



SINERGISE



РЕПУБЛИКА БЪЛГАРИЯ  
АГЕНЦИЯ ЗА АГРИКУЛТУРА  
И РЪДНО РАЗВИТИЕ



REPUBLIKA SLOVENIJA  
MINISTRSTVO ZA KMETIJSTVO,  
GOZDARSTVO IN PREHRANO

# Best Practices for Assuring the Quality of LPIS Data

**Grega Milčinski, Sinergise**

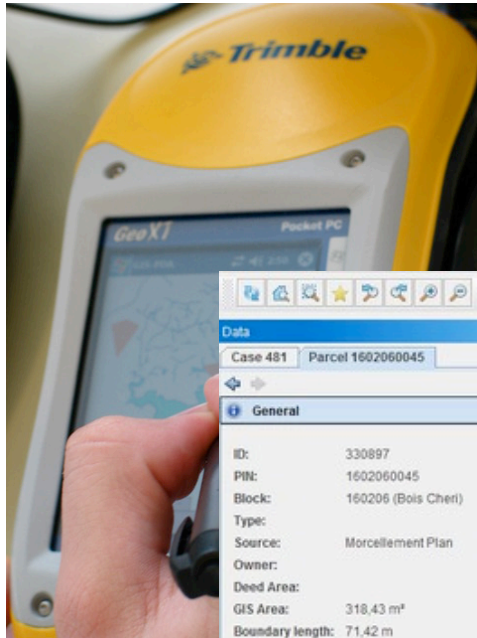
**Alenka Rotter, Ministry of Agriculture, Forestry and Food**

**Zdravko Tušek, Paying Agency for Agriculture, Fisheries and rural development**

# Contents

- Occurrence of errors
- Finding errors
- Solving specific issues
- Improvement of the process

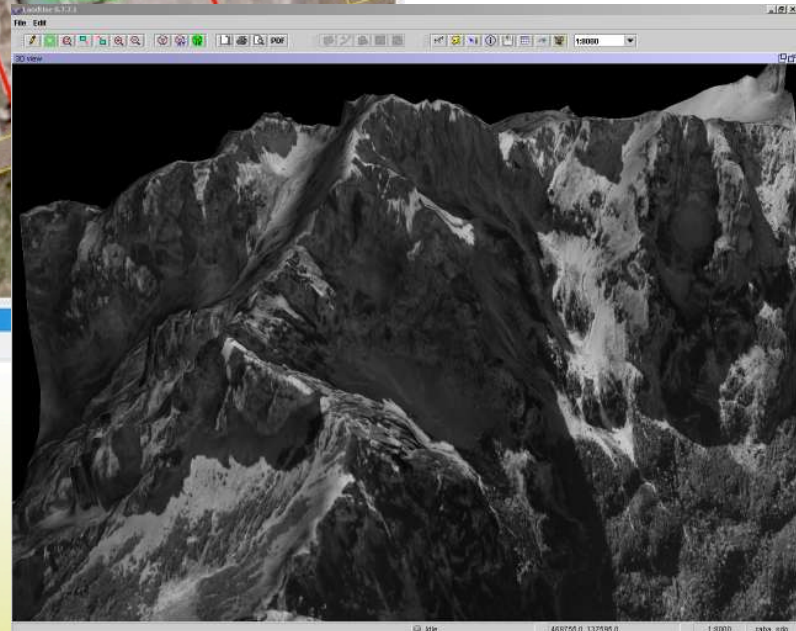
# About Sinergise



The screenshot shows a GIS application window with a data table on the left and a 2D map view on the right. The data table lists parcel information for Case 481, Parcel 1602060045.

