COPERNICUS & LAND COVER

by

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Copernicus Information and Training Session – Bratislava, 12 June 2018

1 WIDER PERSPECTIVE

2 LAND COVER

3 USES

4 CHALLENGES / ISSUES

1

WIDER PERSPECTIVE

1
VERY VERY
I'M SO EXCITED!

1

Global geospatial sector growing very fast

Huge amounts of spatial & other data being generated every second … *including satellite data*

User friendly platforms … user centric (hiding complexity)

Real time … near real time + mobile

More and more data open … *eg COPERNICUS*

Shifting data around ….. 5G

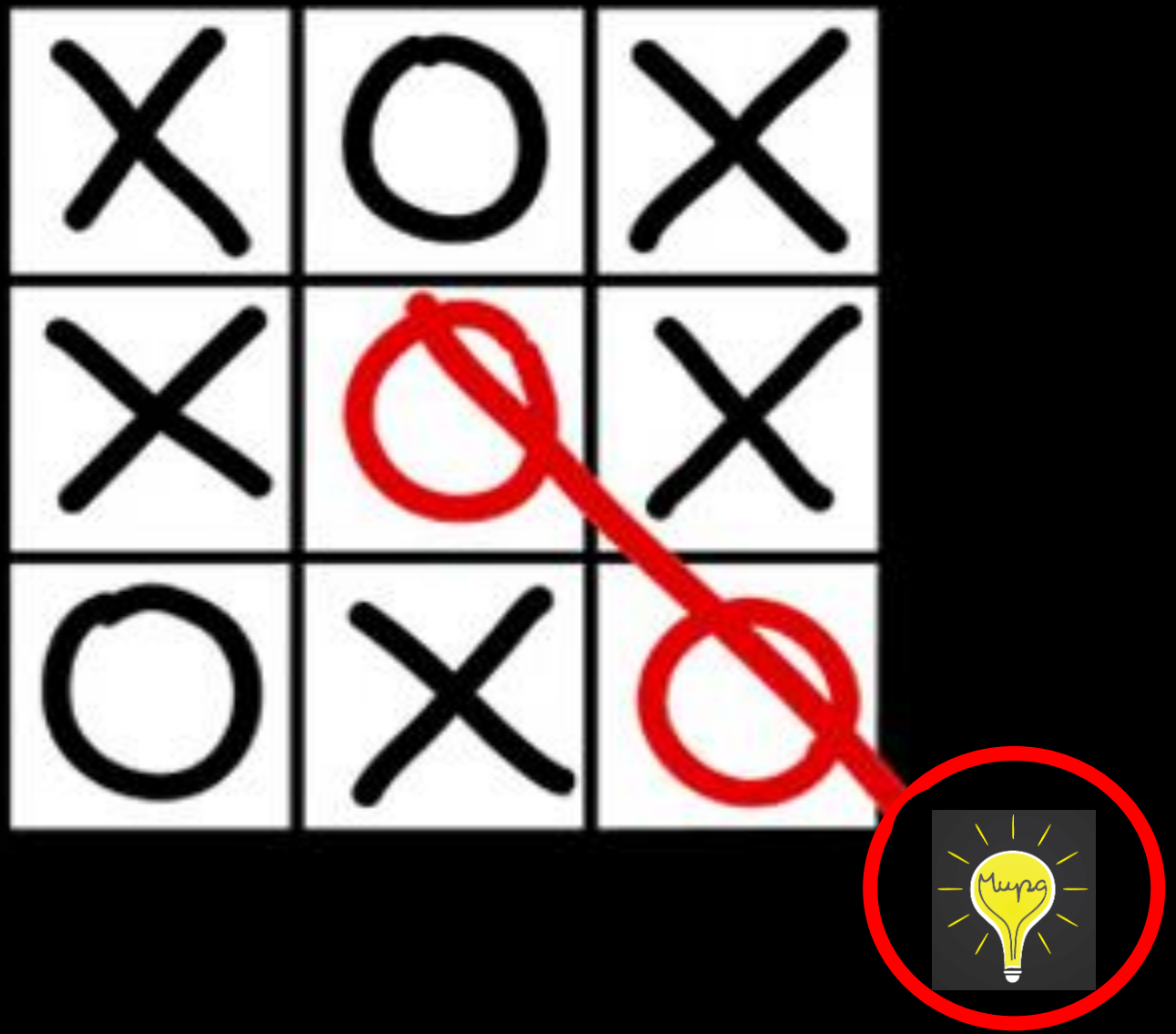
Analytics abilities growing fast … understanding, categorising & predicting

WOW

1

OPPORTUNITIES EVERYWHERE

1



we need to **THINK OUTSIDE THE BOX** … stretch out minds … imagine ……

1
BRIGHTER BETTER
TOMORROW
NOW

2

LAND USE

and land cover

2

LAND COVER – WHAT IS IT

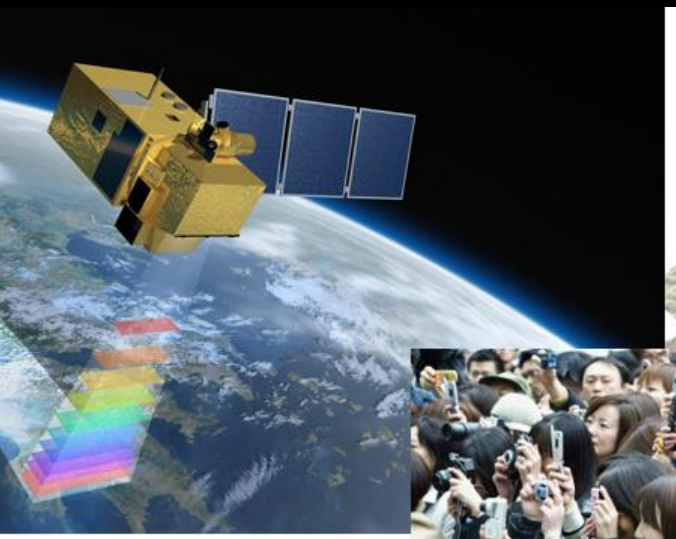
THE ‘THINGS’ WHICH COVER THE LAND SURFACE

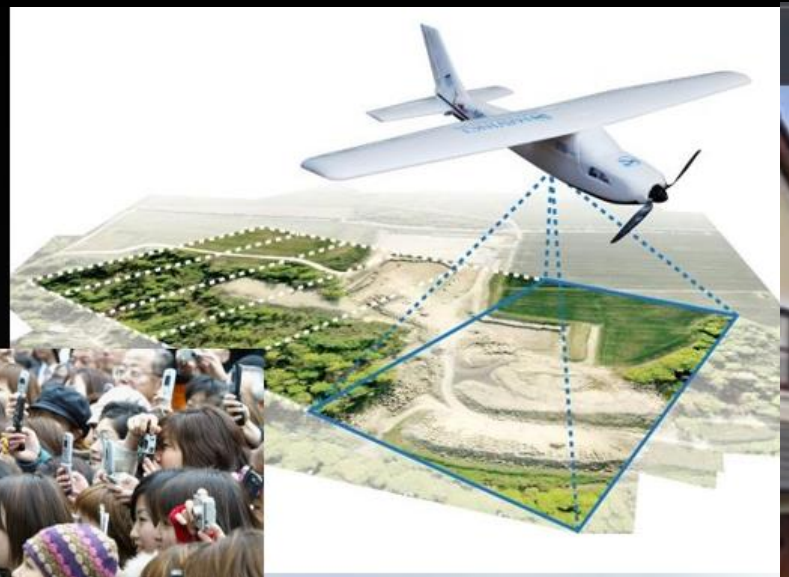
grass buildings tarmac trees water rock sheep vehicles people boats railway lines bri

