SCERIN Research Highlights - POSTERS 'flash talks' *(3 min = 2 slides)*

Research Topic / Title	Presenter(s)	
Evaluation of canopy function by combining field and space borne reflectance time series for a deciduous hardwood forest at SERC, MD, USA	*Petya*	*Campbell*
Forest inventory based on mobile laser scanning data – an initial case study from Slovakia	*Ivan*	*Sačkov*
Monitoring of municipal solid waste landfills using RS methods	*Olga*	*Brovkina*
Exploring Ecosystem Dynamics using SIF and Eddy Covariance: Pilot Data from Maize Field	*Peter*	*Fleischer*
Floodplain forests mapping using earth observations and artificial intelligence	*Ivan*	*Pilas*
Identification of green roofs from airborne RS data	*Miroslav*	*Pikl*
Water Reservoirs and the War in Ukraine: Environmental Consequences	*Volodymyr Starodubtsev*	*Maryna Ladyka*
Meet STELLA – an Instrument for **S**cience and **T**echnology **E**ducation for **L**and / **L**ife **A**ssessment https://landsat.gsfc.nasa.gov/stella/	*Petya*	*Campbell*

Combining Field Proximal and Space-borne Reflectance Time Series for Evaluation of Canopy Function and Productivity

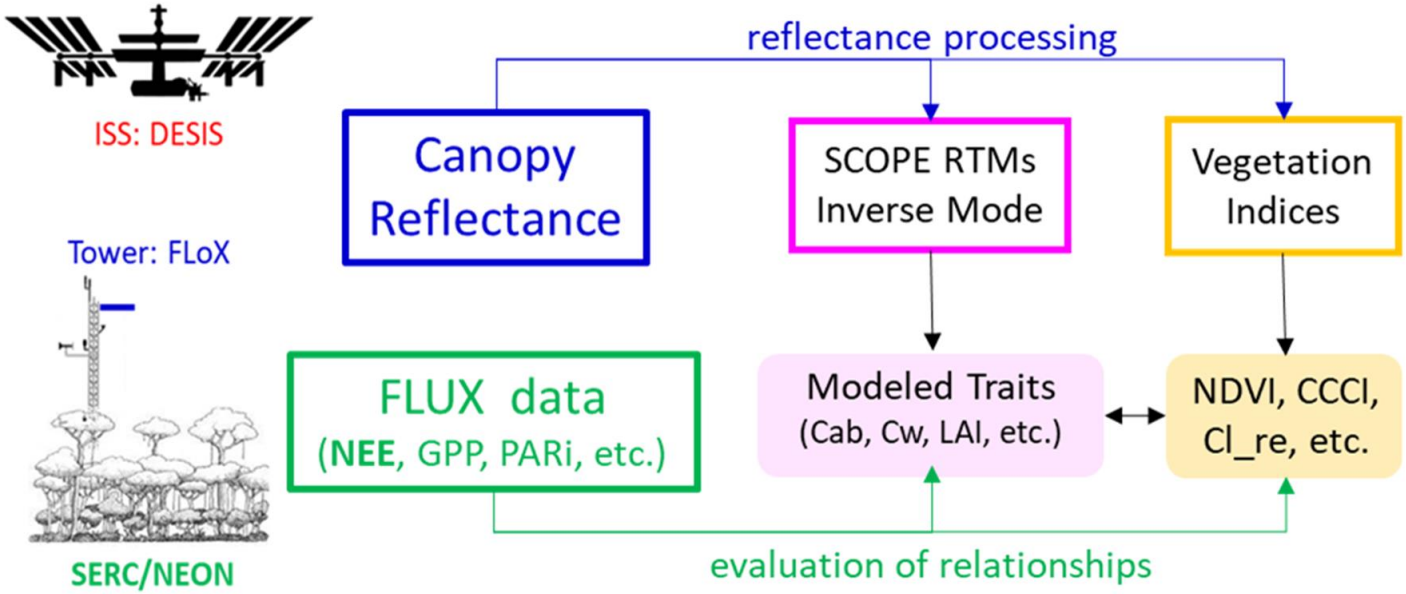
Campbell, Petya K. E. (1, 2); Huemmrich, F. Karl (1, 2); Lukes, Petr (3); Neigh, Christopher (2); Poulter, Benjamin (2); Albrechtova, Jana (4); van der Tol, Christiaan (5); McMahon, Sean (6)

Organization(s): 1: NASA GSFC and UMBC, USA; 2: NASA GSFC, USA; 3: Global Change Research Institute, Brno, Cz; 4: Charles University, Prague, Cz; 5: ITC, University of Twente, Enschede, NL; 6: Smithsonian Environmental Research Center (SERC), Edgewater, MD, USA

STUDY SITE, DATA COLLECTION and PROCESSING WORKFLOW

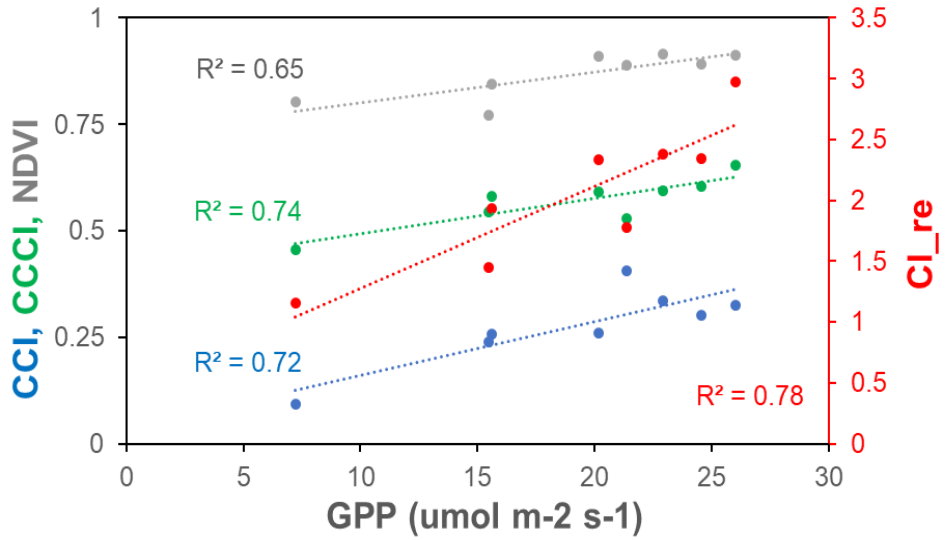
SERC/NEON Tower Footprint and FLoX Field of View (FOV)