Data	
Case 481 Parcel 1602060045	
General	
ID:	330897
PIN:	1602060045
Block:	160206 (Bois Cheri)
Type:	
Source:	Morcellement Plan
Owner:	
Deed Area:	
GIS Area:	318.43 m <sup>2</sup>
Boundary length:	71.42 m
Notes:	
Date From:	
Date To:	
Lock:	true
Status:	LIVE
Active:	true
Case:	481 (Owner: Marko Trebitzan)

The 2D map view shows an aerial photograph with yellow parcel boundaries and a red boundary for the selected parcel. Parcel numbers like 1602060041, 1602060045, and 1602060044 are visible on the map.



Best Practices for Assuring the Quality of LPIS Data, GeoCAP 2011



# About Sinergise

The image displays a screenshot of the Sinergise web application. The interface is divided into several sections:

- Top Left:** A search bar with the text "MIEPO" and a "Pretraživanja" button. Below it, a "Slojevi" (Layers) panel lists various map layers like "ORTO-FOTO KARTA" and "TOPOGRAFSKA KARTA".
- Top Center:** A header for "IZBIRKA VREDNOTENJA NEPREMIČNIN" (Selection of Real Estate Valuation) with the subtitle "Predlog modelov vrednotenja" (Proposal of valuation models). It includes a version number "v1.0.6 (2010-06-08)" and a coordinate "Y,X: 550973.45, 186725.66".
- Left Sidebar:** A "IZBERA MODELA" (Model Selection) section with a dropdown menu set to "STANOVAJIA" and a checked checkbox for "CONE". Below it, there are sections for "IZBERITE MODEL" (Select Model) and "ZAHTEVAJTE INFORMACIJE" (Request Information).
- Main Content Area:** A map showing a highlighted orange route. A detailed information window titled "Urejanje: Gorska pot-Uskovnica - Konjščica - Zajamniki" is open over the map. This window contains fields for:
  - Ime poti: Uskovnica - Konjščica - Zajamniki
  - Vrsta poti: Gorska pot
  - Čas poti: 4 ure
  - Izhodišče: Ribčev Laz (brezplačni p. nasproti hotela Kristel)
  - Vrsta podlage: kolovoz, makedam, asfalt
  - Težavnost: težkaIt also includes two photos: "Slika 1" (a dirt path in a valley) and "Slika 2" (hikers on a trail).
- Bottom Right:** A map control panel with buttons for "Ortofoto", "Višine", "Relief", and "Topo".



# The importance of quality of LPIS

- EU regulations
- Fair distribution of taxpayer's money
- Avoiding the law-suits
- Use of LPIS data in other systems

# Occurrence of errors

- input data of bad quality
  - technical obstacles
  - sloppiness of the operators
  - random errors
  - on purpose
- 
- errors happen also due to change of reality

# How to deal with them?

- Regular LPIS update
- Additional processes



# Finding errors – automatic cross-check

- cost-effective as it is computer generated
- LPIS <-> LPIS
  - double declaration
  - topology errors
  - missing/improper attribute data

