D.T2.1.1

Report of the workshop about presentation of LiDAR (laser scan technique), forest state evaluation toolkit

Királylrét, Szokolya, Hungary
17-19 September 2019

Draft version
09 2019

Content

1. Introduction

1. *photo: Lnyx House Visitor Centre of the DINPD, the venue ofn the workshop*

The first workshop of the WPT2, within the Interreg Central Europe project Centralparks, held at Lynx House Visitor Centre (*Hiúz Ház Erdei Iskola és Látogatóközpont*) in *Királyrét*, *Szokolya*, Hungary (located in the heart of the project site Börzsöny Mountains); on 17-19 September 2019, has been organized by the Danube-Ipoly National Park Directorate (DINPD, PP5).

The meeting was attended by the representatives of Centralparks project partners (PPs) and protected area managers, National Park Directorates, forestry managers, researchers and representative of the Hungarian Agricultural Ministry.

1. *figure: Attendance list of the participants*

	Attendee name	Country	Organization
1.	Gergely Kálmán	HU	DINPD
2.	Isidoro De Bortoli	IT	EURAC Research (LP)
3.	Árpád Bezeczky	HU	DINPD
4.	Ferenc Hock	HU	DINPD
5.	Borbála Szabó-Major	HU	DINPD

6.	Fabian Schwingshackl	IT	EURAC Research (LP)
7.	Zbigniew Niewiadomski	PL	Ekopsychology Society
8.	Libor Ulrich	SK	State Nature Conservancy
9.	Erzsébet Óhegyi	HU	Ministry of Argriculture
10.	Karakai Tamás	HU	DINPD
11.	Marie Petru	CZ	Vzdělávací a informační středisko Bílé Karpaty
12.	Jana Reznickova	CZ	Vzdělávací a informační středisko Bílé Karpaty
13.	Dr. Judit Cservenka	HU	Balaton-felvidéki National Park Directorate
14.	Ágota Kaszián	HU	Balaton-felvidéki National Park Directorate
15.	Zoltán Vajda	HU	Kiskunság National Park Directorate
16.	Dr, Pál Kézdy	HU	DINPD
17.	Soma Horváth	HU	DINPD
18.	János Ruff	HU	Ipoly Erdő zrt.
19.	Tibor Standovár	HU	Eötvös Loránd University
20.	Zsolt Barton	HU	Ipoly Erdő zrt.
21.	Zsolt Baranyai	HU	DINPD
22.	Gábor Takács	HU	Fertő-Hanság National Park Directorate
23.	Géza Király	HU	University of Sopron
24.	Szilvia Rév	HU	Individual entrepreneur
25.	Ferenc Szmorad	HU	Individual entrepreneur
26.	András Sevcsik	HU	DINPD
27	Csaba Mezei	HU	CEEweb for Biodiversity
28.	András Vízkert	HU	DINPD

2. First Day - Opening and introduction of the project

The first day of the workshop (17.09.2019) was opened by Borbála Szabó-Major on behalf of the DINPD as the organizer of the meeting.

2.1. Morning sessions on innovative methods used in management planning

After a short welcome of the participants, the workshop started with a field visit to the project site *Magas-Tax Mountain, Börzsöny Mountains*. The field trip was guided by **Árpád Bezeczky**, a ranger of the DINPD. Mr Bezeczky introduced the different types of forest management within the core area of the DINPD, as well as showcased the benefits of nature conservation values from proper, nature-friendly forest management methods implemented on the protected area of Börzsöny Mountains. He explained the positive effects of small clearing instead of traditional forest management.

2. photo: Group picture at the Hangyás peak, Börzsöny Mountains

After the field visit, **Dr. Pál Kézdy**, the deputy director of the DINPD gave a short presentation about the function and protected areas of the Danube-Ipoly National Park, its conservation values and its main duties.

Furthermore, **Isidoro De Bortoli** (EURAC Research, Centralparks Lead Partner) introduced the natural conservation values of the Carpathian region, showcased the increasing threats to the above, which prevention and mitigation of adverse effects require new approaches adopted at the regional scale. He presented the objectives of the Centralparks project, informed on the length of the project implementation period, 8 project partners from 7 cooperating countries (and 8 associated partners from 8 countries), informed on the project budget value, and number of planned outputs related to INTERREG Central Europe Programme priority No 3, and its specific objective No 3.1, on the Centralparks project-specific objectives, and target groups.

3. photo: Árpád Bezeczky (ranger, DINPD) speaking about the current forest management methods

The second day of the workshop (18.09.19) started with a short introduction of the day by Borbála Szabó-Major. Than **Soma Horváth** (DINPD) featured the nature conservation system of Hungary. He emphasized the importance of the forested areas within protected areas, not just in the case of the DINPD, wherefrom the 31.400 ha forests (roughly 80% of the area of DINPD) of the national park's area only 2.400 ha are under its asset management, the rest of the forested area is managed by forestry corporations. That is why nature conservation management planning is crucial to meet the conservation goals within several protected lands. The innovative methods presented in the workshop are crucial to introduce to further and more effective conservation planning.

4. photo: Soma Horváth (DINPD) introducing the goal of the WPT2 within the Centralparks Interreg project

The first session of the workshop was about the method of LiDAR (light detection and ranging), introduced by **Géza Király** (University of Sopron). Mr Király delineated the development of the methods as well as its working principles. LiDAR is an active-sensor 3D remote-sensing technique, which covers the laser scanning of the surface, and depths of the structure of the surveyed object (mainly forest). He showcased the data processing of surface models and their interpolation. The LiDAR equipment gathers full reflection of each emitted laser pulse, thus makes possible to collect a detailed 3D model of the inside structure. As a result, we got the 3D point cloud, as a base of the digital elevation model (DEM) and a digital surface model (DSM – first reflections). According to the difference between the two models, we can evaluate many aspects of the internal structure-richness, which seems a useful tool in forest and conservation management at the same time.

5. photo: Géza Király (University of Sopron) presenting the LiDAR laser scanning method

After a short coffee break, a case study on the potential uses of LiDAR method for the benefits of Fertő-Hanság National Park Directorate was presented by **Gábor Takács** (Fertő-Hanság National Park Directorate). The recovery of grasslands around the Fertő was carried out in the framework of a KEHOP project on 496 ha with the elimination of invasive alien tree and shrub species as well as the native shrubs. The cut wood produced a significant amount of briquettes, but the traditional forestry methods were not able to the quantification of the timber. The surface model (DSCM) and the terrain model (DTM) based on LiDAR scanning gave relevant information on the volume of the vegetation, which made the regular weights countable. The method seemed effective for the use in case of large, closed shrubs for the prediction of expected timber production.

At the second session of the workshop, **Tibor Standovár** from Eötvös Loránd University introduced a novel multi-purpose forest state assessment methodology to support conservation and forest management planning and monitoring. The aim of this method was to develop a tool to provide supplementary information for forest management and conservation planning, to support Natura 2000 habitat status assessment, to build better collaboration between different actors and to build a monitoring scheme for testing the efficiency of management actions. The protocol is based on the analysis of a huge range of variables including route variables, canopy, standing dead trees, down dead wood, herbs, microhabitats and disturbance, shrubs, regeneration and base documentation (GPS coordinates, photos). An adequate hard- and software for smartphones supported the data collection. The method requires relatively low manpower input. As a result, the production of relevant thematic maps (both from conservation and forestry viewpoints) could happen, which are the more efficient tools in conservation management planning. For more information visit the project site: http://karpatierdeink.hu/eng/a-projektrol.

6. photo: Szilvia Rév presenting the idea of the grassland state evaluation methodology

Last but not least of the morning sessions, **Szilvia Rév** presented about assuring quality in grassland management with a „goal-oriented" database. She emphasized that there is 10.000 ha area grassland within the area of DINPD, where human activity is crucial to maintain the natural conditions. For a more effective management planning an evaluation method was needed to reduce the information gap between rangers and decision-makers and to help policy and strategy making. The so-called goal-oriented database is created from a wide range of attributes including background data, conservation goals and adequate treatments, economic goals and possibilities, problems and threats, documentation of treatments and advice for monitoring the treatments. This method is a gap filler guideline and motive for intersectoral negotiations and could serve as the base of institution-level decision making and strategic planning ad to ensuring effective conservation management planning.

2.2. Afternoon sessions with the field presentation of forest state assessment

The lunch break on the second day followed by a field visit to the Királyrét education trial, where **János Ruff** (Ipoly Erdő Ltd.) talked about the history of the Börzsöny forestry management unit. After centuries of inappropriate intensive use the state forestry company turned the site into a semi-natural forest, where the management follows the natural processes and maintained according to sustainable use. Further, Tamás Karakai (ranger of the DINPD) talked about the nature conservation in the Börzsöny Mountains. He introduced the DINPD's activity in the forested area of the Börzsöny in collaboration of the forestry about leak-management and selection cutting, which are beneficial for both for nature conservation and economic purposes as well.

Next to the discussion on forest management the field presentation of the forest state evaluation protocol was presented by Mr Standovár to the participants, through the implementation of one point-recording.

7. photo: Tibor Standovár (Eötvös Loránd University) presenting how an exact plot is surveyed according to the forest state evaluation protocol

In the afternoon session, two roundtable discussions happened. The discussion on nature conservation management planning system and availability of management plans in the Carpathians was started by **Ms Szabó-Major**, who introduced the nature conservation system in Hungary. According to the nature conservation law (1996. LIII.), the preparation of nature conservation management plans for protected areas is mandatory. The management plans consist 3 main content elements: conservation objectives, nature conservation strategies and management practices (related and not related to the type of cultivation and land use), restrictions and prohibitions and get revised every 10 years. Next to nature conservation management plans, forest management plans and Natura 2000 management plans are guiding the maintenance of protected areas. Currently only 10-15 % of protected areas dispose of an accepted nature conservation management plan. The management plans are crucial for the negotiations with different sectors and for lobbying.

In Poland the situation of nature conservation is slightly different, as were introduced by **Zbigniew Niewiadomski** (Ekopychology Society), since there are several types of protected areas (nature reserves, national parks, landscape parks, protected landscape areas, nature monuments, Natura 2000 sites etc.). The law on nature conservation in Poland requires the adoption of long-term protected area management plans (20 years long) for nature reserves, national parks, landscape parks and Natura 2000 sites. There is a general lack of long-term management plans, but national parks and nature reserve can operate on the bases of a provisional mid-term “project of protective tasks” (planned for 5 years). Out of 23 national parks in Poland, only 5 parks have adopted valid management plans (only 2 located in the area of the Carpathians).

The presentation of the Polish case was followed by the short introduction of the situation in Slovakia by **Libor Ulrich**. There are 2 national type of protected land in Slovakia, the large scale is national park, while the small scale is natural reserves. Both types are required to have a management plan. There is a really small percentage of the protected areas which have management plans (~1%), and only approximately 10% of the management plans are elaborated. Natura 2000 sites are different, could party overlap with the protected areas.

Jana Reznickova (Vzdělávací a informační středisko Bílé Karpaty) introduced the case of Czech Republic, where the protected areas require to have an action plan, which has to be revised in every 10 years. The state nature conservancy is responsible for the preparation of the management plans, but negotiation is required with the managers of the areas. There is still an incompliance with the management planning of protected areas.

8. photo: Group picture at Bajdázó lake

The second roundtable session about the zonation system within national parks in the Carpathians was started by **Ms Szabó-Major**, who introduced the zonation system based on IUCN criteria, which includes 3 main categories: core, management and buffer zone. In Hungary every national park directorate is responsible to dedicate the natural zone in accordance with the policy of the Ministry of Agriculture. In the so-called A zones any economic activity is prohibited and only nature conservation activities can be implemented (elimination of invasive alien species), but solid tourism is possible. In the B zones nature-friendly usage is authoritative, while management activities can be implemented according to its nature conservation management plan (forestry by selection cutting or constant forest coverage). The “C” zone is the location for the settlements, where the infrastructure for forestry, nature conservation and tourism can take place. Currently there are discussions in the DINPD about the zonation system for Börzsöny Mountains, where previously a mutually agreed plan was implemented without a contract. According to the recent negotiations only 5% of the protected area could be delegated as A zone.

The discussion was followed by the presentation of **Mr Niewiadomski**, who showcased the situation of the Polish part of the Carpathians, which includes 19 protected areas (6 national parks and 13 landscape parks). The zonation within the national parks include the following 4 categories: strict protection zone (A), active protection zone (B), landscape protection zone (C) and external buffer zone (D). The total area of the external buffer zones covers almost the28% of the protected areas. The rates of the different zones vary on different sites.

Further, **Mr Ulrich** talked about the zonation system of Slovakia, which includes 3 priority zones: strict protection, landscape protection and buffer zone. The strict protection zone is implemented with the area of national parks and landscape protection areas. **Ms. Reznickova** featured the situation in the Czech Republic, where there are also 3 main zone types within the national parks.

3. Third Day – Closure of the workshop with site visit

The third day of the workshop started with a short summary of the meeting by Ms Szabó-Major. After the official closure of the workshop, the PPs and participants went to the unofficial sightseeing to the Danube-bend and visited the *Visegrád Castle*.

9. photo: The so-called Danube-bend (Dunakanyar), the landscape from the Visegrád Castle

Appendix – Participants lists of the workshop

A.1. Attendance list of the first day (2019.09.17.)

CENTRALPARKS

NAME OF THE EVENT: WORKSHOP ON INNOVATIVE METHODS IN CONSERVATION PLANNING

DATE: 2019. 09. 17.

PLACE: KIRÁLYRÉT, SZOKOLYA, HUNGARY

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A.2. Attendance list of the second day (2019.09.18.)

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NAME OF THE EVENT: WORKSHOP ON INNOVATIVE METHODS IN CONSERVATION PLANNING

DATE: 2019. 09. 18.

PLACE: KIRÁLYRÉT, SZOKOLYA, HUNGARY

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A.3. Attendance list of the third day (2019.09.19.)

CENTRALPARKS

NAME OF THE EVENT: WORKSHOP ON INNOVATIVE METHODS IN CONSERVATION PLANNING

DATE: 2019. 09. 19.

PLACE: KIRÁLYRÉT, SZOKOLYA, HUNGARY

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Workshop on innovative methods in conservation planning

Királyrét, Szokolya, Hungary

Day 1 (Tuesday, 17 September):

13:00 - 14:00 arrival
14:00 - welcome of the project partners
14:15 - field visit
19:00 - DINPD - Introduction of the national park - Pál, Kézdy (DINPD)
- Introduction of Centralparks Interreg project
20:00 dinner

Day 2 (Wednesday, 18 September):

9:00 - 9:15 welcome - short introduction of the day
9:15 - 9:30 goals of the action, project Soma, Horváth (DINPD)
9:30 - 10:00 LiDAR 1 Géza, Király
10:00 - 10:15 Q&A

Coffee break 15 min

10:30 - 11:00 LiDAR 2 Gábor, Takács
11:15 - 11:30 Q&A
11:30 - 12:00 Forest state evaluation Tibor, Standovár
12:00 - 12:15 Q&A
12:15 - 12:45 Grassland state evaluation Szilvia, Rév (under confirmation)
12:45 - 13:00: Q&A
13:00 - 13:15: closure of the session

Lunch: 13:15 - 14:15

14:15 - 15:45 study visit to education trail in Királyrét - site visit of the semi-natural forest management, field presentation of the base of forest state evaluation

Coffee break 15 min

16:00 - 17: 00 group discussion1 / roundtable discussion1: nature conservation management planning systems and availability of management plans in the Carpathian - moderator: Borbála, Major
17:00 - 18:00 group discussion2 / roundtable discussion2: zonation system within national parks in the Carpathians - moderator: Borbála, Major

Dinner: 19:30

Day 3 (Thursday, 19 September):

9:00 - 10.00 Closure of the workshop - lessons learned - short summary of the event - Official close of the meeting
10:00 -Sightseeing in the Visegrád Castle (optional program)
Departure

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NAME OF THE EVENT: WORKSHOP ON INNOVATIVE METHODS IN CONSERVATION PLANNING

DATE: 2019. 09. 17.

PLACE: KIRÁLYRÉT, SZOKOLYA, HUNGARY

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NAME OF THE EVENT: WORKSHOP ON INNOVATIVE METHODS IN CONSERVATION PLANNING

DATE: 2019. 09. 18.

PLACE: KIRÁLYRÉT, SZOKOLYA, HUNGARY

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Interreg
CENTRAL EUROPE
European Union
European Regional Development Fund
Centralparks

CENTRALPARKS

NAME OF THE EVENT: WORKSHOP ON INNOVATIVE METHODS IN CONSERVATION PLANNING

DATE: 2019. 09. 19.

PLACE: KIRÁLYRÉT, SZOKOLYA, HUNGARY

Participant List

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WORKSHOP ABOUT PRESENTATION OF LIDAR (LASER SCAN TECHNIQUE) AND FOREST STATE EVALUATION TOOLKIT (WPT2)

Királyrét, Szokolya| 17th-19th September, 2019

Centralparks

Building management capacities of Carpathian protected areas for the integration and harmonization of biodiversity protection and local socio-economic development

Dr. Isidoro De Bortoli| Eurac Research

THE CARPATHIANS

THE CARPATHIANS

- One of the most important European wildlife refuges
- harbours some of the last primeval beech forests
- one-third of European endemic and threatened plant species
- supports vital populations of all large carnivores (brown bear, grey wolf, Eurasian lynx) and all big native herbivores (European bison)
- Of the main European ecological corridors allowing migrations of animal populations and genetic exchange

INCREASING THREATS

infrastructure development

tourism pressure

habitat destruction and fragmentation

poaching

illegal logging

pollution

climate change

over-harvesting

inappropriate natural resource

management methods

Nature conservation policies and management cultures vary among the Carpathian countries…

…Traditional approaches to natural resource management and biodiversity conservation will may no longer be sufficient to reach long-lasting economic benefits and provision of ecosystem services!

CENTRALPARKS

Aims at building management capacities of Carpathian protected areas for the integration and harmonization of biodiversity protection and local socio-economic development.

PROJECT IN NUMBERS

Project duration

1 April 2019 – 31 May 2022

Project partners

8 project partners from 7 countries

Associated partners

8 associated strategic partners

Project budget

1.6 mio €, 1.3 mio € ERDF Funds

Outputs

13 outputs planned

PROJECT PARTNERSHIP

1. Italy: European Academy of Bolzano/Bozen - Eurac Research (Lead Partner)
2. Austria: European Wilderness Society
3. Czech Republic: Education and Information Centre of Bílé Karpaty Mountains
4. Hungary: Danube-Ipoly National Park Directorate
5. Poland: Ekopsychology Society
6. Romania: NFA-Romsilva-Piatra Craiului National Park Administration R.A.
7. Slovakia: Pronatur NGO, The State Nature Conservancy of the Slovakia

ASSOCIATED PARTNERS

1. Italy: Ministry for the Environment, Land and Sea – IMELS
2. Austria: DANUBEPARKS
3. Germany: European Beech Forest Network
4. Hungary: CEEweb for Biodiversity
5. Ukraine: Ministry of Ecology and Natural Resources of Ukraine
6. Poland: Ministry of Environment of Poland
7. Romania: Ministry of Environment of Romania
8. Slovakia: Ministry of Environment of the Slovak Republic

CENTRALPARKS

Programme priority

3. Cooperating on natural and cultural resources for sustainable growth in CENTRAL EUROPE

Programme priority specific objective

3.1 To <u>improve integrated environmental management capacities</u> for the protection and sustainable use of natural heritage and resources

SPECIFIC OBJECTIVES

1. Improving integrated environmental management capacities of protected area administrations and other public sector entities dealing with the protection and sustainable use of natural resources
2. Reconciling and linking the conservation of biological and landscape diversity to sustainable local socio-economic development
3. Promoting the Carpathian Network of Protected Areas as the framework and tool for transnational collaboration between the protected areas of the Carpathian countries in the Central Europe cooperation area

TARGET GROUPS

1. Protected area administrations in the Carpathians
2. Local public authorities
3. National public authorities
4. Interest groups including NGOs
5. Nature conservation authorities
6. Higher education and research institutions active in the Carpathian region
7. General public

THEMATIC WORK PACKAGES

1. Integration of biodiversity conservation and sustainable development in the Carpathian region
2. Building capacities of Carpathian Protected Areas managers
3. Carpathian Ecosystem Services Toolkit

Expected work package results:

- establishing five transnational thematic task forces involving experts from Carpathian countries, addressing the main substantive socio-economic issues
- supporting a long-term management of the Carpathian Protected Areas
- raising awareness and enhance livelihoods of local communities
- enhancing Carpathian Protected Areas management models by developing innovative management tools
- strengthening pro-environmental attitudes

OUTPUTS

WP T1: Integration of biodiversity conservation and sustainable development in the Carpathian region

- Carpathian strategy for enhancing biodiversity and landscape conservation outside and inside protected areas
- Pilot implementation on strategy for enhancing biodiversity conservation outside and inside protected areas
- Strategy for local sustainable tourism development based on natural heritage of the Carpathians
- Pilot workshops of the strategy for sustainable tourism development
- Guidelines on communication between protected areas and local communities in the Carpathians
- Training on effective communication between protected areas and local communities in the Carpathians

OUTPUTS

WP T2: Building capacities of Carpathian Protected Areas managers

- Strategic document on raising good protected areas management capacities
- Innovative habitat evaluation tool (LIDAR) for forest and grassland state evaluation
- Guidelines for proper integrated nature conservation planning
- Integrated Nature Conservation Management Plan
- Pilot testing of the LiDAR laser scan study on mountainous and river valley in Hungary

OUTPUTS

WP T3: Carpathian Ecosystem Services Toolkit

- Carpathian Ecosystem Services Toolkit (CEST)
- Training programme for local/regional authorities for using the CEST

COMMUNICATION OUTPUTS

- 2 Centralparks Leaflets
- Ecosystem Services Toolkit Study Book
- Guidelines for proper integrated nature conservation planning
- CNPA roundtable session
- Project Multimedia clips
- Cartoon illustrated game poster

CARPATHIAN NETWORK OF PROTECTED AREAS

POLICY CONTEXT

- EU 2020 Biodiversity Strategy
- Convention on Biological Diversity
- The Framework Carpathian Convention, and its thematic Protocols

SYNERGIES

- CEETO - Central Europe Eco-Tourism (Central Europe, ongoing: 2017-2020) on sustainable tourism in protected areas: https://www.interreg-central.eu/CEETO
- MaGICLandscapes (CE, ongoing: 2017-2020) on managing green infrastructure manual on green infrastructure functionality assessment: https://www.interreg-central.eu/MaGICLandscapes
- Green-Go! Carpathians (LIFE, ongoing: 2017-2020) - Green-Go guidebook on formation of green infrastructure in N2000 sites: http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=639&docType=pdf
- BEECH POWER (CE, ongoing: 2019-2022) on empowering and catalyzing an ecosystem-based Sustainable Development of WH Beech forests: https://www.interreg-central.eu/BEECH-POWER

SYNERGIES

The project builds on results and experiences from:

- Carpathian Project (INTERREG IIIB CADSES Neighbourhood Prog, 2005-2008)
- The Framework Convention on the Protection and Sustainable Development of the Carpathians
- BIOREGIO Carpathians (South East Europe - Transnational Cooperation Programme, 2011-2013)

OFF TO A GOOD START

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European Regional Development Fund
Centralparks

Kick-off Meeting, 16-17th April, Bolzano, Italy

MEETINGS HELD

Transnational Thematic Task Force (TTTF) Establishment Meetings

Meeting of TTTF on Developing guidelines on communication between protected areas and local communities in Carpathians, 24-26th June, Czerwienne, Poland.

Meeting of TTTF on Local Sustainable Tourism Development, 26th-28th June, Czerwienne , Poland.

Meeting of TTTF on the Carpathian strategy for Enhancing Biodiversity and Landscape Conservation, 17th - 18th June, Banska Bystrica, Slovakia.

Workshop about presentation of LiDAR (laser scan technique) and forest state evaluation toolkit, 17th to 19th August, Királyrét, Szokolya, Hungary.

Thank you for your attention!

https://www.interreg-central.eu/Centralparks

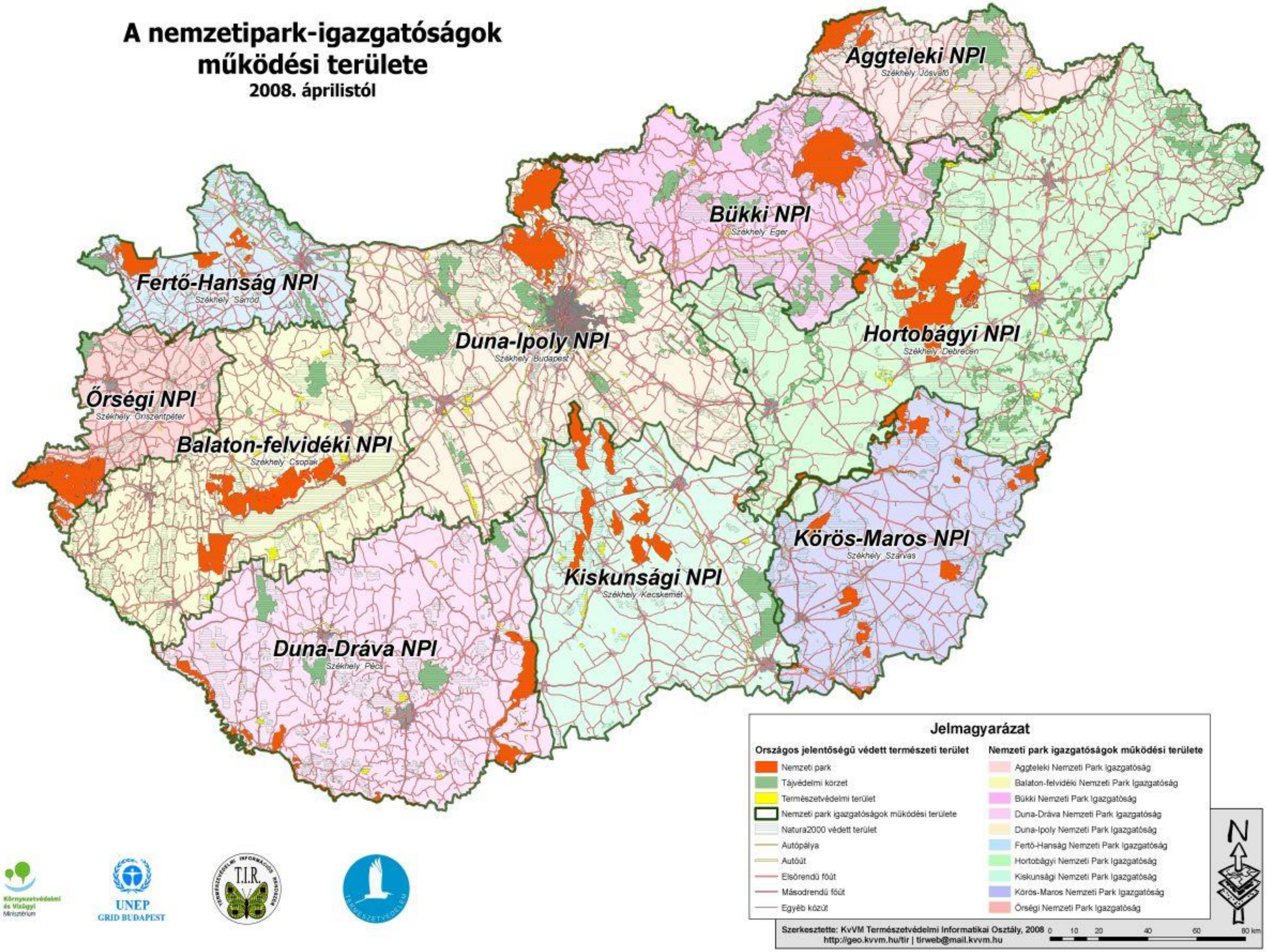
Photos were provided by the European Wilderness Society

Workshop on innovative methods in conservation planning
Királyrét, Hungary | 17-19th September 2019

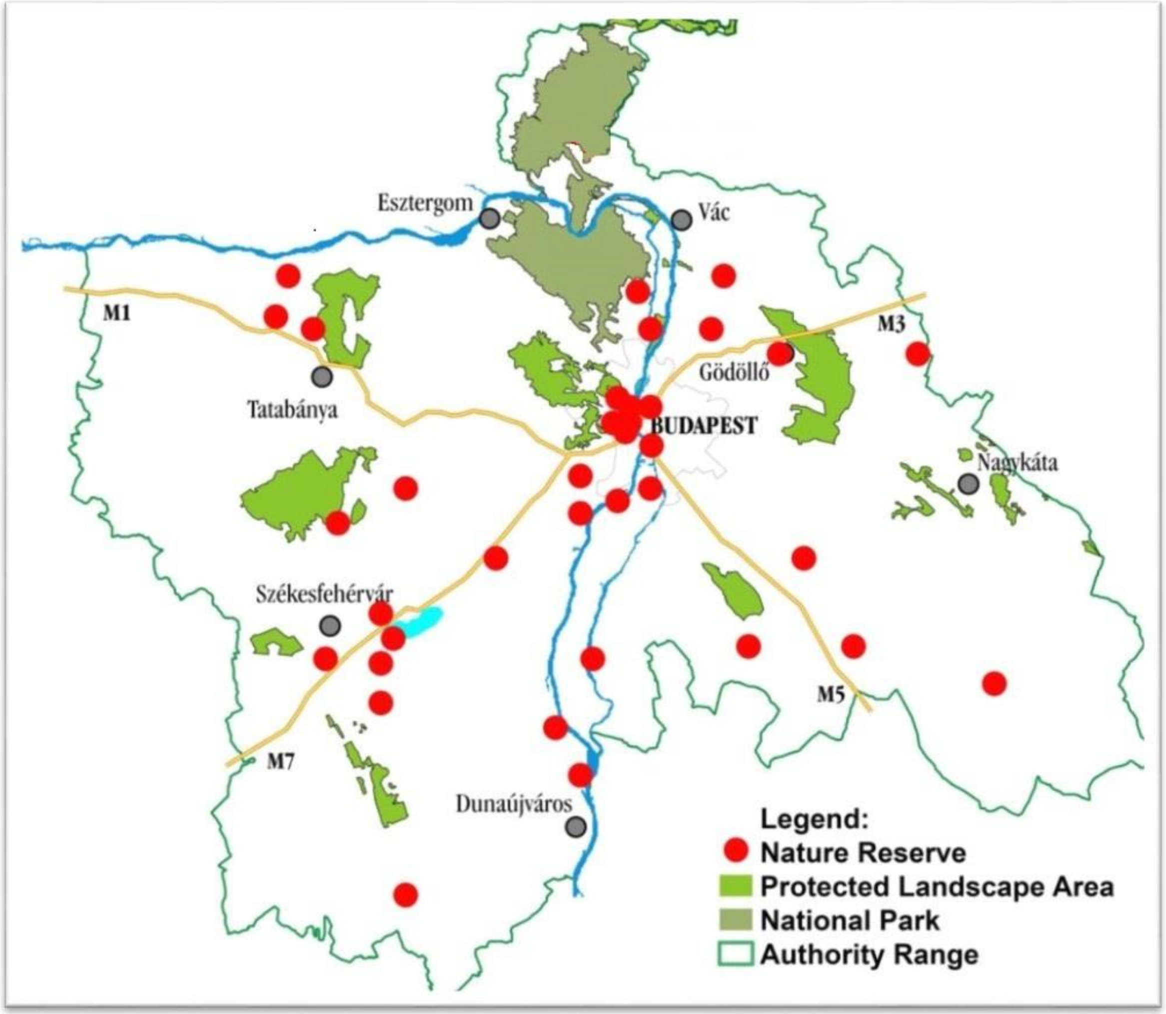
Danube-Ipoly National Park

Centralparks / DINPD / Dr. Pál Kézdy deputy director

NATURE CONSERVATION IN HUNGARY



DANUBE-IPOLY NATIONAL PARK DIRECTORATE



Responsibility:

ca. 125 000 ha
national protected areas

ca. 250 000 ha
Natura 2000 Sites

Internationally protected areas

Ramsar	5 areas – 17.236 acres (6,978 ha)
Biosphere Reserve	Pilis Biosphere Reserve – 27,081 ha
European Diploma	Szénások -1,186 ha
Natura 2000	10 SPA & 58 SAC – 250,000 ha

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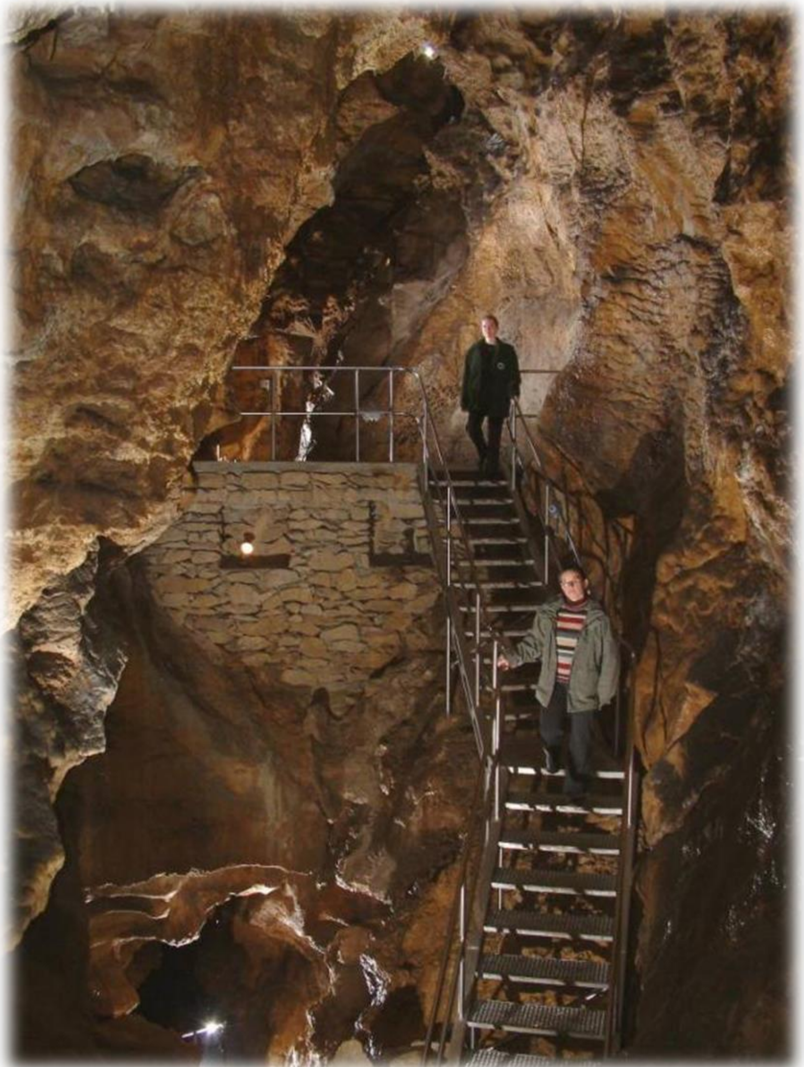


Other values under protection

1,488 caves – including the longest cave in Hungary, situated under the city of Budapest

Over 1,300 springs

Historical monuments: Mounds & Burial fields (179), Ground Forests (96)

Unique landscape values: 47 settlement's cadastres

38 Geological base sections

DANUBE-IPOLY NATIONAL PARK DIRECTORATE

Main tasks:

Habitat management and reconstruction

Species protection programmes

Site management plans

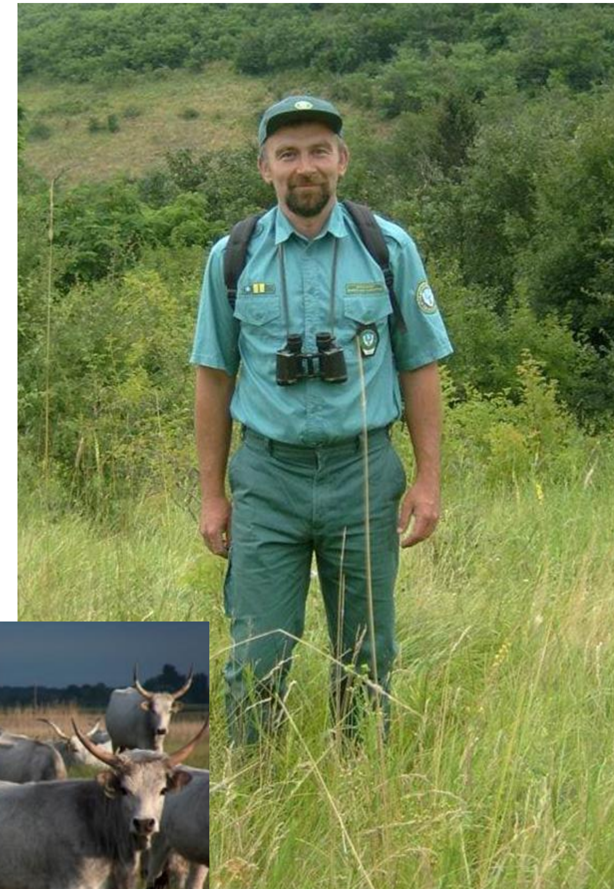
Expertise support in regional planning schemes

Environmental education and ecotourism

Monitoring and research

Land property management

Ranger service



Environmental education and ecotourism

1. Selyem-réti tanösvény
2. Haraszt-hegyi tanösvény
3. Strázsa-hegyi tanösvény
4. Gánti földtani tanösvény
5. Tanösvény a Turjánban
6. Bakanccsal a Vértesben
7. Hajta természetismereti túra
8. Az Ipolytól Drégelyvárig
9. Pálfája tanösvény
10. Madárdal tanösvény
11. Királyréti tanösvény

1. Nagy-Szénás tanösvény
2. Jági tanösvény
3. Fóti-Somlyó tanösvény
4. Sas-hegy tanösvény
5. Kőpark tanösvény
6. Veresegyházi tavak tanösvény
7. Sisakvirág tanösvény

207,000 registered visitors in 2018

DANUBE-IPOLY NATIONAL PARK DIRECTORATE

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Centralparks

Tenders

2015-2023: 30 projects - 9.5 billion HUF = 28.8 million EUR

2019: 22 ongoing projects - 8,8 billion HUF = 26.7 million EUR

- EU Structural Funds: 16 projects
- LIFE: 4 projects
- Duna Transnational Programme: 1 project
- Interreg: 1 project

DANUBE-IPOLY NATIONAL PARK DIRECTORATE

Staff: 145 Rangers: 40

DANUBE-IPOLY NATIONAL PARK DIRECTORATE

Danube-Ipoly National Park

Establishment: 1997

Territory: 60 314 ha

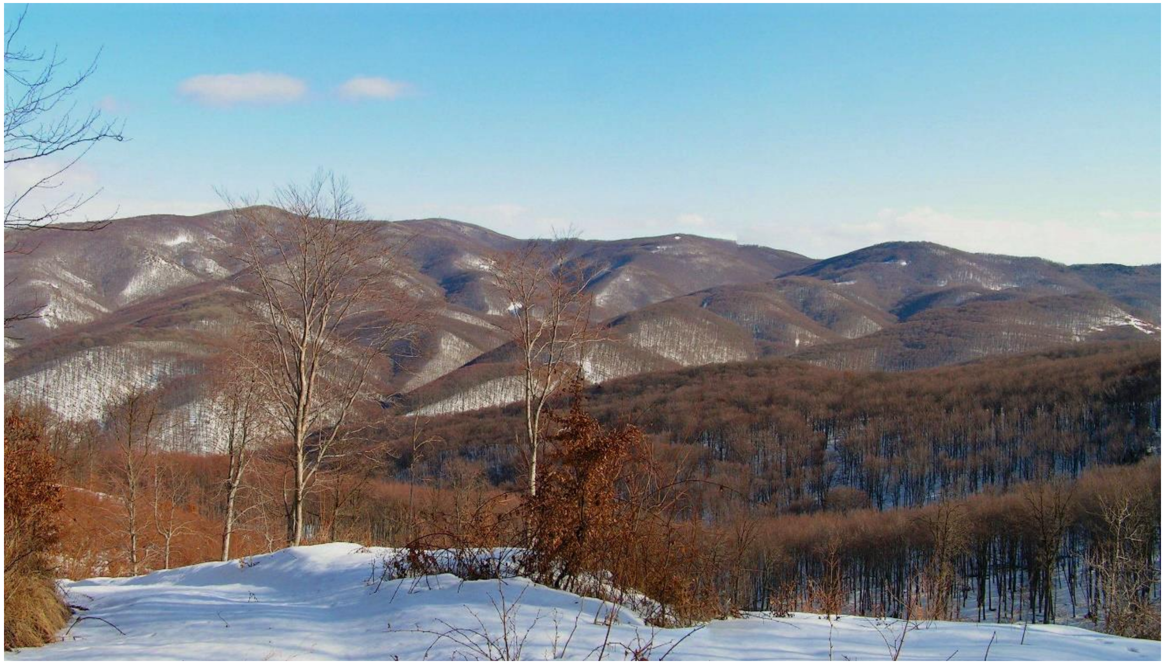
No. of caves: 334

Highest peak: Csóványos – 938 m

International importance:

The Danube Bend
(Das Donauknie)

Conservation values



The Pilis Mountain range:

- south of the Danube
- sedimentary rocks
- submediterranean climate

The Börzsöny Mountain range:

- north of the Danube
- effusive rock
- continental climate

Purple hellebore (Helleborus purpurascens)

It reaches its southernmost distribution within the NP

Hungarian fennel(Ferula sadleriana)

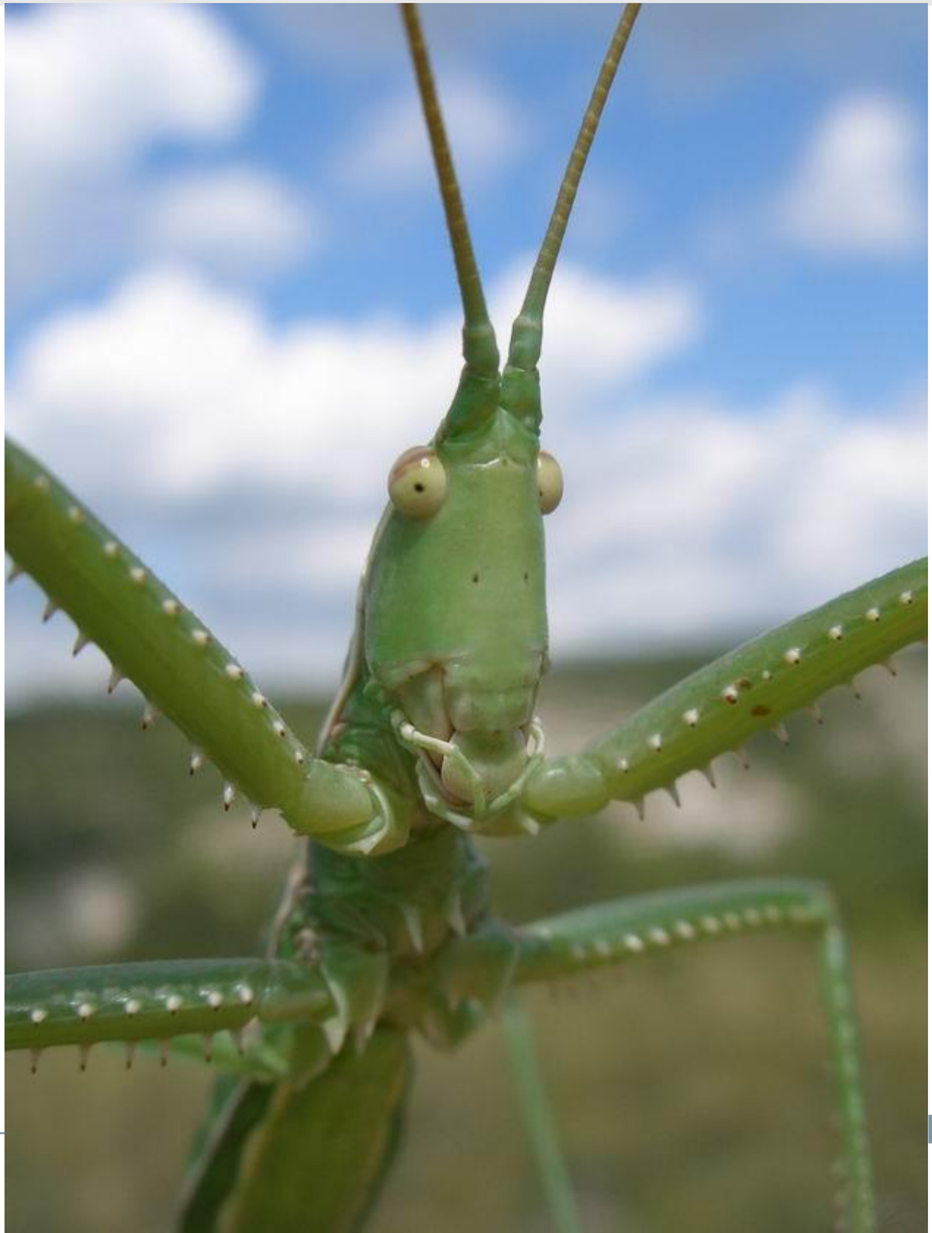
Endemismof the Carpathian Basin

Joint-pine (Ephedra distachya)

DANUBE-IPOLY NATIONAL PARK DIRECTORATE

Petényi Barbel – Barbus carpathicus
The most precious element of the fish fauna

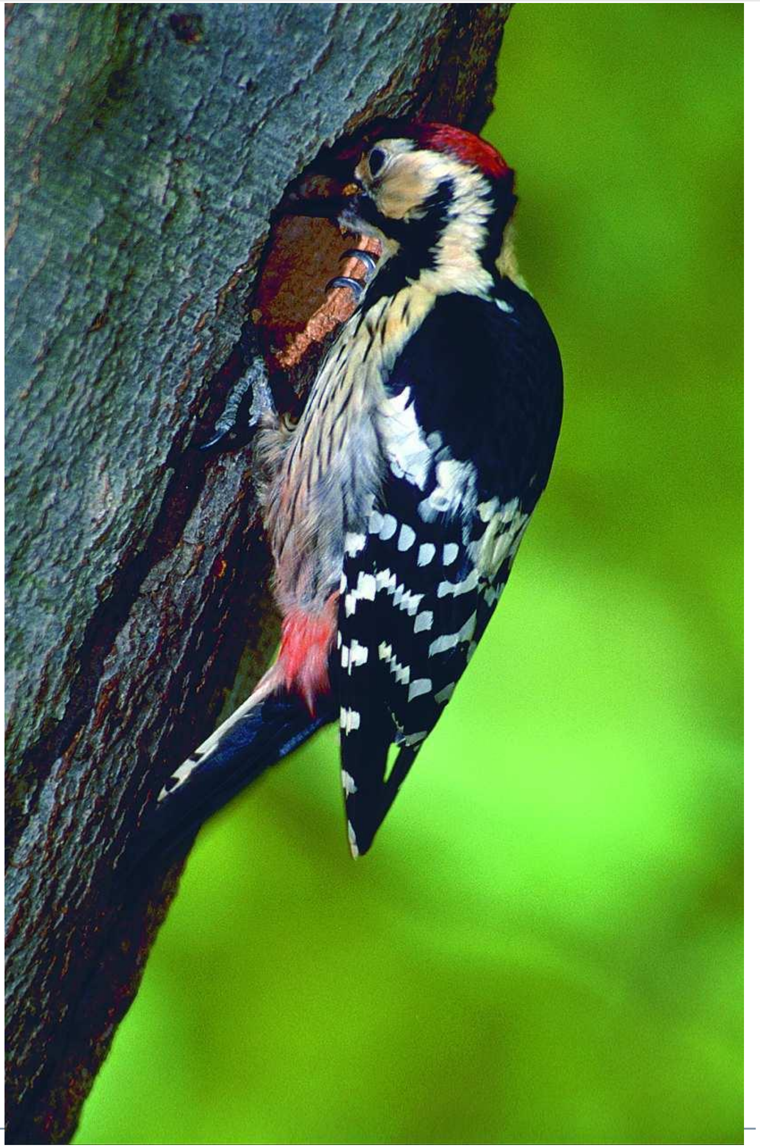
Snake-eyed skink (*Ablepharus kitaibelii*)



Bush-cricket (*Saga pedo*)

DANUBE-IPOLY NATIONAL PARK DIRECTORATE

Longicorn beetle (*Rosalia alpina*)



White-backed woodpack

(*Dendrocopus leucotus*

DANUBE-IPOLY NATIONAL PARK DIRECTORATE

Grey Heron, Great Egret and Black Stork

in the flood plain of the Ipoly River

Interreg CENTRAL EUROPE European Union European Regional Development Fund Centralparks

Lynx

footprints…

…and a photo taken by camera trap

CULTURAL HERITAGE

The Castle of Visegrád

CULTURAL HERITAGE

Interreg CENTRAL EUROPE
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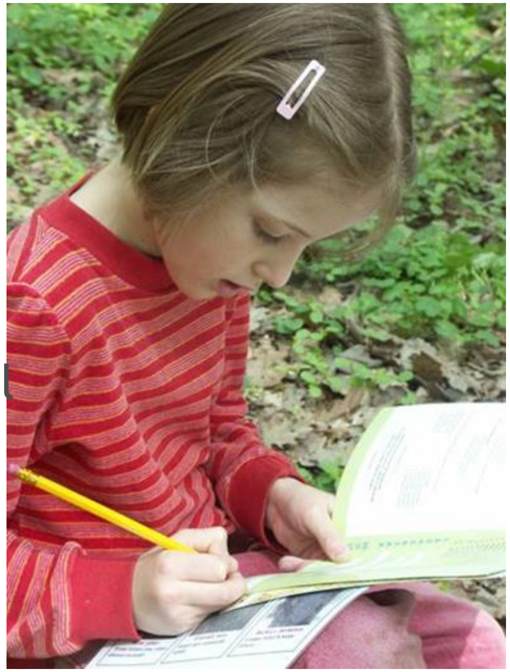
Centralparks

The Castle of Drégelyvár

ENVIRONMENTAL EDUCATION AND ECOTOURISM

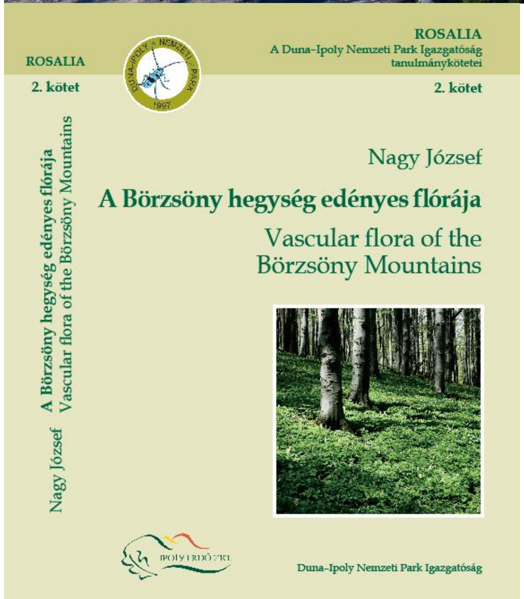
Visitor centres

- Field education centre at Királyrét
- Visitor centre in Esztergom
- 3 nature trails



Green days

- World Water Day
- Earth Day
- European National Parks' Day



Publications

- Rosalia – scientific study series
- Longhorn beetle – quarterly newsletter
- Brochures on nature trail and Protected Landscape Areas

MOBILE WATER LABORATORY

ENVIRONMENTAL EDUCATION AND ECOTOURISM

Nature trail in the Ipoly Valley

ENVIRONMENTAL EDUCATION AND ECOTOURISM

Planned visitor centers in Dömös and Visegrád

RANGER SERVICE

- 10 rangers
- 6000 ha protected area / ranger
- Special tasks:
- prevent damage done
- by technical sports
- (e.g. motocross)

TRUSTEE ACTIVITIES

Grassland management

- Traditional Grey cattle grazing in the Ipoly Valley
- Reaping on 3700 hectares

Forest management

- Elimination of alien species
- Wildlife management

INTERNATIONAL COOPERATION

- CNPA
- DANUBEPARKS

- Transboundary relationships with Slovakia:
  - Dunajské luhy CHKO
  - NGO: Ipoly Union, BROZ
- Twin National Park (Bicas Gorges
  - Hasmas NP in Romania)

THANK YOU FOR YOUR ATTENTION!

eurac research

ŠTÁTNA OCHRANA PRÍRODY SLOVENSKEJ REPUBLIKY

parcul national PIATRA CRAIULUI

stowarzyszenie ekopsychologia

DUNA-IPOLY NEMZETI PARK 1997

PRO NATUR

EUROPEAN WILDERNESS SOCIETY

Let's get Wild!

