



Source : Copernicus Brochure, © EU 2015

Source : UN, 2016

English version

## Earth Observations:

# MESSAGES OF SOME RECENT INTERNATIONAL EVENTS IN THE SDG CONTEXT



G. REMETÉY-FÜLÖPP, SZ. MIHÁLY T. PALLYA  
FOUNDING MEMBERS OF MFTTT'S  
WORKING GROUP ON EO/GI4SDG

# CONTENT



GEO EO4SDG's 1st Annual Meeting  
New York, 5 Aug 2019

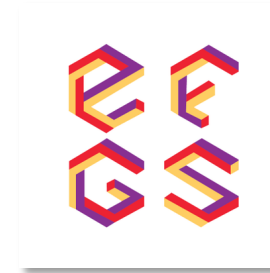


CGLS GLS User Group Meeting on SDGs  
Brussels, 15 Oct 2019

**Copernicus Global Land Service**  
*Providing bio-geophysical products of global land surface*



UN GGIM Academic Network  
New York, 30 July 2019



European Forum for  
Geography and Statistics

12th EFGS Conference  
Manchester, 9-11 Oct, 2019



2nd DLR EO Symposium  
Köln, 2019. nov. 12-13



**ISDE11** 11th INTERNATIONAL  
SYMPOSIUM ON  
DIGITAL EARTH  
Florence (Italy), September 24 – 27, 2019

<https://www.digitalearth2019.eu>

*Digital Earth in a transformed Society*



**GEO EO4SDG**  
1st Annual Meeting  
5 Aug 2019, New York

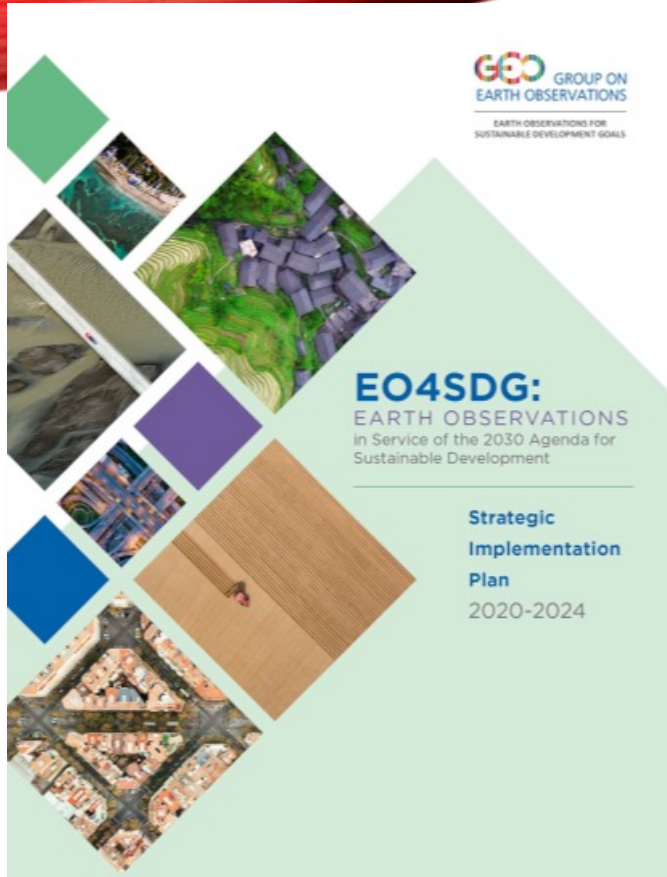
Arranged by the GGIM Sec at the UN Statistical Division, the venue of the meeting was the UN Headquarters prior the Annual Assembly of the UN-GGIM

The Meeting was chaired by Argyro Kavvada (NASA-BAH), executive of the GEO EO4SDG initiative.

As acknowledged partner, MFTTT WG4SDG attended the meeting in remote connection

News on the meeting were posted in the blog called [Napló](#).

Especially the presentations delivered by Steven Ramage of GEO Sec or Ian Coady of the UK's Ministry of Development (his talk on the British EO Ecosystem) are recommended to visit.



## EO and the SD Goals, Targets & Indicators

Table shows where EO is capable to provide support by direct measurements or indirect manner to the achievement of SDGs.

Source: EO4SDG Strategic Implementation Plan 2020-2024

Sustainable Development Goals															
Earth Observations in Service of the Agenda 2030															
Target										Goal	Indicator				
Contribute to progress on the Target yet not the Indicator per se											Direct measure or indirect support				
								1.4	1.5	1.4.2					
							2.3	2.4	2.c	2.4.1					
				3.3	3.4	3.9	3.d			3.9.1					
									5.a	5.a.1					
	6.1	6.3	6.4	6.5	6.6	6.a	6.b			6.3.1	6.3.2	6.4.2	6.5.1	6.6.1	
				7.2	7.3	7.a	7.b			7.1.1					
								8.4							
				9.1	9.4	9.5	9.a			9.1.1	9.4.1				
					10.6	10.7	10.a								
	11.1	11.3	11.4	11.5	11.6	11.7	11.b	11.c			11.1.1	11.2.1	11.3.1	11.6.2	11.7.1
				12.2	12.4	12.8	12.a	12.b			12.a.1				
				13.1	13.2	13.3	13.b			13.1.1					
		14.1	14.2	14.3	14.4	14.6	14.7	14.a			14.1.1	14.3.1	14.4.1	14.5.1	
	15.1	15.2	15.3	15.4	15.5	15.7	15.8	15.9			15.1.1	15.2.1	15.3.1	15.4.1	15.4.2
								16.8							
17.2	17.3	17.6	17.7	17.8	17.9	17.16	17.17	17.18			17.6.1	17.18.1			



	Population distribution	Cities and infrastructure mapping	Elevation and topography	Land cover and use mapping	Oceanographic observations	Hydrological and water quality observations	Atmospheric and air quality monitoring	Biodiversity and ecosystem observations	Agricultural monitoring	Hazards, disasters and environmental impact monitoring
1 No poverty										
2 Zero hunger										
3 Good health and well-being										
4 Quality education										
5 Gender equality										
6 Clean water and sanitation										
7 Affordable and clean energy										
8 Decent work and economic growth										
9 Industry, innovation and infrastructure										
10 Reduced inequalities										
11 Sustainable cities and communities										
12 Responsible consumption and production										
13 Climate action										
14 Life below water										
15 Life on land										
16 Peace, justice and strong institutions										
17 Partnerships for the goals										

- Population distribution
- Cities and infrastructure mapping
- Elevation and topography
- Land cover and use mapping
- Oceanographic observations
- Hydrological and water quality observations
- Atmospheric and air quality monitoring
- Biodiversity and ecosystem observations
- Agricultural monitoring
- Hazards, disasters and environmental impact monitoring

# EO4SDG

- Népesség-eloszlás
- Városok és infrastruktúra térképezés
- Magasság és topográfia
- Felszínborítás és földhasználat-térképezés
- Oceanográfiai megfigyelések
- Hidrológiai és vízminőségi megfigyelések
- Légköri és levegőminőségi megfigyelések
- Biológiai sokféleség és ökoszisztéma megfigyelések
- Mezőgazdasági monitoring
- Veszélyek, katasztrófák és környezeti hatás monitoring



SDGs and app areas of use of EO/Geospatial information  
Source: EO4SDG Strategic Implementation Plan 2020-2024

Tier	SDG Indicators where geospatial information directly contributes (Assessment by WGGI)	EO Applicability (Assessment by GEO)
<b>Tier I</b>		
9.c.1	Population covered by a mobile network	
14.5.1	Protected areas in relation to marine areas	✓
15.1.1	Forest area	✓
15.1.2	Important sites for terrestrial and freshwater biodiversity	✓
<b>Tier II</b>		
6.5.2	Transboundary basin area	
11.2.1	Population that has convenient access to public transport	✓
11.3.1	Ratio of land consumption rate to population growth rate	✓
15.3.1	Proportion of land that is degraded over total land area	✓
15.4.1	Coverage by protected areas of important sites for mountain biodiversity	✓
<b>Tier III</b>		
2.4.1	Agricultural area under sustainable agriculture	✓
6.3.2	Bodies of water with good ambient water quality	✓
6.6.1	Change in the extent of water related ecosystems over time	✓
9.1.1	Rural population who live within 2km of an all-season road	✓
11.7.1	Built-up area of cities that is open space for public use	✓
14.2.1	National exclusive economic zones managed using ecosystem-based approaches	

Tier	Indicators that geospatial information significantly supports (Assessment by WGGI)	EO Applicability (Assessment by GEO)
<b>Tier I</b>		
1.1.1	Proportion of population below the international poverty line	
5.4.1	Proportion of time spent on unpaid domestic and care work	
15.4.2	Mountain green cover index	✓
<b>Tier II</b>		
1.4.2	Proportion of population with secure tenure rights to land	✓
5.2.2	Women and girls 15 years and older subjected to sexual violence	
5.a.1	(a) Proportion of total agricultural population with ownership or secure rights over agricultural land & (b) share of women among owners or rights-bearers of agricultural land	✓
5.a.2	Proportion of countries where the legal framework guarantees women's equal rights to land ownership	
<b>Tier III</b>		
11.7.2	Proportion of persons victim of physical or sexual harassment	
<b>Multiple Tier I/II/III</b>		
4.5.1	Parity indices for all education indicators that can be disaggregated	

SDG indicators where geospatial information directly contributes or significantly supports  
 In: EO4SDG Strategic Implementation Plan 2020-2024. Source: UN WG on GI





**UN GGIM Assembly**  
New York, 7-9 August 2019

Two topics to be shared in the SDG context:

**The evolving Geospatial Industry Council**  
([WGIC](#))

The number of members of the organisation established in 2018 has been doubled in the first year havin 40+ members today.