# Topology errors



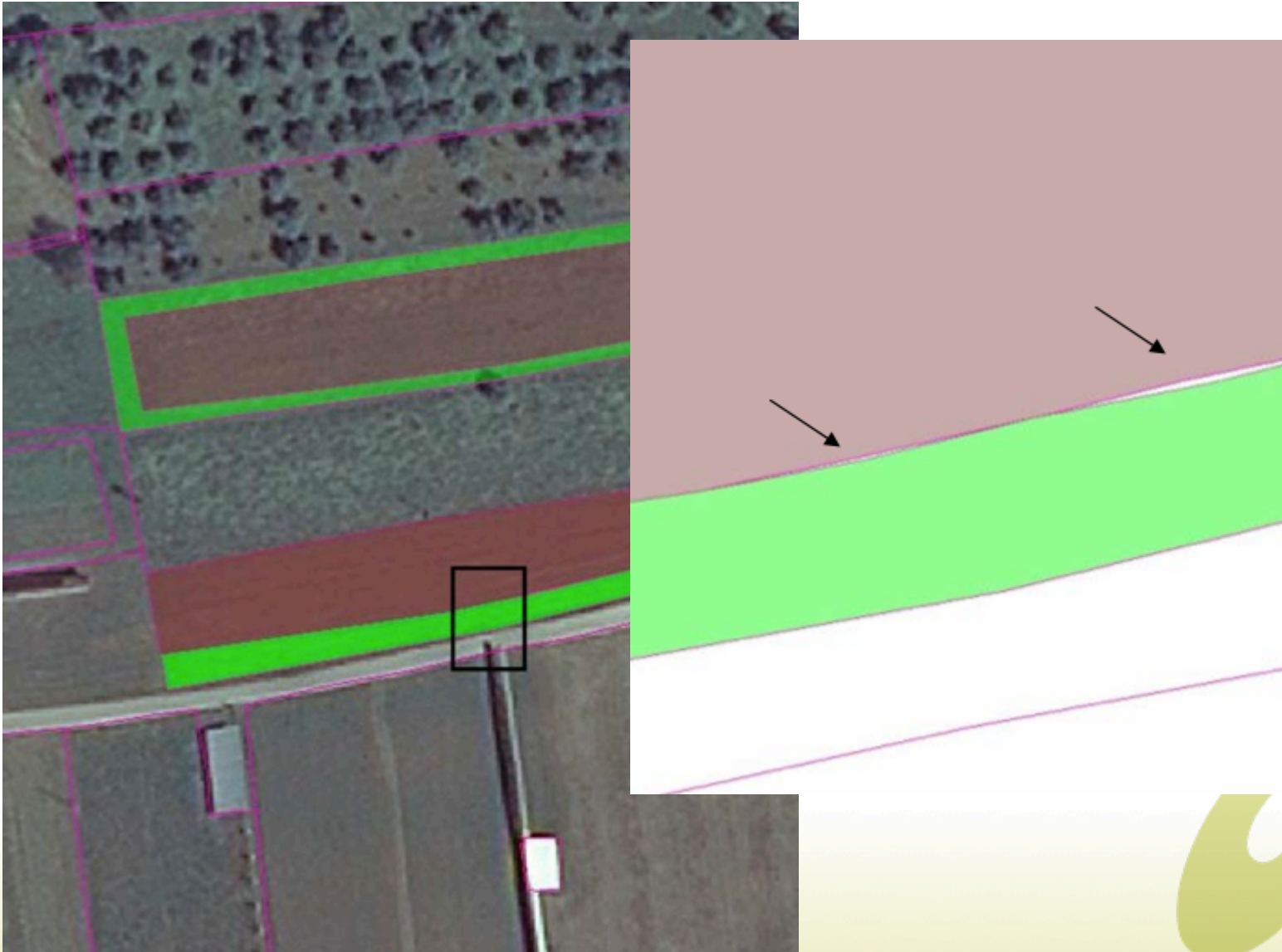
Best Practices for Assuring the Quality of LPIS Data, GeoCAP 201

# Topology errors





# Topology errors



# Finding errors – automatic cross-check

- LPIS < - > land use / land cover
  - Extremely efficient cross-check
  - Up-to-date land cover should be available (whenever aerial imagery is updated)
  - Illegible areas within LPIS parcels
  - Change of borders of LPIS parcel