Data Collections and Processing

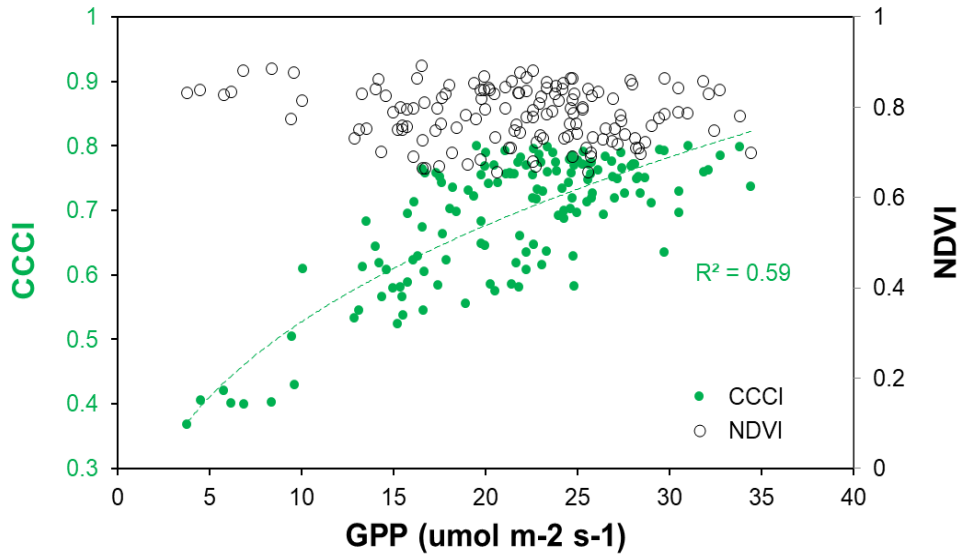


Association between canopy reflectance indices and GPP

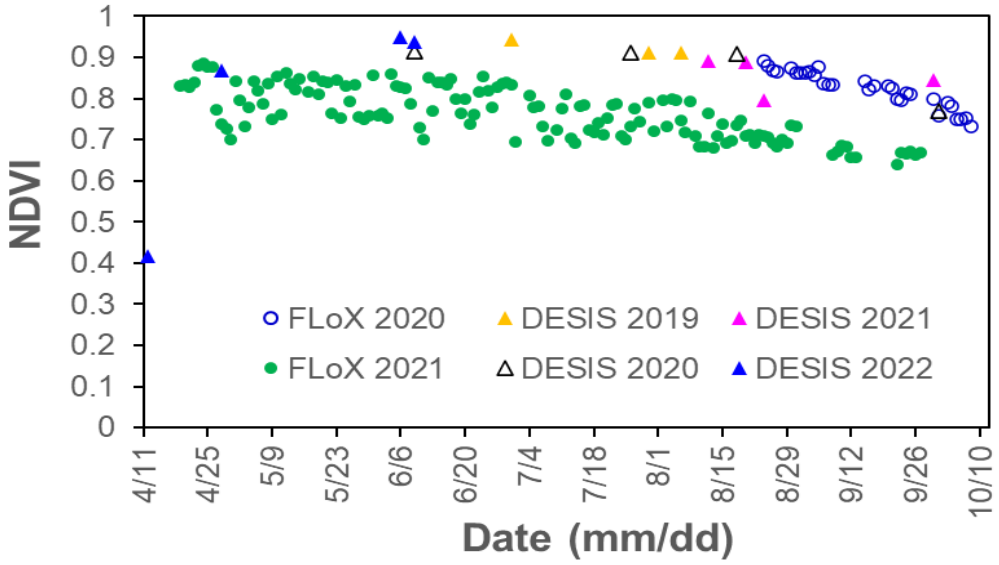
DESIS

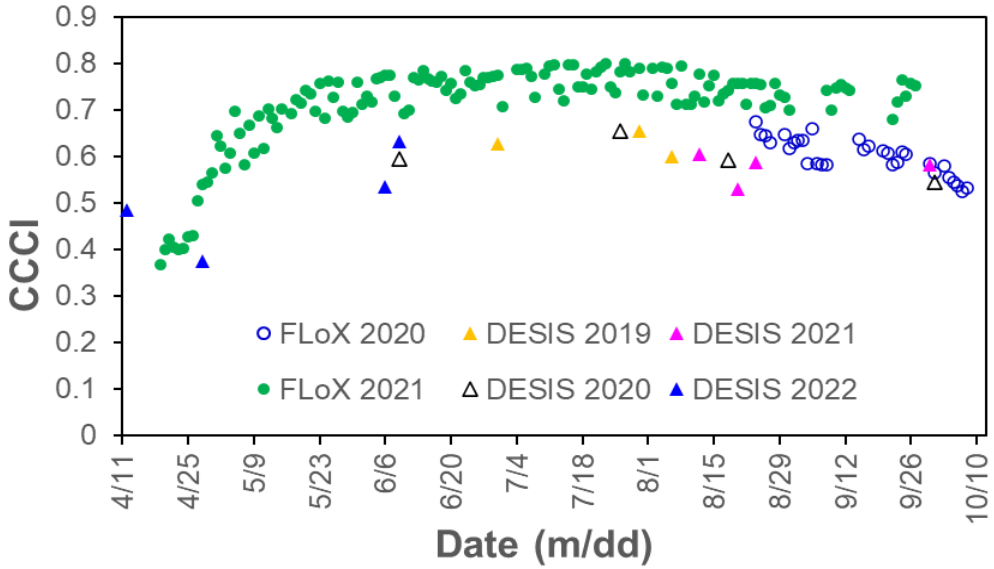


FLoX



Comparison between DESIS and FLoX of the Seasonal distribution of NDVI (A) and CCCI (B)





Forest inventory based on mobile laser scanning data – an initial case study from Slovakia

Ivan Sačkov
National Forest Centre
Geospatial Forestry Laboratory

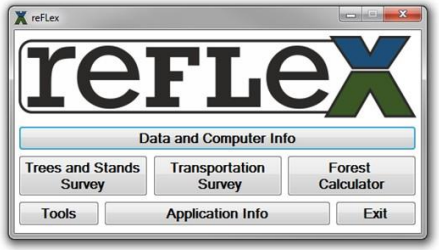
INTRODUCTION

- National forest centre is responsible for monitoring of all forests in Slovakia.
- Since 2014, the field measurement is combined with remote sensing, consisting aerial imaging and airborne laser scanning.
- In 2023, a mobile laser scanner (MLS) was introduced into the monitoring infrastructure.