**Activity of the UN-GGIM Academic Network**  
[SDG Connectivity Dilemma – Land-related and Geospatial information in rural and urban resilience](#) (2019)



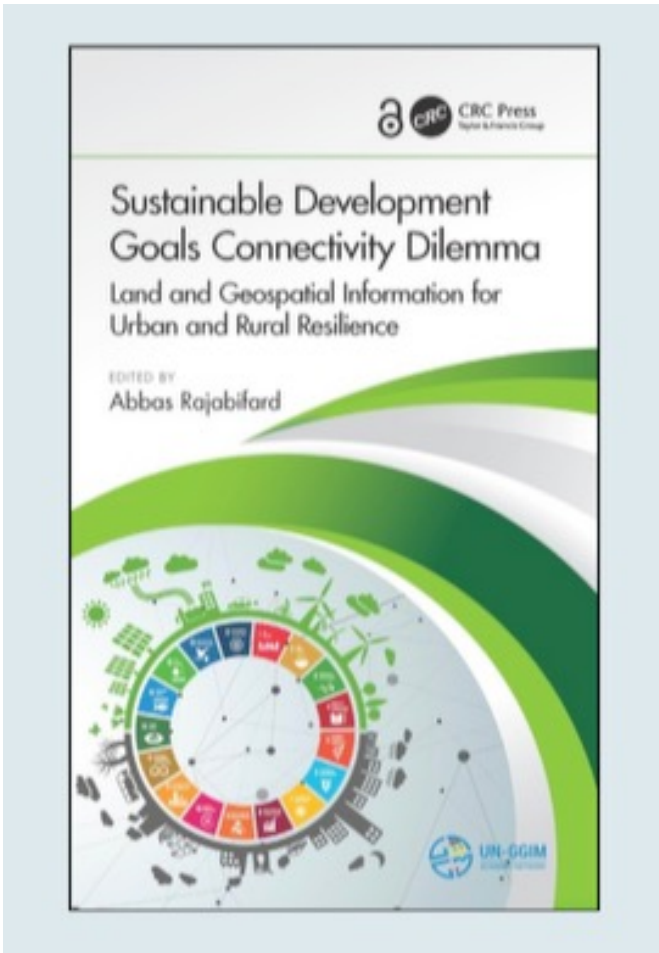
The high-volume migration from rural to urban areas and from one country to another has an impact on the sustainable development

Due to the population growth and the accelerated urbanization there is a change also in the challenges related to the complex social, economic, environmental and governance relationships during the life span of the Agenda 2030.

**The role of land-related and geospatial data infrastructures and services are fundamental to achieve the SDGs.**

The thematics and objectives are in line with the critical challenges, shortages and opportunities, which were identified by the past and recent UN-GGIM events.

The topics have been addressed by interdisciplinary manner involving players of science, industry and political decision makers.



<http://oapen.org/search?identifier=1005177>

The Open Access version of this book, available at [www.taylorfrancis.com](http://www.taylorfrancis.com), has been made available under a Creative Commons Attribution-NonCommercial-No Derivatives 4.0 license

## Main objectives of the work

Based on experiences of internationally acknowledged experts, providing an interdisciplinary study on

- inter-relation between SDGs, geospatial information, legislative, governance, institutional components including the enabling technical tools,
- and how to reach the resilience of the rural and urban areas

Some previous fora of the UN-GGIM Academic Network and the first UN World Geospatial Information Congress prepared by the UN Working Group on Geospatial Information

Secure Land Rights and Smart Cities - Making It Work for Sustainable Development

UN-GGIM 7th Assembly New York, August 2017

The SDGs Connectivity Dilemma: Urban Settlements, Resilience, and Sustainability

UN-GGIM 8th Assembly New York, August 2018

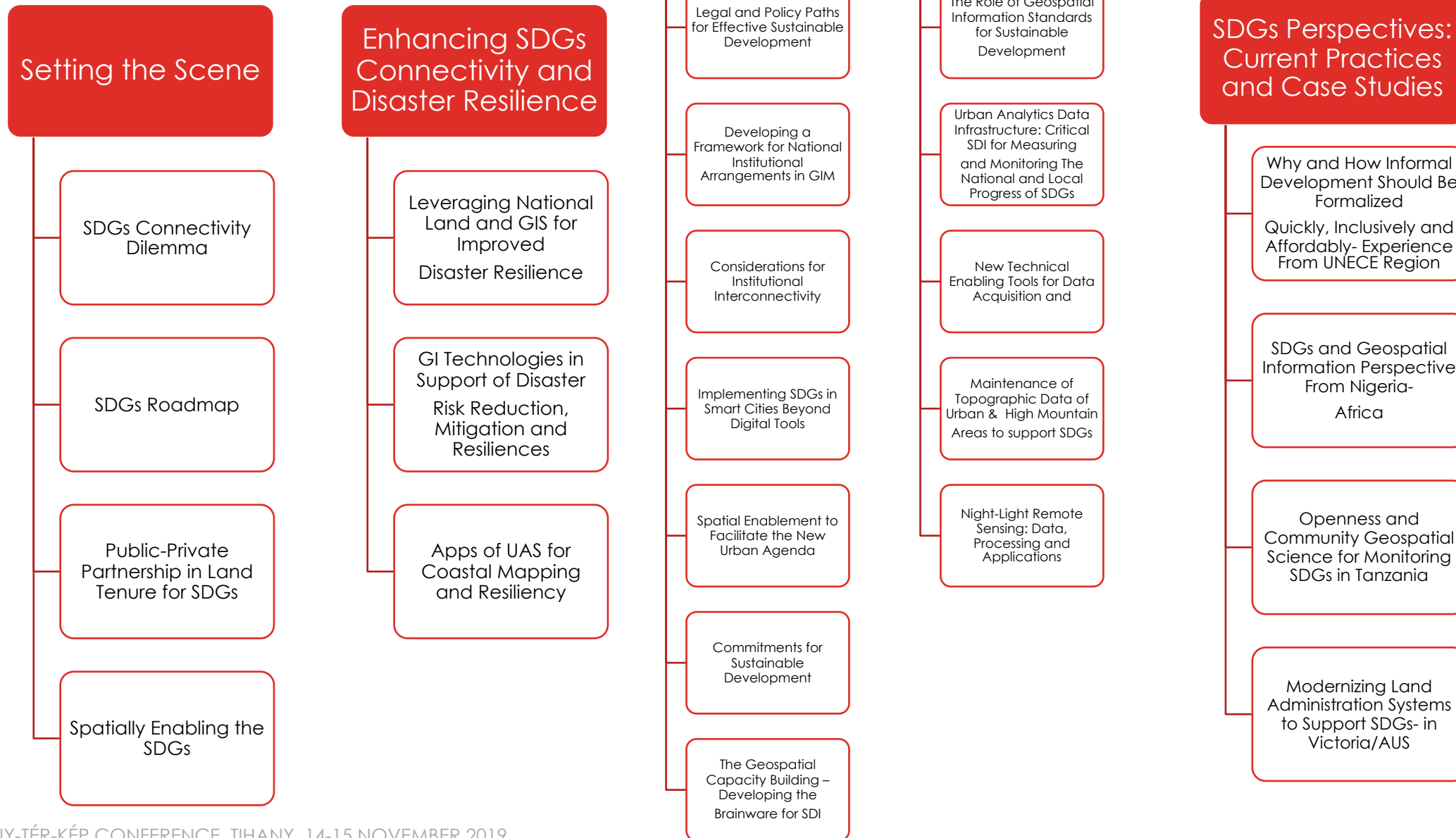
A Sustainable and Resilient World: Capacity Building and Geospatial Research for Implementing the SDG

UN World Geospatial Information Congress (UNWGIC) in China 2018

Contributors include: UN-GGIM Sec (**Greg Scott**), former leads of GSDI Association (**Abbas Rajabifard, Harlan J. Onsrud**), of ISPRS (**Gottfried Konecny, Li Deren, Maria A. Brovelli**), FIG (**Chryssy Potsiou**), EuroSDR (**Joep Crompvoets**) as well as Experts from Australia (**Suart Minchin, Serena Ho**) and many more countries.

# CONTENT OF THE STUDY

(some titles have been shortened)





## Highlights:

Upon the vision of the US Vice-President Al Gore the initiative of ISDE was taken by PR China in 1999 lead by the Chinese Academic of Science (CAS). Established the International Society of Digital Earth in 2006, ISDE became a high-profile organisation having two scientific journals.

2019 gave opportunity to Europe by the new presidency in person of Dr. Alessandro Annoni, one of the father of INSPIRE and head of the JRC's Unit of Digital Economy

ISDE is looking for new ways of working in line with the new challenges and will use the opportunities provided by the novel technologies

The Manual of Digital Earth will be published on-line by Springer in November 2019 A huge work with about 100 authors.

