



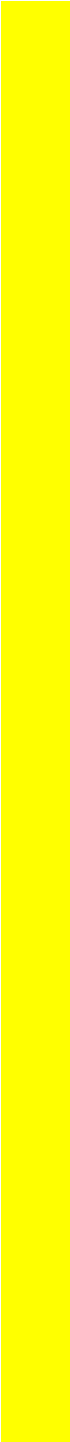
Vlaamse
overheid

Digital Height Model of Flanders II

Tony Vanderstraete

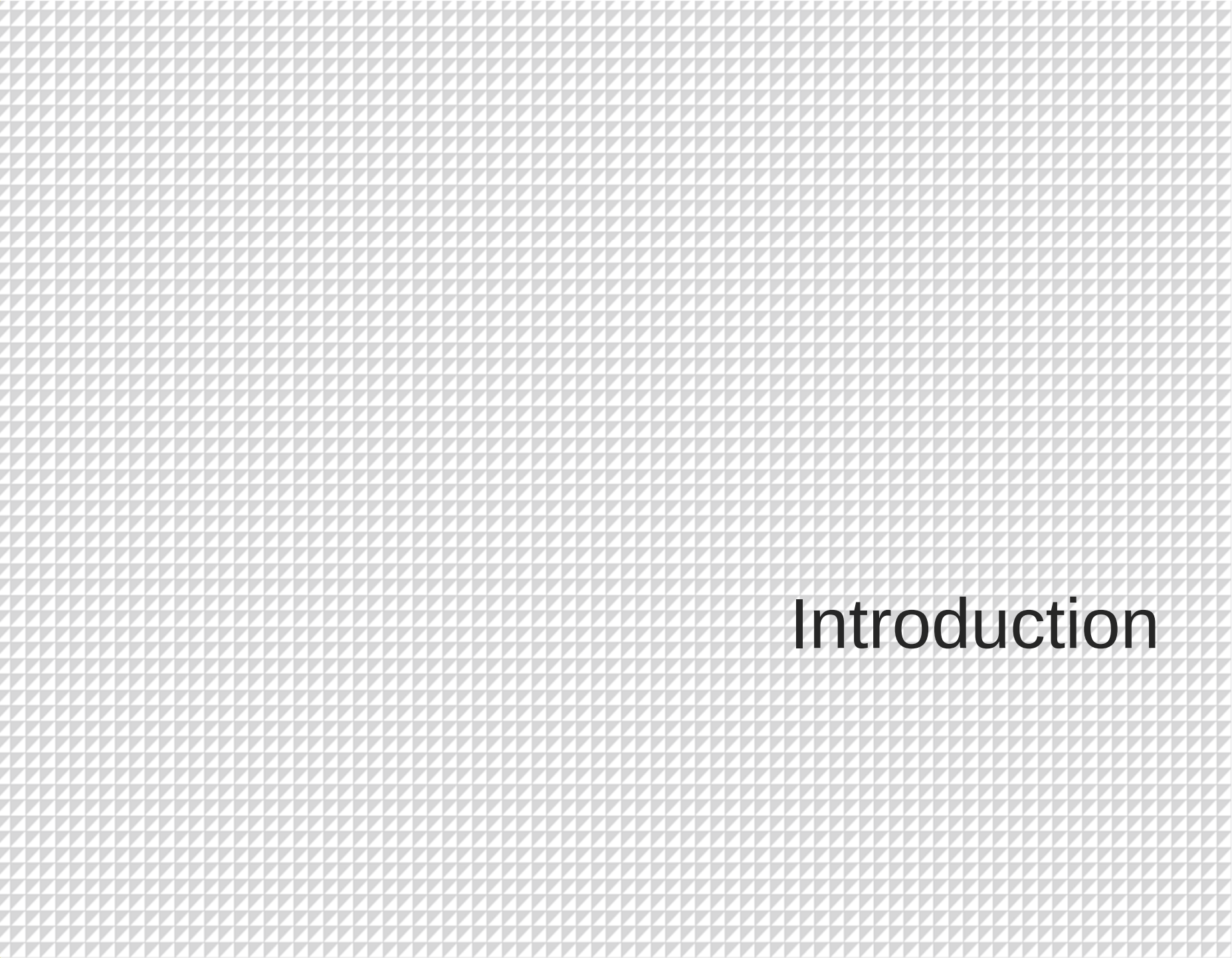
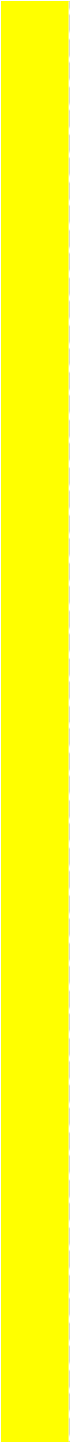
INFORMATIE
VLAANDEREN

www.agiv.be



Agenda

- Introduction
- Point Classification & Quality Control
- Applications
- Open Data Policy
- Conclusions



