



Odkrijte moč lokacije

The scope and the distribution of the remote sensing data in Slovenia

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REPUBLIKA SLOVENIJA
MINISTRSTVO ZA NARAVNE VIRE IN PROSTOR
GEODETSKA UPRAVA REPUBLIKE SLOVENIJE



NAČRT ZA
OKREVANJE
IN ODPORNOST



Financira
Evropska unija
NextGenerationEU

Content



- 80 years of surveying in Slovenia
- CAS – Aerial Photogrammetry
- CLSS – Lidar data
- PAF – Oblique Imagery
- GAAF – Georeferencing historical aerial photographs



80 years of surveying in Slovenia



HIGHLIGHTS FROM HISTORY

- 1944 Founding of the geodetic section
- 1947 Decree of establishing and authorising the Surveying and Mapping Authority
- 1970 Own aerial photogrammetry
- 1980 Established Register of Spatial Units
- 2002 New state topographic map for entire state
- 2005 Building cadastre
- 2008 D96/TM



Remote sensing in Slovenia

We can be proud of almost a 50-year history of continuous cyclic aerial photography on state level.



1943

Oldest aerial photographs in the archive



1975

First cyclic aerial photographing of Slovenia - CAS



2006

Digital technology

2011-2015

First Lidar data for entire state of Slovenia

2022

Testing of oblique imagery

CAS – Cyclic Aerial photography of Slovenia



**Regular provision of data
(3-year cycle)**

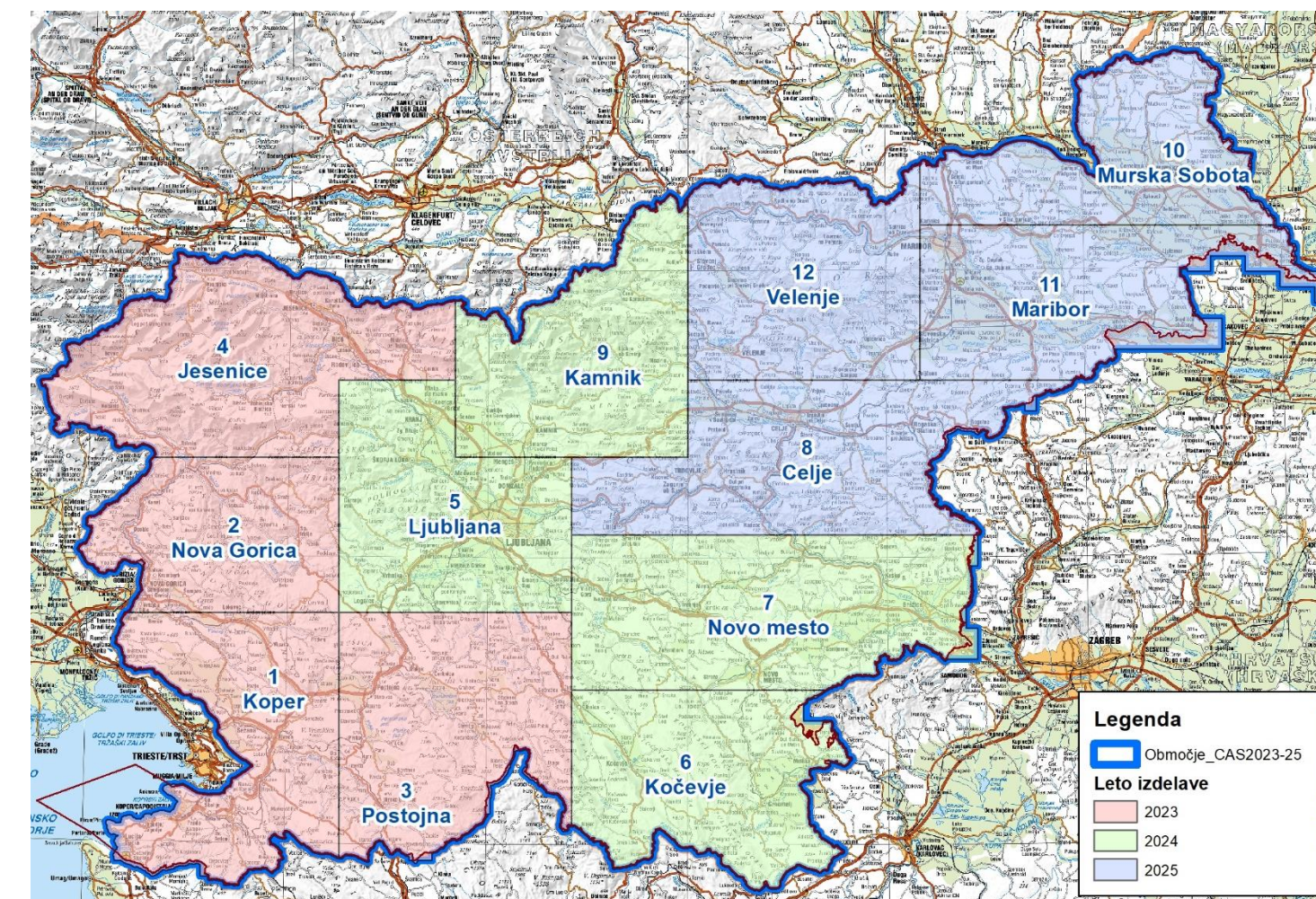
Basic characteristics:

