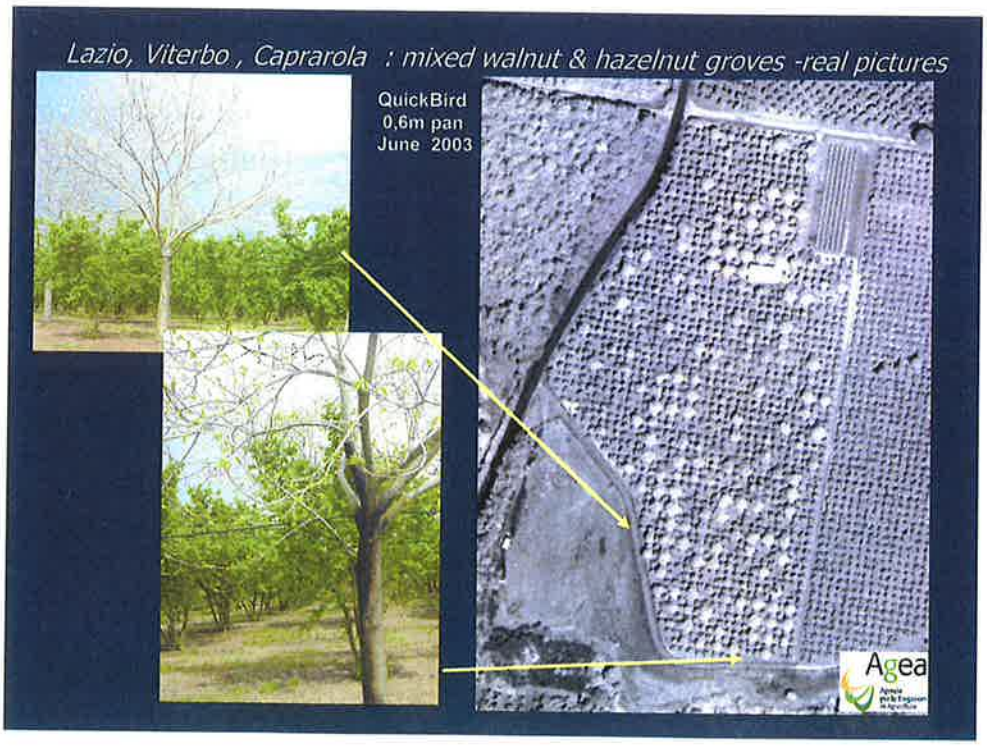




Lazio, Viterbo

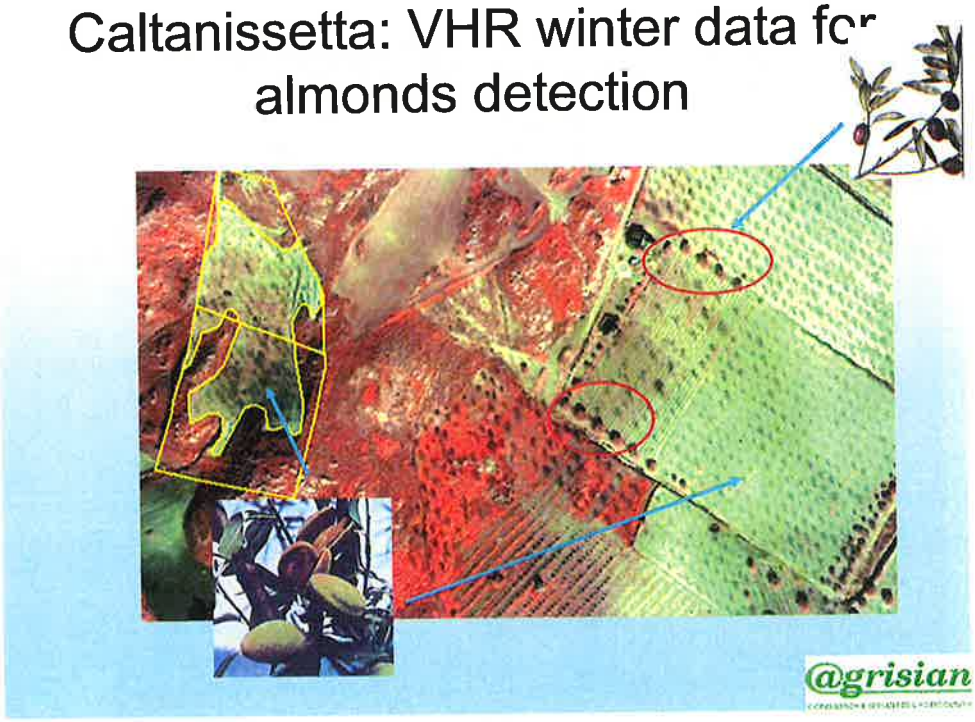
hazelnut and walnut parcels


Lazio, Viterbo
Roughly 1:1.500 scale
?
Agea
Single olive tree detection

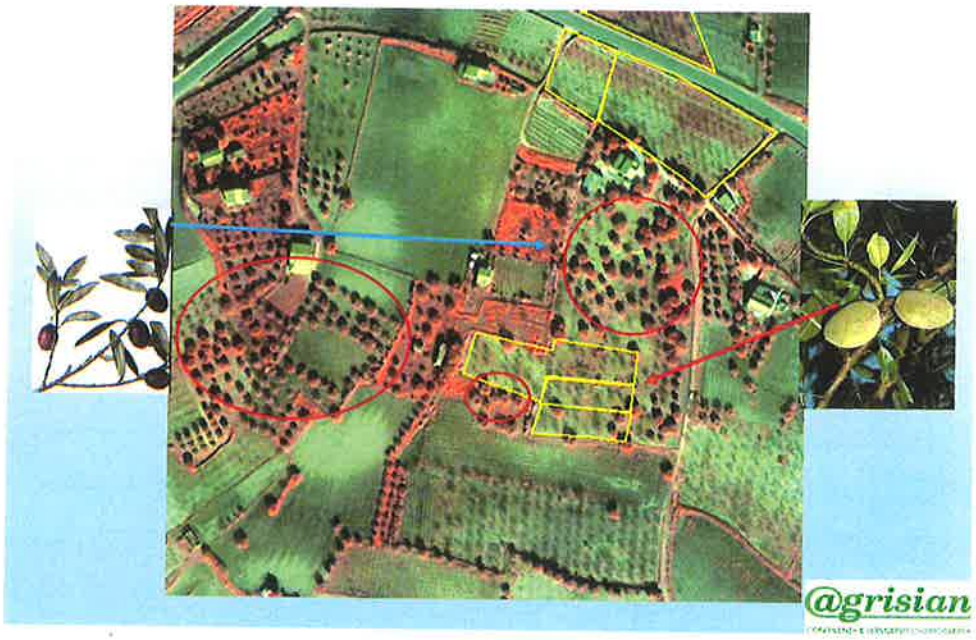

Lazio, Viterbo , Caprarola : mixed walnut & hazelnut groves -real pictures
QuickBird
0,6m pan
June 2003
Agea

Sicily Region: test areas Agrigento, Enna, Siracusa

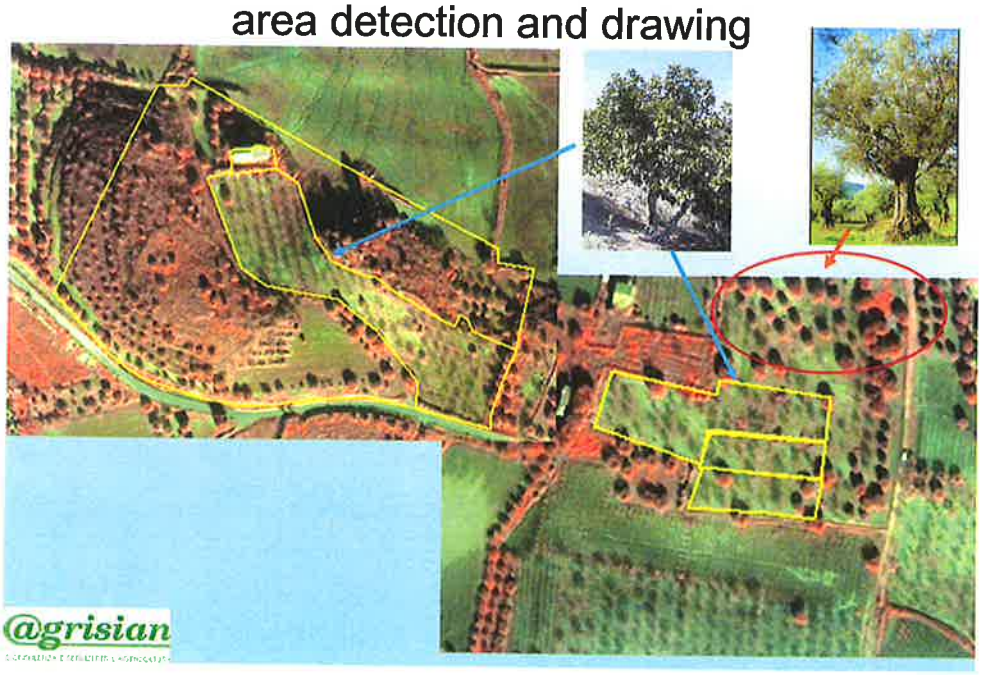
Caltanissetta: VHR winter data for almonds detection