Introduction

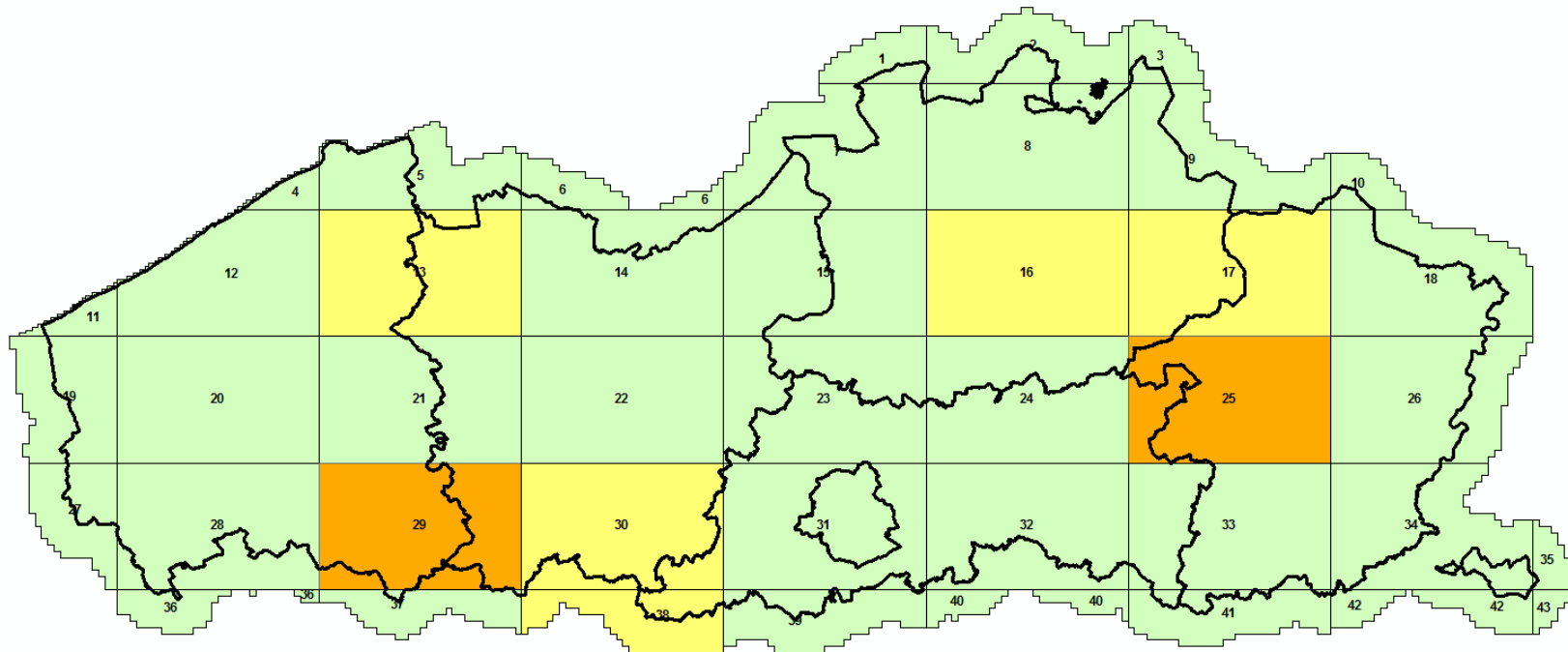
Introduction

- Data acquisition
 - aerial campaign over 3 years (2013-2015)
 - winter period (November - April)
 - Flanders Region, Belgium (17.500 km²)



