SLAM lidar alkalmazása az erdőgazdálkodásban, adatfeldolgozás nyíltforráskódú megoldásokkal

Kiss Csaba

~~13. Foszforgézú~~ FényTérKép
~~2026. június 5.~~ 2026.10.02.

PILISI PARKERDŐ
PARKERDŐ AZ EMBERÉRT

Makita

GNSS Frequency bands:

- GPS: L1 C/A, L1C, L5, L2C
- GLONASS: L1, L2
- Galileo: E1, E5a, E5b, E6
- BDS: B1I, B1C, B2a, B2b, B2I, B3I
- QZSS: L1 C/A, L1C, L5, L2C
- NavIC: L5
- SBAS: L1 C/A
- L-band PPP:
  - PPP: B2b
  - QZSS: L6
  - Galileo HAS: E6
- Concurrent signal reception: 5 + QZSS
  - L1, L2, L5, E6 frequency bands
- Built-in NIC anti-jamming unit
- Tracking Channels: 1040
- Horizontal Position Accuracy:
  - Autonomous: 0.7m
  - RTK: 0.8cm + 1ppm
- Vertical Accuracy:
  - Autonomous: 2.5m
  - RTK: 1.5cm + 1ppm
- Velocity Accuracy Without Aid: 0.03m/s
- Accuracy of 1PPS Signal: 5ns (RMS)
- RTK Convergence Time: 5s
- Time to First Fix (without AGNSS):
  - Cold Start: 28s
  - Warm Start: 28s
  - Hot Start: 1.7s
- Sensitivity:
  - Acquisition: -146dBm
  - Tracking: -160dBm
  - Reacquisition: -155dBm
- Dynamic Performance:
  - Maximum Altitude: 10000m
  - Maximum Velocity: 490m/s
  - Maximum Acceleration: 4g
- Update Rate:
  - Default: 10Hz
  - Max: 20Hz
- Operating temperature: -40°C to +85°C

Nikon
Forestry Pro II
[m][1st]
37.8°
3P
25.5
17.4
:25
WATERPROOF 6x21

24151
Silvanus
Spiegel
Relaskop®
by Dr. W. Bitterlich
Made in Austria
MobileForester

Point #761617
X 0.670119 Nx -0.518319 R 130
Y 0.280285 Ny 0.585852 G 133
Z -0.987362 Nz 0.622995 B 131
2

