



Contemporary tools to strengthen the resilience of human settlements

prof. dr. Tomaž Rodič, SPACE-SI

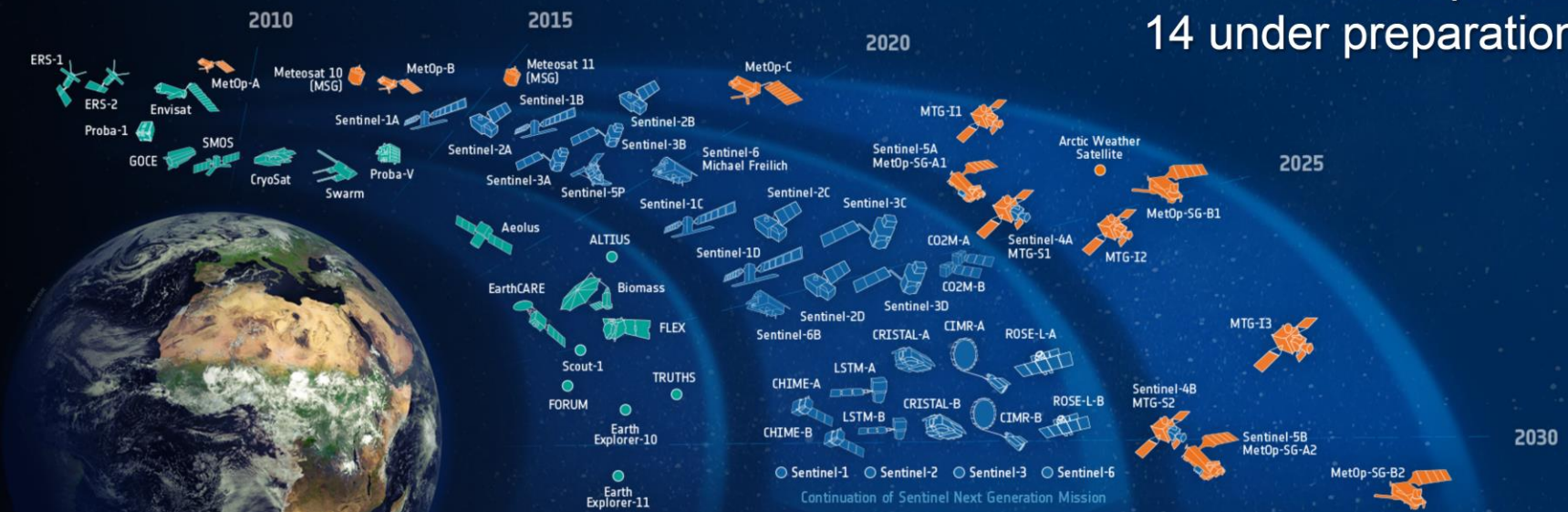
Slovenian Centre of Excellence for
Space Sciences & Technologies



ESA-Developed Earth Observation Satellites



16 in operation
38 under development
14 under preparation



Science



Copernicus



Meteorology





NEMO-HD microsatellite

Video & Multispectral images

Orbit SSO 535 km

Dimensions 38 x 57 x 57 cm

Mass 60,18 kg

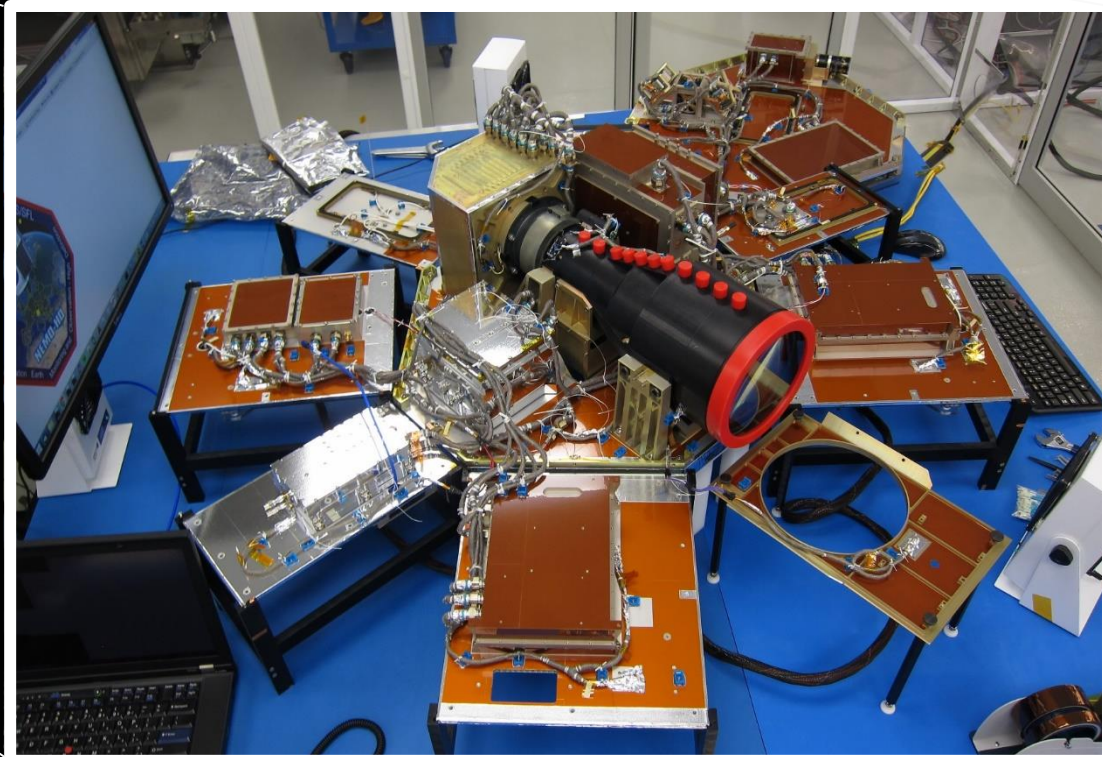
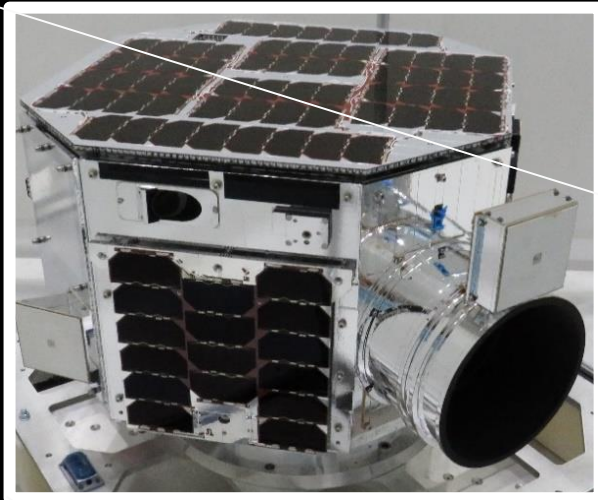
Apperture 155 mm