# Cross-check LPIS <-> land cover

## Seznam kontrol

### Iskalnik

	KMG_MID	Tip	Šifra	Datum	Opis kontrole
	<a href="#">100471994</a>	ERR	<a href="#">GERK-00014</a>	05.05.10 00:16	Raba GERK-a ne ustreza veljavni rabi za vrsto kmetijskega gospodarstva
	<a href="#">100471994</a>	ERR	<a href="#">GERK-00061</a>	05.05.10 00:17	GERK_PID 4204541: Obstaja sosednji GERK 4204539 z enako vrsto RABE ( ? Združiti )
	<a href="#">100471994</a>	ERR	<a href="#">GERK-00061</a>	05.05.10 00:17	GERK_PID 4204539: Obstaja sosednji GERK 4204541 z enako vrsto RABE ( ? Združiti )
	<a href="#">100471994</a>	ERR	<a href="#">GERK-00061</a>	05.05.10 00:17	GERK_PID 4168774: Obstaja sosednji GERK 4168772 z enako vrsto RABE ( ? Združiti )
	<a href="#">100471994</a>	ERR	<a href="#">GERK-00061</a>	05.05.10 00:17	GERK_PID 4168772: Obstaja sosednji GERK 4168774 z enako vrsto RABE ( ? Združiti )
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:16	Napaka - raba GERK-a 4683992 ne ustreza dejanski rabi za 1221,8 m2: 1221,8 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:16	Napaka - raba GERK-a 4639927 ne ustreza dejanski rabi za 2701,71 m2: 2701,71 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:16	Napaka - raba GERK-a 4639813 ne ustreza dejanski rabi za 4941,45 m2: 4941,45 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:17	Napaka - raba GERK-a 4610428 ne ustreza dejanski rabi za 6,09 m2: 6,09 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:16	Napaka - raba GERK-a 4609941 ne ustreza dejanski rabi za 553,57 m2: 553,57 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:16	Napaka - raba GERK-a 4514675 ne ustreza dejanski rabi za 7292,83 m2: 7292,83 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:17	Napaka - raba GERK-a 4514673 ne ustreza dejanski rabi za 41,09 m2: 41,09 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:17	Napaka - raba GERK-a 4514631 ne ustreza dejanski rabi za 768,67 m2: 768,67 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:16	Napaka - raba GERK-a 4260057 ne ustreza dejanski rabi za 4171,37 m2: 4171,37 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:17	Napaka - raba GERK-a 4204541 ne ustreza dejanski rabi za 50,87 m2: 50,87 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:17	Napaka - raba GERK-a 4204539 ne ustreza dejanski rabi za 38,48 m2: 38,48 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:17	Napaka - raba GERK-a 4168774 ne ustreza dejanski rabi za 431,97 m2: 431,97 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:17	Napaka - raba GERK-a 4168772 ne ustreza dejanski rabi za 78,69 m2: 78,69 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:16	Napaka - raba GERK-a 4089472 ne ustreza dejanski rabi za 116,45 m2: 116,45 m2
	<a href="#">100471994</a>	ERR	<a href="#">GERK-90064</a>	05.05.10 00:16	Napaka - raba GERK-a 4005510 ne ustreza dejanski rabi za 184,81 m2: 184,81 m2