Forest cover ca. 2 mil. ha

MATERIALS AND METHODS

- The study area with broadleaved forest covering 0.3 ha is located in central Slovakia (48°48´N, 18°54´E).
- The MLS data were acquired in leaf-off conditions in March 2023 using the LiBackpack DGC50 system (GreenValley International Inc.). The area was scanned in a 10-min single walk with respect to optimize coverage of the entire area and to perform a loop closure trajectory for reducing potential drifts associated with the SLAM algorithm. MLS-based forest inventory was performed using a reFLex software (National Forest Centre).
- Field measurement, as source of reference dataset, was carried out in March 2023. Specifically, a total of 117 trees with diameter at breast height higher than 8 cm were measured for stem position, species, height, and diameter.



reFlex v19.2

RESULTS

- Results reveal, that differences between MLS-acquired and field-measured forest inventory attributes reached a relative root mean square error at 9.0% for tree height and at 6.3% for tree diameter.

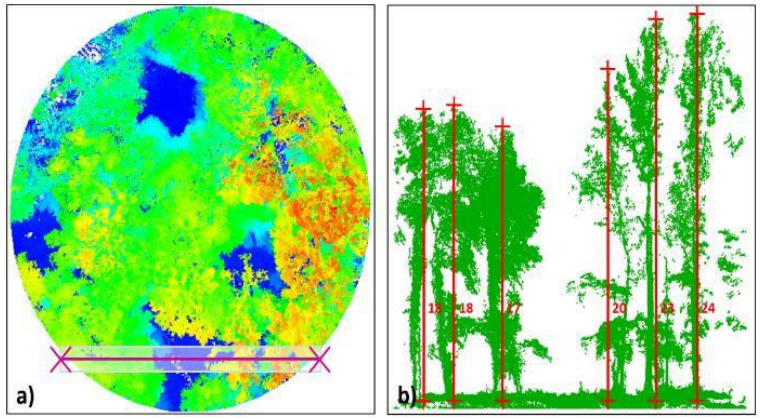
LiBackpack DGC50

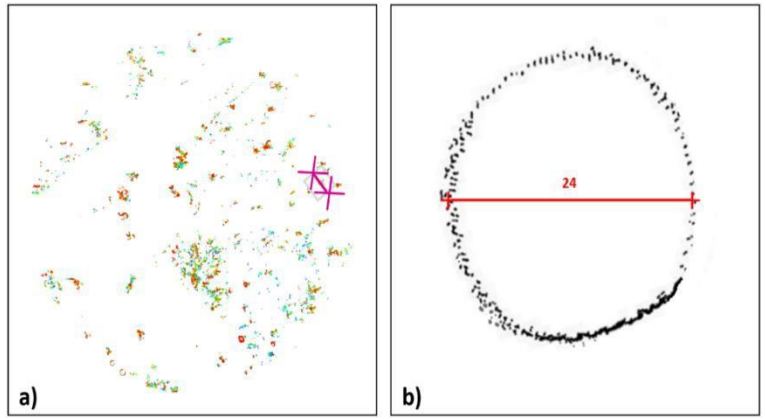
T. G. Masaryka 22, 960 01 Zvolen, Slovakia
www.nlcsk.org, sackov@nlcsk.org

Forest inventory based on mobile laser scanning data – an initial case study from Slovakia

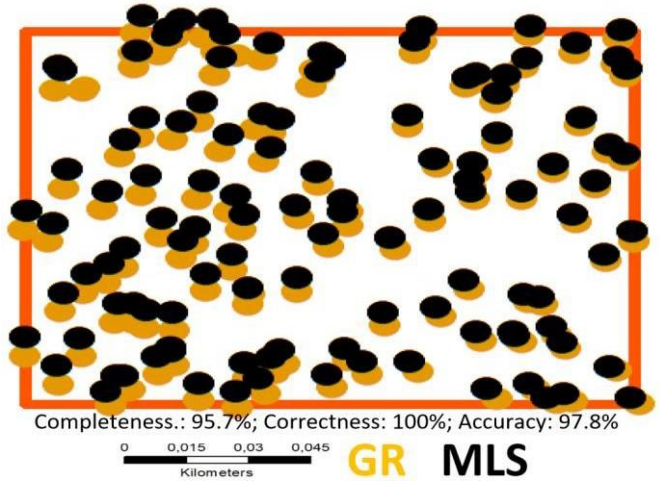
Ivan Sačkov
National Forest Centre
Geospatial Forestry Laboratory

MLS Point cloud

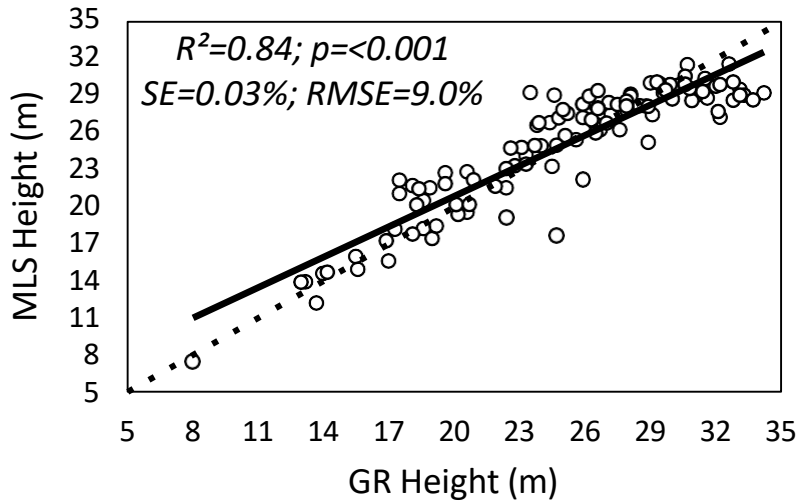


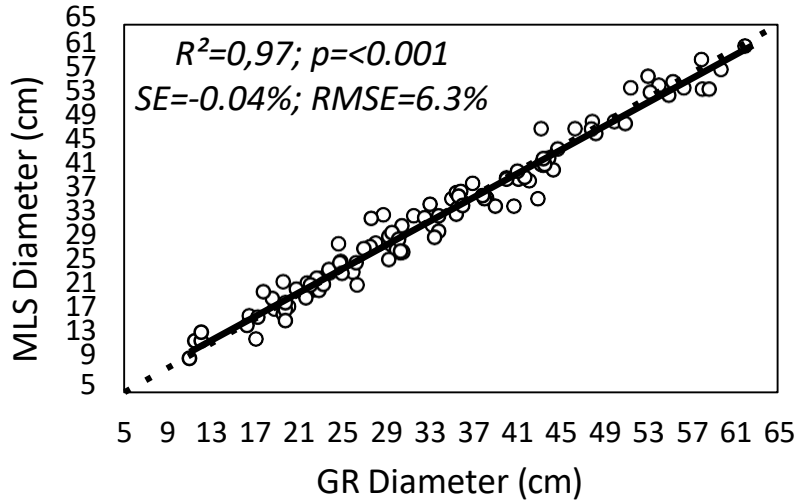


Environment of reFLex software for tree height and tree diameter evaluation



Accuracy of tree detection





Accuracy of tree attributes evaluation

T. G. Masaryka 22, 960 01 Zvolen, Slovakia
www.nlcsk.org, sackov@nlcsk.org

Monitoring of municipal solid waste landfills using RS methods

Brovkina, O., Fajmon, L., Bednařík, A.