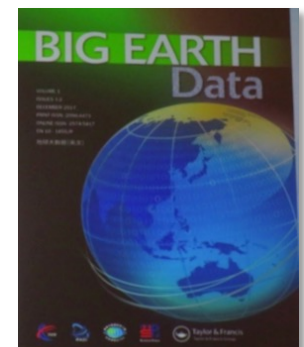
**Hungary is active participant in ISDE since 2003 and we have to keep it!**



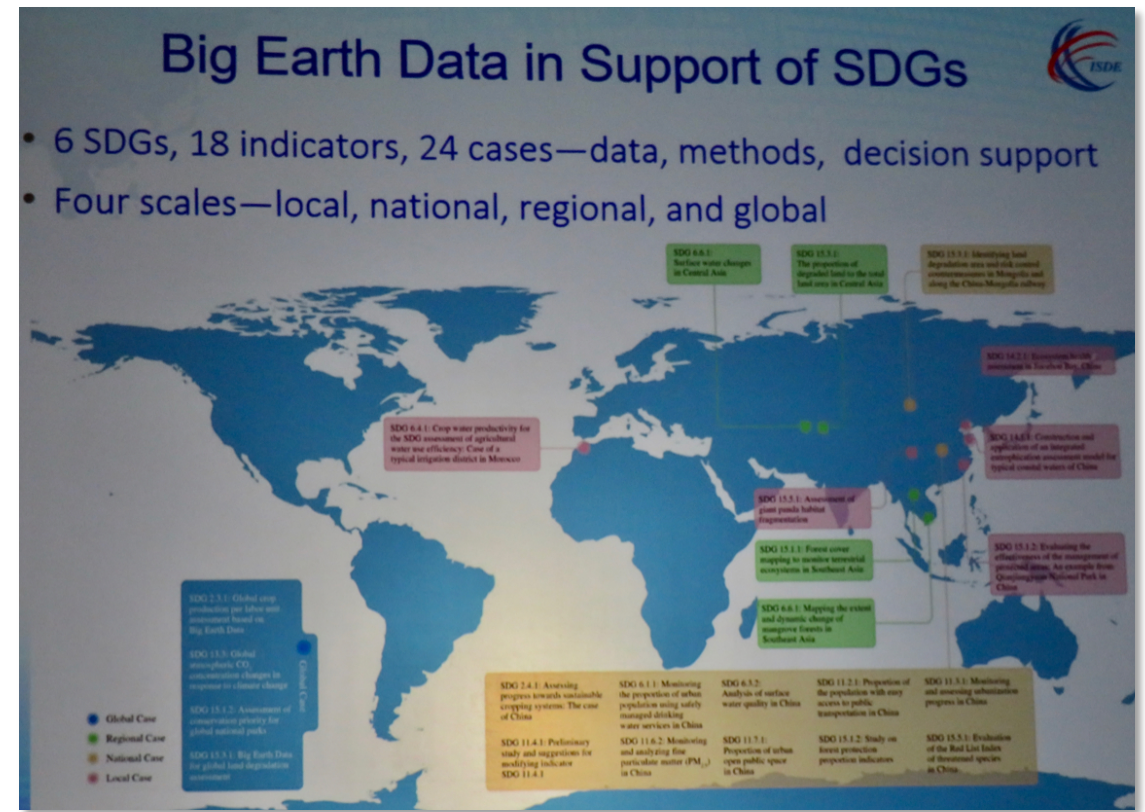
ISDE11 Symposium,  
ISDE Meeting of the European Chapter  
IJ Digital Earth & IJ Big Earth Data  
brainstorming  
Florence, 24-28 September 2019



So far the activity of ISDE was rather limited to its ISDE symposia and Digital Earth Summits. In 2008 and 2018, two scientific journals were also launched.



ISDE - under the leadership of China - prepared an information document in September 2019, which was submitted to the UN General Assembly. Download: also from [here](#).



# ALESSANDRO ANNONI

Head of the **Digital Economy Unit of the Joint Research Centre - European Commission**



### Experience and Interests:

- He worked for several years in the private sector and **managed companies specialised in Remote Sensing, Geomatics, Software and Information Systems development.**
- He is member of the **Group on Earth Observations (GEO) Program Board.**

### Awards:

- **Ian McHarg Medal** of the European Geosciences Union – Earth and Space Science Informatics Division (2013).
- **Digital Earth Science and Technology Contribution Award** of ISDE for outstanding contribution to advancing the development of Digital Earth (2016).

- IoT
- Block Chain
- Virtual Reality / Augmented Reality
- Artificial Intelligence
- Hyper Connectivity
- 5G, Fog/Edge computing
- Progress in computing and microelectronics
- In memory computing...

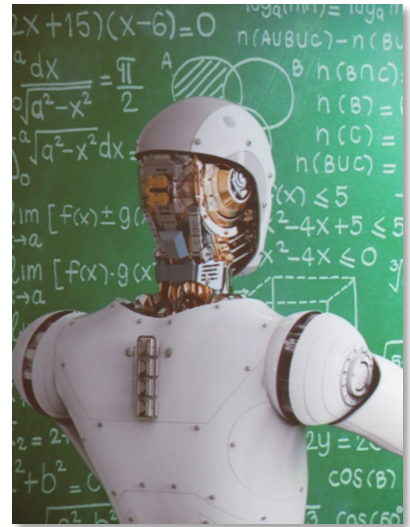


### Major challenges:

- Big Data management
- Creation of DE platforms
- Development of DE ecosystems
- The social dimension
- DE capacity building from heterogenous curricula

### New challenges:

- Sustainability
- Ethics and security
- Digital governance



Credit: A.Annoni. Relevant European solution e.g. P.Baumann „Big Earth Data coverage service enabling Analysis Ready Data” [here](#)

Credit: A. Annoni



Chapter 1 Understanding Digital Earth

**Part I Digital Earth Technologies**

Chapter 2 Digital Earth Platforms

Chapter 3 Remote Sensing Satellites for Digital Earth

Chapter 4 Satellite Navigation for Digital Earth

Chapter 5 Geospatial Information Infrastructures

Chapter 6 Geospatial Information Processing Technologies

Chapter 7 Geospatial Information Visualization & Extended Reality Displays

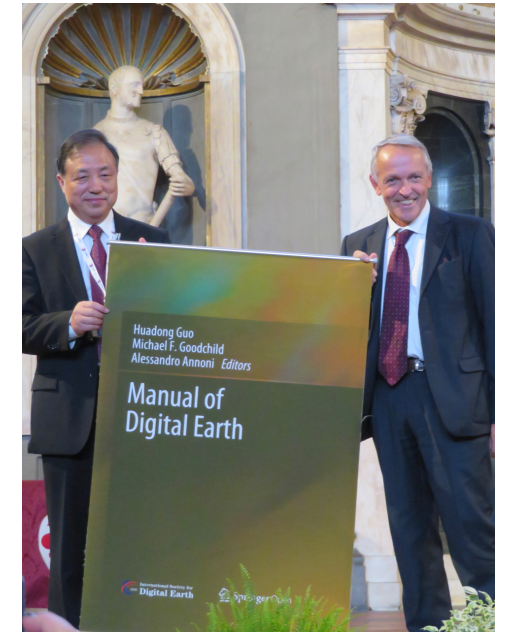
Chapter 8 Transformation in Scale for Continuous Zooming

Chapter 9 Big Data and Cloud Computing

Chapter 10 Artificial Intelligence

Chapter 11 Internet of Things

Chapter 12 Social Media and Social Awareness



H.Guo és A.Annoni

**Part II Digital Earth for Multi-domain Applications**

Chapter 13 Digital Earth for Sustainable Development Goals

Chapter 14 Digital Earth for Climate Change Research

Chapter 15 Digital Earth for Disaster Mitigation

Chapter 16 Digital City: An Urban Perspective on Digital Earth

Chapter 17 Digital Heritage

Chapter 18 Citizen Science in Support of Digital Earth

Chapter 19 The Economic Value of Digital Earth

**Part III Digital Earth Regional & National Development**

Chapter 20 Digital Earth in Europe

Chapter 21 Digital Earth in Australia

Chapter 22 Digital Earth in China

Chapter 23 Digital Earth in Russia

**Part IV Digital Earth Education and Ethics**

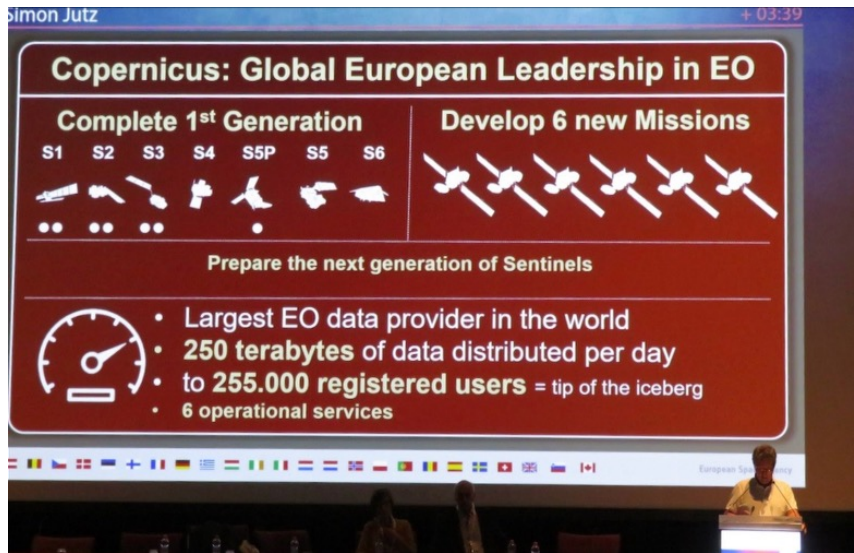
Chapter 24 Digital Earth Education

Chapter 25 Digital Earth Ethics

Chapter 26 Digital Earth Challenges and Future Trends

Editors-in-Chief and content of the Manual of Digital Earth  
Published on line in November 2019. Openly accessible  
Image credits: H.Guo és A. Annoni





Copernicus: Global European leadership in EO !  
Credit: Simon Lutz, DG Grow, Head, Copernicus program



Meeting of the DE European Chapter  
Lead by Mattia Marcensini (DLR)

1



Accessible digital contents

- 1 Europe by Copernicus
- 2 EU Space Policy
- 3 DIAS Data Access
- 4 Copernicus Overview
- 5 Copernicus Benefits
- 6 Copernicus Brochure



2



2



3



5

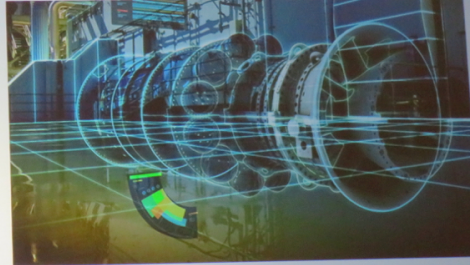


6

Documents on the topics  
of the Copernicus Session

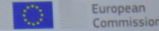
# Digital Earth vs Digital Twin

Digital twins are virtual replicas of physical devices that data scientists and IT pros can use to run simulations before actual devices are built and deployed. They are also changing how technologies such as IoT, AI and analytics are optimized.