2 LAND COVER & LAND USE (1)

2 LAND COVER & LAND USE (2)

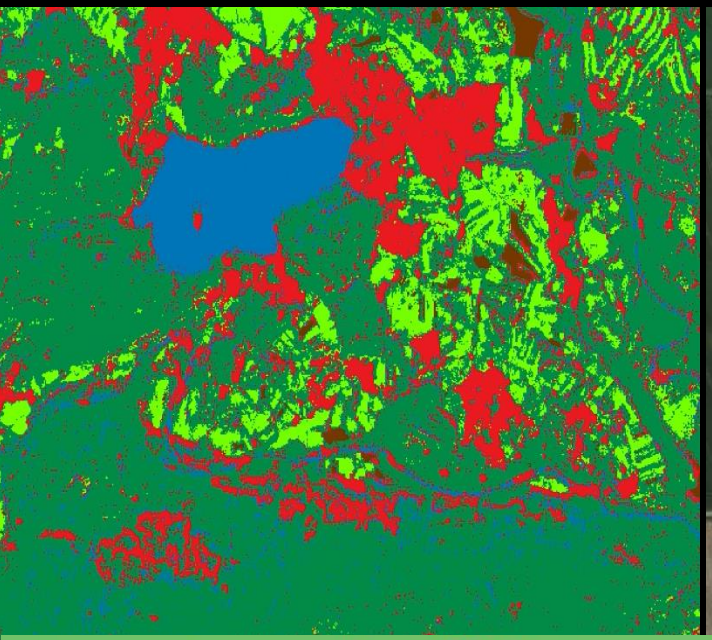
2 VARIETY OF DATA SOURCES

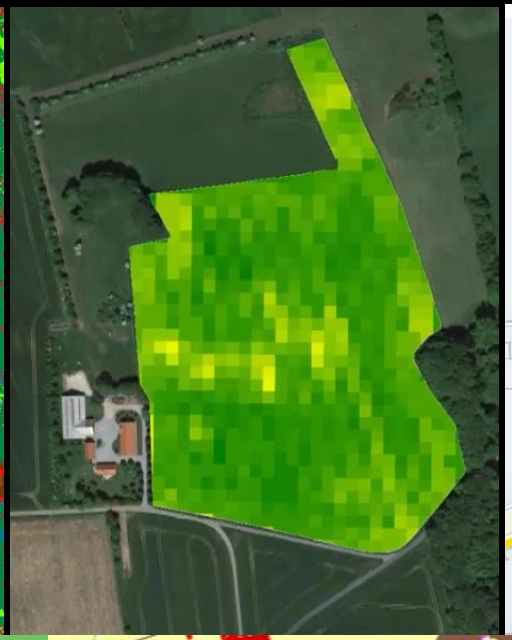


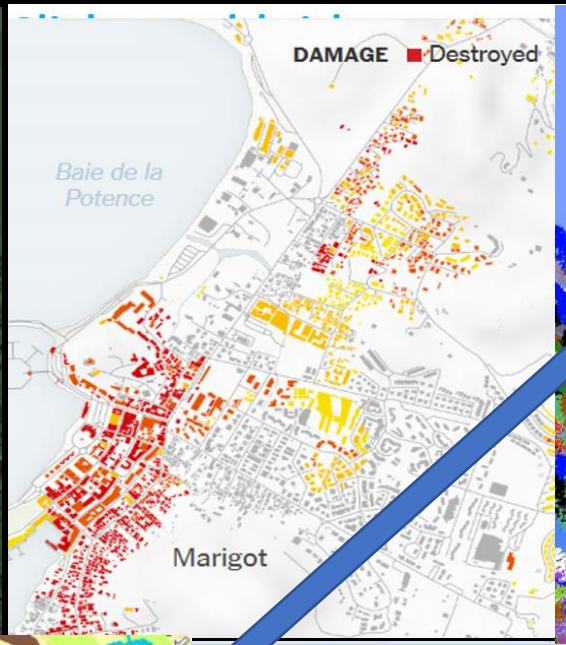


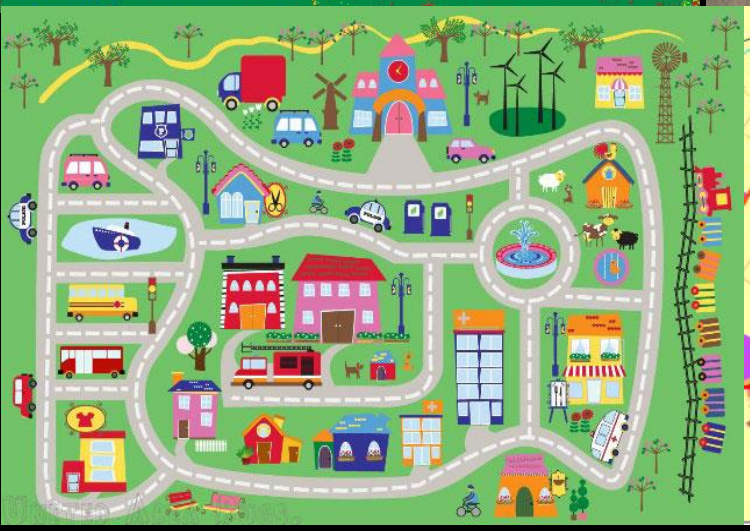
2 LAND COVER REPRESENATIONS …. think outside of the box