Motivation.

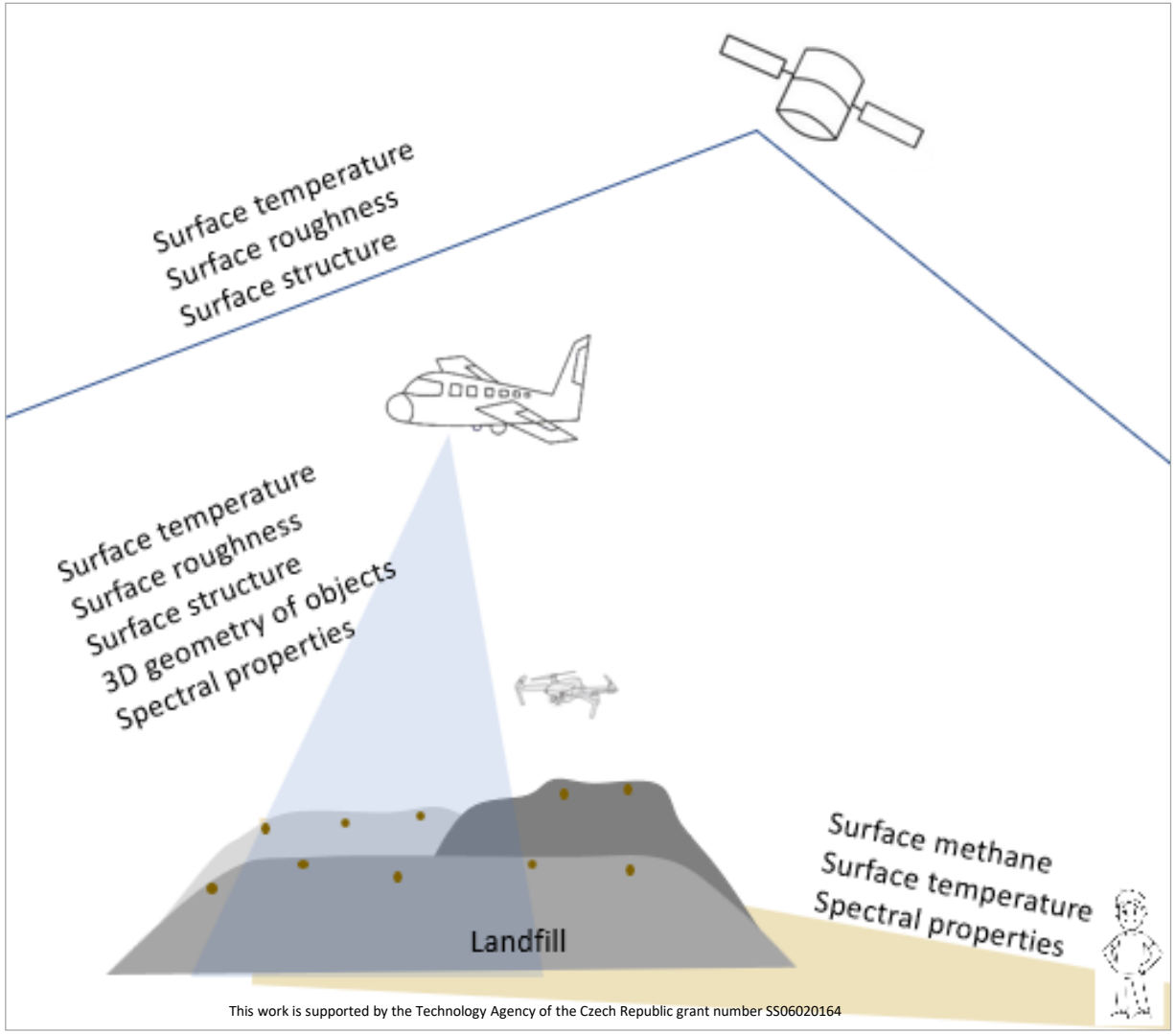
Landfilling raises issues harmful for the environment, such as:

- Discharge of leachate from landfill body
- **Release of methane from ground surface**
- **Settling and instability of landfill body**
- **Spread of invasive plant species**

Methods.

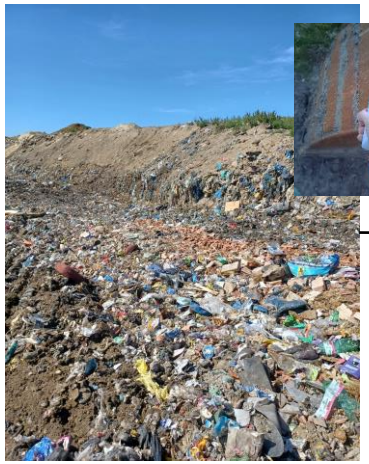
Earth remote sensing methods has high potential to perform accurate area analysis and advance in exploring and studying landfill state:

- **Satellite multispectral data** (Sentinel-2, Sentinel-5)
- **Airborne/UAV hyperspectral data** (VNIR, SWIR, TIR)
- **Airborne laser scanning data**



This work is supported by the Technology Agency of the Czech Republic grant number SS06020164

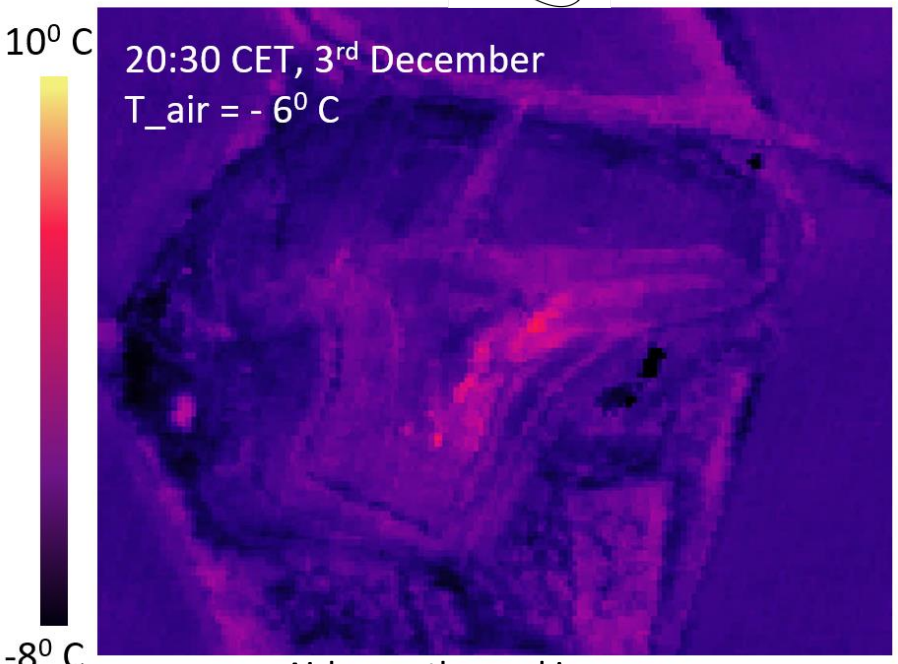
Monitoring of thermal regime of municipal solid waste landfill