Vzdělávací a informační středisko, o.p.s. Bílé Karpaty

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Centralparks

Workshop on innovative methods in conservation planning
Királyrét, Hungary | 17-19th September 2019

Laser Scanning

Géza Király, PhD, associate professor

University of Sopron, Institute of Geomatics, Department of Surveying and Remote Sensing

ACTIVE SYSTEMS

RADAR

Radio Detection and Ranging

- Weather-independence
- Time-independence
- λ=~1-100 cm

LIDAR

Light Detection and Ranging

- Time-independence
- λ=~400-1700 nm

LIDAR (LASER SCANNING)

- Optical wavelength
- Series of distance measurements
- Scanning -> Imaging

LASER SCANNING METHODS

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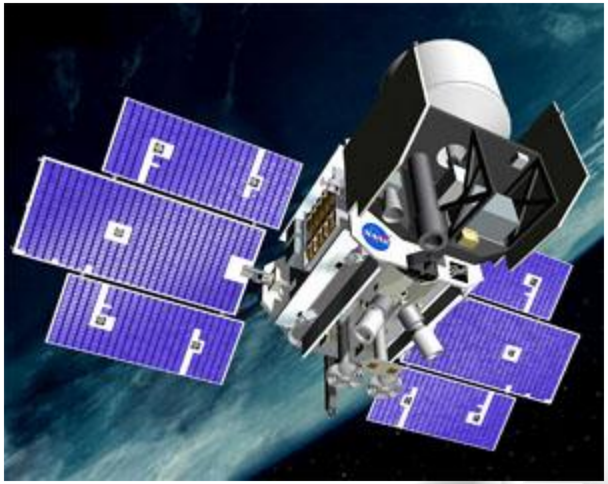
- Time of Flight (TOF), Pulse ranging >10 m
- Continuous-wave ranging
- Triangulation, Pattern projection <10 m

LASER SCANNING PLATFORMS

- Spaceborne
- Airborne
- Terrestrial / Mobile systems

ICESAT ICE, CLOUD AND LAND ELEVATION SATELLITE

- Ice, Cloud and Land Elevation Satellite (ICESat)
- 2003.01.12 – 2009.10.11
- EOS program

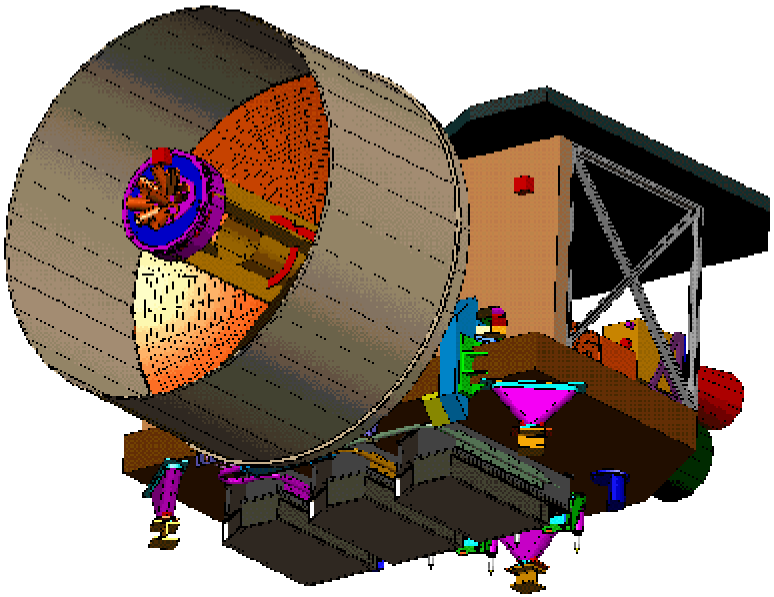


ICESAT ORBIT

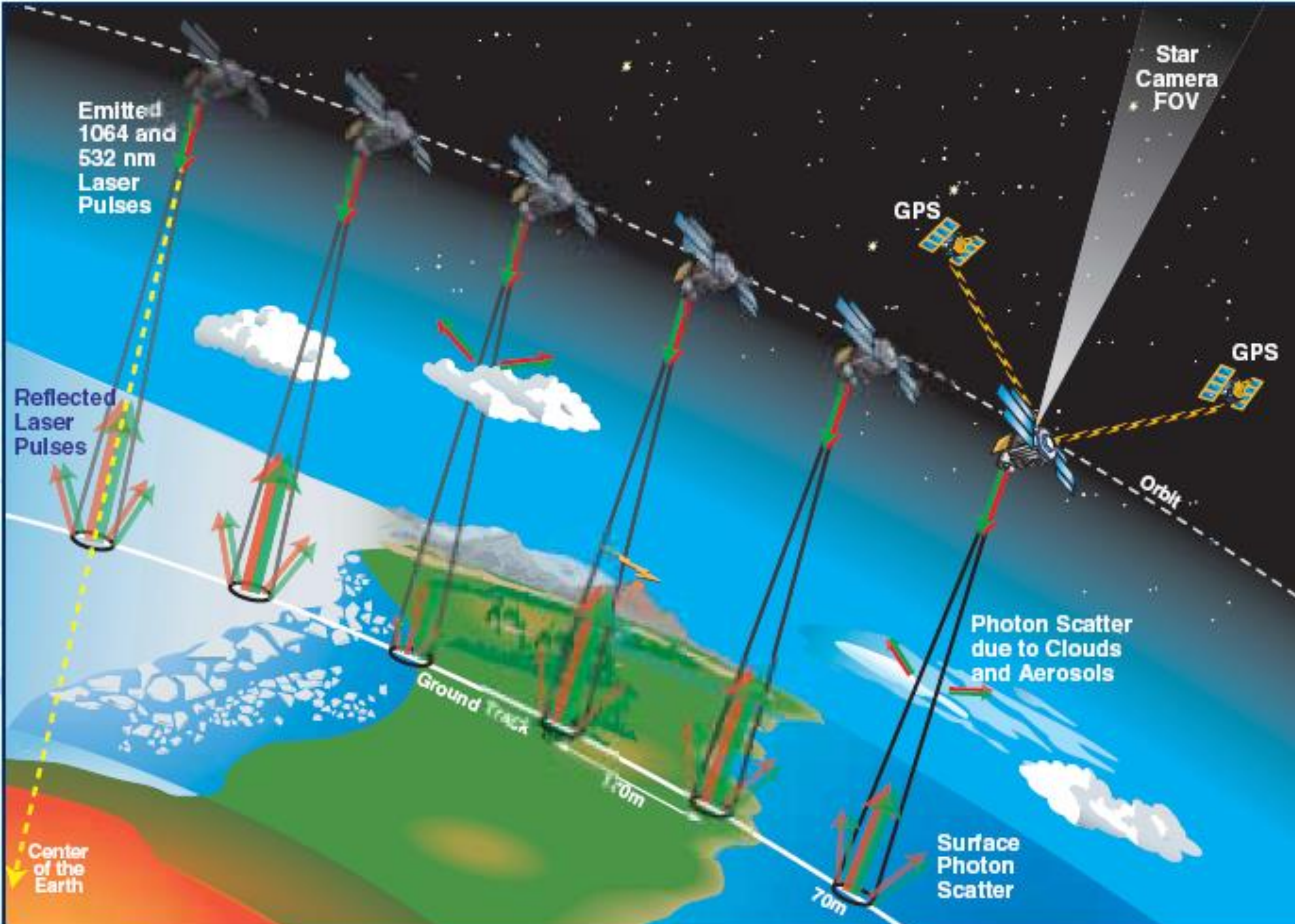
- Altitude: ~590 km
- Inclination: 94°
- Orbit: quasi-circular, frozen
- Equatorial crossing time: 18:00, *descending*
- Period: 96.8 minutes, ~14.8 orbits/days
- Repeat coverage: 8 (91, 183) days
- 15 km distance between orbit at Equator

GLAS
GEOSCIENCE LASER ALTIMETER SYSTEM

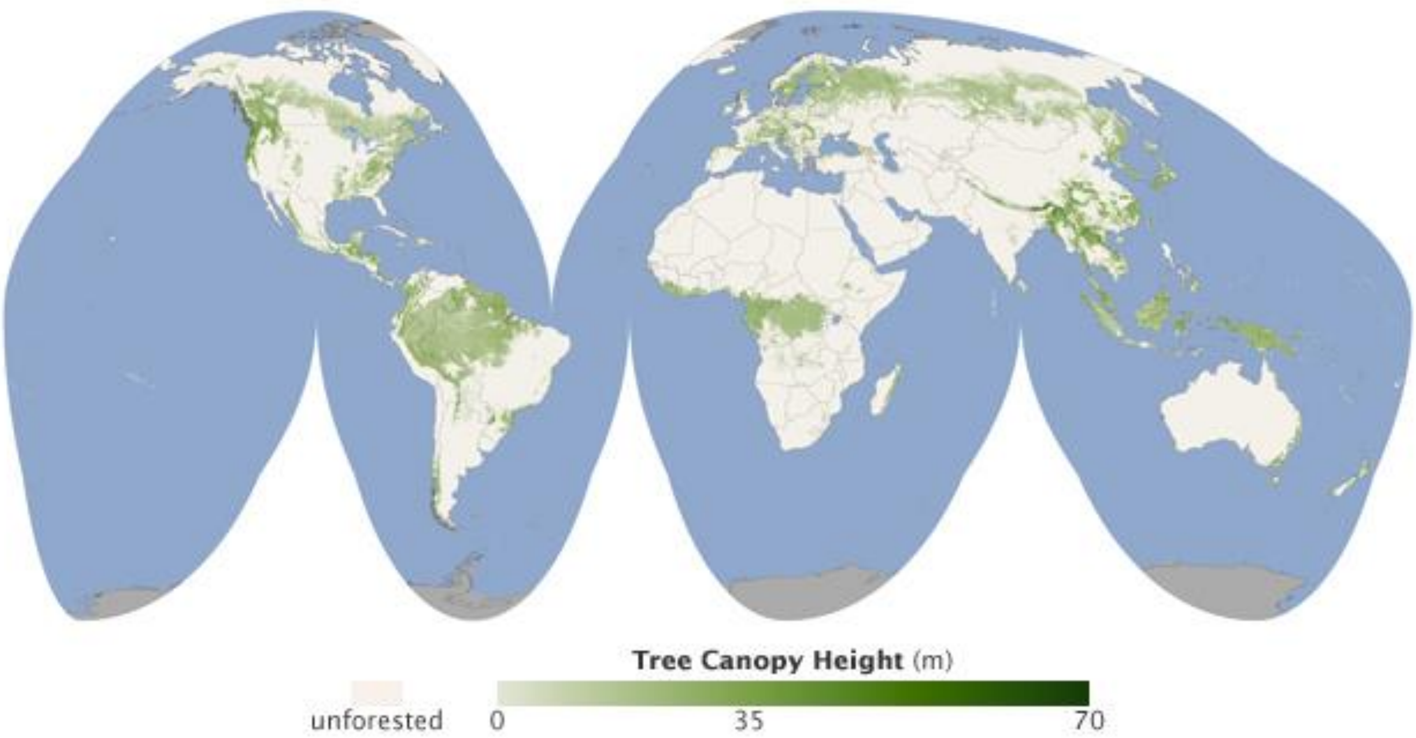
- Laser
  - 532 nm, 1064 nm
  - 40 Hz
  - ~70 m footprint @ every 170 m



- High precision GPS
- Stellar observations
- http://nsidc.org/data/icesat/index.html


Star Camera FOV
Emitted 1064 and 532 nm Laser Pulses
GPS
GPS
Reflected Laser Pulses
Orbit
Photon Scatter due to Clouds and Aerosols
Ground Track
170m
Center of the Earth
Surface Photon Scatter
70m

MICHAEL LEFSKY: GLOBAL FOREST HEIGHT



ICESAT-2
ICE, CLOUD AND SATELLITE-2

- Advanced Topographic Laser Altimeter System (ATLAS)
  - 532 nm
  - Split into 3 pairs of beam
- Will be launched in 2018
- Further info

ICESAT-2
ICE, CLOUD AND LAND ELEVATION SATELLITE

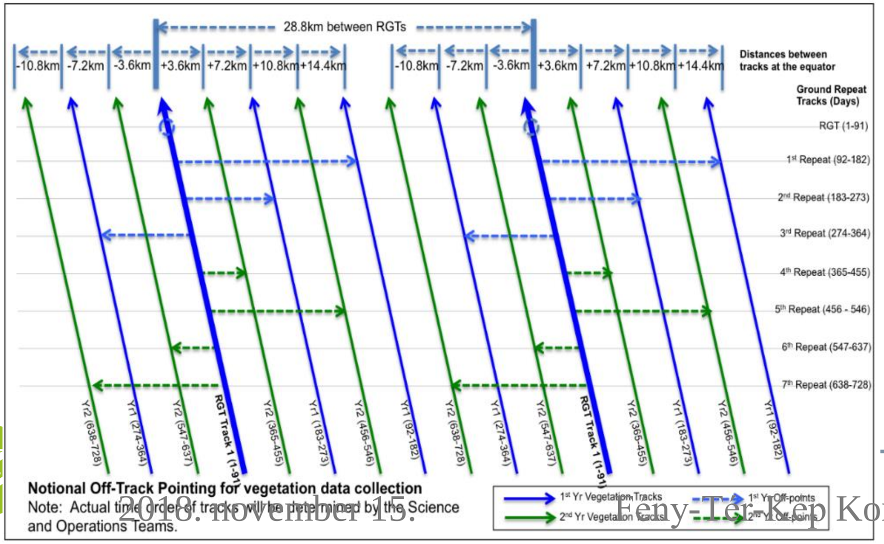
- Launched on 15th of September, 2018.
- Advanced Topographic Laser Altimeter System (ATLAS)

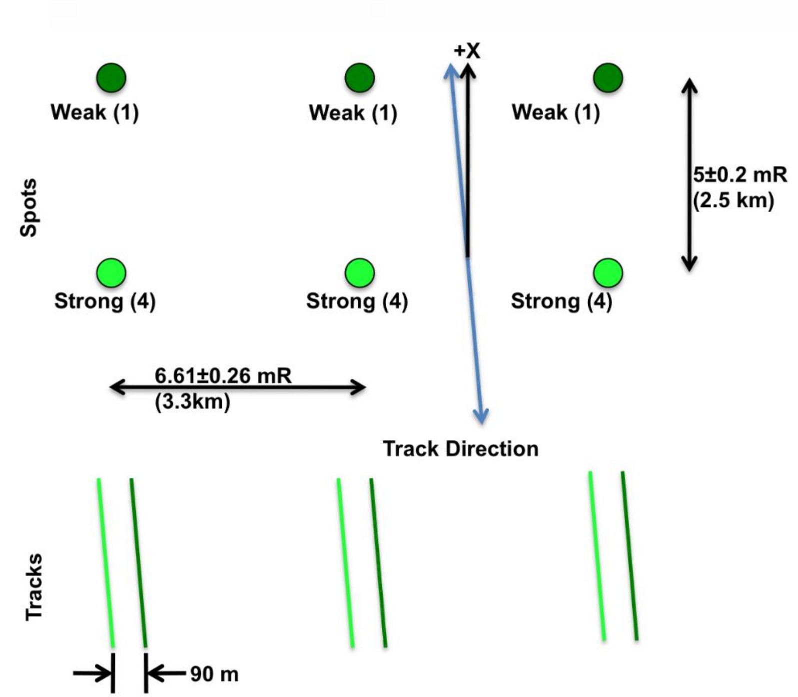
- https://icesat-2.gsfc.nasa.gov/

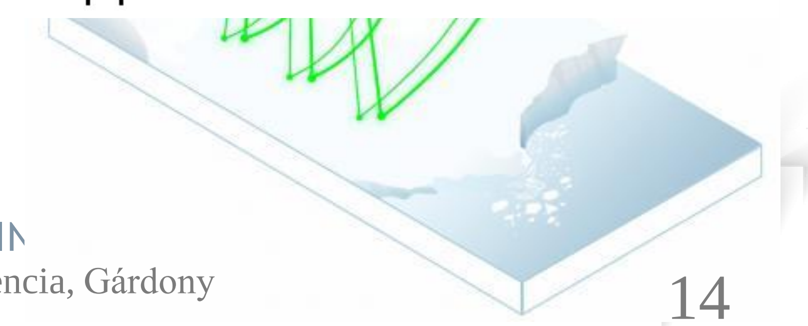

USAF
ULA
DELTA

ADVANCED TOPOGRAPHIC LASER ALTIMETER SYSTEM (ATLAS)

- 532 nm
- Split into 3 beam-pairs
- 10 kHz







TAKIN

HELP NASA MEASURE TREES WITH YOUR SMARTPHONE

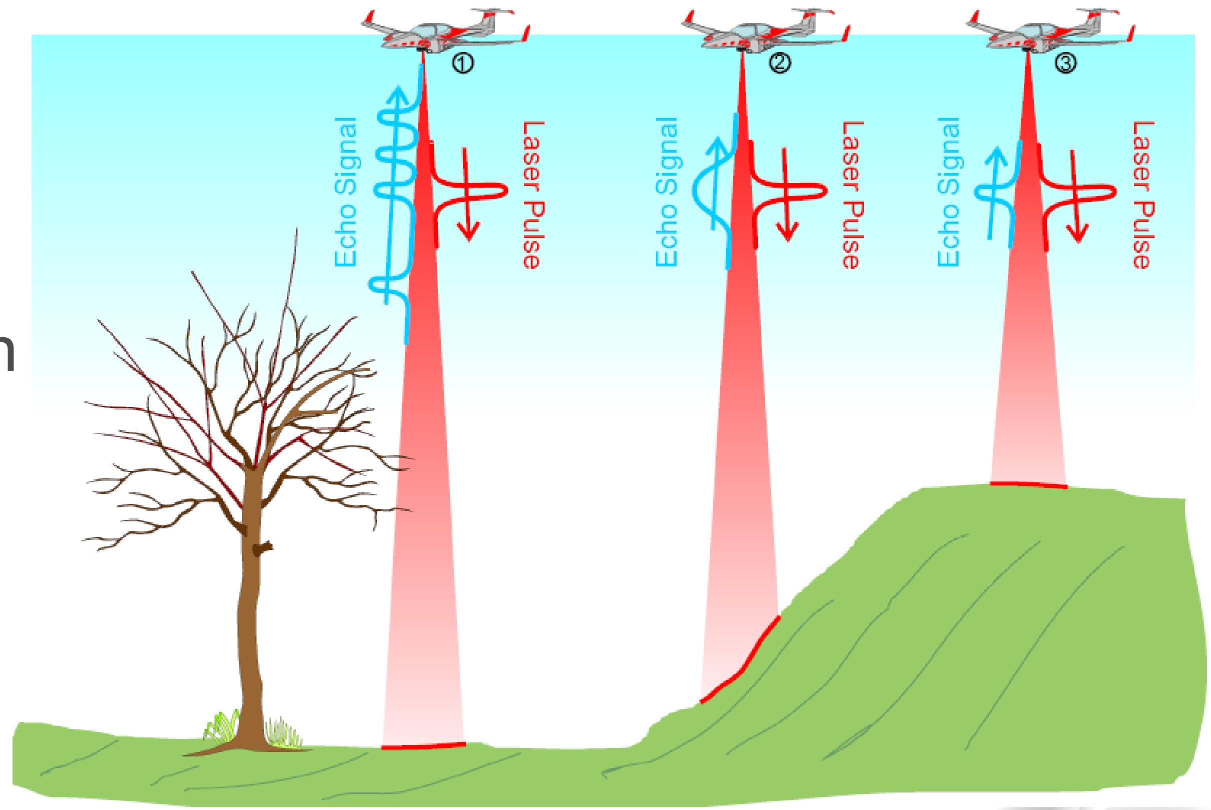
BASICS

- Distances
- Angles
- GPS/INS
- 3D point cloud

FULL WAVEFORM

- 1 return
- 2 returns First/Last
- 4-6 returns
- Full waveform (FWF) digitisation

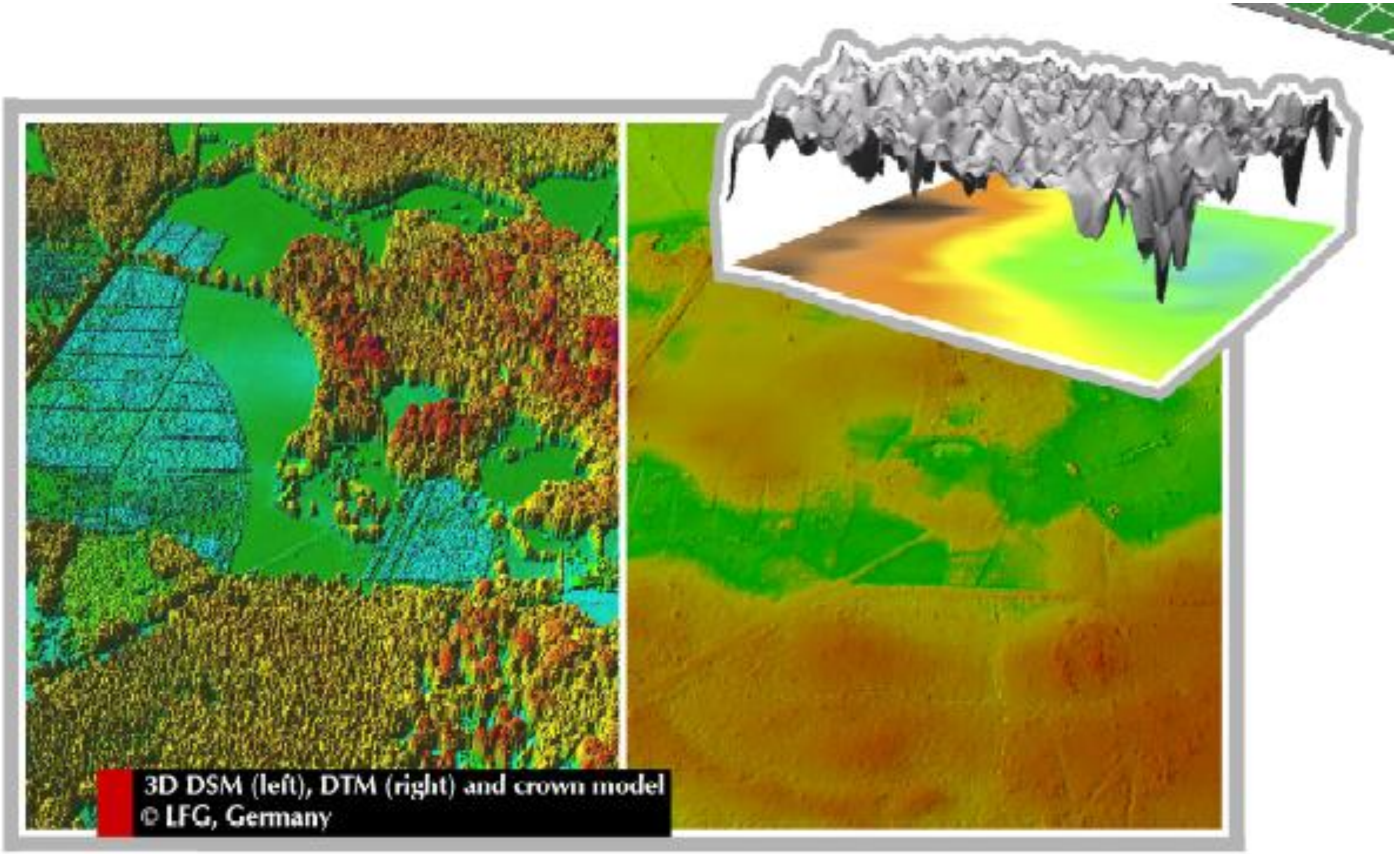
- More information
- Information about the objects



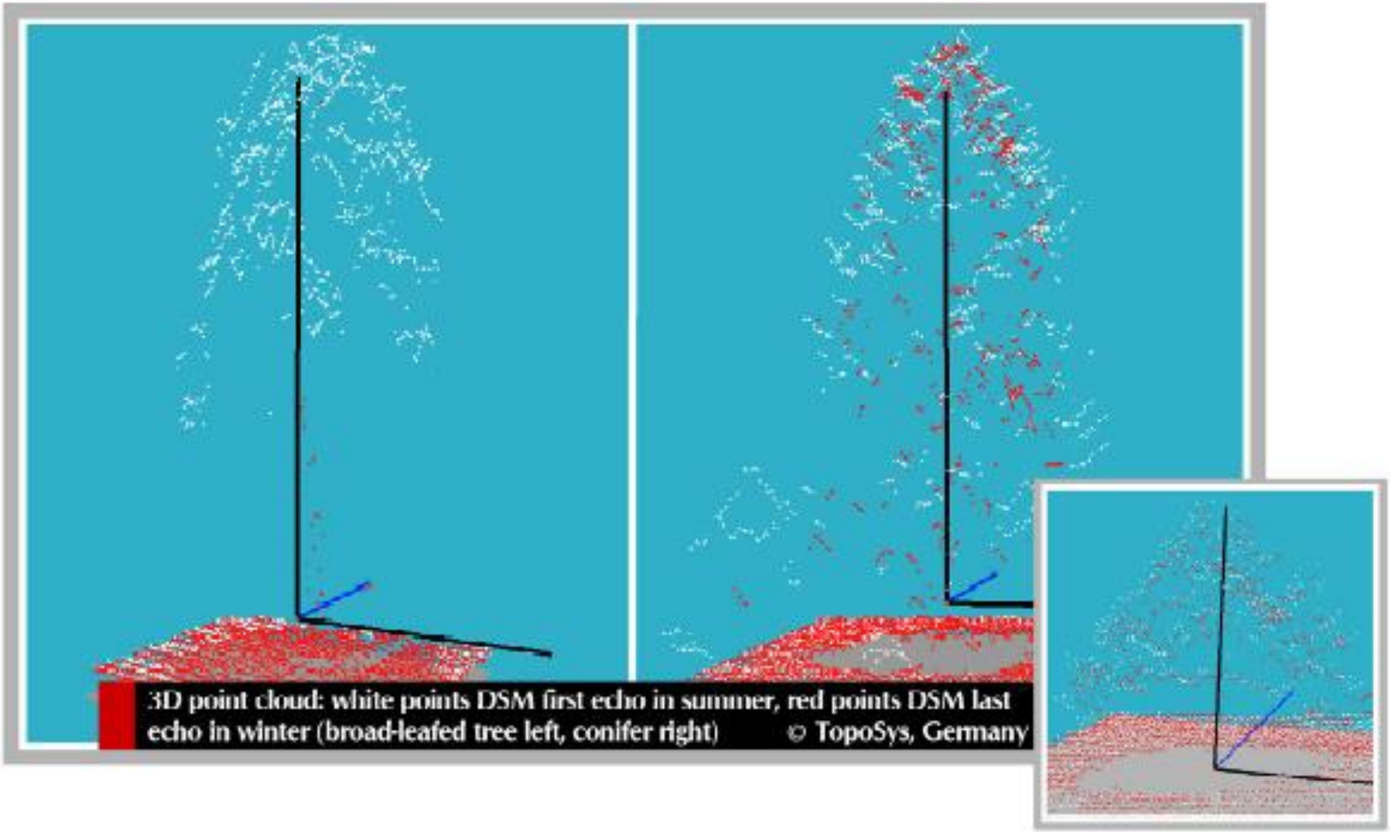
APPLICATION FIELDS

- Topographic surveys
- 3D City modelling
- Archaeology
- Transportation
- Forestry
- ...

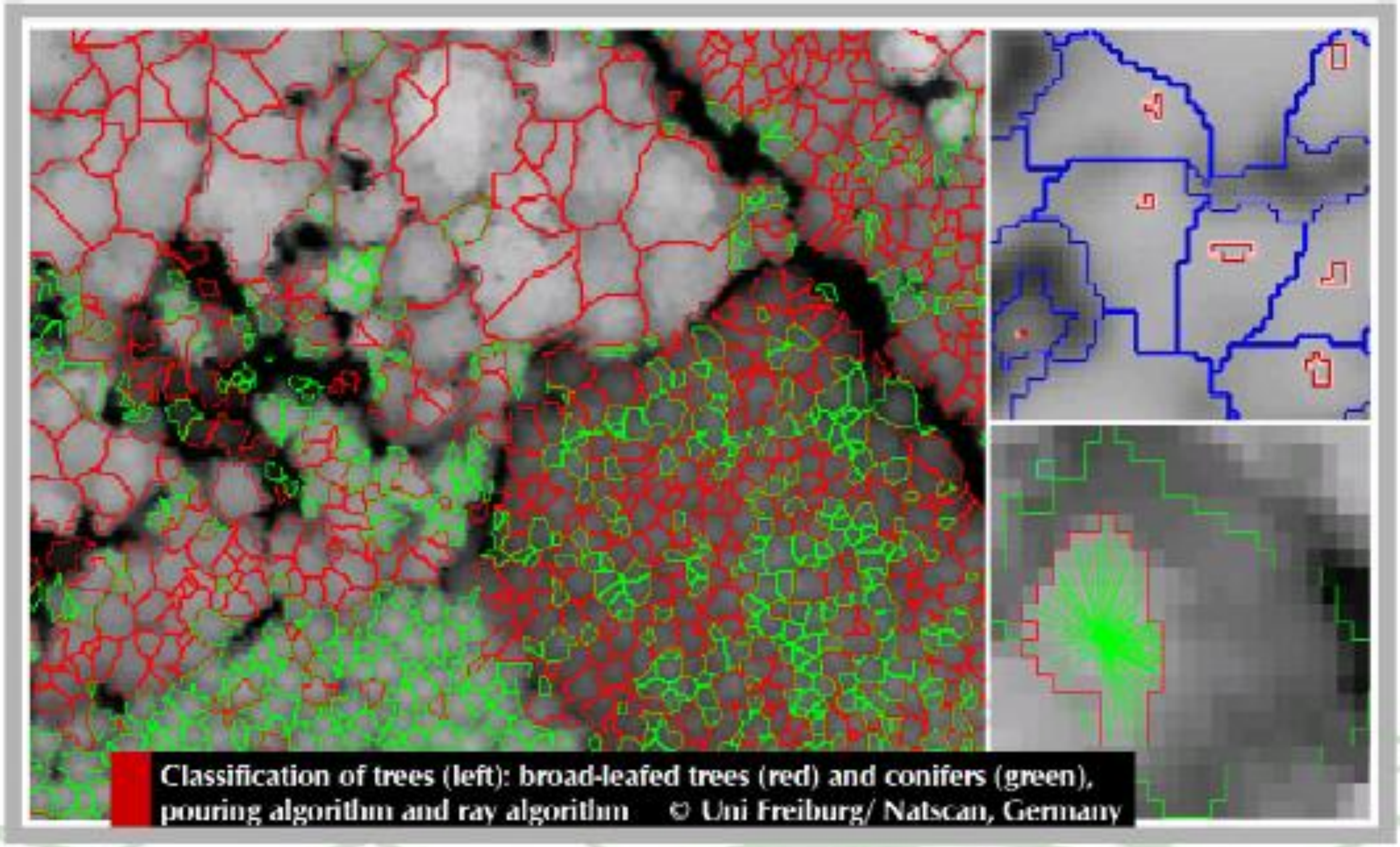
FORESTRY: DIGITAL SURFACE MODEL – DIGITAL TERRAIN MODEL



FORESTRY: DECIDUOUS – CONIFEROUS; WINTER – SUMMER



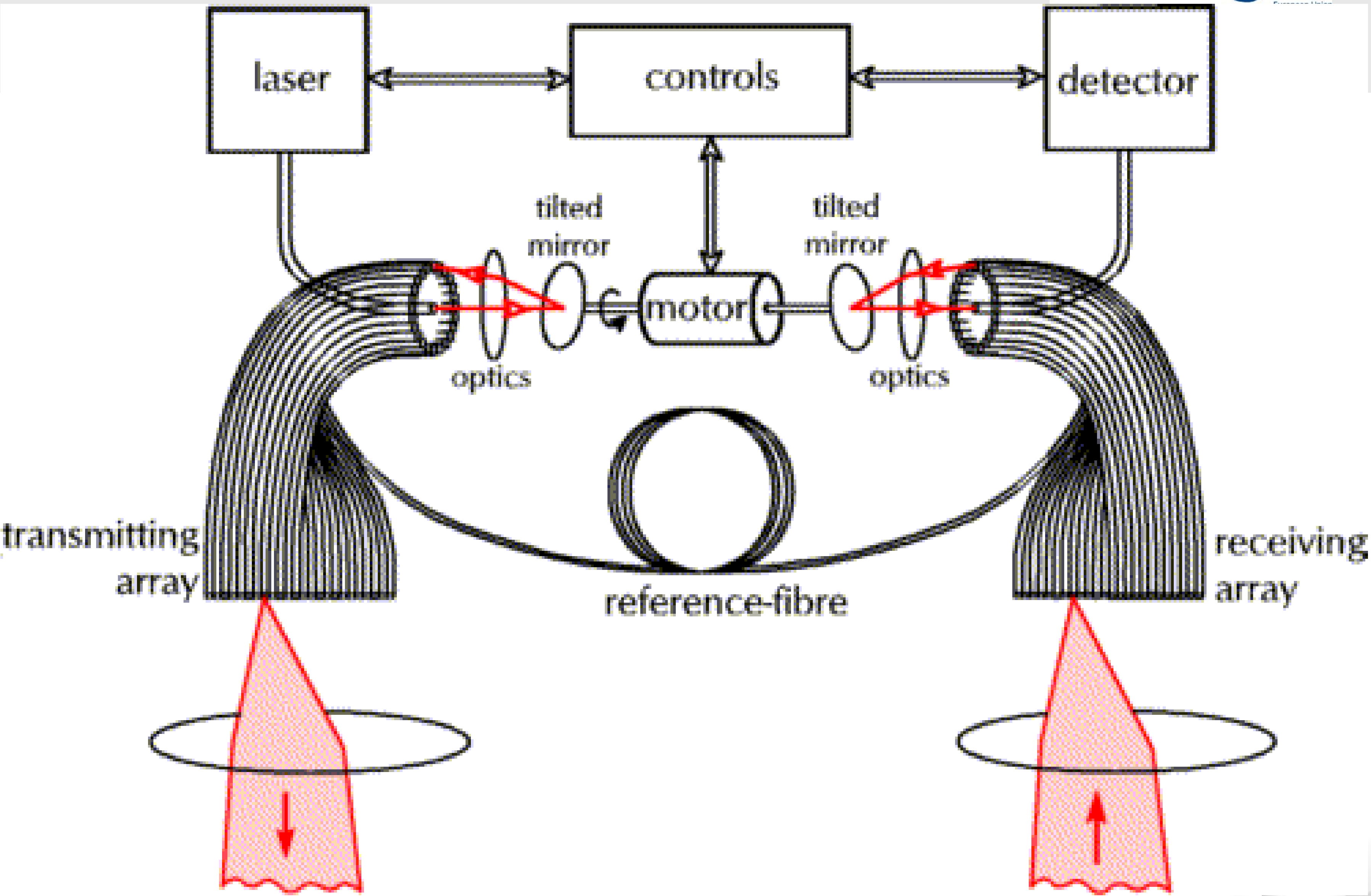
FORESTRY
SINGLE TREE CLASSIFICATION

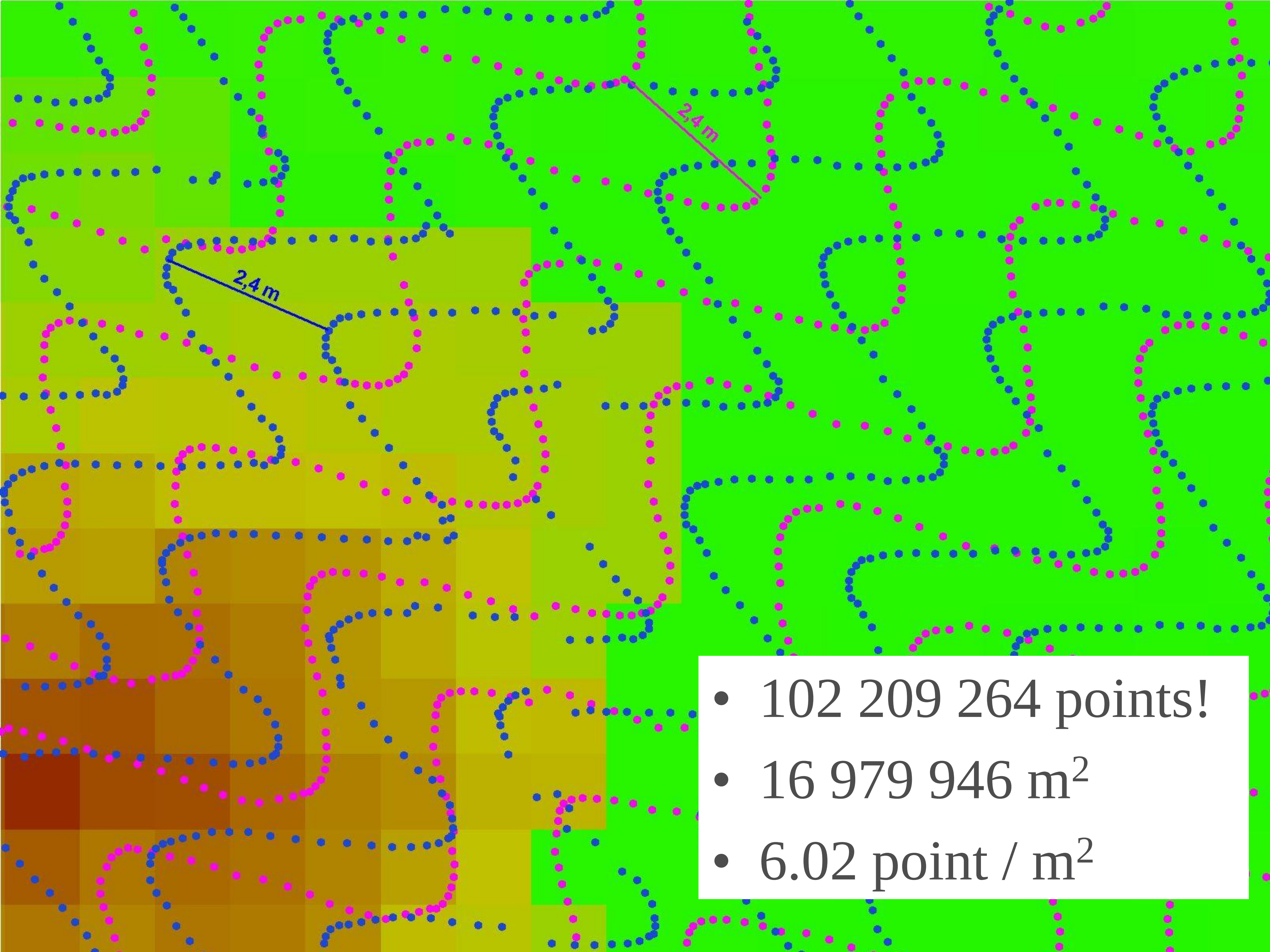


Classification of trees (left): broad-leafed trees (red) and conifers (green), pouring algorithm and ray algorithm © Uni Freiburg/ Natscan, Germany

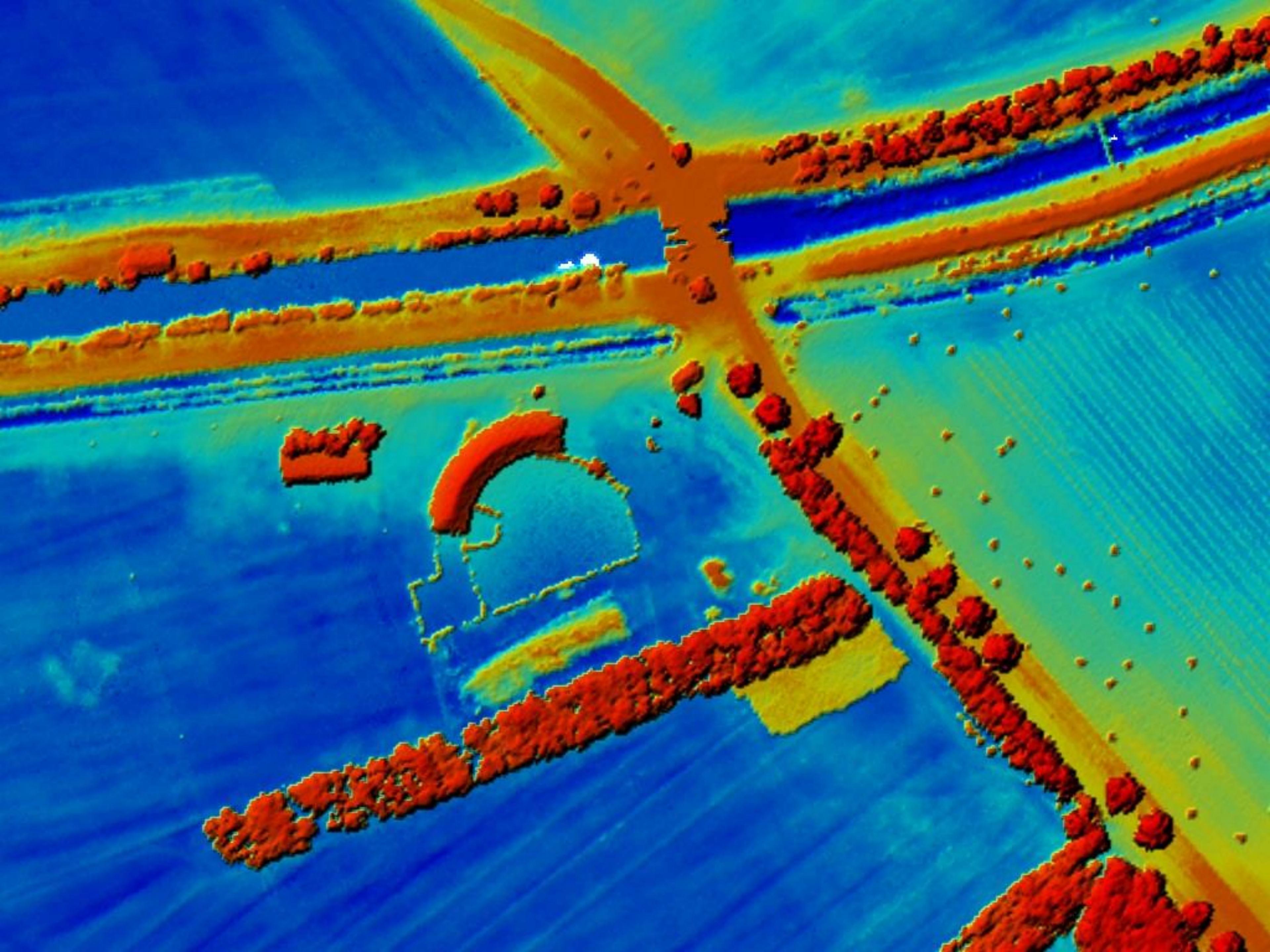
TOPOSYS FALCON II.

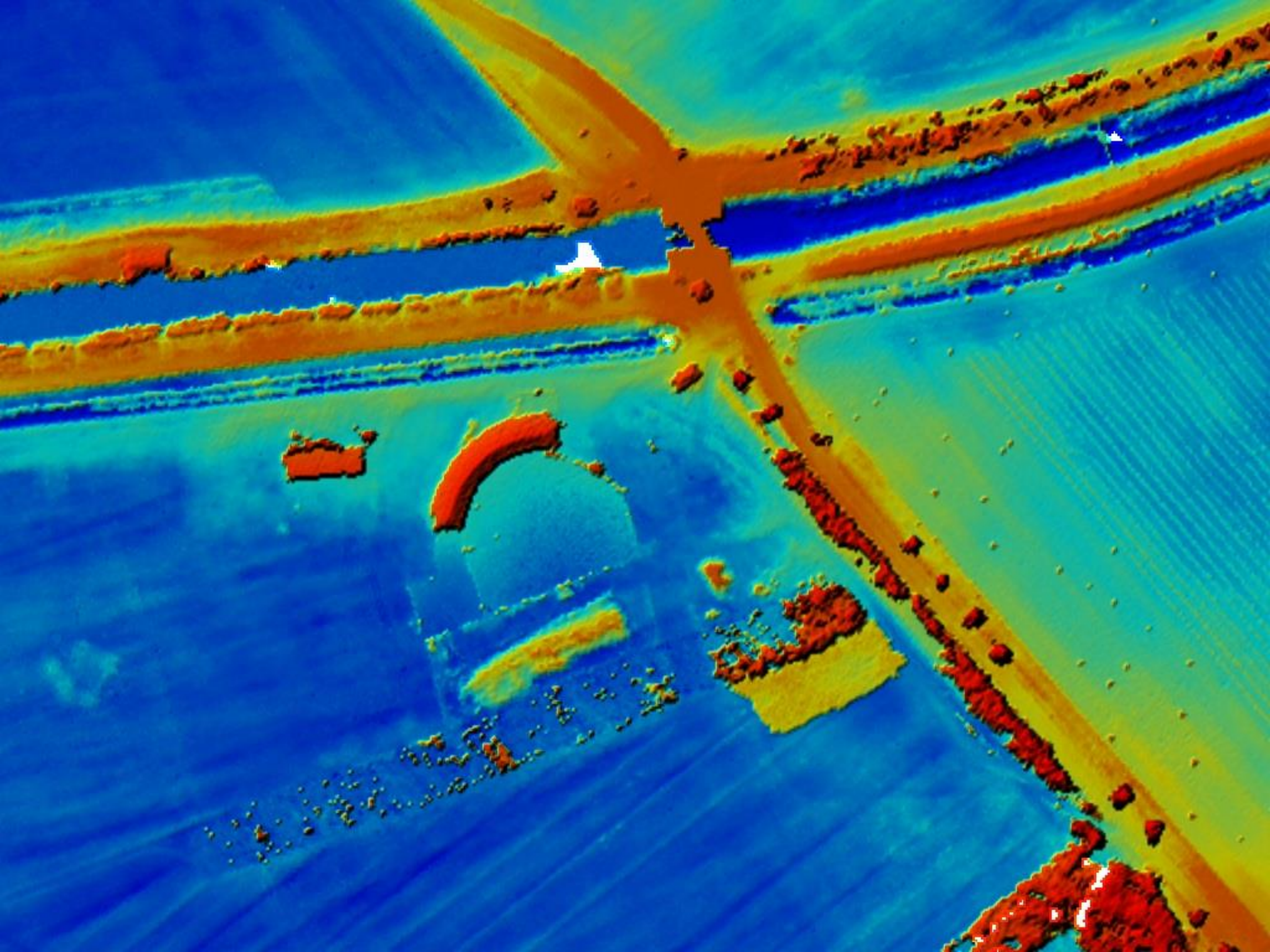
Range	1600 m
Range resolution	1.95 cm
Swath width	14.3°
Frequency of scanning	653 Hz
Laser frequency	83 000 Hz
Effective speed	83 000 /s
Laser wavelength	1560 nm
Safety distance	0.5 m
Data storage	First Echo Last Echo Intensity


laser
controls
detector
tilted
mirror
motor
tilted
mirror
optics
optics
transmitting
array
reference-fibre
receiving
array



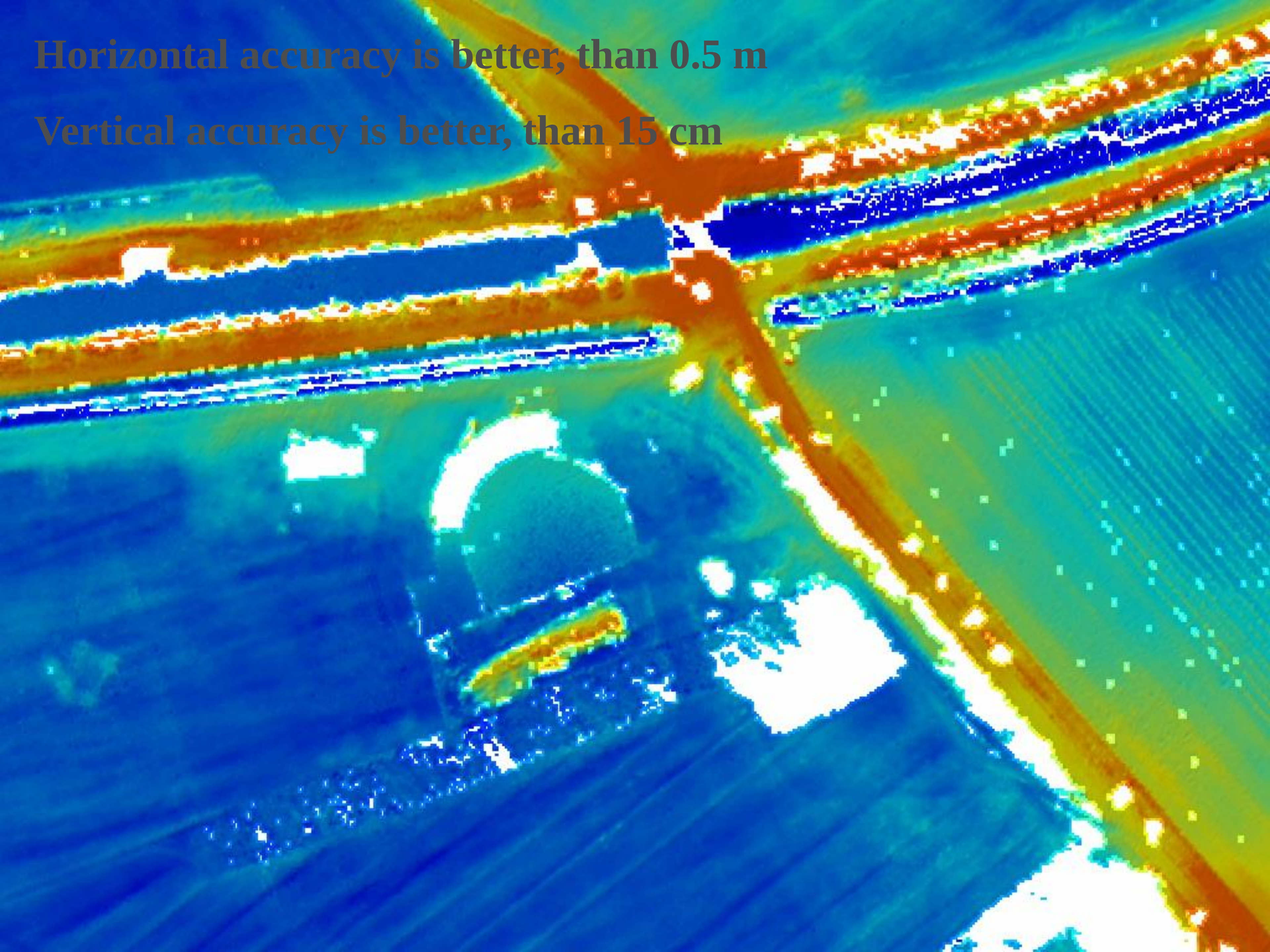
- 102 209 264 points!
- 16 979 946 m^2
- 6.02 point / m^2





Horizontal accuracy is better, than 0.5 m

Vertical accuracy is better, than 15 cm



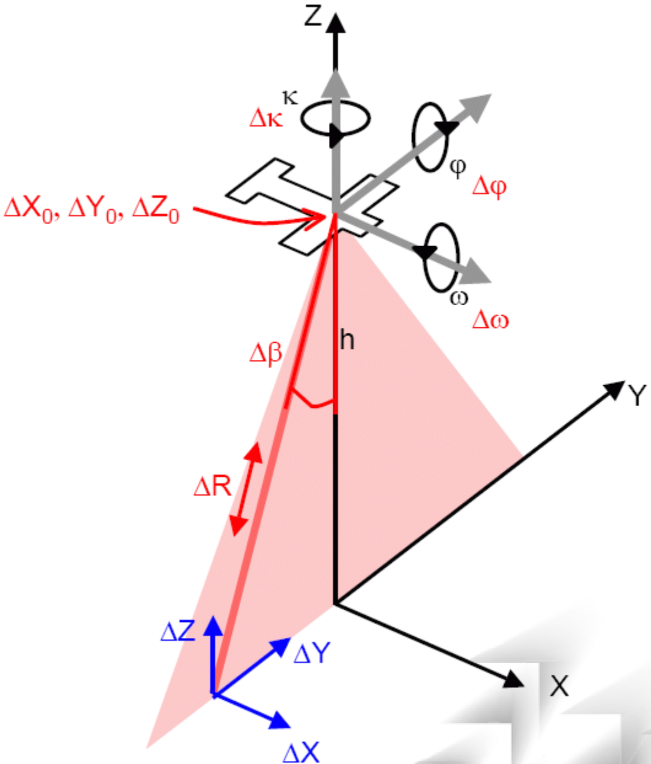

*** 1 : 3D_zsilip.alg ***

- Data capture
- Data processing
  - Creation of Elevation/Surface Models
  - Modelling of objects of interests

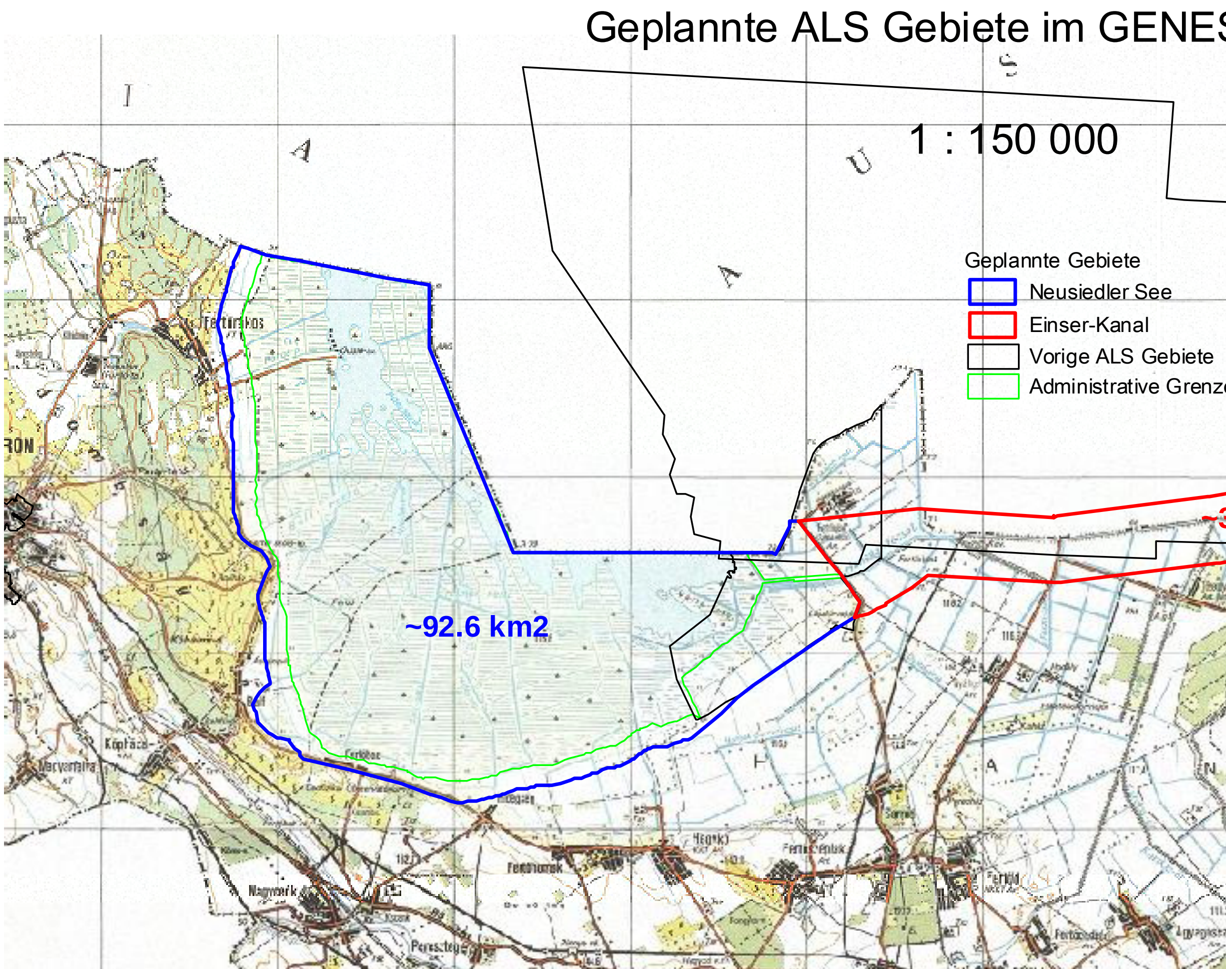
- Data capture -> raw data
- Modelling
  - Orientation -> oriented point cloud
  - Filtering -> Ground points
  - Interpolation -> DTM, DSM, nDSM
  - Object modelling
- Evaluation -> Quality measures