Agrigento: Almonds-olives with winter imagery



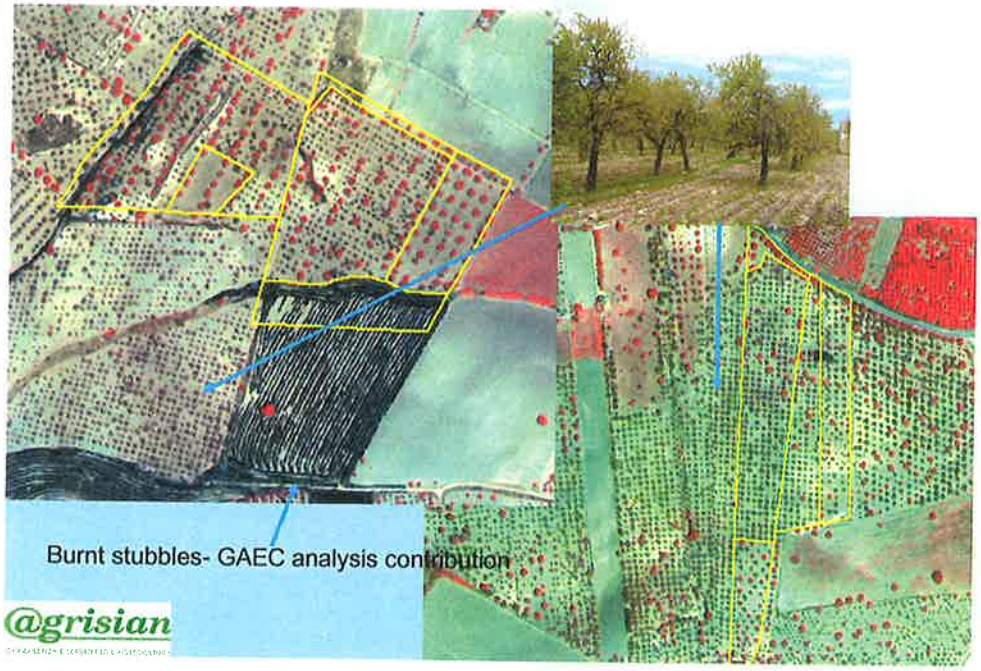
Agrigento, winter imagery: almond orchard area detection and drawing



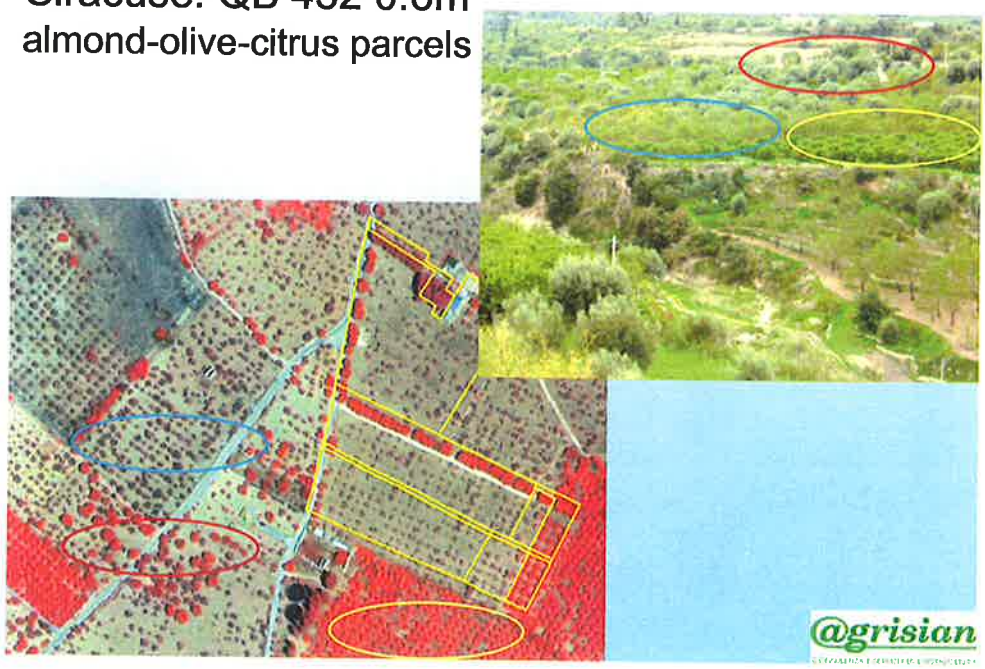
Siracuse, Avola: citrus-almonds differentiation

Siracuse: permanent crops landscape

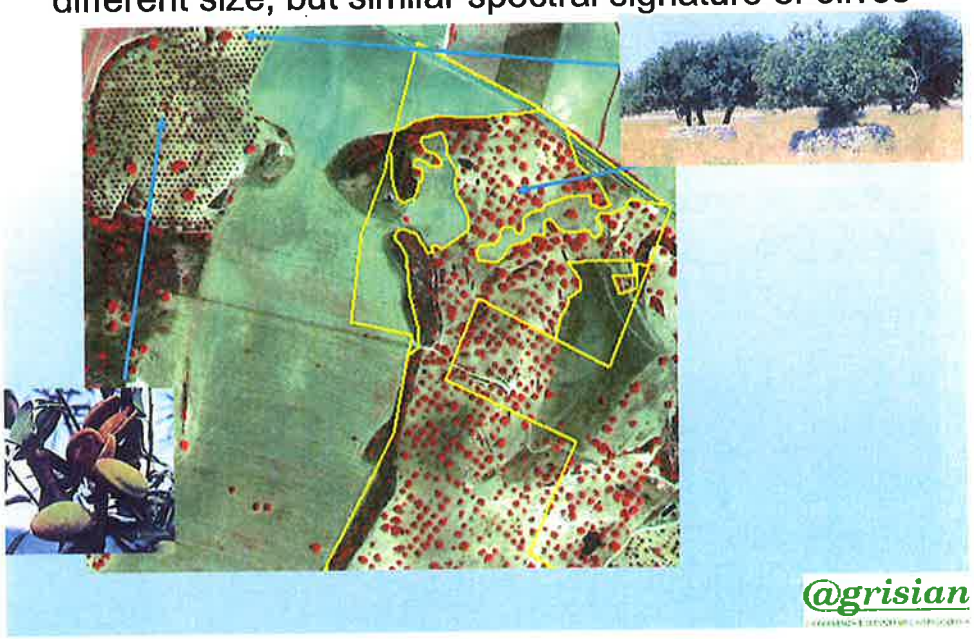
Siracuse: almonds spectral signature, size and shape



Siracuse: QB 432 0.6m
almond-olive-citrus parcels

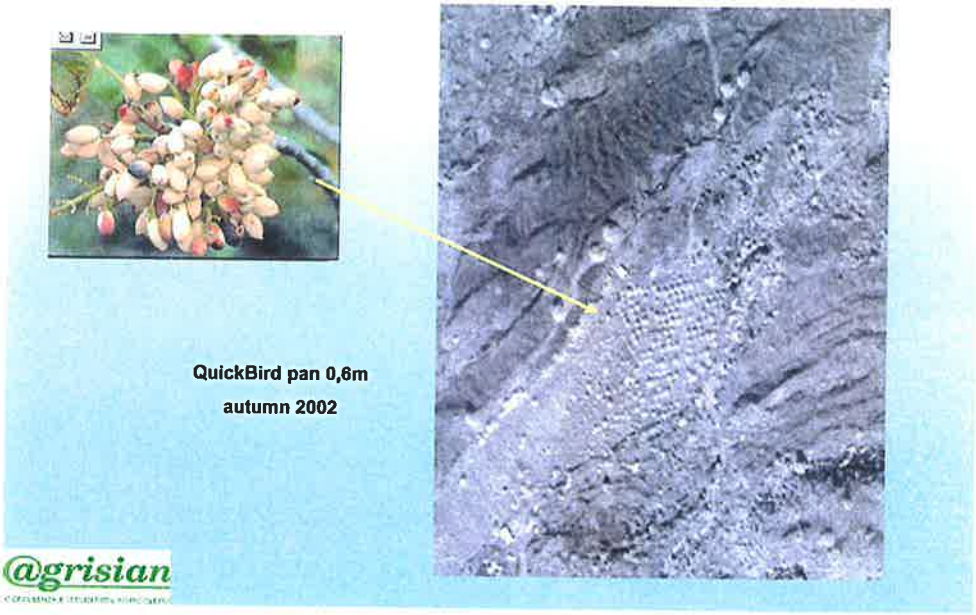


Siracuse: only few parcels of locust bean (carobs) different size, but similar spectral signature of olives