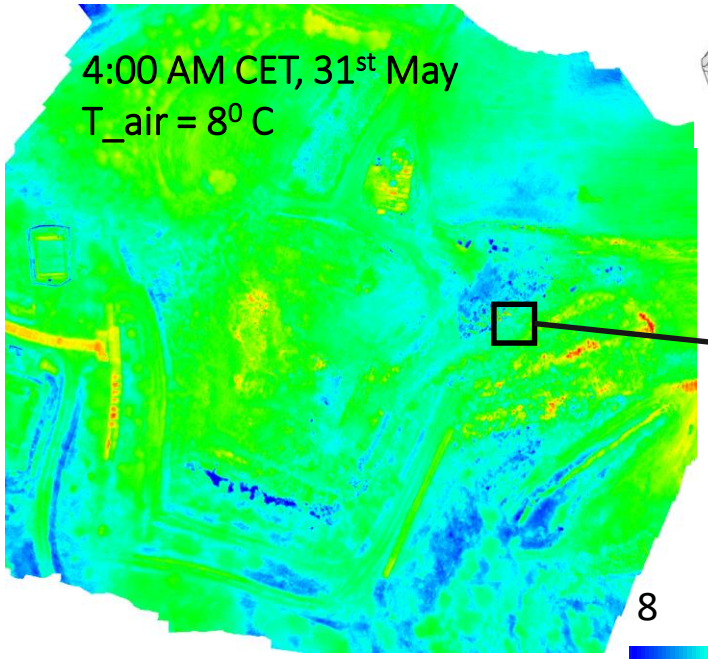
Surface temperature measurements

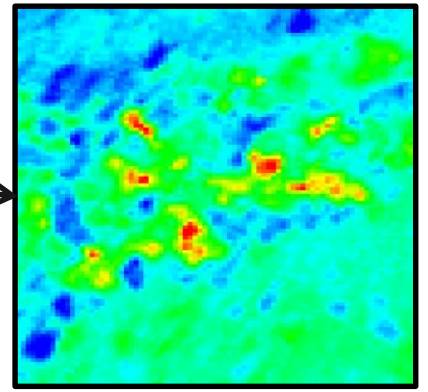
Orthophoto

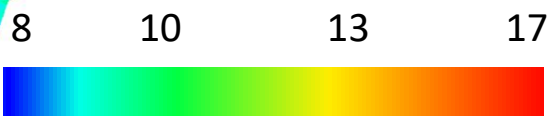
CH_4 concentration measurements



Airborne thermal image







UAV thermal image

This work is supported by the Technology Agency of the Czech Republic grant number SS06020164

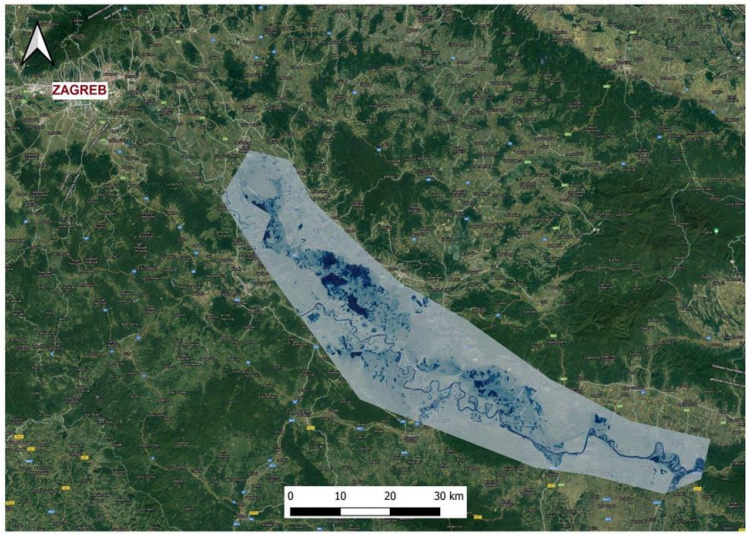
P. Fleischer

FLOODPLAIN FORESTS MAPPING USING EARTH OBSERVATIONS AND ARTIFICIAL INTELLIGENCE - FLASH TALK

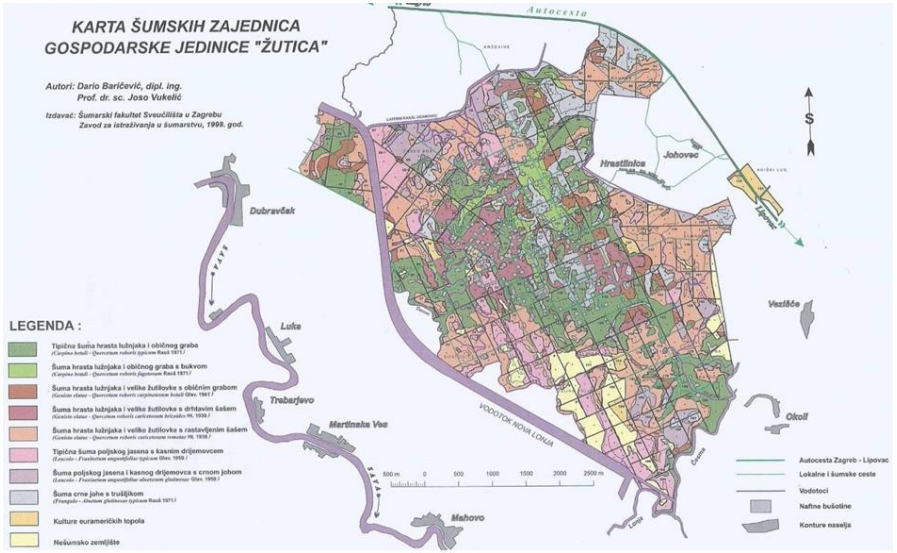
Ivan Pilas

Croatian Forest Research Institute

STUDY AREA



ARCHIVE HABITAT MAP



Example habitat classes (*Phytocoenosis*)