TRANSFORMATION

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} x_0 \\ y_0 \\ z_0 \end{pmatrix} + R_{\omega\varphi\kappa}\left(t + R_m \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos\alpha & \sin\alpha \\ 0 & -\sin\alpha & \cos\alpha \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ -r \end{pmatrix} \right)$$



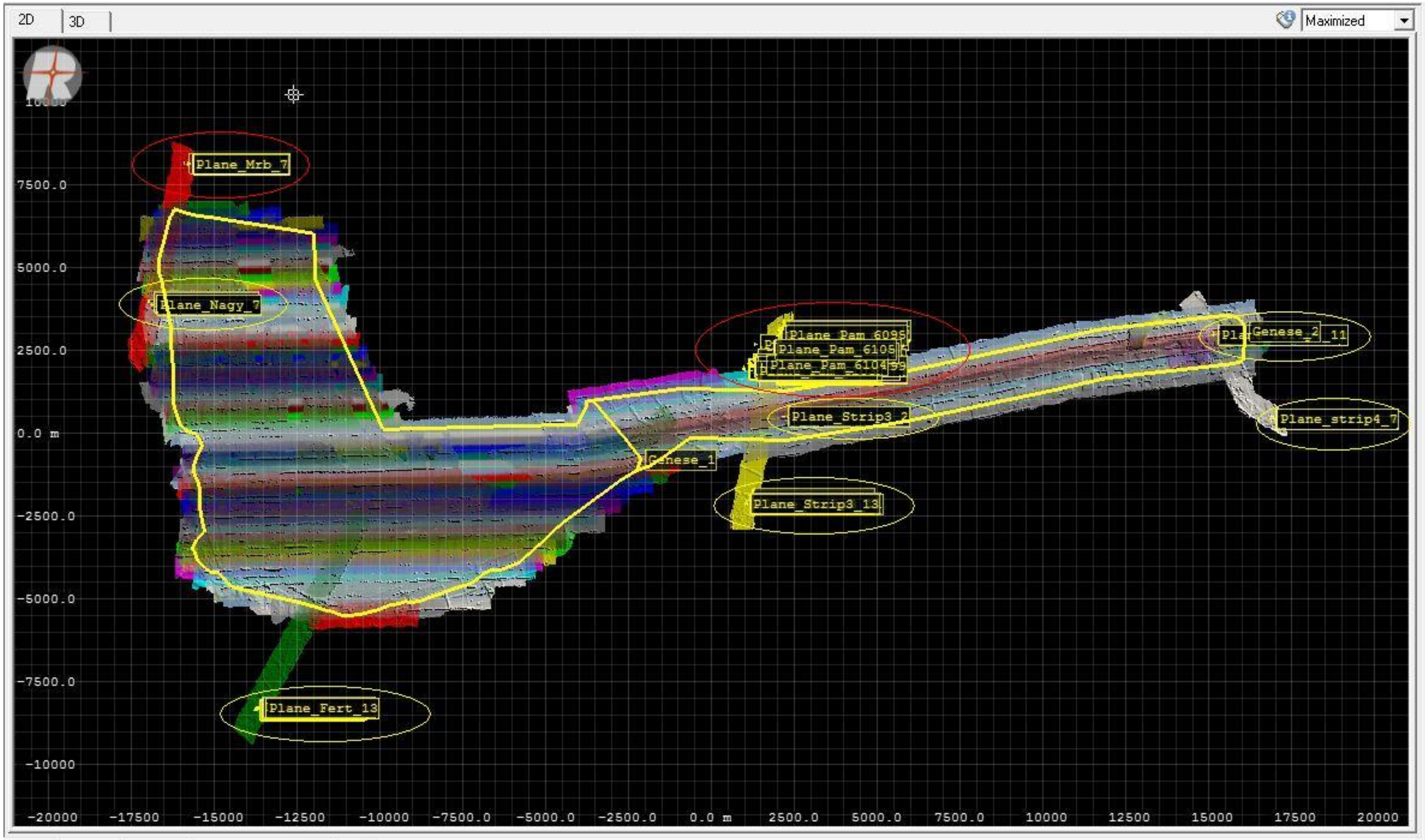
ALS- PLANNING



Laserscanner		
Parameter	Ist	Gefordert
Strahldivergenz [rad]	0.0005	
Anzahl der Facetten	4.00	
Auflösung Länge [m]	0.50	
Auflösung Breite [m]	0.50	
Takt [Hz]	180 000	
Öffnungswinkel [°]	60.00	
Streifenabstand [m]	225.00	
Überlappung [%]	70.00	
Streifenbreite [m]	750.00	
Flughöhe [m]	649.52	
Winkeldelta [°]	0.04	
Scanrate [Zeilen/s]	88.21	
Fluggeschwindigkeit [m/s]	44.11	
max. Punktabstand [m]	0.67	
Punktdichte [1/m²]	4.00	5.00
Fluggeschwindigkeit [km/h]	158.78	
Fluggeschwindigkeit [Knoten]	88.21	
Strahldurchmesser [m]	0.32	
Strahlüberlappung Länge [m]	- 0.18	
Strahlüberlappung Breite [m]	- 0.18	
SCN_THETAD	440	
SCN_THETAN	1364	
SCN_THETAS	600000	

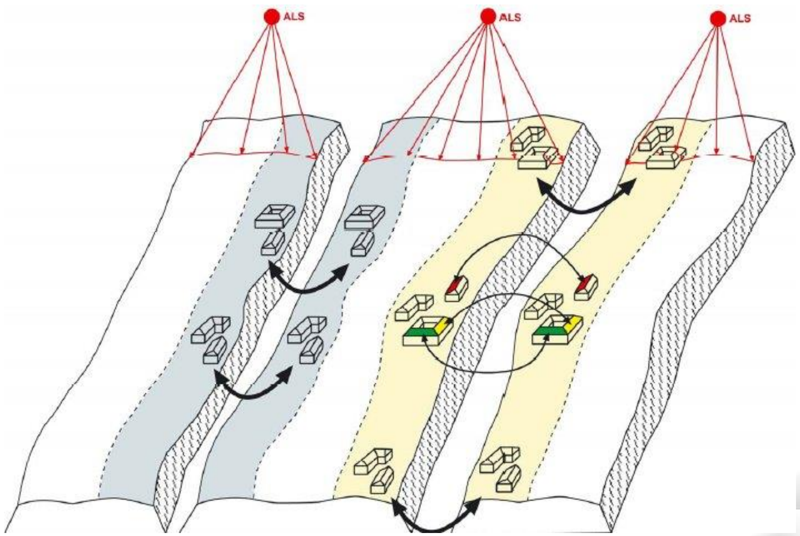
ALS- REALISATION

ALS - REALIZATION



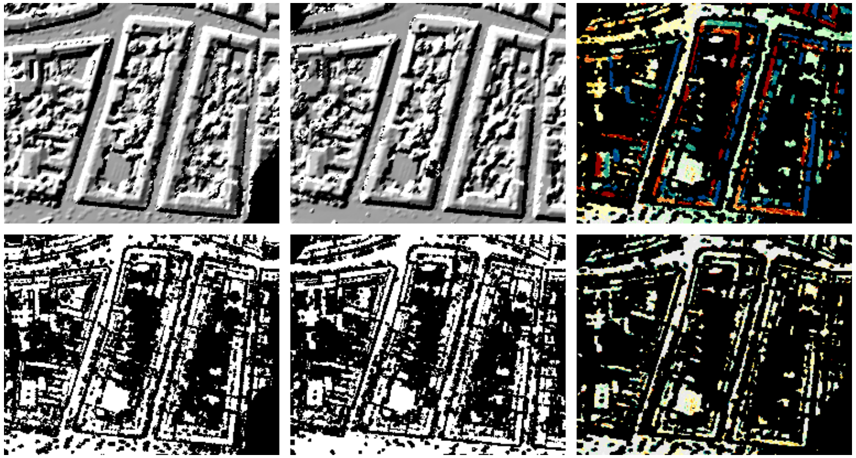
RELATIVE ORIENTATION

- Ressl, C., Mandlburger, G. and Pfeifer, N., 2009. Investigating Adjustment Of Airborne Laser Scanning Strips Without Usage Of GNSS/IMU Trajectory Data. In: "ISPRS Workshop Laserscanning `09", IAPRS, Vol. XXXVIII, Part 3/W8 (2009), ISSN: 168299750; pp. 195 - 200.

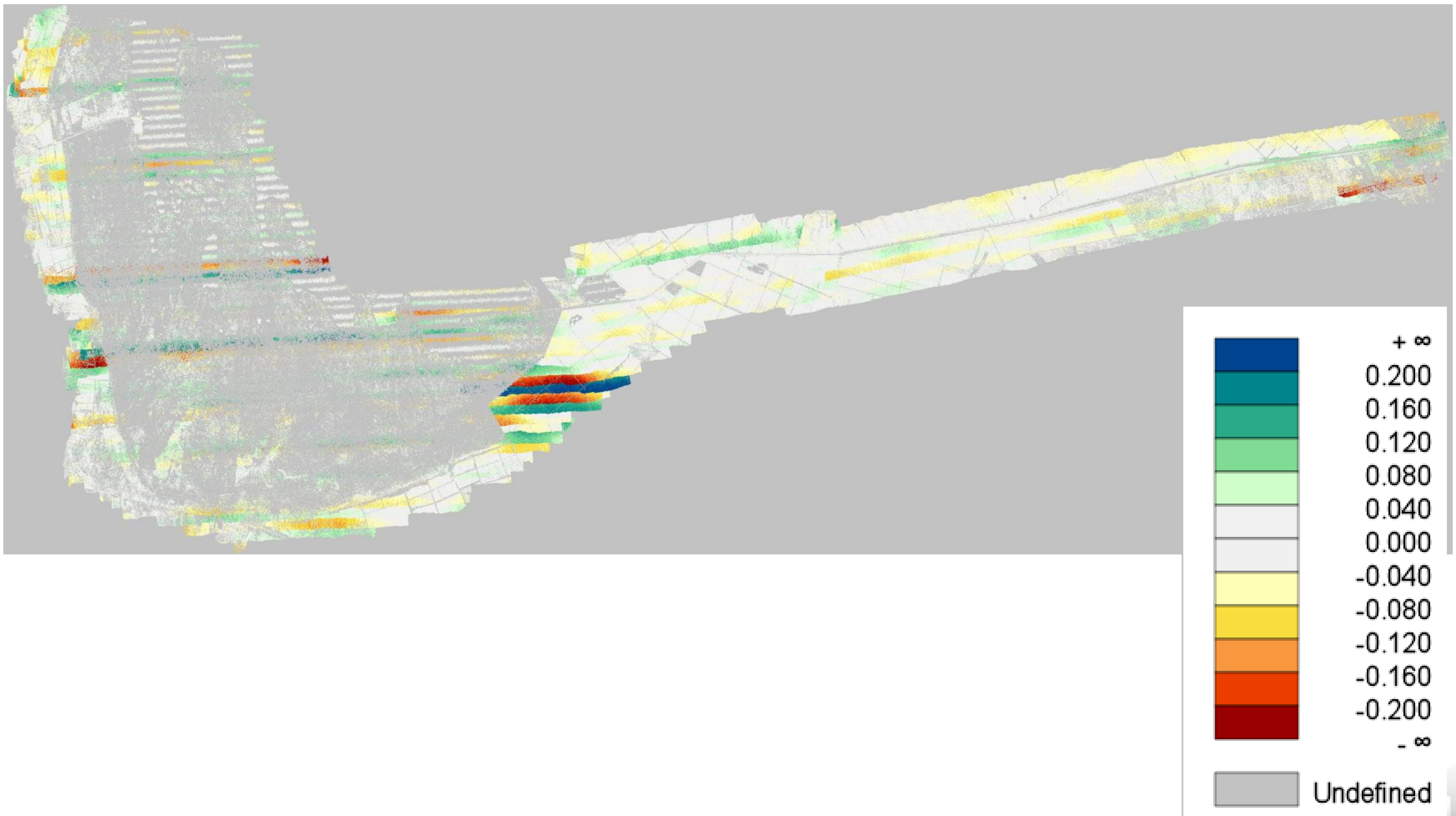


RELATIVE ORIENTATION

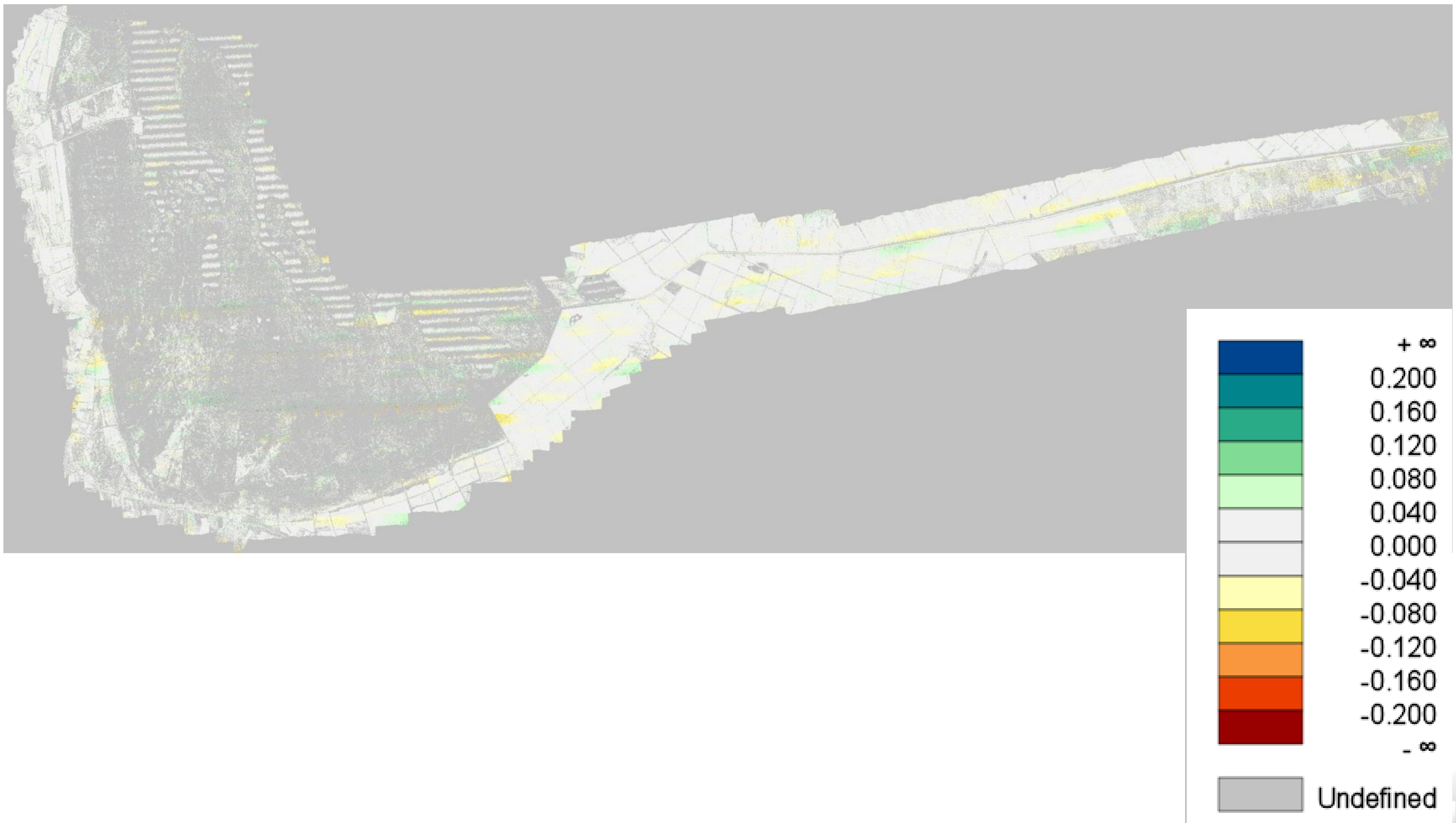
$$\mathbf{T} = \begin{pmatrix} 1+a & b & c & d \\ e & 1+f & g & h \\ i & j & 1+k & l \end{pmatrix}$$



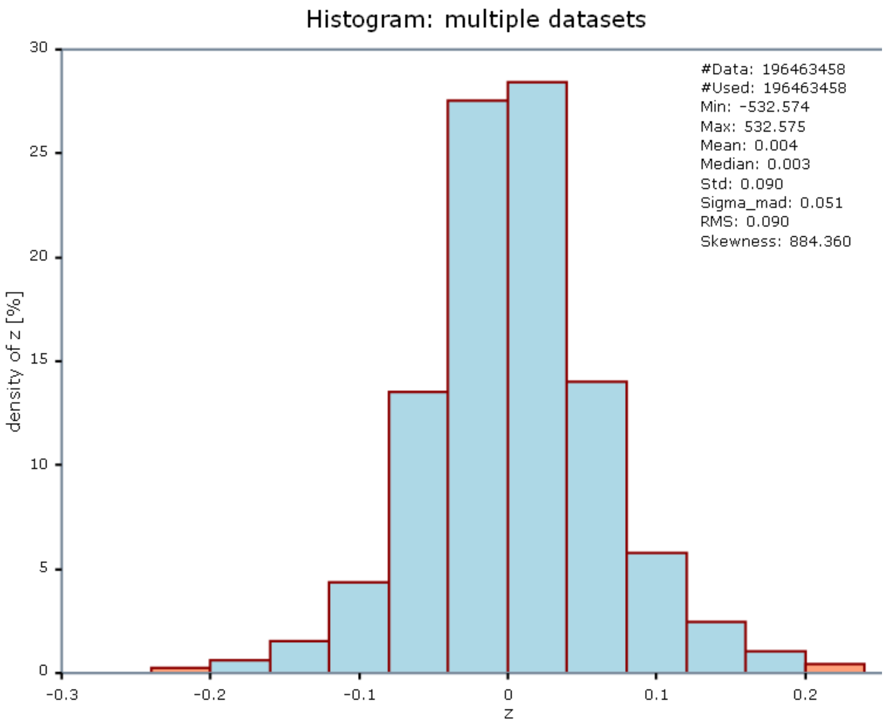
RELATIVE ORIENTATION OF STRIPS BEFORE

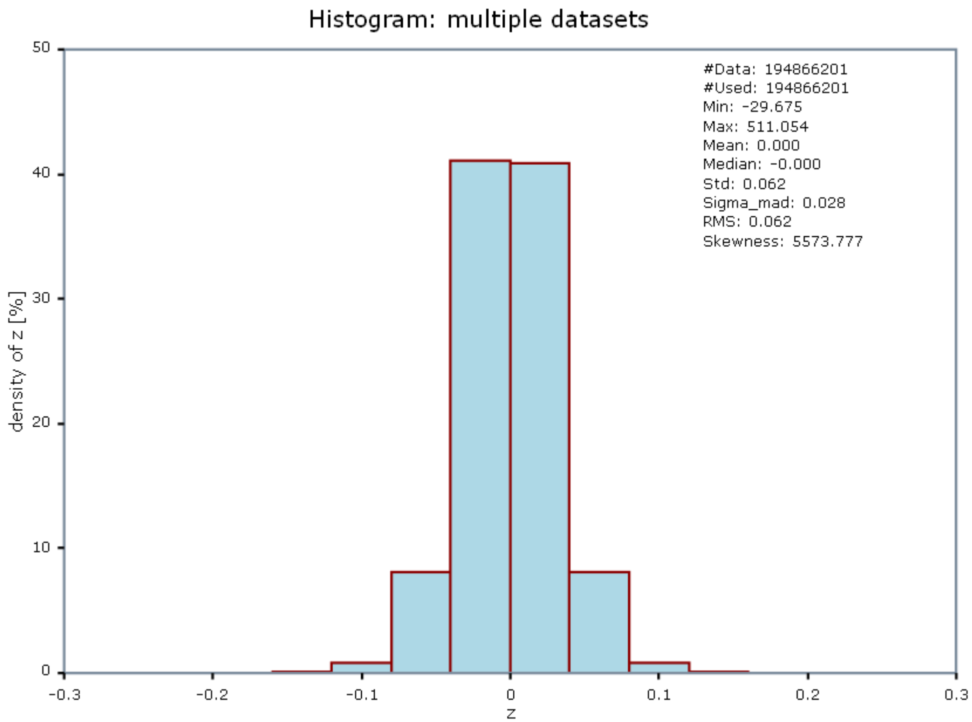


RELATIVE ORIENTATION OF STRIPS AFTER

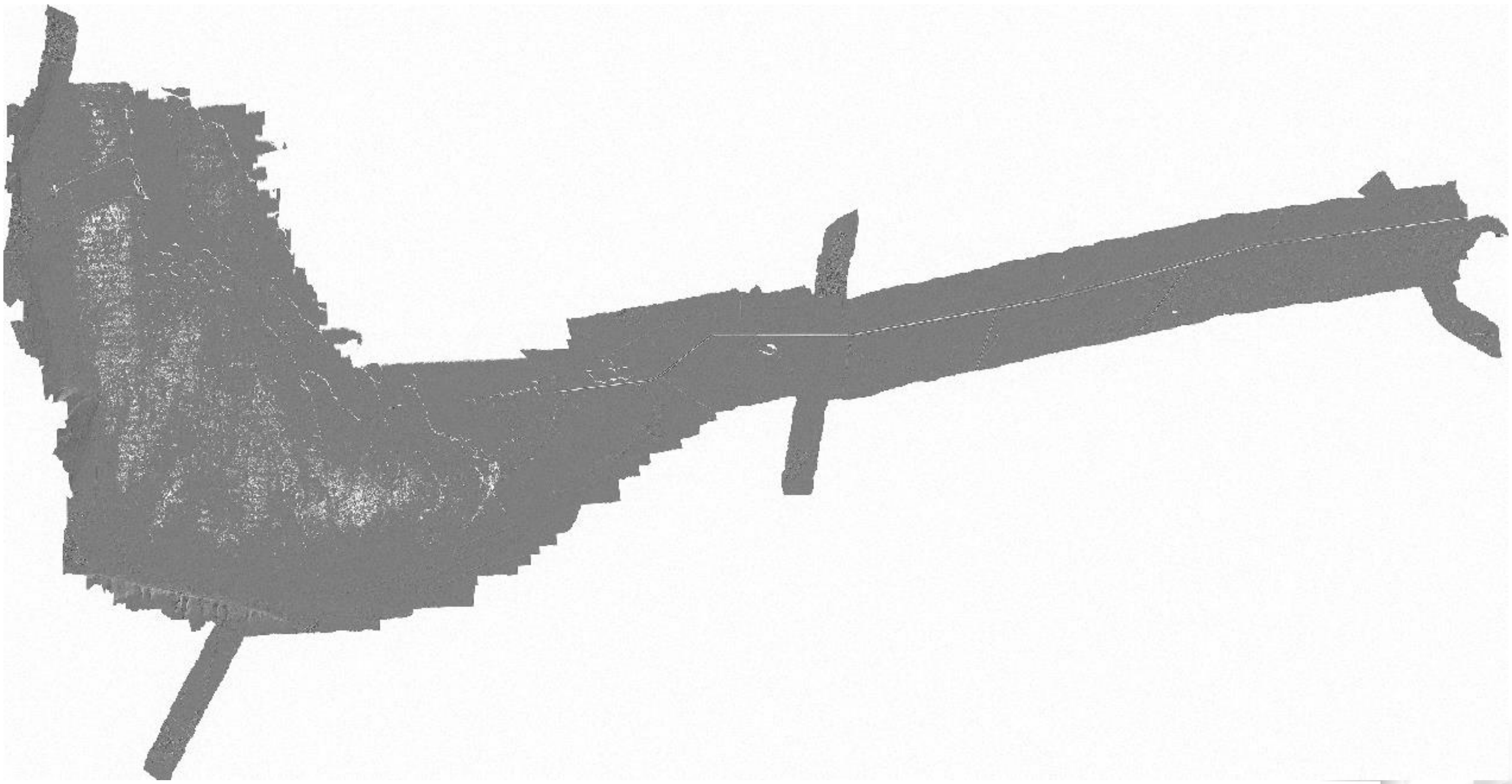


RELATIVE ORIENTATION OF STRIPS

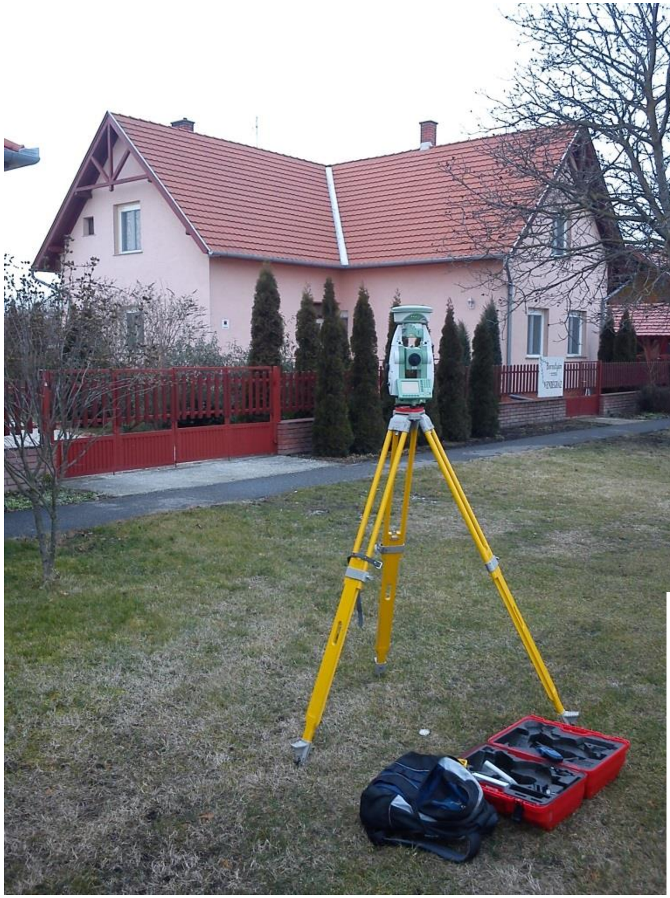


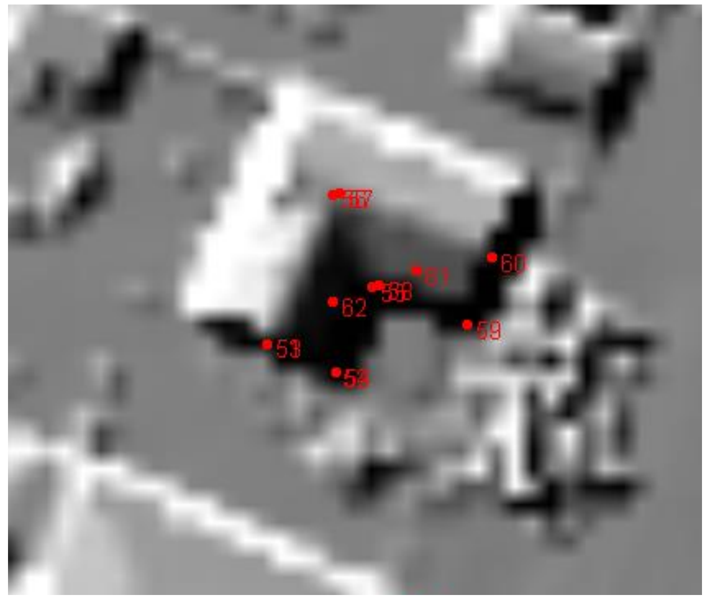


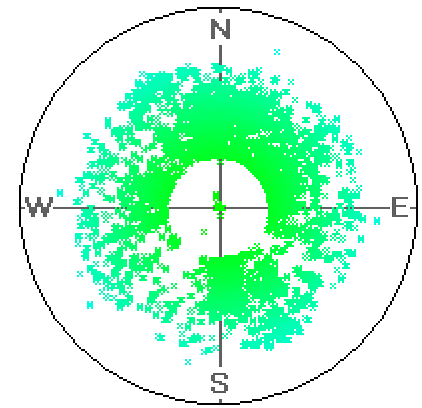
AIRBORNE LASER SCANNING
DIGITAL SURFACE MODEL (DSM)

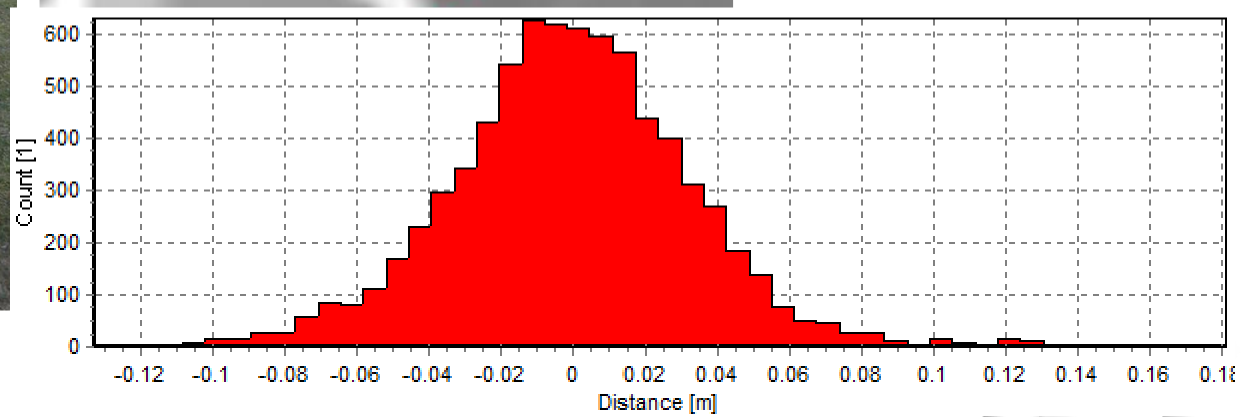


AIRBORNE LASER SCANNING REFERENCE SURFACES









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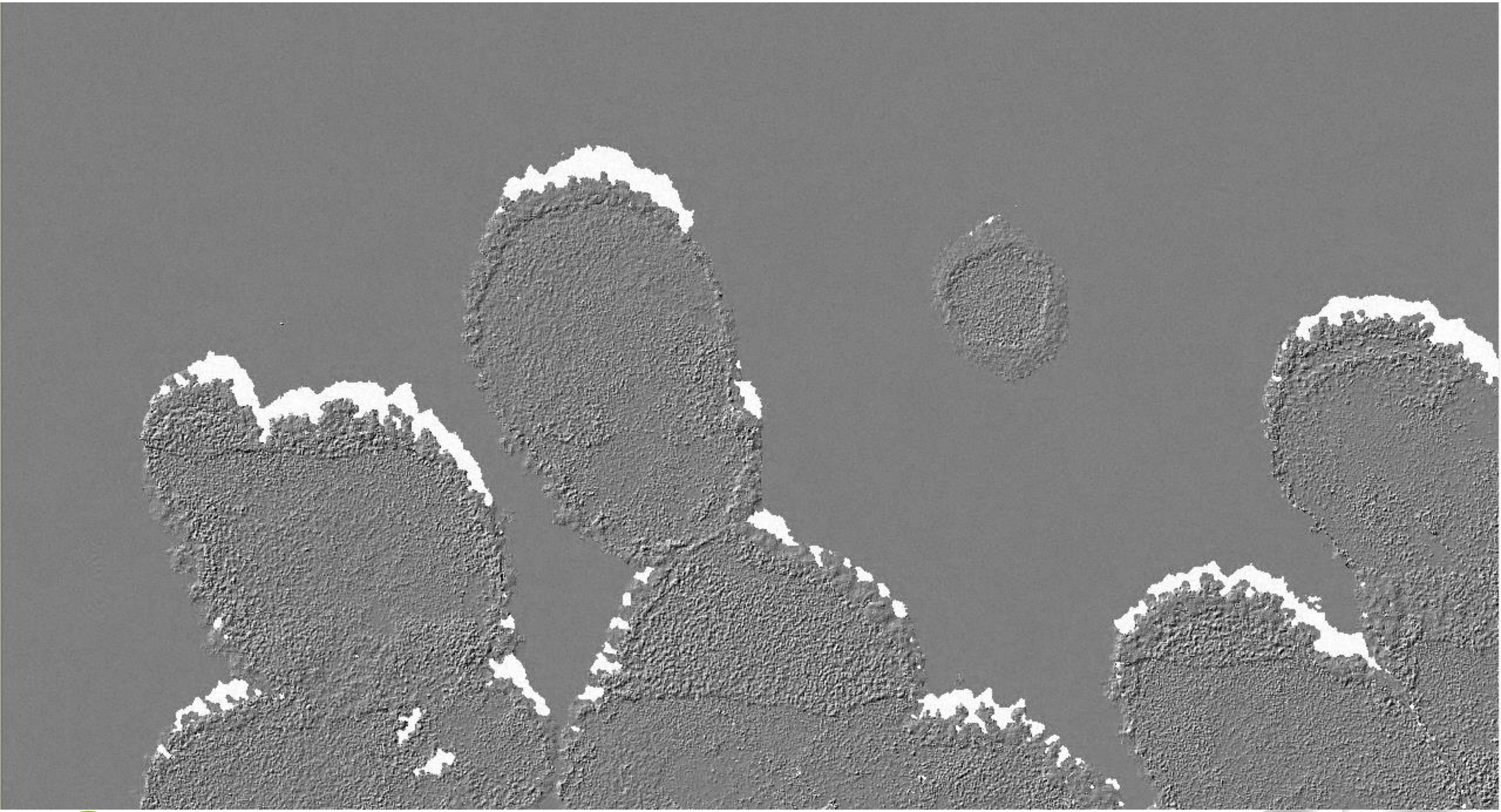
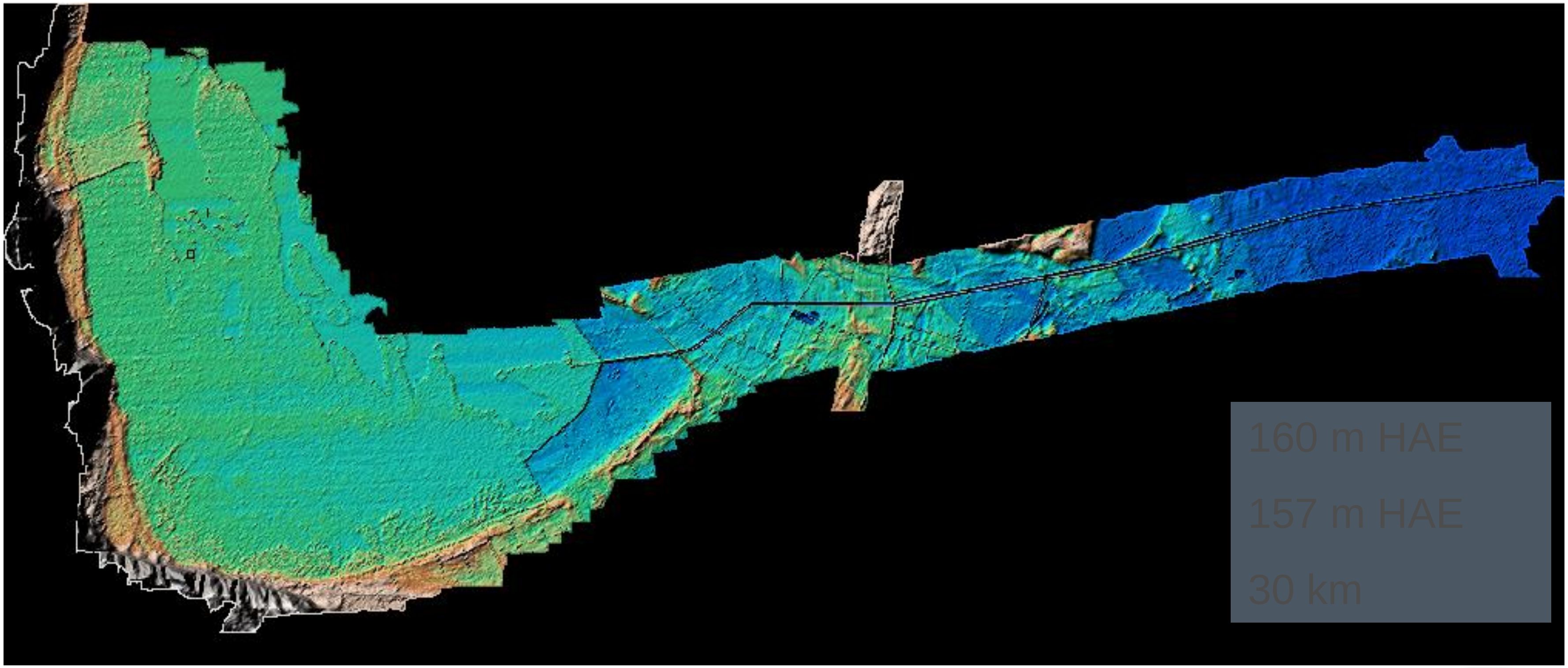
AIRBORNE LASER SCANNING
DIGITAL SURFACE MODEL (DSM) – DETAIL



AIRBORNE LASER SCANNING
DIGITAL TERRAIN MODEL (DTM)



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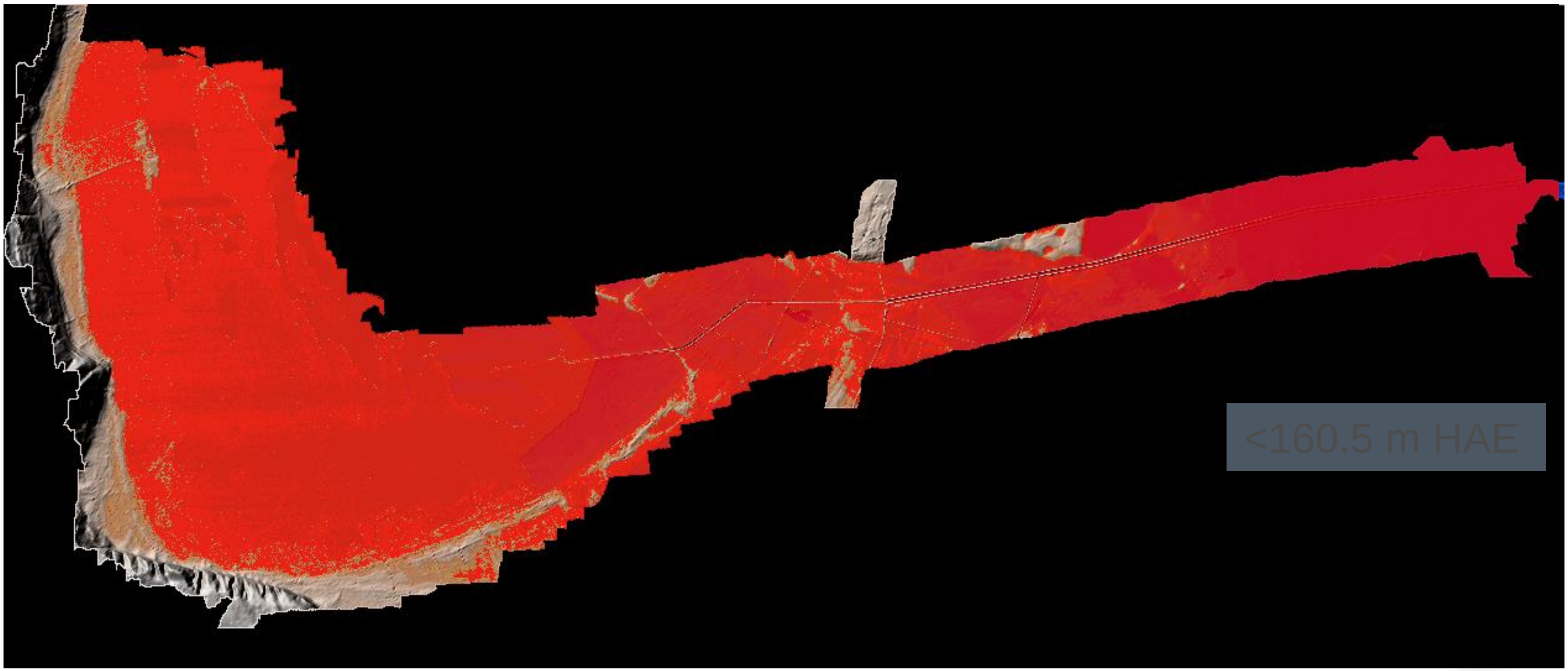
DIGITAL TERRAIN MODEL (DTM)



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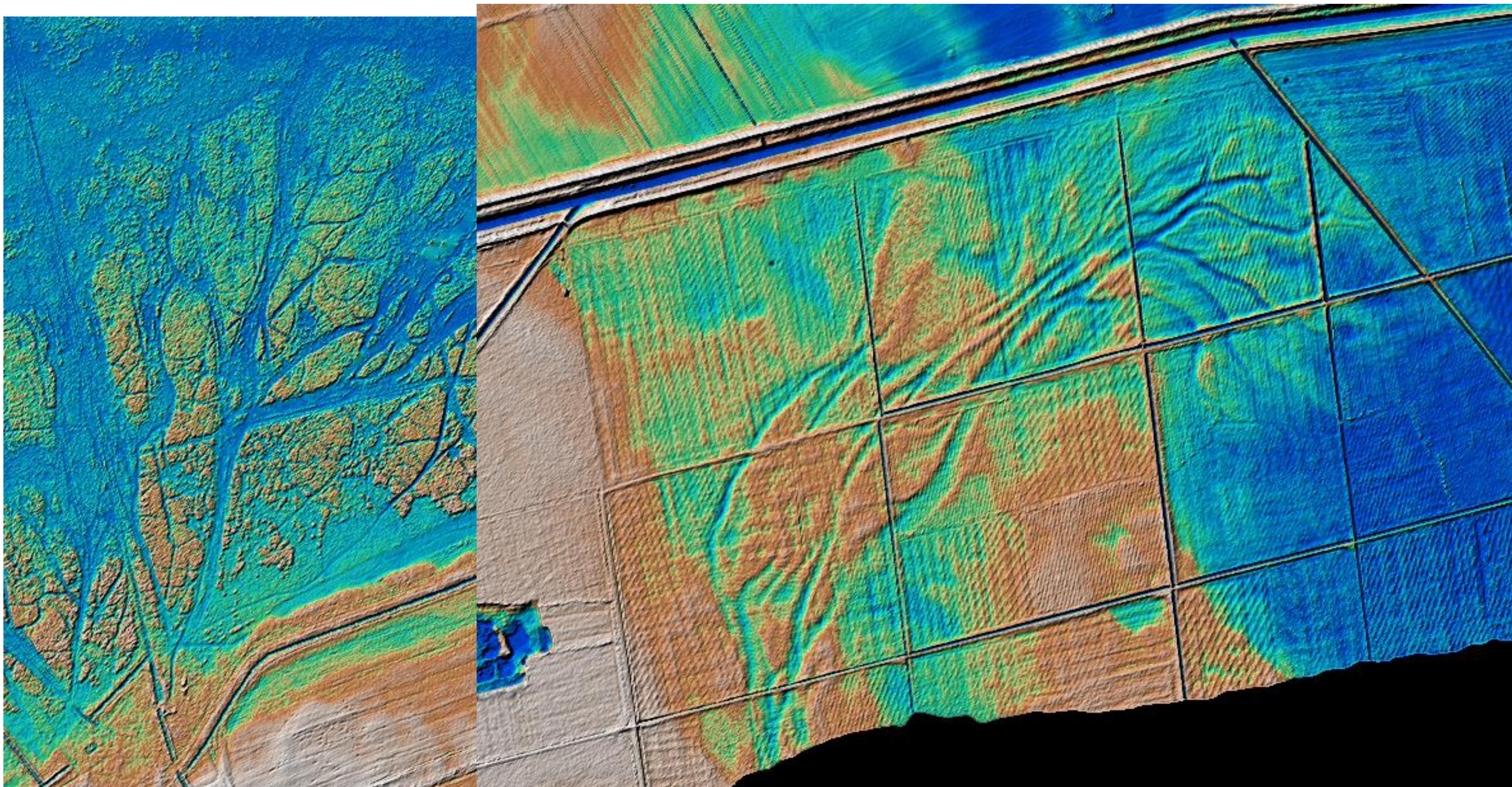
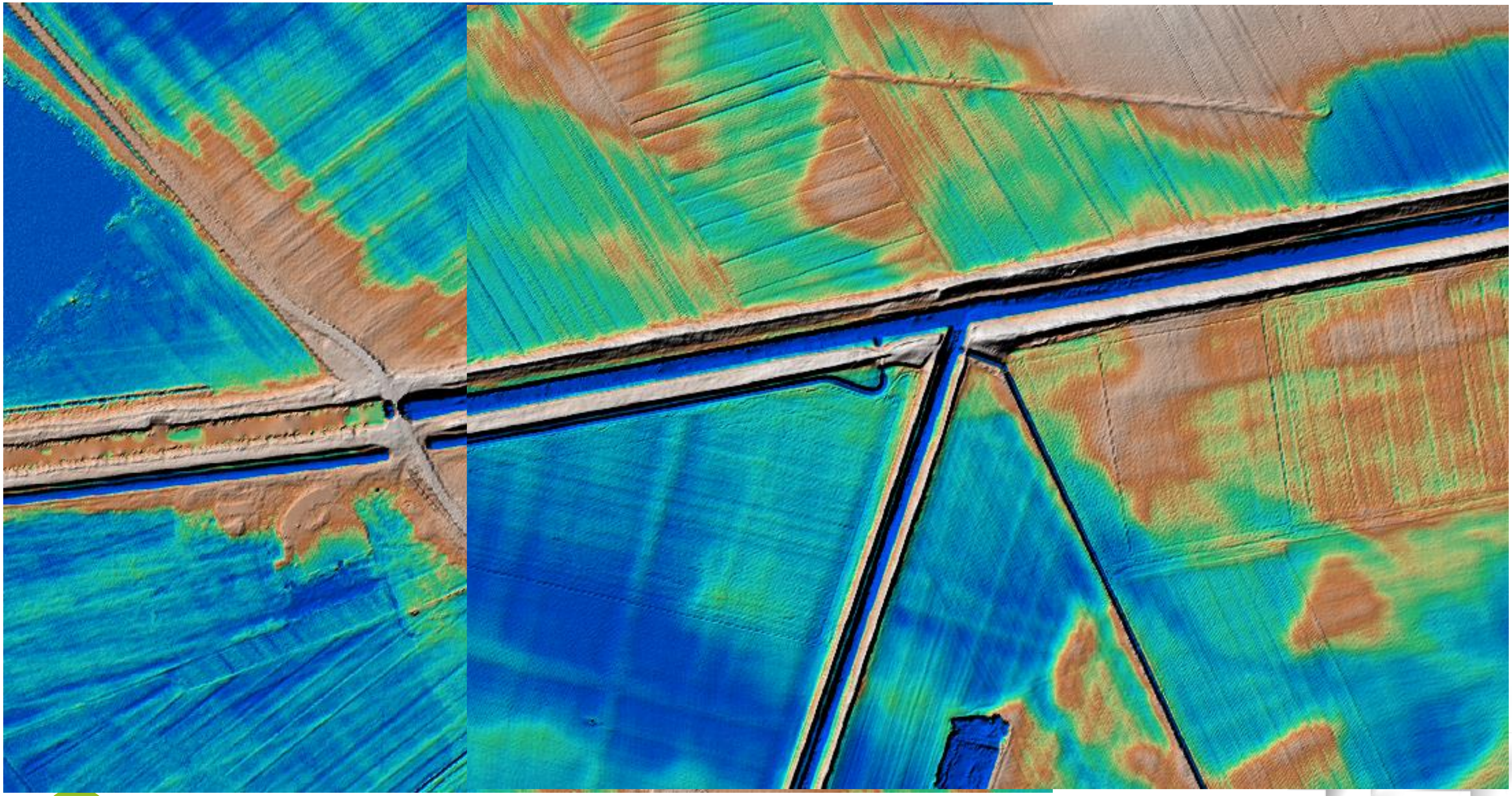
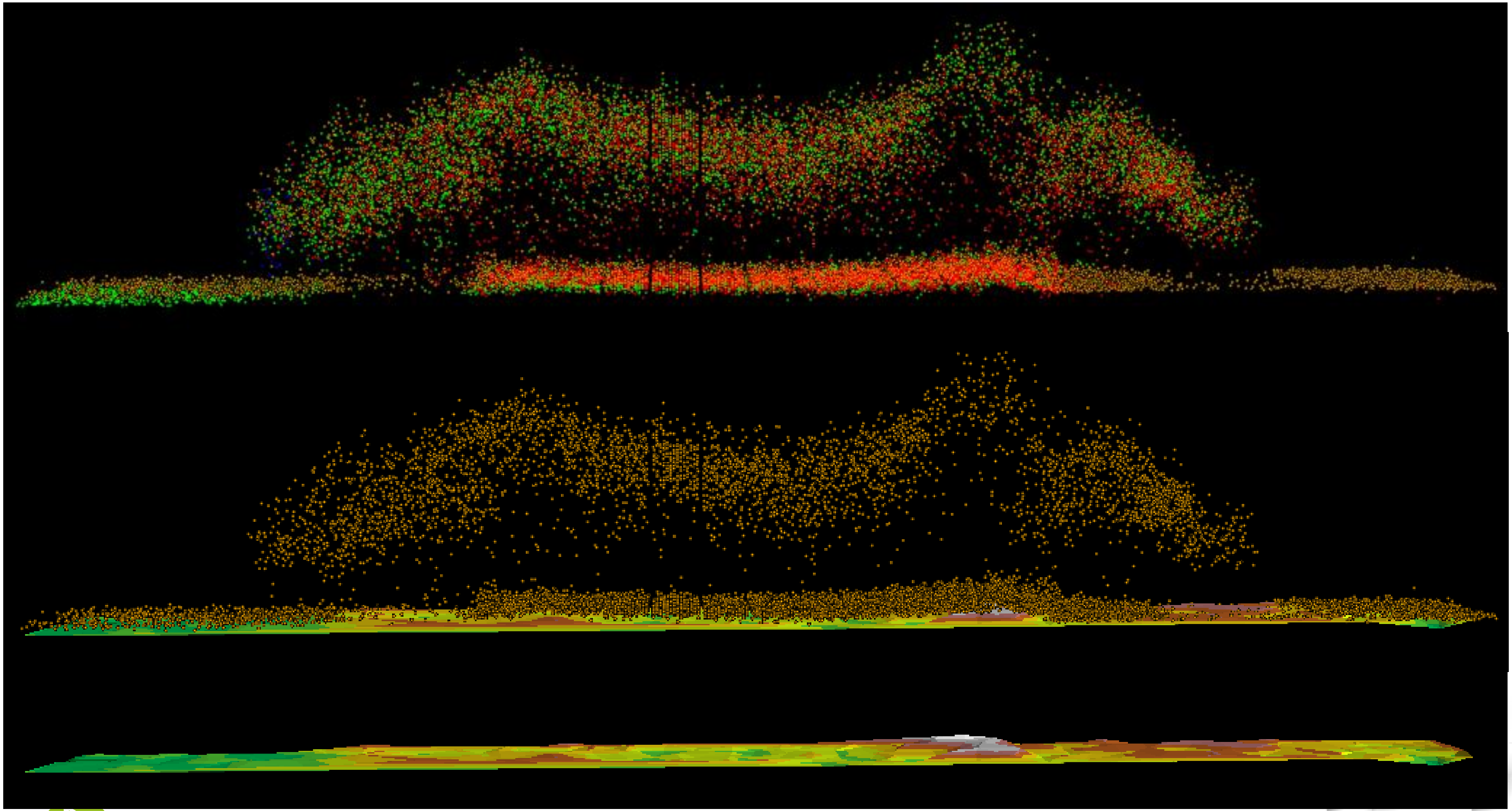
AIRBORNE LASER SCANNING
DIGITAL TERRAIN MODEL (DTM) - DETAILS



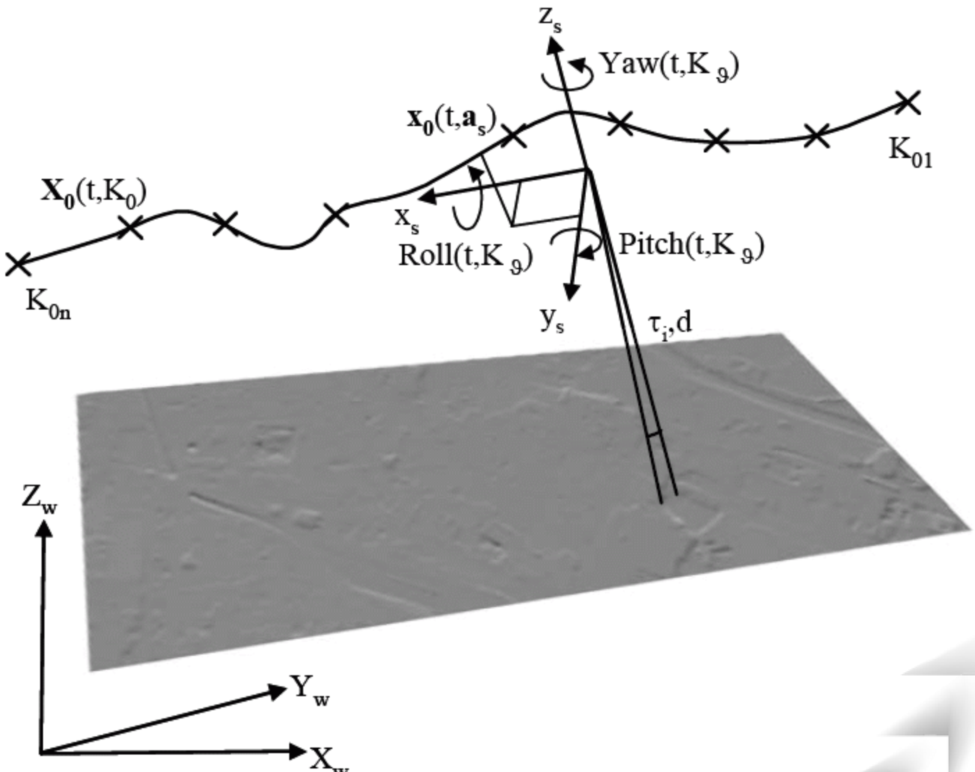
AIRBORNE LASER SCANNING
DIGITAL TERRAIN MODEL (DTM) - DETAILS



A REED ISLAND



TRAJECTORY



Z_s
Yaw(t,K $_\vartheta$)
x_0(t,a_s)
X_0(t,K_0)
K_{01}
x_s
Roll(t,K $_\vartheta$)
Pitch(t,K $_\vartheta$)
K_{0n}
y_s
τ_i,d
Z_w
Y_w
X_w

CREATION OF ELEVATION/SURFACE MODELS

- Point Cloud
- Generally no thematic information

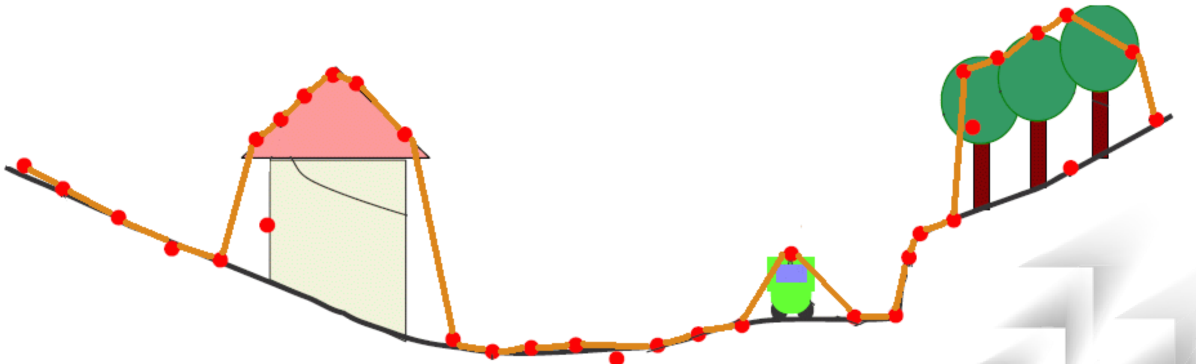
- Filtering
- Interpolation

INTERPOLATIONS

- Digital Surface Models – DSM
- Digital Terrain Models – DTM

CREATION OF DIGITAL SURFACE MODELS (DSM)

- Highest points
- Contains:
  - Buildings
  - Vegetation
  - Etc.