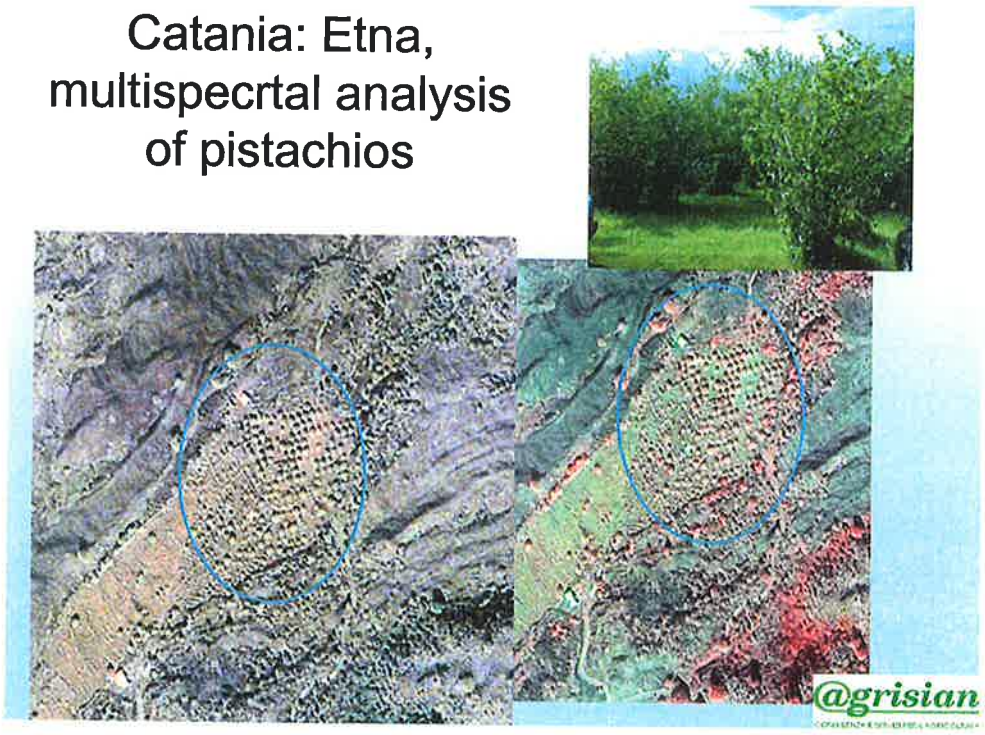


Sicily region: test areas Messina, Catania

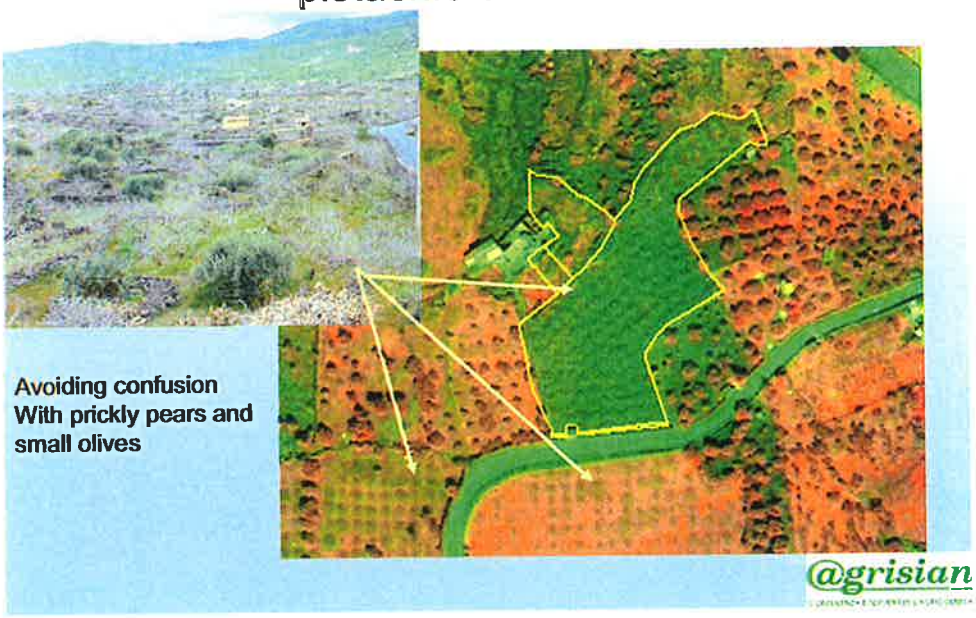
Catania, Bronte. Pistachio cultivations over the lava slopes of Mount Etna



Catania: Etna, multispecrtal analysis of pistachios

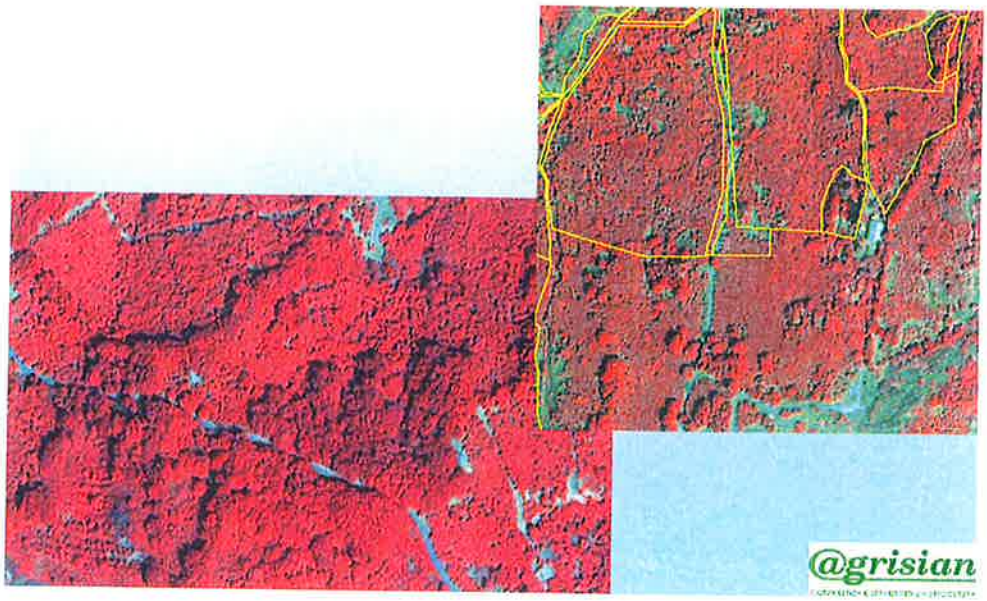


Catania Etna: winter images for complete pistachio detection

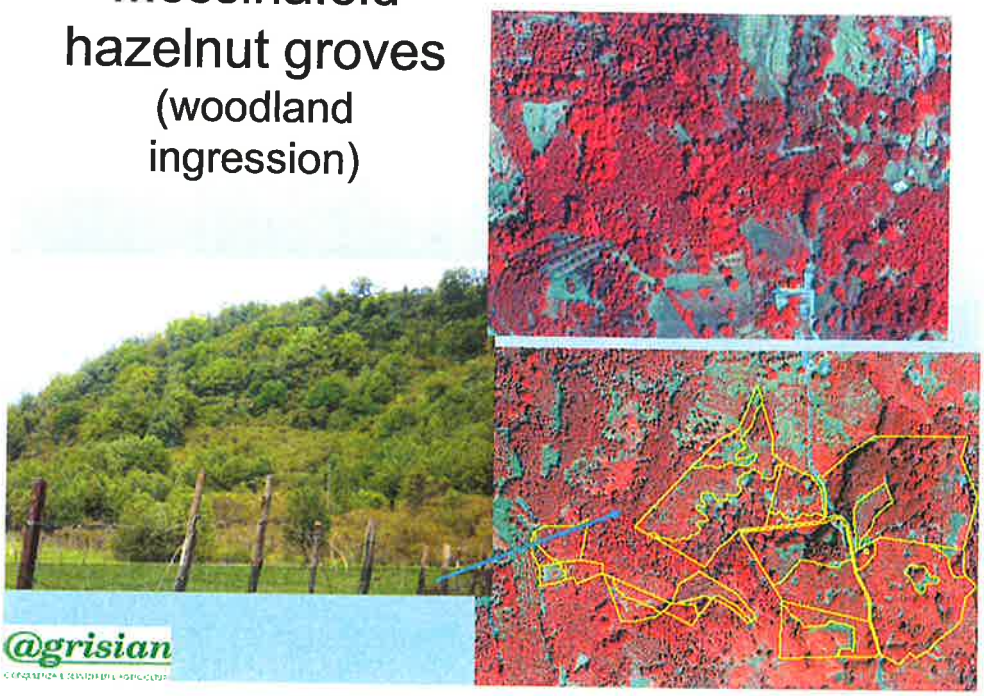


Catania: Etna: negative parcel (50 pistachios declared)

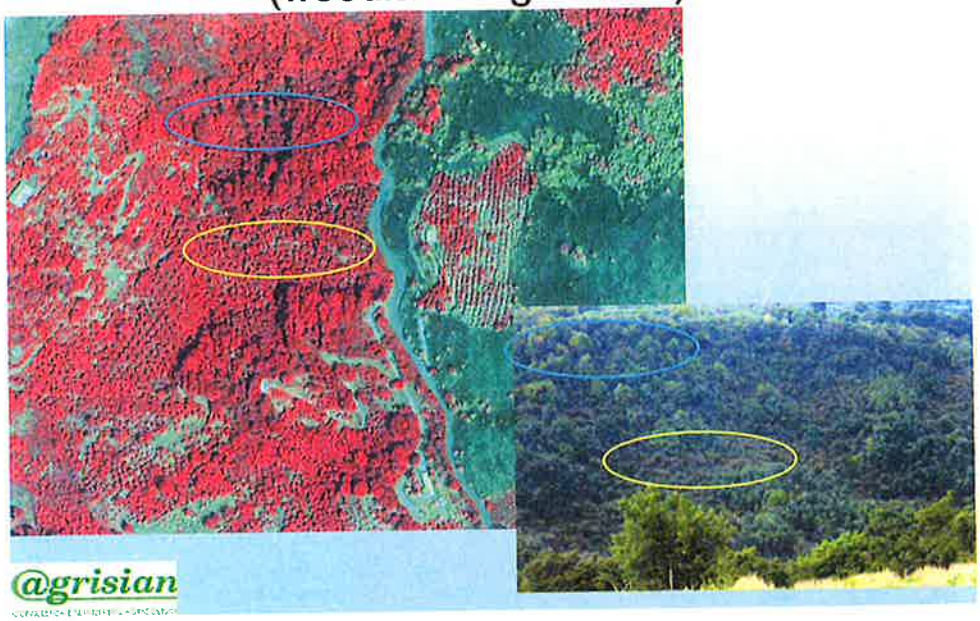
Messina: hazelnut cultivations in mountain areas



Messina:old hazelnut groves (woodland ingression)