# Cross-check LPIS <-> land cover



# Cross-check LPIS <-> land cover





# Cross-check LPIS <-> land cover

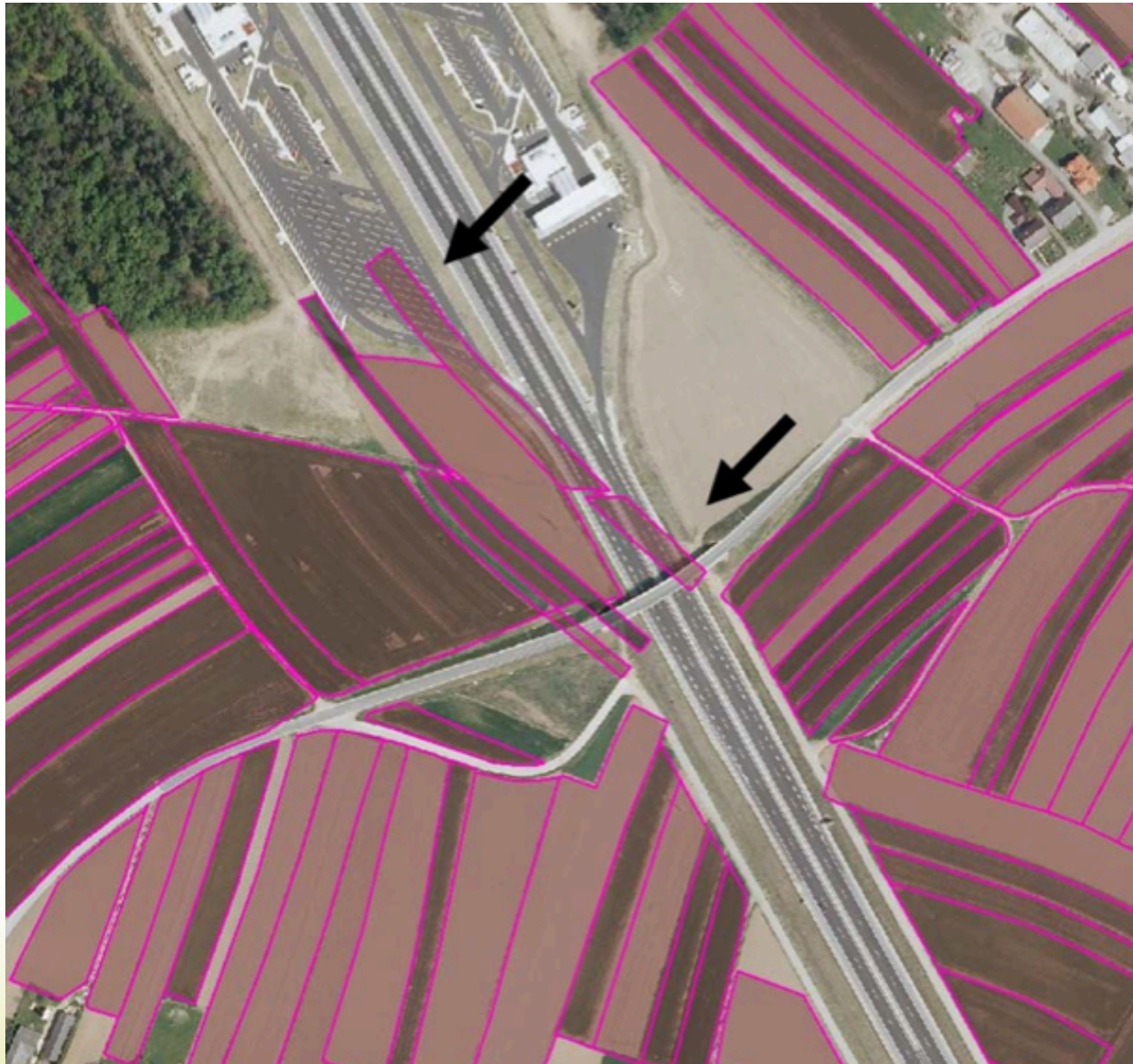




# Finding errors – automatic cross-check

- Other data sources
  - forest cover
  - highway paths and roads
  - building registry
  - habitats
  - football stadiums
  - airplane fields
  
- be aware about the quality of these data (including meta-data)

# Finding errors – automatic cross-check



# Finding errors - aerial imagery update

- automatic test not feasible
- 100% administrative control required
- time consuming
  - 30% of parcels every year (several 100.000)
  - usually, there is no inconsistency found
- optimization of the process



# Finding errors - aerial imagery update

**Layers**

Upper map Lower map

- ORTHO-PHOTO 1:5000
- NEW ORTHO-PHOTO 1:5000
- TOPOGRAPHIC MAP 1:25000
- COUNTIES
- MUNICIPALITIES
- CADASTRAL MUNICIPALITIES
- SETTLEMENTS

**Tasks: 4/19** Show open or checked after: 2/11/11

LPIS ID	FARM ID	STATUS	UPDATED ON
226792	112690	No change	May 31, 2010
1467215	112690	Major change	May 31, 2010
9049249	127283	No change	Jan 27, 2011

**COMMENTS**

No change
  Minor change
  Major change

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v0.0.01 (2011-01-17) SINERGISE