Sándor Ágnes

MID-360

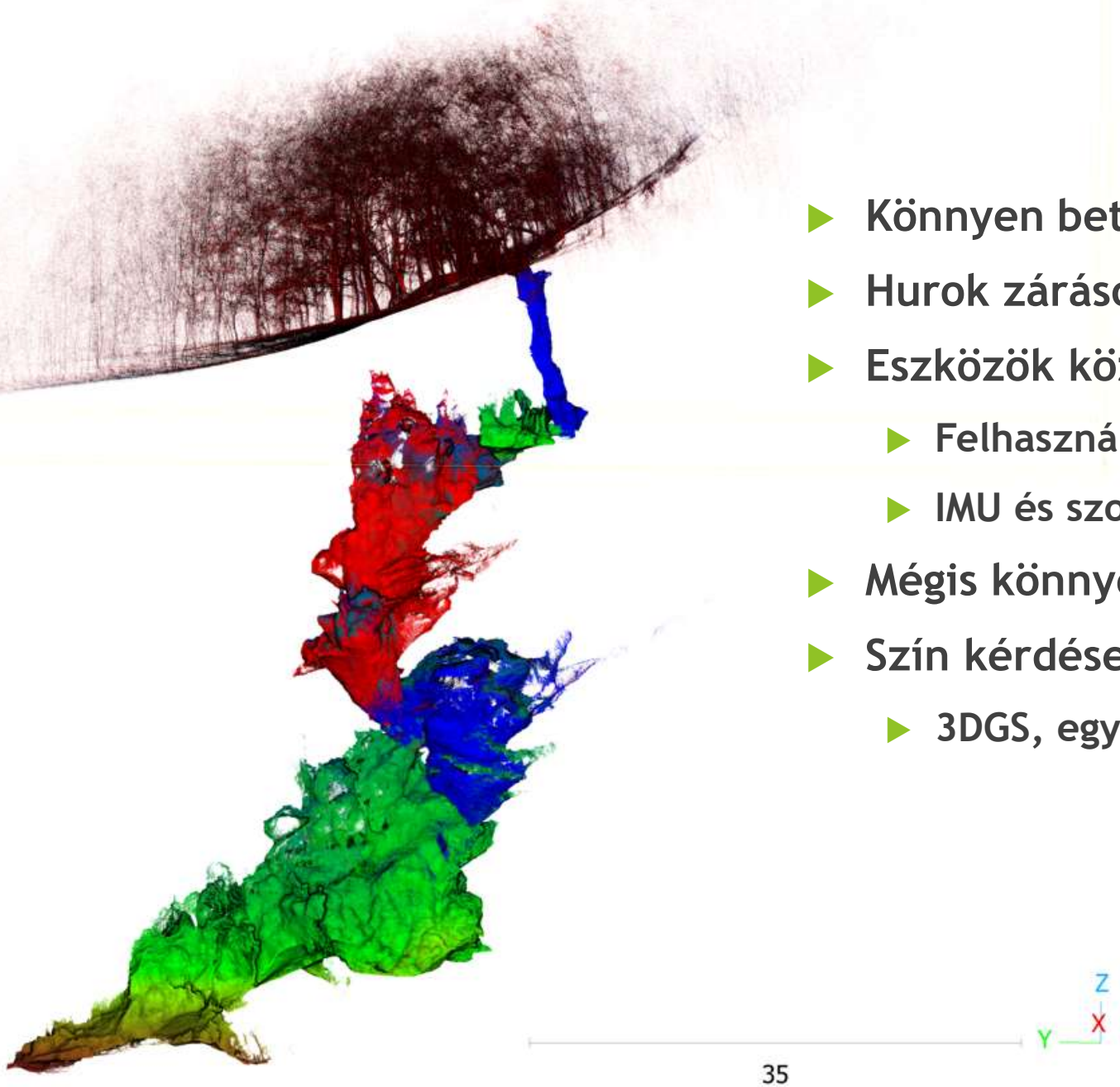
Small But Mighty

Sándor Ágnes

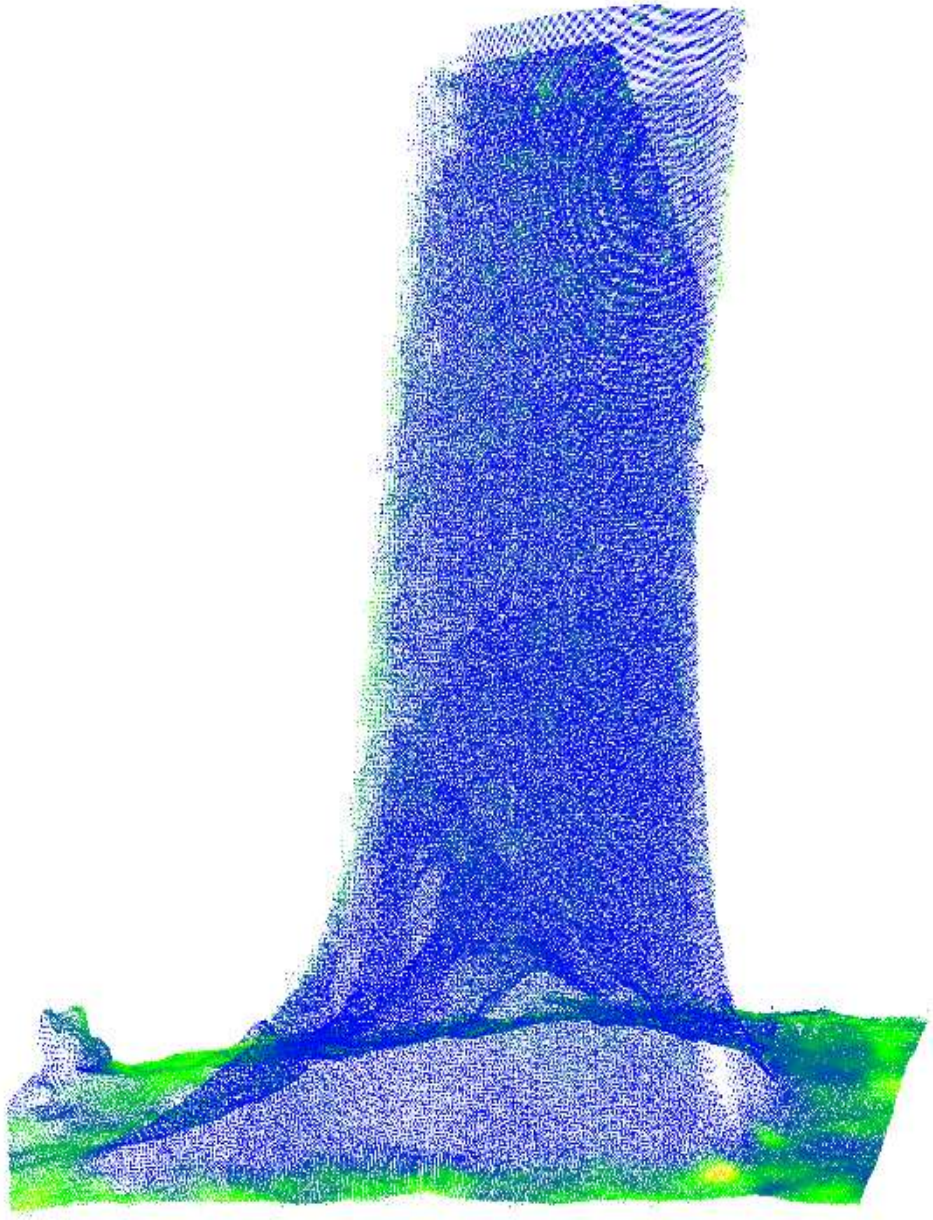
fjd Vision

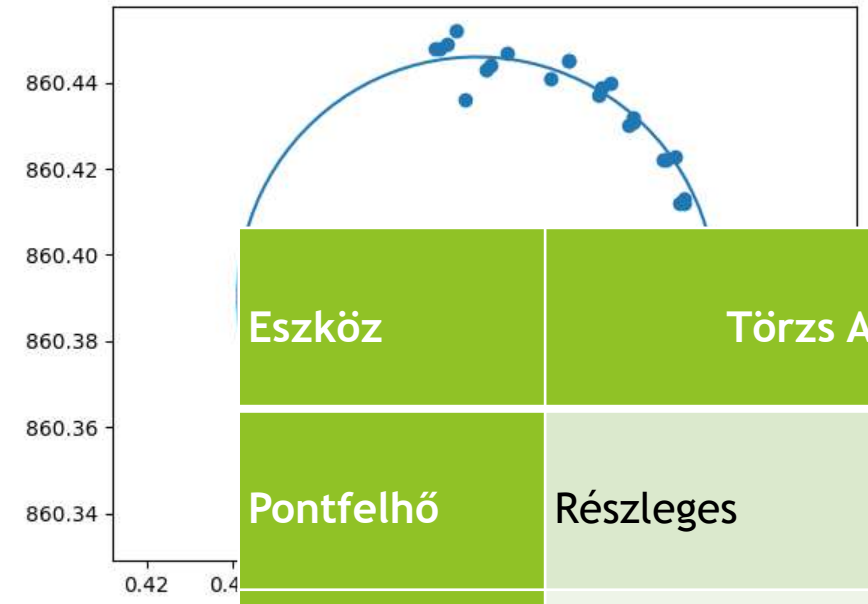
Z
Y
X

Z
Y
X

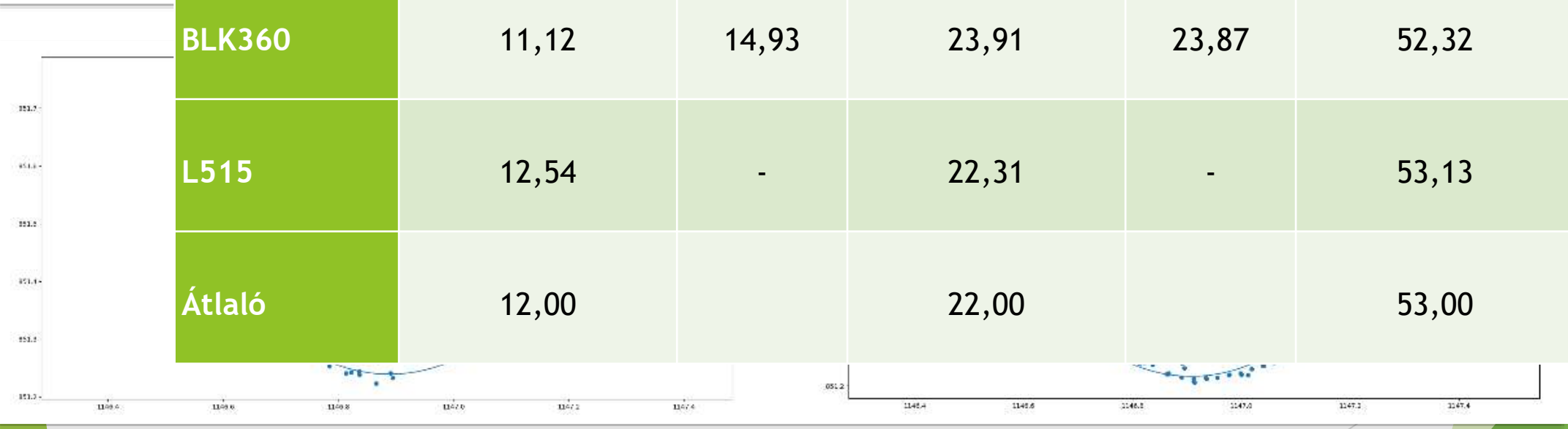


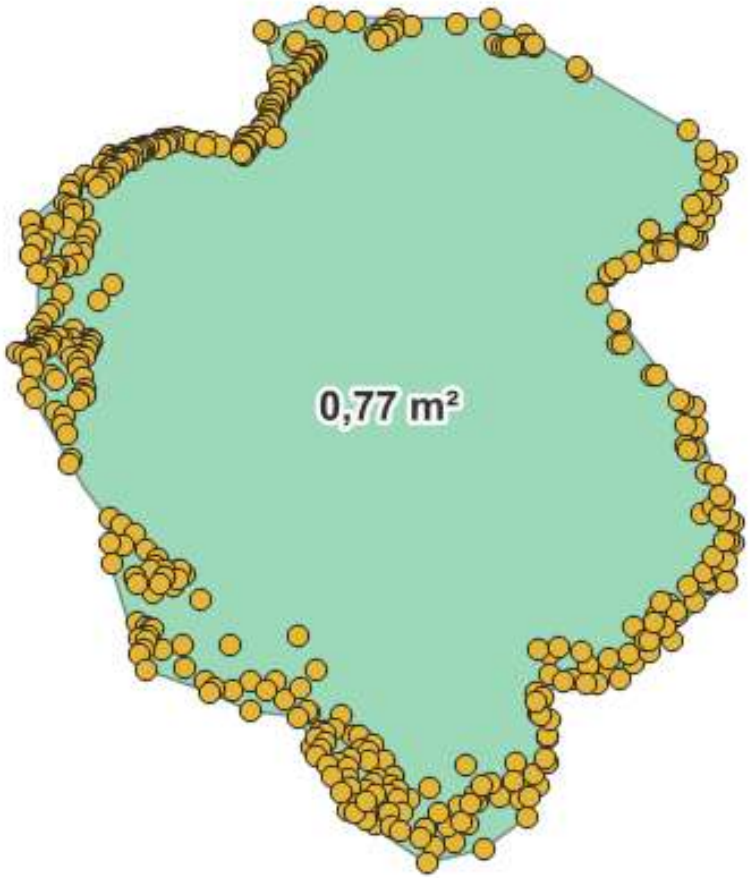
- Könnyen betanulható
- Hurok zárások csak ritkán
- Eszközök közötti jelentős hardware különbség
  - Felhasználói tapasztalat
  - IMU és szoftveres diferencia
- Mégis könnyen kombinálható adatállományok
- Szín kérdése
  - 3DGS, egyéb fotogrammetria, Blender

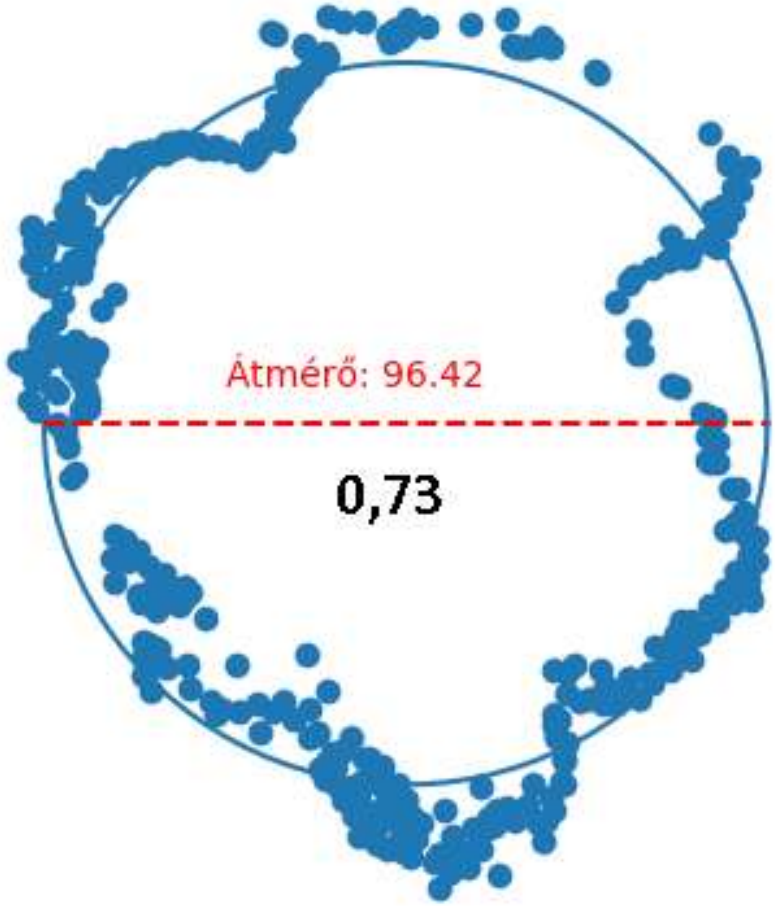


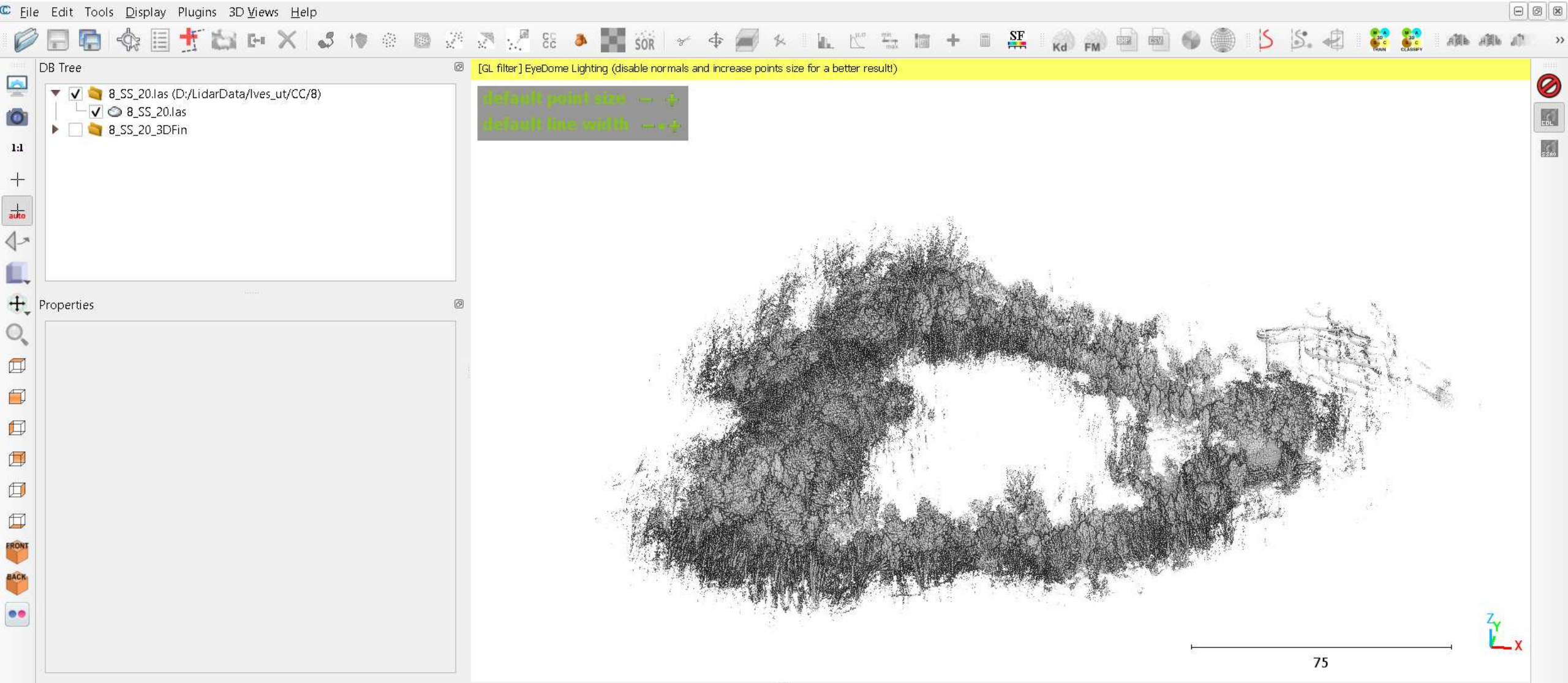


Eszköz	Törzs A [cm]		Törzs B [cm]		Törzs C [cm]	
Pontfelhő	Részleges	Teljes	Részleges	Teljes	Részleges	Teljes
BLK360	11,12	14,93	23,91	23,87	52,32	55,02
L515	12,54	-	22,31	-	53,13	-
Átlaló	12,00		22,00		53,00	