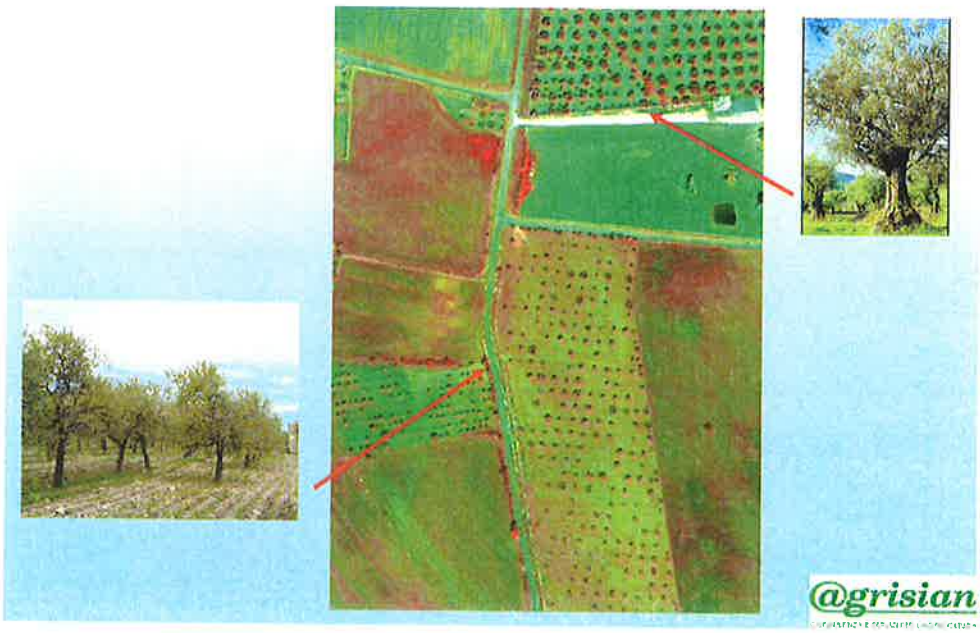
Messina:old hazelnut groves
(woodland ingression)



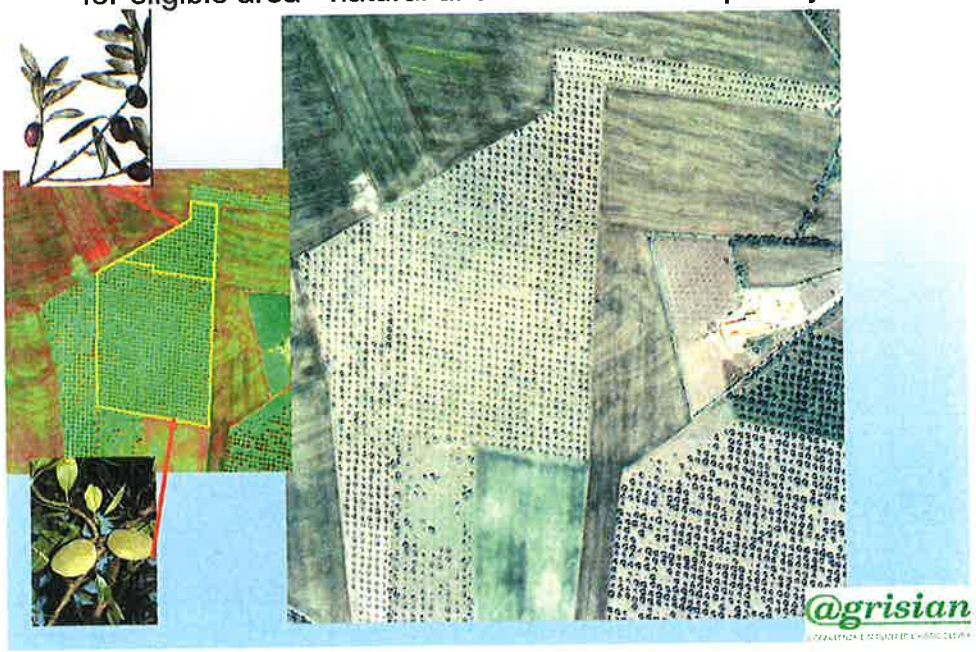
Messina:old hazelnut groves
parcel segmentation for nut eligible area

Puglia Region, area test Foggia

Foggia, S. Giovanni Rotondo- March,5th acquisition date: olives-almonds faible discrimination?

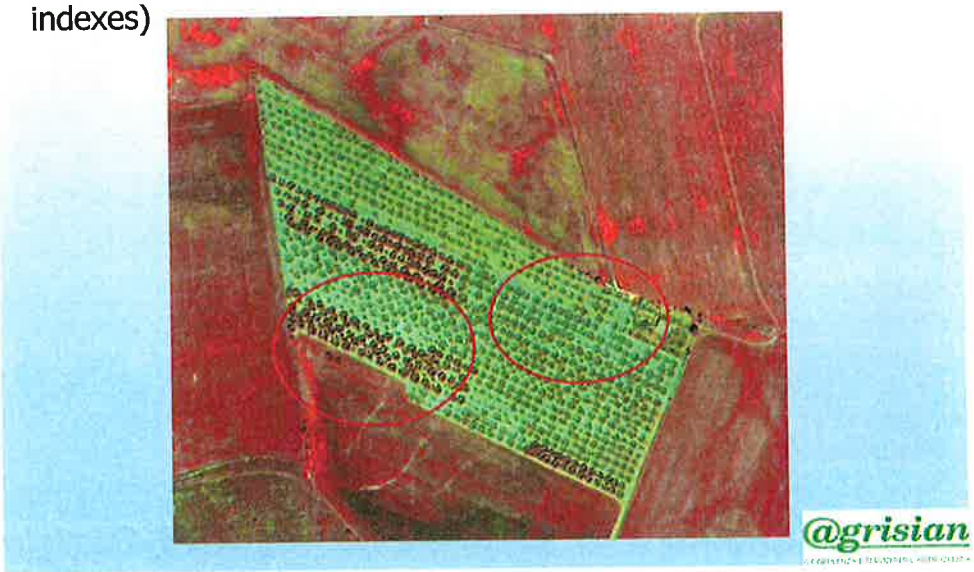


Foggia, S. Giovanni Rotondo: almonds parcel segmentation for eligible area - natural and false colours capability

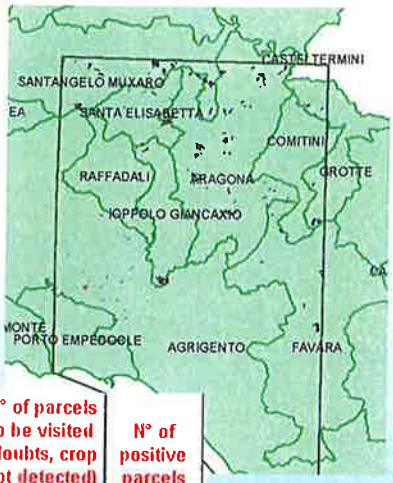


Foggia almonds or olives?

Olives, but with different pruning completion (for italian GAEC indexes)



Agrigento main results



AGRIGENTO Municipality	N° declared parcels	cadastral surface Ha	N° VHR interpretated parcel	Orchard surface detected ha	N° of parcels to be visited (doubts, crop not detected)	N° of positive parcels
A089	115	102,11	49	27,87	2	47
A351	132	107,55	114	85,49	10	104
D514	34	30,99	18	17,97	1	17
E209	35	34,98	14	16,68	1	13
E390	8	24,37	7	23,35	3	4
H159	4	3,28	3	2,89	0	3
I185	13	11,12	12	10,86	3	9
I290	67	107,94	35	50,59	1	34
TOTAL					21	231

@grisian

Enna-Caltanissetta main results

Enna-Caltanissetta Municipality	N° declared parcels	cadastral surface Ha	N° VHR interpretated parcel	Orchard surface detected ha	N° of parcels to be visited (doubts, crop not detected)	N° of positive parcels
B302	121	257,72	37	61,32	5	32
F065	116	213,06	76	126,38	8	68
G580	26	15,06	7	2,81	0	7
TOTAL					13	107

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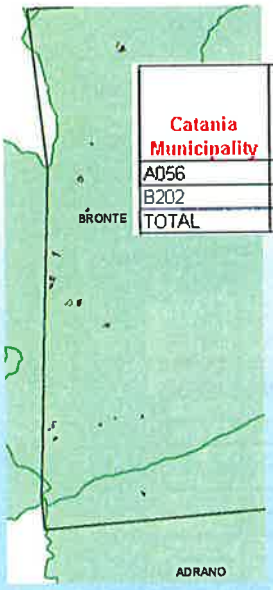
Catania main results



Catania Municipality	N° declared parcels	cadastral surface Ha	N° VHR interpretated parcel	Orchard surface detected ha	N° of parcels to be visited (doubts, crop not detected)	N° of positive parcels
A056	8	0,82	8	0,81	0	8
B202	57	57,01	36	15,62	9	27
TOTAL					9	35

In Italy walnuts, pistachios and carobs togheter only represent around the 15% of the entire nut surface, while hazelnut 40% and almonds 45%

@grisian

Foggia main results

Foggia Municipality	N° declared parcels	cadastral surface Ha	N° VHR interpretated parcel	Orchard surface detected ha	N° of parcels to be visited (doubts, crop not detected)	N° of positive parcels
H926	8	67,94	6	47,43	1	5

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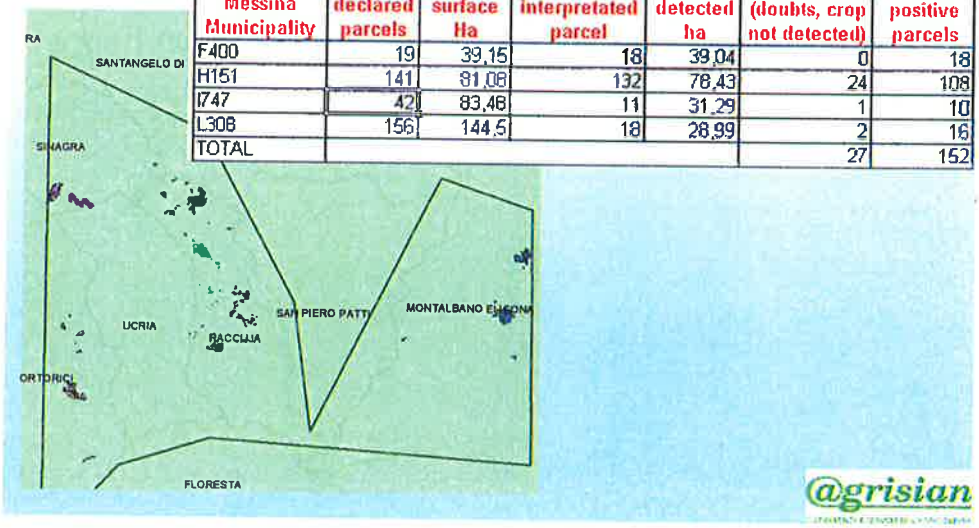
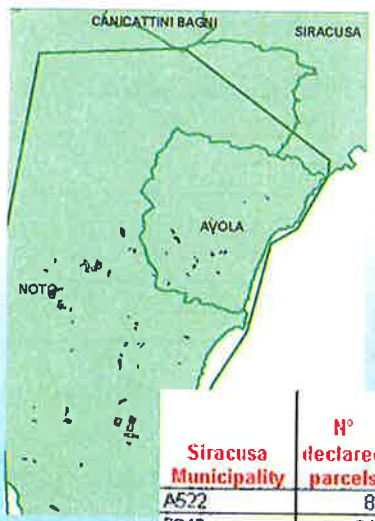
Messina main results