- Required large format aerial camera
- Capture in 4 channels (3x visible light + near infrared)
- GSD maximum 25 cm
- Overlapping 80/30, two test zones 80/60

Products:

- Aerial photographs
- Ground control points and aerial triangulation
- Digital relief model
- Orthophoto (DOF025, DOF050, DOF050IR)
- 3D network (3D mesh):

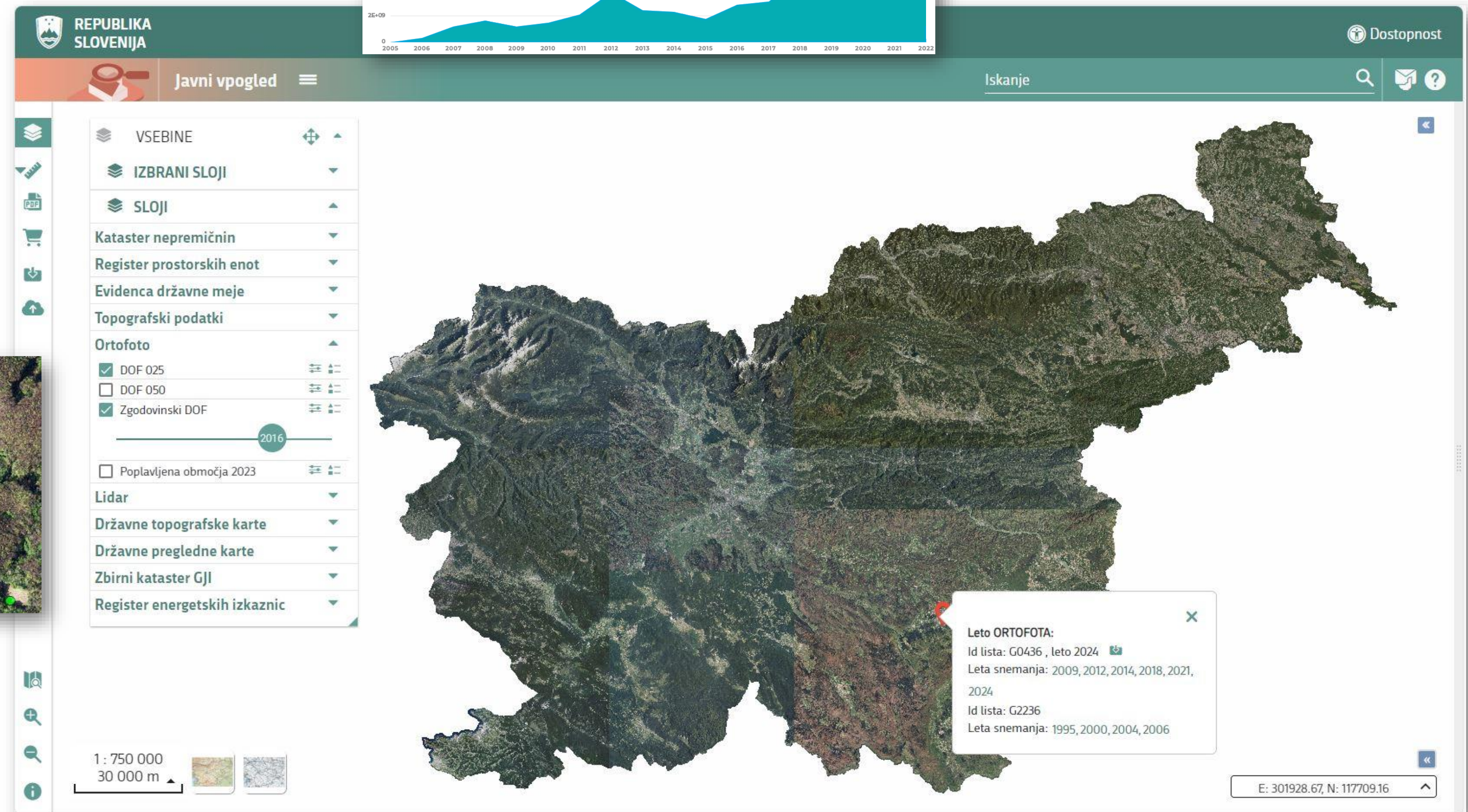
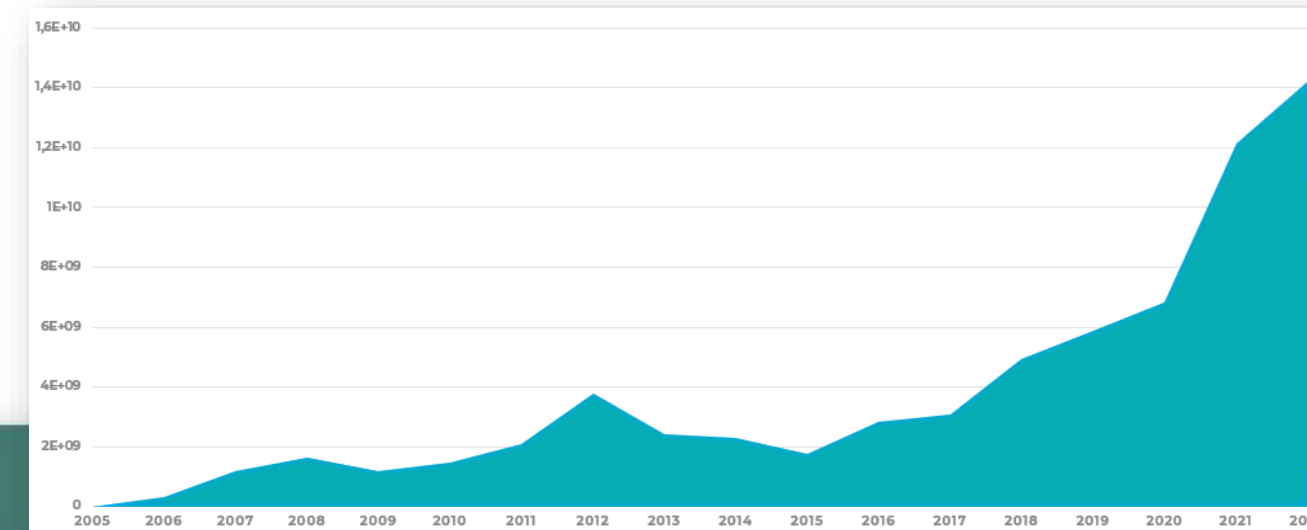
<https://demo.gdi.si/portal/home/webscene/viewer.html?webscene=ee00658f48f248a8a4911268fae1ef98>