0,77 m²


Átmérő: 96.42
0,73


File Edit Tools Display Plugins 3D Views Help
DB Tree
8_SS_20.las (D:/LidarData/Ives_ut/CC/8)
8_SS_20.las
8_SS_20_3DFin
Properties
[GL filter] EyeDome Lighting (disable normals and increase points size for a better result!)
default point size
default line width
75
Console
[08:41:05] Warning: 3DFin has detected a potential error in the terrain modelling.
[08:41:05] This usually happens when the "cloth resolution" parameter didn't fit well the terrain.
[08:41:05] Learn more about this here https://github.com/3DFin/3DFin_Tutorial

CloudCompare v2.13.2 (Kharkiv - Jul 6 2024) [64-bit] - [3D View 1]

File Edit Tools Display Plugins 3D Views Help

DB Tree

8_SS_20.las (D:/LidarData/lves_ut/CC/8)
8_SS_20.las
8_SS_20_3DFin

Properties

Property	State/Value
CC Object	
Name	8_SS_20.las
Visible	✓
Colors	RGB
Show name (i...	
Box dimensions	X: 283.959 (-0.00420959 : 283.955) Y: 256.498 (-0.00399414 : 256.494) Z: 101.396 (-6.657 : 94.739)
Shifted box ce...	X: 141.975 Y: 128.245 Z: 44.041
Global box ce...	X: -52.444704 Y: -6.344990 Z: 44.041000
Info	Object ID: 260 - Children: 0
Current Display	3D View 1
Cloud	
Points	18,475,213
Global shift	(194.42;134.59;0.00)

Console

[08:57:10] Failed to start Python actions: RuntimeError: Please select one point cloud

At:
C:\Program Files\CloudCompare\plugins\Python\Lib\site-packages\three_d_fin\cloudcompare\plugin.py(68): main

[GL filter] EyeDome Lighting (disable normals and increase points size for a better result)

3DFin v0.4.1

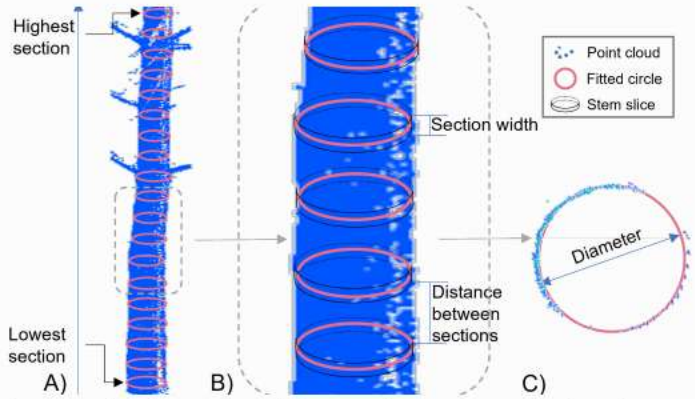
Basic | Advanced | Expert | About

Expected maximum diameter	1.0
Stem search diameter	2.0
Lowest section	0.3
Highest section	25.0
Distance between sections	0.2
Section width	0.05

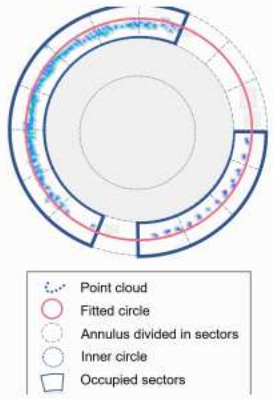
Advanced Parameters

If the results obtained by just tweaking basic parameters do not meet your expectations, you might want to modify these.

You can get a brief description of what they do by hovering the mouse over the info icon right before each parameter. However, keep in mind that a thorough understanding is advisable before changing these. For that, you can get a better grasp of what the algorithm does in the attached documentation. You can easily access it through the documentation button in the bottom-right corner.



A) Sections along the stem B) Detail of computed sections showing the distance between them and their width C) Circle fitting to the points of a section



Several quality controls are implemented to validate the fitted circles, such as measuring the point distribution along the sections.

File already set by the application | Select file | Output Directory | D:\Users\kisscs.PPRT | Select dir | Compute

75

File Edit Tools Display Plugins 3D Views Help

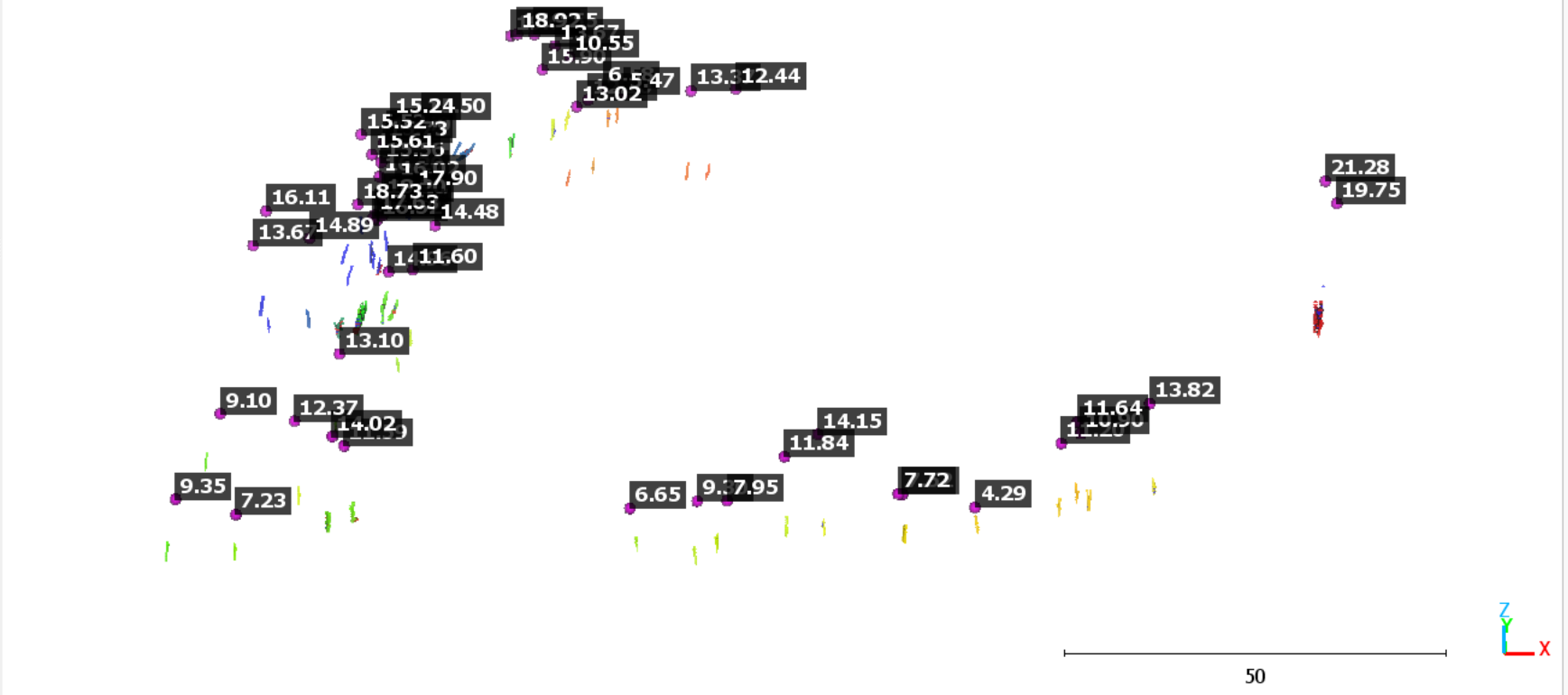
DB Tree

- 8_SS_20.las (D:/LidarData/lves_ut/CC/8)
- 8_SS_20_3DFin
  - dtm
  - Stems in stripe
  - 8_SS_20.las
  - Highest points
  - Fitted sections
  - Axes
  - Tree locator

Properties

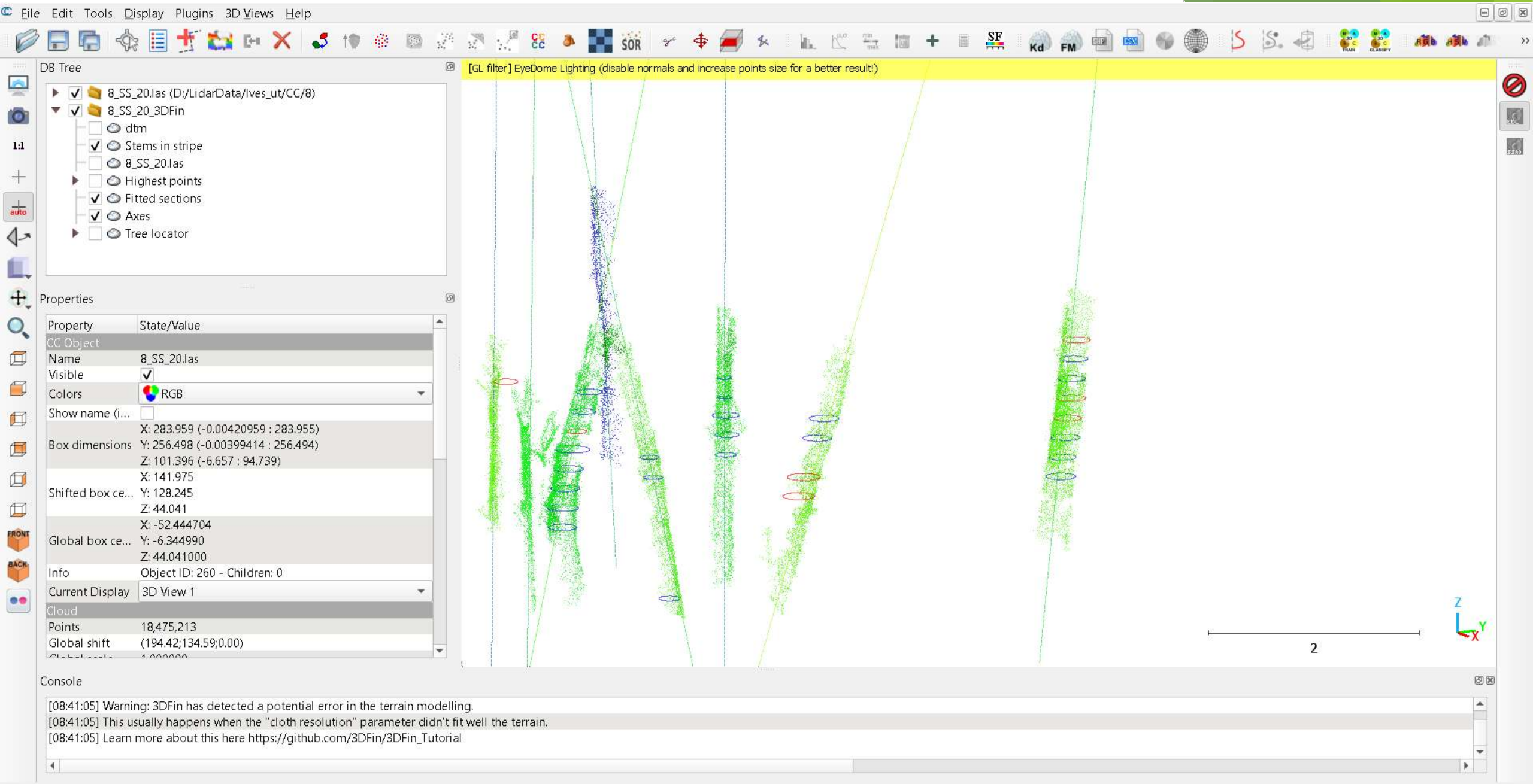
Property	State/Value
CC Object	
Name	8_SS_20.las
Visible	☑
Colors	RGB
Show name (i...	☐
Box dimensions	X: 283.959 (-0.00420959 : 283.955) Y: 256.498 (-0.00399414 : 256.494) Z: 101.396 (-6.657 : 94.739)
Shifted box ce...	X: 141.975 Y: 128.245 Z: 44.041
Global box ce...	X: -52.444704 Y: -6.344990 Z: 44.041000
Info	Object ID: 260 - Children: 0
Current Display	3D View 1
Cloud	
Points	18,475,213
Global shift	(194.42;134.59;0.00)