Messina Municipality	N° declared parcels	cadastral surface Ha	N° VHR interpretated parcel	Orchard surface detected ha	N° of parcels to be visited (doubts, crop not detected)	N° of positive parcels
F400	19	39,15	18	39,04	0	18
H151	141	81,08	132	78,43	24	108
I747	42	83,48	11	31,29	1	10
L308	156	144,5	18	28,99	2	16
TOTAL					27	152



Siracusa main results



Siracusa Municipality	N° declared parcels	cadastral surface Ha	N° VHR interpretated parcel	Orchard surface detected ha	N° of parcels to be visited (doubts, crop not detected)	N° of positive parcels
A522	83	34,33	60	21,28	5	55
F943	242	501,8	121	180,55	5	116
TOTAL					10	171

Viterbo main results

Viterbo Municipality	N° declared parcels	cadastral surface Ha	N° VHR interpretated parcel	Orchard surface detected ha	N° of parcels to be visited (doubts, crop not detected)	N° of positive parcels
B597	6	1,75	6	1,74	0	6
B691	16	8,49	9	3,82	0	9
B735	13	6,77	5	2,7	0	5
C988	18	6,31	7	1,75	1	6
D452	13	5,25	11	4,81	0	11
U382	6	2,14	1	0,33	0	1
TOTAL					1	38

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Orchard area measurement results

TEST province	N° of parcels with measured >= declared	N° of parcels with measured < declared
AGRIGENTO	231	88
CALTANISSETTA-ENNA	107	45
CATANIA	35	11
FOGGIA	5	5
MESSINA	152	58
SIRACUSA	171	19
VITERBO	38	12
TOTAL	*739*	*238*

Total amount of parcels for RFV over the 7 areas (doubt, negative or different crop) = 11%

Total amount of parcels with measured surface less than declared = 32%

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Imagery considerations

Summer images:
Almonds = good distinction, due to signature and size;
Walnuts = good distinction but possibility of confusion with small chestnuts (similar signature, different texure);
Hazelnuts = good distinction due to signature and spacing beteween rows;
Pistachios= possibility of confusion with scattered small olives and prickly pears;
Carobs= possibility of confusion with bigger olives due to the similar spectral signature;

Spring images:
Almonds = less distinction capablity with olive trees due to the lower crown reflectivity;

Winter images:
Almonds = very good distinction vs. olive trees, when leafless
Pistachios = good distinction vs. olive and prickly pears, due to the loss of foliage

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Recommendations

- All the images (considering dates and areas) can appear different and they need a training

- All the species can appear in different mode (due to pruning, local traditions, climate, phenology) at local level

- A nut parcels detection activity with VHR could foreseen 10-15% of percentage of ground survey due to doubt and negative parcels (both for sample controls and GIS creation)

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Recommendations

- The measured (by VHR interpretation) parcels often are < than the declared; it seems that farmers present difficulty in irregular orchards surface calculation …
- Can we provide farmers with proper support ?
- The minimum density is very often reached…Must we reconsider them?

- All the images need proper sofware, ancillary data …and proper data fusion processing (best 432bands + pan)

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Presentation 2 – 1st results of control of nuts with RS in France

Fleur Francois-Chemery, ONIC - ONIOL, FR

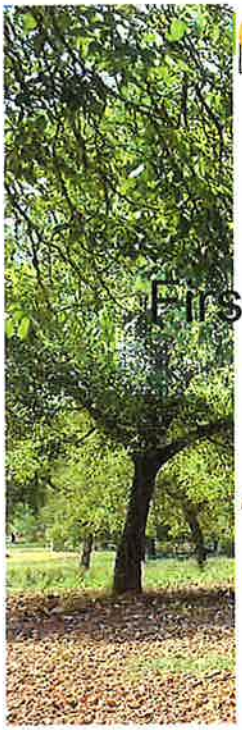
Abstract

As one of the 2004 French RS site was situated in one of the two main productive regions of walnuts, it was decided to try to control these nuts parcels with RS. The ONIC Bordeaux CAPI-team carried out this initial experiment with an IKONOS pansharpened image.

The first part will present the method used to check the eligibility of the walnuts orchards (size above 0.10 ha, density above 50 trees / ha) and the tool implemented on the CAPI software to enable the counting of trees. A procedure was defined to remove areas without trees ("holes" inside the parcel) as only homogeneous nuts areas are eligible for aid.

The second part will present the first results of this first experiment, the difficulties met (saplings not visible on the VHR image, crops between walnuts rows) and the evolution of the method foreseen.

Keywords: Nuts, CAPI, CwRS, VHR



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First results of control of nuts with RS in France

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Control of walnuts with RS

CwRS Sites defined with a risk analysis based on COP and set-aside and forage data :
In 2004, no risk criteria about nut sector.

But

One of the selected sites with around 100 applications with walnut trees = URTO in Dordogne

We expected to receive a VHR image from the JRC.

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METHOD

3

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CAPI – software improvement

Research for

- an inexpensive and rapid solution (2004 is the last year before changing the CAPI-program and we have budget limits)

- A tool to enable the manual count of trees on the VHR image, by marking each tree with a cross

- Saving of the plot in a separate shape

Demo with the archive aerial ortho-photograph (2001) from LPIS

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Points to be checked for walnut parcels

- Homogenity of the parcel
- Minimal area of parcel : more than 0.1 ha
- Minimal density : must be greater than 50 trees / hectare

Crop	Area	Density	Diagnostic code
OK	OK	OK	OK
OK	< 0,1	OK	A7
OK	< or > outside tolerances	OK	C3- or C3+
OK	OK	too low	A6
OK	< or > outside tolerances	too low	A6
KO	-	-	NT

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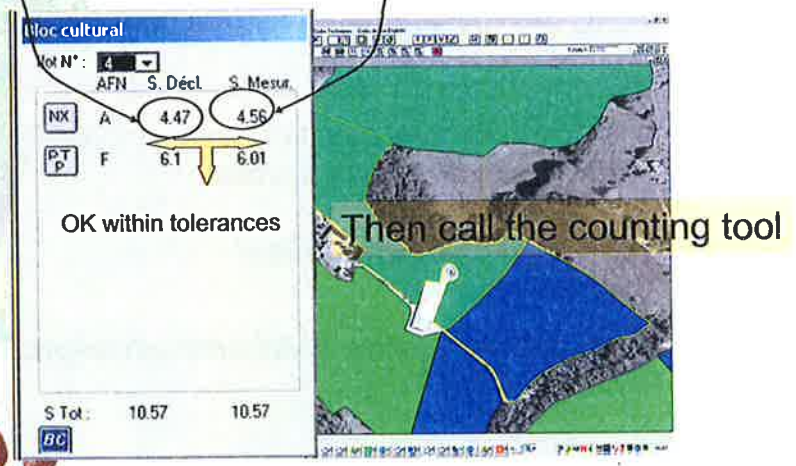
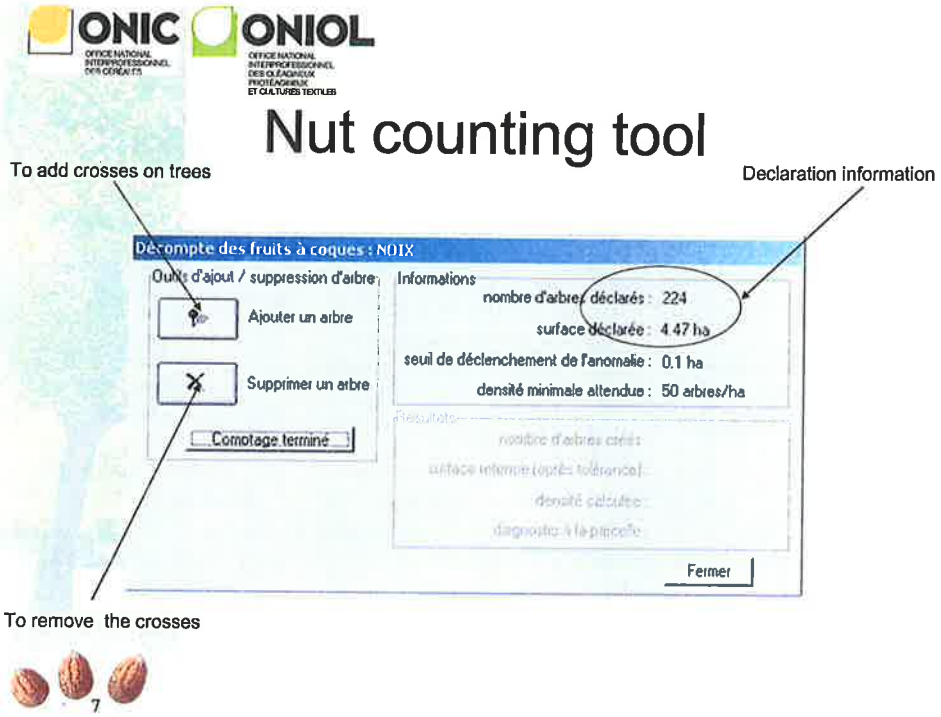
checking the area and recognizing the crop