→ Distribution

Public viewer- ipi.eprostor.gov.si/jv/
Public Geodetic Data (JGP)
wms, wfs, wmts





CLSS – Cyclic Laser Scanning of Slovenia



1. State capture 2011-2015

- Required density 5 dots / m²
- Point cloud -> classification -> altitude model

2. State capture 2023-2025

- Required density 10 dots / m²
- Capture also aerial photographs
- **Products:**
 - GKOT – georeferenced and classified point cloud (13 classes)
 - DMR
 - True orthophoto

Special laser scanning

- Higher density (40 dots / m²)
- Corridor capture (watercourse area)

3D viewer

- Web application for viewing and downloading data

→ Pilot 3D viewer

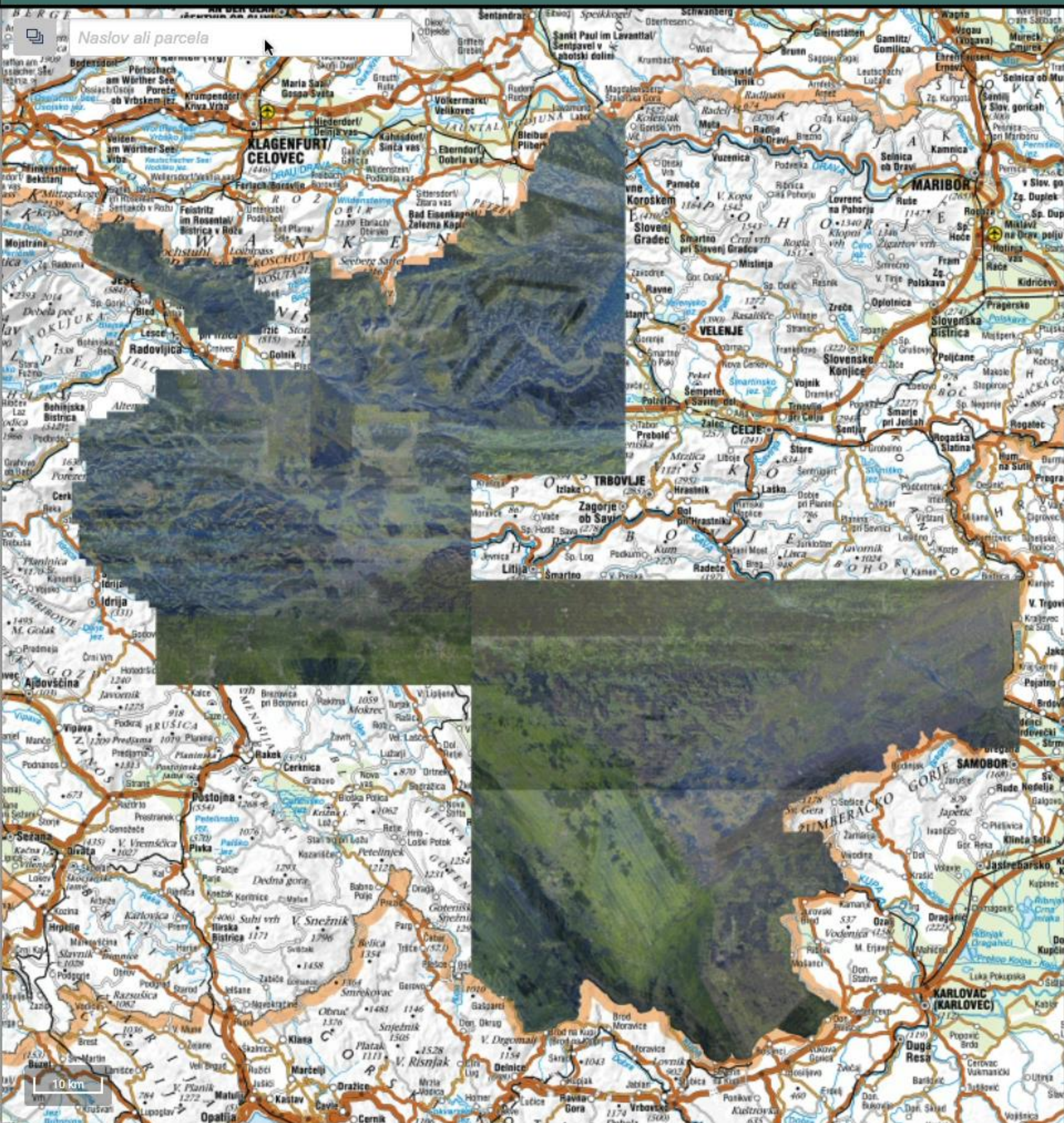
A pilot task of creating a 3D viewer of mainly lidar data is currently under construction. We want to integrate such a viewer later into our "web window" and data access system. We also want to include all other data that enter 3D and even 4D space, so they also have a time component.

www.clss.si.