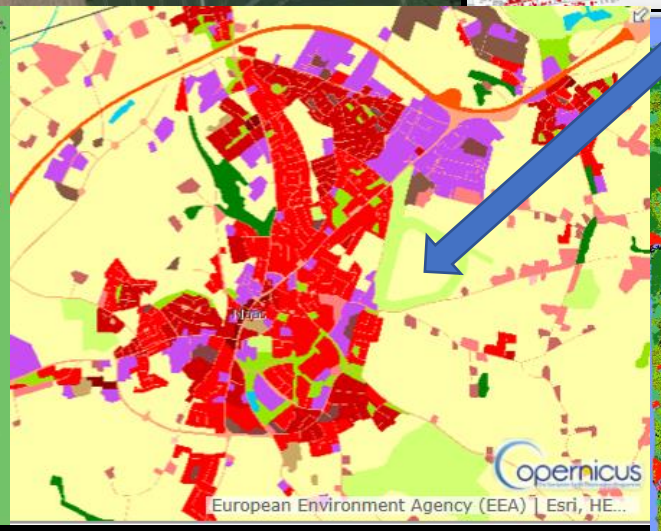
‘NORMAL’ VIEW

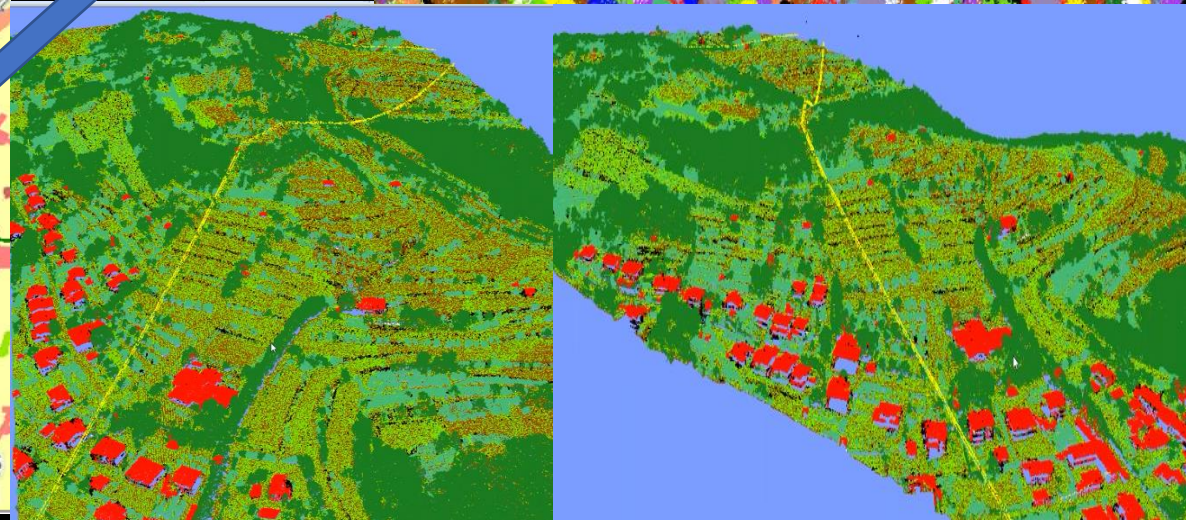












2 LAND COVER CLASSIFICATION

NATURA 2000
Based on MASE topology and CORINE

- 2.3.4.1 Agro-forestry
- 3.0.0.0 Urban Atlas: Woodland and forest
- 3.1.1.1 Broadleaved swamp forest
- 3.1.2.1 Broadleaved swamp forest
- 3.1.3.1 Other natural & semi natural broadleaved forest
- 3.1.4.1 Broadleaved evergreen forest
- 3.1.5.1 Highly artificial broadleaved plantations
- 3.2.2.1 Coniferous swamp forest
- 3.2.3.1 Other natural & semi natural coniferous forest
- 3.2.4.1 Highly artificial coniferous plantations
- 3.3.2.1 Mixed swamp forest
- 3.3.3.1 Other natural & semi natural mixed forest
- 3.3.4.1 Highly artificial mixed plantations
- 3.4.1.1 Transitional woodland and scrub
- 3.4.1.2 Lines of trees and scrub
- 3.5.1.1 Damaged forest
- 4.0.0.0 Urban Atlas: Grassland
- 4.1.1.1 Managed grassland

CORINE

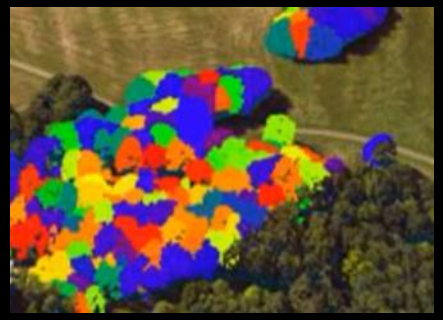
Table 2.2. CORINE land cover nomenclature

Level 1	Level 2	Level 3
1. Artificial surfaces	1.1. Urban fabric	1.1.1. Continuous urban fabric 1.1.2. Discontinuous urban fabric
	1.2. Industrial, commercial and transport units	1.2.1. Industrial or commercial units 1.2.2. Road and rail networks and associated land 1.2.3. Port areas 1.2.4. Airports
	1.3. Mine, dump and construction sites	1.3.1. Mineral extraction sites 1.3.2. Dump sites 1.3.3. Construction sites
	1.4. Artificial non-agricultural vegetated areas	1.4.1. Green urban areas 1.4.2. Sport and leisure facilities
2. Agricultural areas	2.1.Arable land	2.1.1. Non-irrigated arable land 2.1.2. Permanently irrigated land 2.1.3. Rice fields
	2.2. Permanent crops	2.2.1. Vineyards 2.2.2. Fruit trees and berry plantations 2.2.3. Olive groves
	2.3. Pastures	2.3.1. Pastures
	2.4. Heterogeneous agricultural areas	2.4.1. Annual crops associated with permanent crops 2.4.2. Complex cultivation 2.4.3. Land principally occupied by agriculture, with significant areas of natural vegetation

JOB SPECIFIC

Vegetation density

Fertilizer density



Tree sizes

LOOK UP TABLES ACROSS CATEGORISATIONS

2 INSPIRE

ANNEX: 2

	Title
	INSPIRE Data Specification on Elevation – Technical Guidelines
	INSPIRE Data Specification on Geology – Technical Guidelines
	INSPIRE Data Specification on Land Cover – Technical Guidelines
	INSPIRE Data Specification on Orthoimagery – Technical Guidelines

INSPIRE
Infrastructure for Spatial Information in Europe

D2.8.II.2 Data Specification on *Land Cover* – Technical Guidelines

Title	D2.8.II.2 INSPIRE Data Specification on *Land Cover* – Technical Guidelines
Creator	INSPIRE Thematic Working Group *Land Cover*
Date	2013-12-10
Subject	INSPIRE Data Specification for the spatial data theme *Land Cover*
Publisher	European Commission Joint Research Centre
Type	Text
Description	This document describes the INSPIRE Data Specification for the spatial data theme *Land Cover*
Contributor	Members of the INSPIRE Thematic Working Group *Land Cover*
Format	Portable Document Format (pdf)
Source	
Rights	Public
Identifier	D2.8.II.2_v3.0
Language	En
Relation	Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
Coverage	Project duration

189 PAGES LONG

3

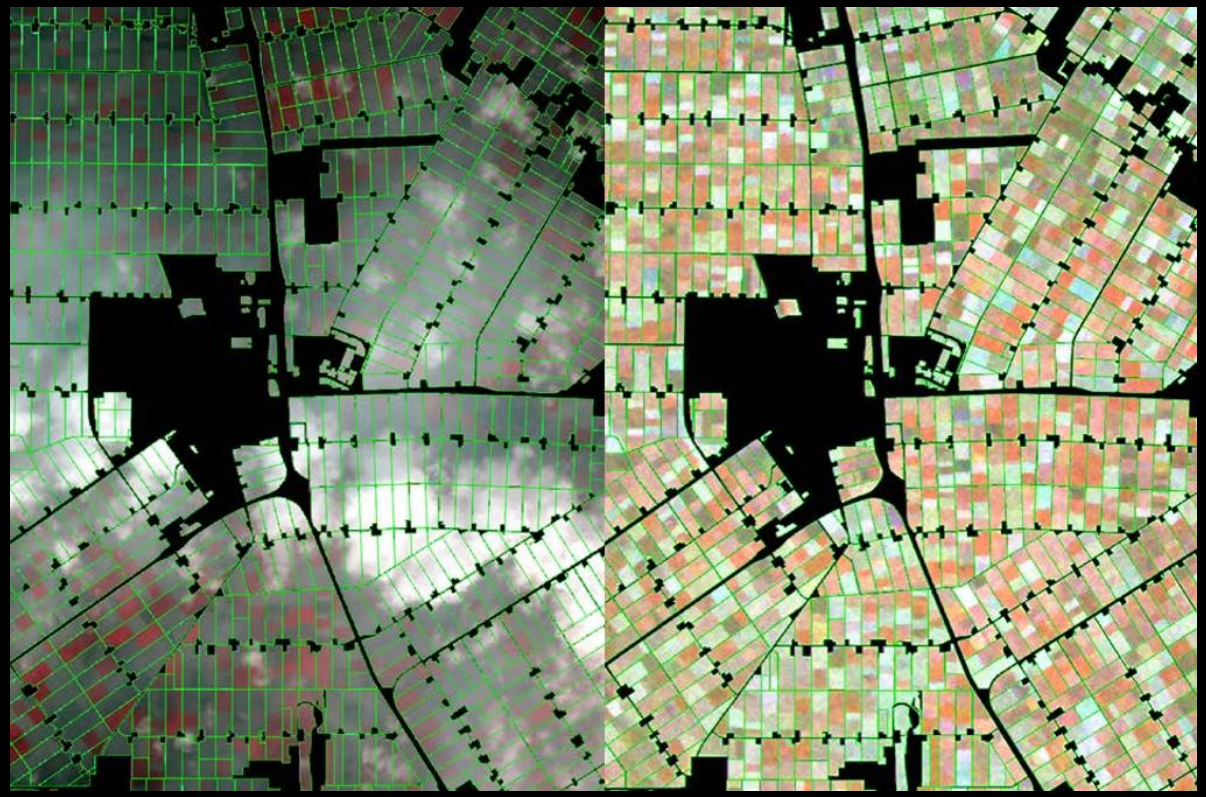
LAND COVER USES

USES ….. HUNDREDS, THOUSANDS, 10s OF THOUSANDS ……..