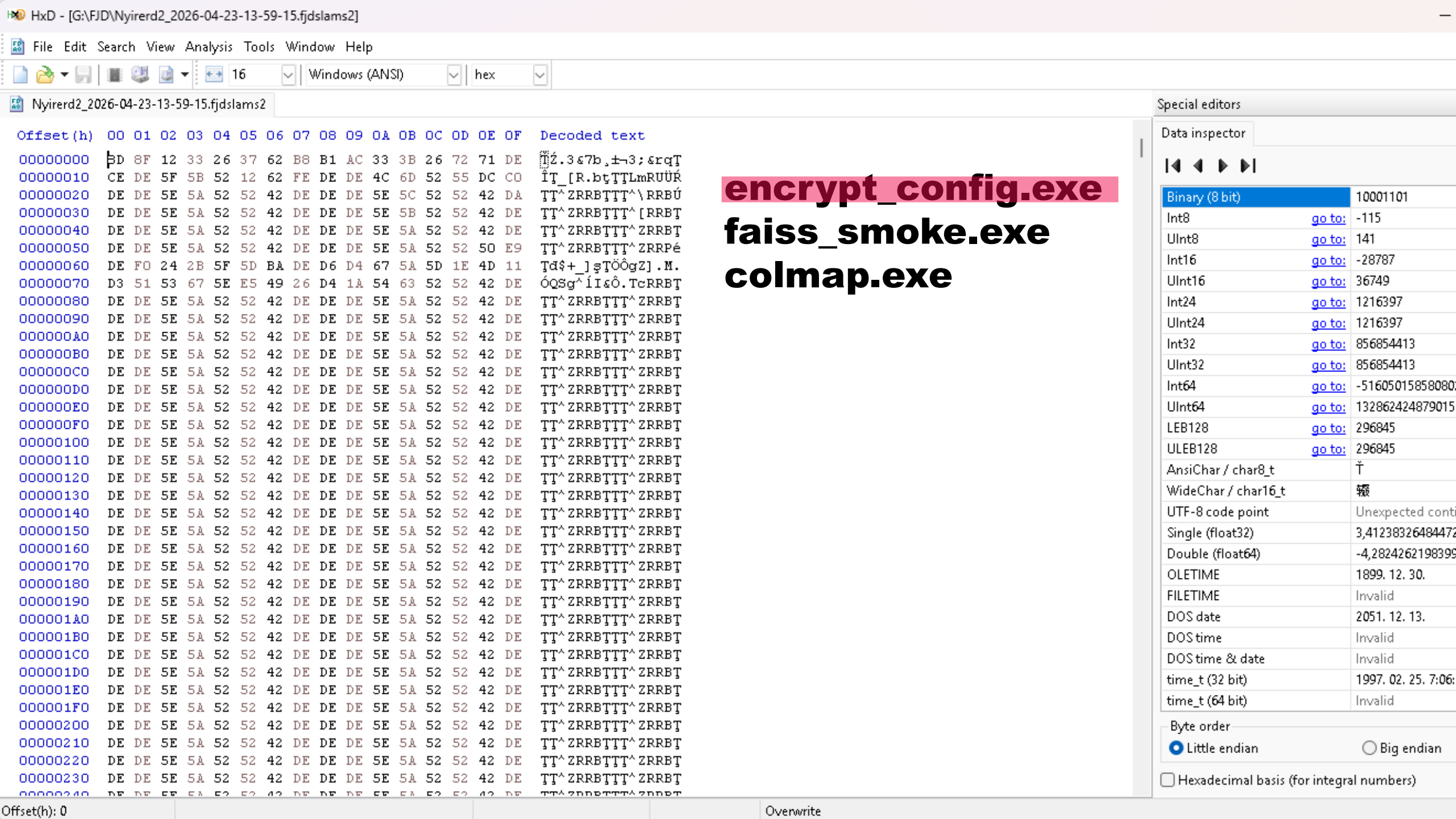
[GL filter] EyeDome Lighting (disable normals and increase points size for a better result!)

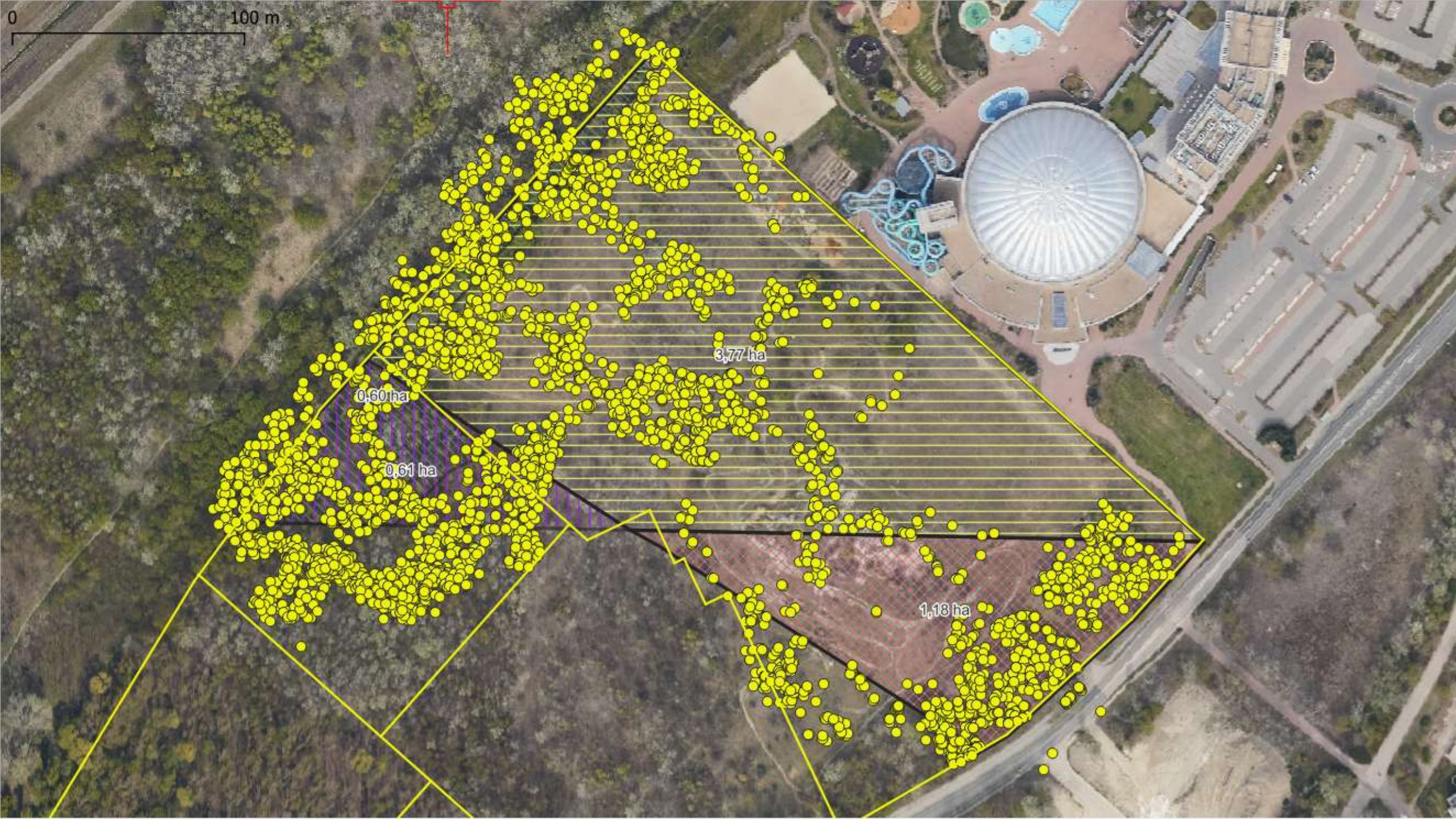


Console

[08:41:05] Warning: 3DFin has detected a potential error in the terrain modelling.
[08:41:05] This usually happens when the "cloth resolution" parameter didn't fit well the terrain.
[08:41:05] Learn more about this here https://github.com/3DFin/3DFin_Tutorial


File Edit Tools Display Plugins 3D Views Help
DB Tree
8_SS_20.las (D:/LidarData/lves_ut/CC/8)
8_SS_20_3DFin
dtm
Stems in stripe
8_SS_20.las
Highest points
Fitted sections
Axes
Tree locator
Properties
Property
State/Value
CC Object
Name
8_SS_20.las
Visible
Colors
RGB
Show name (i...
Box dimensions
X: 283.959 (-0.00420959 : 283.955)
Y: 256.498 (-0.00399414 : 256.494)
Z: 101.396 (-6.657 : 94.739)
Shifted box ce...
X: 141.975
Y: 128.245
Z: 44.041
Global box ce...
X: -52.444704
Y: -6.344990
Z: 44.041000
Info
Object ID: 260 - Children: 0
Current Display
3D View 1
Cloud
Points
18,475,213
Global shift
(194.42;134.59;0.00)
[GL filter] EyeDome Lighting (disable normals and increase points size for a better result!)
2
Z
Y
X
Console
[08:41:05] Warning: 3DFin has detected a potential error in the terrain modelling.
[08:41:05] This usually happens when the "cloth resolution" parameter didn't fit well the terrain.
[08:41:05] Learn more about this here https://github.com/3DFin/3DFin_Tutorial