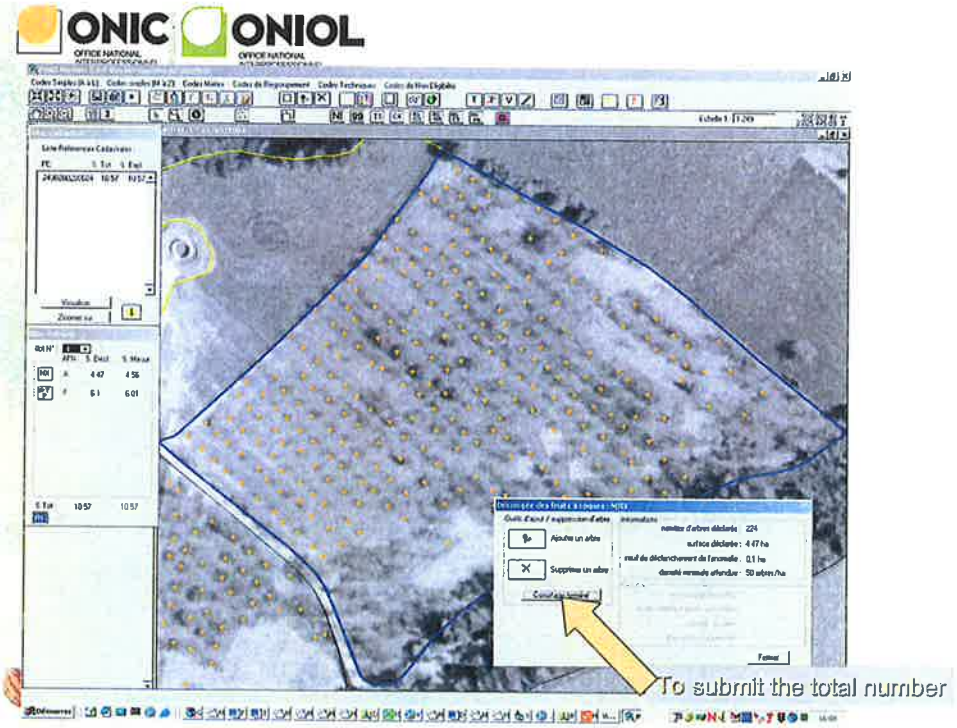
Declared area

Measured area



6


ONIC
ONIOL
Nut counting tool
To add crosses on trees
Declaration information
Décompte des fruits à coques : NOIX
Outils d'ajout / suppression d'arbre
Ajouter un arbre
Supprimer un arbre
Comptage terminé
Informations
nombre d'arbres déclarés : 224
surface déclarée : 4.47 ha
seuil de déclenchement de l'anomalie : 0.1 ha
densité minimale attendue : 50 arbres/ha
Fermer
To remove the crosses


ONIC
ONIOL
To submit the total number

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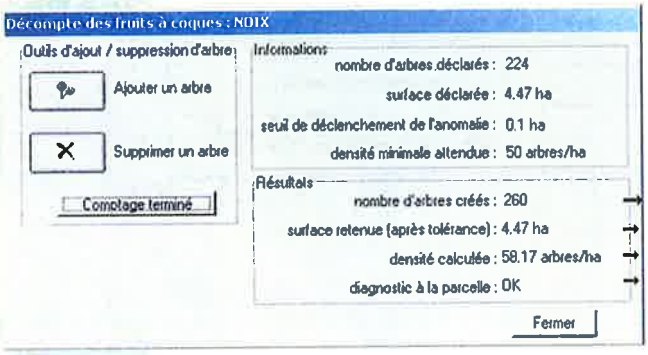
Nut counting tool : results



Results :

- Number of trees
- Retained area
- Calculated density
- Diagnostic

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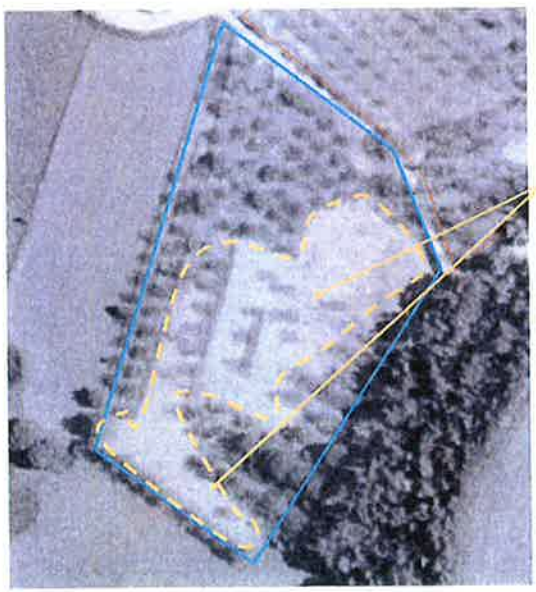
Homogeneous orchard ?



Trees ?

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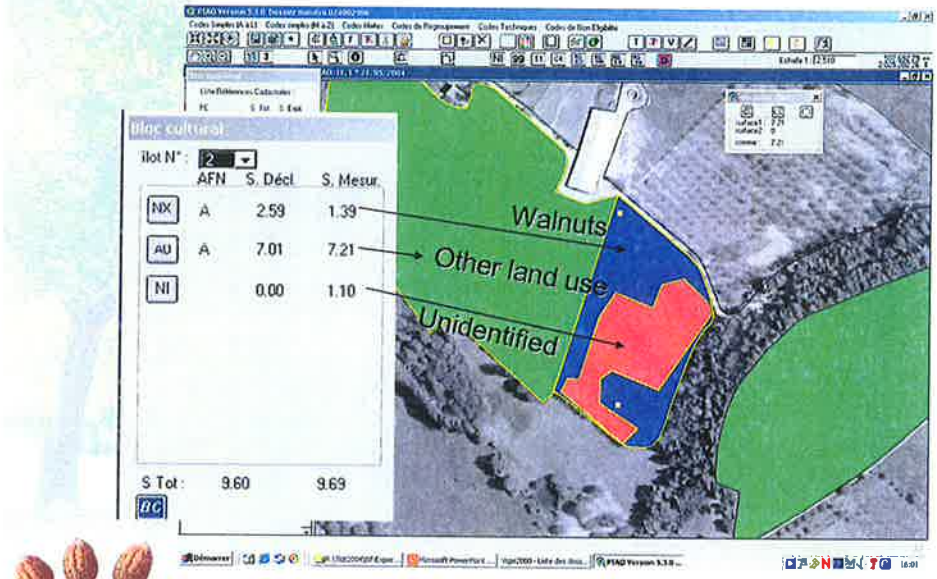
Removing the dubious part



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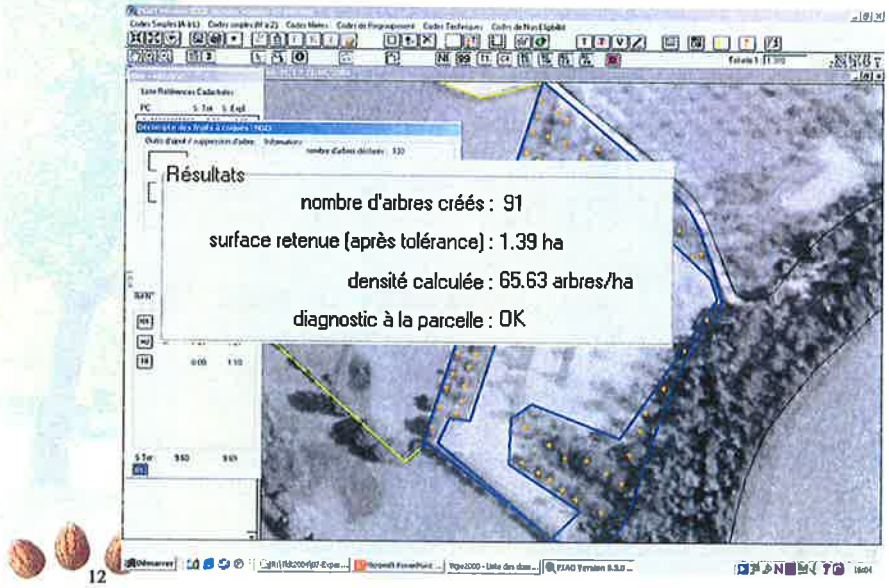
Retained area < declared area
Density OK



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FIRST RESULTS

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106 controlled applications

- 35 applications with a conform nuts group (1/3)
- 71 applications with a non-conform nuts group (2/3)

589 parcels, 620 hectares

- A6 : 18 parcels
- NT : 44 parcels
- C3+ : 108 parcels
- C3- : 18 parcels
- OK : 302 parcels

Non-conform parcel : 35%
=> rejected application
=> in the field inspection

Accepted parcel : 65%

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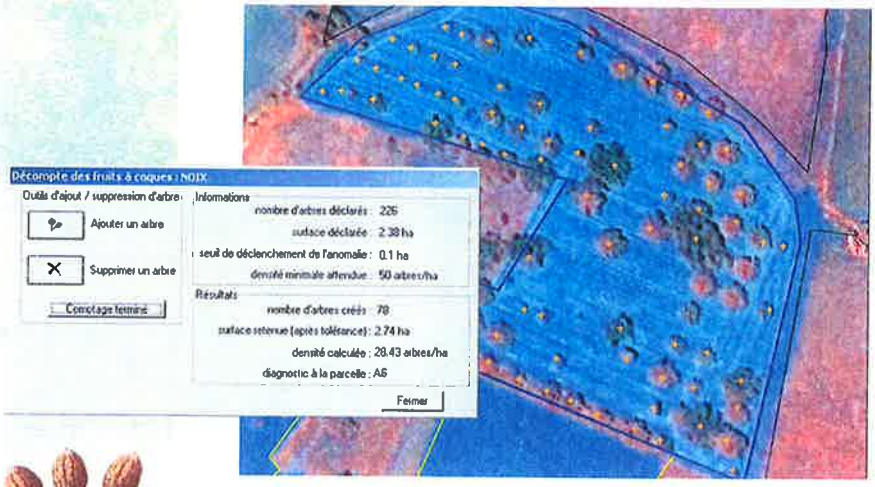
Too low density (A6)