…….. CARBON SEQUESTRATION / CLIMATE CHANGE

FIRE DETECTION / RISK ASSESSMENT URBAN SPRAWL DETECTION SOIL SEALING URBAN RESIDENTIAL NEIGHBOURHOOD AMENITY PLANNING LAW ENFORCEMENT NATURA 2000 SITE HEALTH BIODIVERSITY CHANGE INTEGRATION WITH ADDRESS POINT DATA ILLEGAL DUMPING DETECTION ELECTRICITY GENERATION SOLAR HEATING POTENTIAL CHECKING FARM PAYMENTS PARKING LOT USAGE……

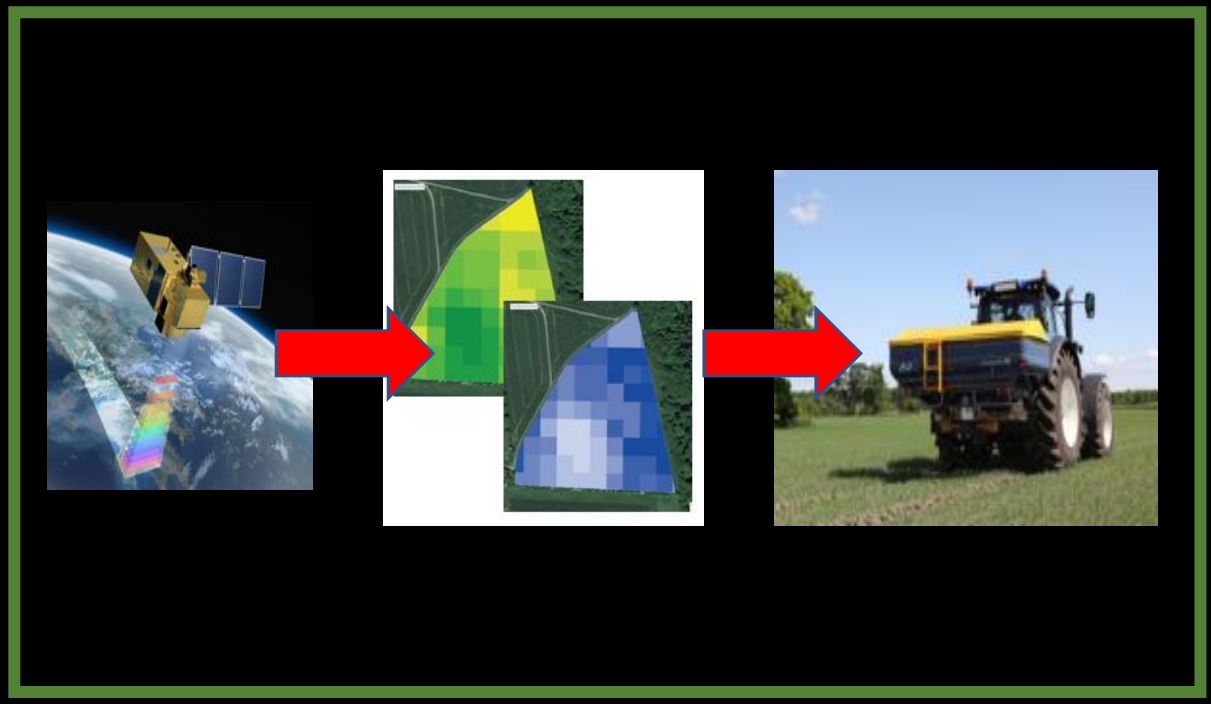
3 USES EXAMPLES … just a very very very few from the many possible ……



Sentinel 2a, false colour composite with abundant clouds

Sentinel 1a, VH composite unaffected by clouds

FARMING LAND COVER FOR EU CAP PAYMENTS (research stage)



sentinel 2 > vegetation index field cover > fertilizer distribution > tractor automatically distributes fertilizer

FREE APP FOR FARMERS

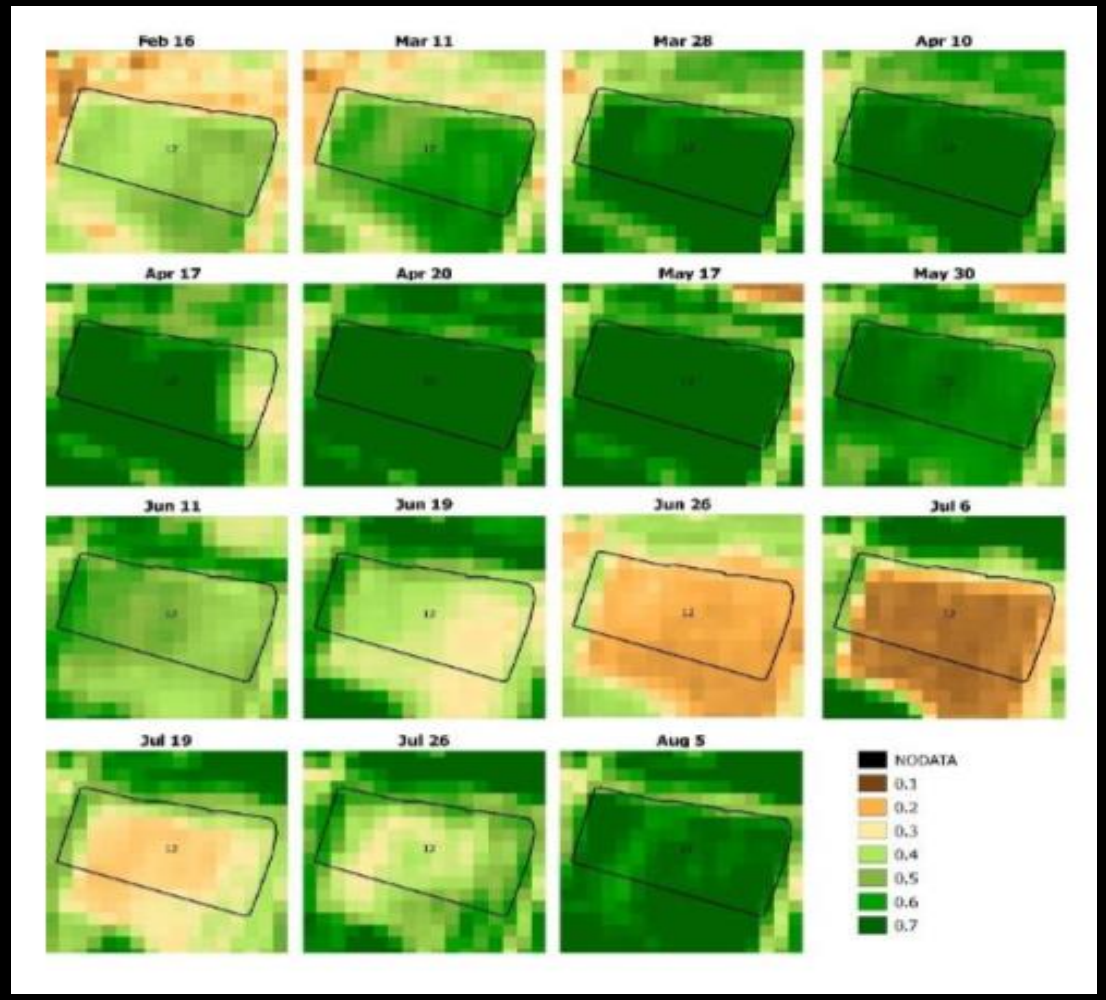
3 USES EXAMPLES …. EU COP PAYMENTS END RESULT

(research stage)