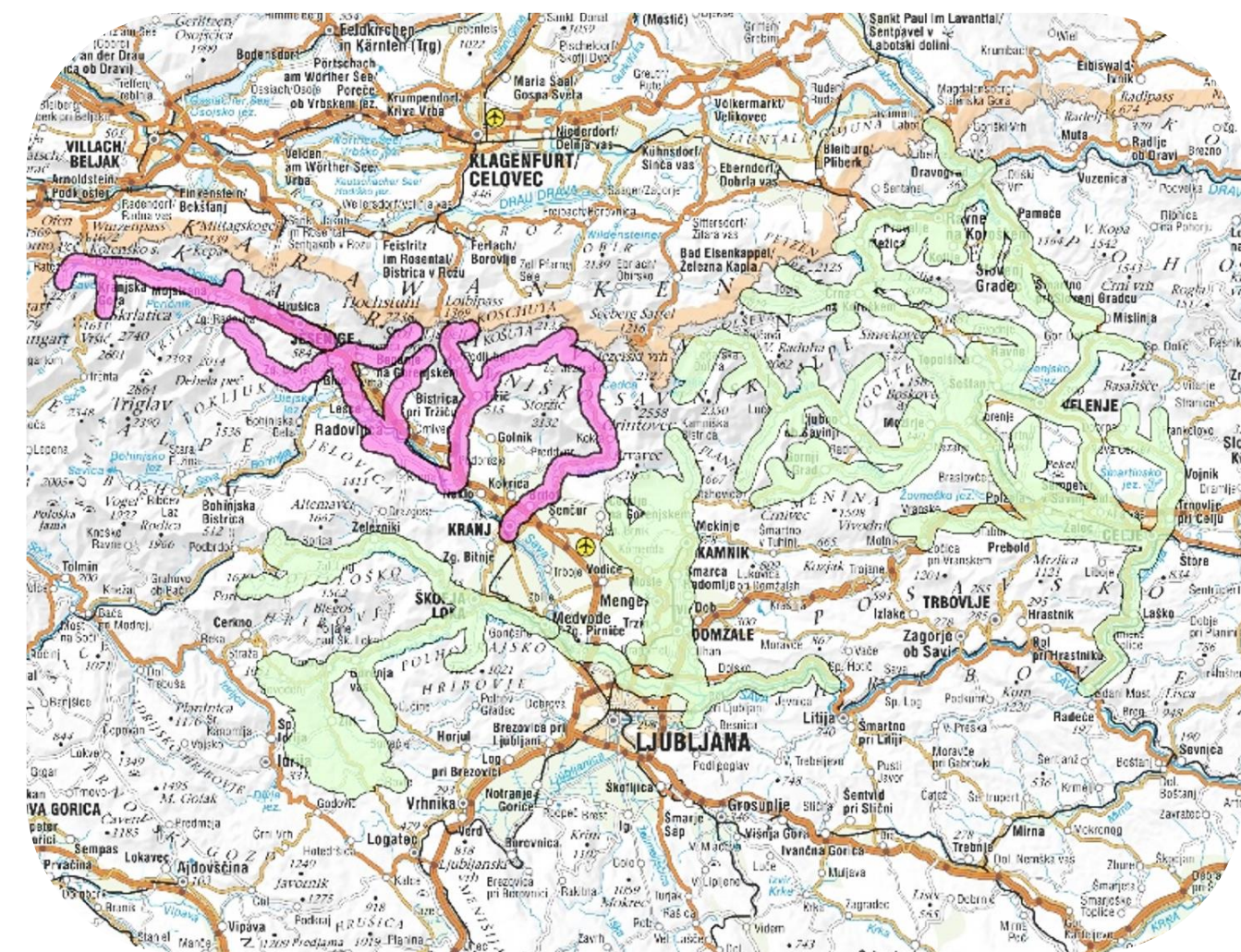