Salici-Populetum (Willows and Poplars)

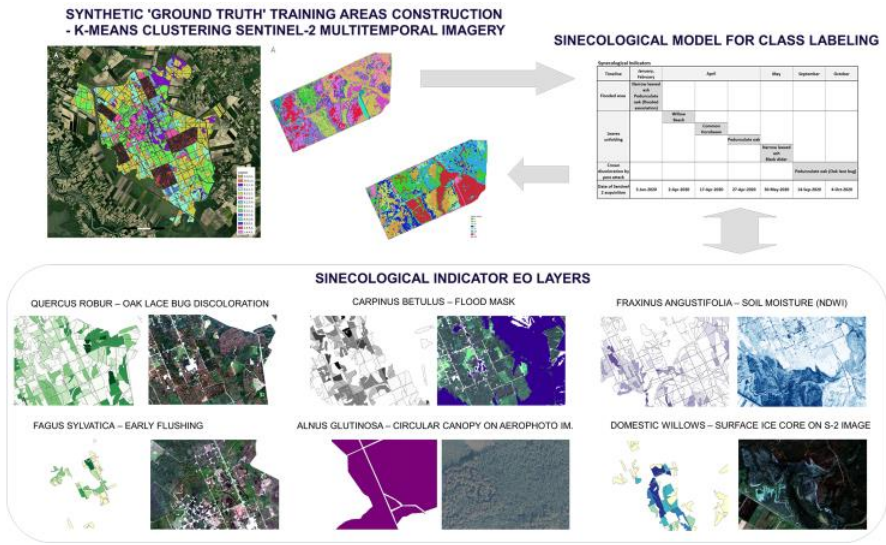
Leucoio fraxinetum angustifoliae (Ash)

Frangulo alnetum-glutinosae (Alder)

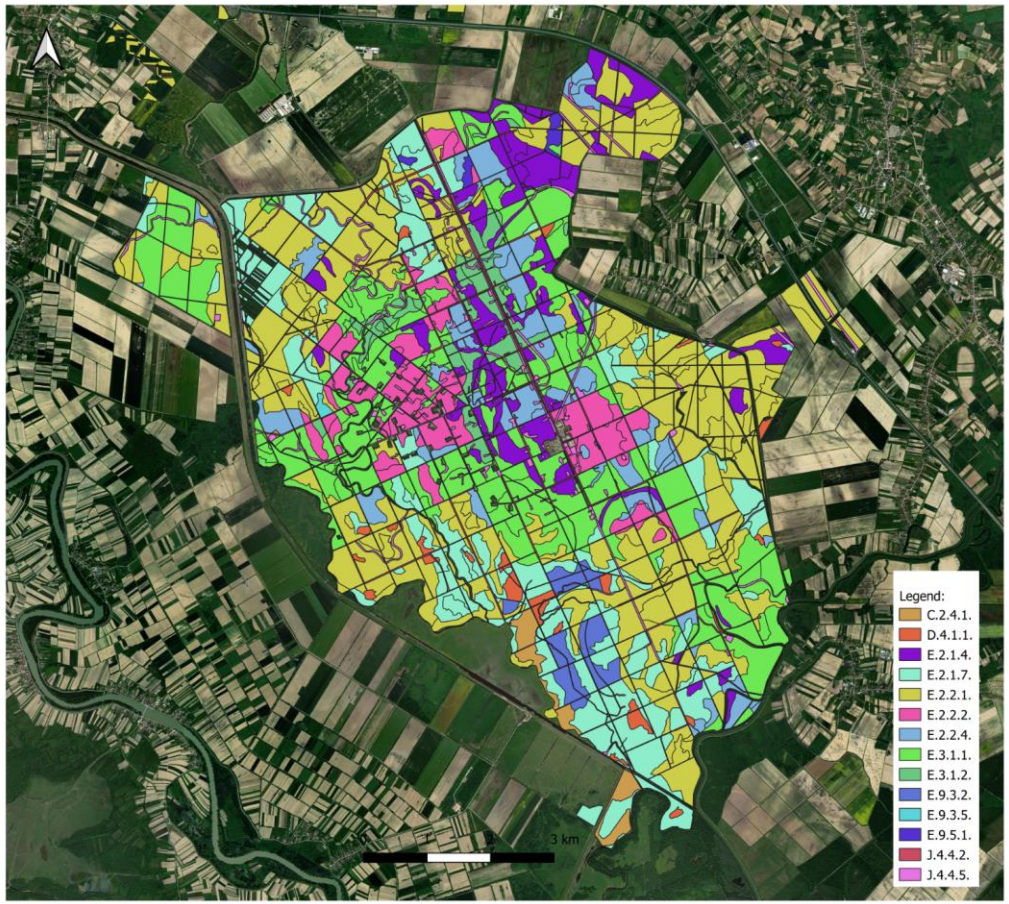
Carpino betuli-Quercetum roboris (Oak)

Genisto elatae-Quercetum roboris Caricetosum remotae (Oak)

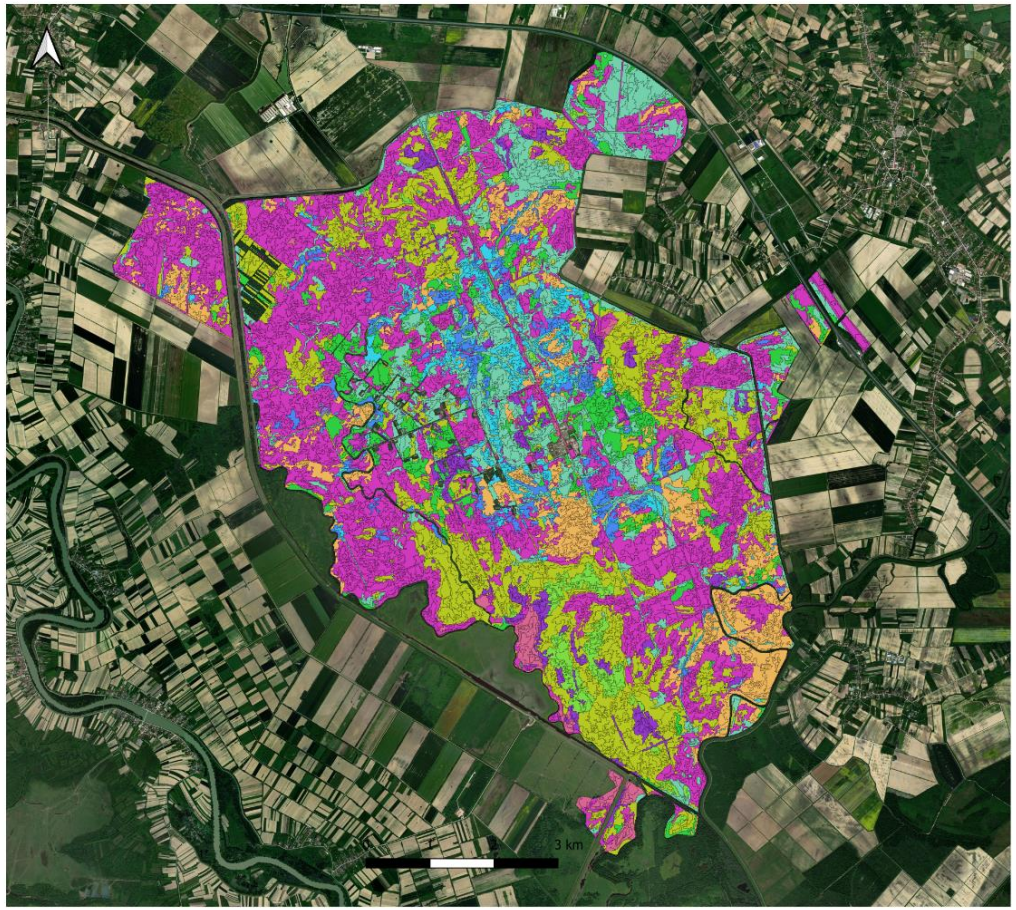
Genisto elatae-Quercetum roboris Caricetosum brizoides (Oak)