<https://www.networkworld.com/article/3280225/what-is-digital-twin-technology-and-why-it-matters.html>

<https://blog.edunox.com/internet-of-things/digital-twin-new-big-strategic-rise-iot/>



ISDE11 11th INTERNATIONAL SYMPOSIUM ON DIGITAL EARTH  
Florence (Italy), September 24 - 27, 2019  
*Digital Earth is a transformed Society*

## Global sustainability: the challenge for science

Geoffrey Boulton  
(University of Edinburgh & the International Science Council)

ICSU Codata on SDG

ISDE11 11th INTERNATIONAL SYMPOSIUM ON DIGITAL EARTH  
Florence (Italy), September 24 - 27, 2019  
*Digital Earth is a transformed Society*

## Integrated Geospatial Information Framework: Digitally Enabling the SDGs

Greg Scott, UN-GGIM Secretariat  
Environmental Statistics and Geospatial Information Branch  
United Nations Statistics Division  
Department of Economic and Social Affairs  
United Nations, New York

UN-GGIM Sec on SDG

JRC: DE & Digital Economy -: our digital age

## Artificial Intelligence: Trustworthy AI & Bias

Barry O'Sullivan, University College Cork, Ireland  
Vice Chair, European Commission High-Level Expert Group on AI  
President, European Artificial Intelligence Association

Barry O'Sullivan

SUSTAINABLE DEVELOPMENT GOALS  
17 GOALS TO TRANSFORM OUR WORLD

- 1 NO POVERTY
- 2 ZERO HUNGER
- 3 GOOD HEALTH AND WELL-BEING
- 4 QUALITY EDUCATION
- 5 GENDER EQUALITY
- 6 CLEAN WATER AND SANITATION
- 7 AFFORDABLE AND CLEAN ENERGY
- 8 DECENT WORK AND ECONOMIC GROWTH
- 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
- 10 REDUCED INEQUALITIES
- 11 SUSTAINABLE CITIES AND COMMUNITIES
- 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
- 13 CLIMATE ACTION
- 14 LIFE BELOW WATER
- 15 LIFE ON LAND
- 16 PEACE, JUSTICE AND STRONG INSTITUTIONS
- 17 PARTNERSHIPS FOR THE GOALS

European AI Association on SDGs, Ethics of AI, ...

Barry O'Sullivan

The European Commission's  
**HIGH-LEVEL EXPERT GROUP ON ARTIFICIAL INTELLIGENCE**

**AI**

**DRAFT ETHICS GUIDELINES FOR TRUSTWORTHY AI**

Working Document for stakeholders' consultation  
Brussels, 18 December 2018

### Ethics Guidelines for Trustworthy AI

**Lawful  
Ethical  
Robust**

#### 7 Requirements

1. Human autonomy and agency
2. Technically robust and safe
3. Privacy and data governance
4. Transparency
5. Diversity, non-discrimination and fairness
6. Societal and environmental wellbeing
7. Accountability

Sanjay Kumar

# Digital Society and Data Economy: Policy Imperatives

27 September, Florence

**Sanjay Kumar**  
 Founder & CEO, Geospatial Media and Communications  
 Founder & CEO, World Geospatial Industry Council  
 Board Member, Radiant Earth Foundation  
 Board Member, Open Geospatial Consortium  
 Member, US National Geospatial Advisory Committee  
 Council Member, International Society for Digital Earth,

**18 ZETTABYTES**  
total data created, captured or replicated so far

**175 ZETTABYTES**  
total data market size to touch by 2025

**2.5 QUINTILLION**  
data created each day at our current pace

**40,000**  
searches by processed by Google every second

**90%**  
of this data generated in last two years

**1.5 BILLION**  
people active on Facebook every day

**66%**  
of the world's population now own a mobile phone

**THE WORLD IS AWASH WITH DATA TODAY**

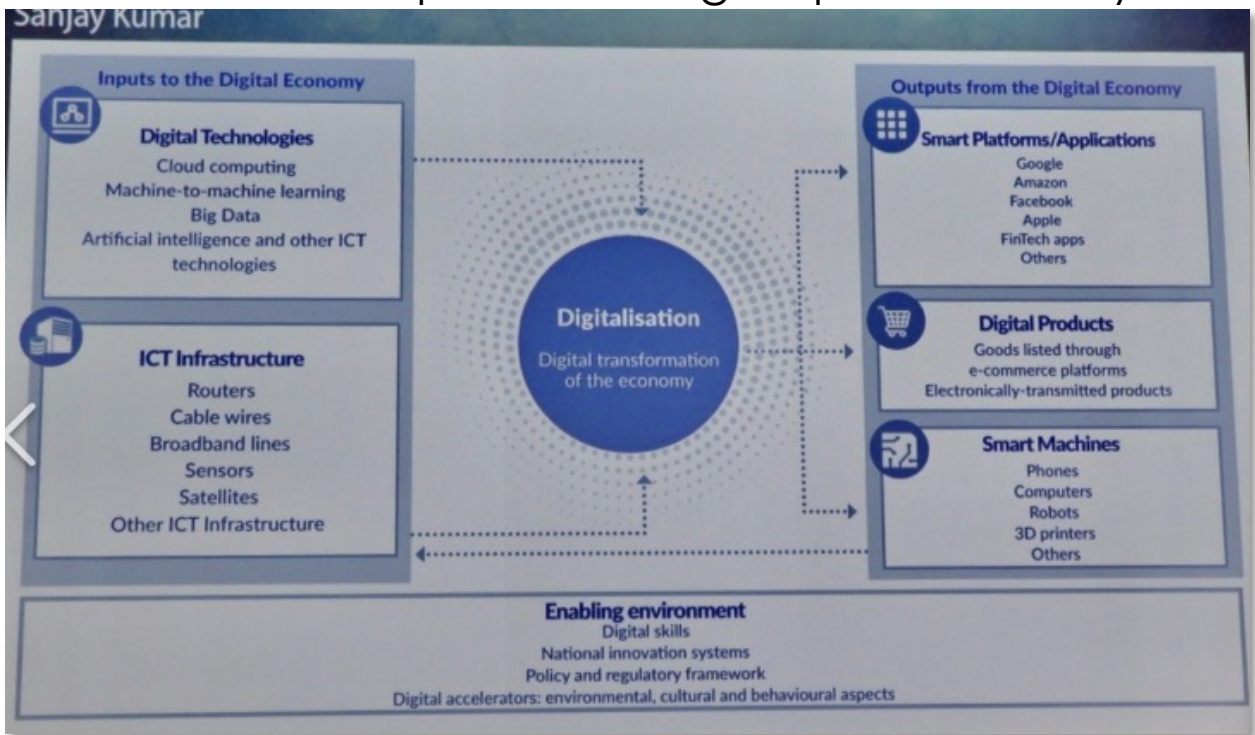
Thomas Blaschke

## ISDE12 THEMES

- Explore the globally coupled natural, physical and social systems of our planet
  - 1.1. Sensing / Data
    - Remote sensing
    - Big Earth data
  - 1.2. New Types of Information
    - Geo-social network data
    - Real-time movement data
  - 1.3. Processing
    - Geo-AI
    - Object / context-based
    - Deep learning
    - Online processing & standards
  - 1.4. Information Integration & Management
    - SDI integration
    - Interactive data archives
    - Data cubes
    - Interop, online processing
  - 1.5./2.1. International Programmes
    - Technical
    - Political
- Identify tractable pathways for sustainable and equitable development
  - 2.2. Science & Society
    - Prospecting the future
    - Digital Earth education
  - 2.3. Transforming Society
    - Open innovation
    - New job profiles
    - startups
3. Applications / Best Practice

Department of Geoinformatics - Z\_GIS | www.zgis.at | thomas.blaschke@sbp

DE from the viewpoint of the geospatial industry - S.Kumar President, WGIC



Next ISDE Symposium in Austria (2021)



Next DE Summit in Russia (2020)

**Unlock and Use EO/Geospatial Data for SDG by Empowering Stakeholder Engagement in a Transformed Society**

G. Benveny-Hilgossy, Sz. Mihály, T. Pálfi, L. Zentai, F. Hegyi and Gy. János  
Hungarian Society of Surveying, Mapping and Remote Sensing - WG4SDG

1 ★

**Content**

- Setting the Scene and Evolution of the MFTTT WG4SDG
- The Emerging Landscape of the SDG-related Stakeholders and Engaged Actors from Academia to Space Industry
- Strengthen Stakeholder Engagement and Capacity Building
- Progress in a Transformed Society with Relevance to SDG
- Conclusions

2 ★

- The UN Agenda 2030 and the SDGs and the established targets and indicators
- Role of EO/geospatial data in monitoring and reporting on SDG targets & indicators
- From: Interdisciplinary collaboration to trans-disciplinary approach
- Stakeholder engagement and capacity building from local to global
- Importance of exploitation of Digital Earth vision and technologies to support informed decisions in SDG-related activities
- Multiple goal of MFTTT WG4SDG: advocate, promote and facilitate the use of EO/IS data and information for SDG by assessing, using and sharing information

3 ★

The inter- and/or trans-disciplinary cooperation and collaboration among stakeholders on domestic level in Hungary is gradually:

- the national strategy on SD and
- Updates of the publications engagement is supported by public documents the international communities, including:

4 ★



5 ★

**Progress in a Transformed Society with Relevance to SDG**  
Ongoing developments:  
**Institutional capacity building (2018-2019)**

Ministerial Commissioner responsible for supervising space activities has been appointed at the Ministry of Foreign Affairs and Trade (MFAT) Department of operations of space research and activities has been set up at MFAT's Faculty operating at the Hungarian Space Office - HSO.