# Finding errors - aerial imagery update

- In case inconsistencies are found
  - small ones – parcels are updated by the central unit, farmers are notified after the process is finished
  - large – meeting with farmers are automatically scheduled in order to solve these
  - no farmer can submit subsidy claim if there are still pending issues

# Finding errors – visual control

- different levels of operators' skills
- 4-eyes control by central unit operators
  - rejecting entries (request for correction)
  - evaluation of operators (statistics)
- identify problematic operators as soon as possible

# Finding errors – visual control

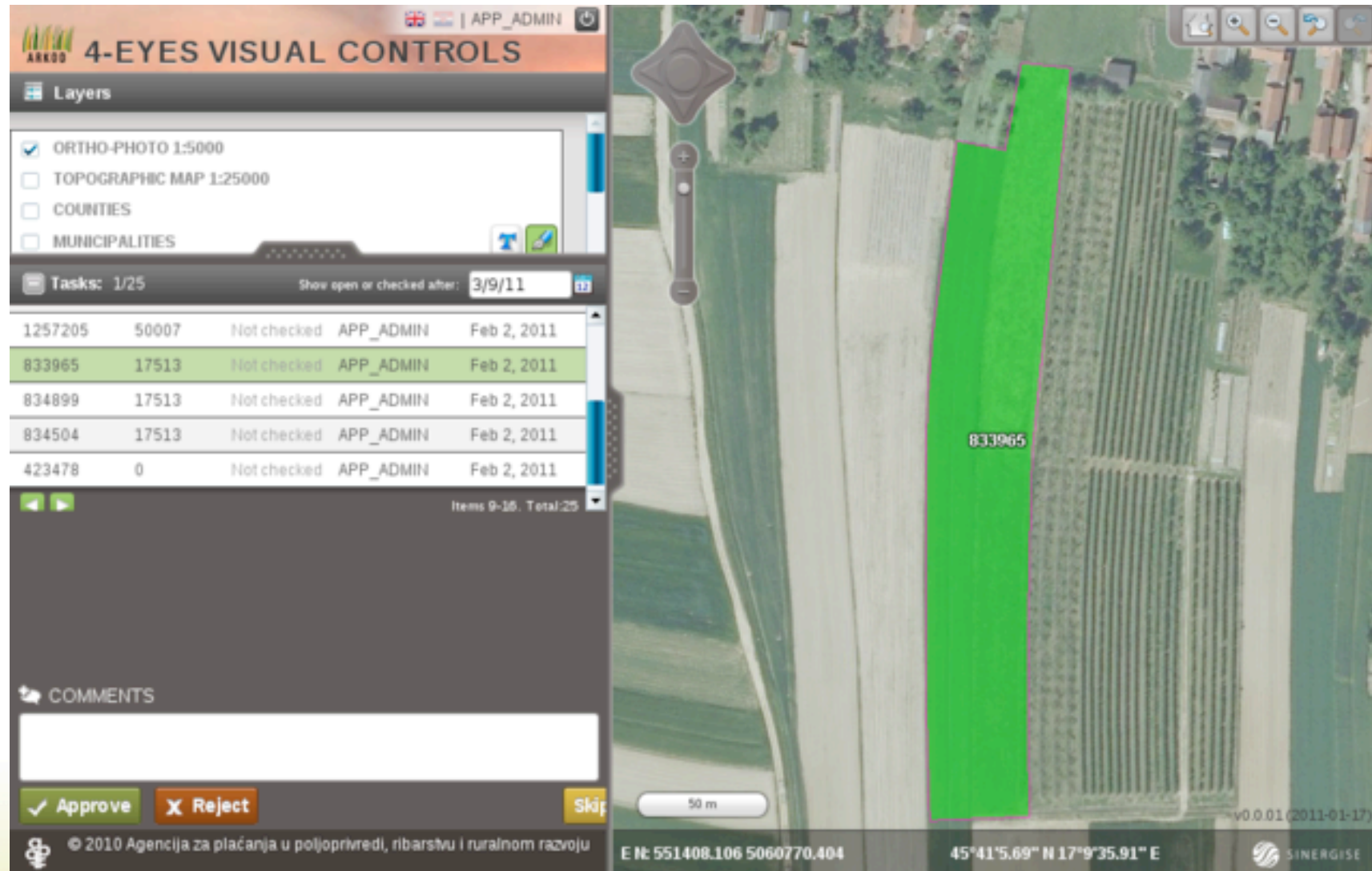


# Finding errors – visual control





# Finding errors – visual control



**4-EYES VISUAL CONTROLS**

Layers