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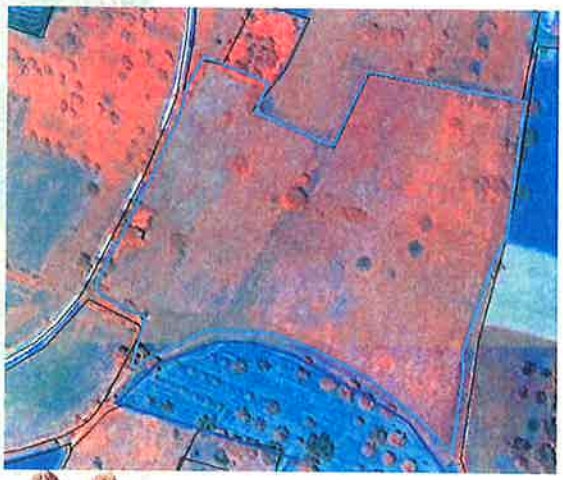
Non recognized crop (NT)



declared :
Grass land : 2,04 ha
Walnuts : 3,07 ha

Retained :
Grass land : 2,04 ha
Walnuts : 0 ha (NT)
Not Identified : 3,07 ha

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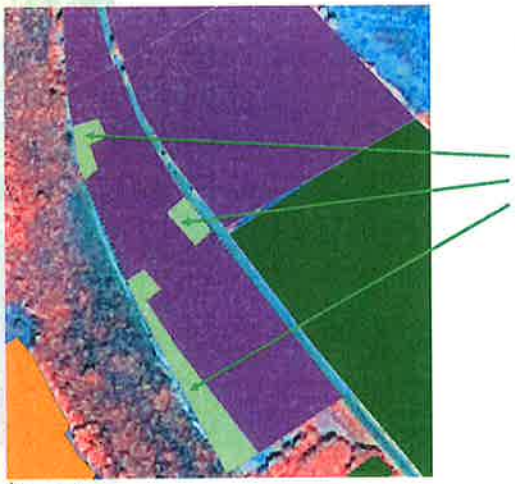
Non homogeneous orchard



0.96 ha declared as walnuts

Parts without visible trees

0.17 ha retained as NI
0.79 ha retained as NX
=> C3+

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Inter-row crops

- Forbidden by the regulation
- Usual practice in Dordogne

=> Farmers were briefed by administration :
no claim allowed for these parcels

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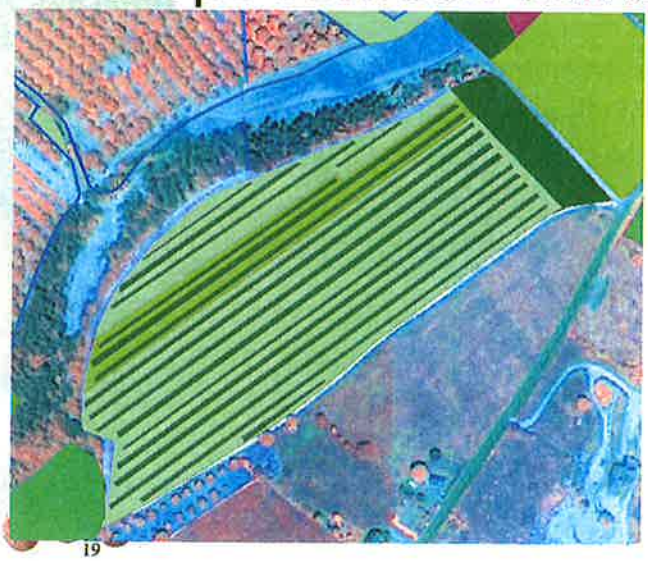
Crops between walnuts rows



Claim :
Other use : 2,00
Corn : 2,90
Barley : 0,50

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Contradictory phase

For refused applications : field inspections of non-conform parcels
-in most cases, there are young trees on these dubious areas

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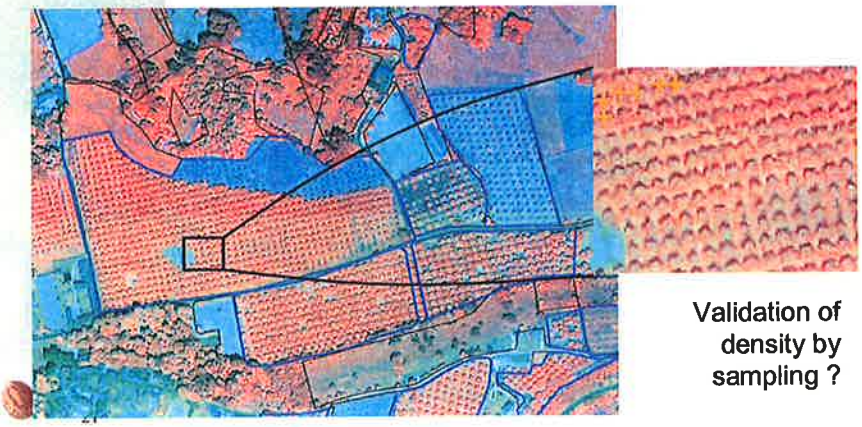
It is necessary to count all the trees ?

In reality, densities are far greater than 50 trees by ha and validation of homogeneity is sufficient in many cases



Validation of density by sampling ?

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CONCLUSIONS

-Reducing field inspections :
1/3 applications without any anomaly
less parcels to check for the refused applications
-Field inspections faster : use of RS measures (possible reintegration of removed parts)
-But CAPI much longer because of the necessity of counting ALL the trees
-> Need to simplify the CAPI procedure by aligning it to field inspection procedure.

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Presentation 3 – Assessing the use of low elevation angle imagery and multiple image blocks with reduced ground control

Simon Kay
JRC, IPSC, Agrifish Unit

Abstract

Two constraints in the use of VHR imagery for IACS control with remote sensing are: increase in the number of imaging opportunities to gather large control zones, and the increase in ground control requirements. Two solutions to these problems have been tested by the JRC during 2004, which are the subject of this presentation.

First, a study was defined using a predefined set of elevation angles for a site in southern France; imagery was acquired using Ikonos, QuickBird and Eros 1a sensors. It was concluded that for the first two sensors, elevation angles down to 60° could be used, assuming other certain conditions for ancillary data were respected.

Second, repeat processing of control zones in Italy, Ireland and Cyprus, where blocks of between 9 and 12 images were acquired, has shown that it is feasible to reduce ground control requirements to between 6 and 10 points per zone (i.e., ~1 point per image scene) and obtain orthoimages of a quality suitable for IACS operations. It was also demonstrated that in certain conditions, the block procedure with *no ground control used* produced results showing a clear improvement of the geometric uncertainty of single images, resulting in an orthoimage with a quality at the limit of acceptance for the control with remote sensing programme.

Keywords: Ikonos, QuickBird, Eros, block adjustment, ground control, elevation angle

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Assessing the use of low elevation angle imagery and multiple image blocks with reduced ground control

Simon Kay
Peter Spruyt *(elevation angle testing)*
Rafał Zieliński, *(block adjustment testing)*
Joint Research Centre - Ispra

JRC ISPRA
Budapest, Hungary

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Outline

- Decreasing elevation angle to satellite
  - Lower elevation angles, more chances for acquiring images
- Block adjustment of VHR images to produce orthoimages
  - Minimum nr of GCPs required
  - Orthoimages – without GCPS…

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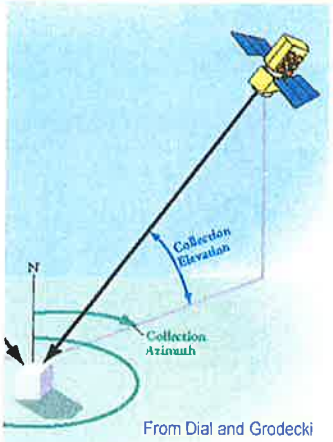
Elevation angle

- **Definition**: is the angle subtended from local horizon at the scene to the sensor
- Non-linear impact on image acquisition opportunities.



From Dial and Grodecki

- Five sets acquired for testing
- 90-88°, 85-80°, 75-70°, 65-60°, 55-50°
- Ikonos, QuickBird, EROS-A
- All processing RPC, off-the-shelf software

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Test ancillary data

- All tests done with work from Mausanne (South of France)
- DEM from ADS40 flight
  - $RMSE_Z$ <0.5m
- DEM from Olistat flight (1997), degraded
  - $RMSE_Z$ 5.81m
- GCPs: derived from ADS40 orthoimage (<0.5m $RMSE_{1-D}$)

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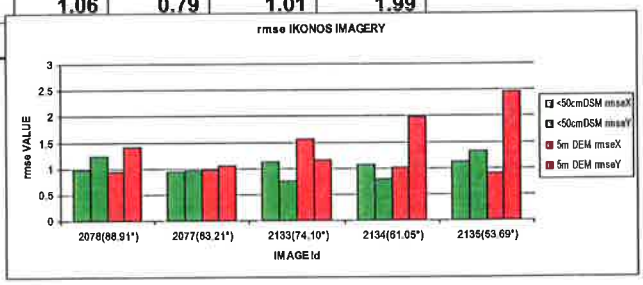
Ikonos result

Ikonos	<50cmDSM		5m DEM	
Elevation angle	rmseX	rmseY	rmseX	rmseY
2078(88.91°)	0.98	1.24	0.93	1.42
2077(83.21°)	0.94	0.96	0.97	1.04
2133(74.10°)	1.12	0.75	1.56	1.16
2134(61.05°)	1.06	0.79	1.01	1.99
2135(53.69°)				