6 ★

**Progress in a Transformed Society with Relevance to SDG**  
Ongoing developments:  
**Institutional capacity building (2020)**

In 2020 reports of a 4th (former flagship institutions in geodesy, Cartography and Remote Sensing) aimed to achieve Non-profit O&E the acknowledged knowledge center for construction planning the future for the anticipated advantages:

- Concentration of highest volume of geospatial, EO data (i.e. informed, and information of the built environment (including buildings, construction and utilities)
- Concentration of competences from urban/regional planning to surveying and land rights, from SD to SD Developments and applications.
- Related tasks are under the supervision of the Prime Minister's Office

7 ★



8 ★

**Some key players in EO in Hungary**

Academia/Educational institutions: University of Debrecen, University of Szeged, University of Pécs, University of Miskolc, University of Sopron, University of Győr, University of Veszprém, University of Óz, University of Miskolc, University of Sopron, University of Győr, University of Veszprém, University of Óz.

9 ★

**HUNGARICA**  
The Hungarian Space Cluster

Established in 2024  
17 members (as of April 2024)  
Annual General Meeting  
Annual General Meeting  
Annual General Meeting  
Annual General Meeting  
Annual General Meeting

10 ★

**The Emerging Landscape of the SDG-related Stakeholders and Engaged Actors from the Space Industry Cluster HUNGSPACE**

MEMBERS:  
The Hungarian Space Cluster  
Established in 2024  
17 members (as of April 2024)

11 ★

**The Emerging Landscape of the SDG-related Stakeholders and Engaged Actors from the Space Industry Cluster HUNGSPACE**

MEMBERS:  
The Hungarian Space Cluster  
Established in 2024  
17 members (as of April 2024)

12 ★

**Strengthen Stakeholder Engagement and Capacity Building**  
Activities of MFTTT's ad-hoc WG4SDG – Talks on domestic fora in 2017

2nd of the European Business and Transformation Conference, 14-16 March 2017  
2nd of the European Business and Transformation Conference, 14-16 March 2017

13 ★

**Strengthen Stakeholder Engagement and Capacity Building**  
Outreach activities of MFTTT's ad-hoc WG4SDG – Talks on domestic fora in 2018

2nd of the European Business and Transformation Conference, 14-16 March 2018  
2nd of the European Business and Transformation Conference, 14-16 March 2018

14 ★

**Strengthen Stakeholder Engagement and Capacity Building**  
Outreach activities of MFTTT's ad-hoc WG4SDG on international forums

2nd of the European Business and Transformation Conference, 14-16 March 2018  
2nd of the European Business and Transformation Conference, 14-16 March 2018

15 ★

**Strengthen Stakeholder Engagement and Capacity Building**  
Outreach activities of MFTTT's ad-hoc WG4SDG in social and printed media

2nd of the European Business and Transformation Conference, 14-16 March 2018  
2nd of the European Business and Transformation Conference, 14-16 March 2018

16 ★

**Strengthen Stakeholder Engagement and Capacity Building**  
Outreach activities of MFTTT's ad-hoc WG4SDG on EO/IS/RS WG Meetings

2nd of the European Business and Transformation Conference, 14-16 March 2018  
2nd of the European Business and Transformation Conference, 14-16 March 2018

17 ★

**Strengthen Stakeholder Engagement and Capacity Building**  
Outreach Activities of MFTTT WG4SDG – an Domestic & Int'l Fora in 2019

2nd of the European Business and Transformation Conference, 14-16 March 2019  
2nd of the European Business and Transformation Conference, 14-16 March 2019

18 ★

**Strengthen Stakeholder Engagement and Capacity Building**  
Activities of MFTTT WG4SDG – Dissemination of information in 2019

2nd of the European Business and Transformation Conference, 14-16 March 2019  
2nd of the European Business and Transformation Conference, 14-16 March 2019

19 ★

**Accomplishment**

2nd of the European Business and Transformation Conference, 14-16 March 2019  
2nd of the European Business and Transformation Conference, 14-16 March 2019

20 ★

**Strategic priority on Digital Agriculture**

2nd of the European Business and Transformation Conference, 14-16 March 2019  
2nd of the European Business and Transformation Conference, 14-16 March 2019

21 ★

**Conclusions**

- Setting up: Interoperable EO and geospatial data infrastructures for the benefit of the public administration and private sector supports digital governance and digital prosperity
- By support of innovation, exploitation of novel technologies, investing in broadband rollout and ICT solutions the digital ecosystem will provide synergies and opportunities and the digital economy, transformation of the society and the implementation of global policies will be accelerated (SDGs, Climate Change and Disaster Reduction as well)
- To ensure timely implementation of the SDGs there is imperative need for inter-disciplinary cooperation and collaboration among the engaged stakeholders

22 ★

**Acknowledgements**

Ferenc Rencsei HSO MFAT  
Daniel Kistóf Lektor Hungary Ltd  
György Vassháza Lektor Hungary Ltd  
Peter Márk Kőrösi  
Gábor Csorosi Cosimo Ltd  
Gábor Kálmán GeoIT Ltd  
Zoltán Zsoryy Min of Innovation & Technology

23 ★

Thank you for your attention!

24 ★



**Copernicus Global Land Service**  
*Providing bio-geophysical products of global land surface*

CGLS User Expert Meeting  
In the topic SDGs  
Brussels, 15 October 2019



Participants of the Copernicus GLS Meeting

## 2 ZERO HUNGER

<b>TARGET 2-1</b>	<b>TARGET 2-3</b>	<b>TARGET 2-4</b>
UNIVERSAL ACCESS TO SAFE AND NUTRITIOUS FOOD	DOUBLE THE PRODUCTIVITY AND INCOMES OF SMALL-SCALE FOOD PRODUCERS	SUSTAINABLE FOOD PRODUCTION AND RESILIENT AGRICULTURAL PRACTICES

VEGETATION	
FAPAR	VPI
FCOVER	DMP
LAI	Burnt Area
NDVI	Soil Water Index
VCI	SSM

LAND COVER	
Land Cover Classif.	
Cover Fraction	
Forest Type	

ENERGY	
Land Surface Temp.	
TOC-Reflectance	
Surface Albedo	

## 3 GOOD HEALTH AND WELL-BEING

<b>TARGET 3-9</b>
REDUCE ILLNESSES AND DEATH FROM HAZARDOUS CHEMICALS AND POLLUTION

WATER	
Lake Surface Water Temp.	
Lake Water Quality	
Turbidity	
Trophic State Index	
Lake Surface Reflect.	
Water Level	

## 6 CLEAN WATER AND SANITATION

<b>TARGET 6-1</b>	<b>TARGET 6-3</b>	<b>TARGET 6-4</b>
SAFE AND AFFORDABLE DRINKING WATER	IMPROVE WATER QUALITY, WASTEWATER TREATMENT AND SAFE REUSE	INCREASE WATER-USE EFFICIENCY AND ENSURE FRESHWATER SUPPLIES

<b>TARGET 6-6</b>
PROTECT AND RESTORE WATER-RELATED ECOSYSTEMS

WATER	
Lake Surface Water Temp.	
Lake Water Quality	
Turbidity	
Trophic State Index	
Lake Surface Reflect.	
Water Level	

HOT SPOTS	
Present Land Cover	
Land Cover Change	

LAND COVER	
Land Cover Classif.	
Cover Fraction	
Forest Type	

## 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

<b>TARGET 9-1</b>
DEVELOP SUSTAINABLE, RESILIENT AND INCLUSIVE INFRASTRUCTURES

LAND COVER	
Land Cover Classif.	
Cover Fraction	
Forest Type	

URBAN ATLAS	
LULC	

## 11 SUSTAINABLE CITIES AND COMMUNITIES

<b>TARGET 11-1</b>	<b>TARGET 11-2</b>	<b>TARGET 11-3</b>
SAFE AND AFFORDABLE HOUSING	AFFORDABLE AND SUSTAINABLE TRANSPORT SYSTEMS	INCLUSIVE AND SUSTAINABLE URBANIZATION

<b>TARGET 11-7</b>
PROVIDE ACCESS TO SAFE AND INCLUSIVE GREEN AND PUBLIC SPACES

LAND COVER	
Land Cover Classif.	
Cover Fraction	
Forest Type	

URBAN ATLAS	
LULC	

## 14 LIFE BELOW WATER

<b>TARGET 14-5</b>
CONSERVE COASTAL AND MARINE AREAS

WATER	
Lake Surface Water Temp.	
Lake Water Quality	
Turbidity	
Trophic State Index	
Lake Surface Reflect.	
Water Level	

HOT SPOTS	
Present Land Cover	
Land Cover Change	

## 15 LIFE ON LAND

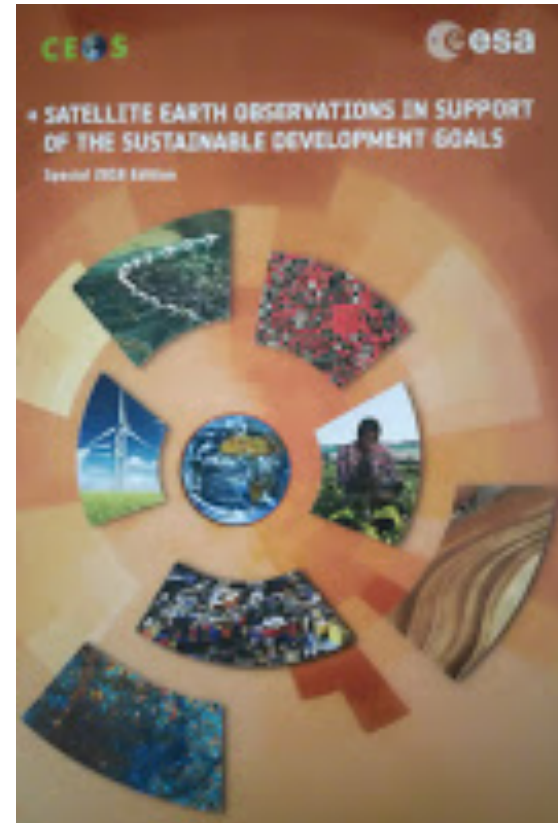
<b>TARGET 15-1</b>	<b>TARGET 15-2</b>	<b>TARGET 15-3</b>
CONSERVE AND RESTORE TERRESTRIAL AND FRESHWATER ECOSYSTEMS	END DEFORESTATION AND RESTORE DEGRADED FORESTS	END DESERTIFICATION AND RESTORE DEGRADED LAND