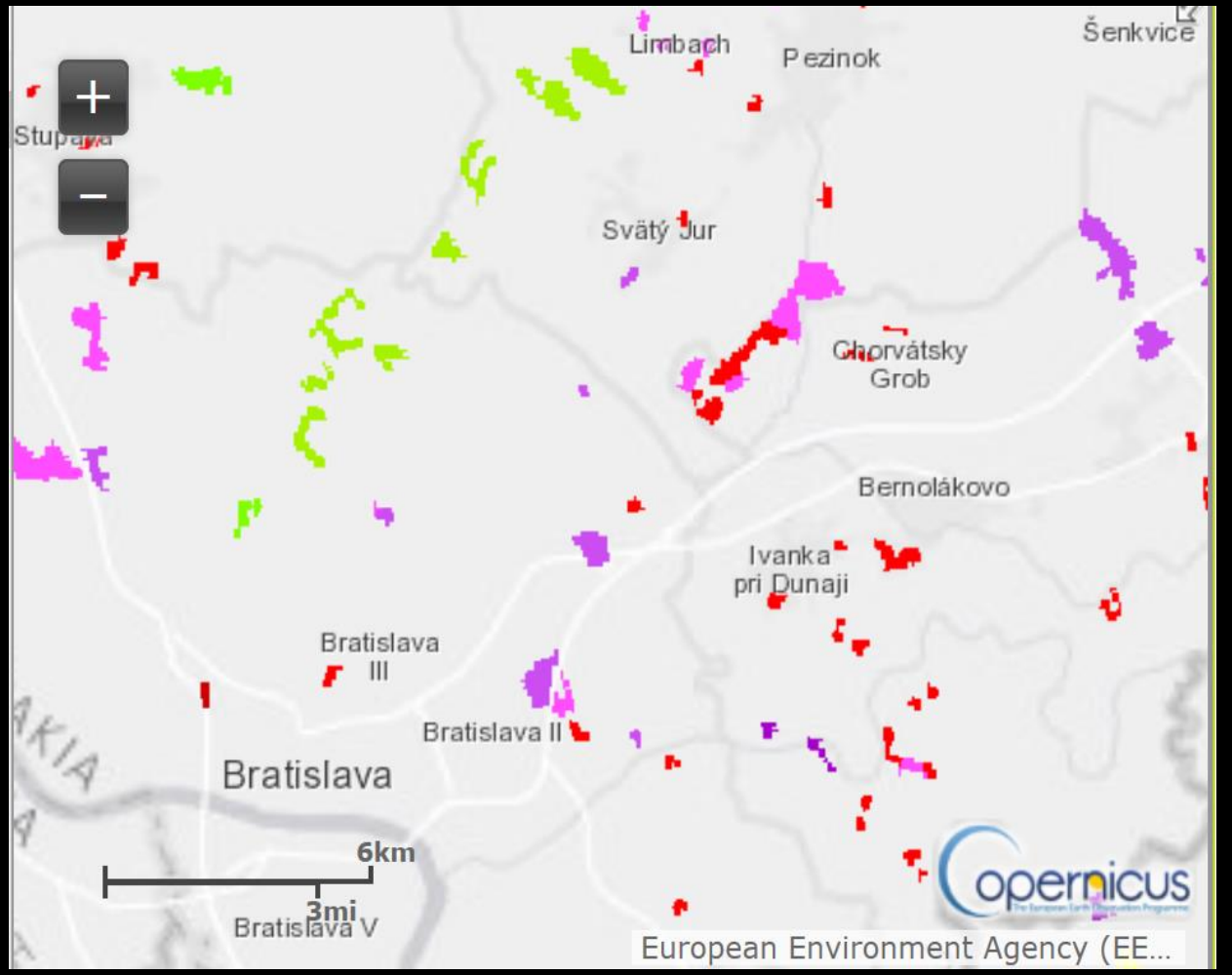
	Crop group		AP Assessment		Trafic Light	Area Determined (ha)	Relevance for the decision at dossier level	Imapct on the payment
AP ID	Declared	Detected	Status	Categorization				
AP001	Crop group 1	Crop group 1	Assessed	Compliant		15,7	YES	YES
AP002	Crop group 3	Crop group 3	Assessed	Compliant		8,45	YES	YES
AP003	Crop group 2	Crop group 2	Assessed	Compliant		6,7	YES	YES
AP004	Crop group 1	??	Assessed	Insufficient evidence		2,15	NO	NO
AP005	Crop group 1	Crop group 1	Assessed	Compliant		22,73	YES	YES
AP006	Crop group 2	Crop group 2	Assessed	Compliant		11,85	YES	YES
AP007	Crop group 2	Crop group 1	Assessed	Non-compliant		4,2	YES	NO
AP008	Crop group 2	??	Assessed	Expert judgement required	Blinking	0,5	NO	NO
AP009	Crop group 2		Not Assessed	No results available		0,2	NO	NO
AP010	Crop group 2		Not Assessed	No results available		0,1	NO	NO
					Total	72,48		

based on combined use of Sentinels 1 & 2 data

3 USES EXAMPLES …. CHANGE DETECTION (a generic use class)



farm plot scale



urban city scale … Bratislava

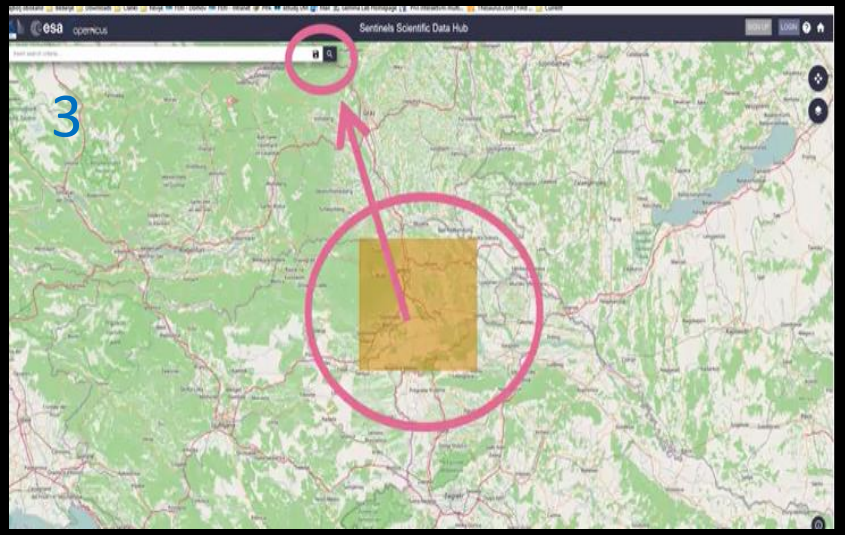
A FEW

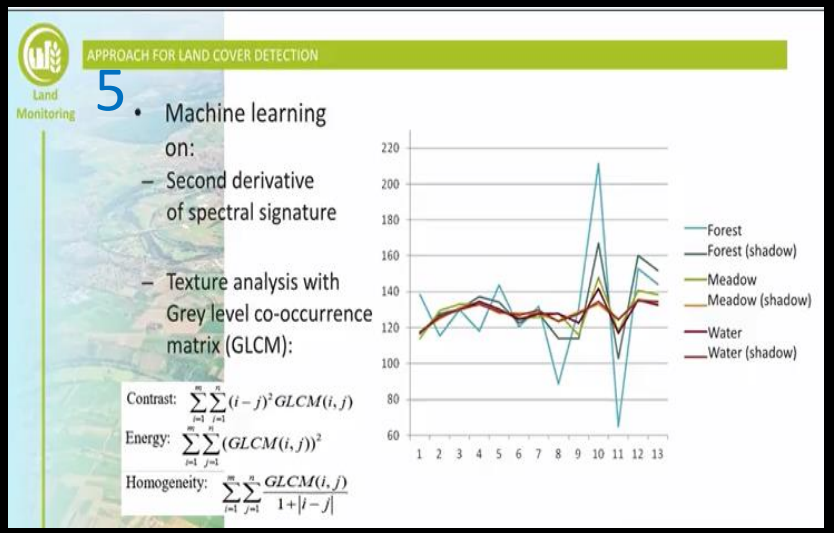
CHALLENGES / ISSUES

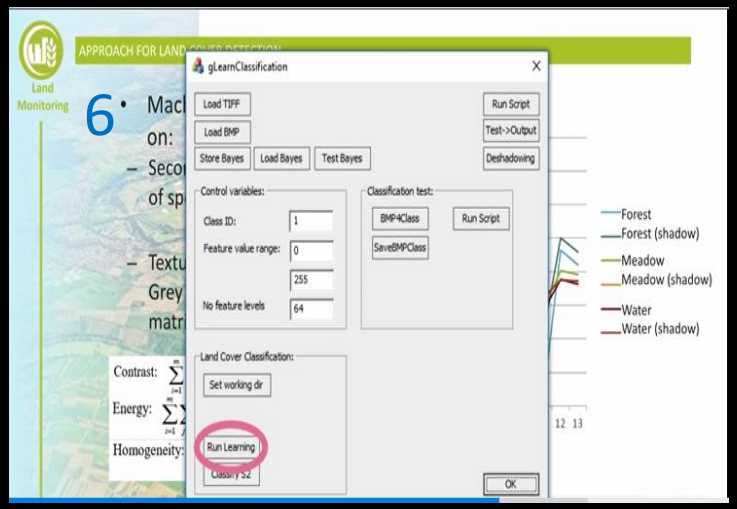
4 AUTOMATION (1)