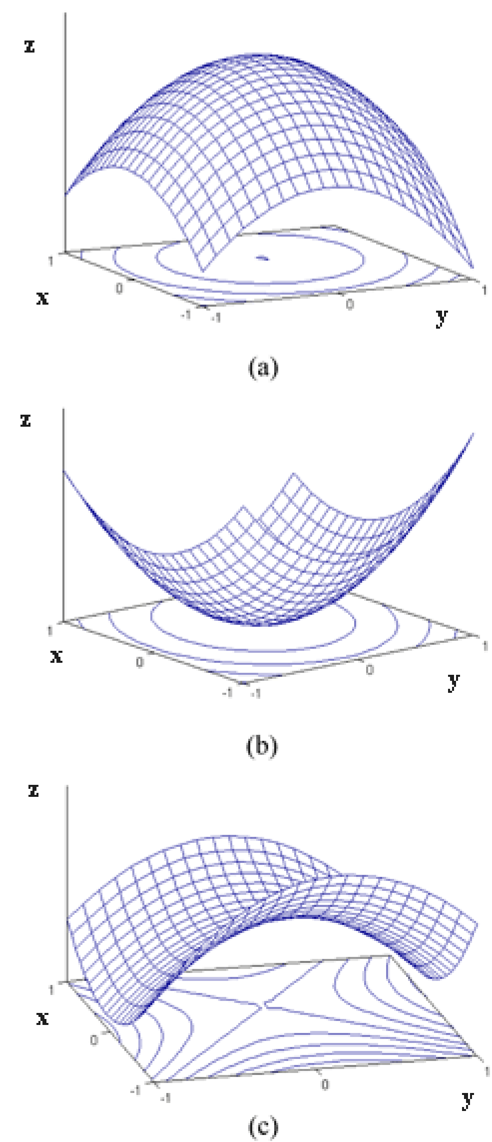


DSM INTERPOLATIONS

- Snap grid;
- Nearest neighbour;
- Delaunay triangulation;
- Moving average;
- Moving planes;
- Robust moving planes;
- Moving paraboloid;

CROWN SURFACES (DSM)

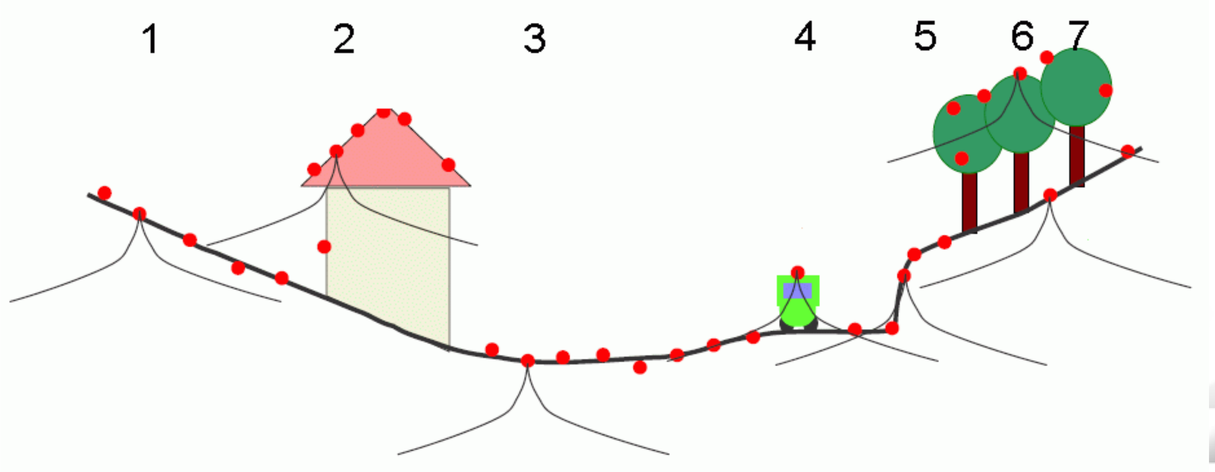
- Functional model
  - Tree height
  - Single tree crown
  - Near continuous surface
- Properties
  - Highest points of the crowns
  - Relative smooth surfaces inside the crowns
  - It touches the ground between the crowns
- Polynomial interpolation
  - Approximation
  - Local point filtering
  - Maximum 2nd order polynoms



CREATION OF DIGITAL TERRAIN MODEL (DTM)

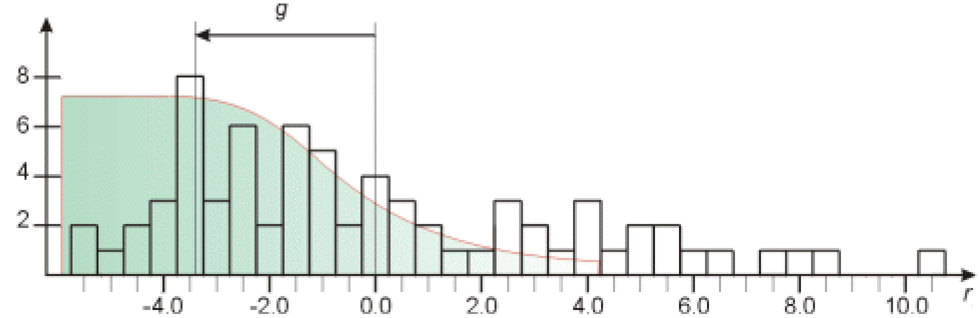
- One of the most crucial point of data-processing
- The following algorithms are the mostly used in production:
  - Morphologic filtering
  - Weighting points, robust filtering
  - Progressive Triangulation Irregular Network
  - Active surfaces

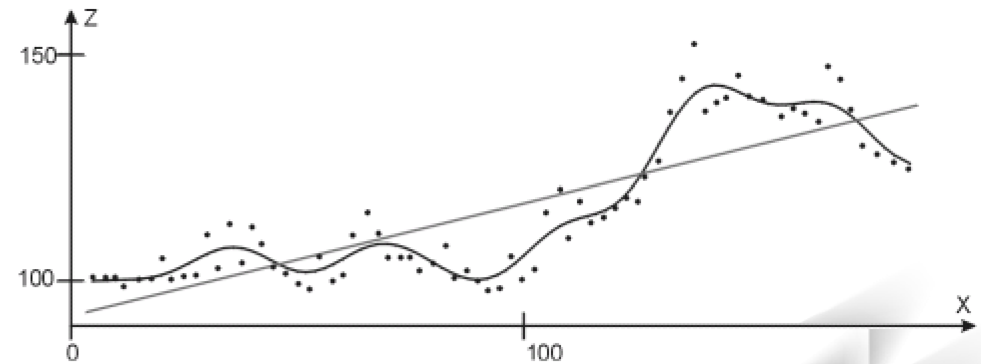
- Vosselman, G. (2000): Slope Based Filtering of Laser Altimetry Data. International Archieves of Photogrammetry and Remote Sensing, Vol. 33, part B3/2, 935-942.



WEIGHTING POINTS

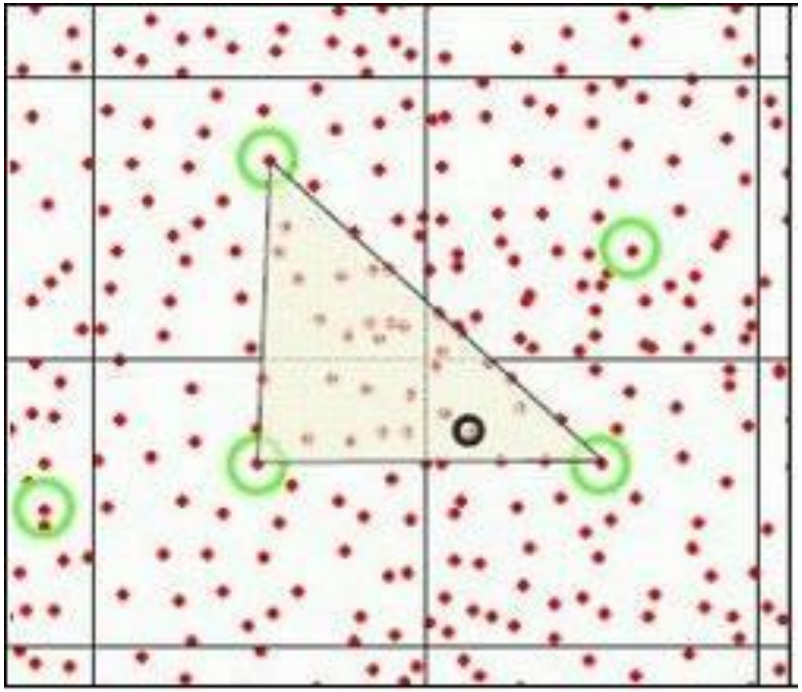
- Kraus, K., Pfeifer N. (1998): Determination of terrain models in wooded areas with airborne laser scanner data. ISPRS Journal of Photogrammetry & Remote Sensing. 53, 193–203
- Implemented in software SCOP++



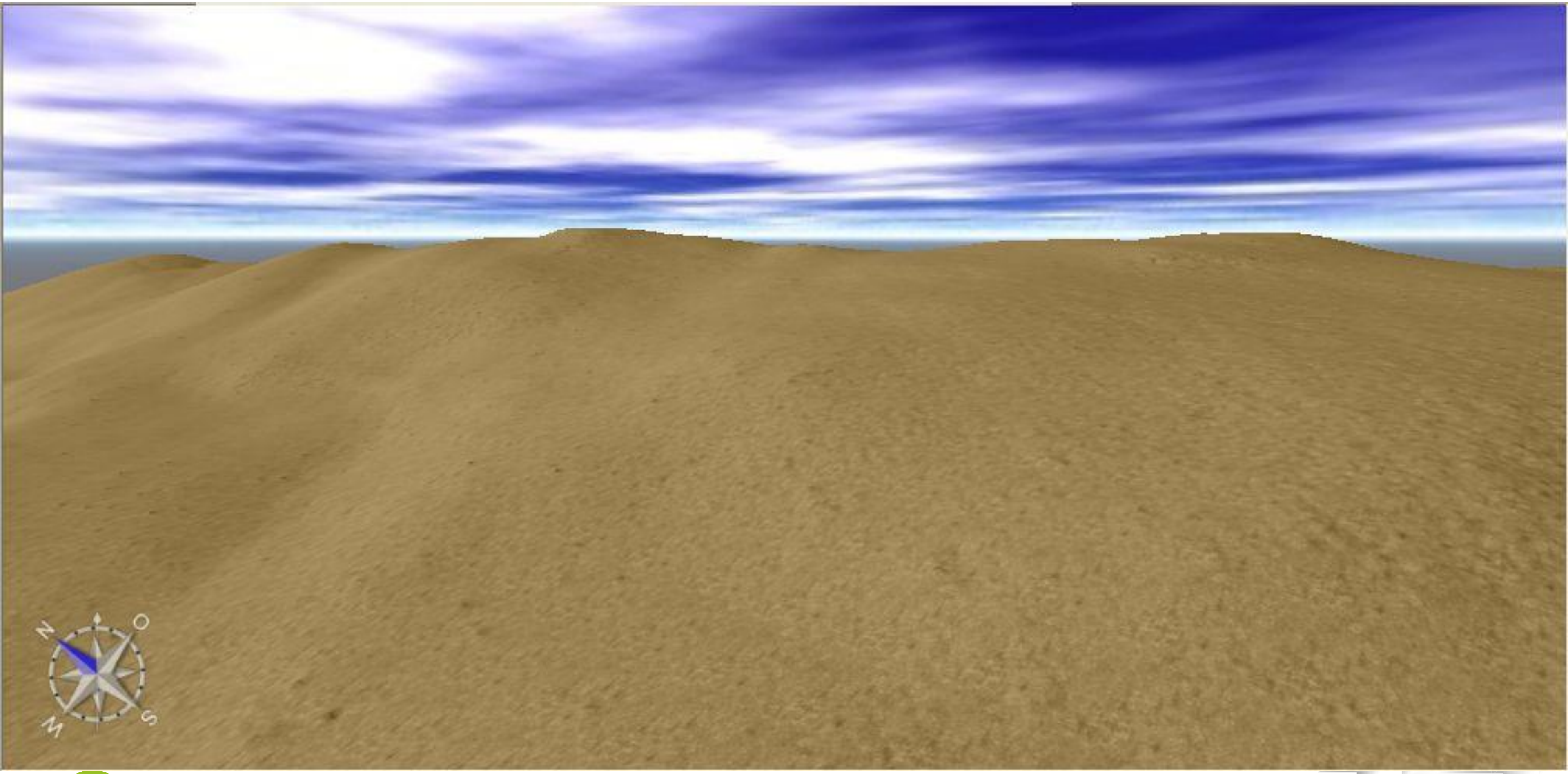


PROGRESSIVE TRIANGULATION IRREGULAR NETWORK (TIN)

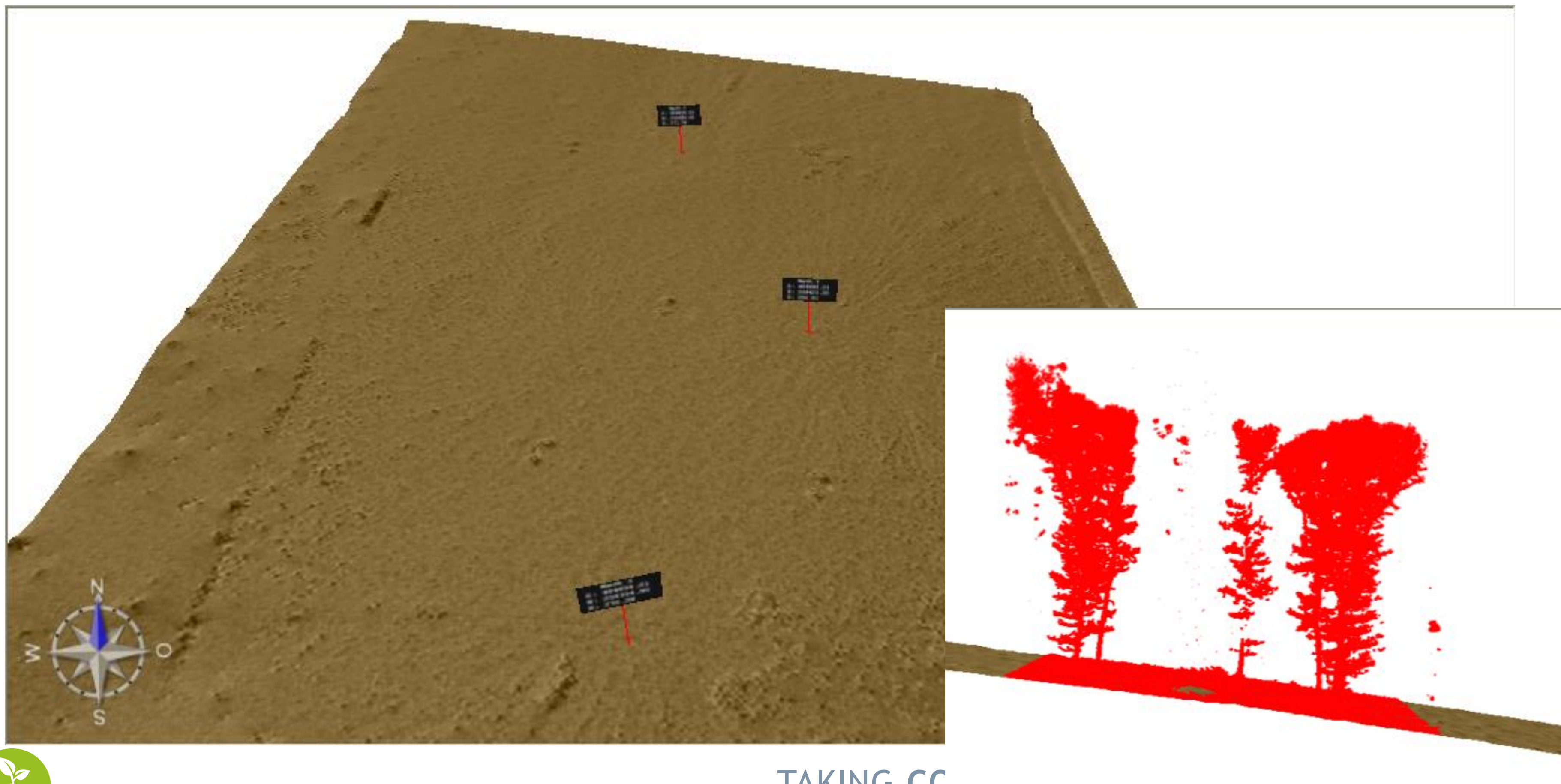
- Coarse-to-fine method
- During ‚densification' the following parameters can be investigated:
  - Slope
  - Iteration angle
  - Iteration distance
  - Minimum side
  - Reduction
- Implemented in software Terrasolid



DTM CREATION – ACTIVE SURFACES

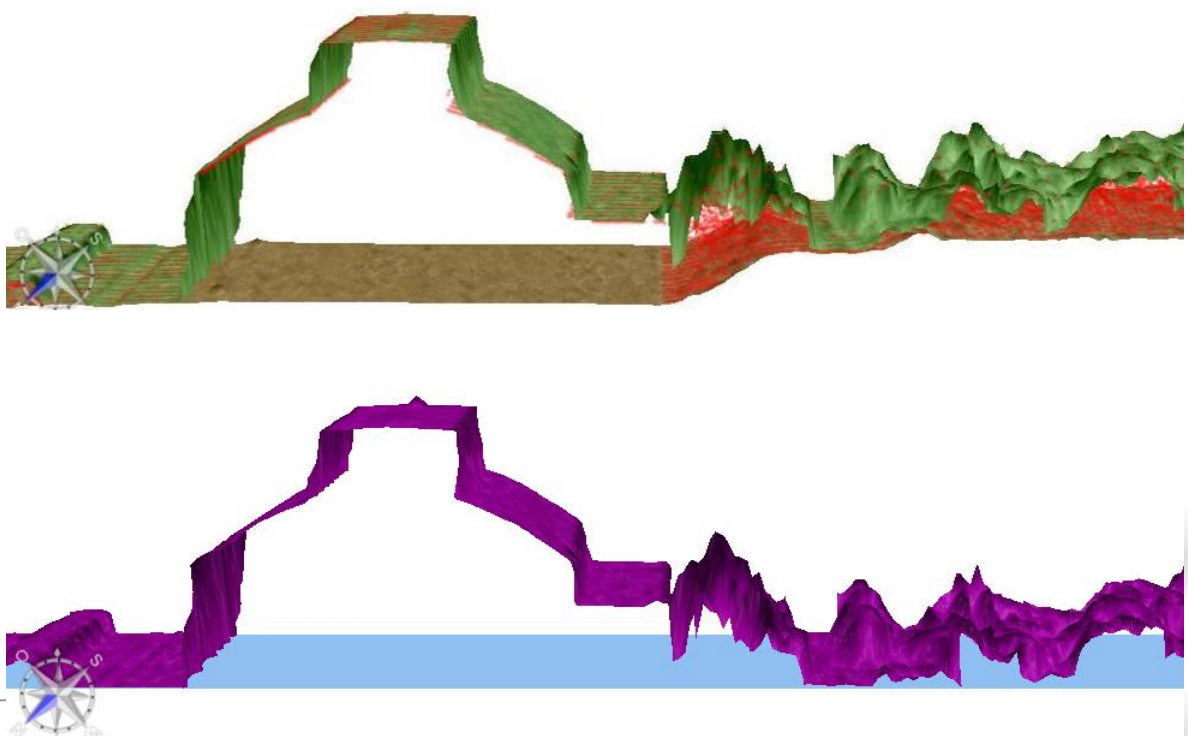


DIGITAL TERRAIN MODEL (DTM)

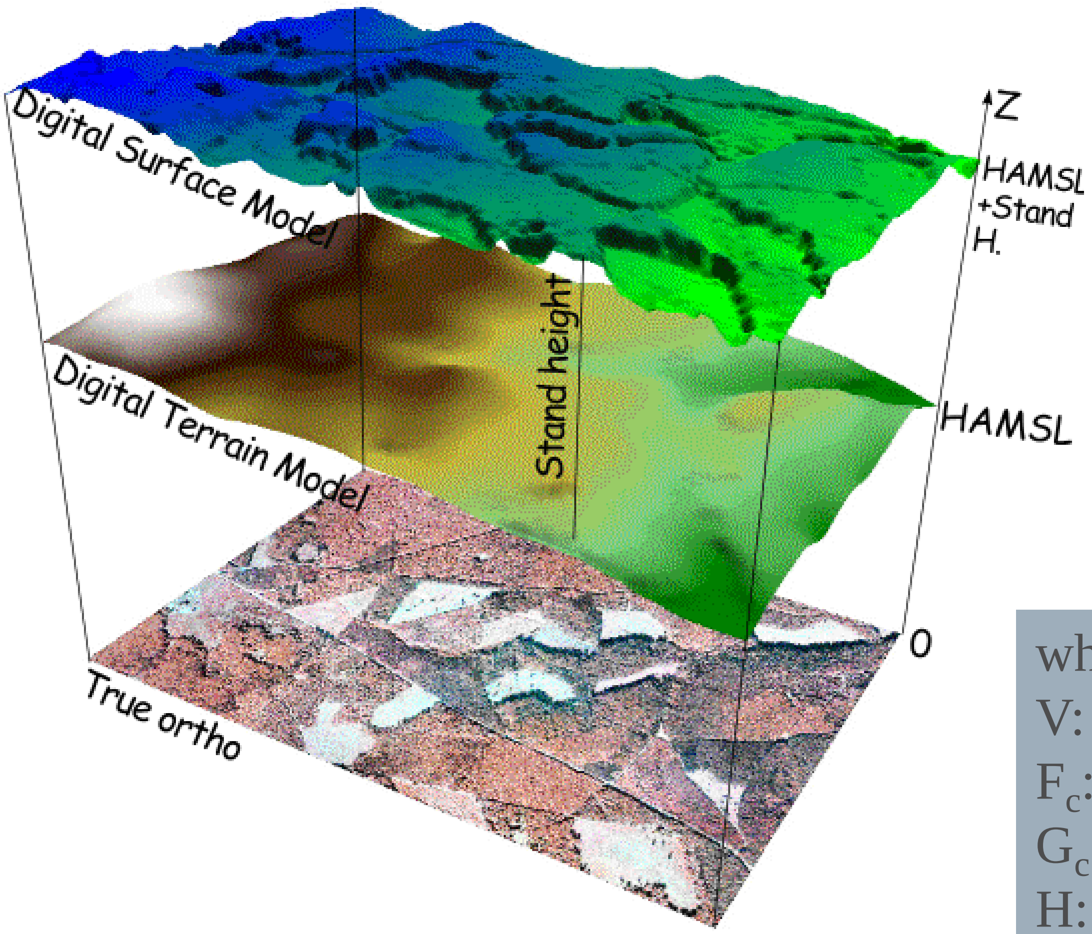


CALCULATION OF NORMALISED DIGITAL SURFACE MODELS (NDSM)

- nDSM=DSM-DTM



NORMALIZED DIGITAL SURFACE MODEL (nDSM)
CANOPY HEIGHT MODEL (CHM)
GROWING SPACE



$$nDSM = DSM - DTM$$

$$V = F_c \cdot G_c \cdot H$$

where:

V: Volume of the stand (m^3)

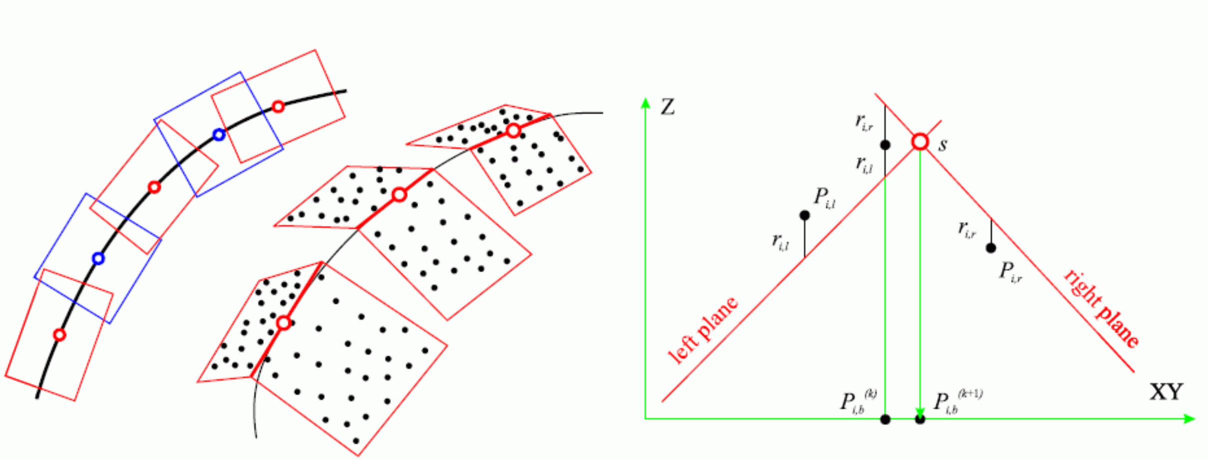
F_c: Form number

G_c: Crown projection area (m^2)

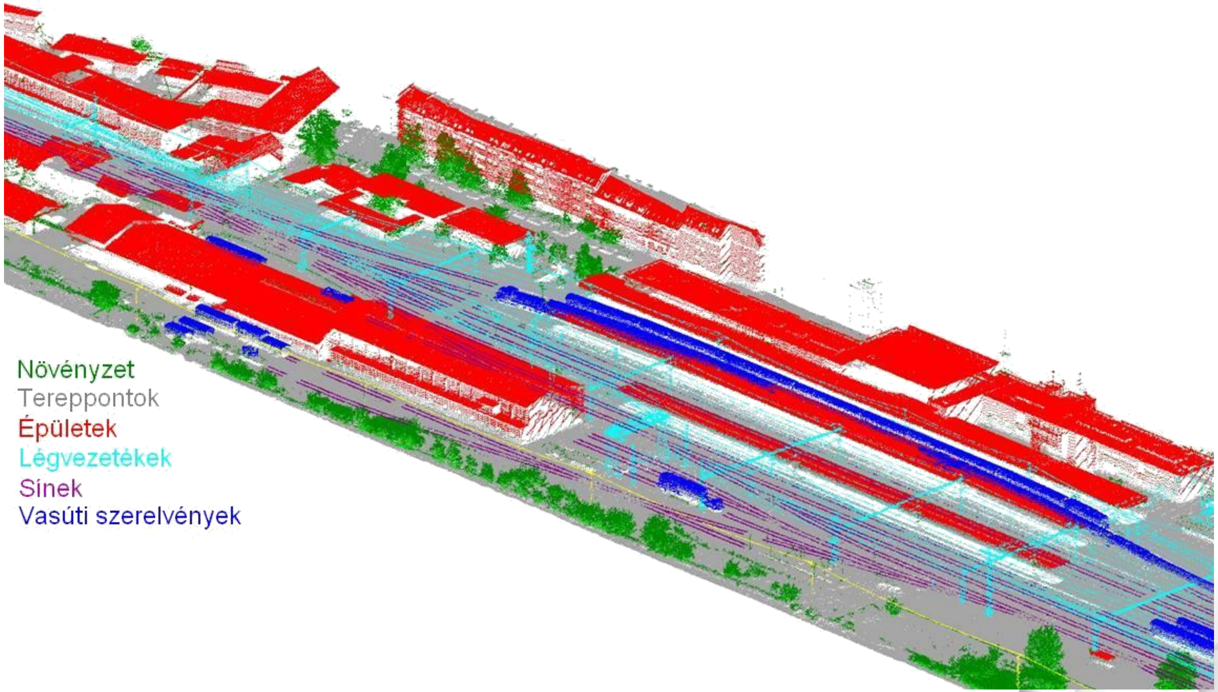
H: Stand Height (m)

MODELLING BREAK-LINES

- Briese (2001)



CLASSIFICATION



METHODS

- Triangulation, Pattern projection <10 m
- Continuous-wave ranging
- Pulse ranging >10 m

TRIANGULATION
MS XBOX KINECT

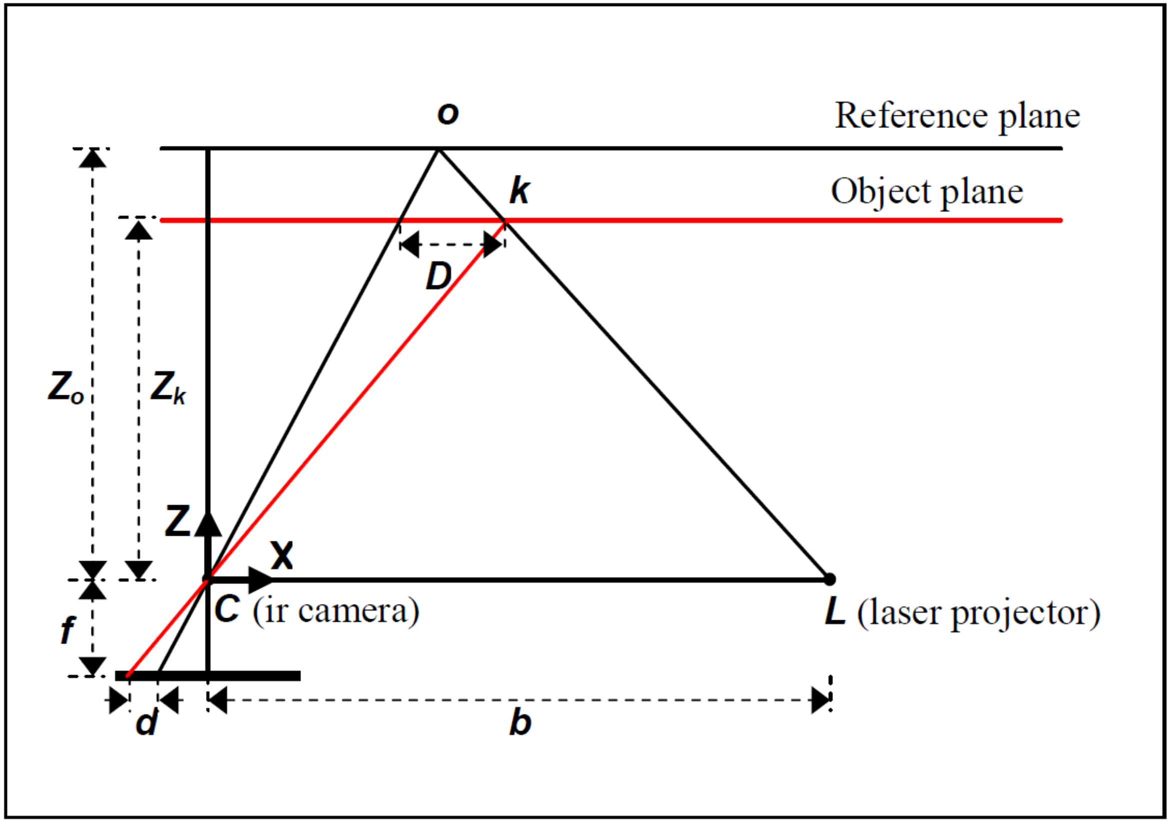
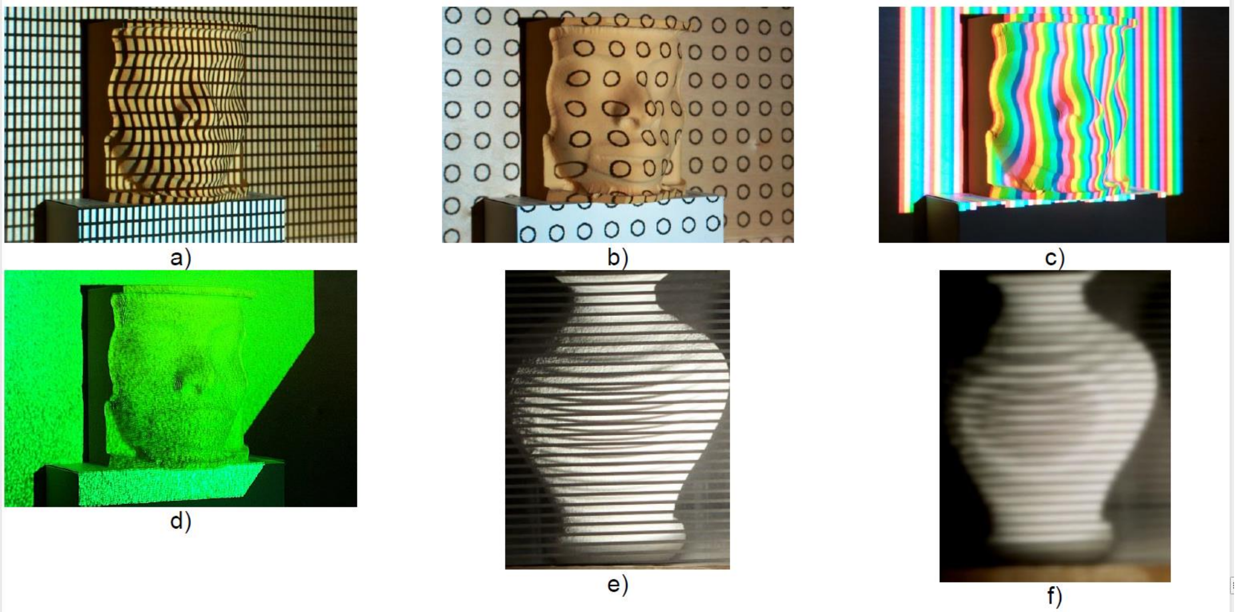


Figure 2. Schematic representation of depth-disparity relation.

PATERN PROJECTION



gure 18. More projection and measurement approaches: a) grid, b) circles, c) colour stripes, d) laser speck
ed in stereo systems, e) shadow Moiré and f) contours obtained after filtering the image in (e).

PULSE RANGING

- $c = 3*10^8$ m/s
- 1 m = 3.33 ns
- 1 mm = 3.33 ps

$$\rho = \frac{1}{2} c \Delta t$$

$$\delta\rho = \frac{1}{2} c \delta t$$

COMPARISON OF PULSE AND CW

A. Wehr, U. Lohr / ISPRS Journal of Photogrammetry & Remote Sensing 54 (1999) 68–82 71

Pulse:

Range: $R = \frac{1}{2} c \cdot t_L$

Range Resolution: $\Delta R = \frac{1}{2} c \cdot \Delta t_L$

Max. Range: $R_{max} = \frac{1}{2} c \cdot t_{L\,max}$

Range Accuracy: $\sigma_R \sim \frac{c}{2} t_{rise} \cdot \frac{1}{\sqrt{S/N}}$

Sinusoidal CW-Modulation:

Travelling Time by Phase Difference: $\left.\begin{matrix} T \triangleq 2\pi \\ t_L \triangleq \Phi \end{matrix}\right\} \Rightarrow t_L = \frac{\Phi}{2\pi} \cdot T$

Range: $R = \frac{1}{2} c \cdot \frac{\Phi}{2\pi} \cdot T = \frac{\lambda}{4\pi} \cdot \Phi$

Max. Unamb. Range: $R_{max} = \frac{\lambda_{long}}{2}$

Range Resolution: $\Delta R = \frac{\lambda_{short}}{4\pi} \cdot \Delta\Phi$

Range Accuracy: $\sigma_R \sim \frac{\lambda_{short}}{4\pi} \cdot \frac{1}{\sqrt{S/N}}$

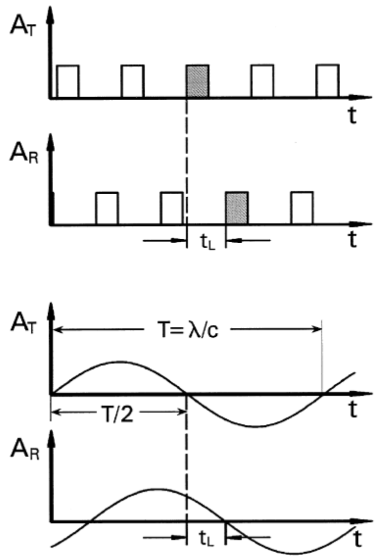
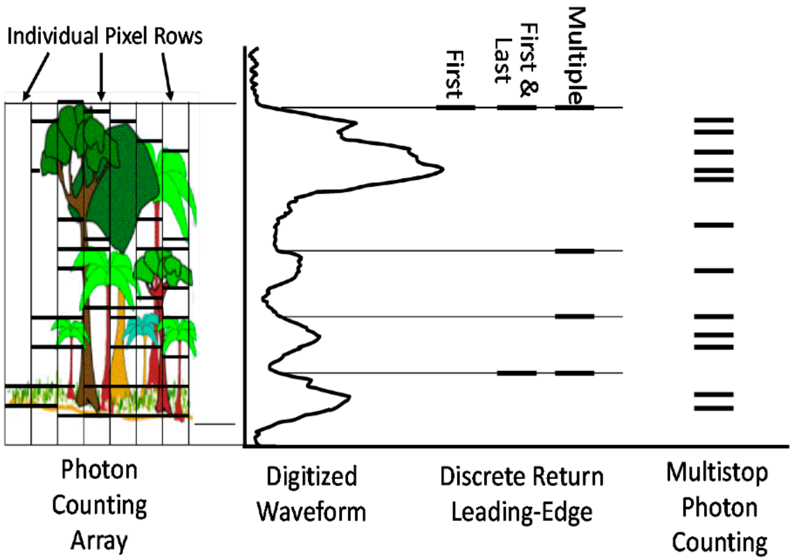


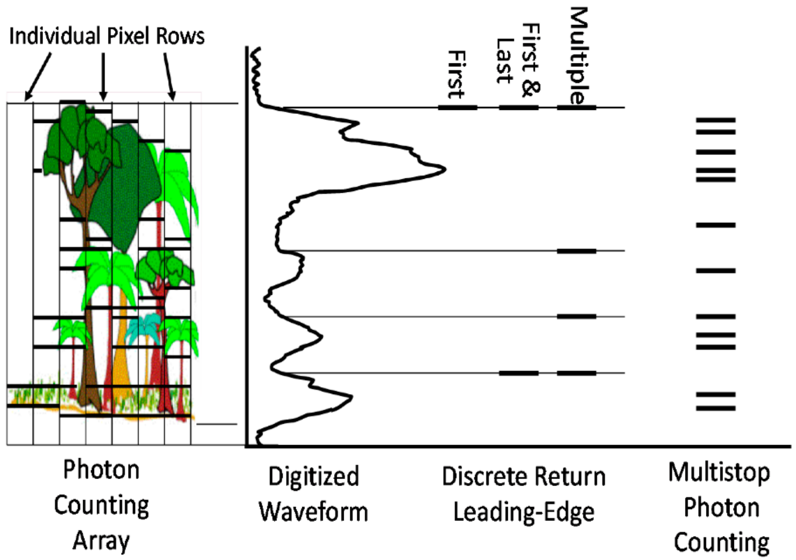
Fig. 3. Measuring principle of pulse and CW-lasers. On the right, the first and third figures show the transmitted signal, the second and

NEW TECHNOLOGIES
SINGLE PHOTON LIDAR (SPL)



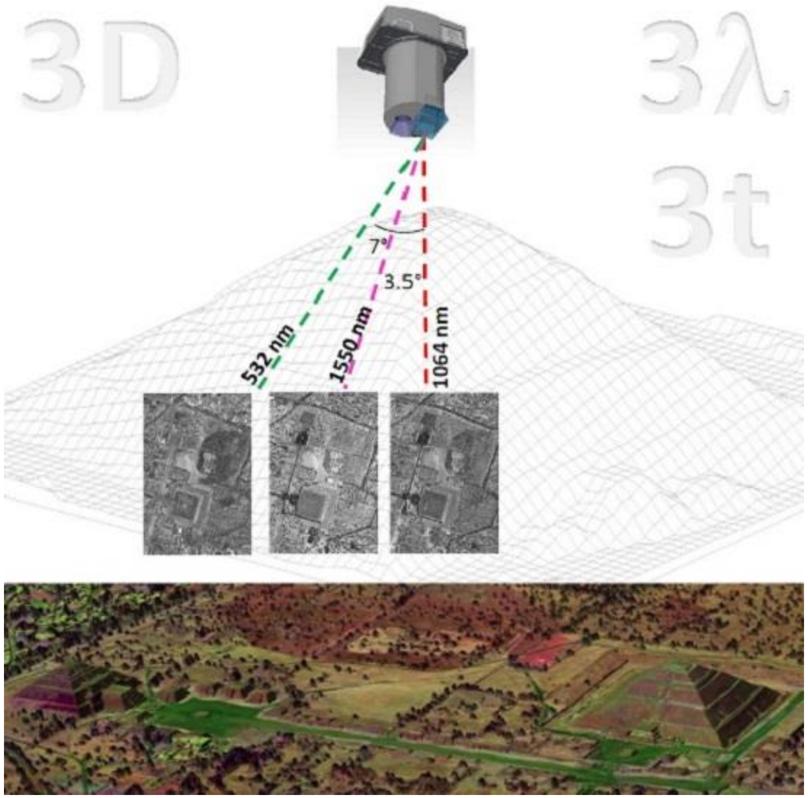
- NASA Microaltimeter (2001)
- < 2 uJ/pulse
- Sigma Space Corporation: High-Resolution Quantum Lidar System (HRQLS)

NEW TECHNOLOGIES
GEIGER MODE LIDAR (GM)



- Military
- Harris IntelliEarth™
- 2015

NEW TECHNOLOGIES MULTISPECTRAL LIDAR (MS)



- Teledyne Optech Titan MW (multi-wavelength)
- National Center for Airborne Laser Mapping (NCALM)

REMOTE SENSING
SPECIAL ISSUE "AIRBORNE LASER SCANNING"

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- Special Issue Information
- Keywords
- Published Papers

A special issue of *Remote Sensing* (ISSN 2072-4292).

Deadline for manuscript submissions: **closed (21 October 2016)**

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Guest Editor
Prof. Juha Hyyppä
Finish Geospatial Research Institute, Masala, Finland
Website | E-Mail
Interests: laser scanning (airborne, mobile and terrestrial); 3D remote sensing; individual tree detection; virtual forests

Special Issue Information

Dear Colleagues,

Airborne laser scanning has recently embraced a revolution in technological advancements and various innovations in practical applications. Among numerous developments, we have notably experienced progressive changes from discrete recording to waveform recording, from single spectral (band) to multispectral laser scanning, and from traditional single pulse collection to multi pulse (Geiger mode) and single photon collections. Additionally, UAV laser scanning is emerging. As a result of such technological advancements, the operational platform altitude may vary from tens of meters to over ten-thousand meters; the point density reaches from a couple of points per square meter to tens or even a hundred points per square meter;

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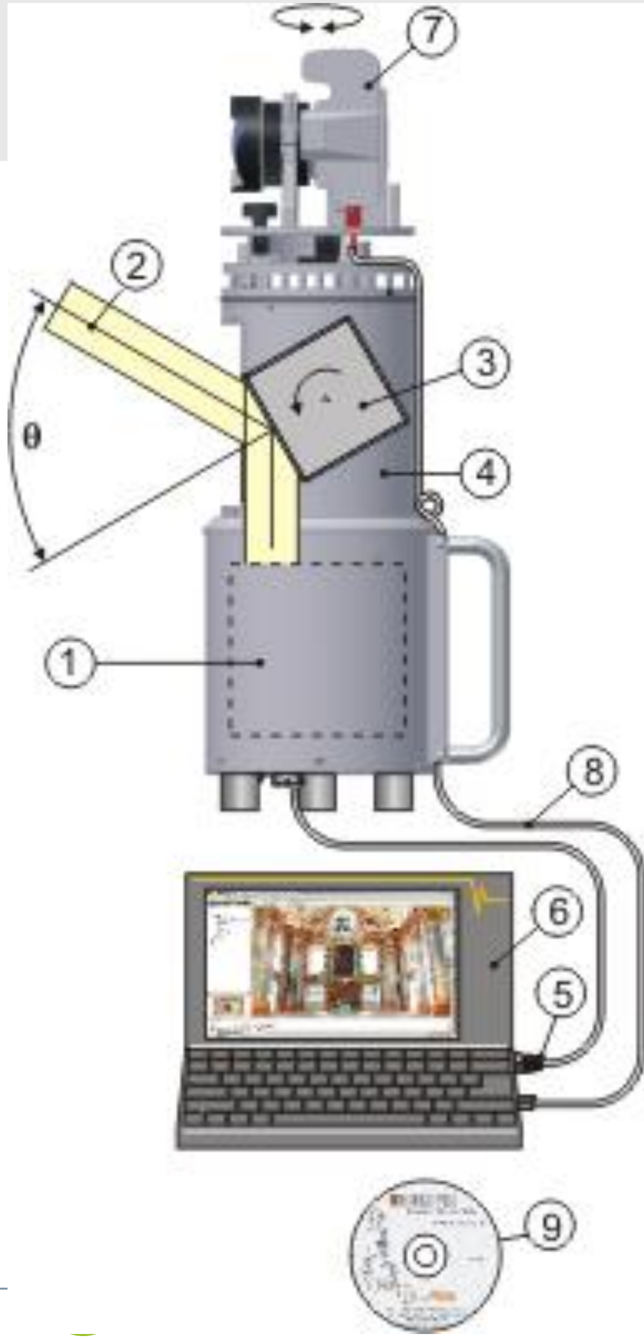

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1. Rang
2. Lase
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4. Rota
5. TCP/
6. Lapt
7. Cam
8. USB/
9. RISC

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Accuracy	10 mm 1σ @ 50 m
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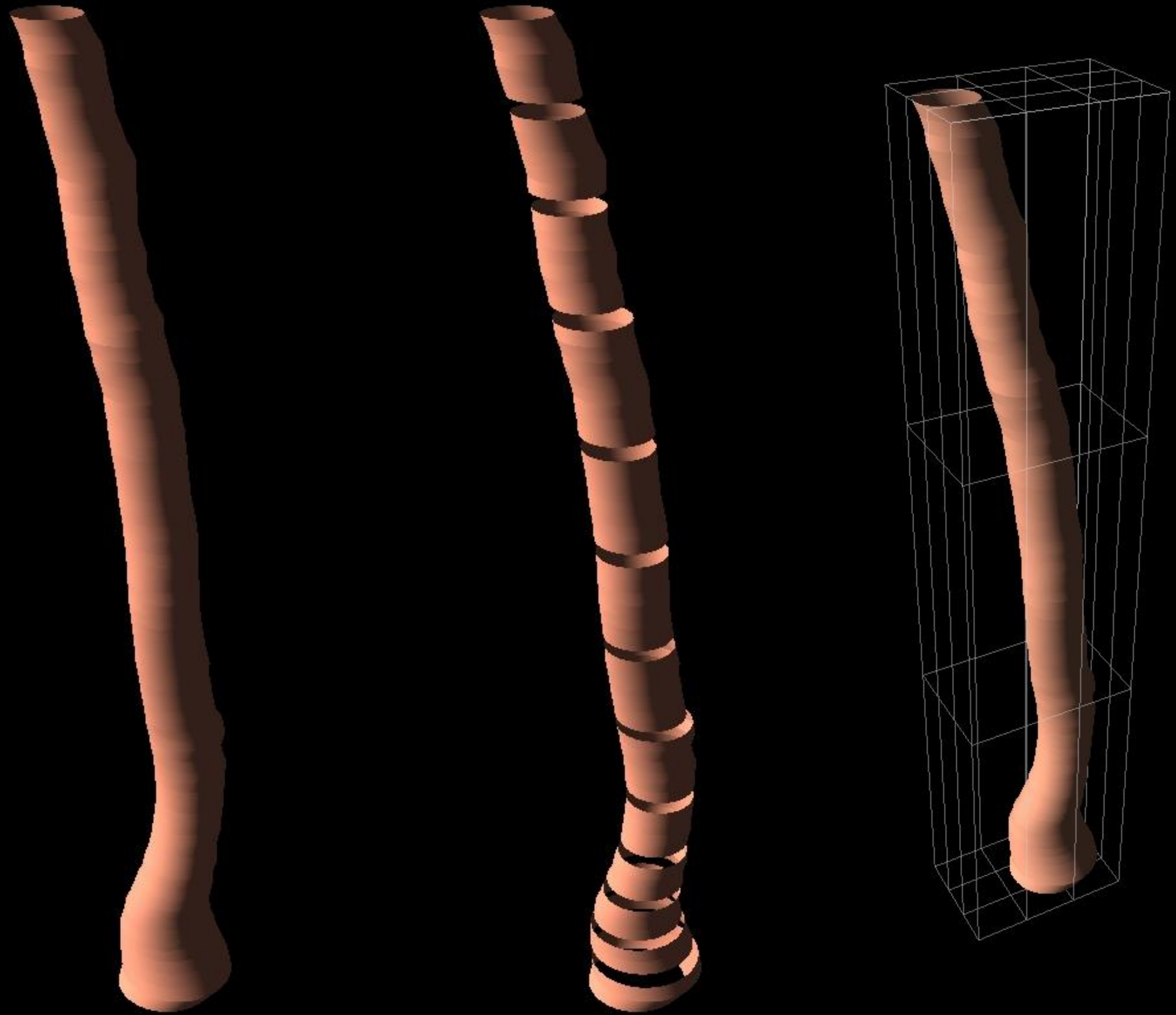
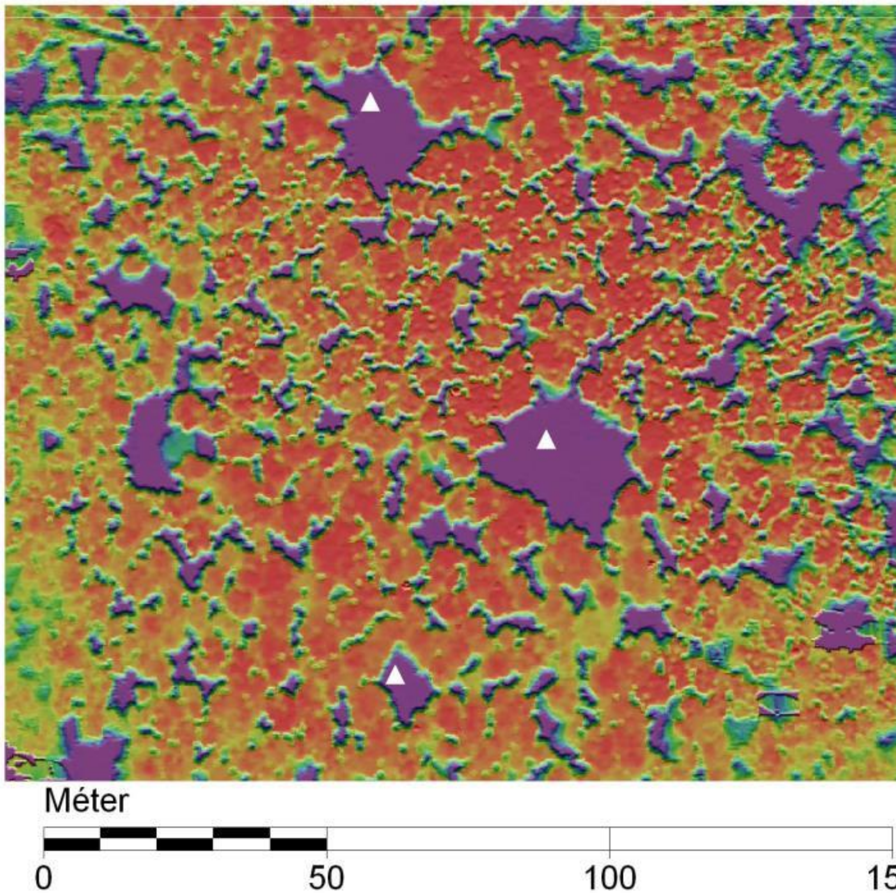
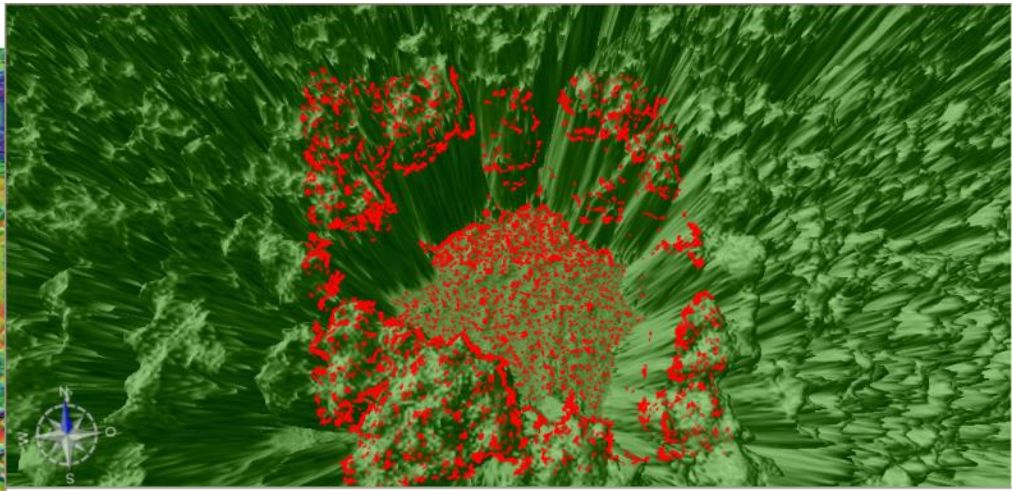
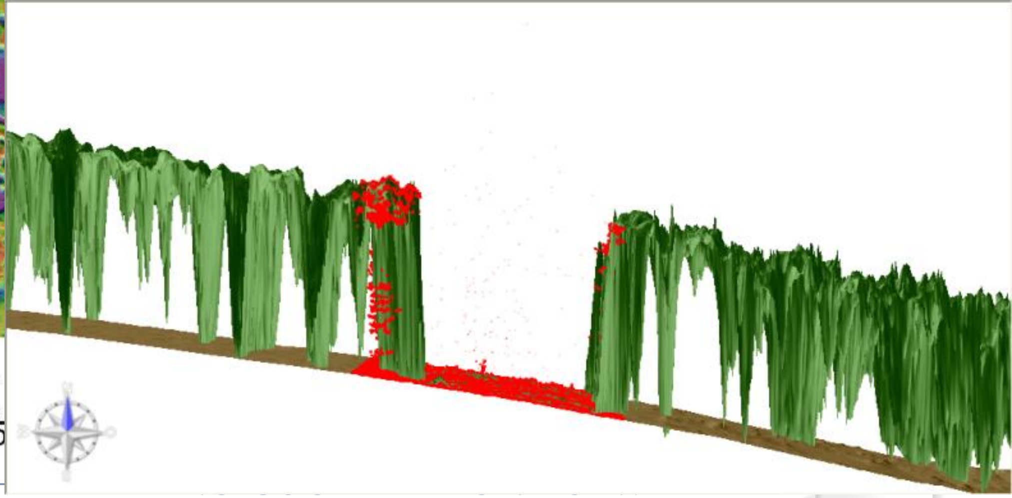