HR GSD 2,8 m @ SWOT 10 km

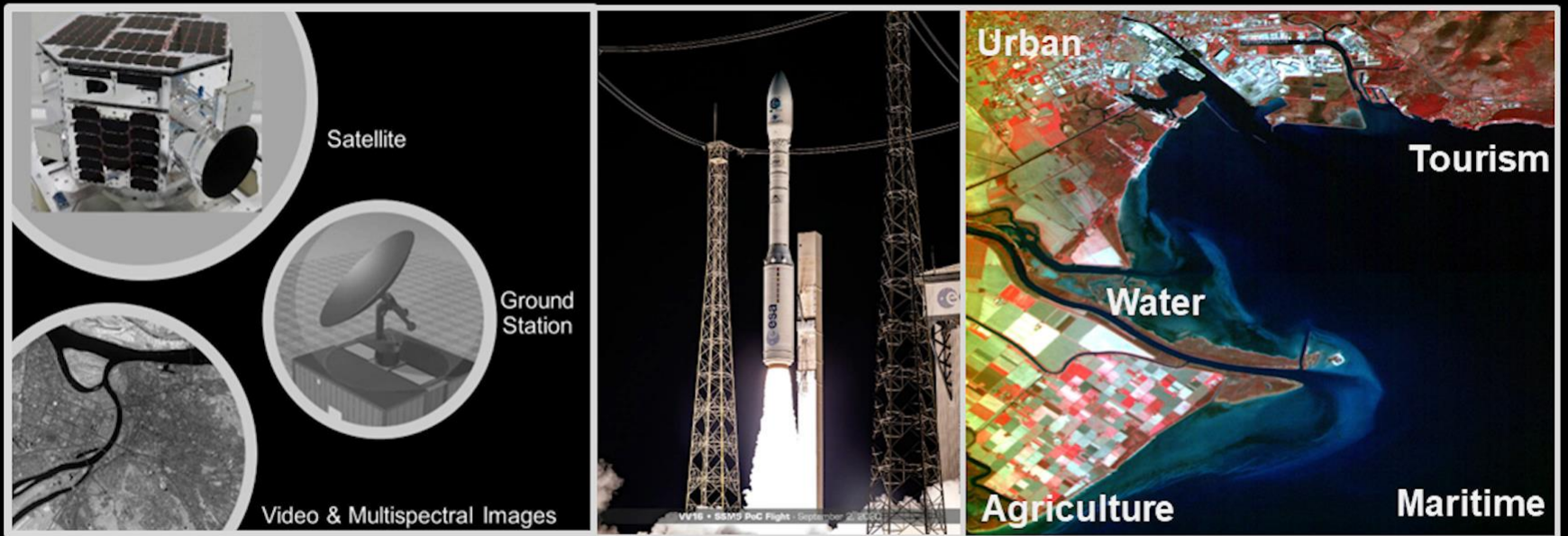
LR GSD 40 m @ SWOT 70 km



Nemo-HD



Nemo-HD Microsatellite Mission



Ground Station (S & X)