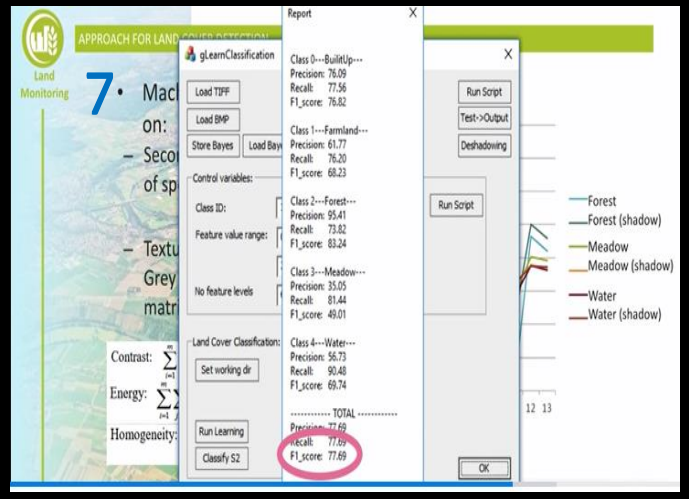
1 OBTAIN TRAINING LAND COVER DATA

2 GO TO COPERNICUS SCIENTIFIC HUB

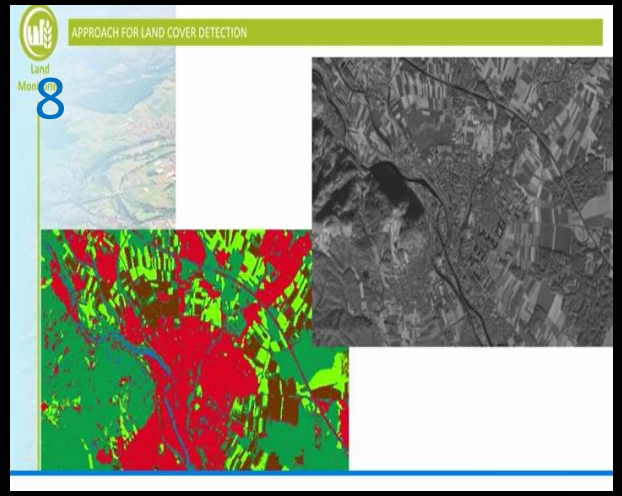








ITERATIONS



9

WHEN 95% ACCURACY … APPLY ACROSS WHOLE AREA

4 AUTOMATION (2)

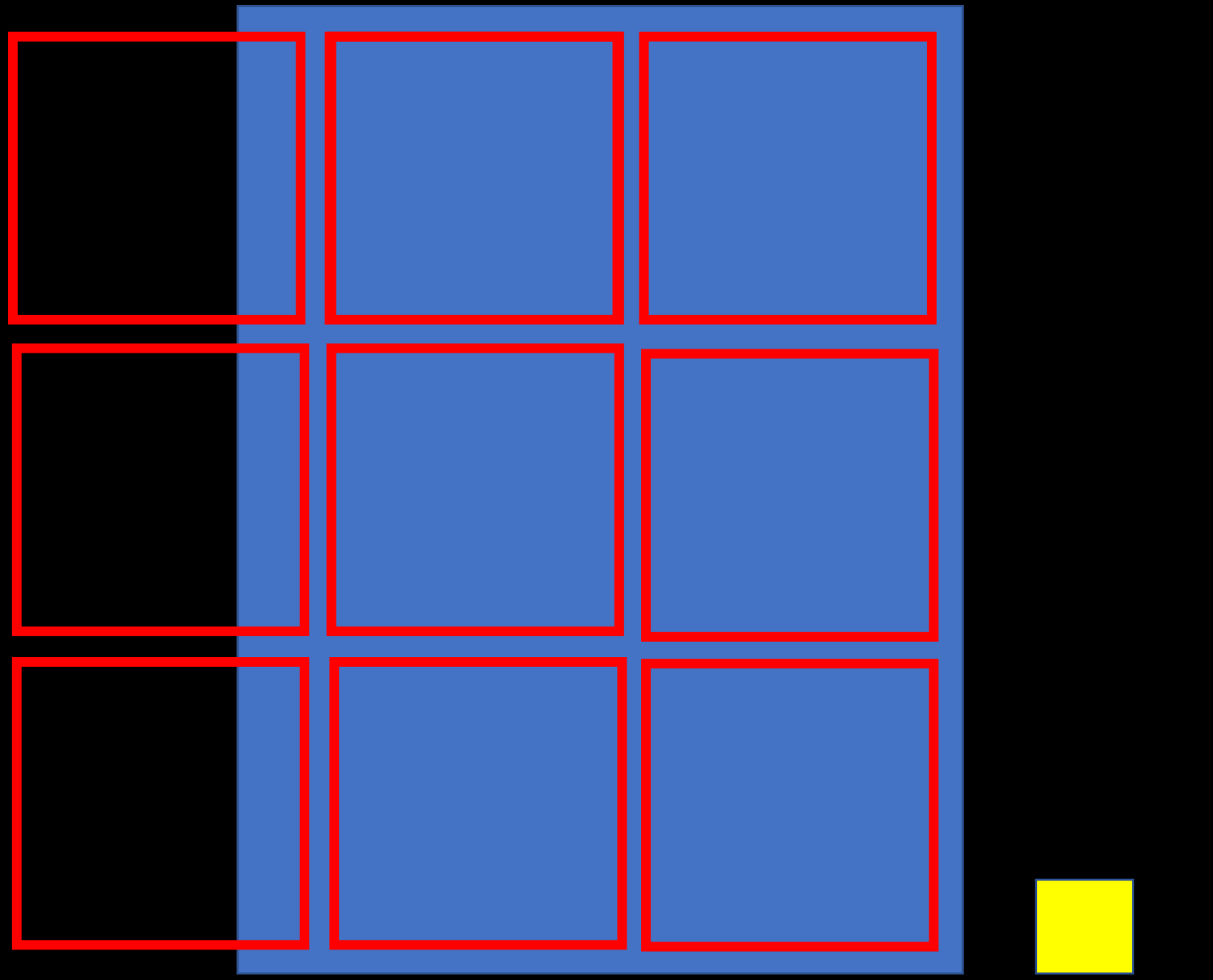
4 RESOLUTION

SENTINEL 2