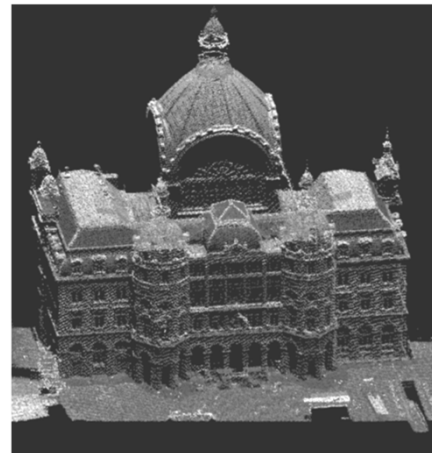
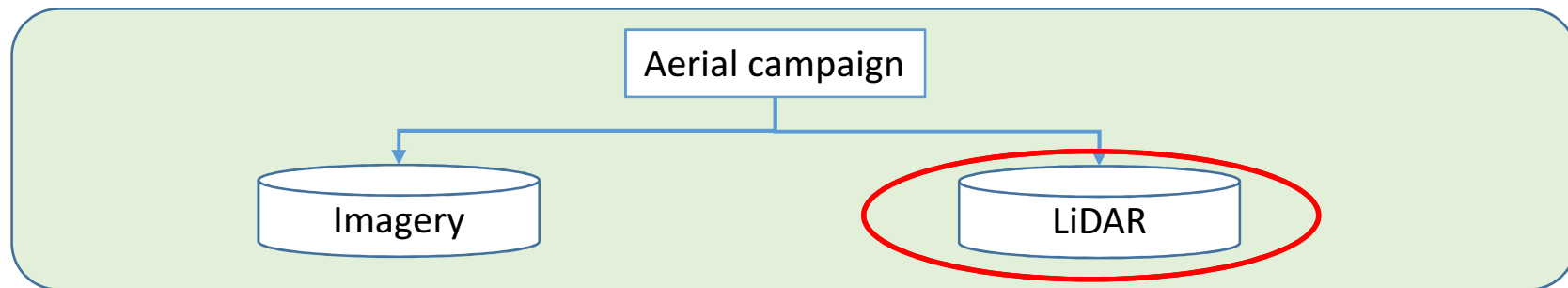
Introduction

- Data acquisition



Introduction

- Data acquisition
 - LiDAR and imagery taken simultaneously



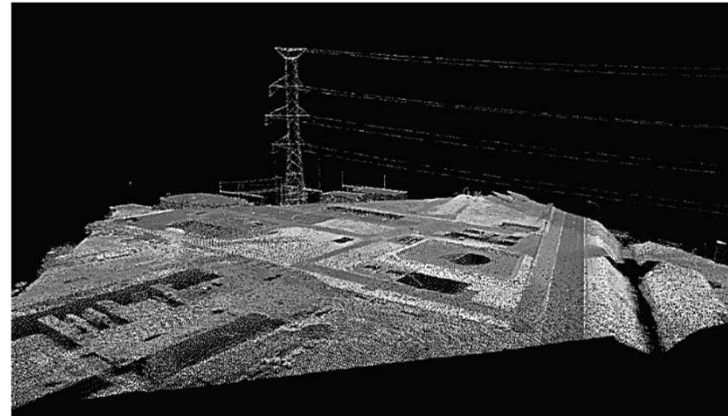
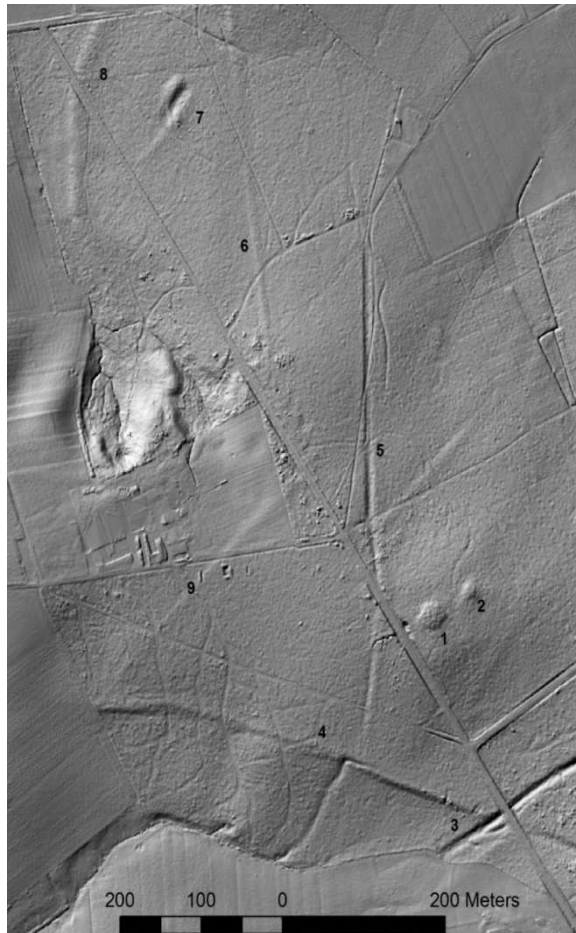
Introduction