CROWN SURFACES (DSM)



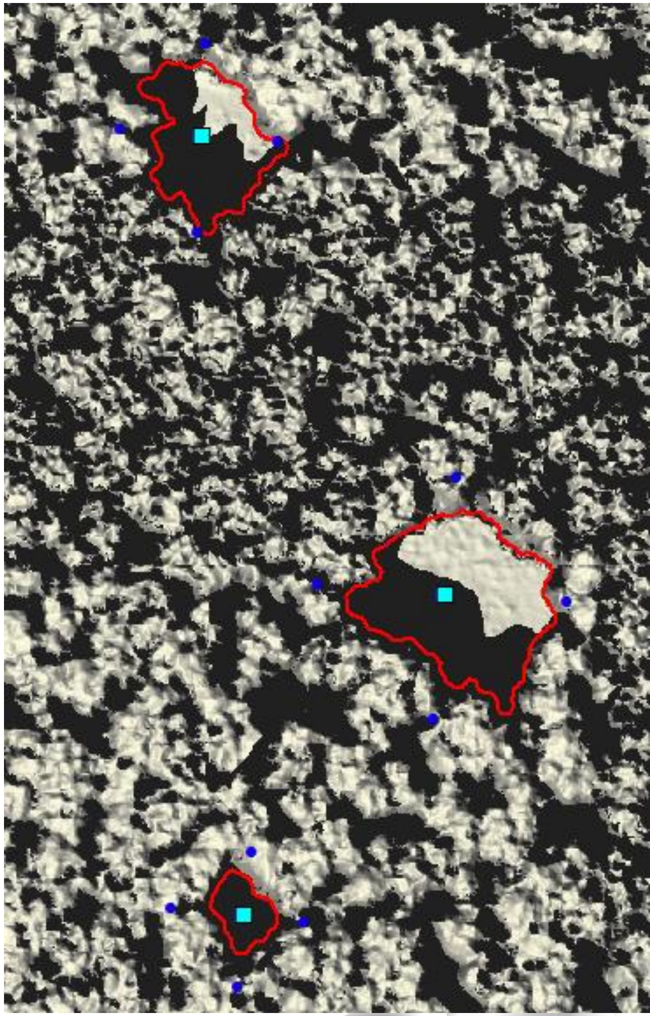




SHADING BASED ON DSM

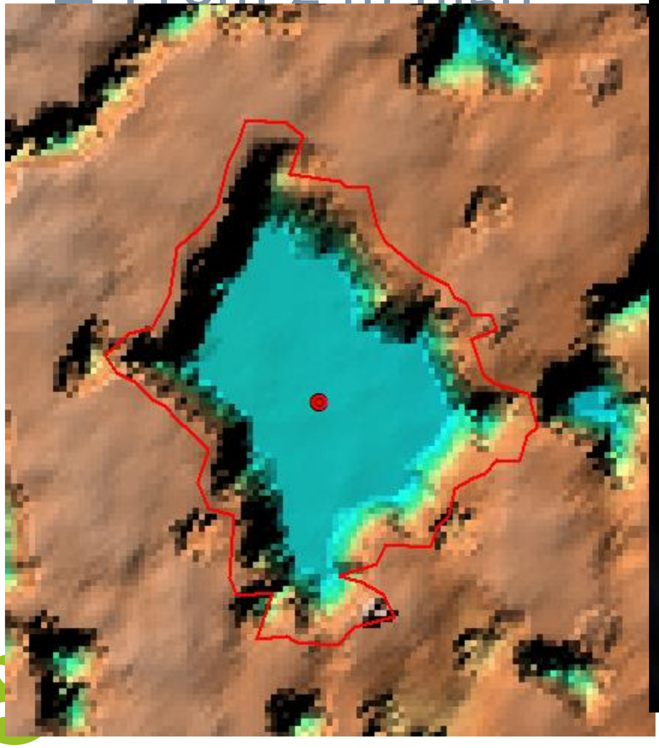
- 2013.06.24. 12:00
- Sun Azimuth: 216,88°
- Sun Elevation: 62,61°

- The gap L1 is not directly lit by the Sun

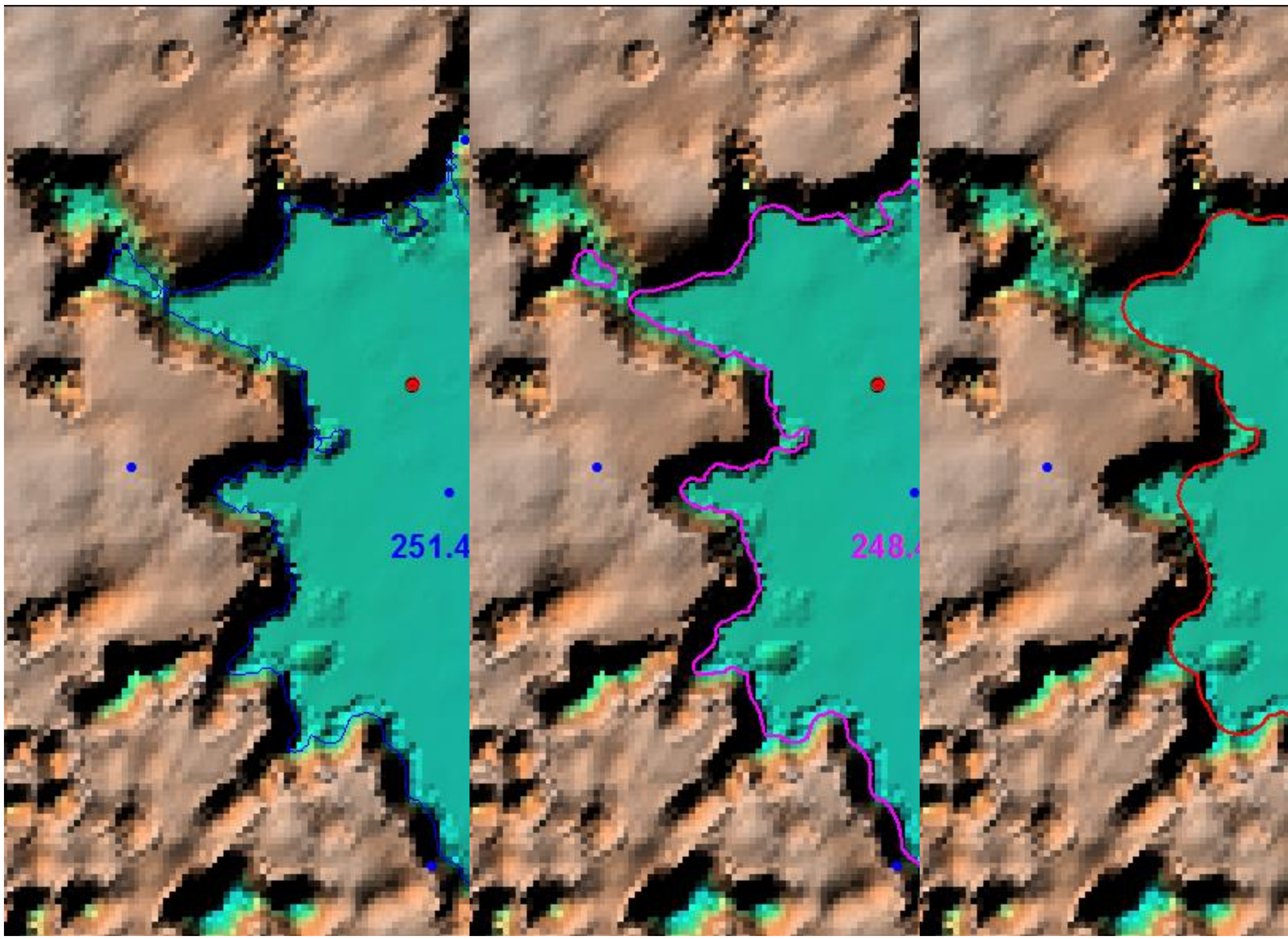


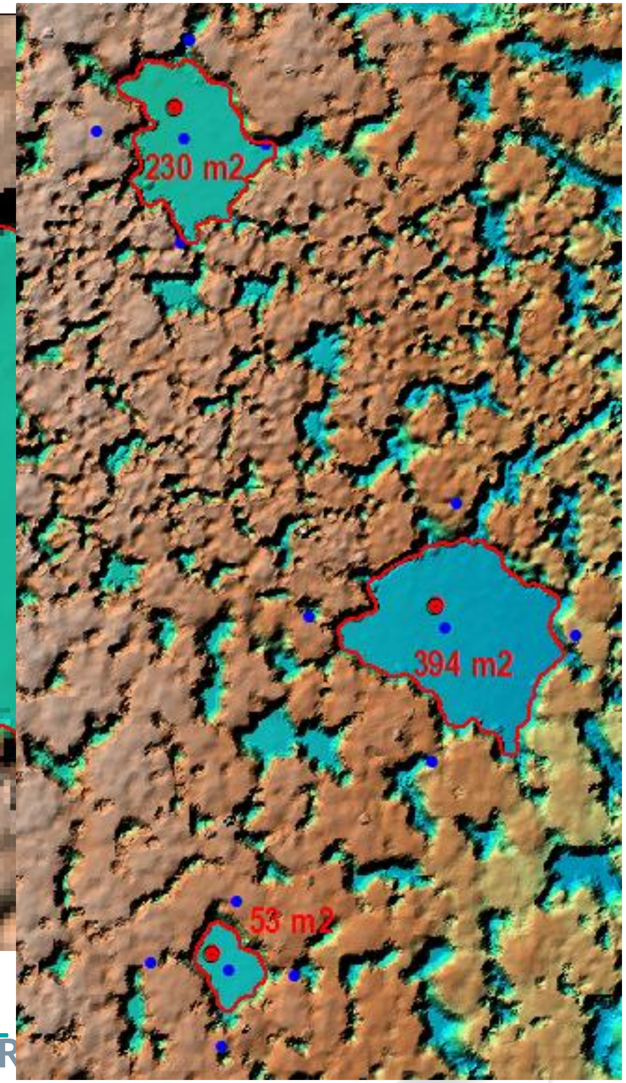
VISIBILITY BASED ON DSM

- Gap L1
- From the middle point
- From 2 m high



SIZES OF THE GAPS BASED ON DSM GENERALIZATION





nDSM=2 m izovonal; eredeti; -0,3 m; +0,3 m

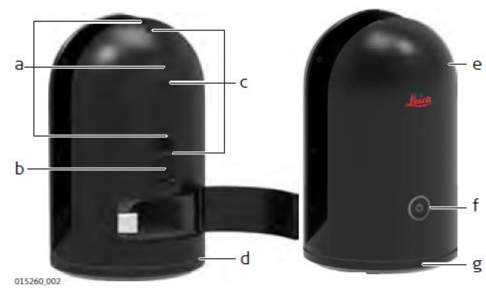
LEICA BLK360

- Announced first in Autodesk University 2016.11.15-17, Las Vegas
- Delivered in December, 2017
- 2nd such device in Hungary
- Small and lightweight (1 kg!)
- 830 nm
- 360° HZ / 300° V
- 0.6 – 60 m range
- 360 kHZ
- 4-6 mm @ 10 m
- Relatively cheap (~16k EUR)

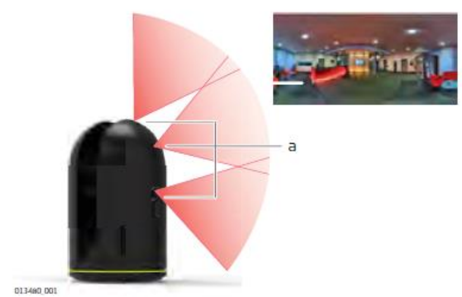
LEICA BLK360

- RGB Camera
  - 2592 x 194
  - 60° x 45° (
  - 5 MP, 3 Can
  - HDR
  - Led Flash
  - 150 MP full
- Thermal Car
  - FLIR
  - 160 x 120 p
  - 71° x 56° (
  - 360° HZ /

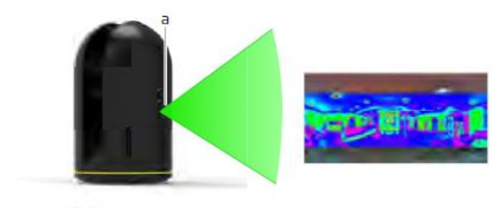
Instrument Components



a Flash light for HDR camera
b Thermal camera (available in special product variant)
c HDR camera
d Ring-shaped LED
e Scanner 360 °
f Power button
g 360 ° WLAN antenna



a 3 cameras



a Thermal imaging (available in special product variant)

SCANNING ON A NFI SAMPLE PLOT 06/01/2018

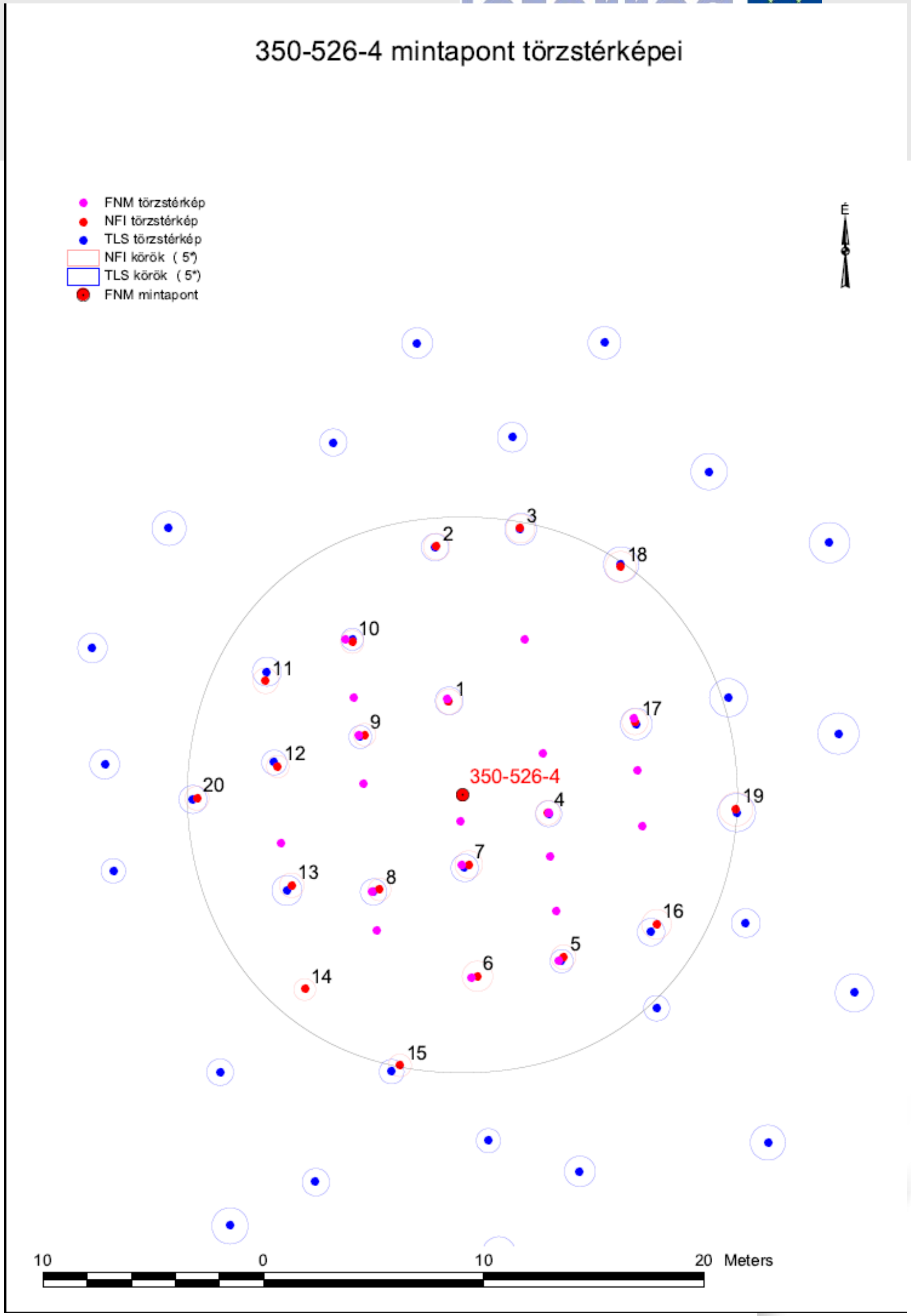
3D POINT CLOUD

RGB

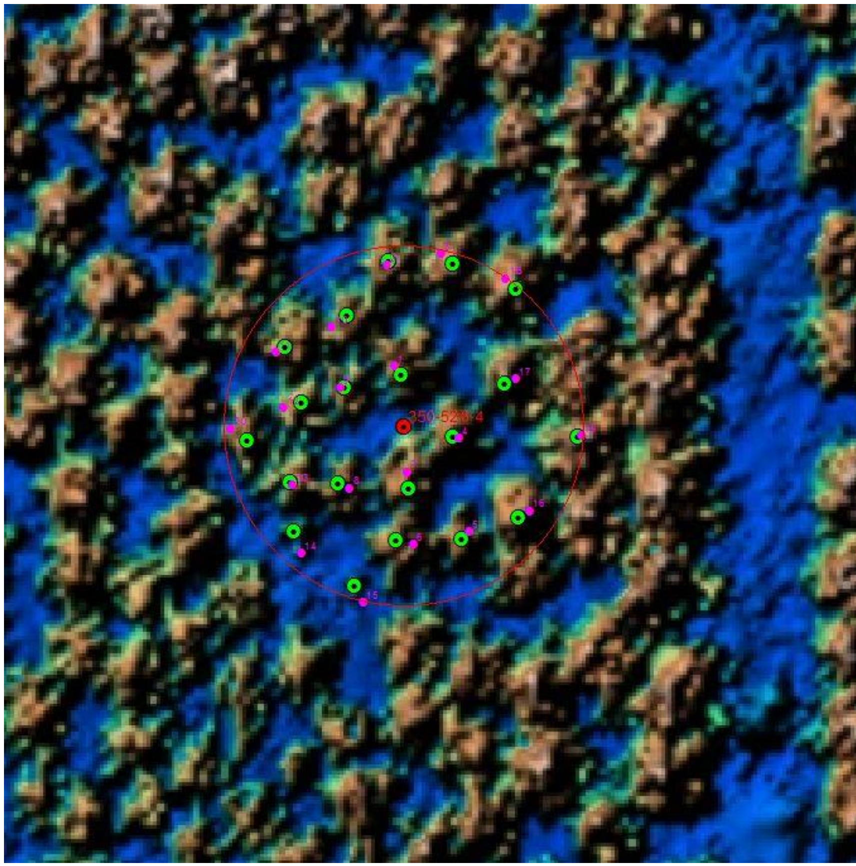
Intensity

RESULTS: STEM MAPS

- Data Preprocessing:
  - OPALS
  - SCOP++
- Data Processing:
  - BROLLY Gábor, KIRÁLY Géza, CZIMBER Kornél: Fejlesztések egyesfák dendrometriai jellemzőinek automatizált meghatározására földi lézerszkenner adatokból.
- Data Evaluation:
  - ESRI, QGIS, Excel
- DBH deviations (cm):
  - Min -2.142
  - Max 5.286
  - mean 1.947
  - Std. dev 2.161



RESULTS: PRECISE STEM MAPS, SINGLE TREE HEIGHTS

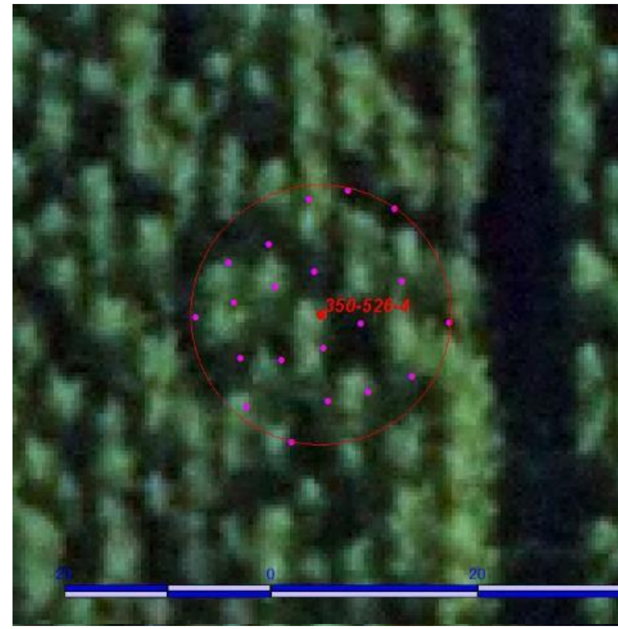


350-526-4
mintapont
az ALS
BFM-mel

É

NFI fak
ALS facsúcsok
FNM Mintapont

40 Meters



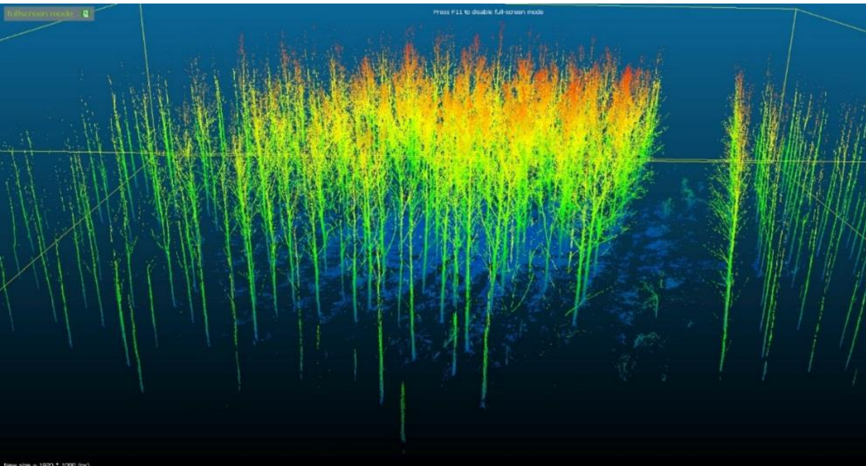
350-526-4
mintapont
a 2015-ös
ortofotóval

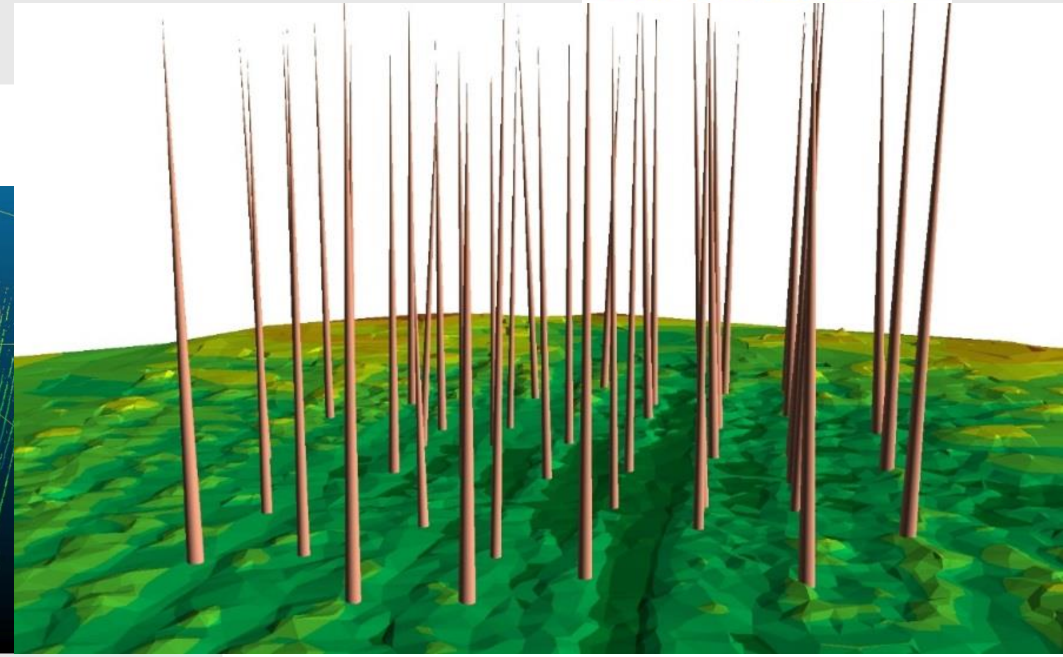
40 Meters

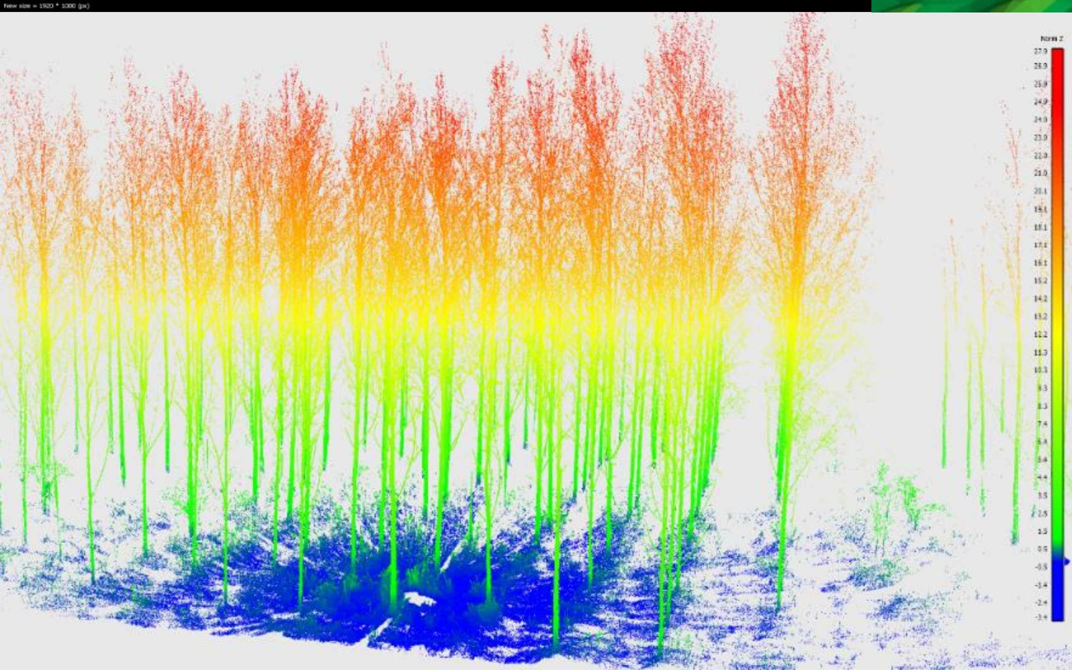
Min	-0.810
Max	2.982
Mean	1.435
Std. Dev	1.02988
n	18

RESULTS: SINGLE TREE MODELLING

3D Point Cloud



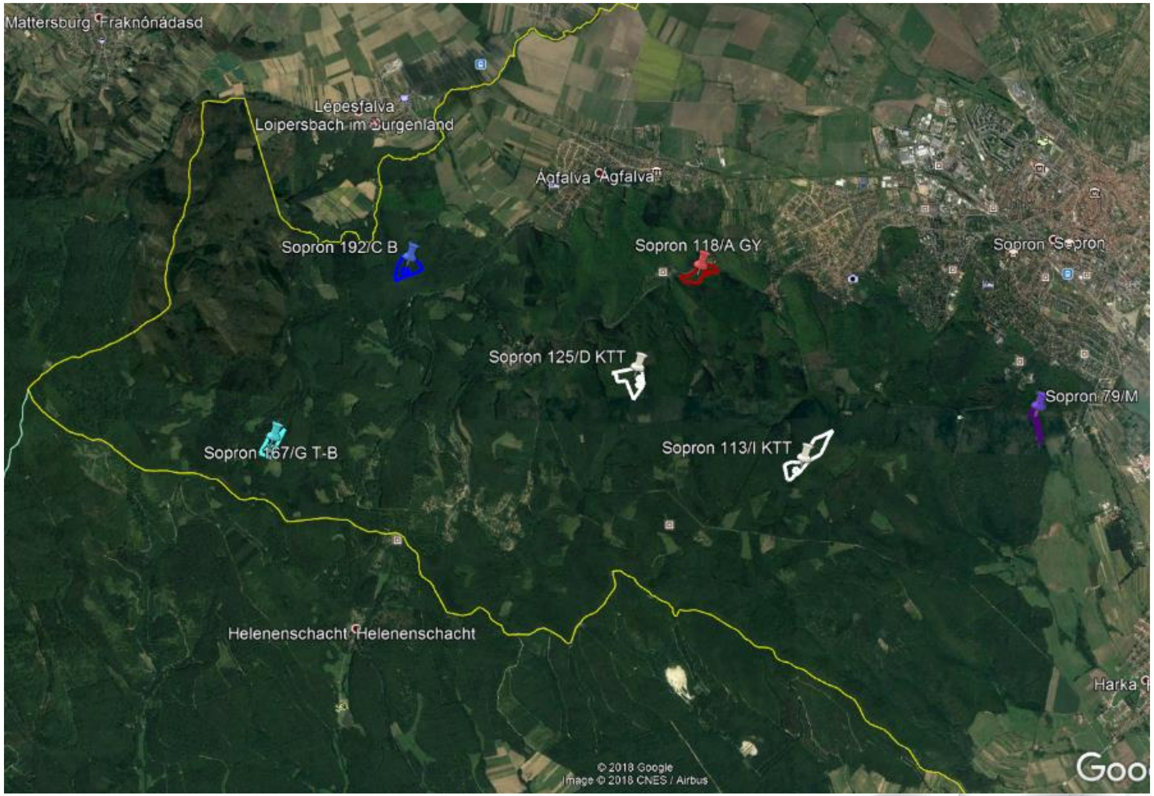




- DTM
- Tree models
  - **Position**
  - **DBH**
  - **Leaning**
  - **Height**

NAIK-ERTI LONG-TERM EXPERIENCE SAMPLE SITES

- Started in the 50-ies
- Standardised since 1962 (Birck et al. 1962)
- Forest management and wood production
- ~ 50 * 50 m parcels
- Numbered tree (But no positions)
  - Species,
  - DBH
  - H
  - Management and height classes



ERTI KTT-391
09/03/2018

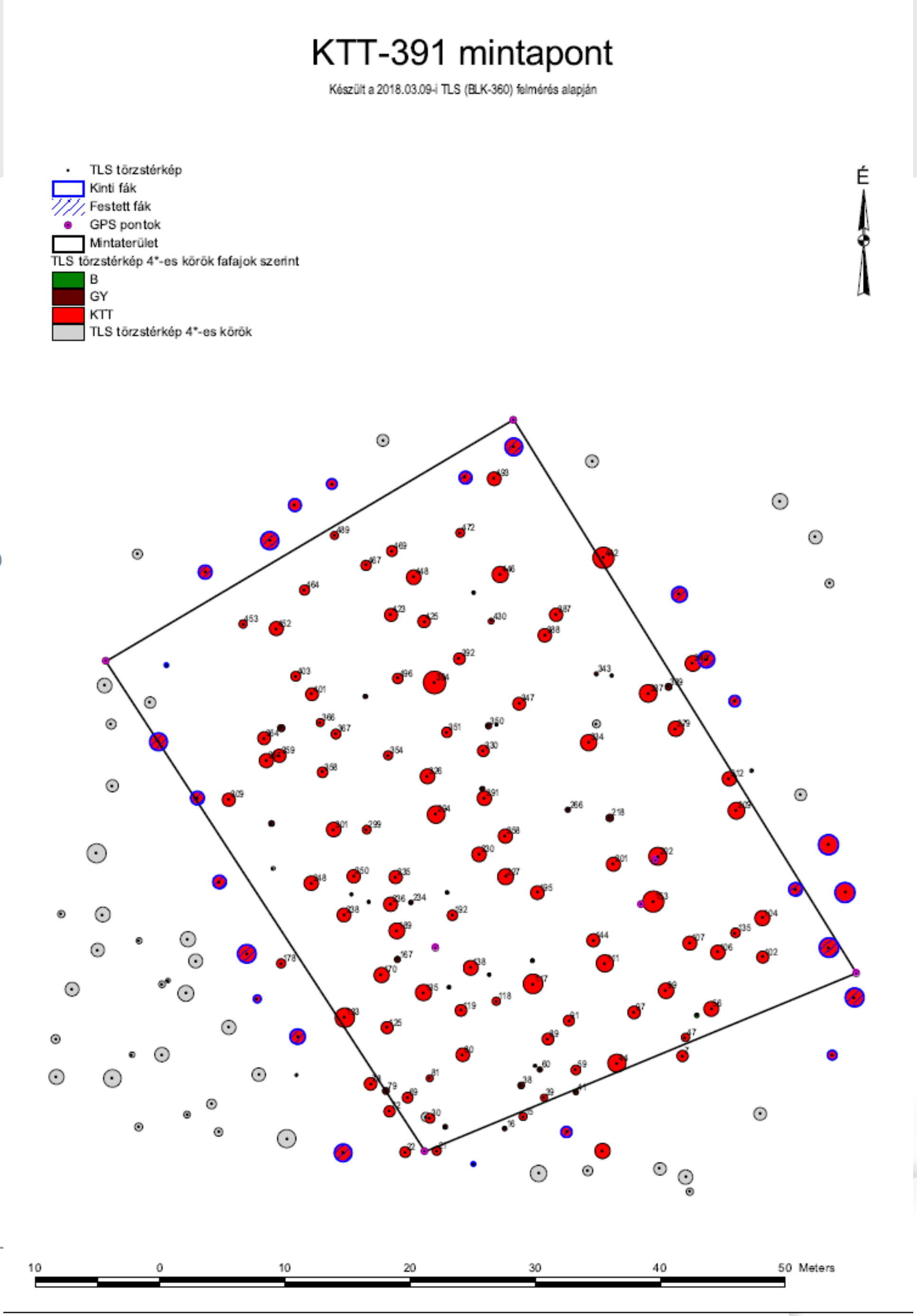
3D POINT CLOUD DETAIL

RGB
very low dynamic range

Intensity
numbers are visible

RESULTS: STEM MAP

- Automatically detect 104 stems
- From 148



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parcul national PIATRA CRAIULUI

stowarzyszenie ekopsychologia

DUNA-IPOLY NEMZETI PARK 1997

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Bílé Karpaty

Workshop on innovative methods in conservation planning
Királyrét, Hungary | 17-19th September 2019

Use LIDAR to estimate the amount of wood briquettes produced during bush clearing

Gábor Takács (FHNPD) – Géza Király Phd (US)

INTRODUCTION

We are planning grassland reconstruction on 496 ha on the pastures and meadows around Lake Fertő

Main goals:

- Restorate natural grassland habitat with native shrub patches and forest belt

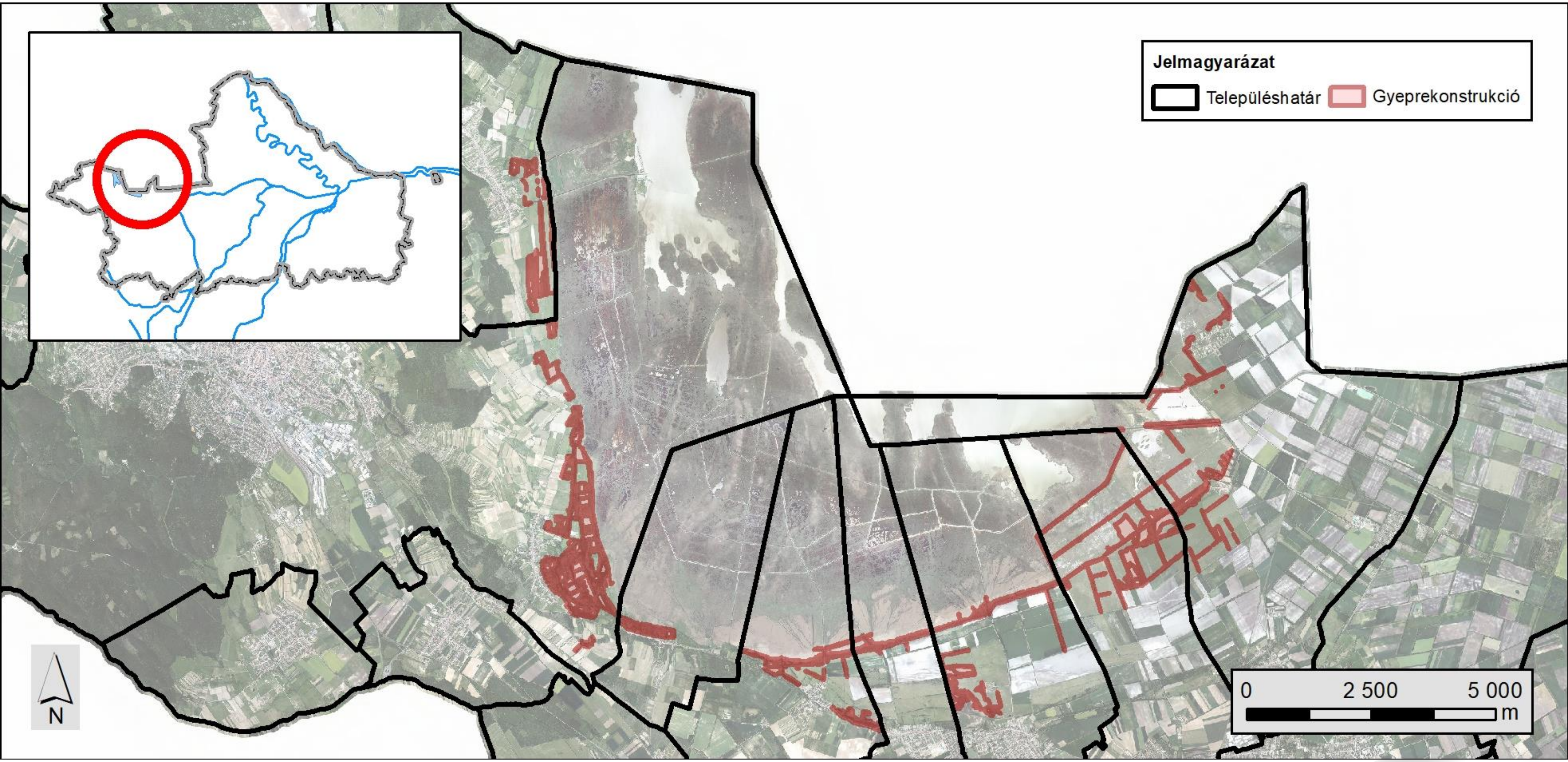
Means:

- Eliminate invasive trees and bushes from grassland and from ditches and roads between grasslands
- Suppress native bushes

Significant amount of harvested wood and wood briquettes are expected and should be estimated (eg deposition area needed)

Traditional forestry methods are inadequate

THE PROJECT AREA



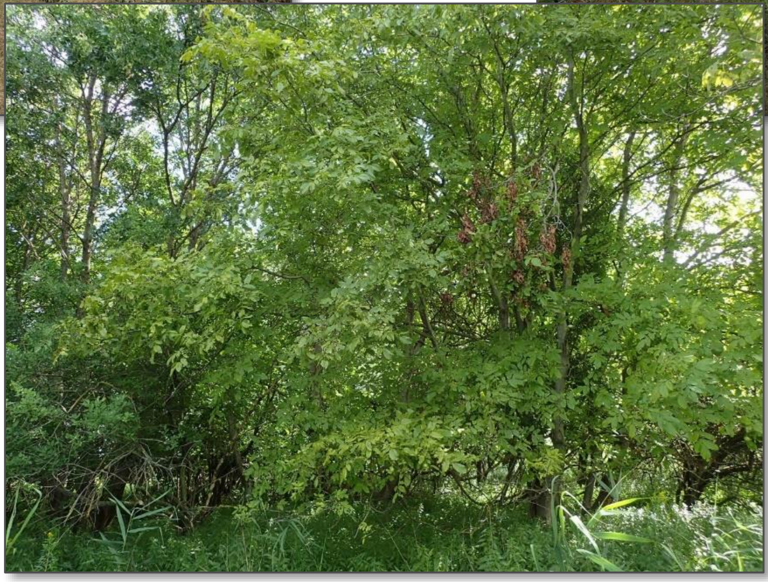
ABOUT THE RESTORATION

Variety of covers (individually, in groups, closed)

Main types of shrubbery:

- Homogeneous, closed Russian olive, old trees, dense, impassable
- Individually or groups of Russian olive
- Homogeneous, closed Common dogwood
- Common dogwood with Russian olive
- Red ash forrest and youthful
- Carpathian walnut (Juglans regia)
- Native alley, with invasive trees

ABOUT THE RESTORATION



METHOD

A LIDAR survey of the project area was prepared in 2017

- Avr. point density: 5,6 point/m2
- Min. point density : 5,6 point/m2
- Avr. point distance: 0,45 m
- Min. overlap of bands: 15 %
- Expected vertical accuracy: 0,06 m

The vegetation height (nDSM) can be calculated from the surface model (DSM) and the terrain model (DTM).

Coverage: 98,8%

OVERVIEW OF THE SURVEYED AREA

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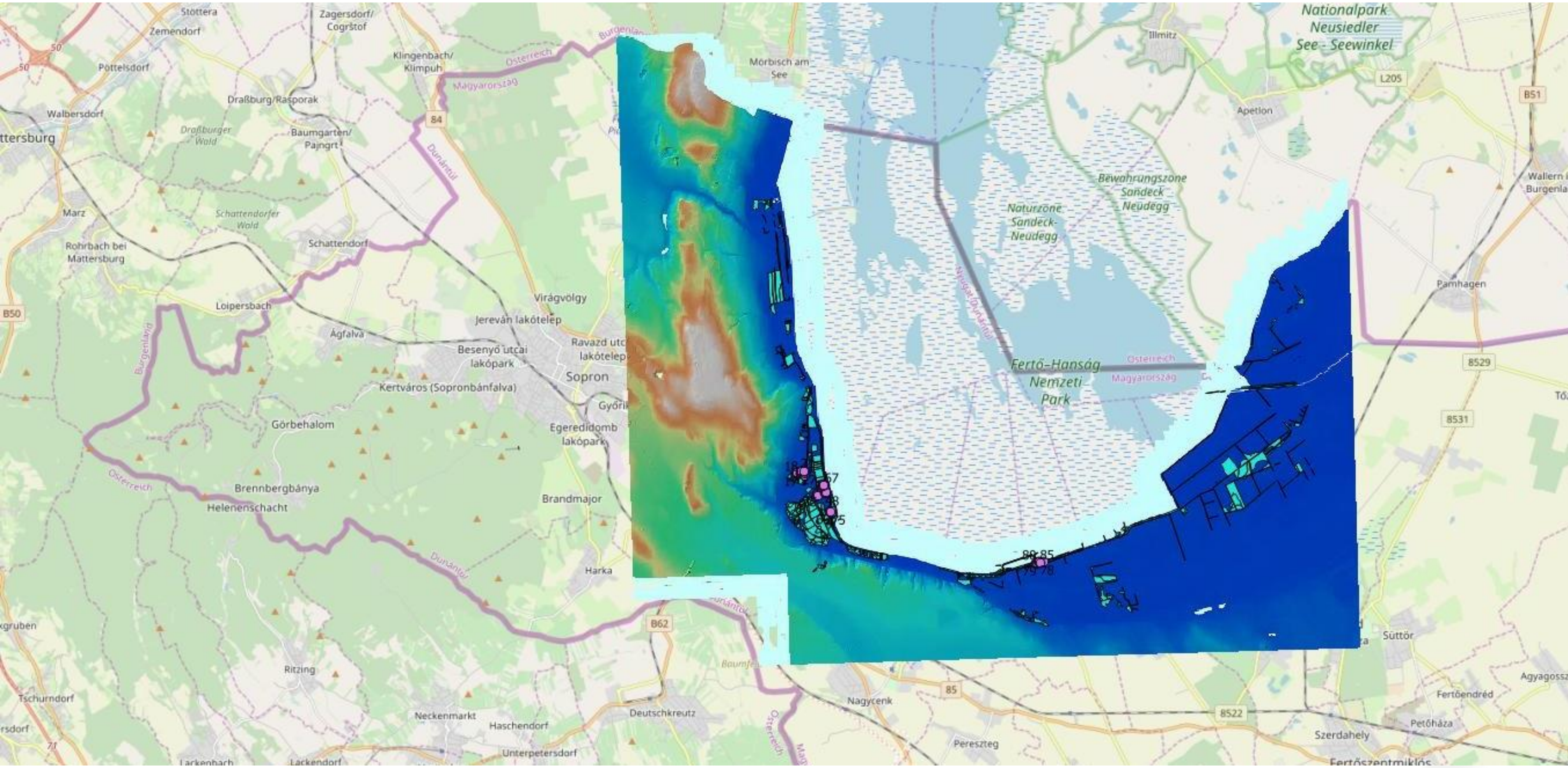
European Union European Regional Development Fund
Centralparks



METHOD

We only work with those areas,

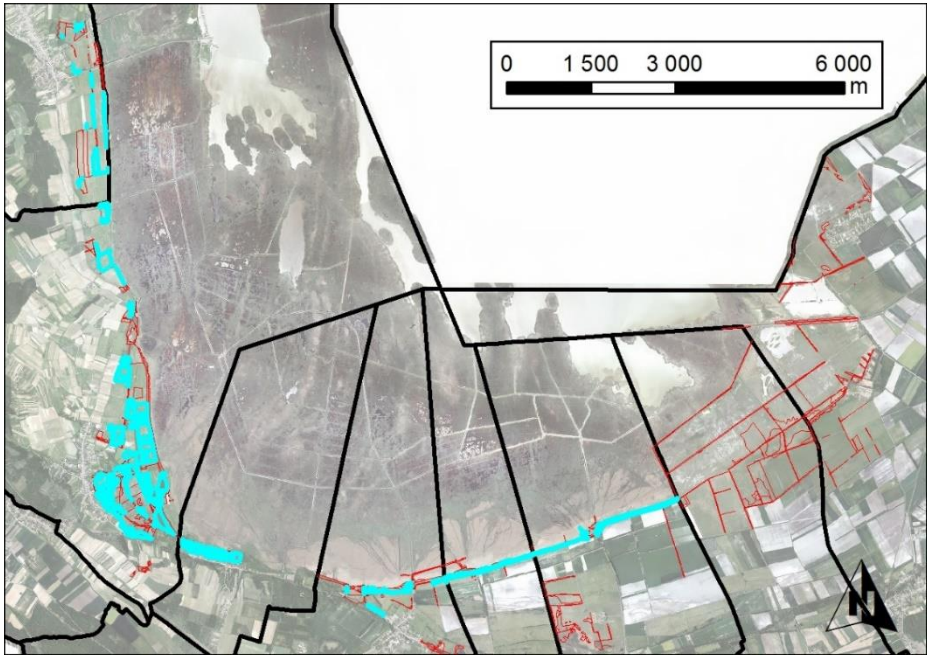
- which affect the whole area
- where the shrub cover is significant

We didn't care:

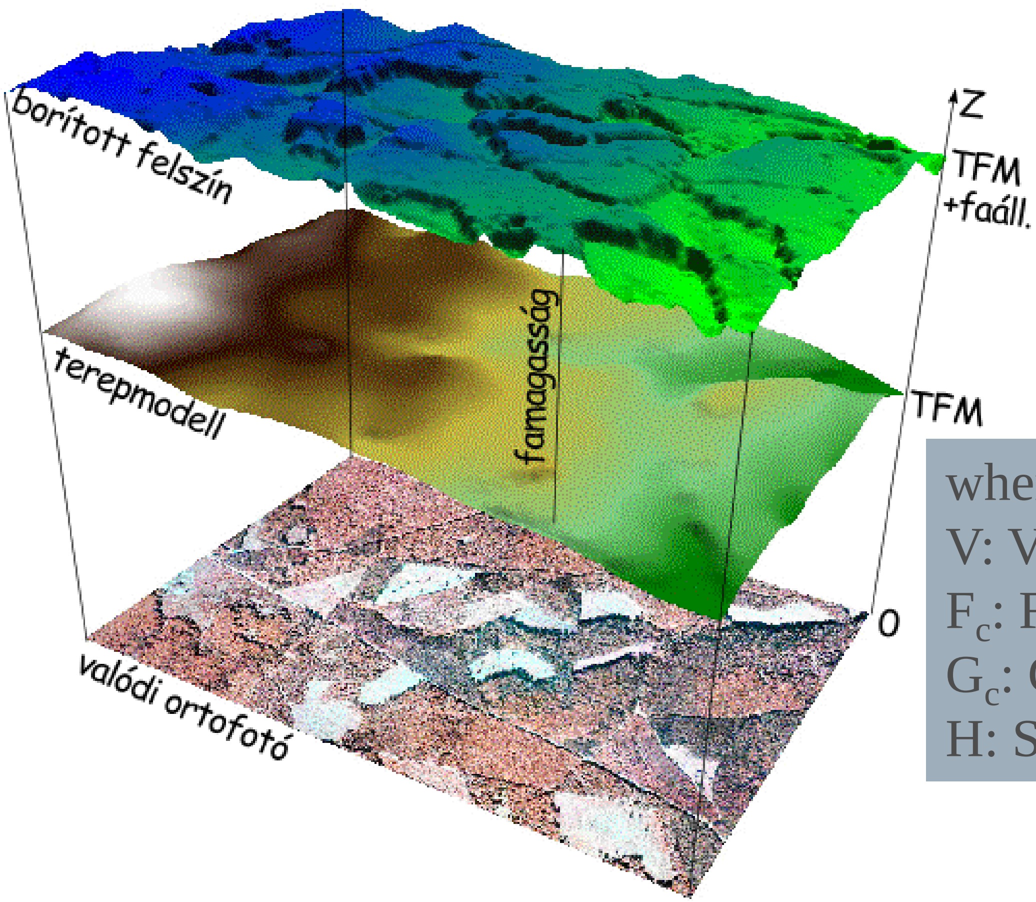
- Areas with low shrub cover
- Trees in alleys

121 examined habitat patch from 538

130,3 ha from 496



NORMALIZED DIGITAL SURFACE MODEL – CANOPY HEIGHT MODEL (nDSM – CHM)

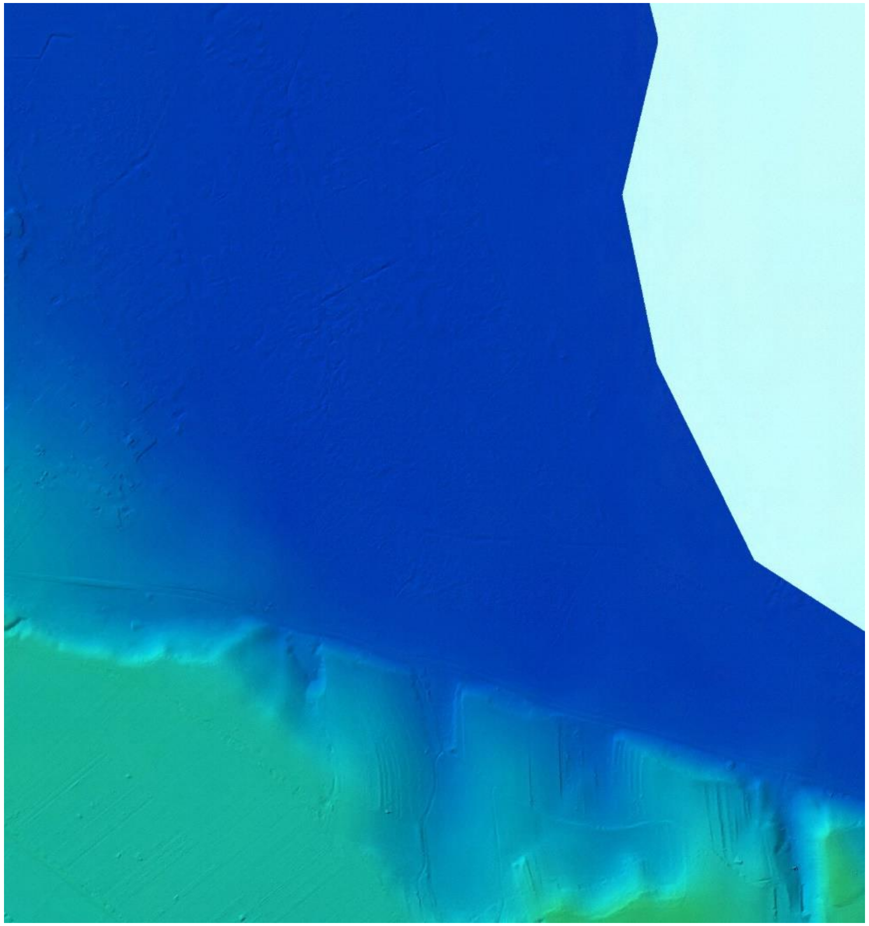


$$nDSM = DSM - DTM$$

$$V = F_c \cdot G_c \cdot H$$

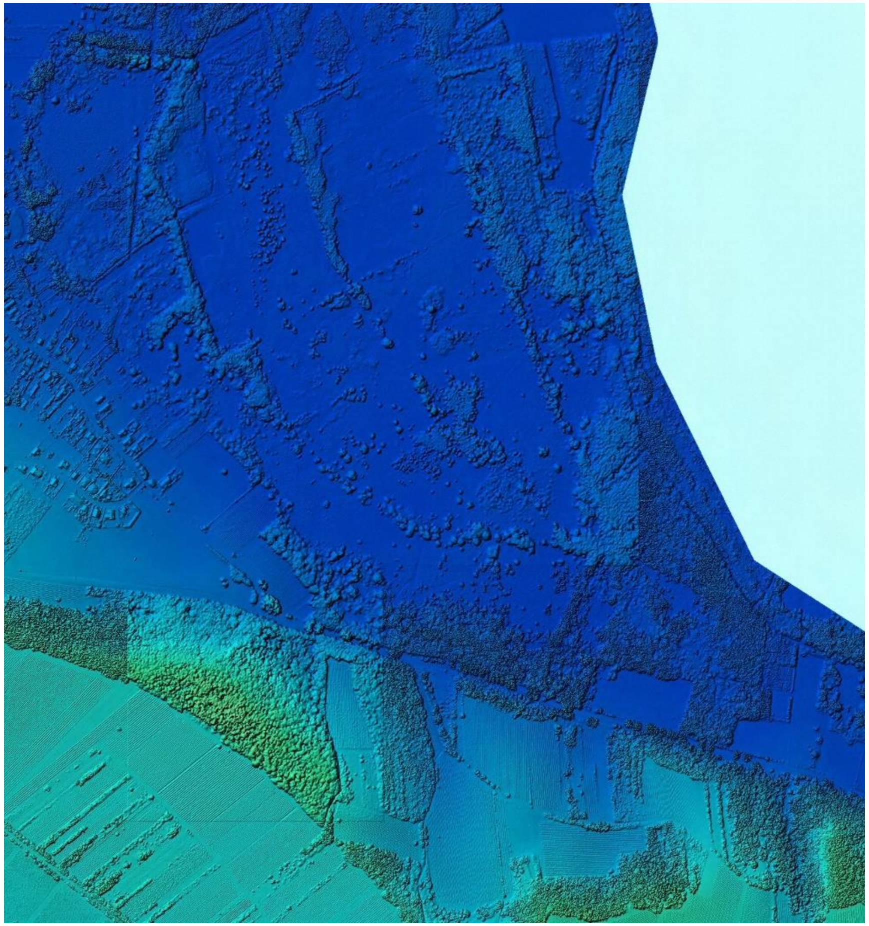
where:
V: Volume of the stand (m^3)
F_c: Form number
G_c: Crown projection area (m^2)
H: Stand Height (m)

DIGITAL TERRAIN MODEL (DTM) DETAIL



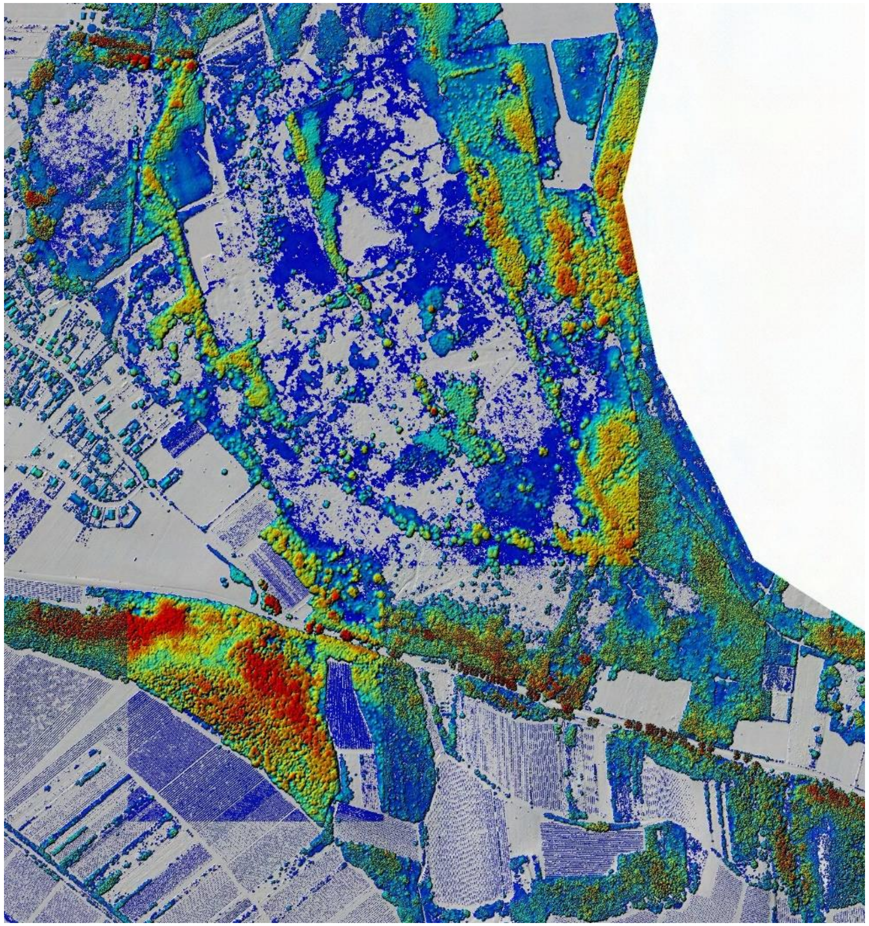
Creating DTM using the last echoes, filtering and interpolations

DIGITAL SURFACE MODEL (DSM) DETAIL



Creating DSM using first echoes and interpolations

NORMALIZED DIGITAL SURFACE MODEL (nDSM)

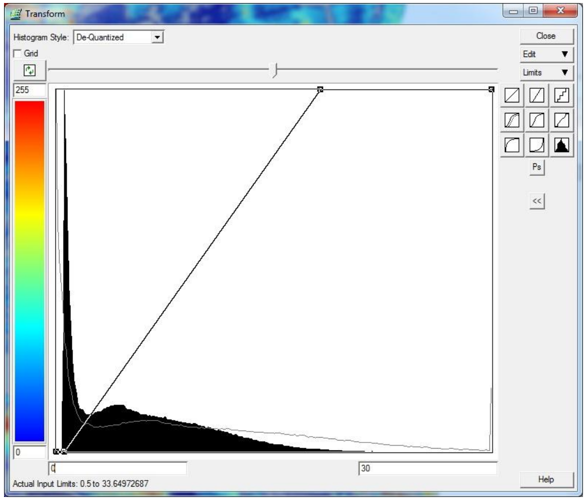


Creating the nDSM:

nDSM = DSM – DTM

Describing vegetation (and other objects) height

Colouring above 0,5 m to 30 m



RESULT

Volume of vegetation on 121 patches: 5.603.432 m^3.