Pomjan near Koper
since 2012





SPACE SI



Nemo-HD Video from Space





Satellite Technology Challenges



River Basin Scanning Modes

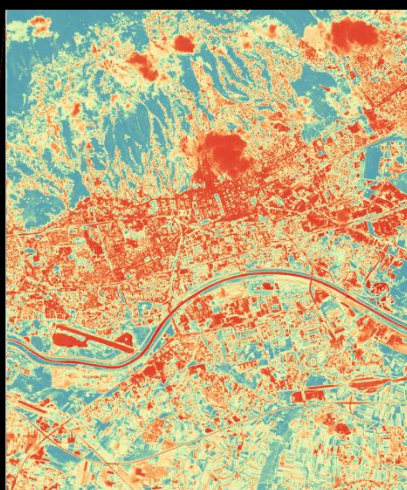


Sava River Scanning

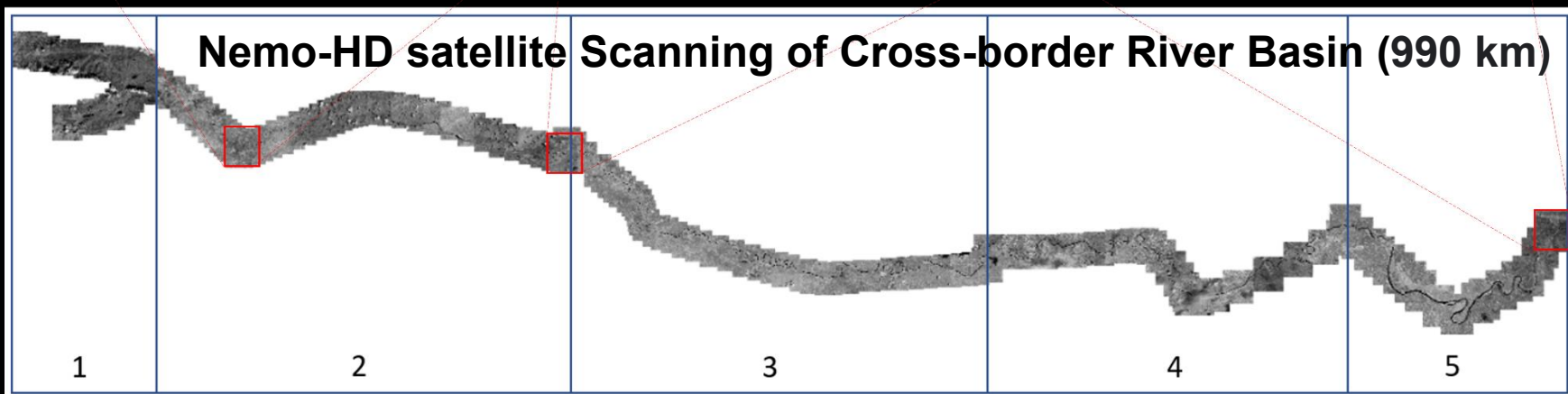
Ljubljana
SLOVENIA



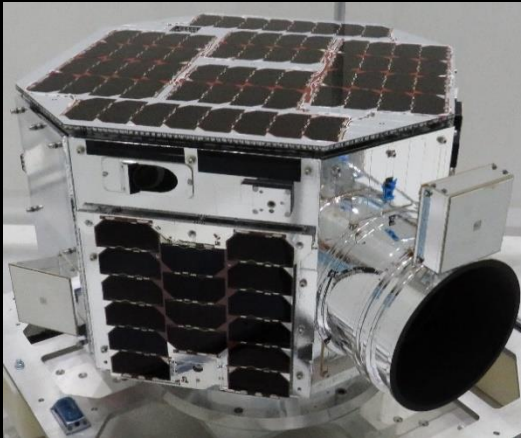
Zagreb
CROATIA



Belgrade
SERBIA

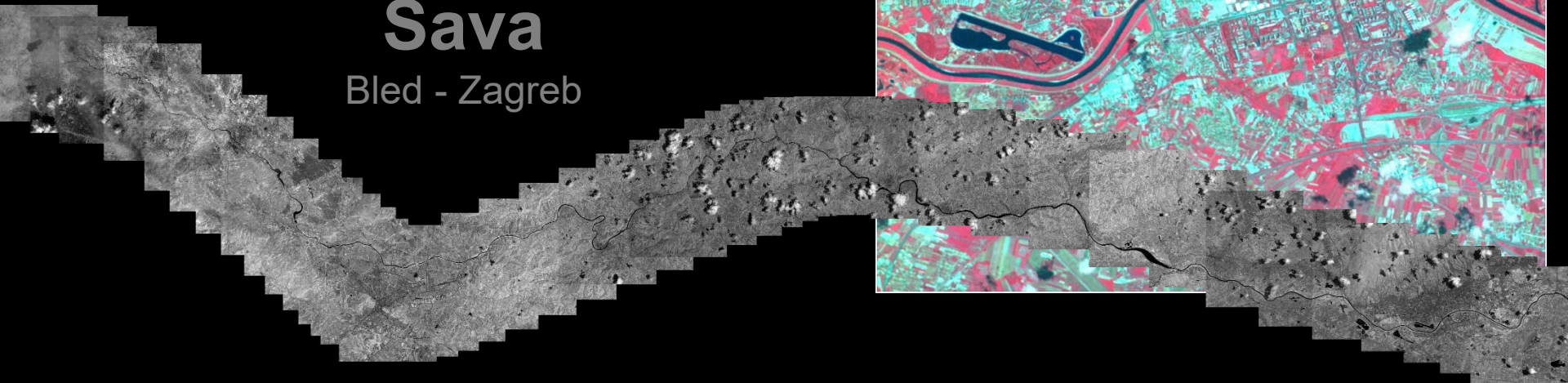
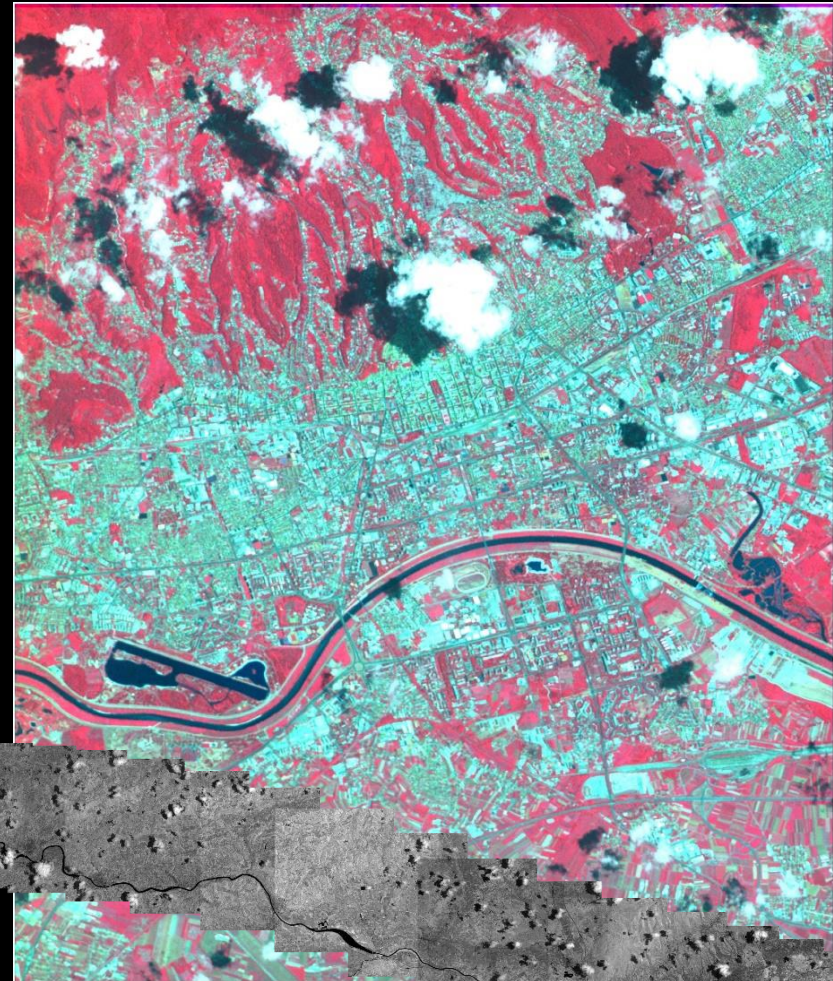