HxD - [G:\FJD\Nyirerd2_2026-04-23-13-59-15.fjdslams2]
File Edit Search View Analysis Tools Window Help
16
Windows (ANSI)
hex
Nyirerd2_2026-04-23-13-59-15.fjdslams2
Special editors
Data inspector
Offset (h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F Decoded text
00000000 BD 8F 12 33 26 37 62 B8 B1 AC 33 3B 26 72 71 DE
00000010 CE DE 5F 5B 52 12 62 FE DE DE 4C 6D 52 55 DC C0
00000020 DE DE 5E 5A 52 52 42 DE DE DE 5E 5C 52 52 42 DA
00000030 DE DE 5E 5A 52 52 42 DE DE DE 5E 5B 52 52 42 DE
00000040 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000050 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 50 E9
00000060 DE F0 24 2B 5F 5D BA DE D6 D4 67 5A 5D 1E 4D 11
00000070 D3 51 53 67 5E E5 49 26 D4 1A 54 63 52 52 42 DE
00000080 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000090 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000000A0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000000B0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000000C0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000000D0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000000E0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000000F0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000100 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000110 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000120 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000130 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000140 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000150 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000160 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000170 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000180 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000190 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000001A0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000001B0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000001C0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000001D0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000001E0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
000001F0 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000200 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000210 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000220 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
00000230 DE DE 5E 5A 52 52 42 DE DE DE 5E 5A 52 52 42 DE
encrypt_config.exe
faiss_smoke.exe
colmap.exe
Binary (8 bit) 10001101
Int8 go to: -115
UInt8 go to: 141
Int16 go to: -28787
UInt16 go to: 36749
Int24 go to: 1216397
UInt24 go to: 1216397
Int32 go to: 856854413
UInt32 go to: 856854413
Int64 go to: -51605015858080
UInt64 go to: 132862424879015
LEB128 go to: 296845
ULEB128 go to: 296845
AnsiChar / char8_t
WideChar / char16_t
UTF-8 code point Unexpected conti
Single (float32) 3,41238326484472
Double (float64) -4,2824262198399
OLETIME 1899. 12. 30.
FILETIME Invalid
DOS date 2051. 12. 13.
DOS time Invalid
DOS time & date Invalid
time_t (32 bit) 1997. 02. 25. 7:06:
time_t (64 bit) Invalid
Byte order
Little endian
Big endian
Hexadecimal basis (for integral numbers)
Offset(h): 0
Overwrite


0
100 m
3,77 ha
0,60 ha
0,61 ha
1,18 ha

- Dedikált feldolgozó gép vagy parancssoros mód
- Fafaj meghatározás kérdése?
  - Pontfelhő morfológia
  - Fénykép, RGB
  - 3DGS
  - Kéreg mintázat
  - Elegyarány geotag-gel illesztőpont felvétel helyett
  - AI

Köszönöm a figyelmet!

GET 5% OFF

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- On Sale (9)
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- Quadcopter Frames (47)
- Ready-To-Fly Drones (32)

Availability

Items 1-20 of 187

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Fiber Optic Canister V2 - 50km

$3,790.00

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Fiber Optic Canister V1 - 50km

$3,790.00

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Fiber Optic Canister V2 - 40km

$2,990.00

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Fiber Optic Canister V1 - 40km

$2,990.00

Add to Cart

Fiber Optic Canister V2 - 30km

$2,390.00

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Fiber Optic Canister V1 - 30km