<b>TARGET 15-4</b>
ENSURE CONSERVATION OF MOUNTAIN ECOSYSTEMS

VEGETATION	
Land Cover Classif.	
Cover Fraction	
Forest Type	

HOT SPOTS	
Present Land Cover	
Land Cover Change	

CGLS  
4SDG



CEOS and its member ESA has published last year a guide entitled: Satellite Earth Observations in support of the SDGs with cases on services, research + developments and applications

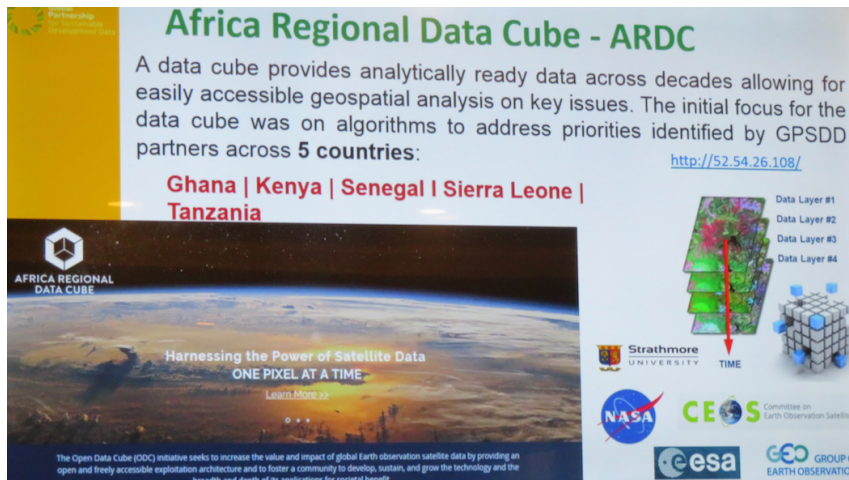
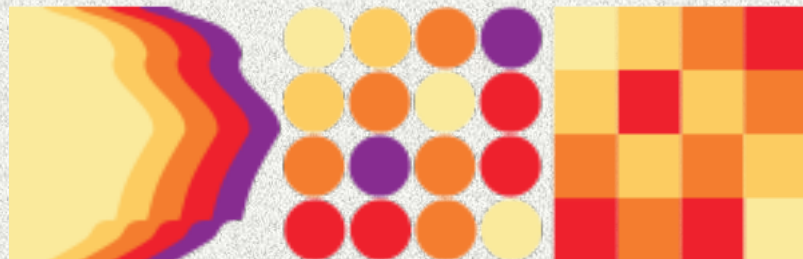


Image credit: CGLS UGM, 2019

MFTTT report on the Copernicus GLS User Meeting: [here](#).

[Related lecture: http://www.oecd.org/sti/the-space-economy-at-a-glance-2014-9789264217294-en.htm](http://www.oecd.org/sti/the-space-economy-at-a-glance-2014-9789264217294-en.htm)

# EUROPEAN FORUM FOR GEOGRAPHY AND STATISTICS



12th. EFGS Conference  
Manchester, 9-11 October 2019





Citate from Twitter post of UN-GGIM :

[UN-GGIM:](#)  
[Europe@UNGGIMEurope](#)

This week [@Manchester](#) is hub for [#geospatial](#) & [#statistical](#) communities with [@EuroGeographics](#) General Assembly, [@UNGGIM](#) Expert Group meeting, [@UNGGIMEurope](#) ExCom meeting and [@EFGS2019](#) conference

Between 8-11 October 2019, Manchester was the hub of geospatial and statistical information experts

- The 6th Meeting of the UN-GGIM Secretariat's international expert working group on 8-9 October, 2019
- The Annual Meeting of the European Forum of Geography and Statistics (EFGS) was held between 9-11 October. From Hungary it was attended by Tamás Palya of Lechner Nonprofit Kft, who is one of the founding members of MFTTT WG4SDG
- The main topics discussed was the support of SDGs- and the Census in 2020.
- The Central Statistical Office from Hungary was not present
- The delegate of the Lechner Nonprofit Kft will provide a short report to be published in ,*Geodézia és Kartográfia*'

## Merits, lessons learned:

- Best practices have been introduced on the visualization of SDGs' indicators the integration of geospatial and statistical information
- Better cooperation is required between stakeholders of the geospatial and statistical domains. It is inevitable in case of some indicators. The coming Population Census will provide a good opportunity.
- The role of open data was emphasized
- New opportunity: Global Statistical Geospatial Framework (GSFC) development. Details: [here](#)
- Improvements in data quality are needed with special emphasis to the Population and Housing Censuses in 2020.
- Detailed program of the Conference: [here](#)



Hungarian contribution to the work of EFGS  
(Poster presentation)



**2nd DLR Symposium on  
New Perspectives of EO**  
Cologne 12-13 November 2019



The five topics discussed

- Satellite remote sensing of lands, waters, atmosphere and climate
- **Applications for the Sustainable Development Goals**
- Big Data and Artificial Intelligence
- EO education and capacity building
- Sensor- or mission-specific methodology development in data analytics

Tag 1 – Dienstag, 12. November 2019			Tag 2 – Mittwoch 13. November 2019		
Registrierung			Keynote: EnMAP – The German Hyperspectral Mission		
Begrüßung im Plenum			3a Hyperspektrale Erdbeobachtung	3b Natur und Umweltmonitoring	3c Satellitengeodäsie 1
Keynote: Erdbeobachtung in der BGR – Geogefahren und mineralische Rohstoffe			Kaffeepause		
1a Neue Perspektiven für Infrastruktur-Projekte 1	1b Wissenschaftliche Anwendungsentwicklung	1c Anwendungen im Kontext der Nachhaltigkeitsziele	4a Plattformen und Datenbereitstellung	4b Gewässer und Umweltmonitoring	4c Satellitengeodäsie 2
Mittagspause			Mittagspause		
2a Neue Perspektiven für Infrastruktur-Projekte 2	2b Katastrophen und Risikomanagement	2c EO-Education	5a Big Data in der Erdbeobachtung	5b Wälder und Forstwirtschaft	5c Atmosphäre und Klima
Kaffeepause			Kaffeepause		
Panel-Diskussion: Von der Entwicklung in die operationelle Anwendung, Erfahrungen, Herausforderungen, Erfolge aus der Praxis			6a KI-Anwendungen	6b Landwirtschaft und Ernährung	6c Wirtschaft und Ressourcen
Poster & Ice-breaker			Zusammenfassung und Schlussworte		

- ESA programs
- DLR's EO activity
- **EO/Geospatial data for SDGs**  
(BKG-Statistics cooperation)
- Germany's hyperspectral satellite mission
- From development to operational applications
- Platforms and data services
- Big Data managements
- AI applications



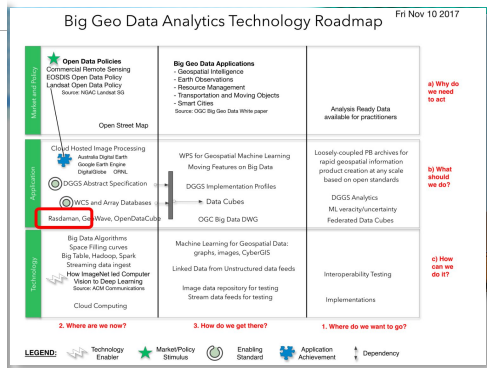
100 Most Promising Big Data Providers 2016

**B**ig Data is not a new buzzword. More than 100 organizations have already put their own spin on the term. But the real challenge is not in defining the term, but in making the data being collected and analyzed meaningful. While many focus on the volume of data, the real challenge is making the data being collected and analyzed meaningful. While many focus on the volume of data, the real challenge is making the data being collected and analyzed meaningful.



**rasdaman**  
Pioneering Agile Array Analytics

...the father of Big Data. In order to exploit the full potential of Big Data, it is necessary to have a good understanding of the data being collected and analyzed. This is where the real challenge lies. While many focus on the volume of data, the real challenge is making the data being collected and analyzed meaningful.



**Prof. Peter Baumann in action at the 2nd DLR EO Symposium on 13 November 2019**

## BigDataCube: Flexible, Scalable User Services for Massive Spatio-Temporal EO Data

Symposium „Neue Perspektiven der Erdbeobachtung“, Köln, 2019-nov-12  
Dimitar Misev, Peter Baumann, Bang Pham Huu, Vlad Merticariu, Heike Hoeng, Dimitris Bellos, Sven Jacobsen, Stefan Wiehle  
Jacobs University, rasdaman GmbH, cloudEO AG, DLR

Technically co-sponsored by: CODATA Germany, ESI

## CIO Review interview with father of Rasdaman

### BigDataCube

Big Earth Datacube Analytics Made Easy

**Project brief:**  
Title: BigDataCube  
Start: 01 Jan 2018  
Duration: 18 months

**Technical approach:** The project develops the European Datacube, rasdaman, in two infrastructures: ... The public service of CODE-DE, the German Copernicus hub, will complement the batch-oriented Hadoop services with interactive extraction and processing along the paradigm of "any query, any time, on any size".

### BigDataCube

Big Earth Datacube Analytics Made Easy

**Project brief:**  
Title: BigDataCube  
Start: 01 Jan 2018  
Duration: 18 months

**Goal:** BigDataCube leverages datacubes for enhancing Earth data access and paving the way for collaboration across disciplinary and geographical boundaries for industry and research. The massively simplified, accelerated Big Data handling benefits many markets, such as agro-informatics; providers don't need to develop or deploy complex technology, but can use and serve data readily, thereby freeing resources for their core business.