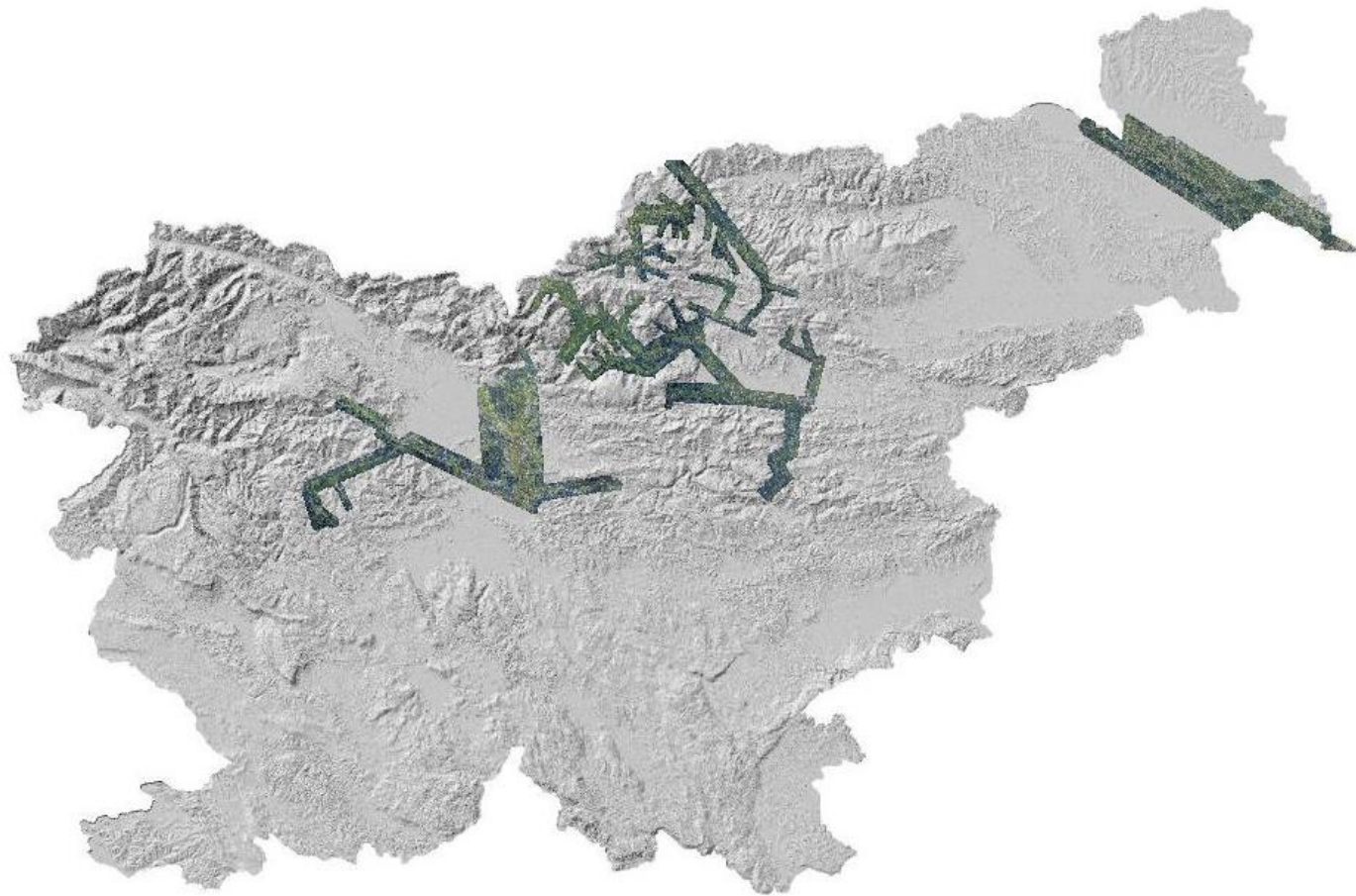
Date to download:

- Classified raw point (km x km)
- Digital relief model
- Digital surface model
- Shaded relief image
- POF – true orthophoto (normal or infrared)





Flood 2023 in Slovenia





PAF – Oblique Imagery



Time of capture

- Autumn 2022 – Spring 2023

Test area

- Ljubljana: 5 x 5 km, 5 cm GSD
- Murska Sobota: 10 x 5 km, 10 cm GSD
- Bohinjska Bistrica (Bled): 10 x 10 km, 15 cm GSD

Products

- Aerial photographs (nadir + 4 oblique photos)
- Digital Surface Model
- True orthophoto
- 3D network
- Special viewer

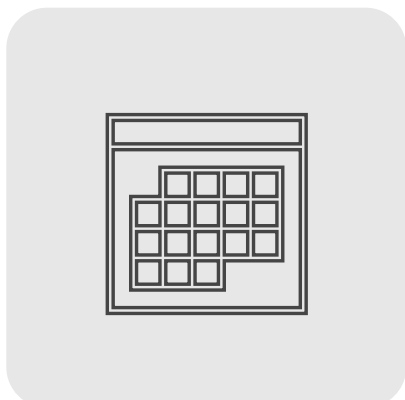
gurs.lift-fly.com

strrd.maps

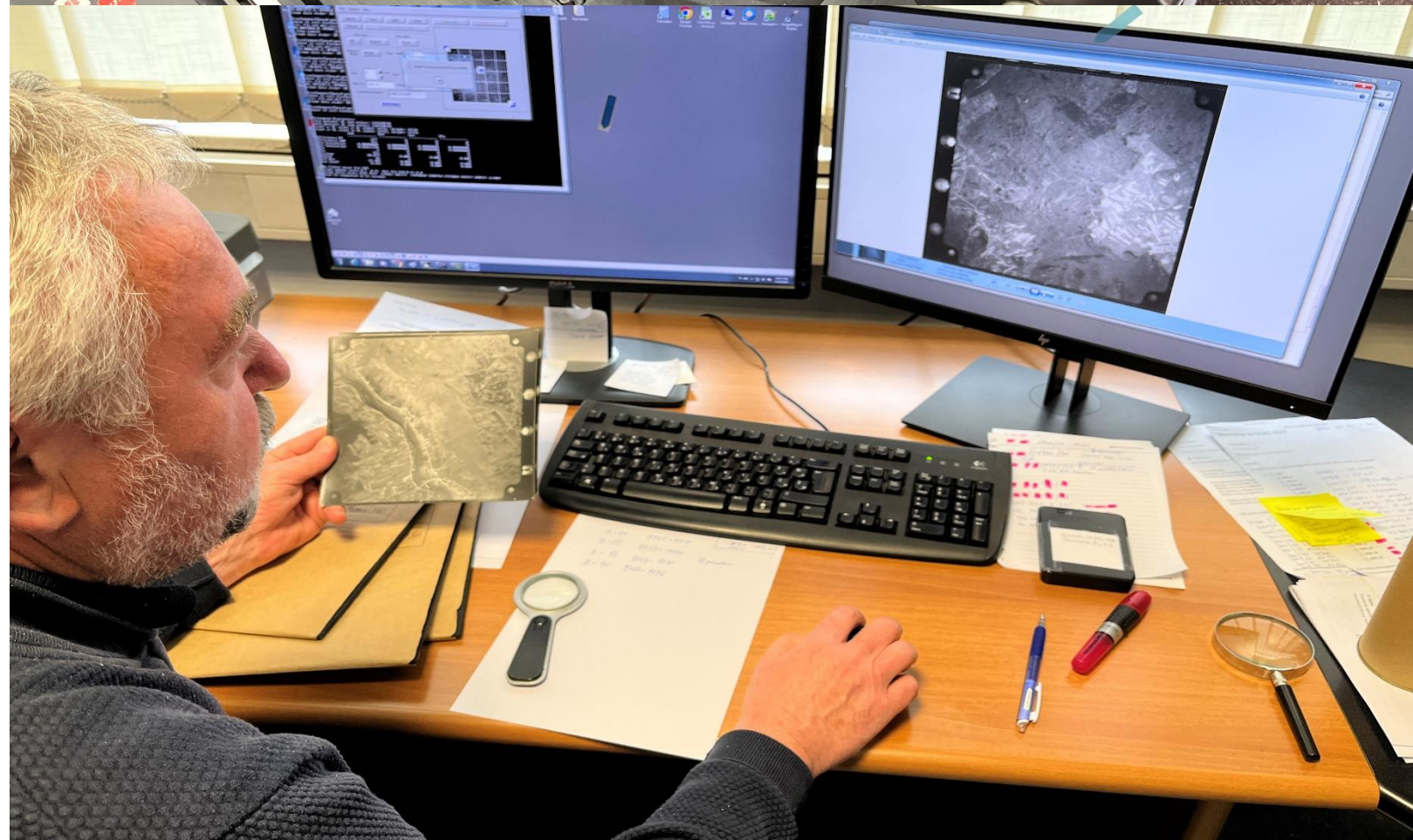
- ☐ GURS 3D STAVBE
 - ☐ Vsa območja
 - ☐ Vsa območja - 2D tlorisi nadzemnega dela stavbe z atributi
 - ☐ Vsa območja - 2D tlorisi strehe s karakterističnimi linijami
 - ☐ Vsa območja - centriodi stavb
- ☐ ODTISI (FOOTPRINTS)
 - ☐ Murska Sobota
 - ☐ Murska Sobota (sever)
 - ☐ Murska Sobota (jug)