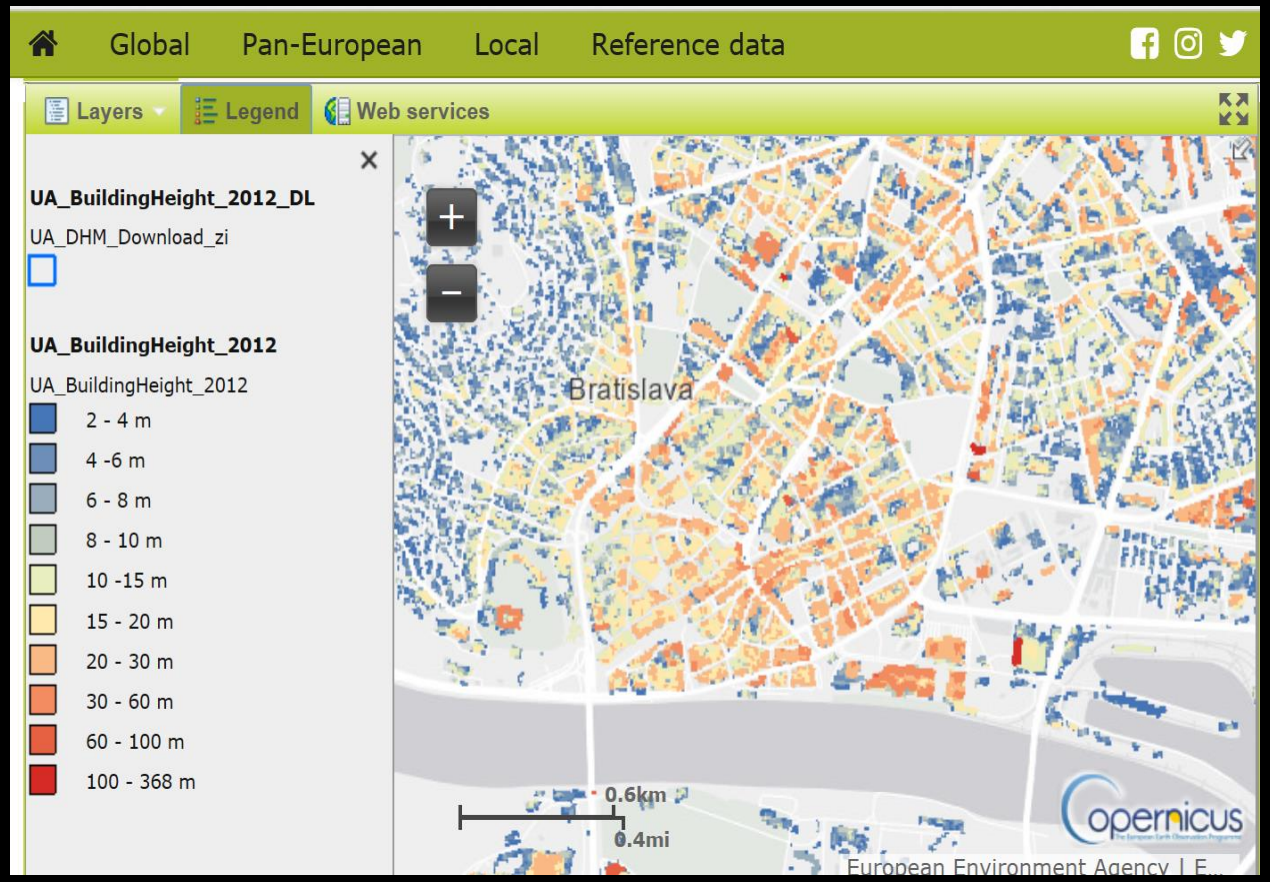
MEASURING ANYTHING LARGER THAN ABOUT 10m X10m great & its free

STAGED USE OF SATELLITE DATA

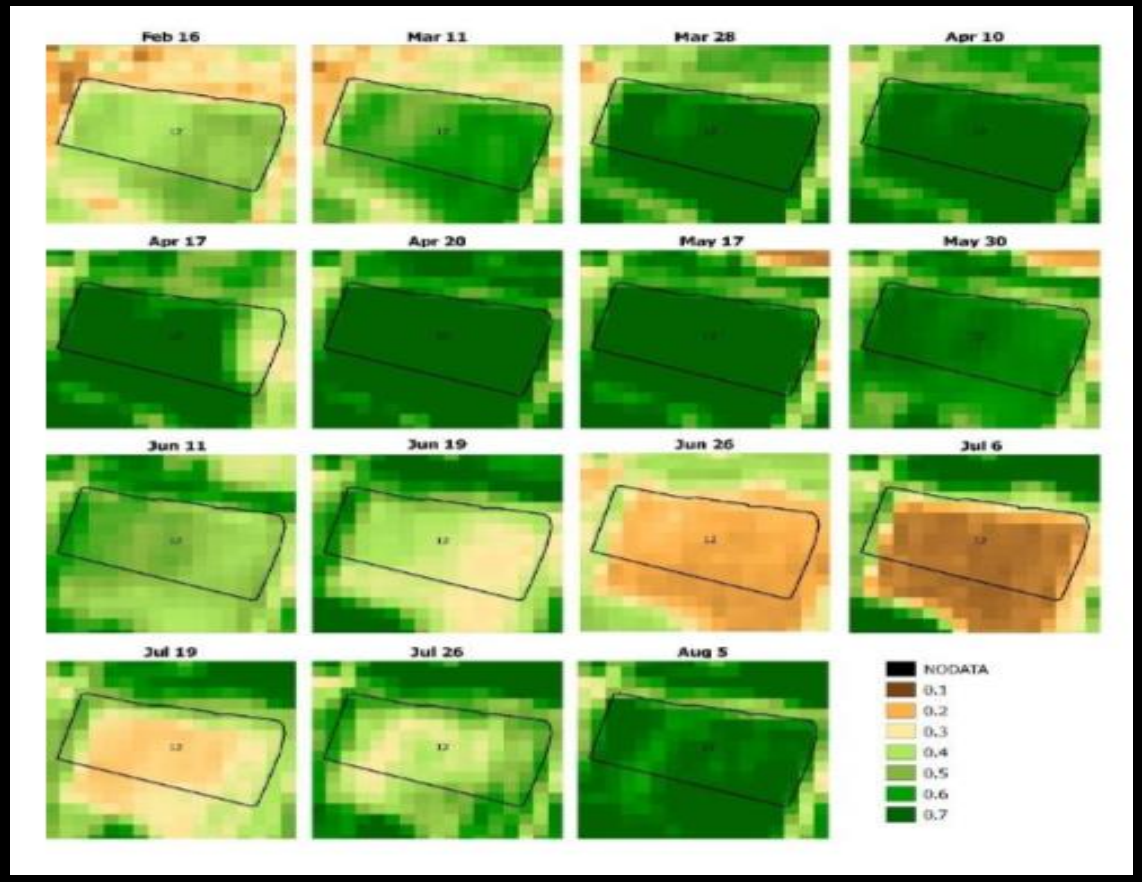
(1) 'LOWER' RESOLUTION DATA (EG SENTINEL 2)
(2) AREAS OF INTEREST …. CHANGE DETECTION
(3) 'HIGHER' RESOLUTION DATA TO GET CLOSER LOOK (EG WORLD-VIEW 3 … 31cm x 31cm)