Sava River Scanning



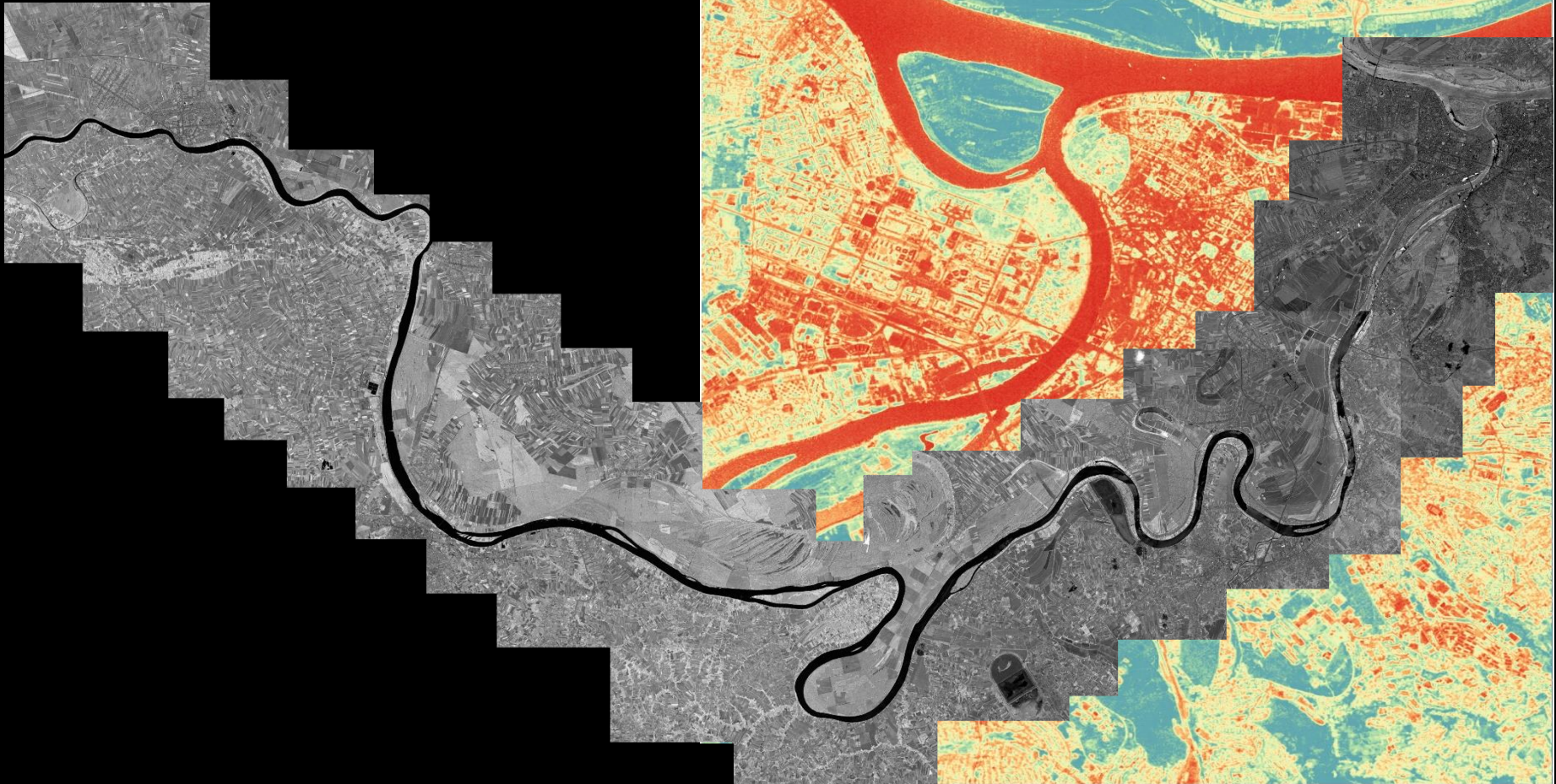
Sava

Bled - Zagreb



Sava - Danube

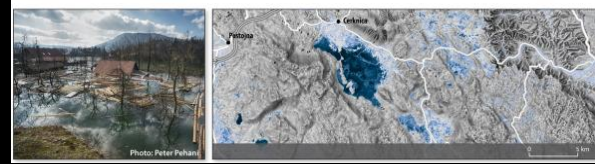
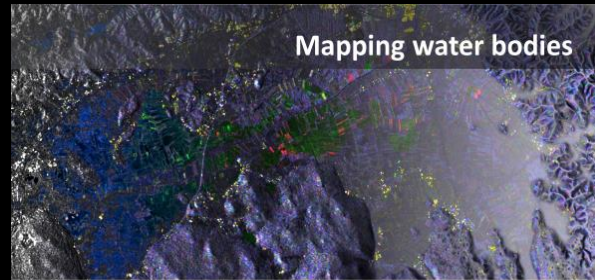
Sremska Mitrovica to Belgrade



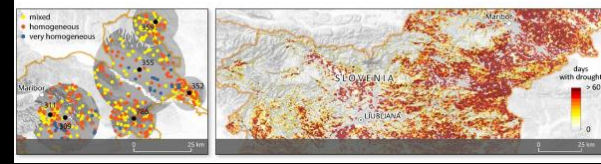
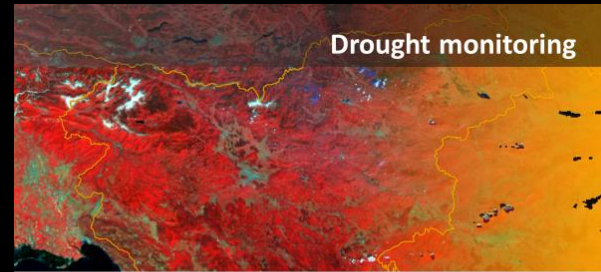