FID	COUNT	AREA	MIN	MAX	RANGE	MEAN	STD	SUM
104	51256	51256	-0,028	19,1471	19,1751	8,8754	3,1299	**454915,0313**
141	69401	69401	-0,2439	18,8506	19,0945	4,814	3,6416	**334093,5313**
142	60649	60649	-0,145	15,8158	15,9608	5,0304	2,8642	**305090,4375**
459	29057	29057	0	19,9932	19,9932	9,1022	4,3627	**264483,0625**
145	33507	33507	-0,1852	33,1453	33,3305	7,4701	4,914	**250301,6094**
429	48053	48053	-0,1132	23,1936	23,3068	4,4208	3,2524	**212430,8906**

DETERMINE THE REAL AMOUNTS

- Trial cuts to determine the real amount of wood to be harvested and wood briquettes
- 6 sample plots
- In the most typical habitat types

DETERMINE THE REAL AMOUNTS

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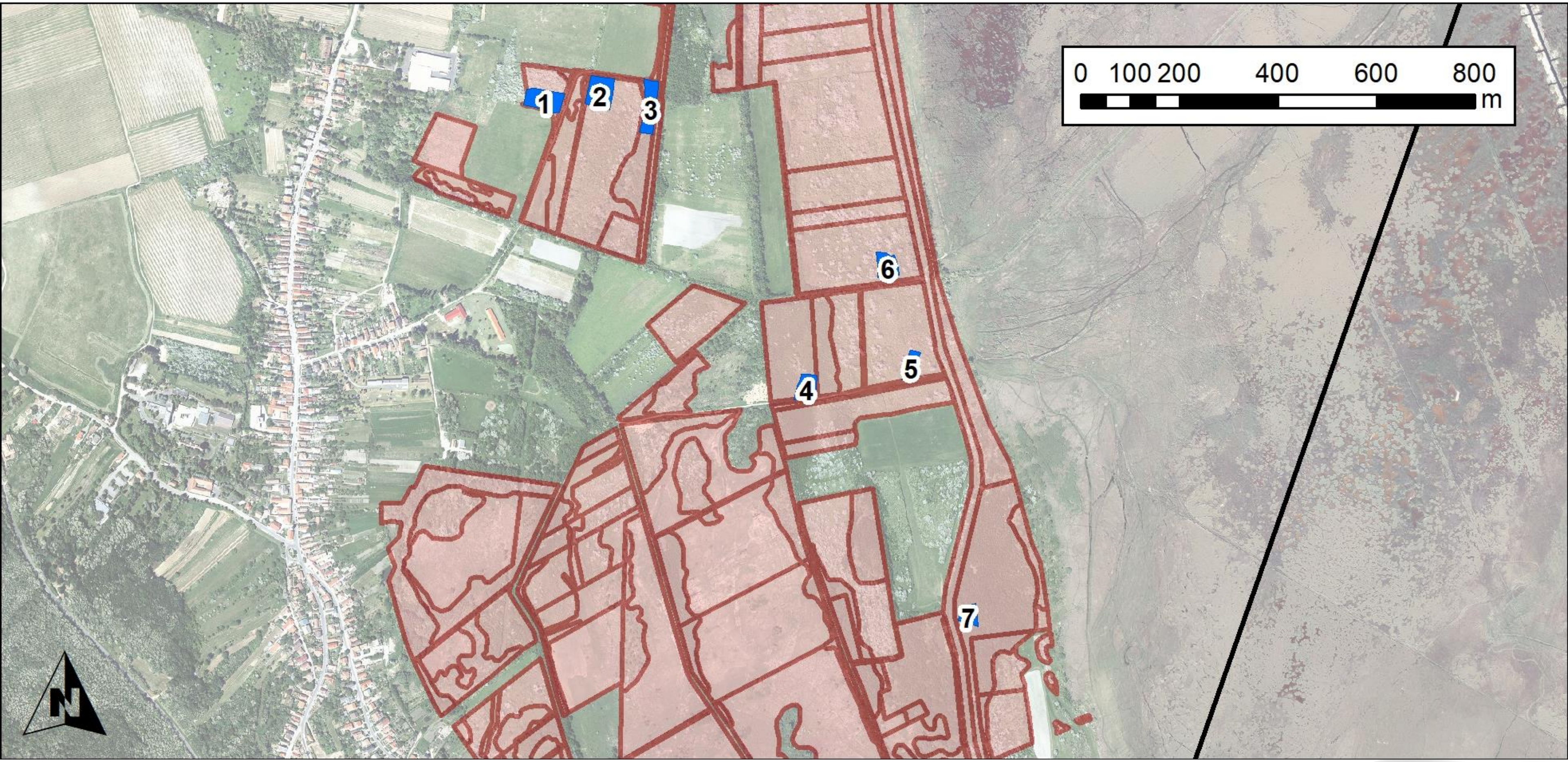

DETERMINE THE REAL AMOUNTS

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The result is a multiplier that tells you how the volume of vegetation in a particular type relates to the amount of briquettes.

Type	Description	Area (m^2)	NDSM m3	Harvested wood cubage (ürm)	Briquettes (ürm)	Multiplier Máglya/ NDSM
1	Russian olive (*Elaeagnus angustifolia*)	2938	15363	633,75	140,40	**0,0413**
2	Russion olive groves	3207	9637	367,50	71,76	**0,0381**
3	Thick AK	2741	24351	337,50	166,92	**0,0139**
4	Thick AK	1893	11893	397,80	88,92	**0,0334**
5	Common dogwood (*Cornus sanguinea*)	1216	2927	138,00	31,20	**0,0471**
6	Mixed Russian olive and common dogwood	1906	6819	216,00	46,80	**0,0317**

RESULT

The 121 areas examined were classified to the 7 sampling areas

From here you can determinate the required minimum quantities by a simple multiplication

Quantity of wood to be harvested min. **213.228** ürm (1x1x1,3 m)

Expected amount of briquettes min. **36.763 m^3** (~5913 atrotonna)

But..

Few sample areas are a source of error

Significant amounts of wood can also come from unrated areas.

SUMMARY

- The method is suitable for determining the amount of wood to be harvested.
- The method is suitable for determining the amount of briquettes produced.
- Primarily useful in large areas.
- Increasing the number of plots can give more accurate results.

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Thank you for your attention

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Fertő-Hanság Nemzeti Park

SOPRONI EGYETEM

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Vzdělávací a informační středisko, o.p.s. Bílé Karpaty

Workshop on innovative methods in conservation planning
Királyrét, Hungary | 17-19th September 2019

A novel multi-purpose forest state assessment methodology to support conservation and forest management planning and monitoring

Centralparks / Eötvös Loránd University, Budapest / Tibor Standovár

MOTIVATIONS

Long-term maintenance of protected forests and their species can only be assured if relevant management plans are built upon sound information about their conservation status

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Long-term maintenance of protected forests and their species can only be assured if relevant management plans are built upon sound information about their conservation status

To achieve this we need data on adequate themes (i.e. reflecting those characteristics that are important for forest-dwelling species) at appropriate spatial and temporal scales

MOTIVATIONS

Long-term maintenance of protected forests and their species can only be assured if relevant management plans are built upon sound information about their conservation status

To achieve this we need data on adequate themes (i.e. reflecting those characteristics that are important for forest-dwelling species) at appropriate spatial and temporal scales

However, we miss this information !

LIMITS OF EXISTING INFORMATION

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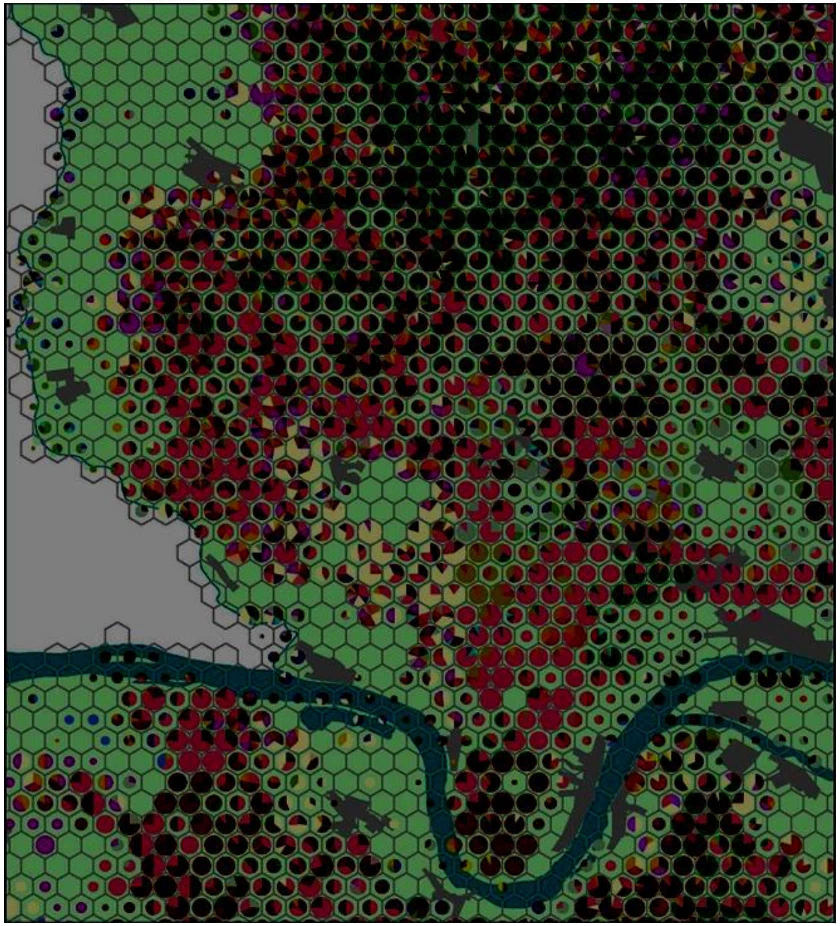
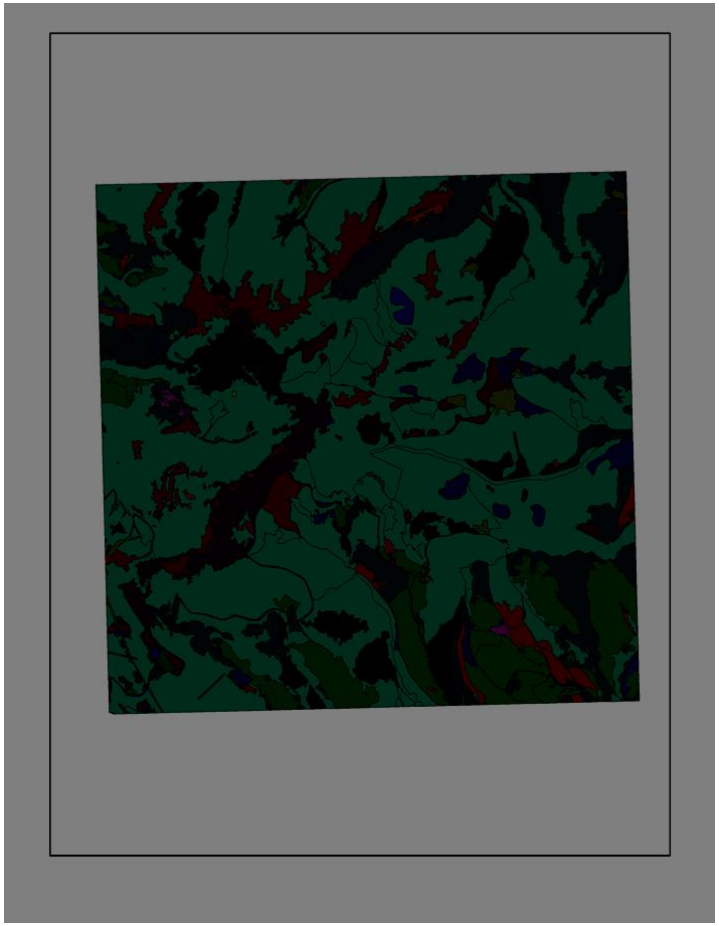


- MÉTA hexagon maps

LIMITS OF EXISTING INFORMATION



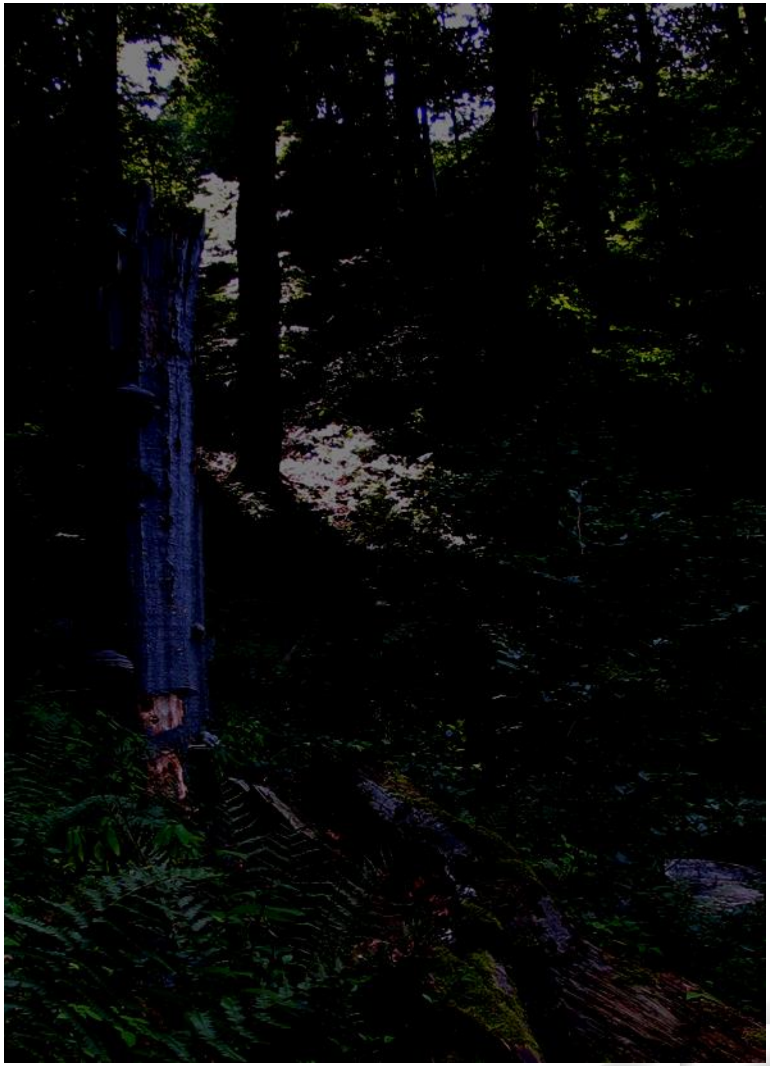
- Traditional vegetation or habitat maps

LIMITS OF EXISTING INFORMATION

- Forest management plan maps

LIMITS OF EXISTING INFORMATION

- MÉTA hexagon map
- Traditional vegetation or habitat maps
- Forest management plan maps
- All lack the information reflecting the difference between forests of high versus low conservation value



1. DEVELOPMENT OF FOREST STATE ASSESSMENT METHODOLOGY

The vision from the very beginning:

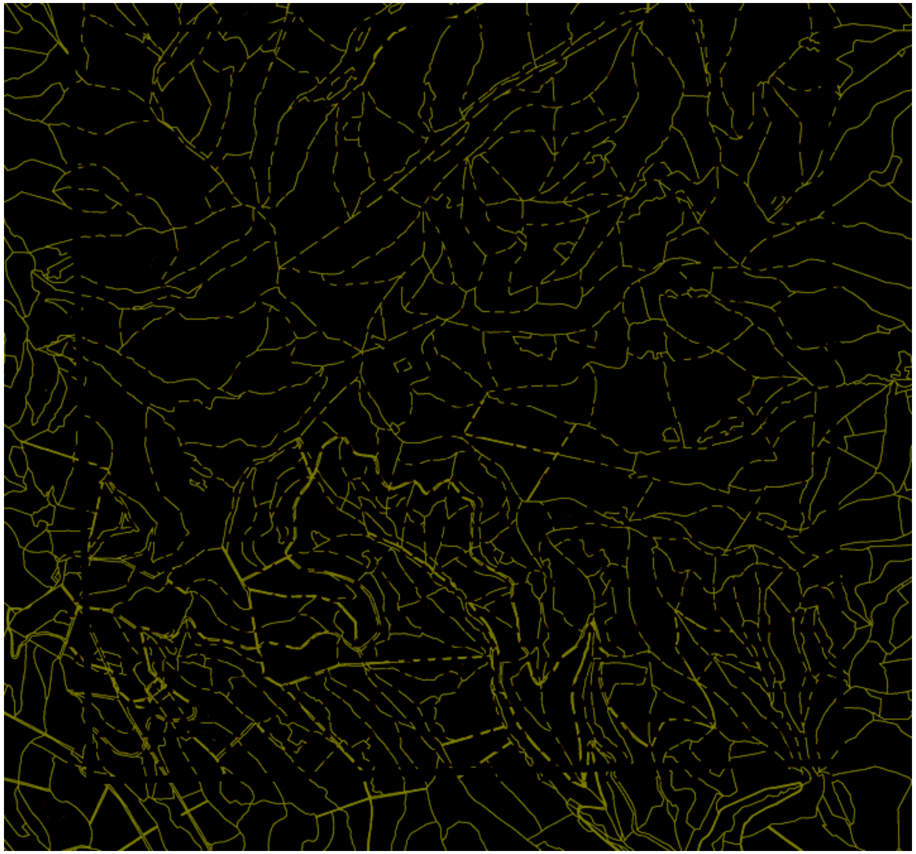
- To provide supplementary information for forest management and conservation planning
- To support Natura 2000 habitat status assessment
- To build better collaboration between different actors by including them from the planning process
- To build a monitoring scheme for testing the efficiency of management actions

1. IMPORTANT STEPS OF DEVELOPING OUR FOREST STATE ASSESSMENT METHODOLOGY

- Explore the applicability of available information sources (forest inventory, remotely sensed data)
- Decide on and device field-forms for necessary data
- Check time and labour requirements on test sites for different sampling intensities
- Finalise the protocol
- All these took us a bit more than a year

1. DEVELOPMENT OF FOREST STATE ASSESSMENT METHODOLOGY

- Systematic sampling
- Several themes (attributes) to record
- Generation of independent thematic maps showing different aspects of forest structure and function



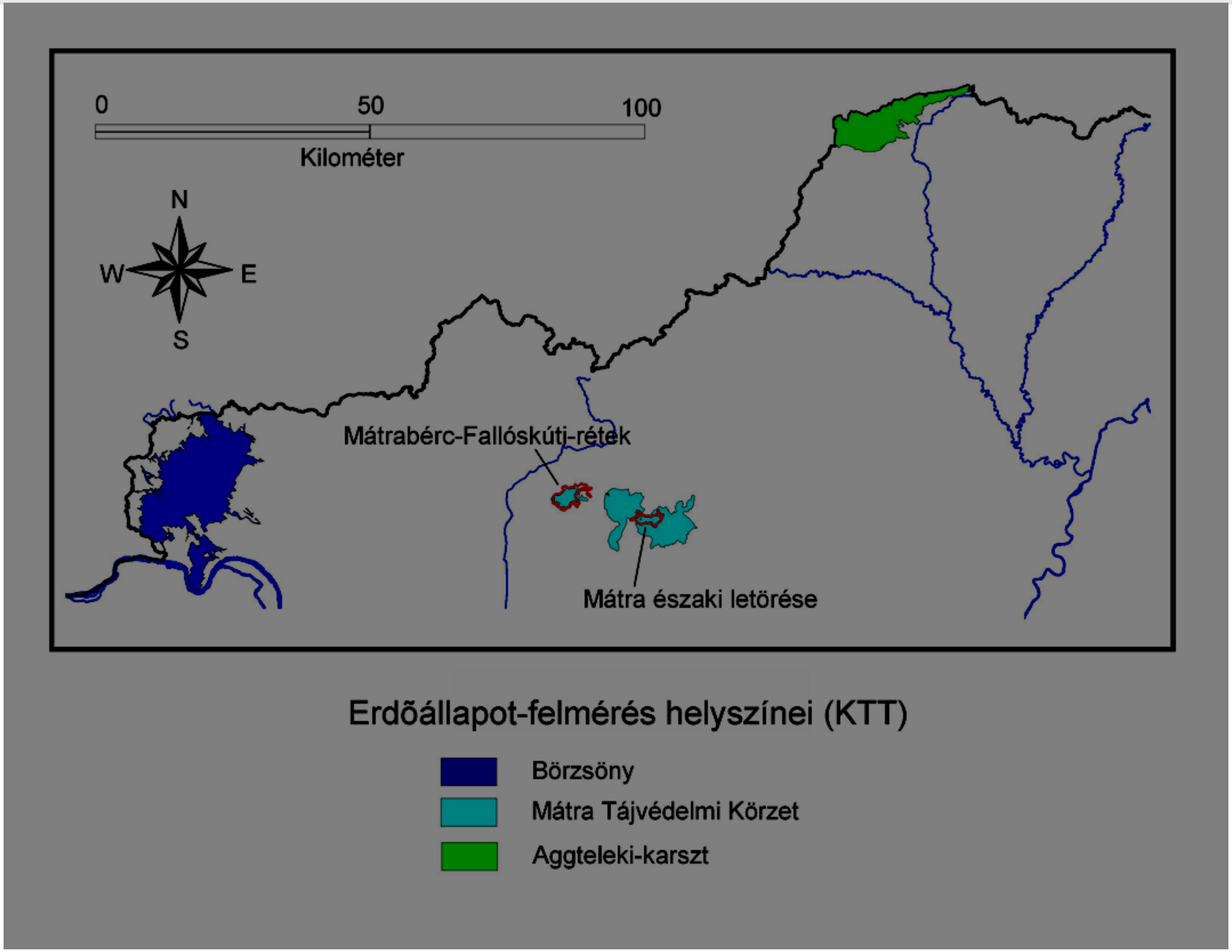
2. FOREST STATE ASSESSMENT

- The staff consist of 3 researchers (2 full-time and myself), one database expert and one part-time research assistant
- Android application was written by a hired programmer
- This group is responsible for the whole forest state survey from method development to assisting field survey to data quality checking and data analyses

2. FOREST STATE ASSESSMENT

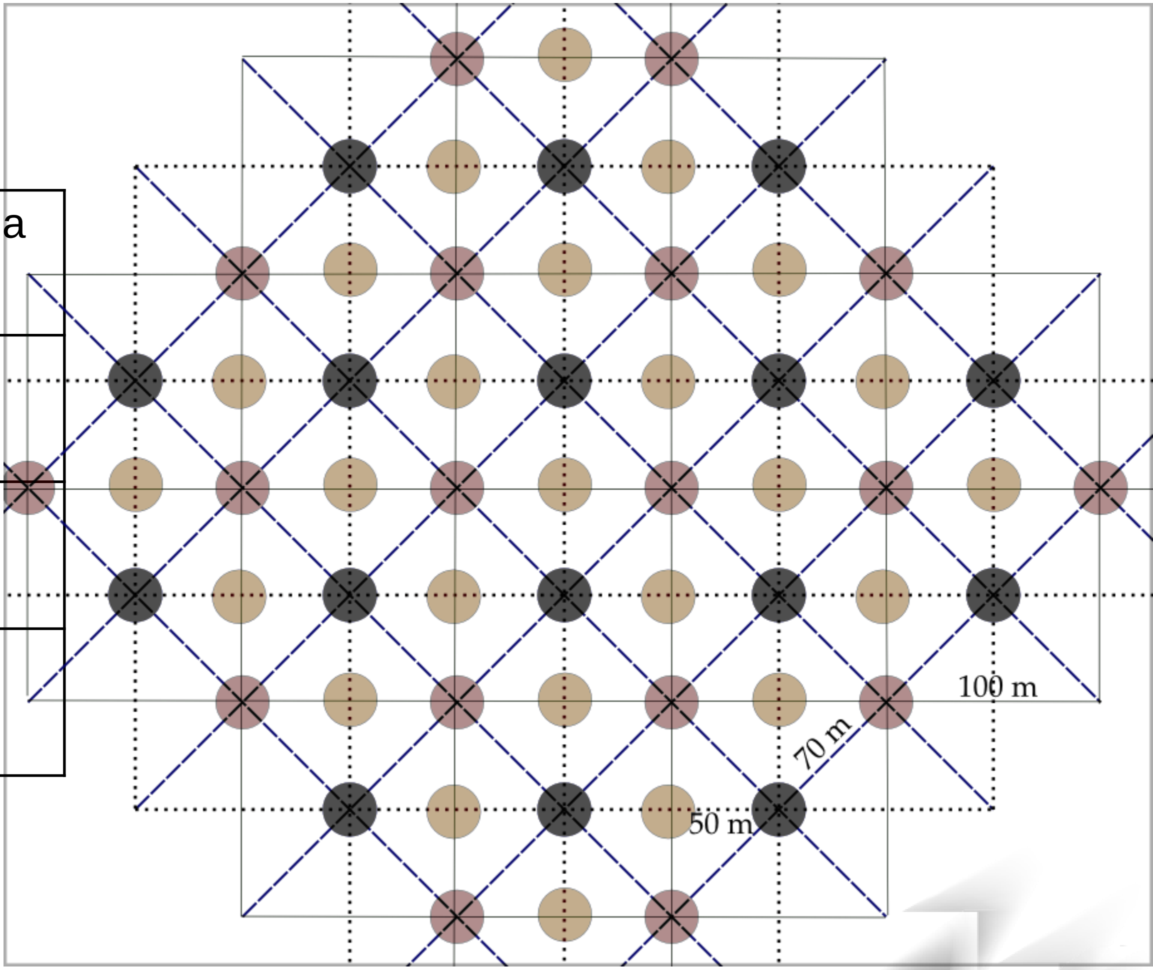
- Training of field crew (close to 100 applicants at different stages, 34 certified people)
- The commitment is to accomplish the field mapping securing full coverage on cc. 50.000 hectares during 3 field seasons
- In spite of facing difficulties we managed to accomplish the task

2. SAMPLING AREAS OF FOREST STATE ASSESSMENT

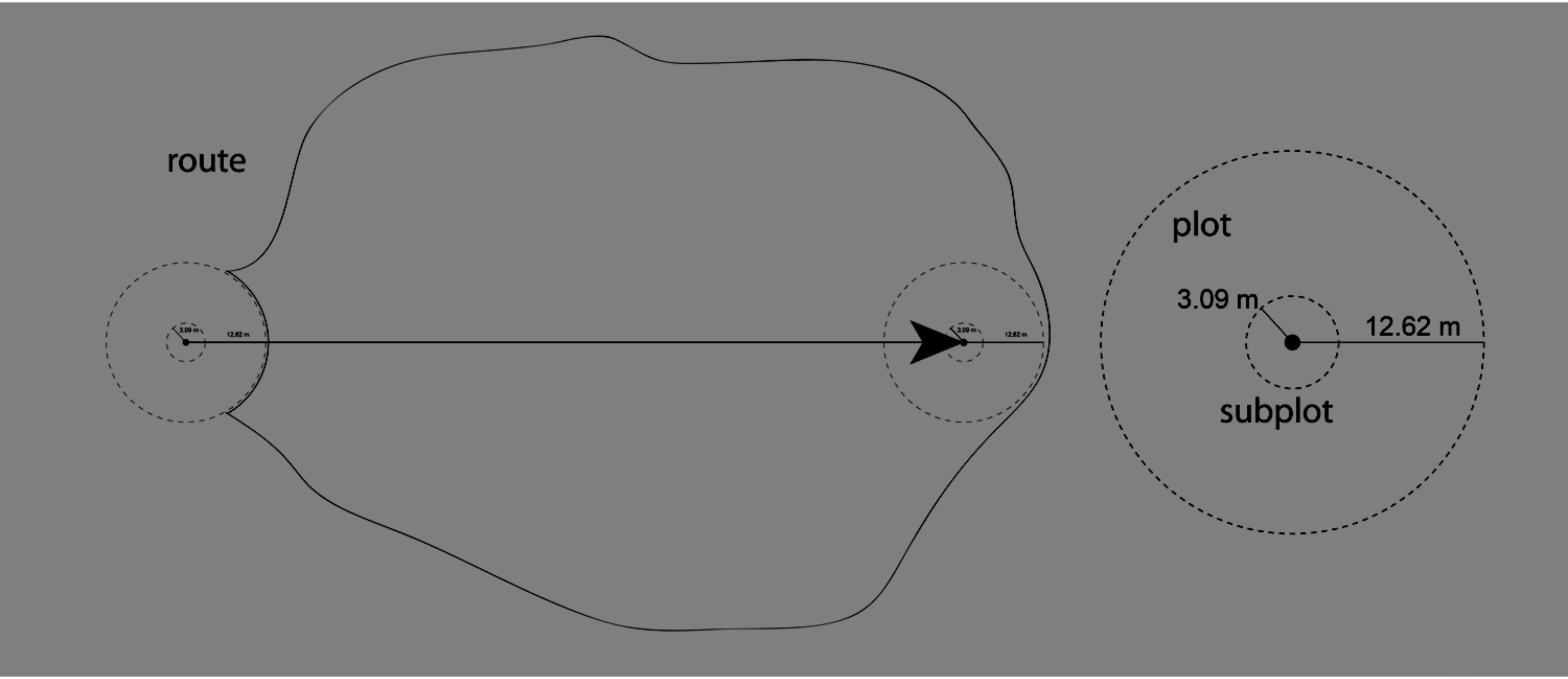


SYSTEMATIC SAMPLING GRID

Frequency	represented area	Point / ha
50 m	2.500 m^2 20%	4
70 m (70,71m)	5.000 m^2 10 %	2
100 m	10.000 m^2 5 %	1



SAMPLING UNITS



PLOT VISUALLY ESTIMATED

(trees near the edge measured)

PLOT VISUALLY ESTIMATED

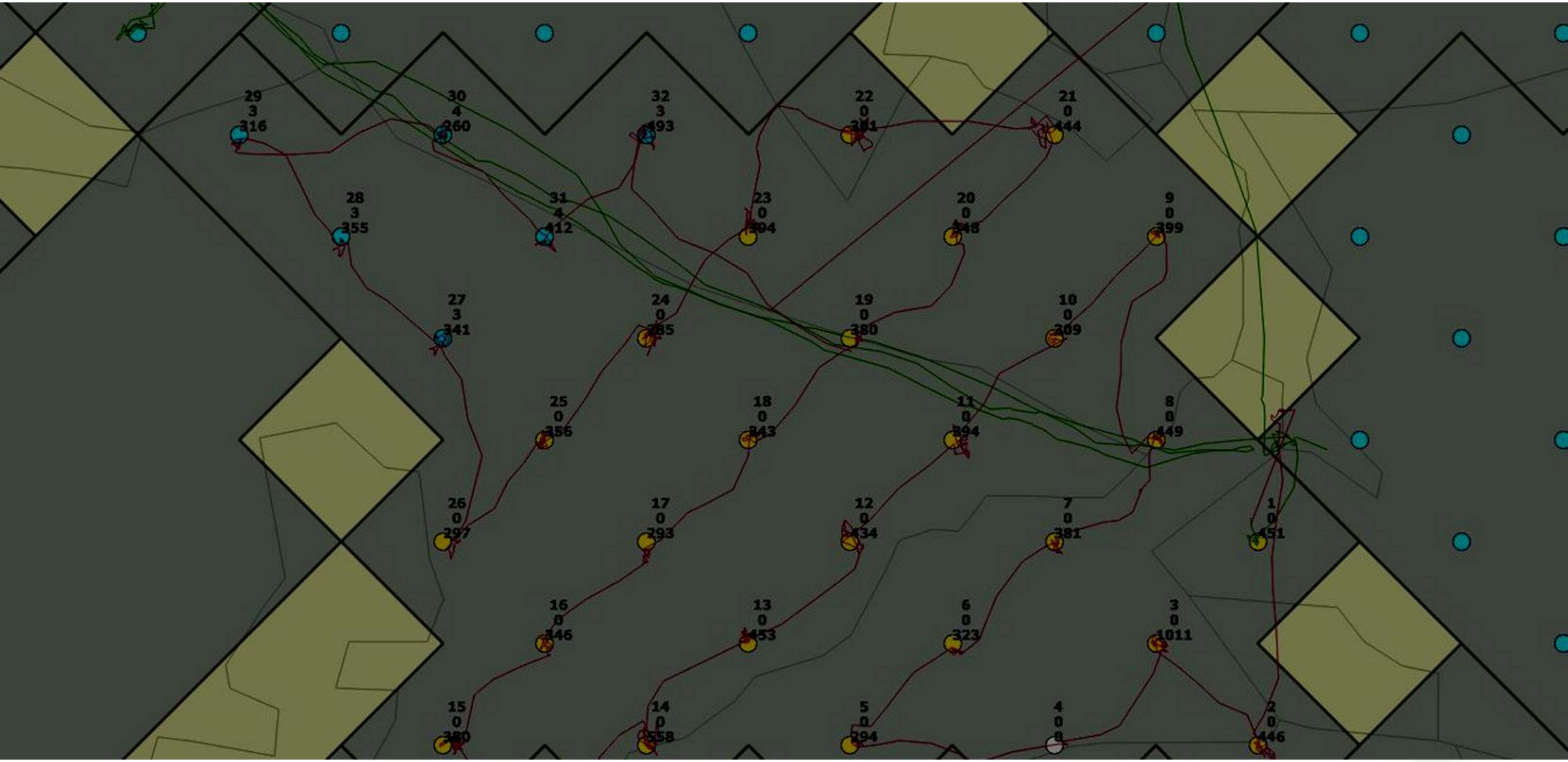
(trees near the edge measured)

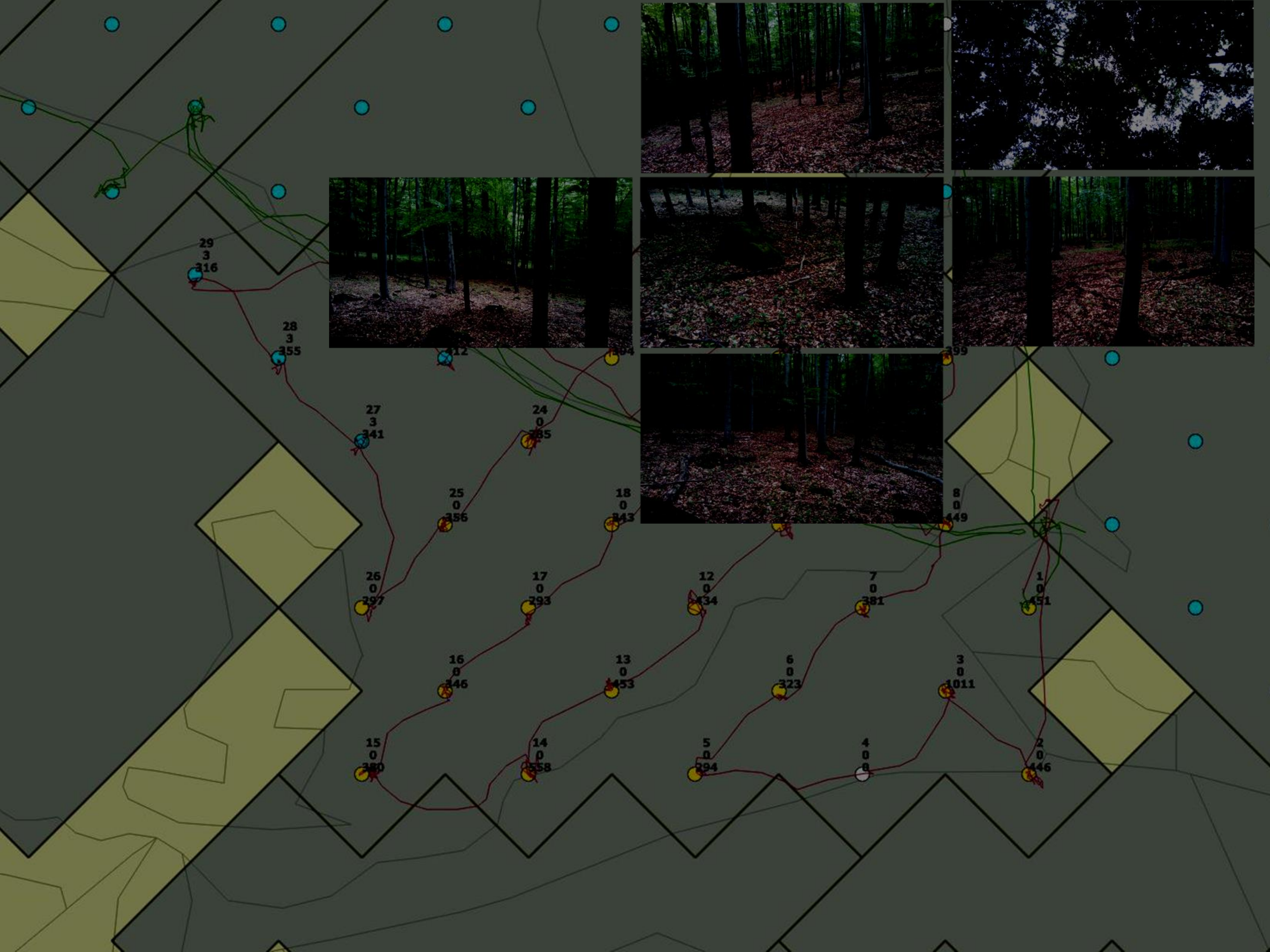
VARIABLES IN THE PROTOCOL

variable group	description
route variables	site related microhabitats, agressive tree species etc.
canopy	cover of species in diameter classes
standing dead trees	number in diameter classes, decay, species
down dead wood	quantity and diameter, decay, species
herbs	herb cover, dominant, site and disturbance indicators, adventive

VARIABLES IN THE PROTOCOL

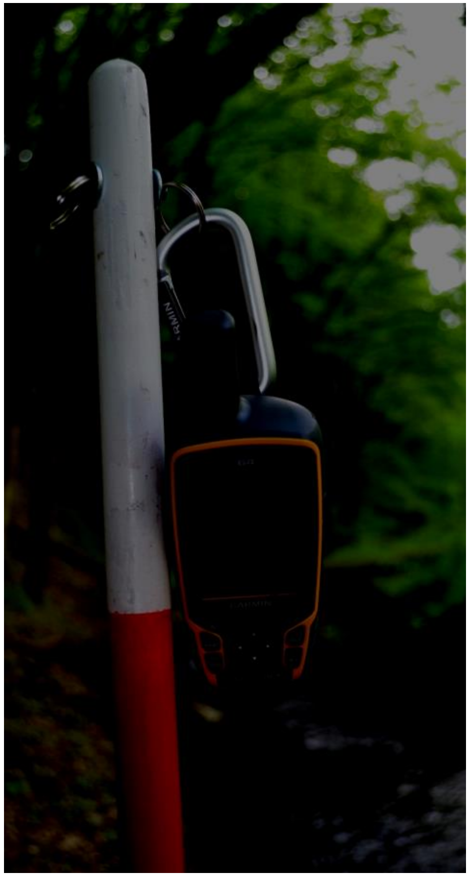
variable group	description
microhabitats and disturbance	tree microhabitats, soil disturbance etc.
shrubs	cover, dominant and site indicators
regeneration	cover, species, browsing
documentation	gps coordinates, photos




29 3 316
28 3 355
27 3 341
24 0 385
25 0 356
18 0 343
8 0 449
26 0 297
17 0 293
12 0 434
7 0 381
1 0 451
16 0 346
13 0 453
6 0 323
3 0 1011
15 0 380
14 0 558
5 0 294
4 0 0
2 0 446

HARDWARE AND SOFTWARE

Administrator/data analysis	QGIS, python 2.7, (R-script) PostgreSQL-PostGIS, ArcGIS 10.2
Data collection	Android 4.2 Jelly Bean, ForestDataCollect, SQLite, Geopaparazzi, SpatiaLite
Server	CentOS 6.4, ProFTP, PostgreSQL 9.3, python 2.7
Hardware	Evolveo Strongphone Q4, GARMIN GPSMap64

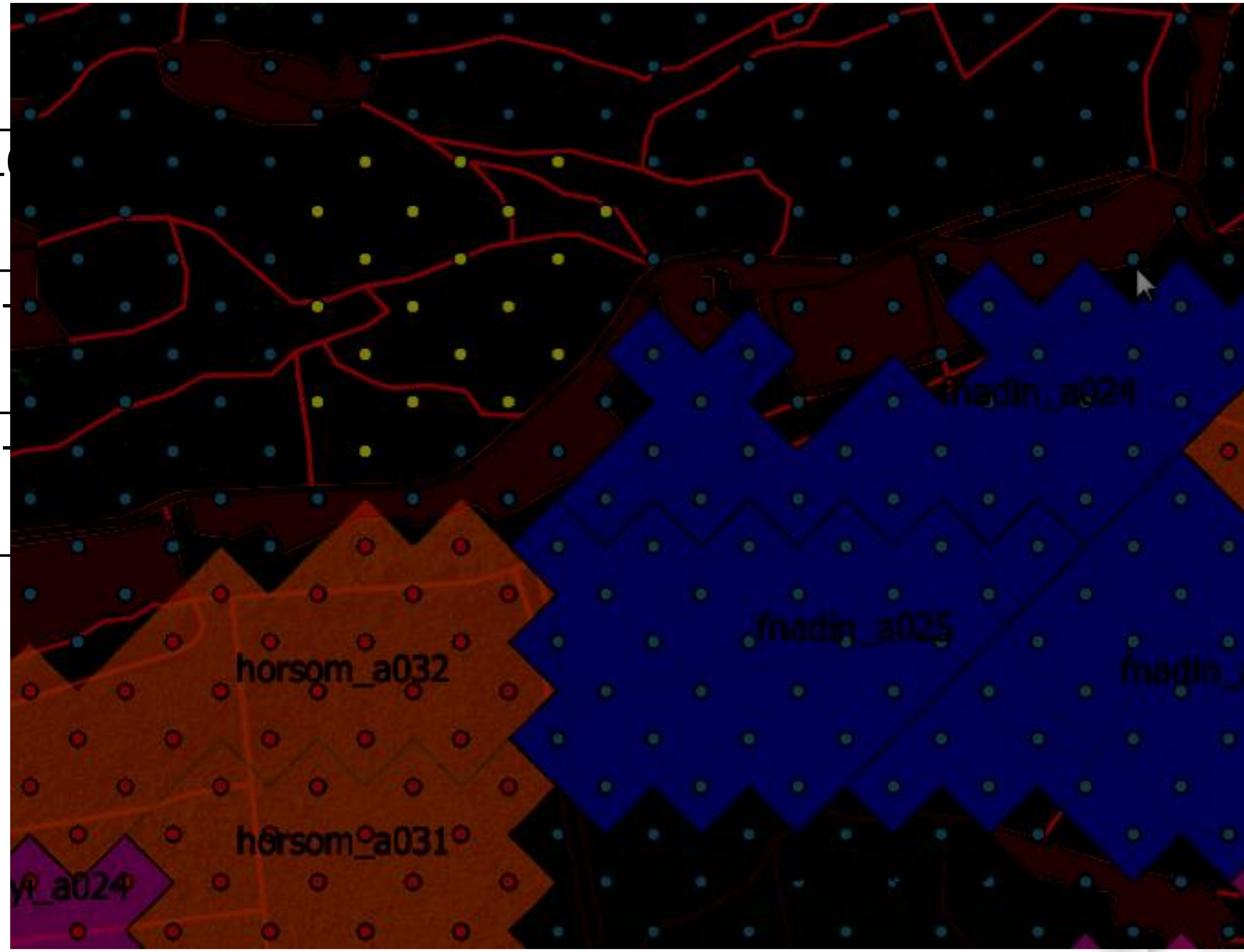


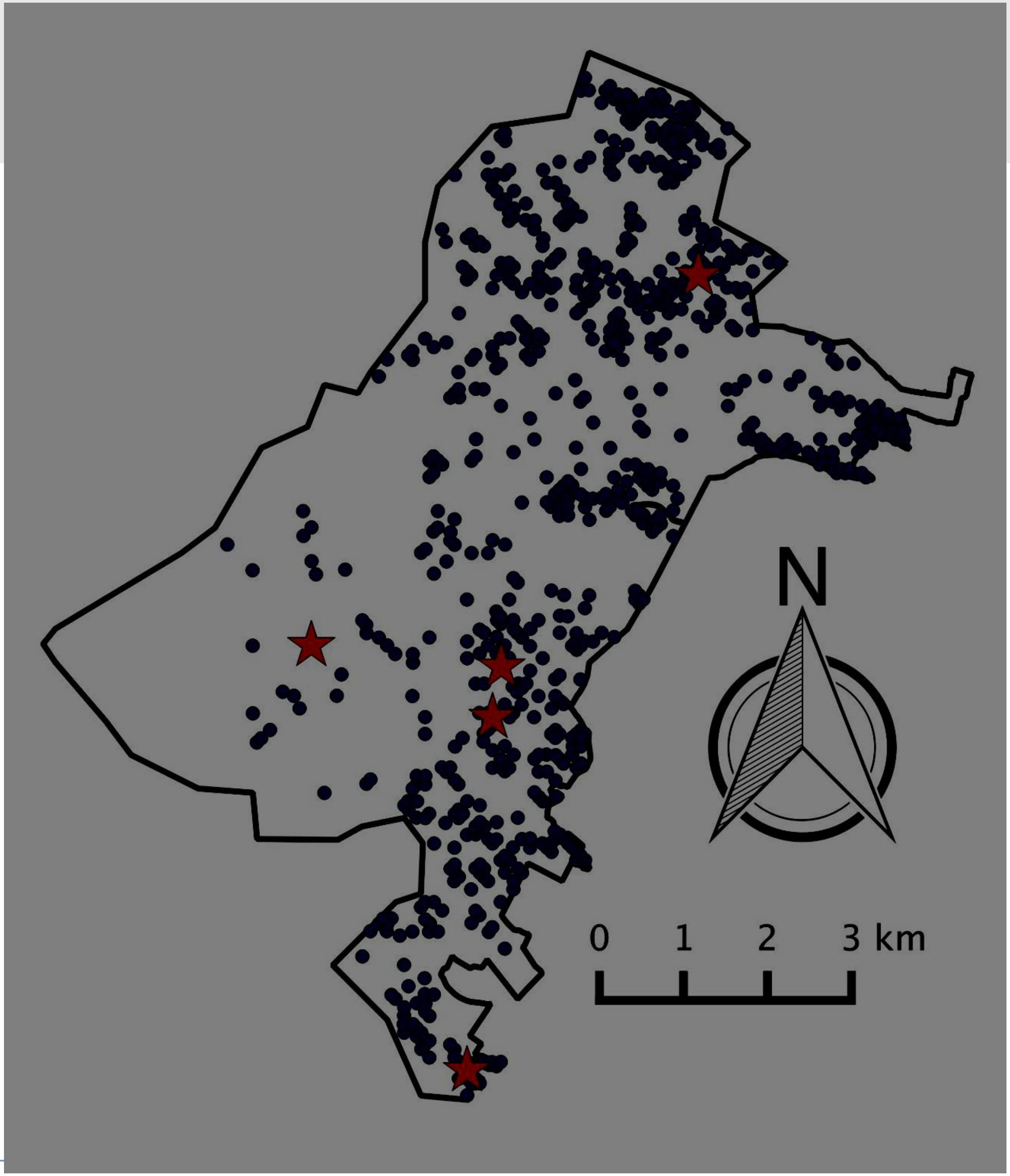
Packages

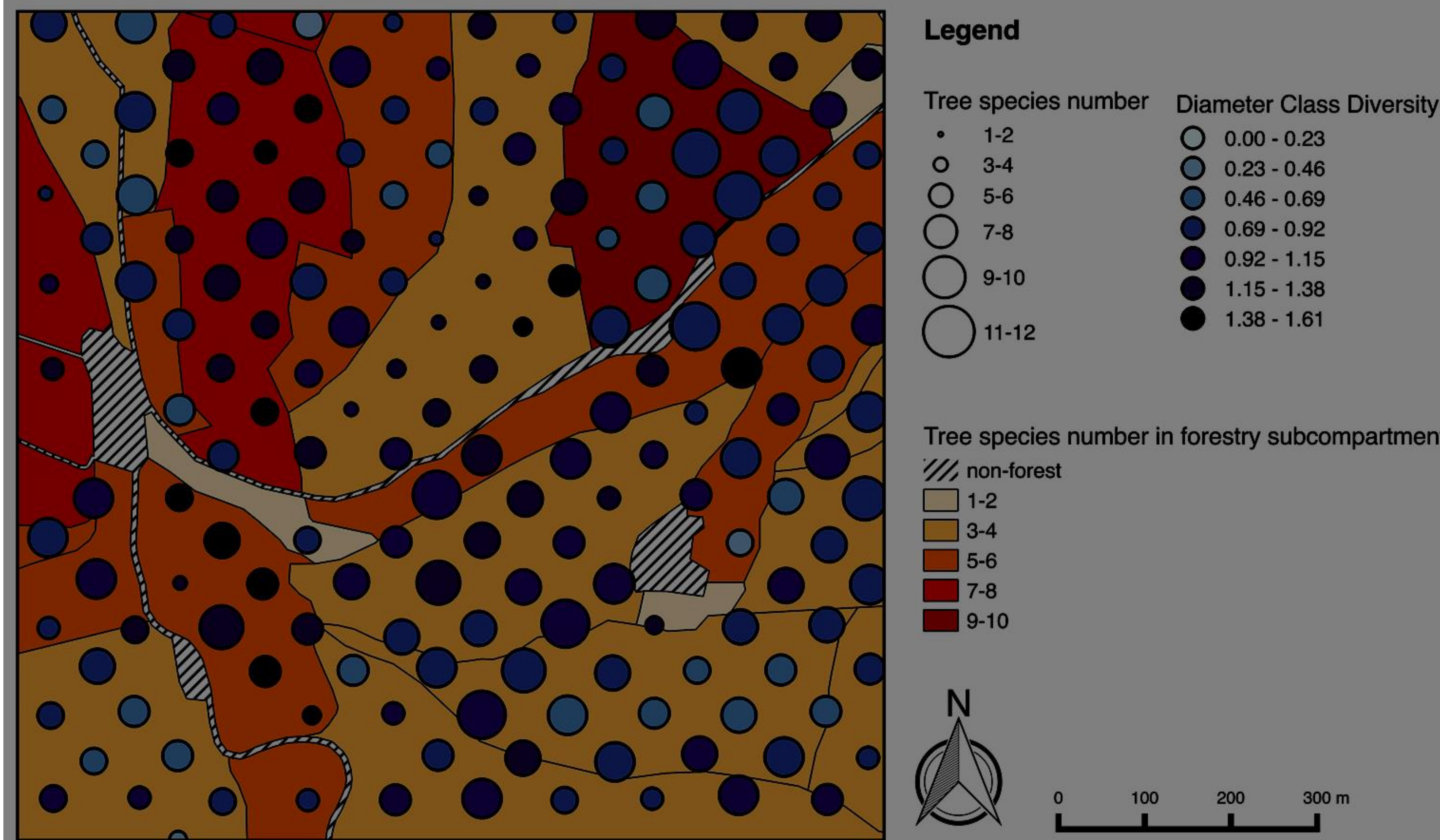
grid points	50-100 K
packages	2500-3000
field crew	20-30