$2,390.00

Add to Cart

Fiber Optic Canister V2 - 25km

$1,890.00

Add to Cart

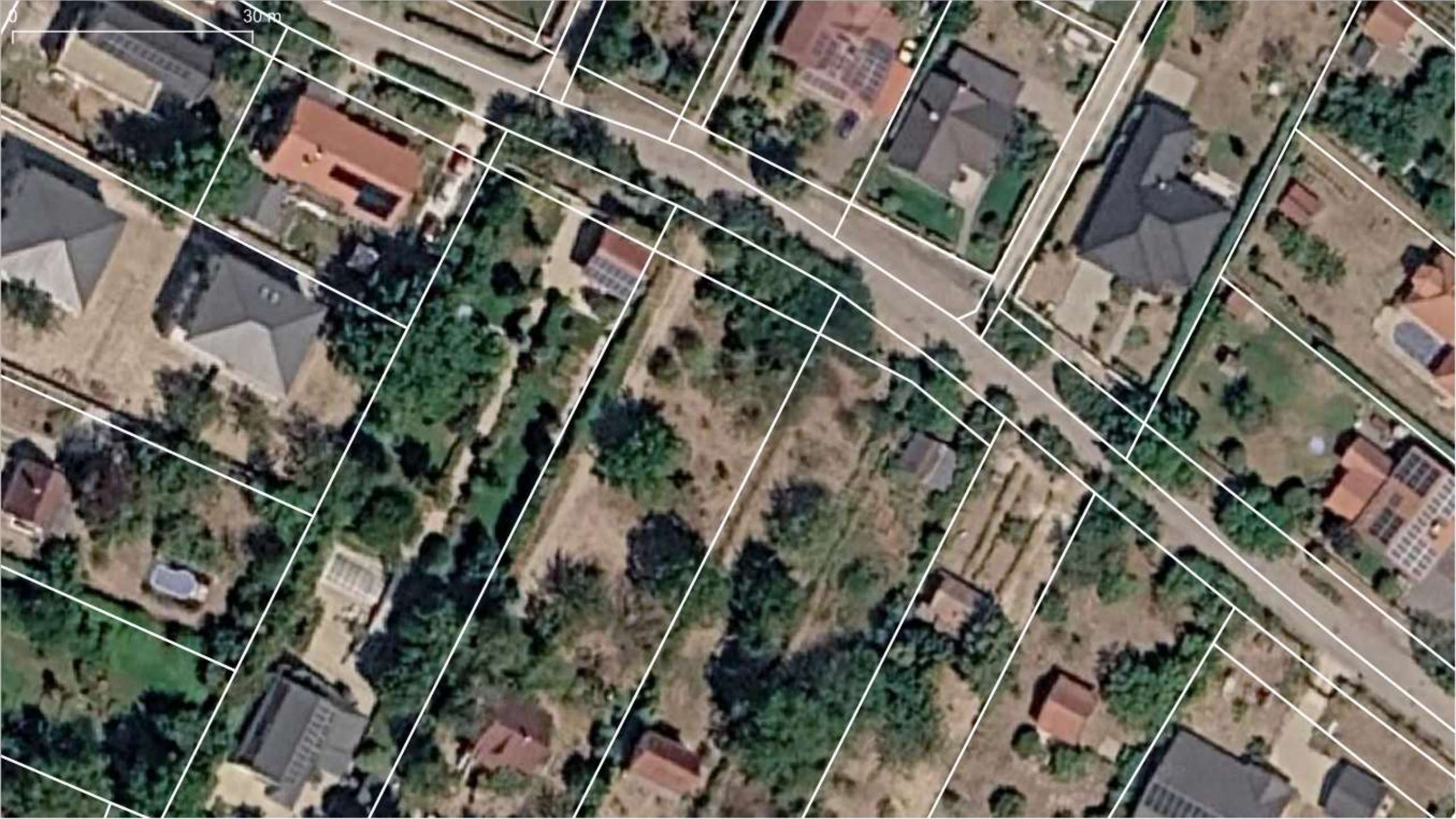
Fiber Optic Canister V1 - 25km

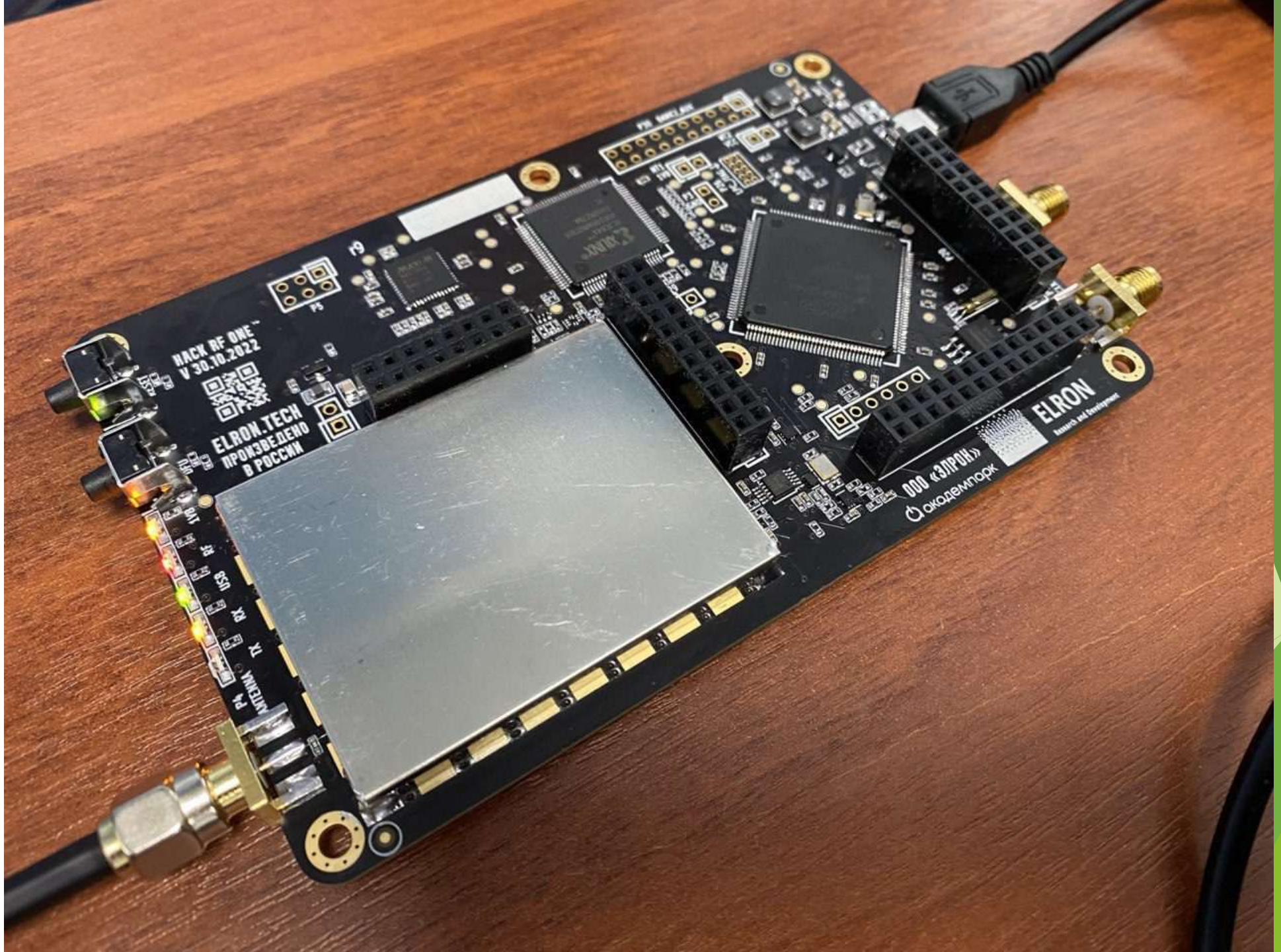
$1,890.00

Add to Cart

Chat

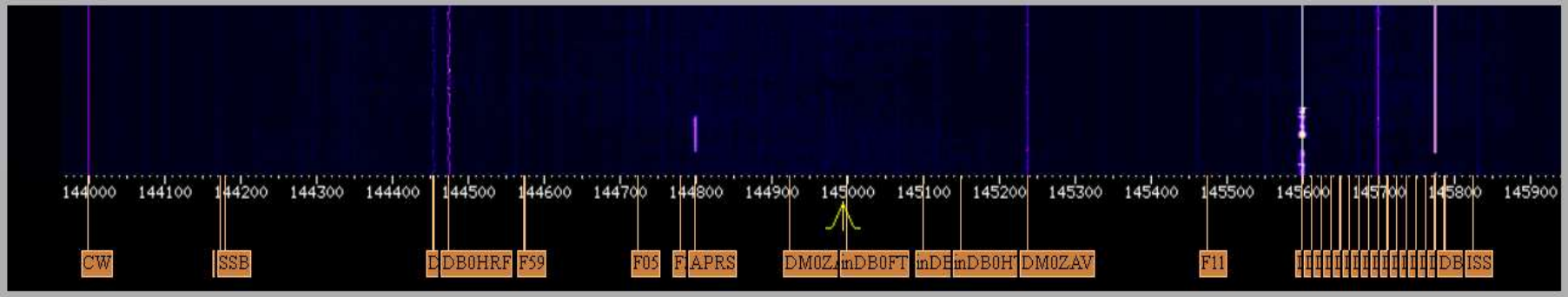
Cables From Fi
Drones Cover I
Areas of Ukrai
IE
Birds in Ukraine are nesting
with fibre optic cables
from war drones
X /@RAINMAKER1973
Forests Covered
From Fiber-Optic
Drones


0
30 m


HACK RF ONE
V 30.10.2022
ELRON.TECH
ПРОИЗВЕДЕНО
В РОССИИ
ELRON
ООО «ЭЛРОН»
академпарк
ANTENNA
TX
RX
USB
BIAS

RECEPTOR DE CARUARU, PE - POR PY7NM http://py7nmcaruarupe.ddns.net:81/ HI21AU82RH; 2 users	6.688 - 7.712 MHz	DIPOLO	16
	9.032 - 10.568 MHz		
	146.282 - 147.818 MHz		
	26.887 - 28.423 MHz	5/8	
UA6EH WebSDR Server http://85.173.189.23:8901/ LN03su98; 22 users	2.616 - 4.664 MHz	Inverted V and RTL-SDR V3	17
	6.588 - 7.612 MHz		
	9.988 - 11.012 MHz		
	13.608 - 14.632 MHz	Inverted V and RTL-SDR V3 Pro	
WebSDR for QO-100, 160/80m, 60/40m, 20m, 6m and local VHF/UHF/SHF bands 2m/70cm/23cm by DK1ML Frankfurt/Main reworked Oct. 2025 http://sdr.homeip.net:8901/ JO40IB; 15 users	143.961 - 146.009 MHz	2m: Diamond X50 40m above ground with Filter+PreAmp, RTL2838 TCXO	18
	437.976 - 440.024 MHz	70cm: Diamond X50 40m above ground with Filter+PreAmp, RTL2838 TCXO	
	1240.980 - 1243.020 MHz	23cm: Omni 8dBi 40m above ground, RTL2838 TCXO	
	10489.500 - 10490.000 MHz	QO-100: Dish 1.2m, Octagon LNB, locked with Leo Bodnar GPSDO, RTL2838 TCXO	
	1.800 - 3.848 MHz	160/80m: Homebrew HiEndFed-Dipole, 40m long, 40m above ground, RTL-Blog V4	
	5.190 - 7.238 MHz	60/40m: Homebrew HiEndFed-Dipole, 40m long, 40m above ground, RTL-Blog V4	
	13.994 - 14.506 MHz	20m: Homebrew Wirebeam pointing to USA/Asia, 40m above ground, RTL-Blog V4	
	50.094 - 50.286 MHz	6m: Dual-Band Dipole H-Pol., 40m above ground, FunCube V2 Pro+	
Muti-band webSDR located at the former RAF Hack Green in Cheshire http://hackgreensdr.org:8901/ IO83RA; 28 users	1.708 - 2.092 MHz	Double size G5RV @ 30m	19
	3.266 - 4.034 MHz		
	5.158 - 5.542 MHz		
	6.858 - 7.242 MHz		
	13.816 - 14.584 MHz		
	17.908 - 18.292 MHz		
"THIS IS SPARTA SDR MW-HF-VHF by SV3GCB with RTL & RSP1 Receivers and DEDICATED ANT for EACH Receiver www.spartasdr.gr http://sv3gcb.ddns.net:8905/ KM16FX | Sparta, Laconia-Peloponnese,GR; 18 users	0.783 - 1.807 MHz	MW-AM Ant: λ-Wave Square Loop (H-pol)	20
	49.978 - 51.002 MHz	6m Ant: λ/2 Vertical	
	27.551 - 29.599 MHz	10m Ant: 5/8-λ Vertical with radials	
	13.934 - 14.446 MHz	20m Ant: Full wave λ Delta Loop (North-sloper) RSP1	
	6.982 - 7.238 MHz	40m Ant: Full wave λ Delta Loop (44m) (12m/AGL) RSP1cl	
	5.272 - 6.808 MHz	60m Ant: G5RV Hor-Dipole (110ft trials)	
	3.419 - 3.931 MHz	80m Ant: Full wave λ Square Loop (84m) (15m/AGL) RSP1	
	1.544 - 2.056 MHz	160m Ant: λ/2 Hor-Dipole RSP1	

all bands | others slow | one band | blind | Allow keyboard | Waterfall: HTML5 Sound: HTML5



S meter

S-Meter Squelch: Off Set

Mute | Squelch | Notch1 | Notch2

Volume:

Soft Squelch:

S: Off

Gain control:

Auto | Alt AGC | Manual

Gain:

Try "Manual AGC" to reduce noise for QO-100 + SW.

Frequency - dual memory band select:

144995.00 DWN UP

-2.5k | -50 | -3 | 00 | +3 | +50 | +2.5k

2m | 70cm | 23cm | Qo100

160/80m | 60/40m | 20m | 6m

Click Band button twice for VFO-A/B

Waterfall:

zoom out | zoom in | Header

max out | max in | Labels

waterfall view | spectrum analyzer

weak signals | strong signals

Speed medium Size medium

Modulation:

CW | LSB | USB | AM | FM

CW-n | LSB-n | USB-n | AM-n | FM-n

CW-vn | LSB-vn | USB-vn | AM-vn | FM-vn

USB-CW On | Synchronous AM: SAM-U | SAM-L

Bandpass:

2.70 kHz@-6dB Pitch: 0 Hz rst

narrower | wider | <shift< | >shift>

<lower | lower> | <upper | upper>

APF 750 Hz Ref. Tone

VariNotch 2000 Hz

Memories:

recall | erase | store (new)