# DATA CUBE BASED ANALYSIS IN INTERDISCIPLINARY GEOSCIENCE SOLUTIONS

**Partners:** Internationally recognized experts are teaming up: ... Jacobs University (project coordinator) and rasdaman GmbH are leading Datacube experts and active shapers of OGC, ISO, and INSPIRE Datacube standards. They contribute the scalable rasdaman Datacube engine for interactive datacube processing and federation.

**Supported by:** Federal Ministry for Economic Affairs and Energy, Federal Ministry for Education and Research, Federal Ministry for Digital Affairs and Consumer Protection, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Federal Ministry for Transport, Building and Urban Affairs, Federal Ministry for Health, Federal Ministry for Labour and Social Affairs, Federal Ministry for Economic Cooperation and Development, Federal Ministry for the North German Coast, Federal Ministry for the North Sea, Federal Ministry for the Reconstruction of the East German States, Federal Ministry for the Federal Police, Federal Ministry for the Federal Reserve Bank, Federal Ministry for the Federal Security Service, Federal Ministry for the Federal Intelligence Agency, Federal Ministry for the Federal Security Office, Federal Ministry for the Federal Security Service, Federal Ministry for the Federal Security Office, Federal Ministry for the Federal Security Service, Federal Ministry for the Federal Security Office.

## The leading Big Datacube Analytics engine

- any query, any time, on any size -

**Fast.** Unprecedented speed through adaptive partitioning, parallel & distributed processing, mixed hardware use

**Flexible.** Enabling datacube query language for direct access, aggregation, analysis, and fusion

**Scalable.** From embedded to cloud to planetary federation

**Multi-dimensional.** Complex analytics on n-D spatio-temporal sensor, image, simulation, and statistics data

**Secure.** Easy-to-define policies enforced down to single pixel level

**Open standards.** Blueprint for OGC, ISO, INSPIRE datacube standards

**Open source.** Official OGC and INSPIRE Reference Implementation

Free download from [www.rasdaman.org](http://www.rasdaman.org)

The high performance rasdaman ("raster data manager") datacube engine resembles the world's leading, multi-award winning Array Database System. Through its unique "what you get is what you need" paradigm, rasdaman processes server-side and delivers only the exact result needed - no bandwidth is wasted. While developers enjoy the powerful query language, data users can remain in their comfort zone and use their well-known clients. Its patented architecture makes rasdaman the best performing of its kind, smoothly embedding itself into IT infrastructures, readily working directly on any archive without database import.

This tech made in Germany is mature and operational on 600+ TB databases, soon crossing a Petabyte, queries have been parallelized 1,000x in the Amazon cloud. Its enabling datacube query language has made rasdaman the blueprint for the "Big Datacube" standards of OGC, ISO, and INSPIRE. Application domains include:

- Earth Science: 1D sensor timeseries, 2D satellite imagery, 3D x/y/z image timeseries and y/z geophysical voxel data, 4D x/y/z/t atmospheric & ocean data, etc. Mainfield clients are supported, ranging from navigation (e.g., OpenLayers) over Web GIS (e.g., OGIS and ArcGIS) to analysis (e.g., Python and R) as well as visualization (e.g., NASA WorldWind), coupled through the open OGC standards; in fact, rasdaman is official OGC and INSPIRE WCS Reference Implementation.
- Space Science: optical & radio astronomy data, cosmological simulation data, etc.
- Life Science: all image modalities, such as X-ray, CAT scan, confocal microscopy, etc.
- Statistics & Business: next-generation MOLAP system, combining MOLAP speed with ROLAP scalability

rasdaman is available as open source rasdaman community and proprietary, compatible rasdaman enterprise edition which adds highly effective performance enablers and various convenience tools; maintenance is available for both.

**Contact**  
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Hans-Herrmann-Selling-Str. 17  
D-28759 Bremen  
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Email: [contact@rasdaman.com](mailto:contact@rasdaman.com)  
WWW: [www.rasdaman.com](http://www.rasdaman.com)

Rasdaman partners include: CODE, CloudEO, DLR, NASA, ECMWF, ANU/NCI...

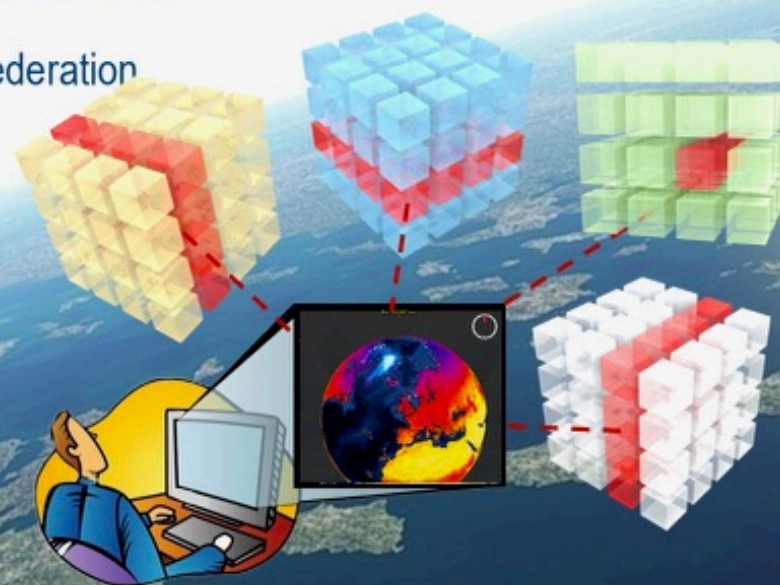
Rasdaman, the Big Data analytics engine

## rasdaman: Datacubes At Your Fingertips

= „raster data manager“: **actionable datacubes**

- pioneered datacubes: patents, awards, 160+ publications
- Standards blueprint, reference implementation
- Scalable **Big Datacube Analytics** architecture
  - 2.5+ PB, 1000x cloud parallelization, federation
- Mature, operational, worldwide installations
  - AWS, CreoDIAS, CODE-DE, AWI, HZG, NCHC Taiwan, ...
  - open-source rasdaman: >28,000 downloads

rasdaman  
raster data manager



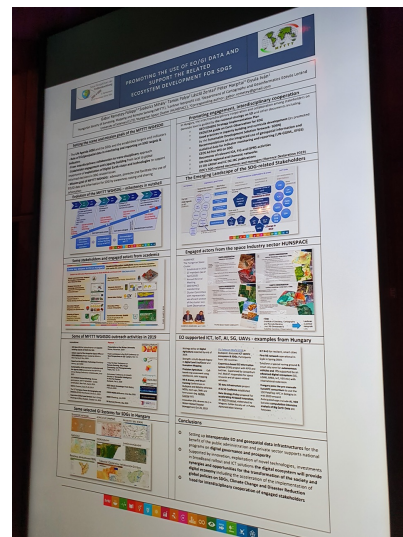
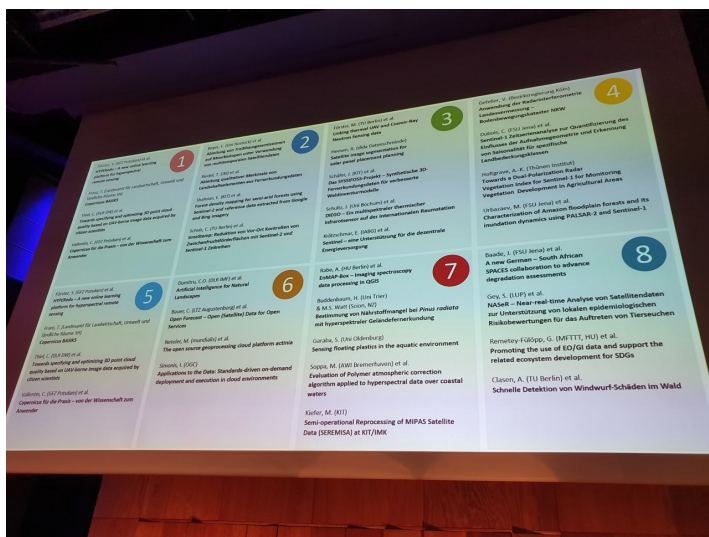
- Open source, actionable
- Worldwide installations
- For the attention of EO Information System (FIR), Lechner Nonprofit Ltd and MoFA&T

Source: P.Baumann, 2019

# Hungarian contribution to the topoc SDGs



## The accepted poster of MFTTT WG4SDG





2. Symposium  
12-13 November 2019, Köln

**PROMOTING THE USE OF EO/GI DATA AND SUPPORT THE RELATED ECOSYSTEM DEVELOPMENT FOR SDGs**

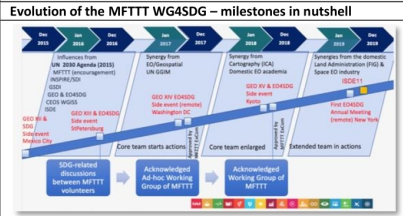


Working Group on EO/GI for SDGs

Gábor Remetej-Fülöpp<sup>1,3</sup> Szabolcs Mihály<sup>1</sup> Tamás Palya<sup>2</sup> László Zentai<sup>3</sup> Péter Hargitai<sup>4</sup> Gyula Iván<sup>4</sup>  
<sup>1</sup>Hungarian Society of Surveying, Mapping and Remote Sensing (MFTTT), <sup>2</sup>Lechner Nonprofit Ltd., <sup>3</sup>Department of Cartography and Geoinformatics Eötvös Loránd University of Sciences (ELTE), <sup>4</sup>Hungarian Space Cluster (HUNSPACE), \*Corresponding author: gabor.remete@gmail.com