Official forest habitat map of the State Forestry Service

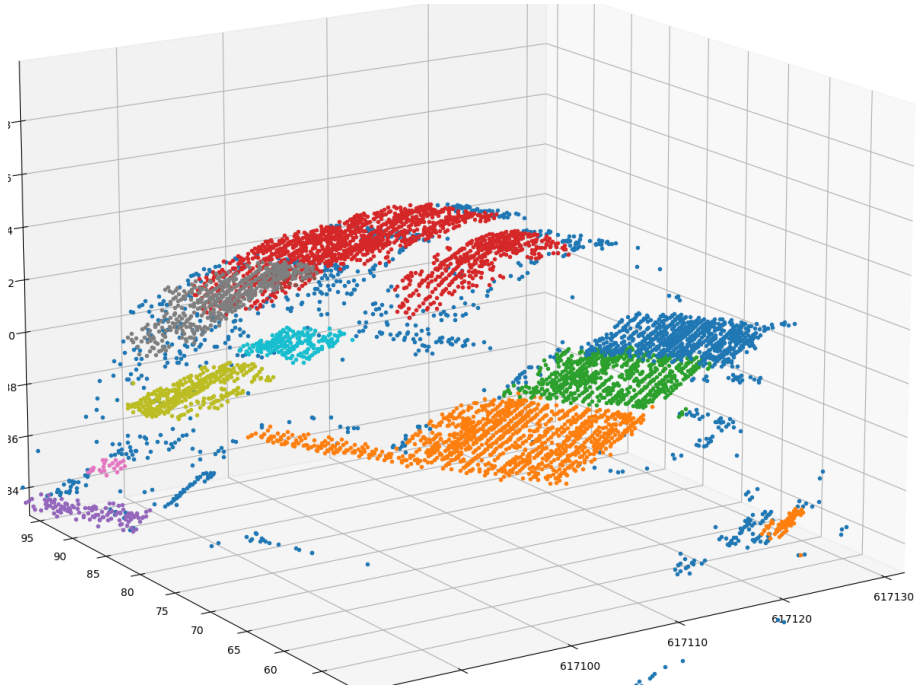


Produced map of the habitats using GEOBIA and Random Forest



Identification of vegetated roofs from airborne RS data

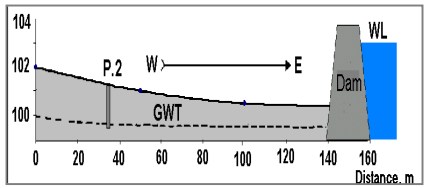
Pikl M.(pikl.m@czechglobe.cz), Fajmon L. Novotný J.
Global Change Research Institute CAS



Water Reservoirs and the War in Ukraine: Environmental Consequences

Volodymyr Starodubtsev, Maryna Ladyka
National University of Life and Environmental Sciences of Ukraine, Kyiv

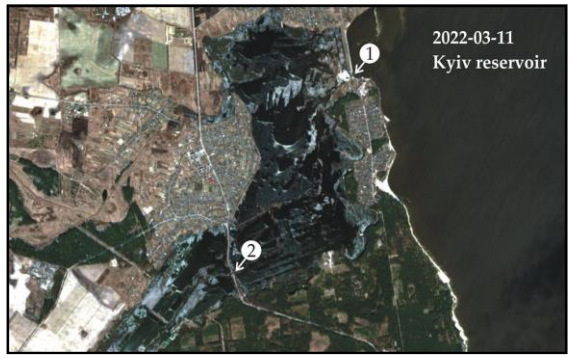
Dam explosion and flooding of the Irpin' River valley



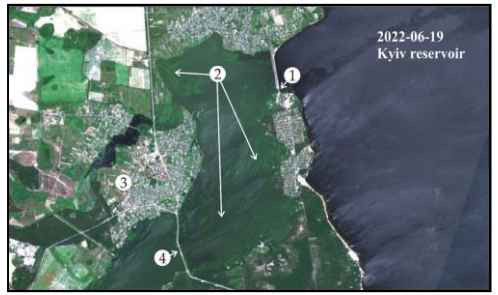
Kyiv reservoir and Kozarovychi dam's profile

Destoyed dam

Reclaimed floodplain of the Irpin' River before dam explosion



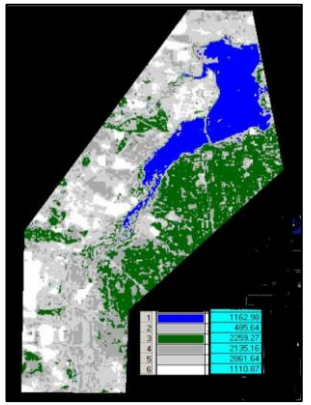
Flooded Irpin' River valley after dam explosion, 2022-03-11



2022-06-19

«Ice field» on flooded Irpin' River valley, 2022-11-18

2023-01-03



LC classification, 2023-05-31

Destroying of Kakhovka HPP

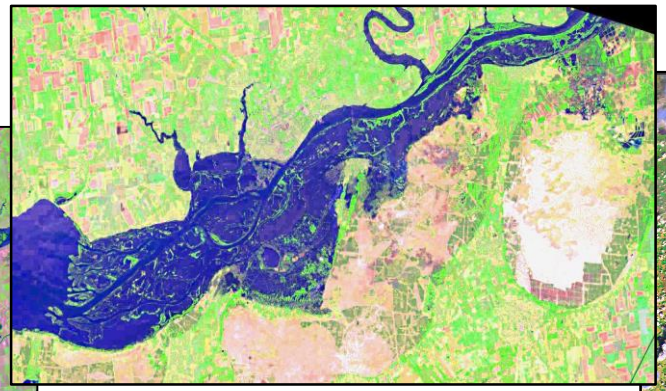
Kakhovka HPP before destroying, 2023-06-05