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Low elevation angle imagery, multiple image blocks with reduced ground control 5

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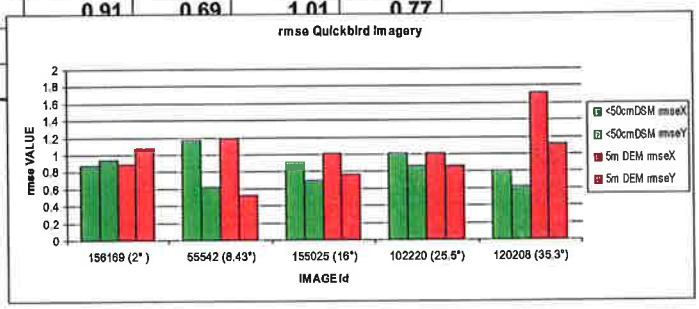
QuickBird result

QuickBird	<50cmDSM		5m DEM	
View angle	rmseX	rmseY	rmseX	rmseY
156169 (2°)	0.88	0.94	0.89	1.07
55542 (8.43°)	1.17	0.62	1.19	0.53
155025 (16°)	0.91	0.69	1.01	0.77
102220 (25.5°)				
120208 (35.3°)				



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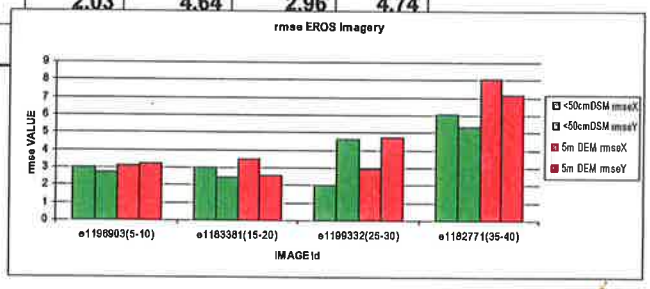
EROS-A

EROS-A	<50cmDSM		5m DEM	
View angle	rmseX	rmseY	rmseX	rmse Y
e1196903(5-10)	2.99	2.75	3.13	3.22
e1183381(15-20)	3.02	2.46	3.51	2.56
e1199332(25-30)	2.03	4.64	2.96	4.74
e1182771(35-40)				



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Conclusions, decreasing elevation angle…

- A reminder: ancillary data are very important!
  - Permits lower acquisition angle, which gives more chances of acquisition
- For QuickBird and Ikonos:
  - no problem detected in optimal conditions up to elevation 50° - 55°
- For EROS-A:
  - More complex sensor geometry? Or just lower spatial resolution?
  - Risk beyond 70°

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Block adjustment, intro

- 2003/4 best practice and recommendations for orthoimage creation:
  - Single image space resection
    - 2 to 4 points per image
  - Some sites, 8 to 12 images…
    - Often 20 to 30 GCPs required
    - Distribution – critical?
- Proposed solution
  - Reduce ground control through block adjustment

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Methodology

- Method of correction - RPC
  - PCI software [Geomatica 9.0 and 9.1]
- Various distribution and point numbers tested
- Steps/phases
  - Manual point identification
    - GCP, Check point (CP) , Tie Point (TP)
  - Model and orthophoto generation
  - Mosaicing (TIFF 8 bits)
  - Independent quality control (CP) in ArcView application

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Ireland– TINA site

- Area: 38x50km
- Moderately hilly area:
  - Up to 921m, SD 105m
- DEM from Dept A&F, form 1995 orthophoto creation
  - $RMSE_Z$ 4.0m

Low elevation angle imagery, multiple image blocks with reduced ground control 11

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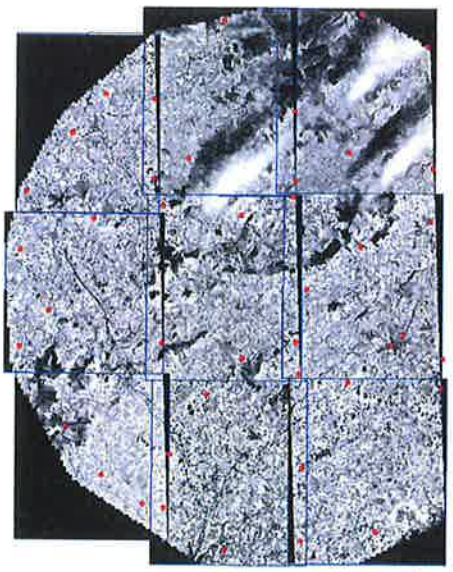
TINA

- IKONOS the same day of acquisition (2003 campaign)
  - Block of 9 [12] images (3 by 3)
  - Number of points from GPS survey: 40



Low elevation angle imagery, multiple image blocks with reduced ground control 12

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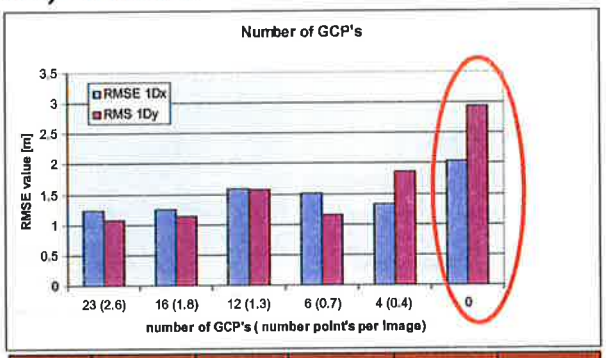
Results, TINA



GCP	Check Points	Tie Points	RMS 1Dx [m]	RMSE 1Dy [m]	RMSE 2D [m]
23 (2.6)	18	19	1.23	1.08	1.64
16 (1.8)	18	19	1.26	1.14	1.7
12 (1.3)	18	19	1.59	1.58	2.24
6 (0.7)	35	19	1.51	1.15	1.9
4 (0.4)	37	19	1.33	1.67	2.29
0	41	19	2.04	2.94	3.58

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Low elevation angle imagery, multiple image blocks with reduced ground control 13

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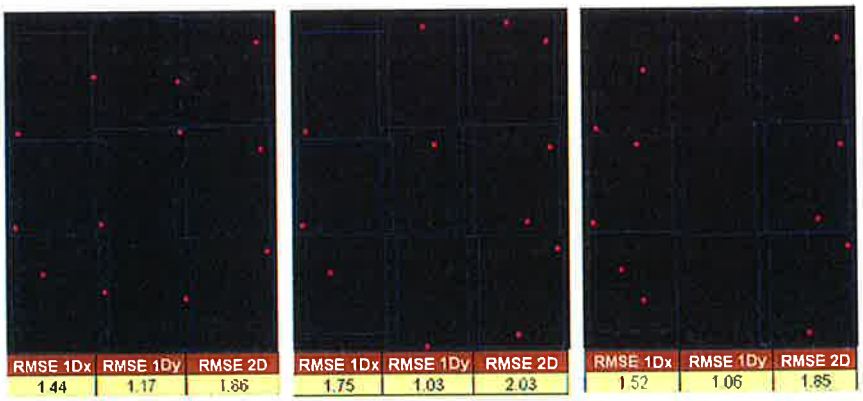
Distribution of GCP points, test



All tests include 12 GCPs, 29 CPs and19 TPs

- $RMSE_{2D}$ does not vary much (0,2m of difference), so the distribution do not influence the block quality significantly (**if there are GCP on the edges**)l
- In the case of no GCPs on central strip, the model is still stable (again for the not highly variable terrain)
- It is recommended to input the GCP points on the edges and in the centre line of block (preferably on the overlapping areas)

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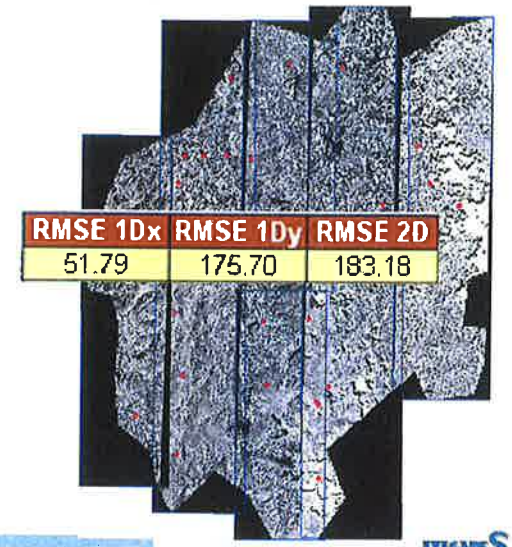
MACE test area (Italy)

- Ikonos data
  - 5 strips, common date, 2004 campaign
  - 70x50km
- Strong relief
  - >2000m, SD 413m
- DEM quality
  - Adequate, 6.3m against control
- Check Points: aerial survey tie points
- Only tested without GCPs



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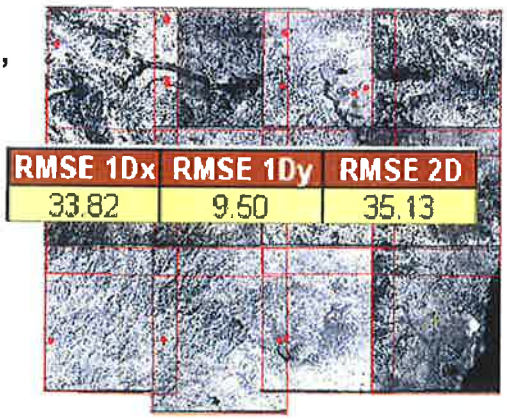
Cyprus test area

- QB data (12 images, 4 strips, common date)
  - taken for LPIS
  - 60x50km
- Rough terrain
  - 1500m relief,
  - SD 257m
- Again, only check made without GCPs



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Conclusions, block adjustment

- Operational ortho-correction of VHR imagery with no GCPs remains a dream…
- But well placed ground control can be reduced to **under one GCP per image**
  - So GCPs can be down to typical numbers for 25km radius sites
  - Requires:
    - Right software (off the shelve)
    - Good ancillary data

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