Food



Water

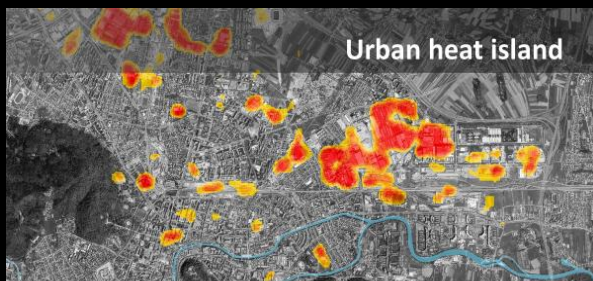


Climate



Energy

Urban environments



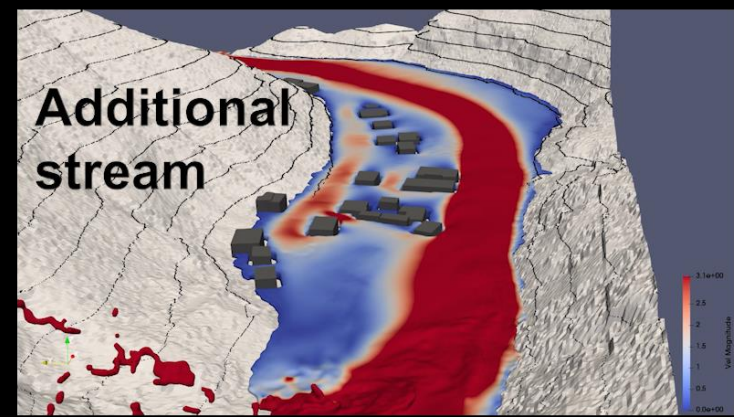
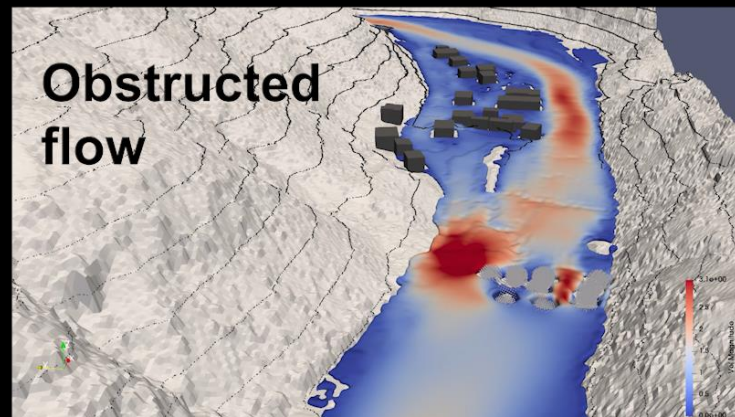
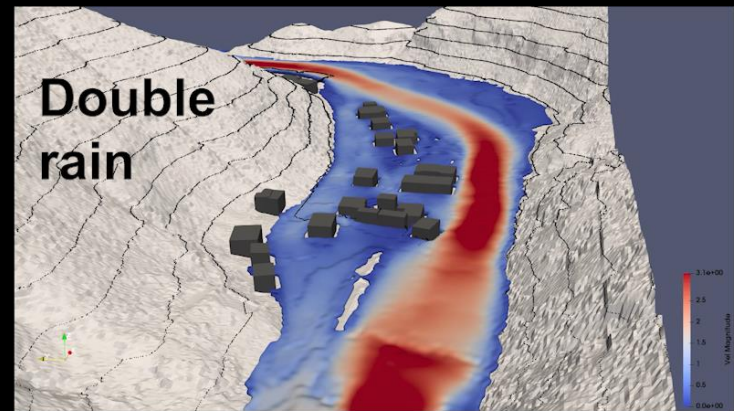
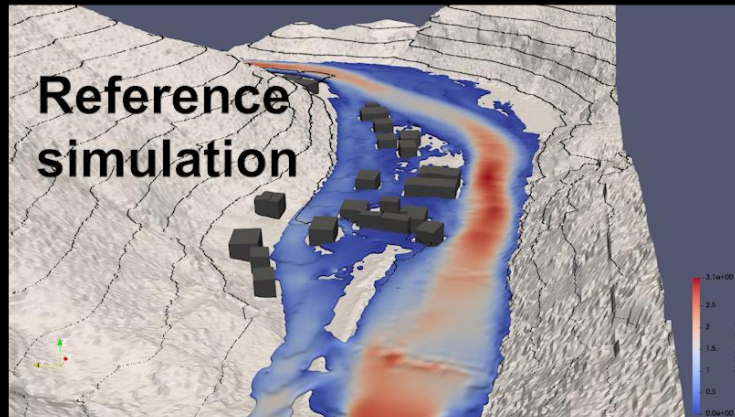
Natural disasters