 - ☐ Murska Sobota (vzhod)
 - ☐ Murska Sobota (zahod)
 - ☐ Ljubljana
 - ☐ Ljubljana (jug)
 - ☐ Ljubljana (sever)
 - ☐ Ljubljana (zahod)
 - ☐ Ljubljana (vzhod)
 - ☐ OF Ljubljana
 - ☐ Bled
 - ☐ Bled (jug)
 - ☐ Bled (vzhod)
 - ☐ Bled (zahod)
 - ☐ Bled (sever)
 - ☒ Ljubljana pomlad
- ☐ KATASTER NEPREMIČNIN
 - ☐ KN - Stavbe
 - ☐ KN - Stavbe, tloris
 - ☐ KN - Stavbe, nadzemni tloris
 - ☐ KN - parcele
- ☒ PODLAGE SNEMANJA
 - ☒ PAF - Murska sobota
 - ☐ PAF - Bled
 - ☐ PAF - Ljubljana
- ☒ PODLAGE
 - ☒ Ortofoto SLO (DOF2023)
 - ☐ Orthophoto SLO (DOF2021)
 - ☐ OpenStreetMap
 - ☐ CLSS POF 2023
 - ☐ CLSS POFI 2023

Naslov, občina, naselje





GAAF – Georeferencing historical Aerial photographs



Aerial photographs

- 130.830 negatives
- 5.952 contact sheets (military objects)
- From 1943 till 2005
- 23cm x 23cm or 18cm x 18cm in role
- BW (85,9%), colour (14,1%)
- Special – PAS (61%), Cyclical – CAS (39%)
- Metadata from 1970