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Airport disruptions LIVE
Bookmarks
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Uzhhorod
Ужгород
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Eger
Nyíregyháza
Satu Mare
Baia Mare
Debrecen
Tatabánya
Szombathely
Székesfehérvár
Veszprém
Szolnok
Oradea
Zalău
Bistrița
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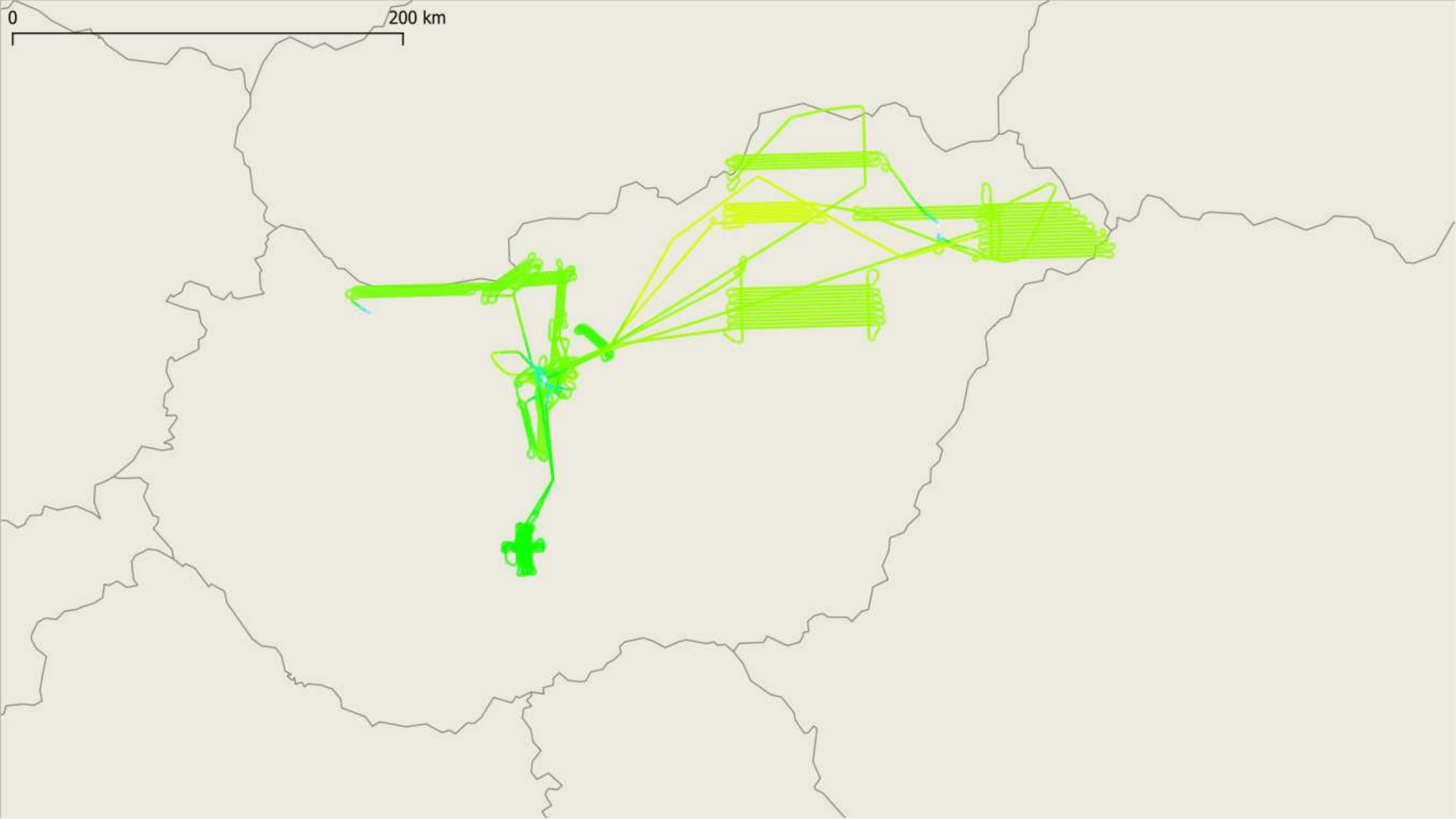
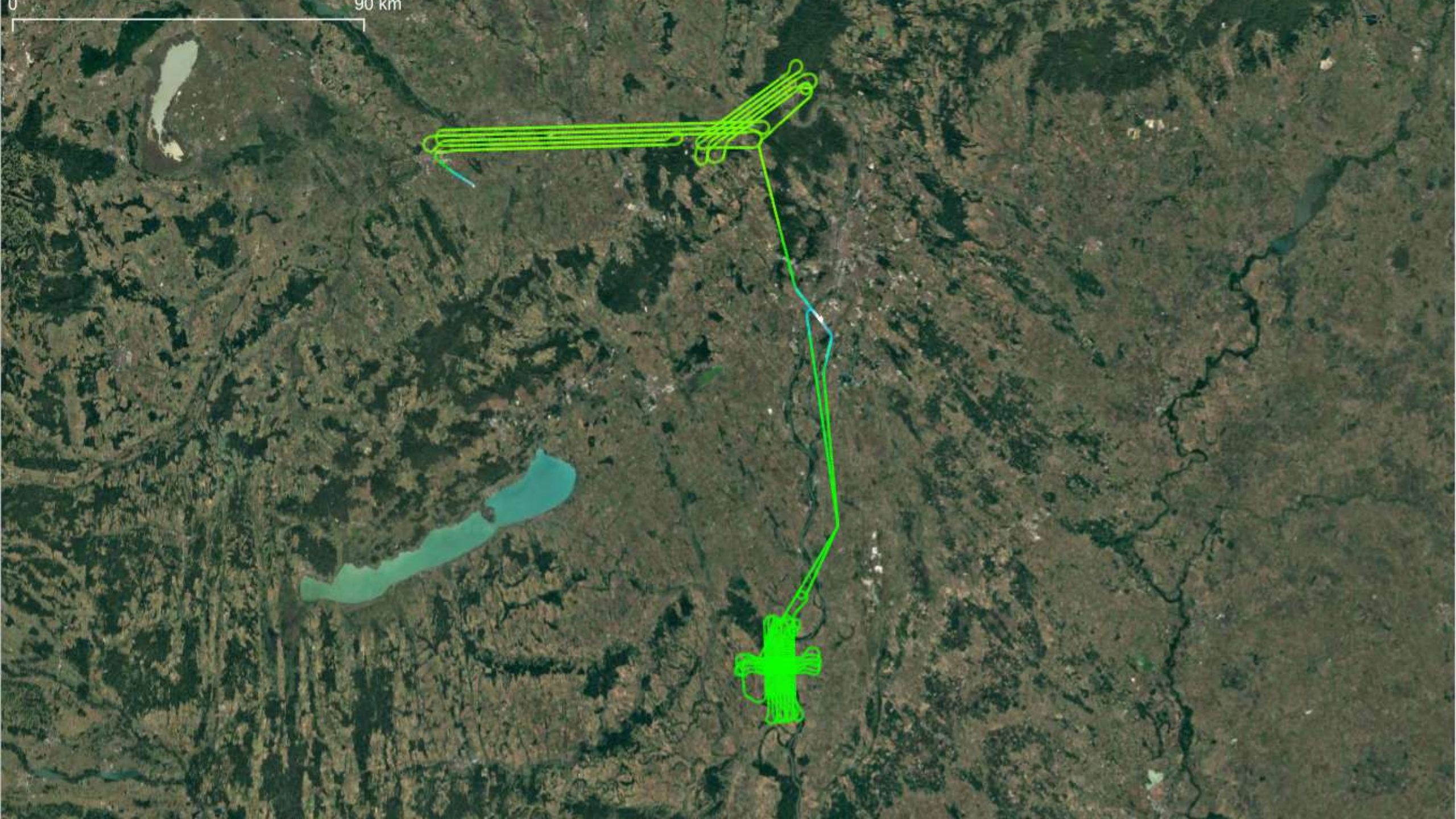
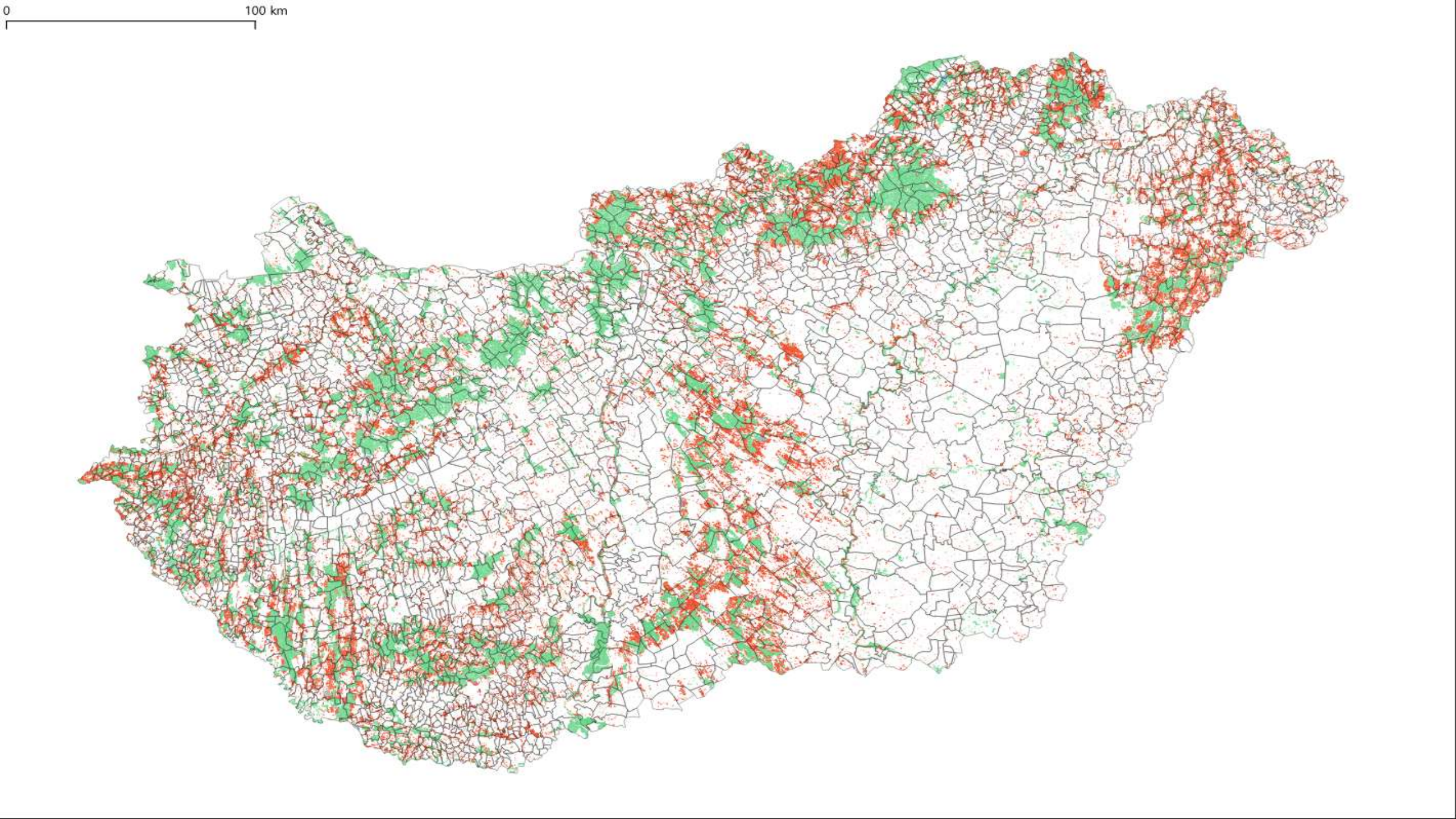
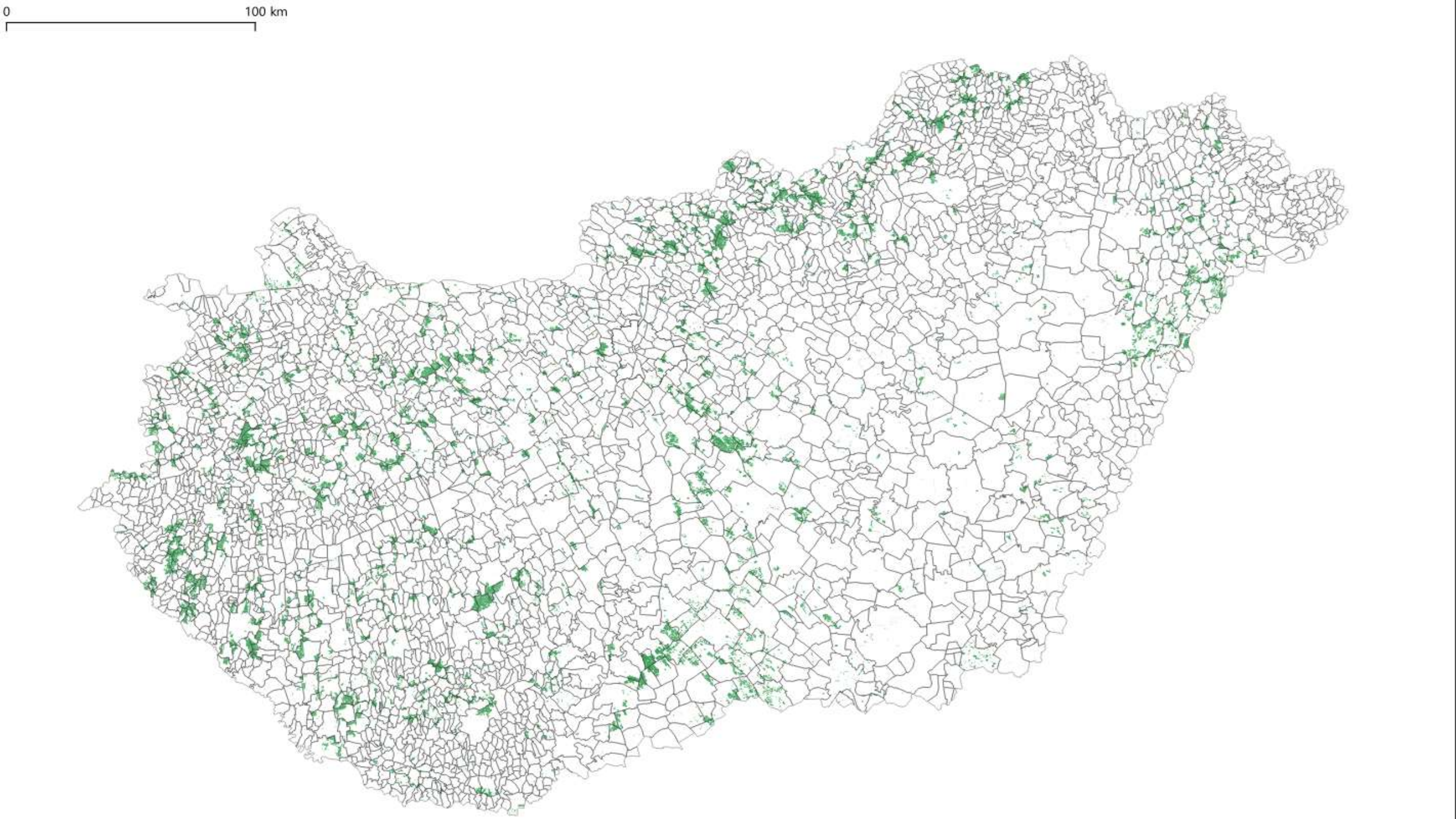
Wiener Neustadt
Sopron
Yaremche
Яремче
Kolomyya
Коломия
Ivano-Frankivs
Івано-Франків
Settings
Weather
Filters
Widgets
Playback
Google
Keyboard shortcuts
Map Data ©2026 GeoBasis-DE/BKG (©2009), Google
50 km
Terms
Report a map error