Packages

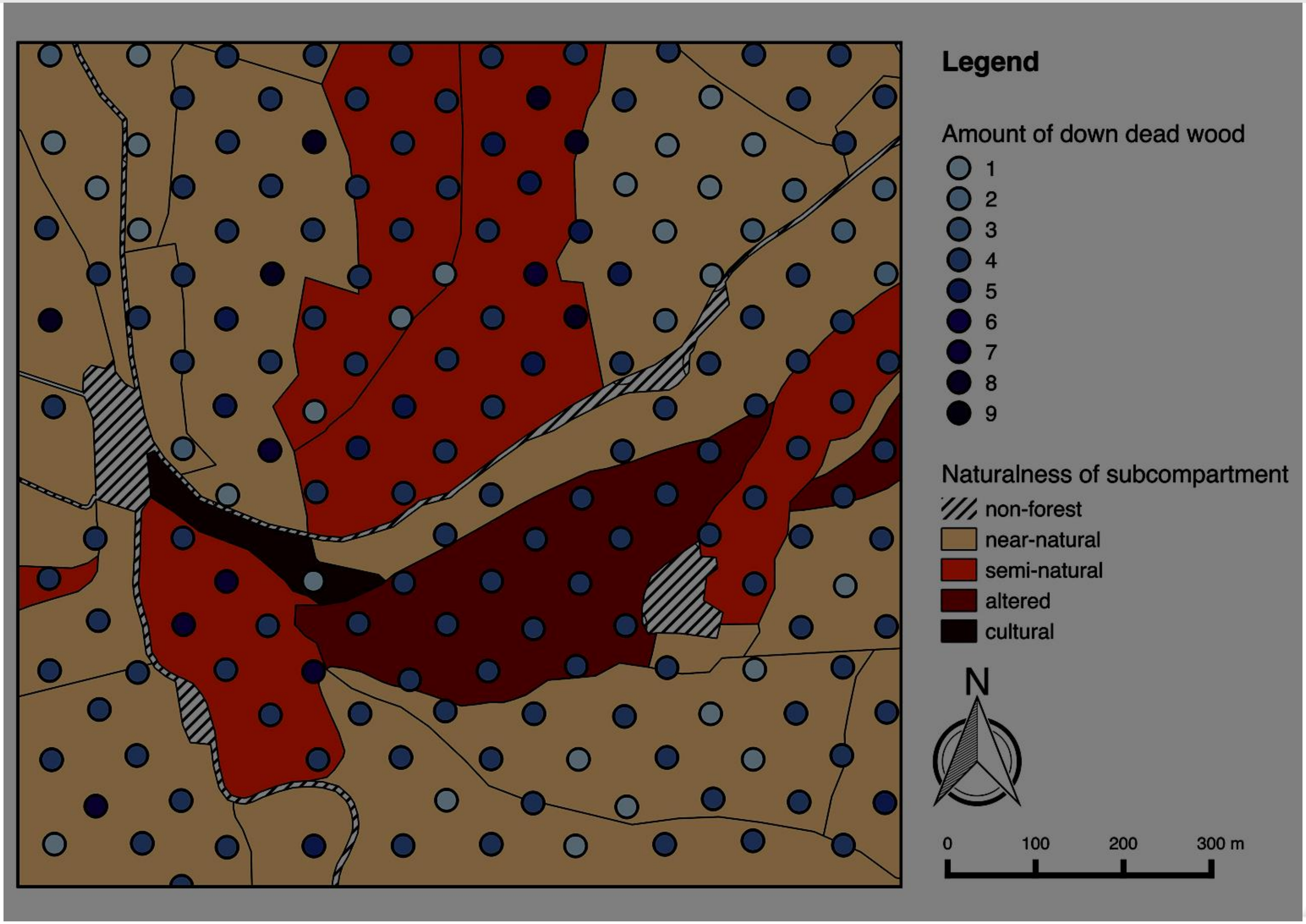
grid points	50-1
packages	2500-
field crew	20-




N
0 1 2 3 km



Legend
Tree species number
1-2
3-4
5-6
7-8
9-10
11-12
Diameter Class Diversity
0.00 - 0.23
0.23 - 0.46
0.46 - 0.69
0.69 - 0.92
0.92 - 1.15
1.15 - 1.38
1.38 - 1.61
Tree species number in forestry subcompartment
non-forest
1-2
3-4
5-6
7-8
9-10
N
0
100
200
300 m


Legend
Amount of down dead wood
1
2
3
4
5
6
7
8
9
Naturalness of subcompartment
non-forest
near-natural
semi-natural
altered
cultural
N
0
100
200
300 m

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Bílé Karpaty

Workshop on innovative methods in conservation planning
Királyrét, Hungary | 17-19th September 2019

Assuring quality in grassland management with a „goal-oriented” database (DINPD)

Szilvia, Rév; Zsolt, Baranyai

STRUCTRE OF THE PRESENTATION:

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I. What is the problem - situation analysis	II. Goals	III. Materials and Methods	IV. In DINPD's practice: „goal-oriented database"

I. WHAT IS THE PROBLEM - SITUATION ANALYSIS

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- Huge amount of land (more than 10.000 hectare)! Big responsibility.
- Divergent grasslands
- Human activity is crucial in their natural conditions

How are these grasslands used?

What is actually happening? State of populations?

What is the purpose of conservation?

Who knows? How long can we recollect?

Lack of information in the National Park Directoritate…

Who and how could use any information?

Strategic planning. Joint professional policy and direction. Leading instructions. Evaluation of the grassland management actions. Tracking. Overview, Statistics. Decision making. Documentation. Information flow.

Make a more efficient grassland management for wildlife conservation!

Give support for rangers.

Assuring the quality.

- Documentation
- Explanation
- Feedback
- Empowerment

Realistic and sustainable way.

II. GOALS

What kind of information do we need?

Optimalization task:
In between no data and every data…

It should:

- reduce the information gap between the rangers and the officers
- help to make objective decision making process and strategic mechanisms

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Requirements:

- Be suitable (easy to handle, practical,subjective, realistic, no exact data)
- Be valid in time and space
- Has an easy going data set-up (gathering and store data easily)
- Be „indicator focused" (focus on significant informations)

„Goal-oriented database"

- Currently under testing phase.
- Based on the knowledge of rangers
- Joint consideration per management blocks
- Base unit: „treatment block"
- The treament block is reviewed annually
- Uploading: approximately 20 min/ treament block
- Structure of the data-set: Yes or know questions, choose the fittest answer, programmed

IV. IN DINPD'S PRACTICE: „GOAL-ORIENTED DATABASE"

Main attributes, data collection structure:

- ✓Background data (Land use category, territorial dimension, ÁNÉR codes, natural conditions, conservation status, owner, land user)
- ✓Conservation goals and adequate treatments
- ✓Economic goals and possibilities
- ✓Problems, threats (for the state of habitats/species!)
- ✓Documetation treatments (in the concrete year)
- ✓Advice for monitoring the treatments (biomonit.)

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Conservation goals and adequate treatment planning

Elemental conservation goals: ***text***

I. Planning:

- Conceptional management tasks
- Realistic, short therm management tasks

II. Feedback:

- The compliance of the appointed management appropriation
- The state of the area in terms of the elemental nature conservation goal (according the subjective judgement of the ranger) improving/declining/stagnating?

(Assignmnet: secondary, tertiary conservation goals)

Economics (farming) goals and possibilities

- Is there any conflict between conservation and land use (goals)? Yes/No
- Does maintenance need a conservation effort (or land use is enough to aim the conservation goals) ? Yes/No

Problems/ Major threats (for the state of habitats/species!)

- Nondescript state / degradation (tendency)
- Nondescript state / degradation (state)
- Shrub overgrowing
- Invade by perennial alien species
- Ploughing
- Decreasing population of endangered species
- Unpredictable events (weather , wildfire)

IV. IN DINPD'S PRACTICE: „GOAL-ORIENTED DATABASE"

Documentation of management treatments

- Implemented water retention
- Implemented grazing and second-growth hay grazing
- Implmented mowing and clearing mowing
- Targeted elimination of invasive species
- Shrub removal
- Reed harvest
- Grassland restoration

IV. IN DINPD'S PRACTICE: „GOAL-ORIENTED DATABASE"

Why is it good for us? What are the benefits?
- for rangers

- Gap filler for documentation and planning
- Guideline and motive for intrasectoral negotiations, professional consultations.
- Potential base of institutional level decision making and strategic planning (leading instructions)
- Base of the modification/renunciation of lease contracts.

Why is it good for us? What are the benefits?
- **for the Directorate**

- The nondescript grasslands can be filtered (overused,underused, degradation, allien species occurrance)
- Serve as a base of nature conservation management planning.
- A tool to make statistics
- A real information source in negotiations with other sectors

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Királyrét, Hungary | 17-19th September 2019

Nature conservation management planning system and availability of management plans in the Carpathians

Centralparks / DINPD / Borbála Szabó-Major

I. STATE OF THE ART

Lack of capacity → long-term planning is difficult

Unadaptive, old fashioned frameworks

Only implemented in exact protected land (TT, TK, NP core areas)

II. LEGAL BASIS IN HUNGARY

Nature conservation law – 1996. LIII.

Government Decree 347/2006. (XII. 23.) designates the National Park Directorates → management of Pas

conservation management methods for the protection, maintenance, restoration, and presentation of a protected natural area and its natural values, and *restrictions, prohibitions and other obligations*

Preparation is obligatory, for 10 years, revision if needed

3 parts: background study, detailed NC management plan, legislative annex

Content elements of the conservation management plan

- Conservation objectives,
- Nature conservation strategies,
- Nature management practices, restrictions and prohibitions.

Requirements - specific to cultivations or generally applicable to the whole area - shall be determined taking into account the specificities of the design area.

II. LEGAL BASIS IN HUNGARY

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Management practices - not specific to the type of cultivation and land use - restrictions and prohibitions:

Protection of geological values

Management and maintenance of habitats

Protection of species

Protection of landscape and cultural values

Visiting the protected area

Education and presentation for nature conservation purposes

Research, investigations

II. LEGAL BASIS IN HUNGARY

Management practices, restrictions and prohibitions related to the type of cultivation and land use

Management of arable land

Management of grassland (meadow and pasture)

Management of vineyards, gardens and orchards

Management of forests

Establishment of restrictions and prohibitions on areas and activities in different cultivations.

II. LEGAL BASIS IN HUNGARY

The National Park Directorate is responsible for the preparation of the management plan for protected areas of national importance.

The elements of the management plan are contained in Decree 3/2008. (II. 5.) KvVM.

The preparation of the nature management plans as described above has been approved by the Minister of Rural Development in accordance with Decree 16/2012. (VII. 6.) VM instruction.

II. LEGAL BASIS IN HUNGARY

In accordance with the provisions of the Nature Conservation Act, the nature management plan must be published by a ministerial decree. The compliance of the requirements of the management plans is mandatory.

Forest management plan

In harmony with the NCMP (N2K MP)

Carried by external experts' team, with the revision of nature conservation

For 10 years

Forest managers are responsible for teh implementation

Natura 2000 management plan

I. part:

Data on location

Threats

Management tasks

II. part: background documentation

IV. IMPLEMENTATION

Widespread consultation precedes the proclamation of conservation management plans for protected areas of national importance.

On the local level, among the owners, land users, local municipalities and other local stakeholders the consultation is coordinated by the National Park Directorate.

The Ministry of Agriculture is responsible for the preparation of the draft legislation containing the conservation management plan and the coordination of the inter-ministerial reconciliation.

V. PROBLEMS AND THREATS

Lack of arrangements between sectors

For only 10-15% of the Pas in HU has current MPs

Law is for 3-10 pages bans and restrictions, not a detaled, with no possibilities /options, with a lack of management view (how to maintain financially?)

V. PROBLEMS AND THREATS

By the end of 2020 all of the N2K MPs suppose to be accepted

No strict rules, the directions are general

Lack of information on habitats and species, using practical information

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Meeting in Királyrét, Szokolya, Hungary. 17-19 September 2019

Nature conservation / management planning in Poland

Ekopsychology Association (PP4)

Good afternoon!

Buon pomeriggio! / Guten Nachmittag!

Dobré odpoledne!

Jó napot kívánok!

Dzień dobry!

Buna ziua!

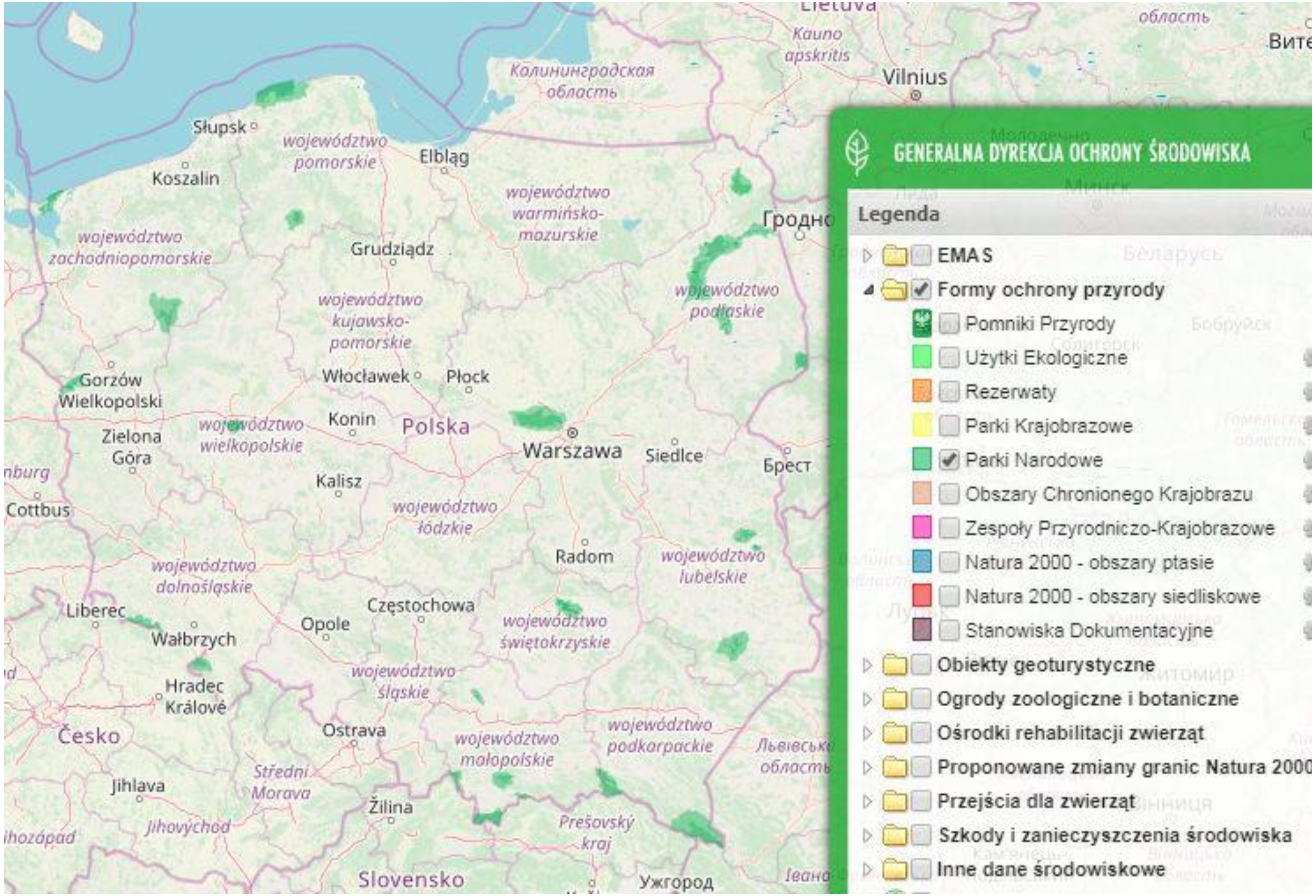
Добар дан!

Dobré popoludnie!

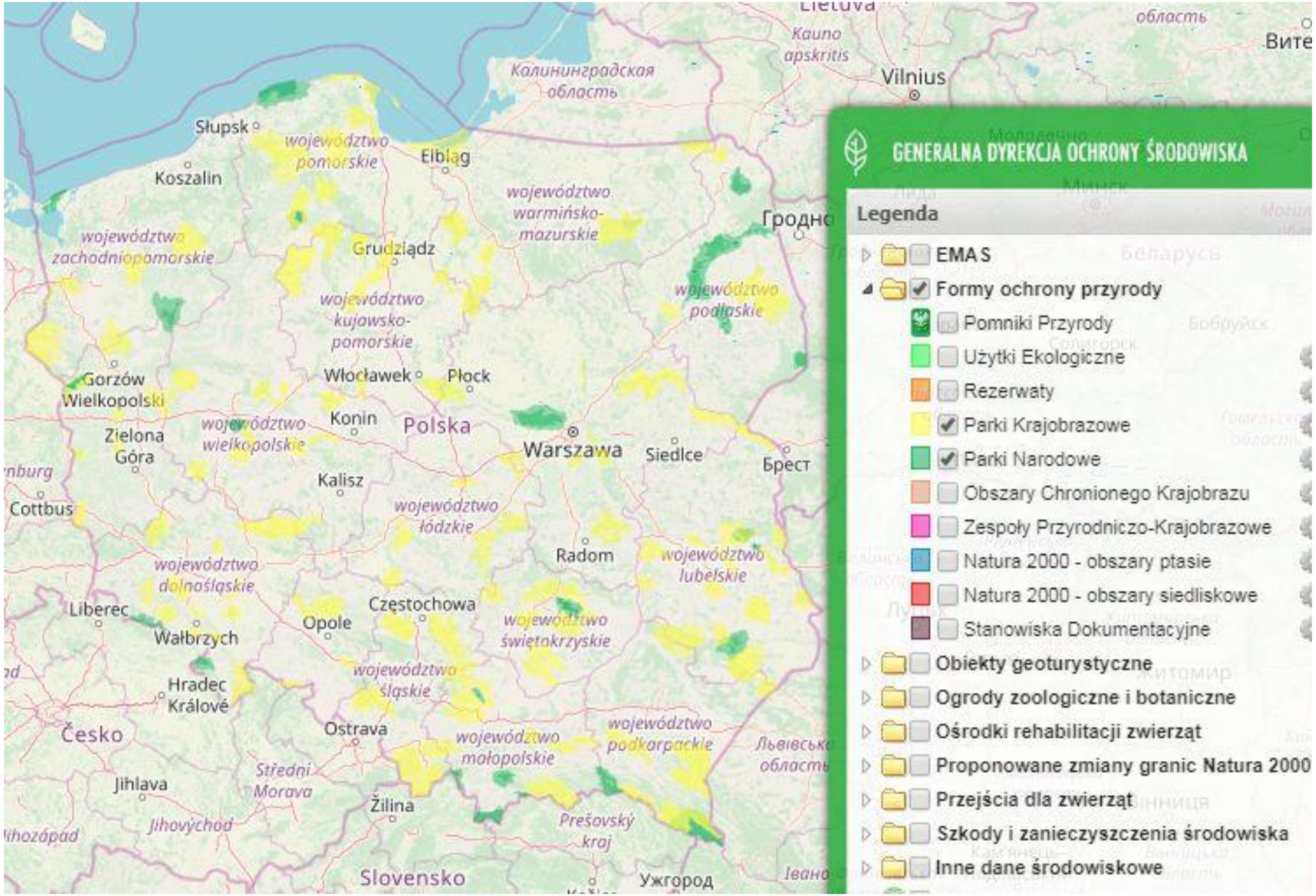
Доброго дня!

Protected area categories in Poland

nature reserve (IUCN Ia)	1 499
national park (IUCN II)	23
landscape park (IUCN V)	124
protected lanscape area (IUCN V)	407
nature monument (IUCN III)	36 232
documentation site	178
ecological area	7 661
landscape-nature complex	352
Natura 2000 site:	145 SPAs + 849 SACs



23
national parks



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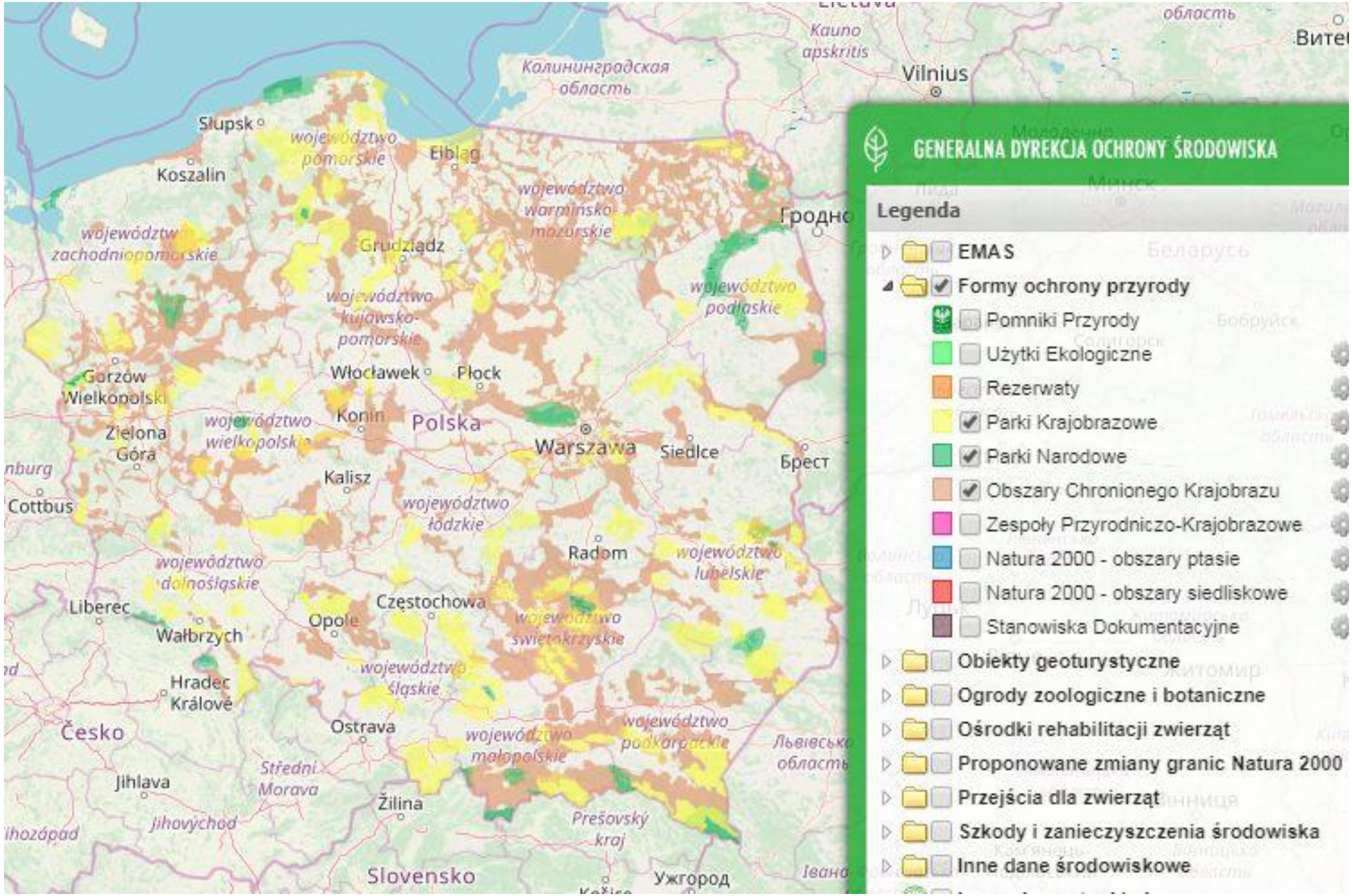
23
national parks
and
124
landscape parks

Difference between PL national parks and landscape parks

- national parks are designated by the Council of Ministers, and supervised by the Minister of Environment
- landscape parks are designated and supervised by the Regional Council (self-govt. Assembly of the administrative province)
- national parks have the exclusive right to manage all state-owned land within their boundaries (except public roads, but including forests)
- landscape parks are not managing the land, their forests are managed by the State Forests administration
- each national park has own director and administration, while landscape parks are administered by a regional Board for LP Group



23
national parks,

124
landscape parks

and 407
protected
landscape areas

Management plans are not required for:

protected landscape areas (PLAs) designated by the Regional Councils, as no management takes place in PLAs, commonly perceived in PL as much less effective than landscape parks (landscape parks have own administration, rangers, mgmt plans)

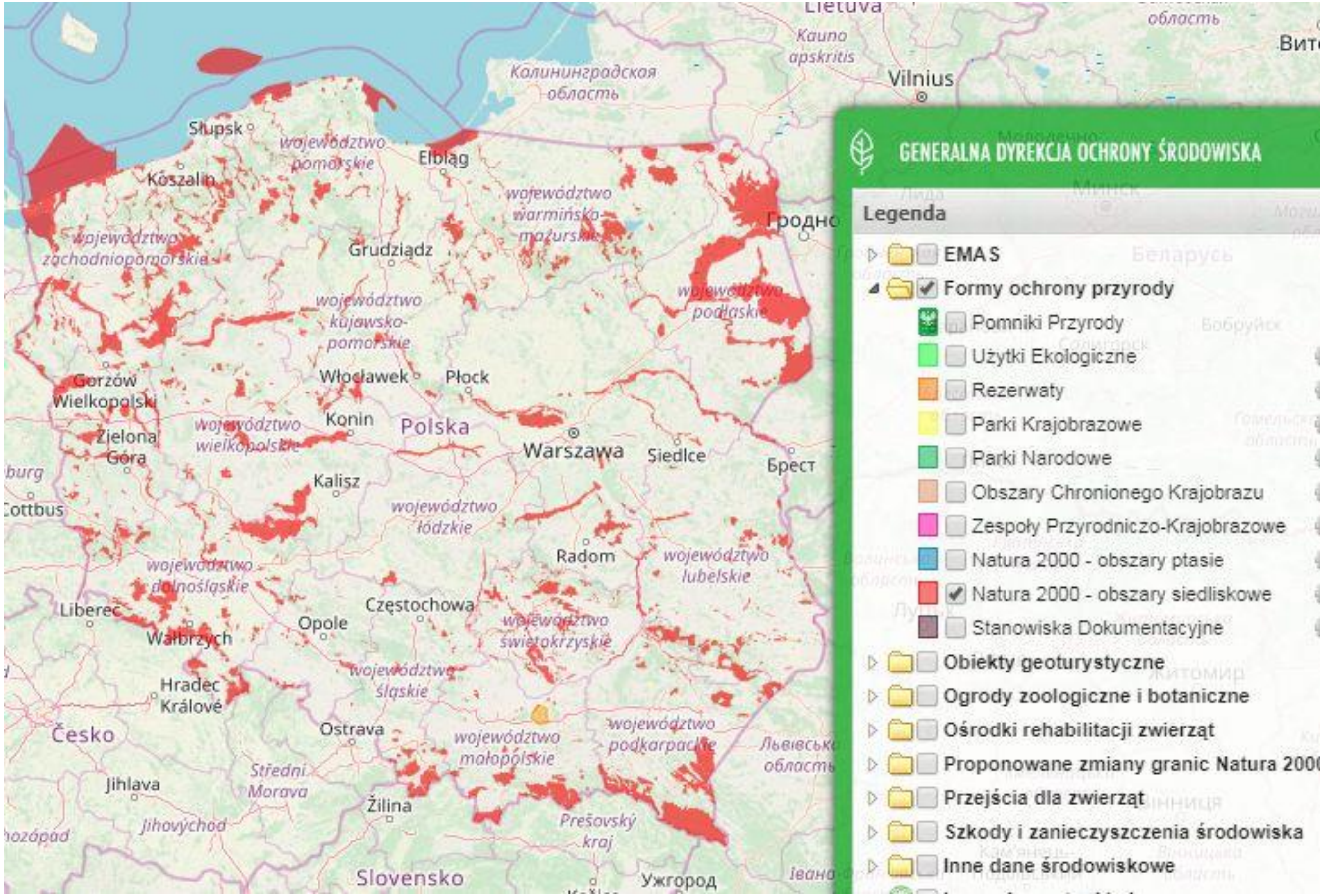
four types of PAs designated by local community authorities (nature monuments, documentation sites, ecological areas, and landscape-nature complexes).

The PL law (2004 Act on Nature Conservation)

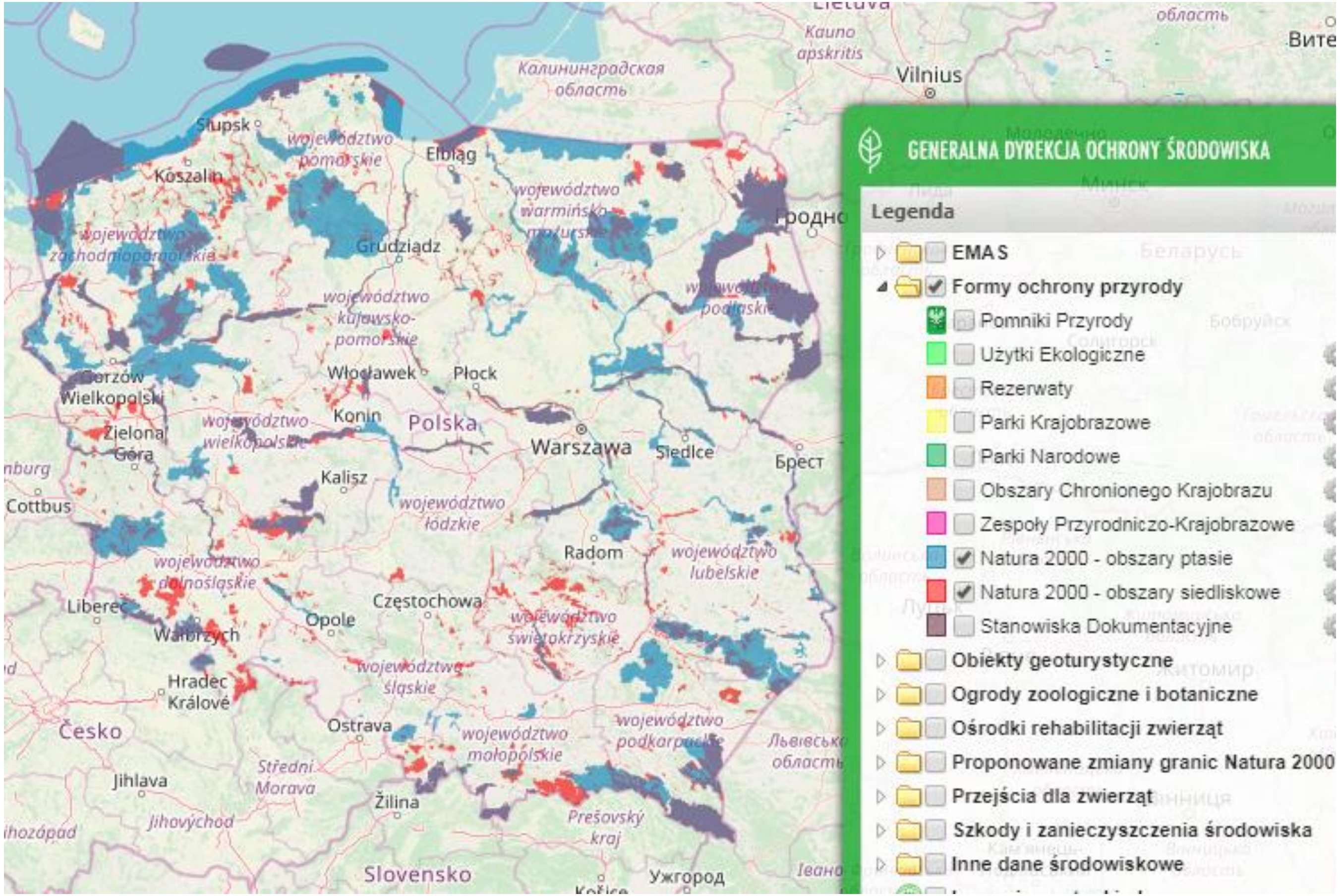
requires the adoption of long-term (20-year) protected area management plans for:

- nature reserves (adopted by the Regional Director of Environment Protection)
- national parks (adopted by the Minister of Environment)
- landscape parks (adopted by the Regional Council = self-govt. assembly)
- Natura 2000 sites (adopted by the Minister of Environment)

145 SPAs (special protection areas, Birds Directive)



849 SACs (special areas for conservation, Habitat Directive)



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145 SPAs
and
849 SACs

Natura 2000 sites (SPAs and SACs) sometimes overlap

moreover, N2000 sites often overlap PAs of national categories

e.g. you can find yourself in an area of a nature reserve

located inside a landscape park, and within the external buffer zone of a national park,

simultaneously bearing SPA or/and SAC designation

If so, the management plan for a N2000 site would be prepared together with a plan for the NR or LP.

1499 NRs
23 NPs
124 LPs
145 SPAs
849 SACs
(all requiring mgmt plans)
+ 407 PLAs

In the absence of a long-term (20-year) management plan

nature reserves and national parks operate on the basis of a provisional mid-term (max. duration: 5 years) “project of protective tasks”

while the validity period of “projects of protective tasks” for Natura 2000 sites is longer (10 years).

Such temporary solution does not apply to landscape parks.

I do not need to tell you how costly is the preparation of a management plan for a single protected area

Consequences:

some valuable areas are not designated as nature reserves (even though planned for designation, and deliberately left with no human intervention / forestry management)

as their formal designation would automatically require allocating funds for the mgmt plan preparation…

Sometimes changes in the law might send all previously developed management plans into the dustbin

e.g. in result of the Act of 7 Dec. 2000 (entered into force on 2 Feb. 2001) amending the PL Act on Nature Conservation

the validity of all previously adopted PA management plans expired on 2 Feb. 2002

and all PAs were allowed max. 5 years to prepare new mgmt plans…

In result, out of 23 national parks in Poland

only 4 national parks currently have valid long-term (20-year) management plans

(the validity of 1 of these 4 expires with the end of 2019)

Other national parks (as well as many landscape parks and nature reserves) in Poland

operate on the basis of a provisional (max. duration: 5 years) “project of protective tasks”

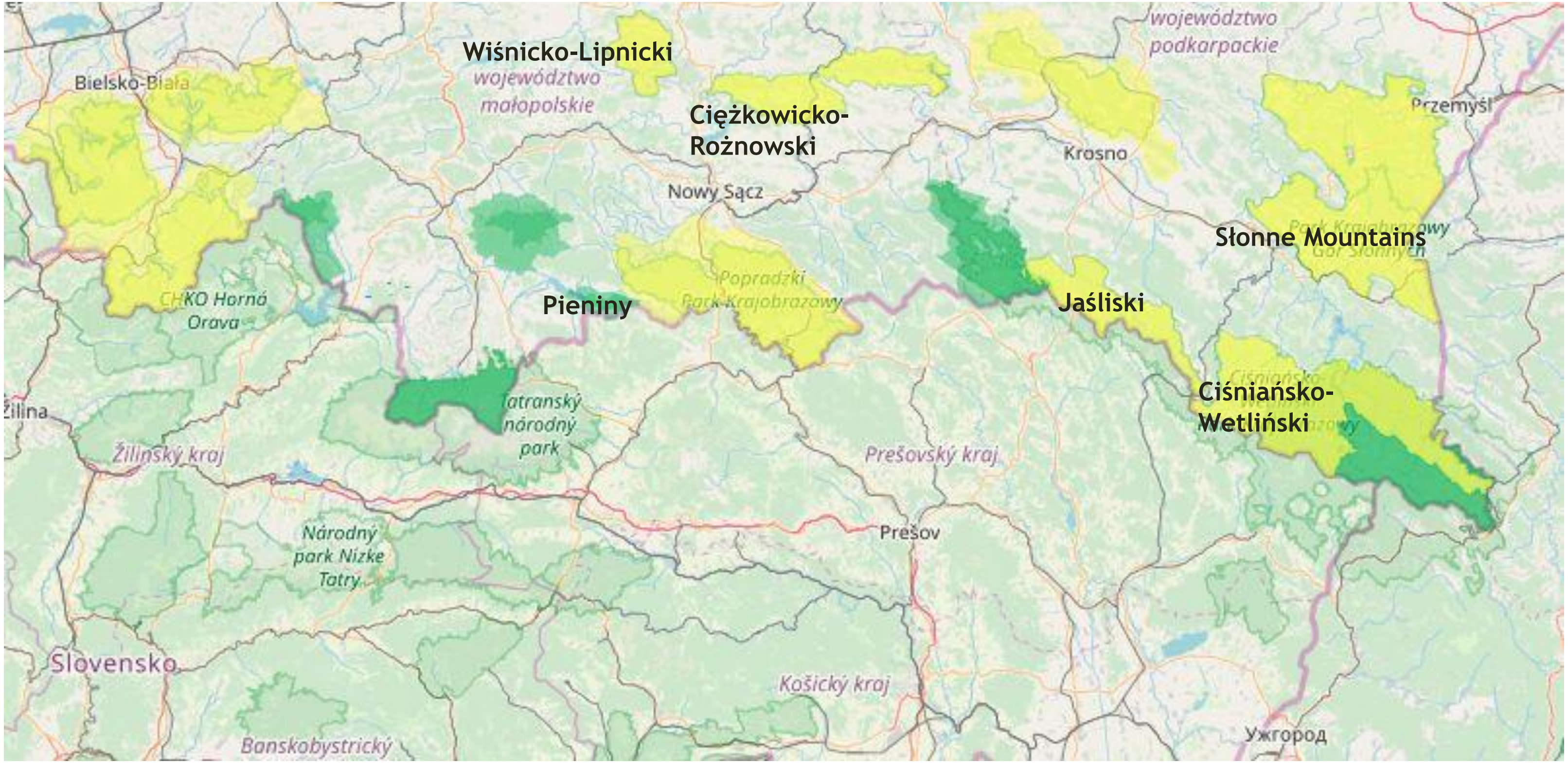
In the PL part of the Carpathian region

only **1 out of 6** national parks (Pieniny National Park)

and **5 out of 13** landscape parks (Wiśnicko-Lipnicki LP, Ciężkowicko-Rożnowski LP, Jaśliski LP, Słonne Mountains LP, and Ciśniańsko-Wetliński LP)

have valid 20-year management plans

while other 5 national parks and 8 landscape parks either prepare mgmt plans, or await approval and adoption.


Wiśnicko-Lipnicki
Ciężkowicko-
Rożnowski
Pieniny
Jaśliski
Słonne Mountains
Ciśniańsko-
Wetliński
Bielsko-Biała
województwo
małopolskie
Nowy Sącz
Krosno
województwo
podkarpackie
Przemyśl
CHKO Horná
Orava
Popradzki
Park Krajobrazowy
Tatranský
národný
park
Žilina
Žilinský kraj
Prešovský kraj
Prešov
Národný
park Nízke
Tatry
Slovensko
Košický kraj
Banskobystrický
Ужгород

Thank you!

Grazie! / Danke!

Děkuji!

Köszönöm!

Dziękuję!

Mulțumesc!

Хвала!

Ďakujem!

Дякую!

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Zonation system within national parks in the Carpathians

Centralparks / DINPD / Borbála Szabó-Major

PA ZONATION SYSTEM

Based on IUCN criteria

3 main categories: core-management-buffer

Different opinion of Member Countries

Different phases of implementation

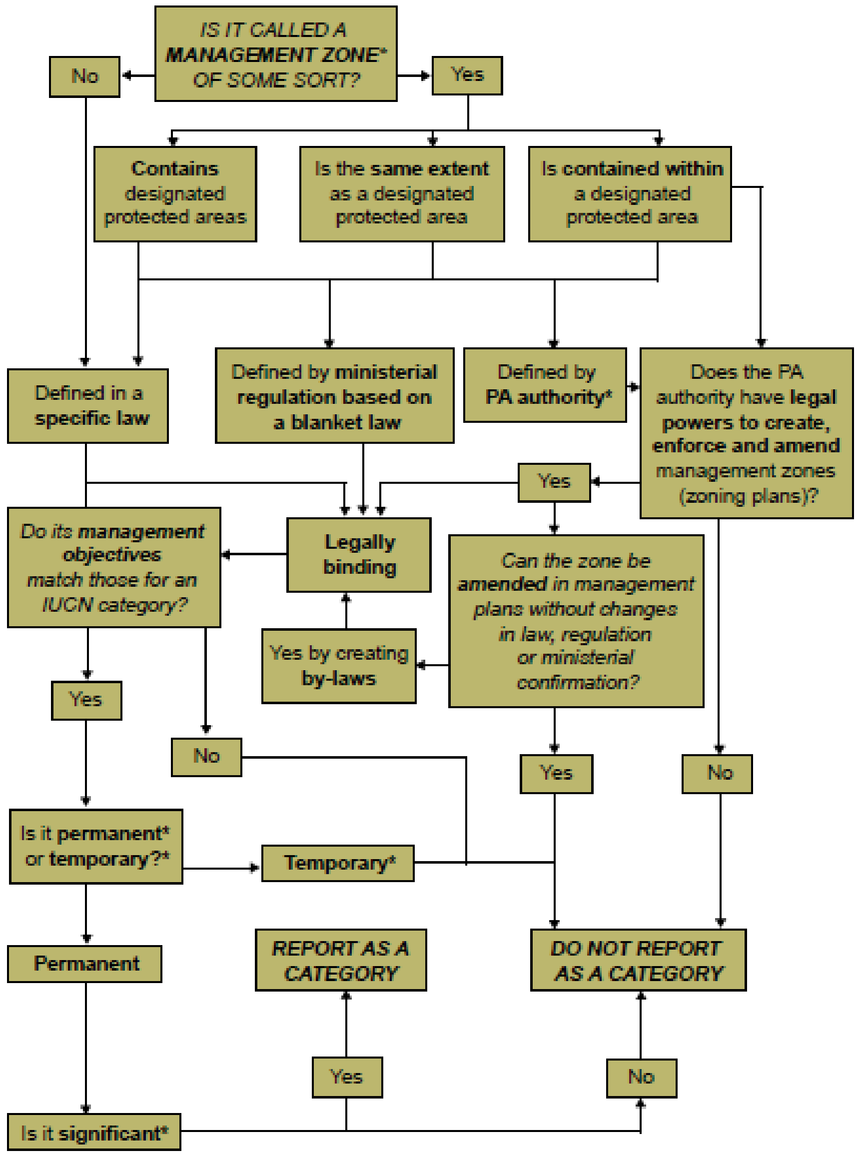
IUCN CRITERIA

Guidelines for Applying Protected Area Management Categories

Core zone – Nature Conservation Nature environment

Management zone

Buffer zone



* **Management zone** – e.g., buffer zone, wilderness zone, recreation zone, no-take zone, core zone etc.
Protected area authority – Ministerial department, agency, NGO or community institution that is recognised in law
Permanent – inscribed in law, established and recognised, subject to a long-term vision (e.g., core zone for key breeding species)
Temporary – established for management purposes only, temporal (e.g., for a limited period)
Significant – of a recognisable and reasonable scale and/or proportion to the wider landscape

SITUATION IN HUNGARY

Nature conservation law

- For every NPDs – in accordance with the policy of Ministry – natural zone / naturefriendly usage zone and service zone
- Strictly protected: natural zones of national parks, core zones Biosphere Reserves and Forest reserves

2013

Negotiations for jjoint dvelpoment

Minutes of the meetings but no contracts are available.