Digitization

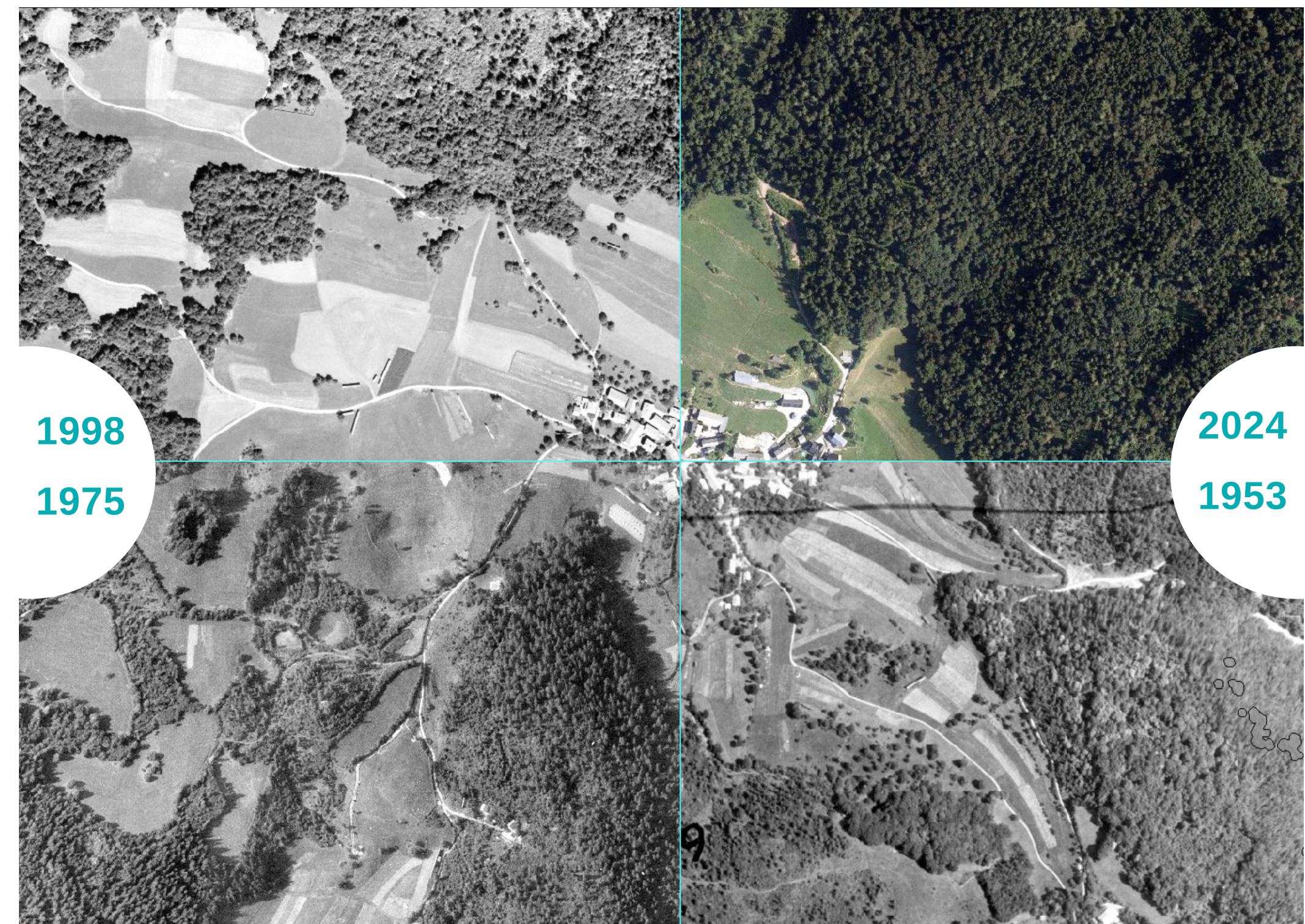
- Leica DSW700 Scanner
- Resolution 12,5 μm
- Started in 2018

Georeferencing and orthophoto

- Started in 2024
- Inside PAS or CAS
- Rough calibration - vignetting
- Accuracy minimum 10m

Results

- Georeferenced photograph
- Orthophoto (same year)
- Seamlines
- Layer in Public viewer



What to do next?

At the Surveying and Mapping Authority of the Republic of Slovenia, we do not collect remote sensing data for our own needs, but we want to provide this type of data to the widest possible range of users, at least within the public sector. In addition to standard products, such as classic orthophotos from CAS, we can also provide data of more advanced technologies. To do this, however, there must also be a clear need and support for the continued provision of funds.

Shortening cycles? New ways to capture? Higher resolution, higher density? The reaction of users?



Shortening cycles?

- „Annual“ Slovenija from above
- Combination of CAS and CLSS

New methods of capturing?

- LiDAR
- Oblique aerial photography

Higher resolution, higher density?

- Usability : Problems

Reaction of users

- It is important for us to know the needs and capabilities of using data
- What is used and how



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Thank You

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SLO4D



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