4 COVER DATA INTEGRATION WITH A FEW OTHER DATA TYPES

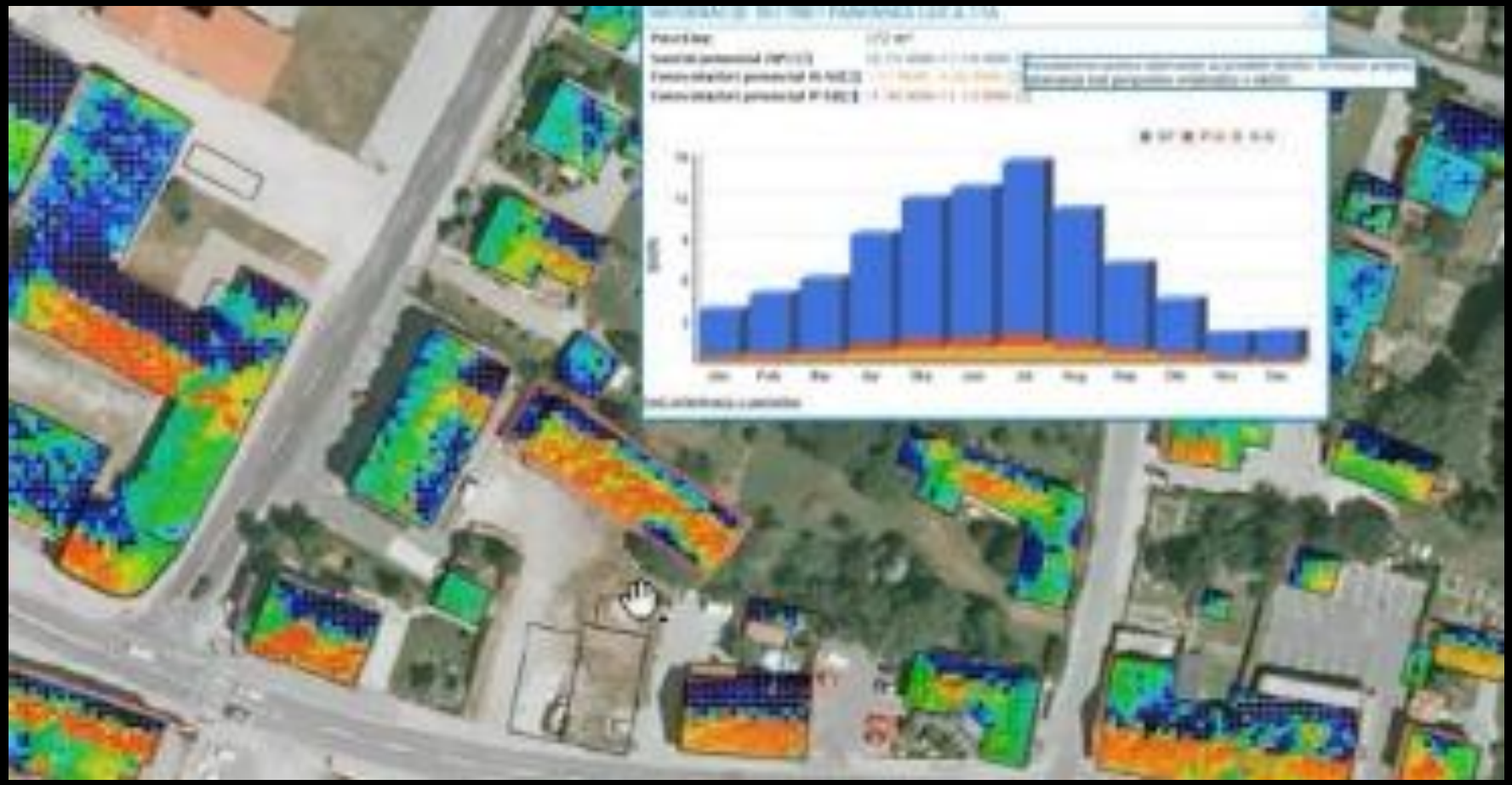


building footprints & heights



vegetation cover & plot boundary

4 COVER DATA INTEGRATION WITH MULTIPLE OTHER DATA TYPES



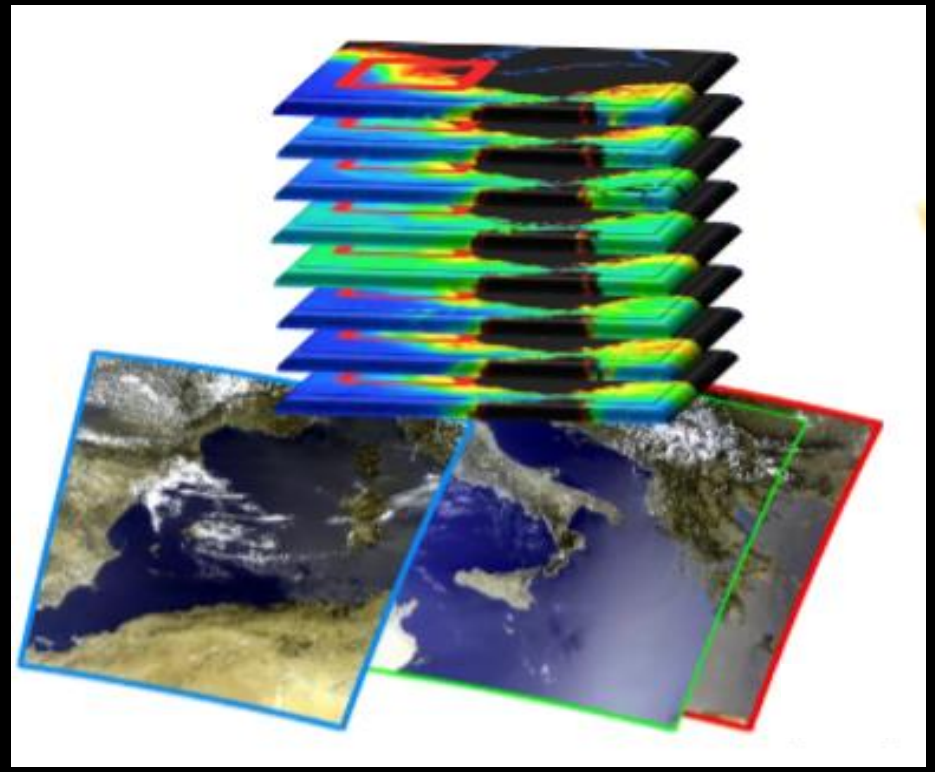
Building roofs & orientation & solar radiation levels & solar panel efficiency
> electricity generation potential

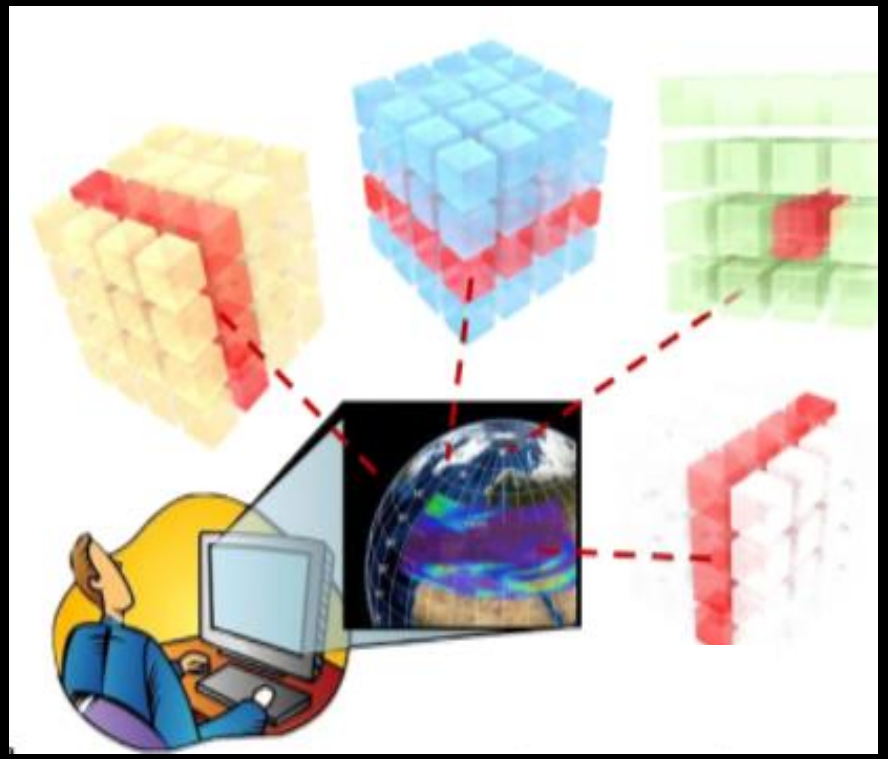
4

truly MASSIVE

ORGANISING & MANAGING MASSIVE AMOUNTS OF SATELLITE (and other) DATA

DATA CUBES





We need a European DATA CUBE (help … Copernicus we need you ….)
compatible with a GLOBAL DATA CUBE

A
absolutne
PRILEZITOSTI VSADE … PREJDITE FRE TO
…. DAKUJEM STE ….