0
200 km


0
90 km


0
100 km


0
100 km

File Edit Tools Display Plugins 3D Views Help

DB Tree

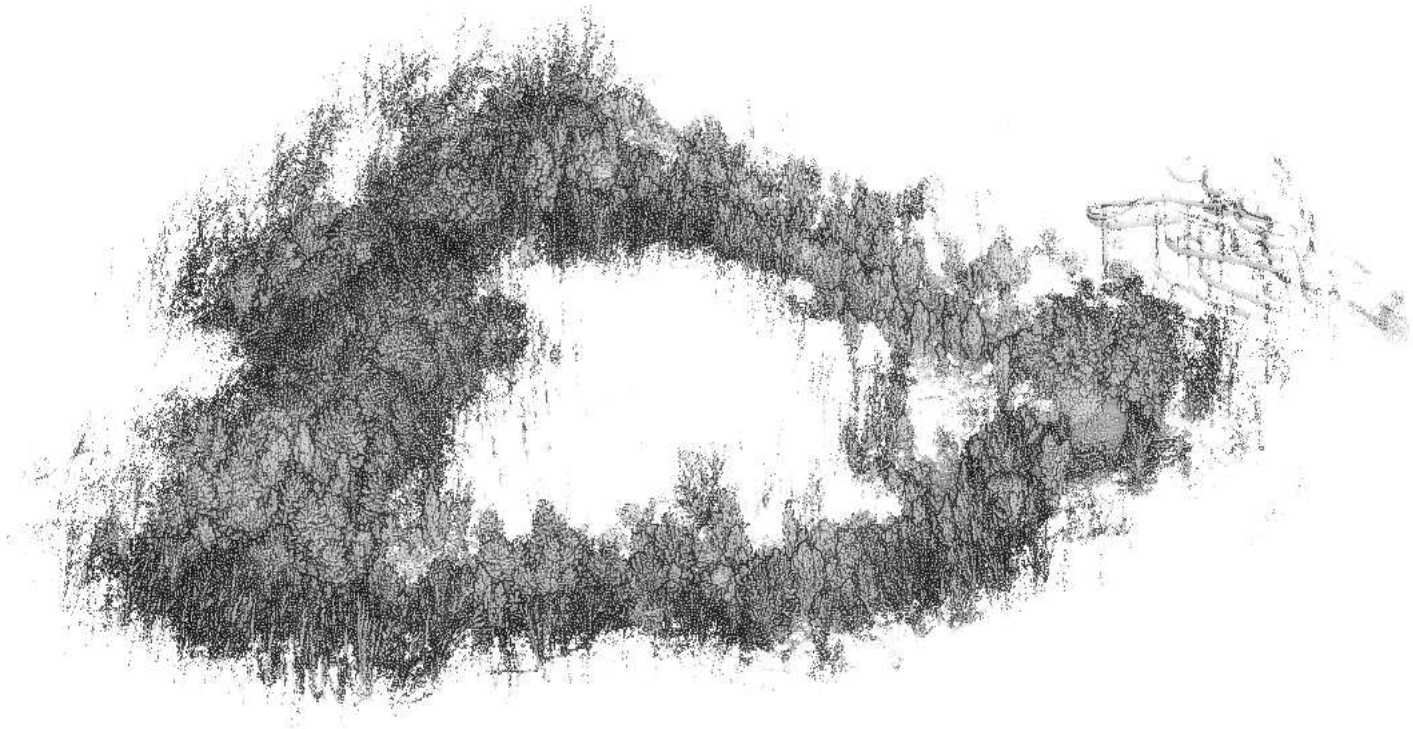
- 8_SS_20.las (D:/LidarData/lves_ut/CC/8)
  - 8_SS_20.las
- 8_SS_20_3DFin

Properties

[GL filter] EyeDome Lighting (disable normals and increase points size for a better result!)

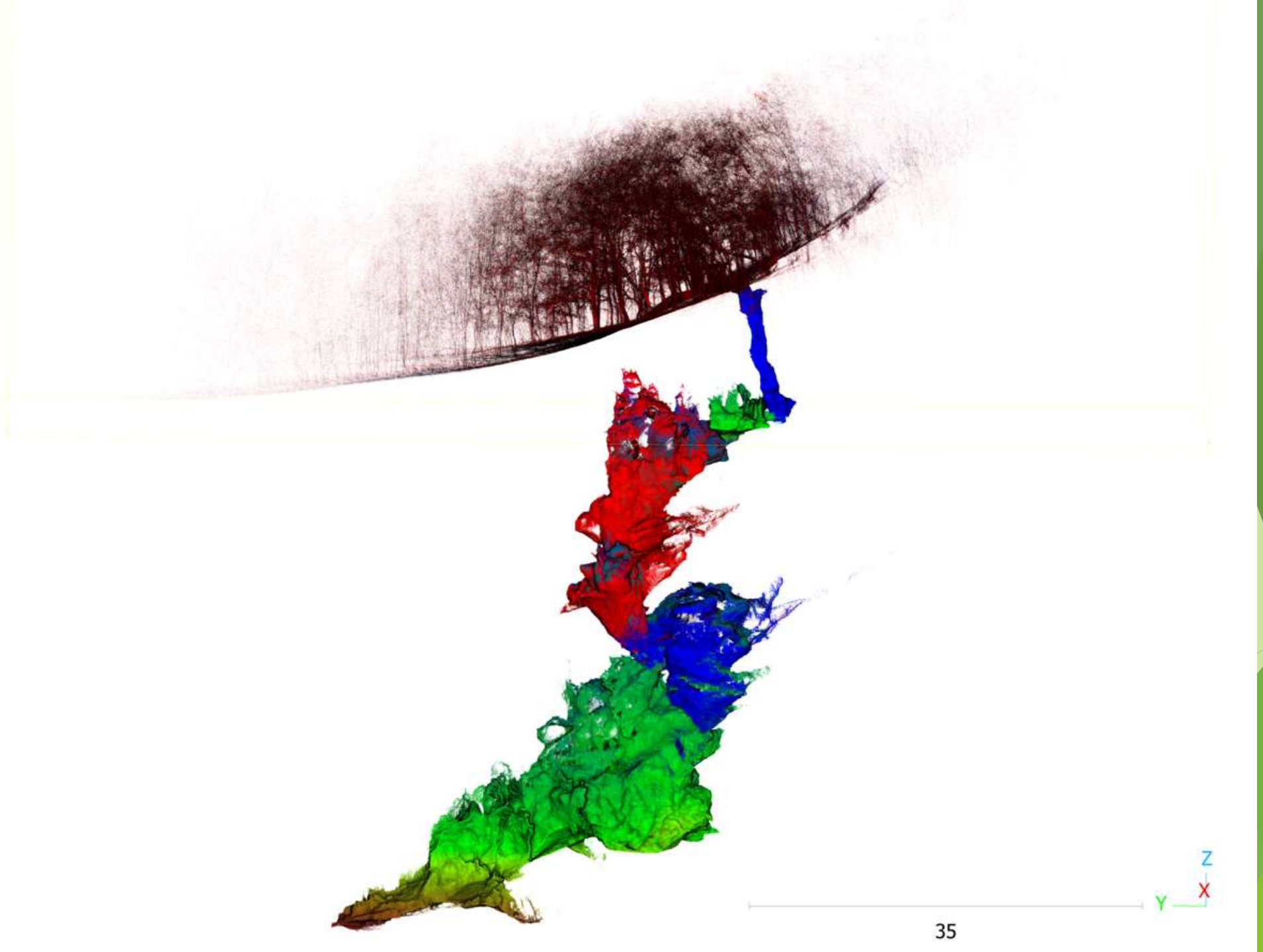
default point size

default line width



Console

[08:41:05] Warning: 3DFin has detected a potential error in the terrain modelling.
[08:41:05] This usually happens when the "cloth resolution" parameter didn't fit well the terrain.
[08:41:05] Learn more about this here https://github.com/3DFin/3DFin_Tutorial


Z
X
Y

CloudCompare v2.13.2 (Kharkiv - Jul 6 2024) [64-bit] - [3D View 1]

File Edit Tools Display Plugins 3D Views Help

DB Tree

IMG_20220721_1_34.xyz (E:/TERKEP/POINTCLOUD/Gyuszi/202...

IMG_20220721_1_34 - Cloud

Properties

[GL filter] Screen Space Ambient Occlusion

Console

[09:17:51] [I/O] File 'E:/TERKEP/POINTCLOUD/Gyuszi/2022_07_21/IMG_20220721_1_36.xyz' loaded successfully

[09:18:44] [GL Filter] Filter initialized

[09:18:44] Note: go to << Display > Shaders & Filters > No filter >> to disable GL filter

Köszönöm a figyelmet!