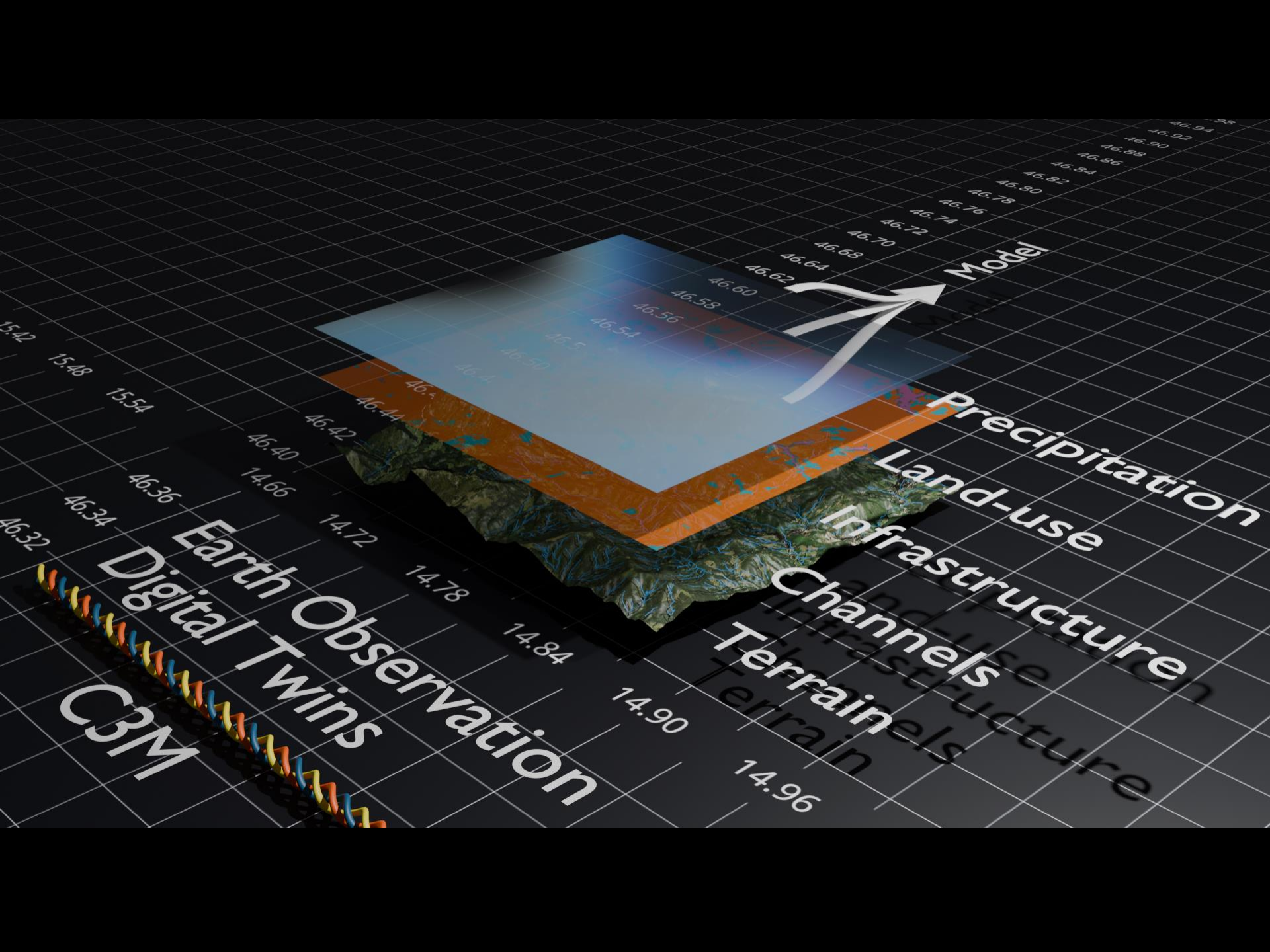


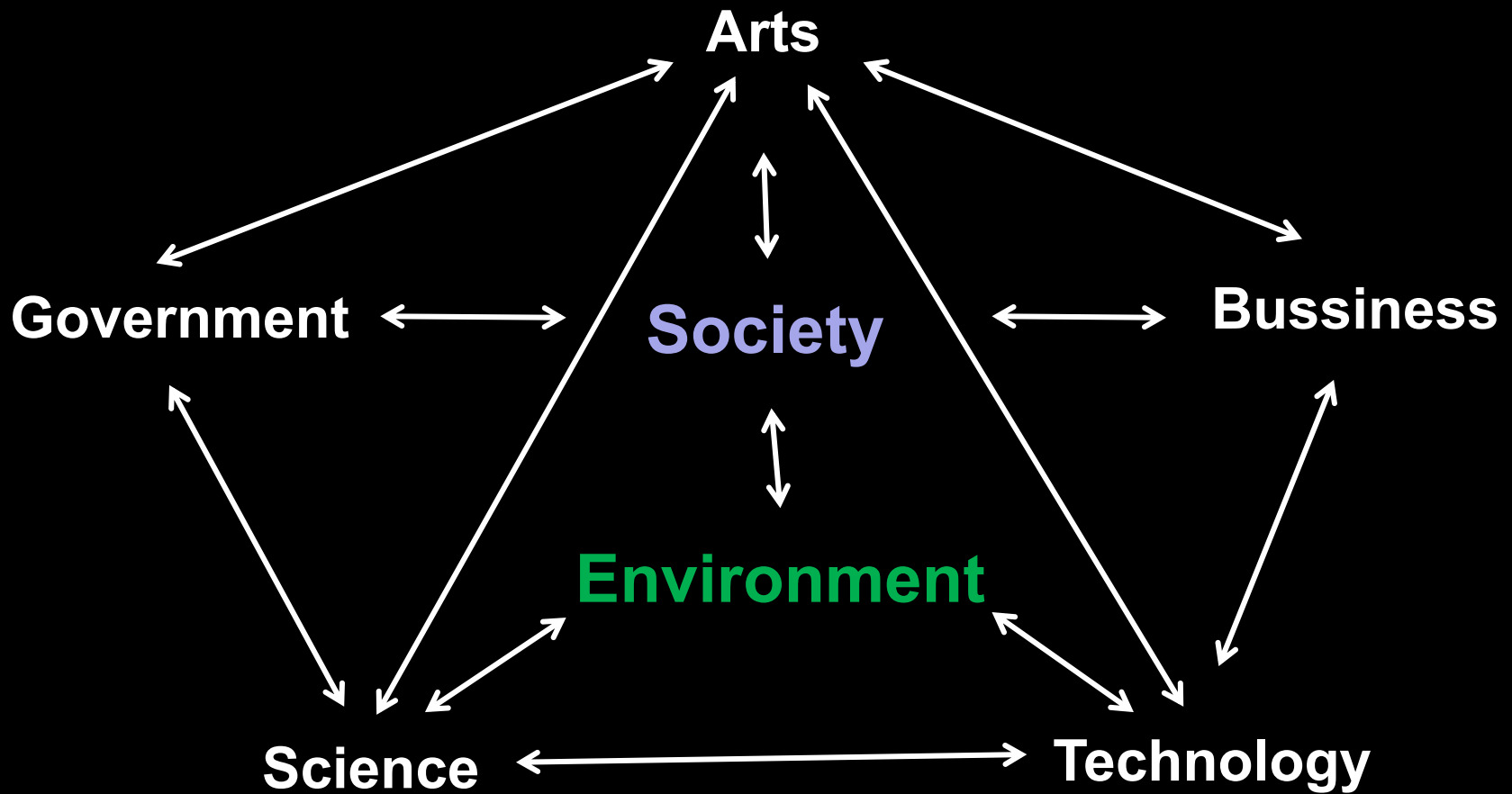
Maritime, air, land Transport



Rapid Assessment of Flooding Scenarios









SPACE SI



River Tame, UK



River Ganga, India



River Mekong, Cambodia



River Amazon, Brazil

Economics of Biodiversity Conservation and Innovative Approaches to Finance

Case Studies: 4 distinct river systems

River Tame (UK) | River Ganga (India) | River Mekong (Cambodia) | River Amazon (Brazil)



SPACE-SI



United Nations

Department of Economic and Social Affairs
Sustainable Development



Home

SDG Knowledge ▾

Intergovernmental Processes ▾

HLPF

SIDS ▾

Partnerships ▾

Engage ▾

News

About

Satellite Data and Digital Twin Models to support River Basin Management

SPACE-SI, Slovenian Centre of Excellence for Space Sciences and Technologies (Partnership)

[#SDGAction50361](#)