- ORTHO-PHOTO 1:5000
- TOPOGRAPHIC MAP 1:25000
- COUNTIES
- MUNICIPALITIES

Tasks: 1/25 Show open or checked after: 3/9/11

1257205	50007	Not checked	APP_ADMIN	Feb 2, 2011
833965	17513	Not checked	APP_ADMIN	Feb 2, 2011
834899	17513	Not checked	APP_ADMIN	Feb 2, 2011
834504	17513	Not checked	APP_ADMIN	Feb 2, 2011
423478	0	Not checked	APP_ADMIN	Feb 2, 2011

COMMENTS

Approve Reject Skip

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E N: 551408.106 5060770.404 45°41'5.69" N 17°9'35.91" E

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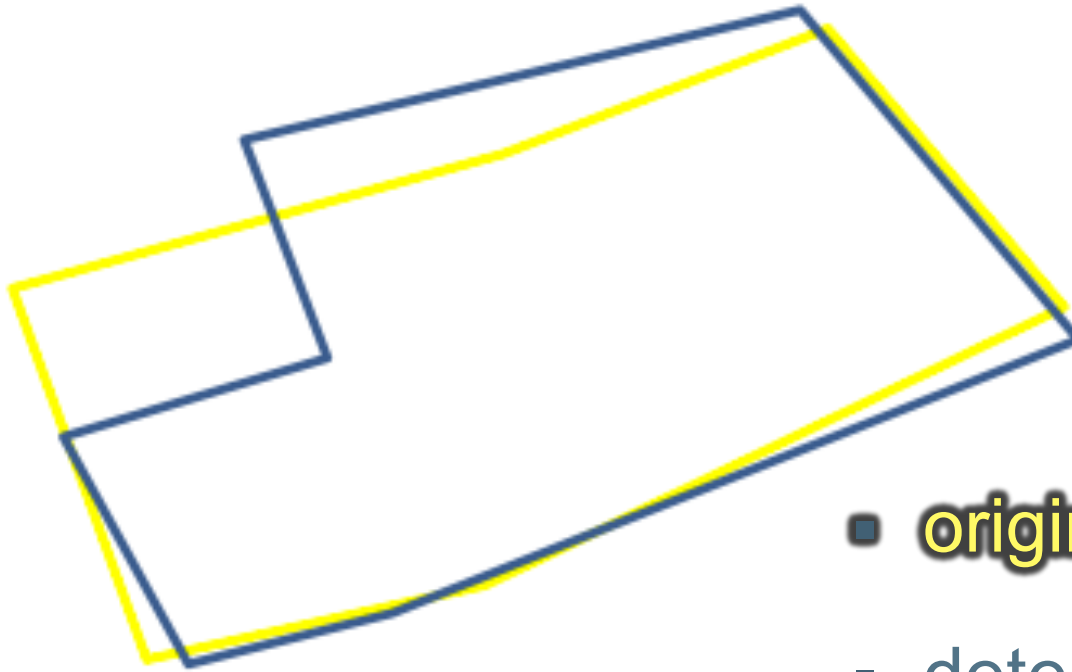
# On-the-spot controls and CwRS

- Update of LPIS based on OTS/CWRS
- Integration with GPS
  - geo-positioned photos
  - detailed information about measured points