### Setting the scene and mission goals of the MFTTT WG4SDG

- The UN Agenda 2030 and the SDGs and the established targets and indicators
- Role of EO/geospatial data in monitoring and reporting on SDG targets & indicators
- From interdisciplinary collaboration to trans-disciplinary approach
- Stakeholder engagement and capacity building from local to global
- Importance of exploitation of Digital Earth vision and technologies to support informed decisions in SDG-related issues
- Mission goal of MFTTT WG4SDG: advocate, promote and facilitate the use of EO/GI data and information for SDG by awareness raising and sharing information



### Some stakeholders and engaged actors from academia

**Some key players in EQ in Hungary**

- Obuda University (New Faculty, Technical Faculty, Information Systems)
- University Debrecen (11 Departments)
- University of Debrecen (Faculty of Agriculture and Food Sciences)
- University of Pápa (Faculty of Geography)
- Szent István University, Gödöllő (Faculty of Agriculture and Food Sciences)
- University of Sopron (Faculty of Agriculture and Food Sciences)
- University of Szeged (Faculty of Agriculture and Food Sciences)
- University of Pécs (Faculty of Geography)
- University of Miskolc (Faculty of Geography)
- University of Győr (Faculty of Geography)
- University of Veszprém (Faculty of Geography)
- University of Óz (Faculty of Geography)
- University of Tatabánya (Faculty of Geography)
- University of Sopron (Faculty of Geography)
- University of Szeged (Faculty of Geography)
- University of Pécs (Faculty of Geography)
- University of Miskolc (Faculty of Geography)
- University of Győr (Faculty of Geography)
- University of Veszprém (Faculty of Geography)
- University of Óz (Faculty of Geography)
- University of Tatabánya (Faculty of Geography)

### Some of MFTTT WG4SDG outreach activities in 2019

**Accomplished:**

- GS Open 2019 at Substanzlabor at Capacity building experts of EO/GI for SDG
- Liason report of the Hungarian Space Office at CEOS WGS4SDG advisory board by NOAA in Vienna Spring 2, May, 2019.
- Report on the GEO Data Technology Workshop Vienna, April 2019
- Sustainability of the surveyor's profession and the Agenda 2030 presented at the MFTTT Bi-annual Meeting Conference in Balaköcs, June 2019
- GEO WGS4SDG Annual Meeting, Remote participation, MFTTT WGS4SDG's 3-side contribution, New York, Aug 3, 2019.
- ISDE11 Florence, Sept 28-29, 2019
- The 12<sup>th</sup> European Forum for Geography and Statistics (EFGS) Manchester, Oct 11-12, 2019
- Copernicus Global Land Services User's Group Meeting on SDGs, Brussels, October 15, 2019

**Planned:**

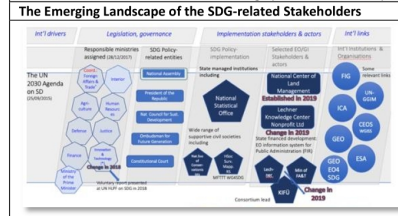
- Presentation at the MFTTT Workshop, Witten, November, 2019
- New Perspectives in EQ Colloq. Nov 12-13
- Poster contribution to the DLR Conference on New Perspectives in EQ Colloq. Nov 12-13
- Fly-Talk Conference on Remote Sensing, GIS, Image Processing and Photogrammetry Thuringia, Nov 19-20
- Anniversary Conference of HUNSPACE in the 21st Century Budapest, Feb 20, 2020
- GEO Data & Knowledge Week Berlin, February 2020
- GEO WGS4SDG Business Area May 2020
- ISDE12 Salzburg, July 2020
- ISDE12 Salzburg, October 15, 2020
- De Summit Online, May 2020

### Some selected GI Systems for SDGs in Hungary

### Promoting engagement, interdisciplinary cooperation

In Hungary, the inter/transdisciplinary cooperation and collaboration among stakeholders on domestic level is guided by the national strategy on SD and other documents including:

- o GEO EASDG Strategy Implementation Plan
- o CEOS/ESA guide on Earth Observation for SDG
- o Good practices in capacity building and curricula development (as promoted by the Sustainable Development Solution Network- SDSN)
- o Recommendations on the integrated use of geospatial information and statistical data for indicator monitoring and reporting (UN-GGIM, EFGS)
- o CEOS Ad-hoc WG on SDG
- o Documents of relevant ICA, FIG and ISPRS activities
- o UN-GGIM regional and thematic networks
- o EC DG GROW and EC DG JRC publications
- o ISDE's SDG-related documents and messages (Florence Declaration 2019)



### Engaged actors from the space Industry sector HUNSPACE

**HUNSPACE The Hungarian Space Cluster**

- Established in 2014
- 37 members (as of April 2019)
- Annual General Meeting
- MEMBERSHIP
- Cluster Committee with representatives of each section of the cluster incl. Earth Observation

### EO supported ICT, IoT, AI, 5G, UAVs - examples from Hungary

**Strategy policy on Digital Agriculture** expected by end of 2019:

- Strength: a multi-decade legacy in digital Land Use/Cover and Ecosystem Mapping
- Weakness: Limited resources
- Opportunities: Collaborative crop assessment using satellite EO, cloud-based mapping
- Threats: Limited resources, limited expertise in AI, 5G, and Smart Farming

**ICT R&D for resilient, smart cities** First 5G network operational in Győr in Spring 2019.

**Zalóna** a special riving ground & smart city zone for autonomous vehicles and ITS supported by an advanced digital ecosystem (5G, LiDAR, GNSS, IoT, V2X etc) with international automation

**Hungary joins the pre-escalate European consortium** to use the 150 Petabit/sec 5G in Budapest in mid 2020 onward.

**Anticipated apps include AI, V2X** but also competition-intensive analysis of Big Earth Data are foreseen.

### Conclusions

- o Setting up interoperable EO and geospatial data infrastructures for the benefit of the public administration and private sector supports national programs on digital governance and prosperity
- o Supported by innovation, exploitation of novel technologies, investments in broadband rollout and ICT solutions the digital ecosystem will provide synergies and opportunities for the transformation of the society and digital economy including the acceleration of the implementation of global policies on SDGs, Climate Change and Disaster Reduction
- o Need for interdisciplinary cooperation of engaged stakeholders



# LOOKING AHEAD



<http://www.fig.net/fig2020/>

The three major topics:

- The smart surveyor
- Integrated land and water management
- **Ten years to go to achieve the SDGs**



## **1. Smart Surveyors**

Rapid urban growth, smart energy, cleaner mobility, and 'land rights for all' are some of the challenges demanding innovative surveying approaches and technologies. Sensing technologies, spatial data processing technologies and related approaches are already available. Use and improve them to become future proof, Smart Surveyors!

## **2. Integrated Land and Water management**

Without integrated land and water management, the Netherlands as also other coastal countries cannot sustain its agricultural and urban development. Climate change, though, increases the risks of sea and riverine floods and extended drought periods and complicates this management task. Unorthodox measures are called for. Get familiar with these measures and discuss them from your critical surveyor perspective.

## **3. Ten years to go to achieve the Sustainable Development Goals**

The countdown begins, only one decade to go to accomplish the Sustainable Development Goals. The SDGs are the blueprint to achieve a better and more sustainable future for all and surveying professionals have a key role to play. How did we, as surveyors, contribute to ending poverty, improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests? In addition, what will be our role for the coming 10 years?

# FIG Working Week 2020

Since 2017 the voluntary MFTTT WG4SDG emphasizes the challenge and opportunity for the profession due to the role EO/Geospatial data are playing for the implementation of SDGs

Since 2018 MFTTT WG4SDG advocates in several talks that the integration of the NSDI and Statistical information systems and the joint, multi-disciplinary (nexus) approach could provide synergy (eg. In case of land- and water-related SDGs)

The voluntary MFTTT WG4SDG raised awareness in this year emphasizing, that there is only one decade to go to implement the Agenda 2030's SDGs

**1. Smart Surveyors**

**2. Integrated Land and Water management**

**3. Ten years to go to achieve the Sustainable Development Goals**

**The three topics of the FIG Working Week 2020 has definite relations from the perspective of SDGs**

# CONCLUSIONS

- THE SUPPORT OF THE ACHIEVMENT OF THE SDGS IS HIGH ON THE AGENDA AND WORKPLAN OF THE INTERNATIONAL PROFESSIONAL COMMUNITIES
- THE INCLUSIVE MFTTT WG4SDG PARTICIPATES INTERNATIONAL FORA SINCE 2017 IN ORDER TO SHARE THE INFORMATION WITH THE DOMESTIV COMMUNITIES AND TO ASSIST TO MAKE VISIBLE THE RELEVANT HUNGARIAN ACHIEVMENTS
- IN ORDER TO SOLVE COMPLEX MULTI-DISCIPLINARY PROBLEMS, INTERDISCIPLINARY APPROACH IS NEEDED, USING ENABLING TECHNOLOGIES (E.G. IoT, AI, UAV, 5G) BASED ON APPROPRIATE AND INTEROPERABLE INFRASTRUCTURES (NSDI, BIM) IN INTER-SECTORAL COOPERATION OF THE STAKEHOLDERS (E.G. AGRICULTURE, LAND- WATER AND FOREST MANAGEMENT, EO, STATISTICS, GEOSPATIAL COMMUNITY AND INFOCOMMUNICATION)
- BESIDES DATA, INFORMATION INSIGHT AND KNOWLEDGE BASED WISDOM ALSO R+D, INNOVATION, FINANCIAL, ECONOMIC, INSTITUTIONAL AND EDUCATIONAL REQUIREMENTS SHOULD BE EQUALLY ADDRESSED



### **Budapest by night as seen from the ISS**

The snapshot was taken by cosmonaut Oleg Kononyenko on board of the International Space Station  
Image enhancement: Interspect Ltd., Halásztelek, Hungary  
Credit: Gábor Bakó

THANK YOU FOR YOUR KIND  
ATTENTION!