DESCRIPTION

SDGS & TARGETS

DELIVERABLES & TIMELINE

RESOURCES MOBILIZED

PROGRESS REPORTS

FEEDBACK



SLOVENIA
Savinja, Meža

COLOMBIA
Magdalena

INDIA
Ganga: Devprayag,
Varanasi



ARGENTINA
Bermejo

PHILIPPINES
Bicol

KENYA
Narok, Lake Victoria & Turkana





Project Head, Lawrence Nderu

Multi-scale Digital Twin Model of Narok, KENYA

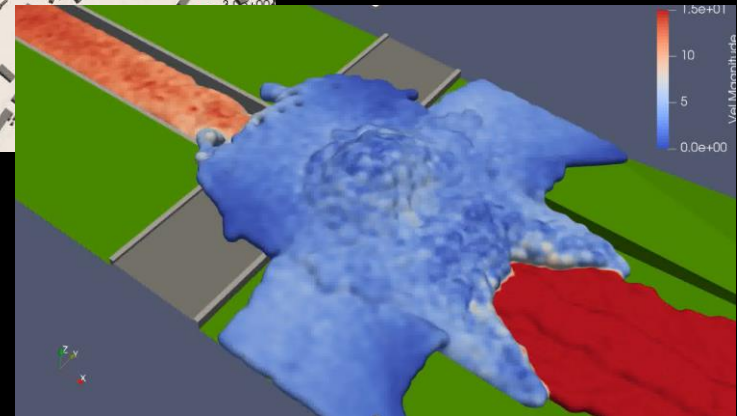
Macro



Mezzo



Micro





SLOVENIA
DEVELOPMENT PARTNERSHIP





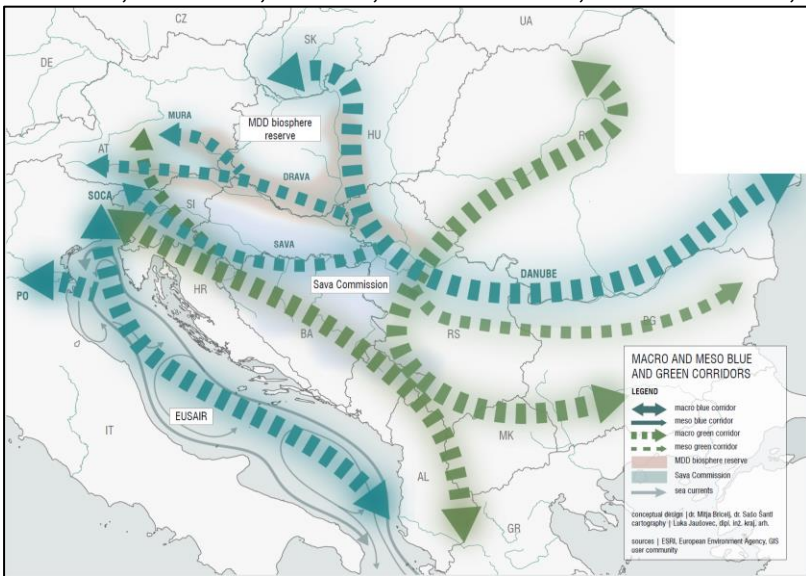
SLOVENIA
DEVELOPMENT PARTNERSHIP



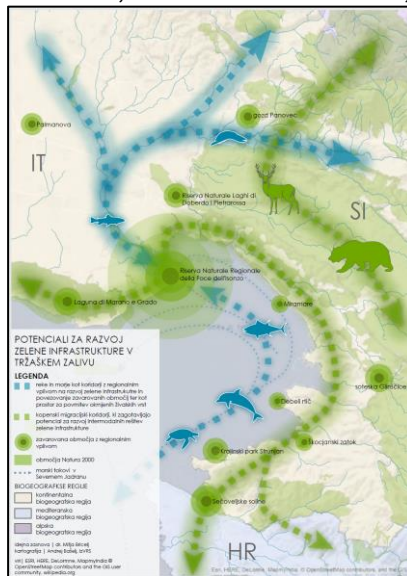
Eco-connectivity at different scales:

HANDBOOK FOR RECOGNISING AND PLANNING GREEN INFRASTRUCTURE: IzVRS & MNVP: M. Bricelj (editor)

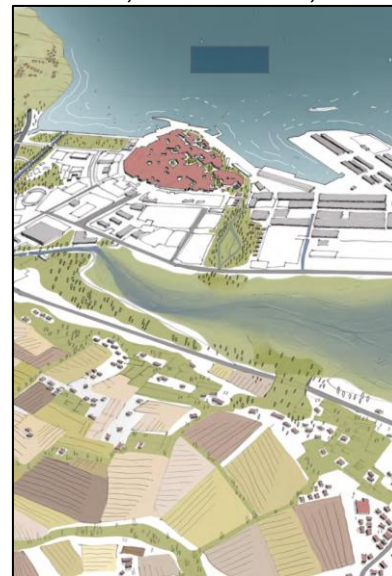
S. Šantl, N. Sirnik, Humar, H. Caserman, P. Suhadolnik, M. Peček, R. Soczka Mandac, Š. Trdan, M. Starman, M. Bricelj



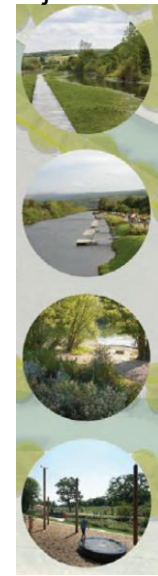
Macro



Mezzo



Micro



Local

SENTINEL satellite data

NEMO-HD satellite data

DOF, drones, on-ground sensors

Multi-physics



Multi-scale



Multi-body



Multi-objective



River Basin Management

as Constrained Multi-objective OPTIMISATION problem



DTSI-P Apps

Digital Twin of Slovenia – Precursor Apps

- App #1 Flash flood modelling
- App #2 Geomorphology of water land
- App #3 Where-Is-Water
- App #4 Simulations of flood-affected properties
- App #5 Landslide scenario-based modelling

SPACE-SI,
C3M, Flai, Geocodis, Flycom Technologies, GeoZS

Inverse analyses & Optimisation



**TEDEN SREDOZEMSKÉ OBALE
IN MAKROREGIONALNIH
STRATEGIJ**

Izola, Slovenija
15. – 17. september 2025

**MEDITERRANEAN COAST
AND MACRO-REGIONAL
STRATEGIES WEEK**

Izola, Slovenia
15 – 17 September 2025



tomaz.rodic@space.si



EU Strategy for the
Adriatic and Ionian Region
EUSAIR

TEDEN SREDOZEMSKO OBALE IN MAKROREGIONALNIH STRATEGIJ

Izola, Slovenija
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**MINISTRY OF FOREIGN
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REPUBLIC OF SLOVENIA
**MINISTRY OF COHESION
AND REGIONAL DEVELOPMENT**



REPUBLIC OF SLOVENIA
**MINISTRY OF NATURAL RESOURCES
AND SPATIAL PLANNING**



Občina · Comune di
IZOLA · ISOLA



Prosperity through Diversity



EUSBSR
EU STRATEGY
FOR THE BALTIC
SEA REGION



EUSALP
EU STRATEGY FOR
THE ALPINE REGION



**Primorski
Tehnološki
Park.**