# Upgrade of LPIS based on OTS/CWRS

- Slovenia – position, not only area is important
  - 95% of the controls can be updated in the LPIS automatically, without manual work
- Croatia – controls focused to area
  - semi-automatic process for LPIS update

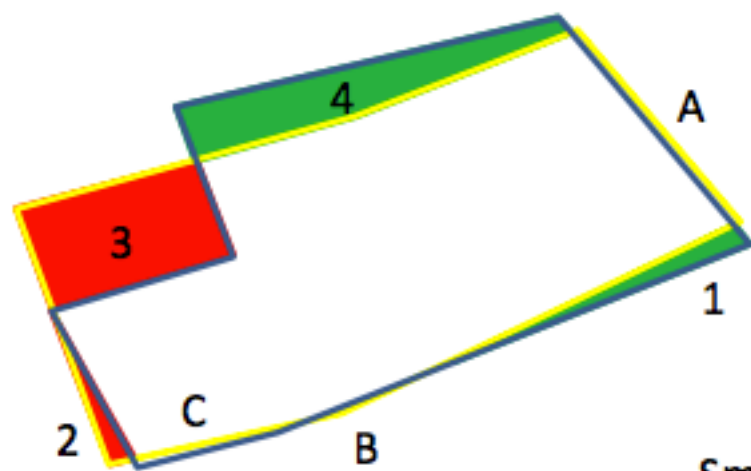
# Semi-automatic update of LPIS based on OTS



- original ARKOD
- determined ARKOD
- by Ekotoxa



# Semi-automatic update of LPIS based on OTS

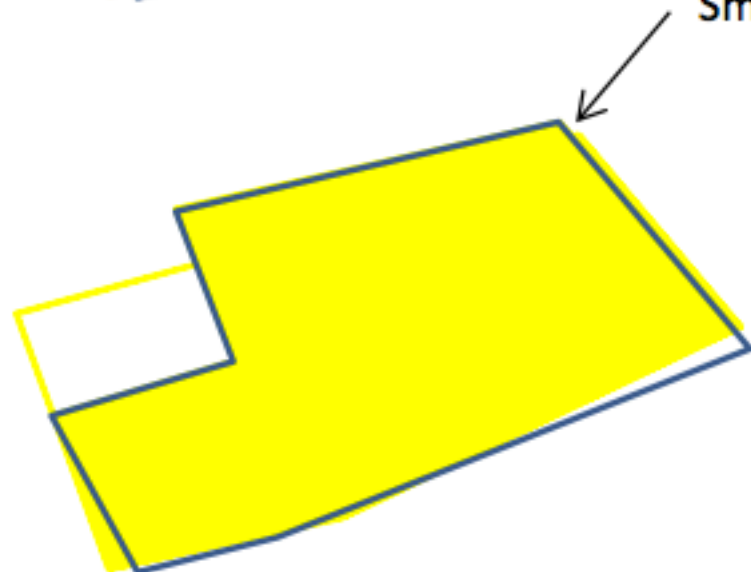


Parts that can be added to the ARKOD (1, 4)



Parts that can be deleted from the ARKOD (2, 3)

Small adjustment of resulting shape needed



Updated shape of the ARKOD (only parts 3 and 4 used for the update)

# Integration with GPS





# Integration with GPS



Best Practices for Assuring the Quality



# Integration with GPS

- outstanding insight in the execution of the control
- photos and original GPS measurements are stored in the system
  - can be used in the following years during digitization with the farmer

# Share data

- Other users will find errors



# Prevention of errors

- Rules for digitization
  - minimum scale
  - perform topology control
  - prevent overlapping (double-declaration)
  - check for minimum distance between points
- Cross-check with other data – on entry
  - land cover

# Future steps

- Image recognition
  - increasing the amount of controls based on aerial imagery and satellite imagery
- Should we actually focus to increase the quality of controls?
  - How much should we worry about positional accuracy (GIS vs “area + rough location”)