Dam a day after its collapse, 2023-06-07, *Maxar Technologies*

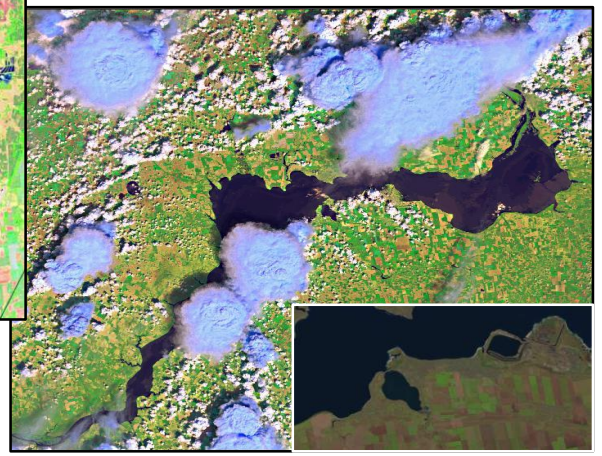
Consequences of Kakhovka HPP destroying

Territories before flooding

Flooded territories, 2023-06-09



Flooded territories, 2023-06-09



Evidence of hostilities on both banks of the Dnieper

STELLA

Science and Technology Education for Land / Life Assessment

An instrument
for science, education, outreach, and engagement

Created by Paul Mirel
Presented by Petya Campbell

STELLA's Mission

"With STELLA, we want to democratize scientific instrumentation, in the same way that Landsat Science has democratized Earth science data; by making the science and scientific tools available to people who are interested.

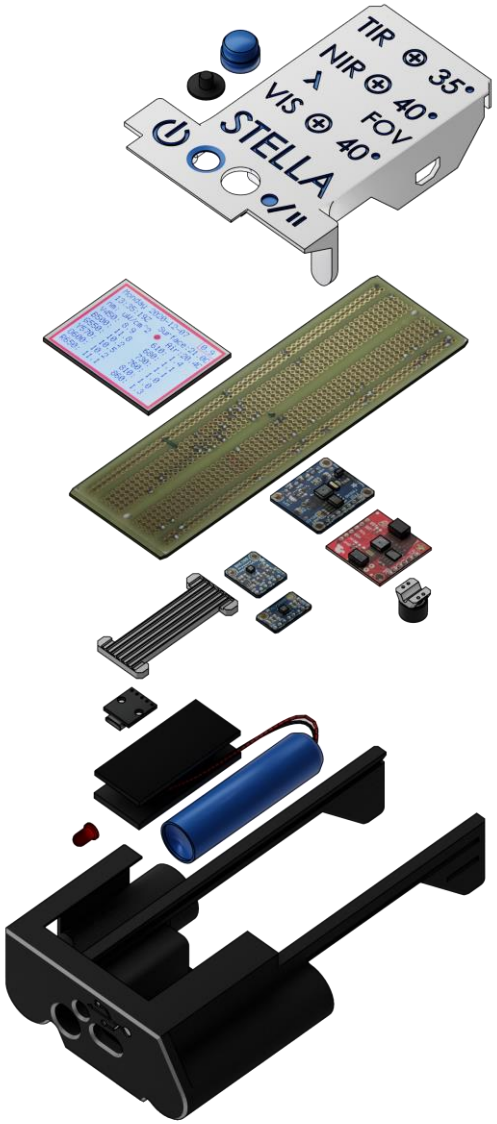
We built the STELLA instruments so that anyone can build one.

Building your own instrument teaches you to think about the capabilities and limitations of instruments we use and of our understanding.

The limits of our instruments set the limits of our understanding, so understanding our instrumentation is key to scientific discovery."

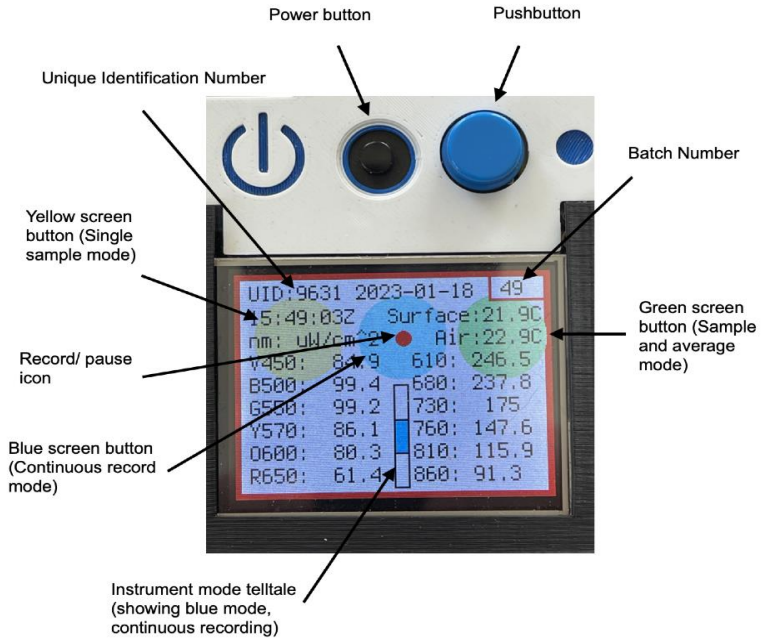
- Paul Mirel, creator of STELLA

STELLA 1.0



Hello and welcome to STELLA!

STELLA-1 controls and screen indicators



Press the power button to turn on your STELLA-1.
The display will show the STELLA welcome screen while the system is booting up, and then switch to the instrument table display.

If no micro SD card has been inserted, the sample indicator LED will light up a constant red. Turn the instrument off, insert an SD card, and turn it back on again. The sample indicator LED will flash when a datapoint is recorded.

The batch number provides a reference to one or several samples taken as a batch. The batch number restarts at 0 on a new calendar day.

STELLA's Meat and Potatoes

- Detailed Description
- User Manual
- Parts List
- Build Instructions
- Software
- Software Instructions
- 3D Print Files
- Print File Instructions
- Sensor Technical Details
- Data Viewer
- Web Presence

Future Offerings?

- A choice guide directing people to the correct STELLA
- An Applications section: what has been learned and in what way
- …

https://landsat.gsfc.nasa.gov/stella/