Respectful treatment

Urgent implementation of NCMP! (missing)

A zone

Any economic activity is forbidden

Not any treatments are forbidden: elimination of invasive alien species + maintenance of natural forest dynamic (dead wood), solid tourism infrastructure

B zone

Nature-friendly usage

According to nature conservation management plan

Constant forest coverage – selection cutting

‚Wilderness’ conservation concept

Avoidance of other economic activities

Temporary zone

C zone

Tourism infrastructure – mass tourism

Forestry buildings

Settlements

134/2013 (XII.29.) VM RENDELET

Natural zone

Its only function purpose: maintain the landscape’s and ecosystem’s natural processes and structure, sustainability, protection

Minimal actions – preservation without treatment

Only actions – elimination of invasive species, maintain natural forest structure, research, special species conservation, natural water management

NATURE-FRIENDLY USAGE ZONE

Presence of nature conservation management actions

At the same time: nature conservation management, nature-friendly land use

Strictly protected areas: only usage according law

Forestry and other land uses are possible

SERVICE ZONE

Settlements

Intensive function

Regular human presence

Infrastructure for nature conservation

Zonation system of the NPDs

Professional preparations: NPDs

Considering: natural values, threats, strictly protected areas, settlements, built-up areas

Goal: „optimal size"

From 2014 a slight delay…

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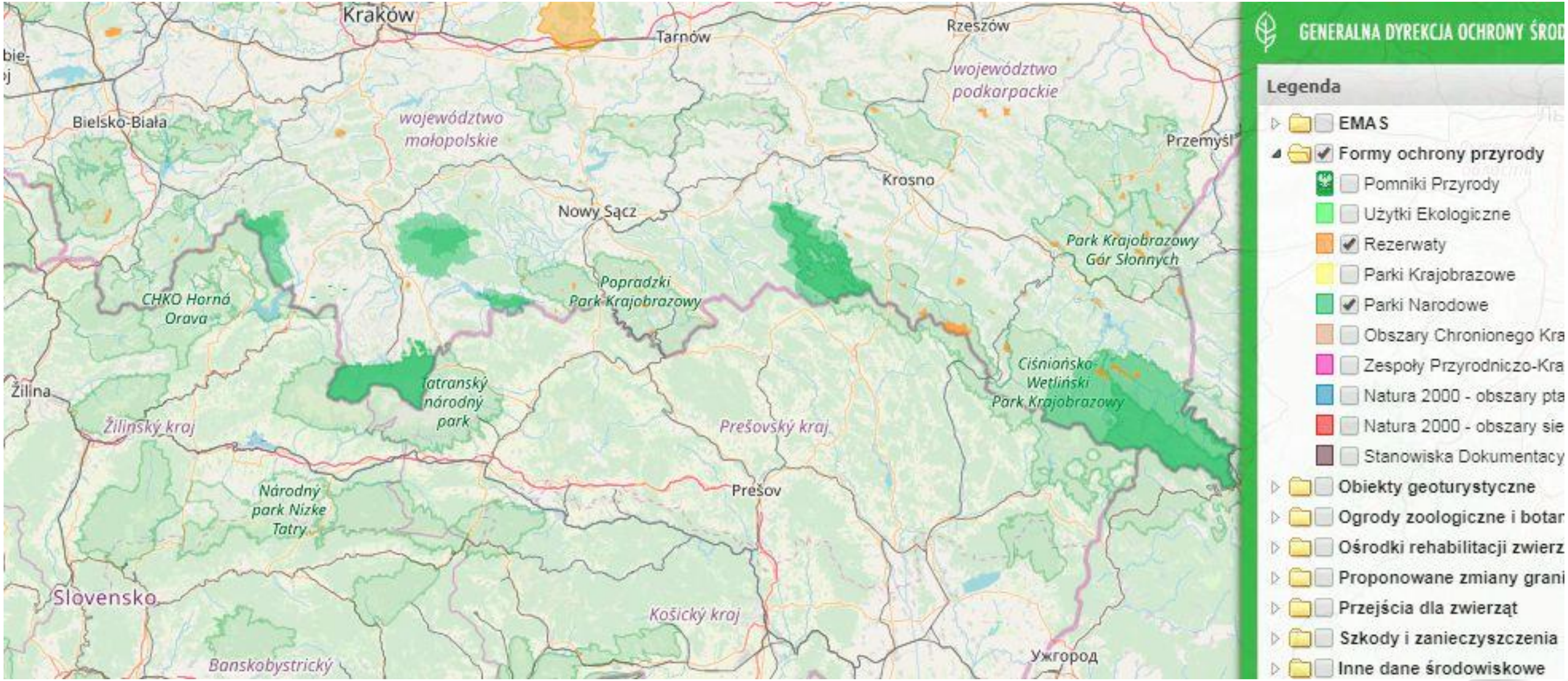
Carpathian protected area zonation - Poland

Ekopsychology Association (PP4)


Kraków
Tarnów
Rzeszów
województwo podkarpackie
województwo małopolskie
Bielsko-Biała
Przemyśl
Krosno
Nowy Sącz
Park Krajobrazowy Gór Słonnych
Popradzki Park Krajobrazowy
CHKO Horná Orava
Ciśniańsko-Wetliński Park Krajobrazowy
Tatranský národný park
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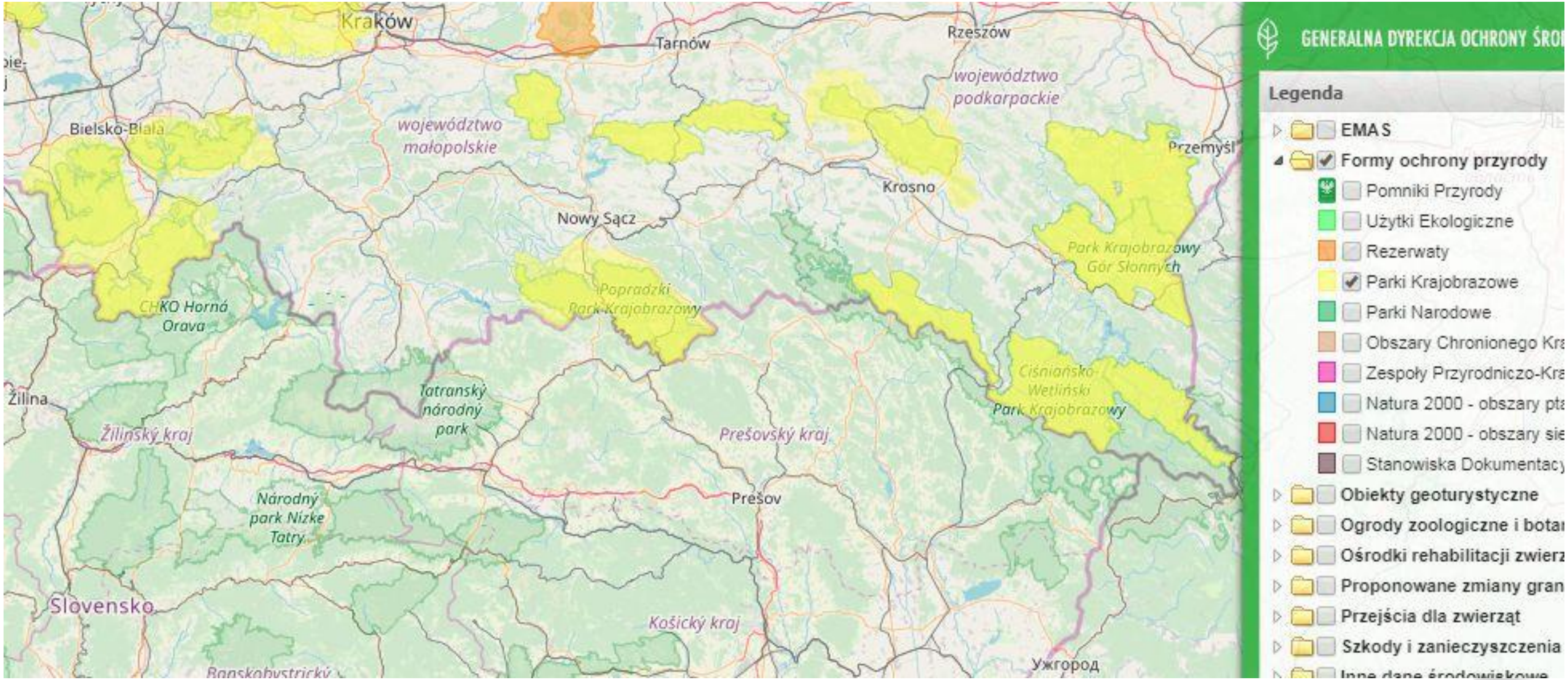
Národný park Nízke Tatry
Slovensko
Košický kraj
Banskobystrický
Ужгород
GENERALNA DYREKCJA OCHRONY ŚROD
Legenda
EMAS
Formy ochrony przyrody
Pomniki Przyrody
Użytki Ekologiczne
Rezerwaty
Parki Krajobrazowe
Parki Narodowe
Obszary Chronionego Kra
Zespoły Przyrodniczo-Kra
Natura 2000 - obszary pta
Natura 2000 - obszary sie
Stanowiska Dokumentacy
Obiekty geoturystyczne
Ogrody zoologiczne i botan
Ośrodki rehabilitacji zwierz
Proponowane zmiany grani
Przejścia dla zwierząt
Szkody i zanieczyszczenia
Inne dane środowiskowe


GENERALNA DYREKCJA OCHRONY ŚRO
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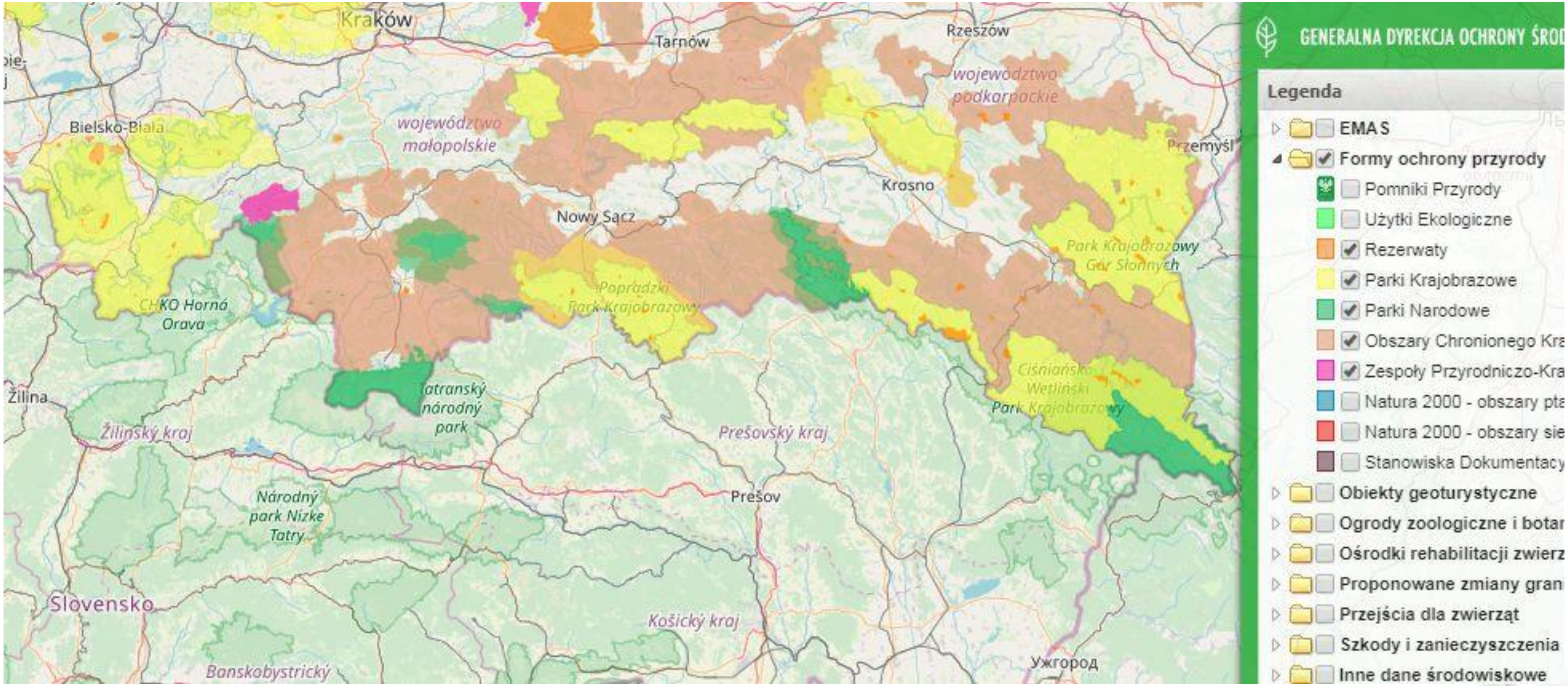
Košický kraj
Ужгород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Bielsko-Biała
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Przemyśl
Krosno
Nowy Sącz
Park Krajobrazowy Gór Słonnych
Popradzki Park Krajobrazowy
CHKO Horná Orava
Ciśniańsko-Wetliński Park Krajobrazowy
Žilina
Tatranský národný park
Žilinský kraj
Prešovský kraj
Národný park Nízke Tatry
Prešov
Slovensko
Košický kraj
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GENERALNA DYREKCJA OCHRONY ŚRO
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Przejścia dla zwierząt
Szkody i zanieczyszczenia
Inne dane środowiskowe

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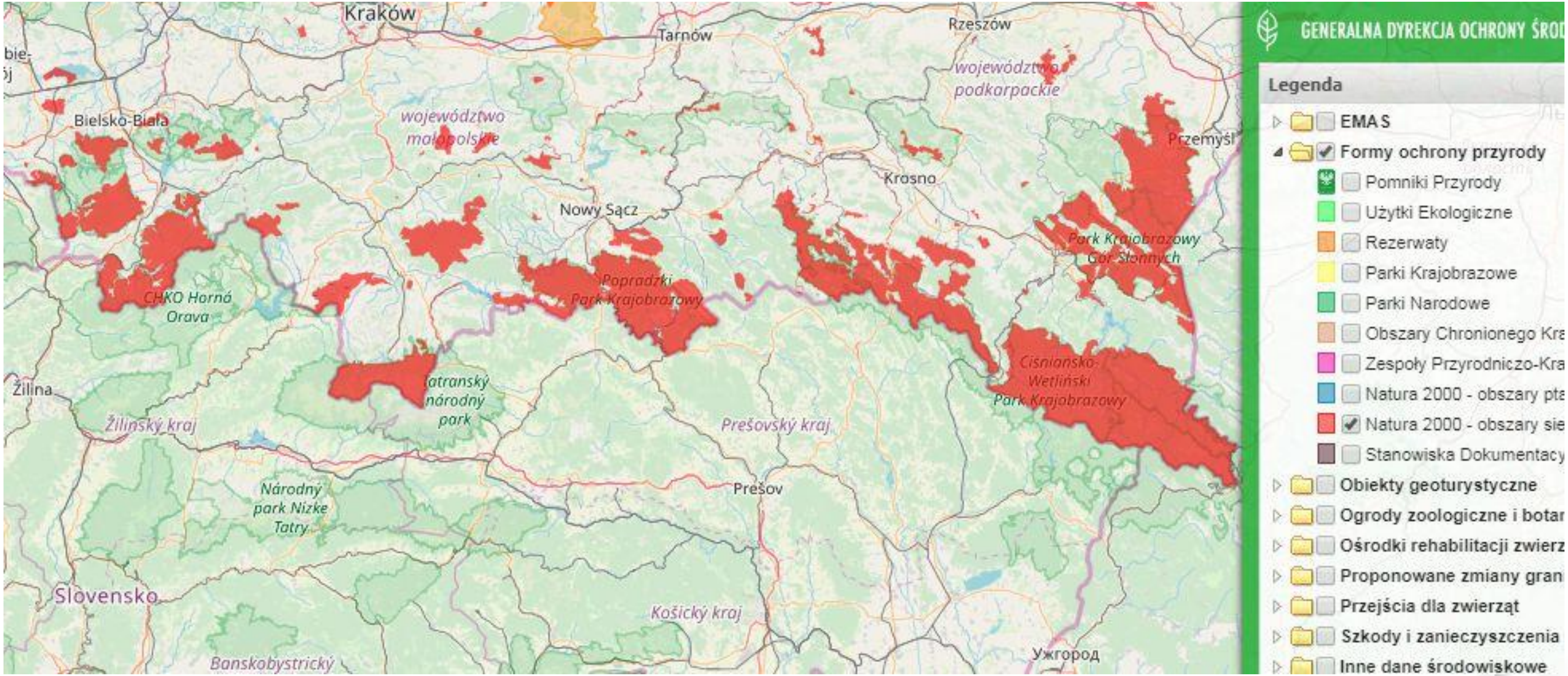
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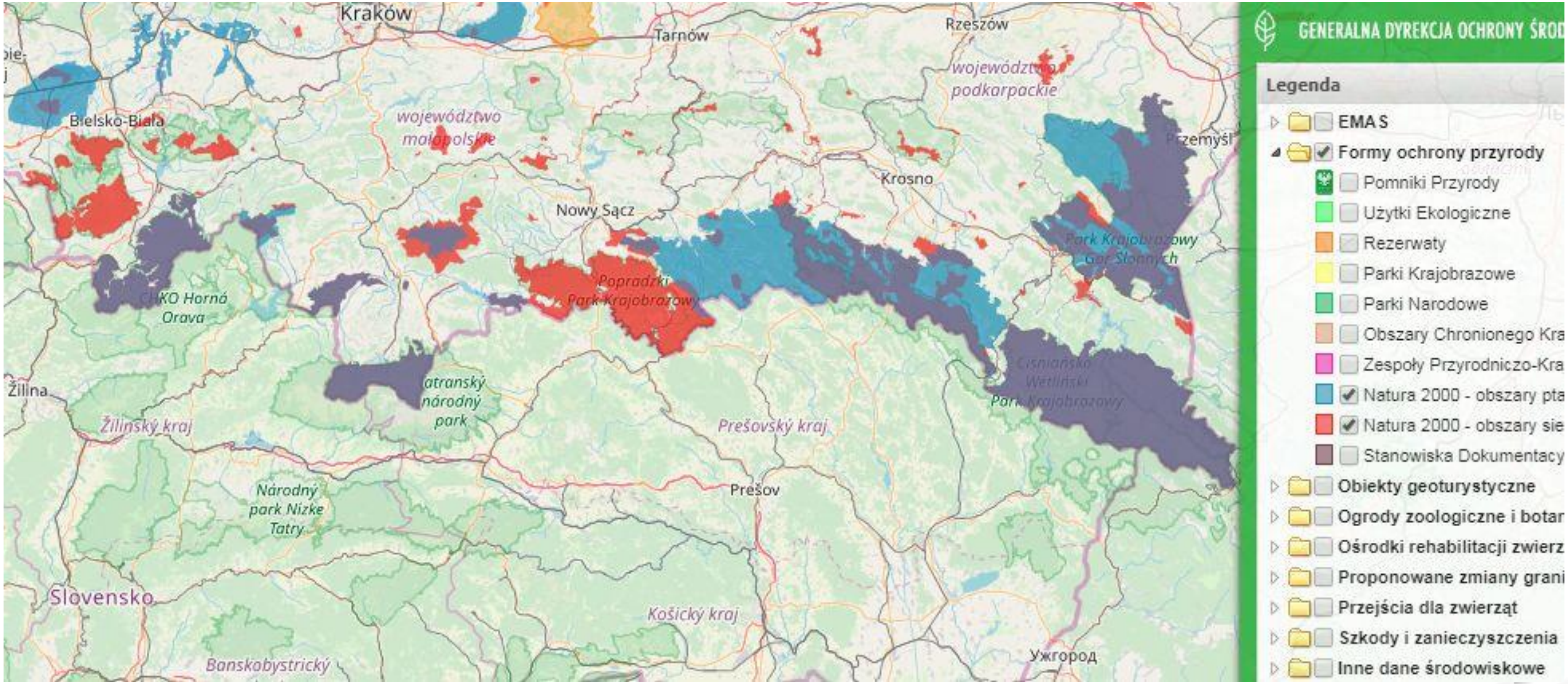
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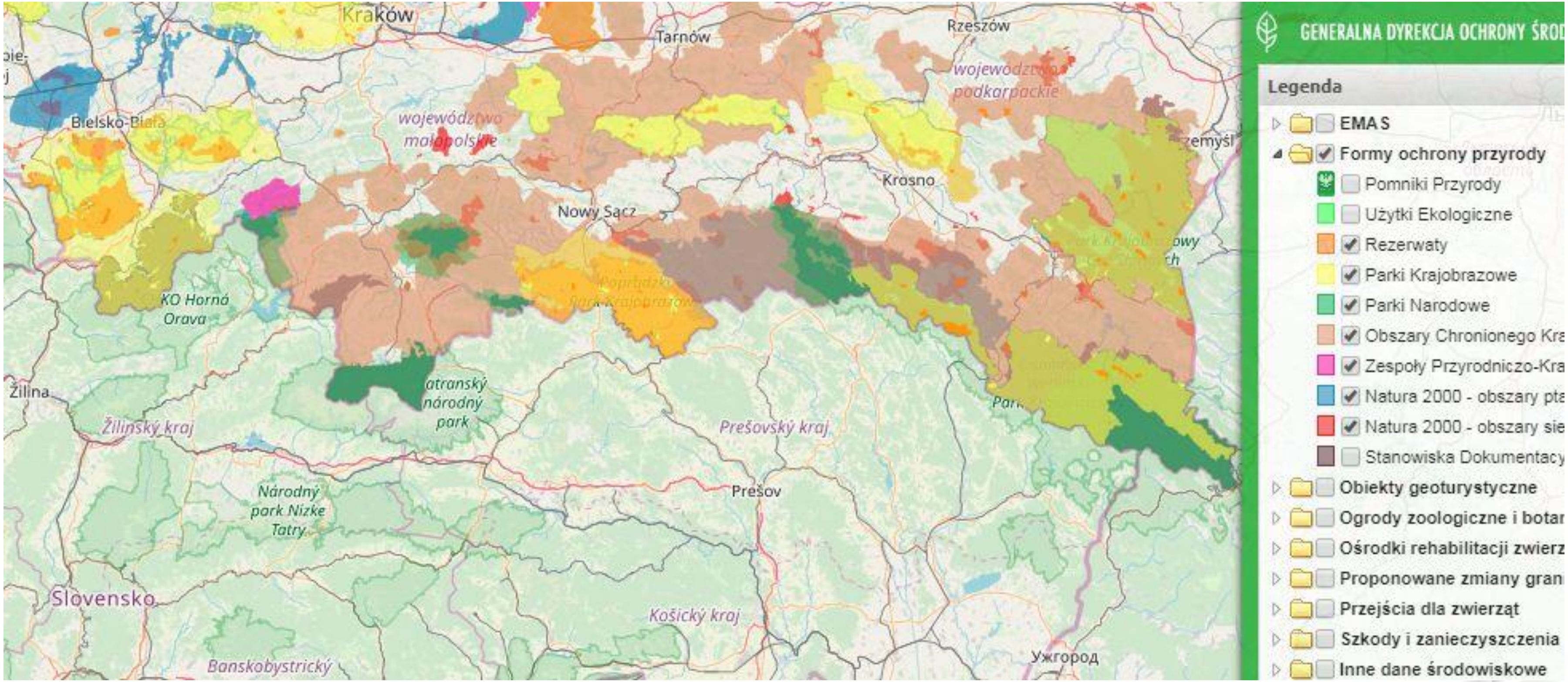
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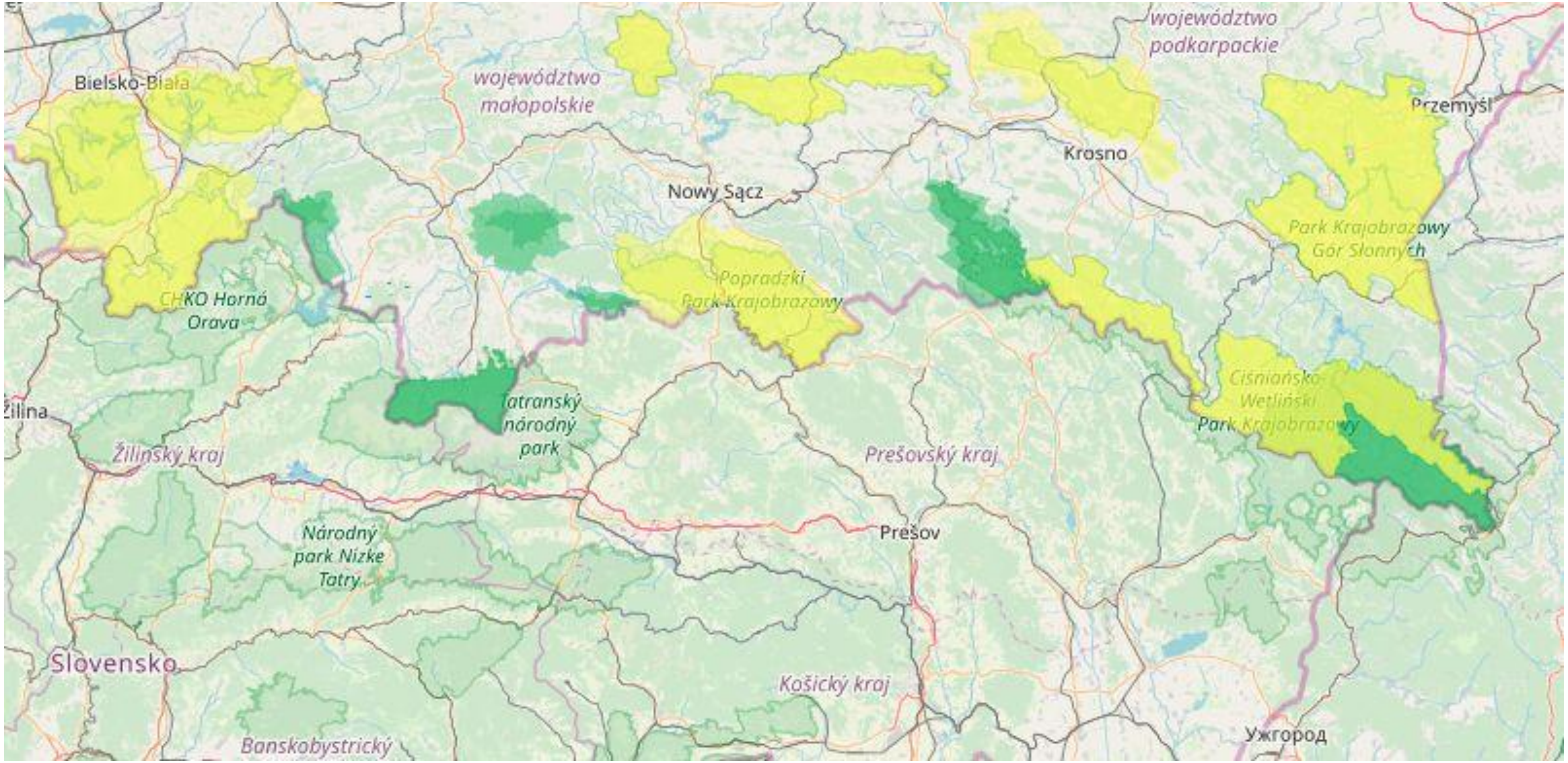
Planning context in PL part of Carpathian region

- High share of protected areas in the Carpathian region:
- 28.4% protected in national parks and landscape parks
- almost 70% protected either in NP, LP, or protected landscape area
- almost 50% within Natura 2000 sites
- forest cover 46% (average for PL: 30.8%)
- rural population density in 3 „Carpathian” administrative provinces highest among all 16 PL regions (in Młp and Śl >2x the PL average, or 5x the average for the 3 least populated PL regions)
- **Consequences**: settlement + infrastructure development pressures, ⇒ land-use/land-development conflicts, in addition to tourism pressure

CNPA member areas: national and landscape parks



CNPA member areas: national and landscape parks

In PL Carpathian Network of Protected Areas (CNPA) includes **19 PAs**,encompassing **529 392.10 ha (5 293.9 km^2)**

- 6 national parks (82 563.13 ha) of IUCN cat. II
- 13 landscape parks (446 828.97 ha) of IUCN cat. V

CNPA member areas stretch over **28.4%** of the PL territory within the scope of application of the Carpathian Convention (18 612.48 km^2)

Zonation in landscape parks

Landscape parks have no zonation prescribed by the law, but

- landscape parks include e.g. strict nature reserves (A)
- some nature reserves have external buffer zones (B)
- some landscape parks (C) have external buffer zones (D)

13 landscape parks in the PL part of the Carpathian region together encompass **446 828.97 ha**

5 LPs have external buffer zones of **125 969.67 ha** (in total)

Zonation in national parks

Each national park in Poland is divided into three protective / functional zones:

- strict protection zone (A)
- active protection zone (B)
- landscape protection zone (C)

Furthermore, national parks have legally designated <u>external</u> buffer zones (D)

Zonation in Carpathian national parks

6 national parks in the PL part of the Carpathian region together encompass **82 563.13 ha**, divided into:

- strict protection zone (A) 43 209.18 ha (52.33%)
- active protection zone (B) 34 689.68 ha (42.02%)
- landscape protection zone (C) 4 664.28 ha (5.65%)

+NP external buffer zones (D) **106 670.95 ha** in total (in the East Carpathians BR national park external buffer zone partly overlaps two landscape parks)

Babia Góra National Park

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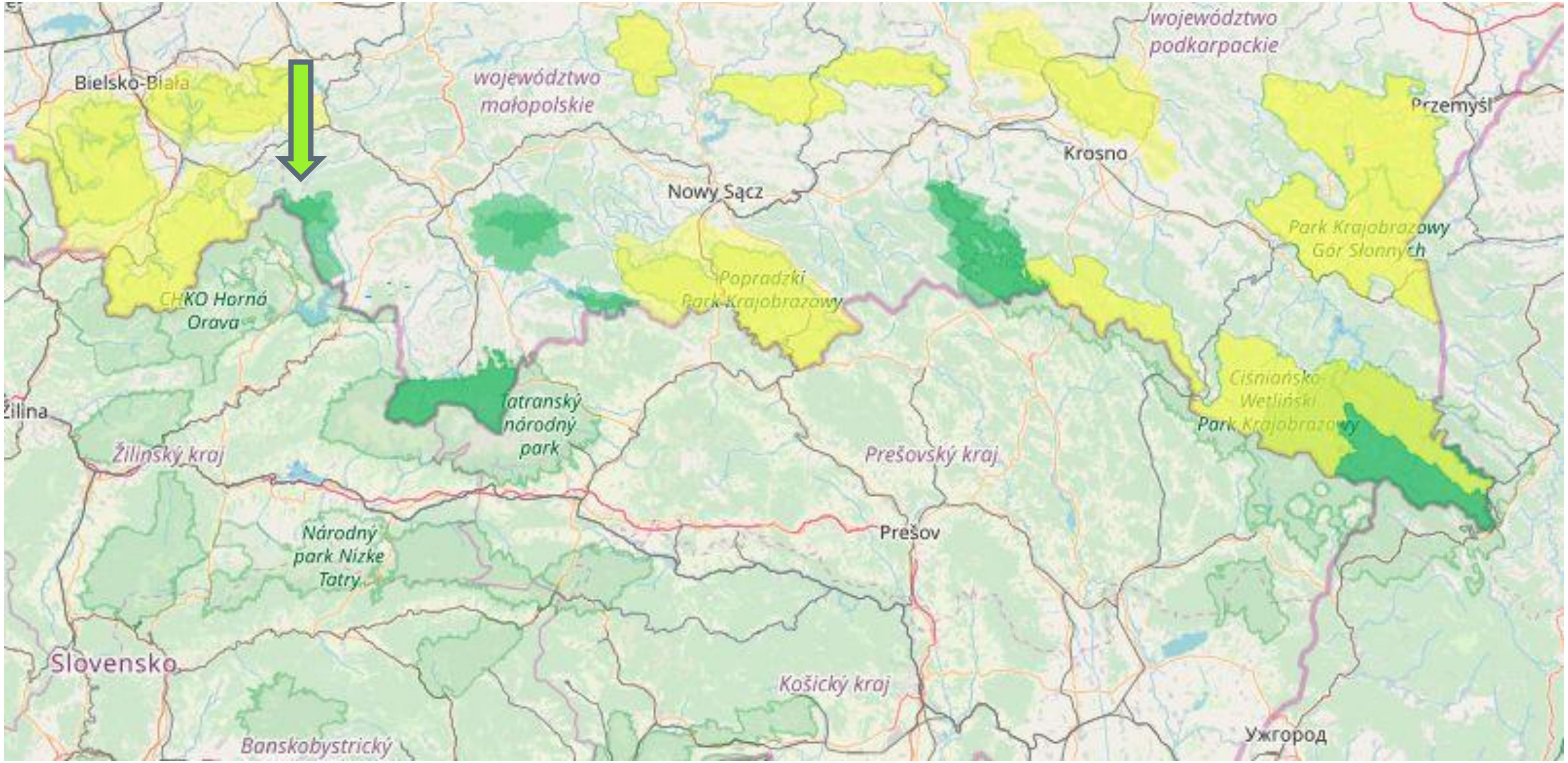


Photo: http://zpppn.pl/parki-narodowe


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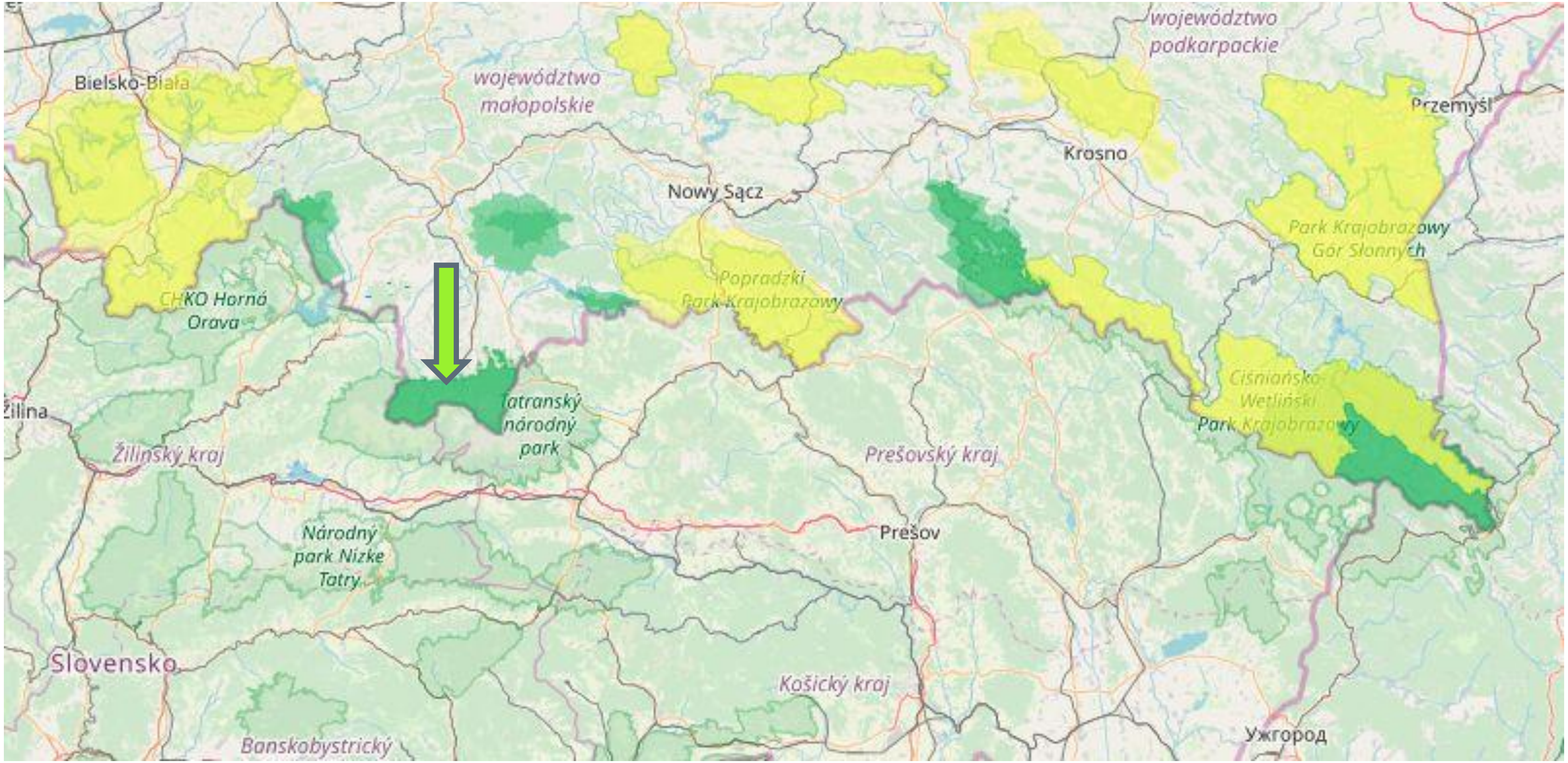
Babia Góra National Park

NP total area	**3391,55 ha**
▪ strict protection zone	1125,82 ha (33,19%)
▪ active protection zone	2083,57 ha (61,14%)
▪ landscape protection zone	182,16 ha (5,37%)
+ NP external buffer zone	**8437,00 ha**

Tatra National Park

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Tatra National Park

NP total area **21167,82 ha**

- strict protection zone 14984,12 ha (70,79%)
- active protection zone 3469,30 ha (16,39%)
- landscape protection zone 2714,40 ha (12,82%)

\+ NP external buffer zone **180,95 ha**

Gorce National Park

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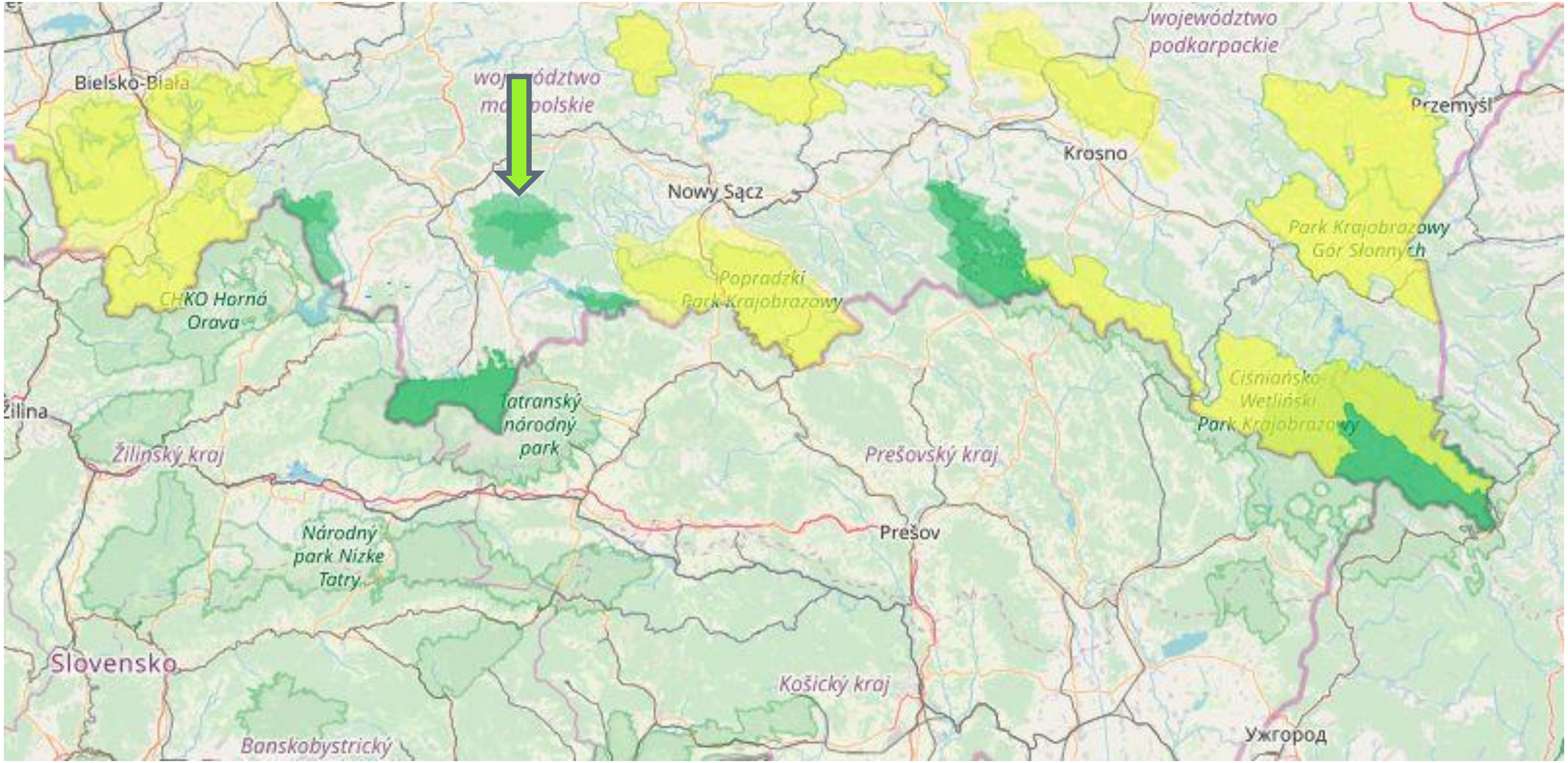


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Gorce National Park

NP total area	**7029,85 ha**
▪ strict protection zone	3611,07 ha (51,37%)
▪ active protection zone	2882,51 ha (41,00%)
▪ landscape protection zone	536,27 ha (7,63%)
+ NP external buffer zone	**16647,00 ha**

Pieniny National Park

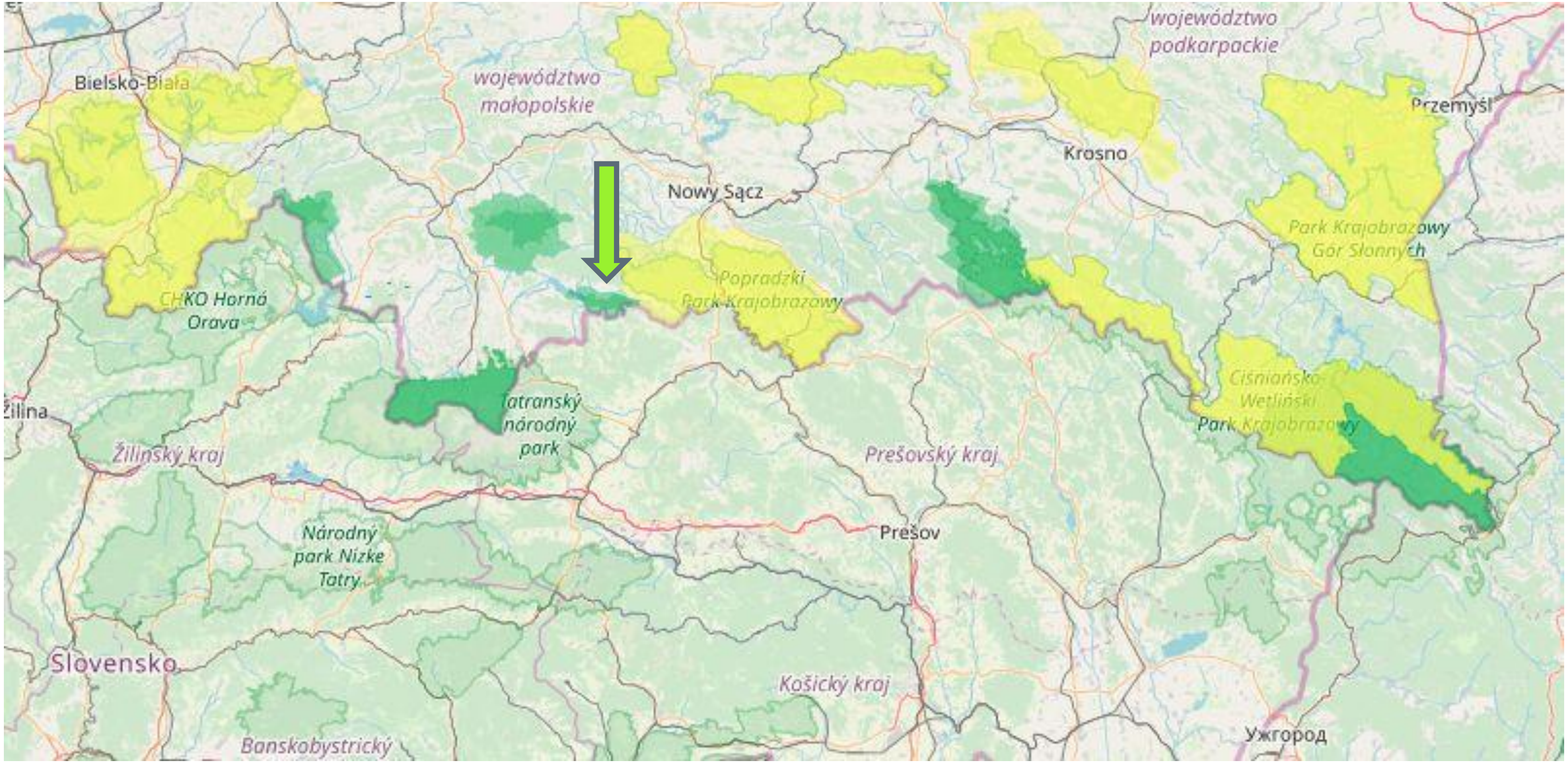


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Photo: http://zpppn.pl/parki-narodowe

Pieniny National Park

NP total area	**2371,75 ha**
▪ strict protection zone	743,92 ha (31,36%)
▪ active protection zone	532,94 ha (22,47%)
▪ landscape protection zone	1094,89 ha (46,16%)
+ NP external buffer zone	**2653,80 ha**

Magura National Park

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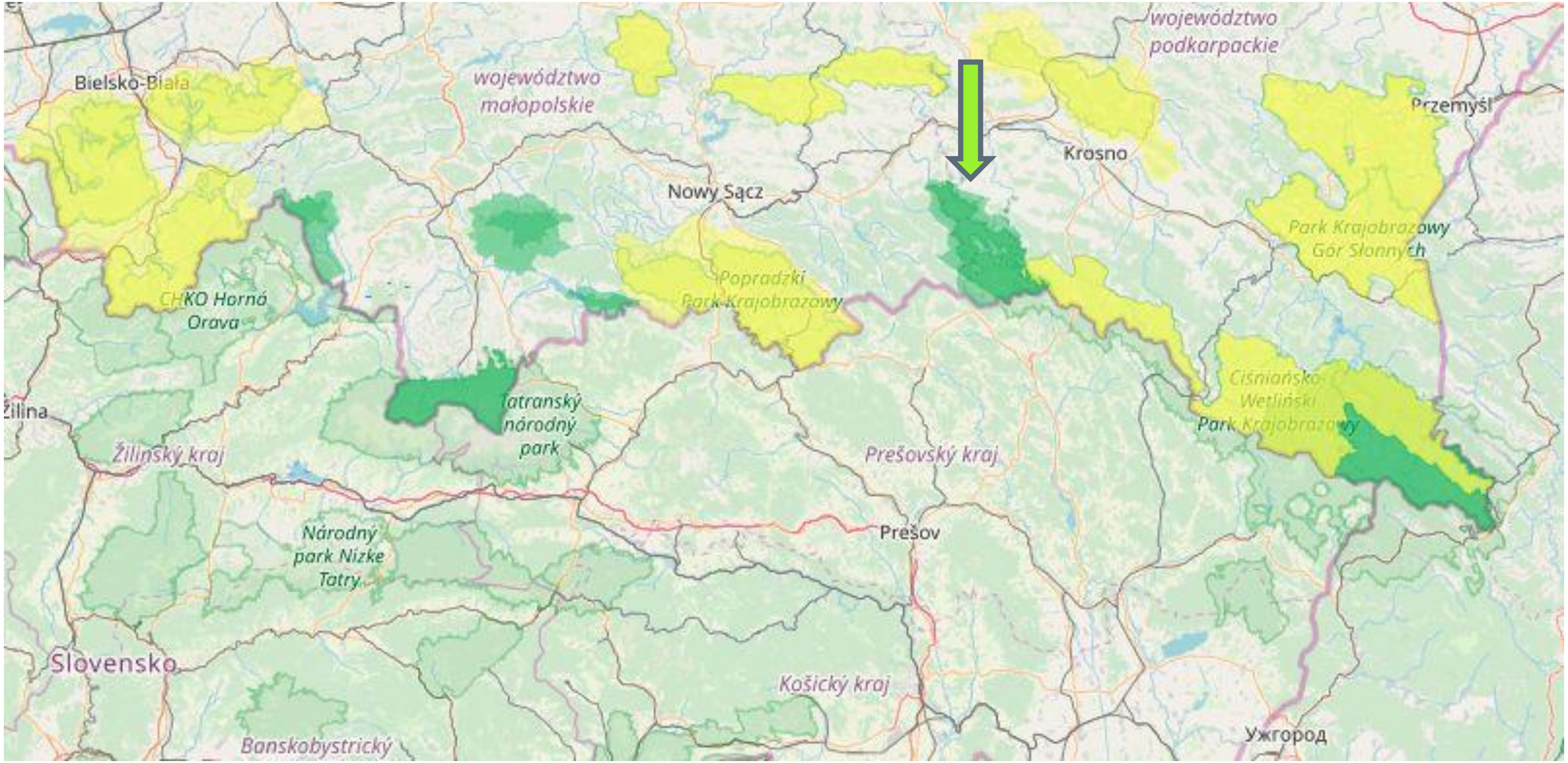


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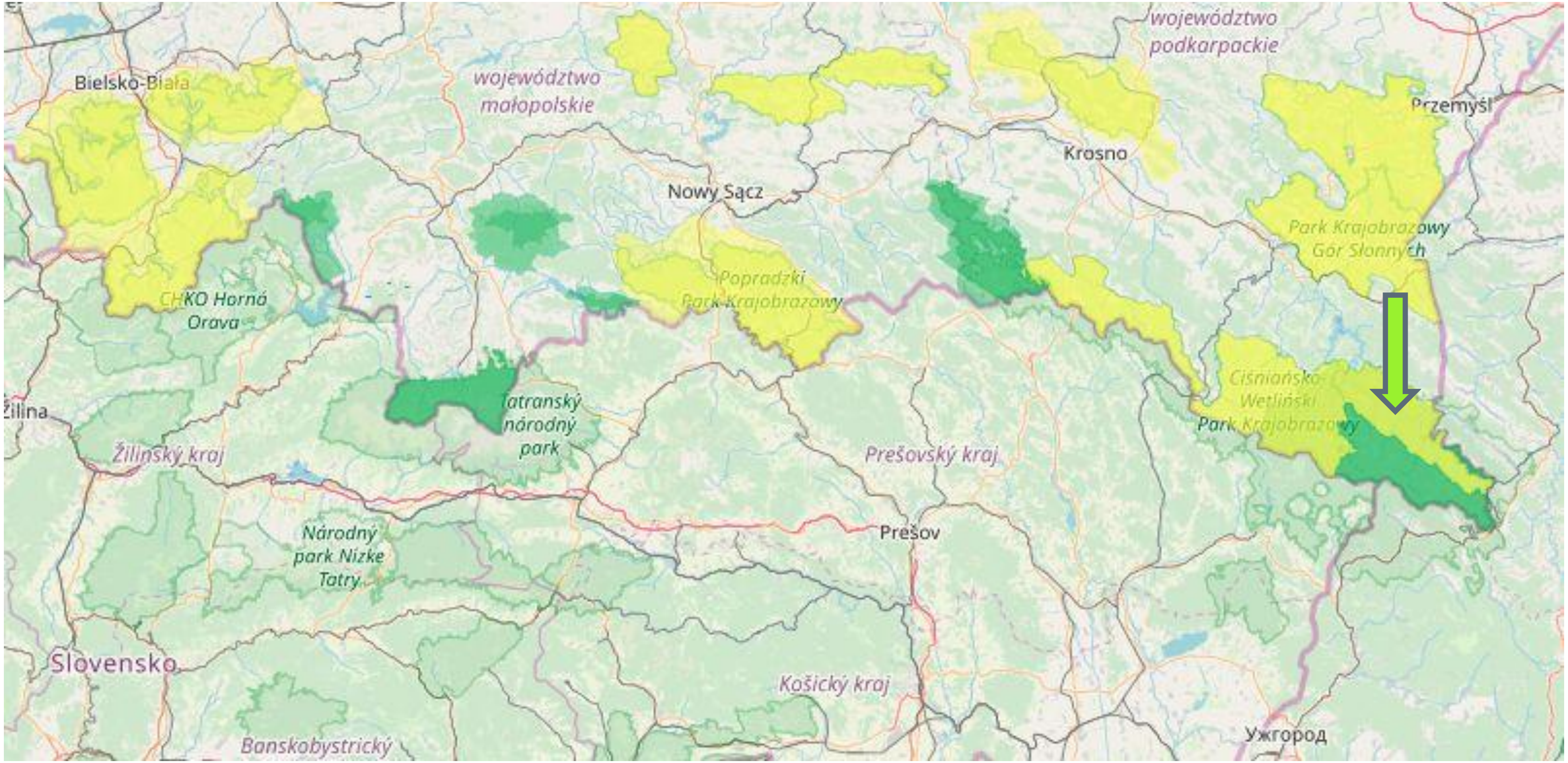
Photo: http://zpppn.pl/parki-narodowe

Magura National Park

NP total area	**19400,00 ha**
▪ strict protection zone	2408,00 ha (12,41%)
▪ active protection zone	16936,36 ha (87,30%)
▪ landscape protection zone	55,64 ha (0,29%)
+ NP external buffer zone	**22969,00 ha**

Bieszczady National Park

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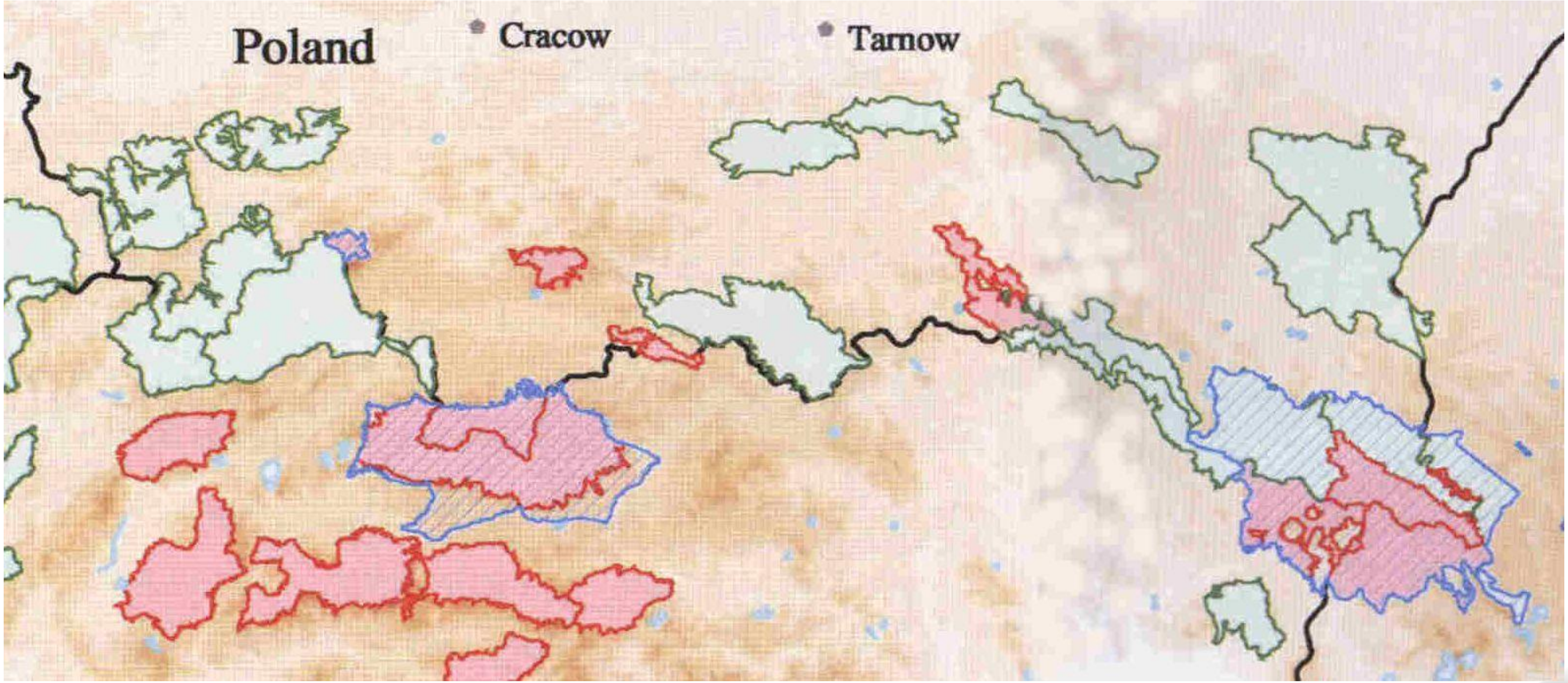
Bieszczady National Park

NP total area	**29202,16 ha**
▪ strict protection zone	20336,25 ha (69,64%)
▪ active protection zone	8785,00 ha (30,08%)
▪ landscape protection zone	80,92 ha (0,28%)
+ NP external buffer zone	**55783,20 ha**

PA zonation vs. transboundary ecological connectivity

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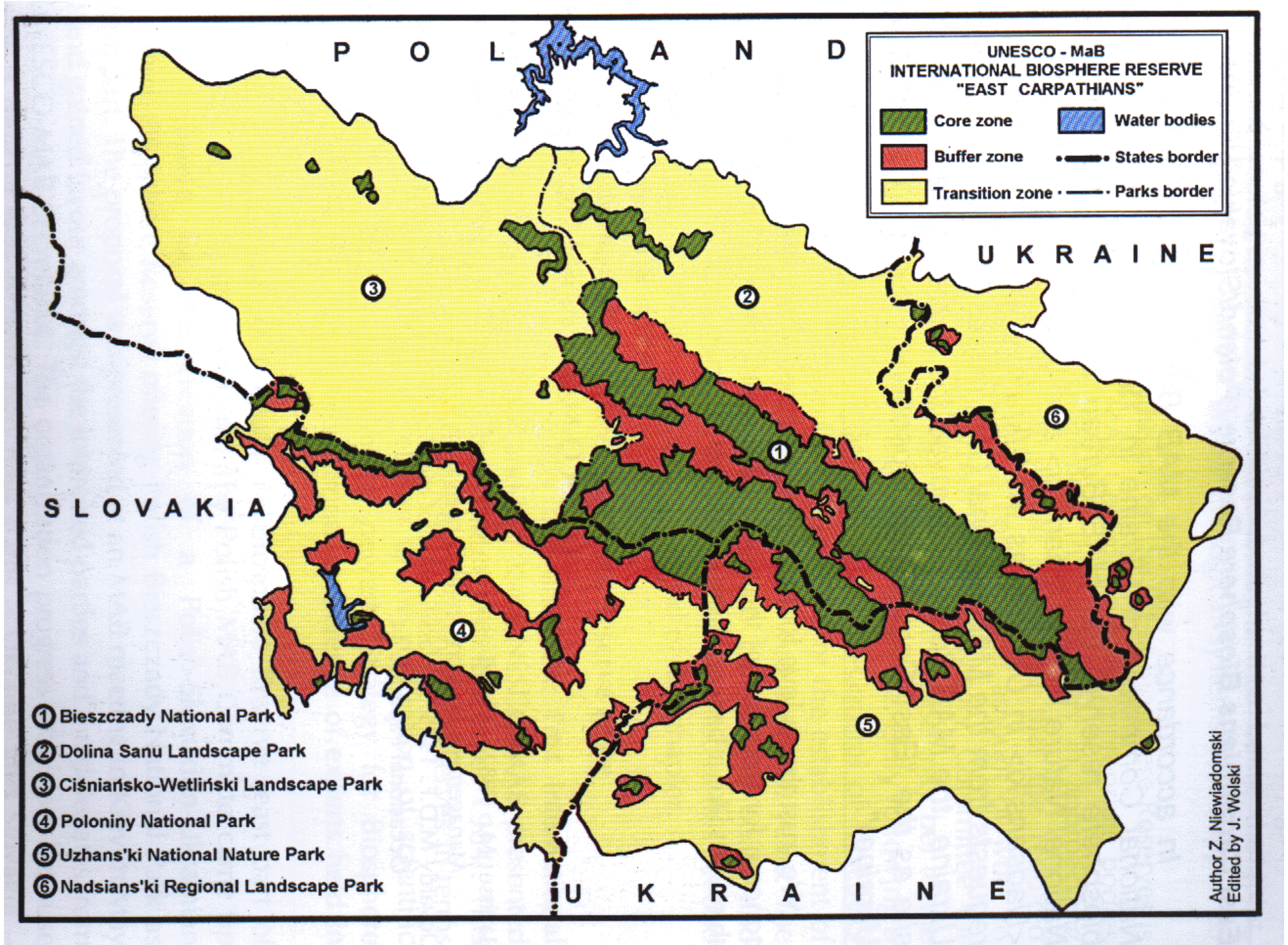
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"EAST CARPATHIANS"
Core zone
Water bodies
Buffer zone
States border
Transition zone
Parks border
P O L A N D
U K R A I N E
S L O V A K I A
U K R A I N E
1 Bieszczady National Park
2 Dolina Sanu Landscape Park
3 Ciśniańsko-Wetliński Landscape Park
4 Poloniny National Park
5 Uzhans'ki National Nature Park
6 Nadsians'ki Regional Landscape Park
Author Z. Niewiadomski
Edited by J. Wolski


Photo: ©Zbigniew Niewiadomski

Thank you!

Grazie! / Danke!

Děkuji!

Köszönöm!

Dziękuję!

Mulțumesc!

Хвала!

Ďakujem!

Дякую!

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