- Source data specifications

	DHMF II	DHMF I
Period	2013-2015	2001-2004
LiDAR		
Point density	16 pts/m ²	1 pt/ 4m ²
Geometric accuracy	XY : 0.10m	XY : 0.10m
	Z : 0.05m	Z : 0.07m
Format	LAZ	ASCII
Imagery		
Resolution	0.10m	n.a.
Geometric accuracy	XY: 0.10m	
format	Tiff	

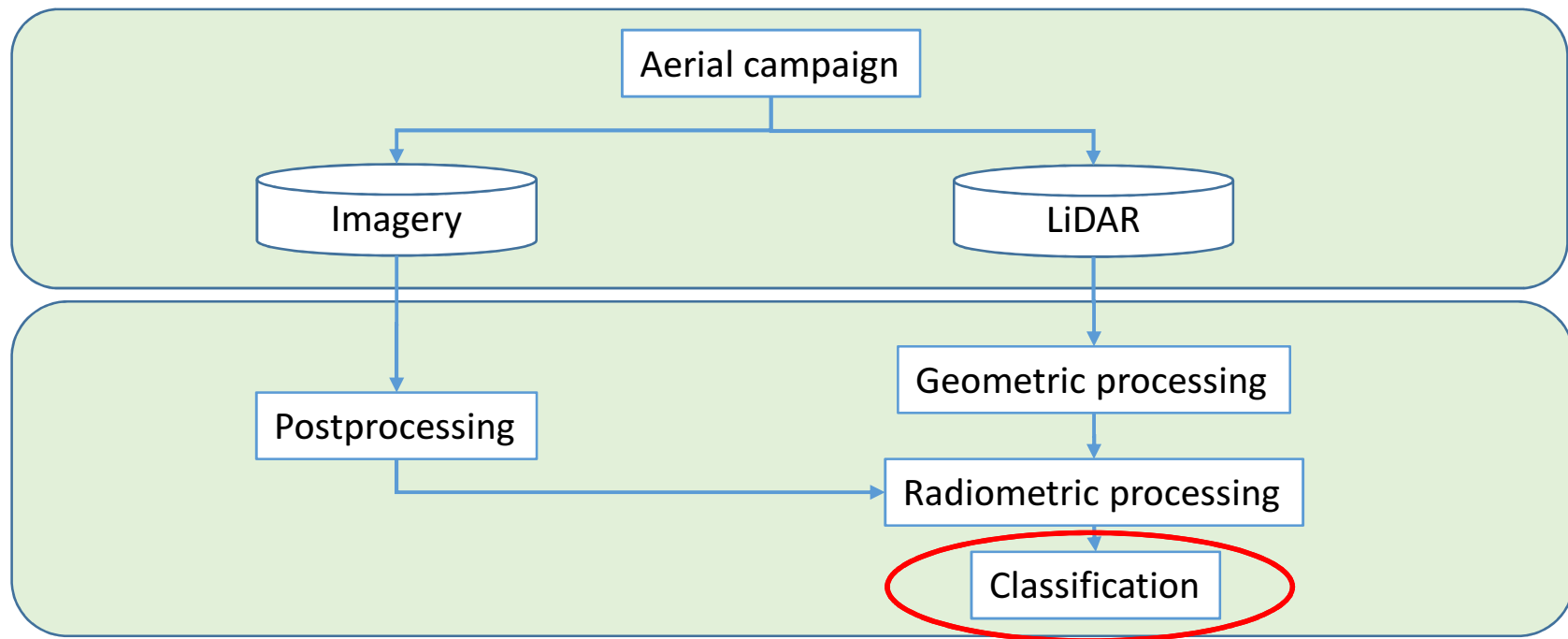
Introduction

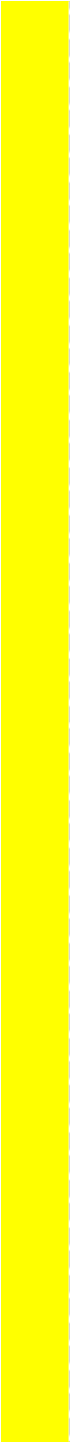
- LiDAR data



Introduction

- Data processing





Point Classification & Quality Control

Point Classification & QC

- The challenge
 - develop highly cost-efficient processes
 - guarantee constant high quality
 - on a regional scale

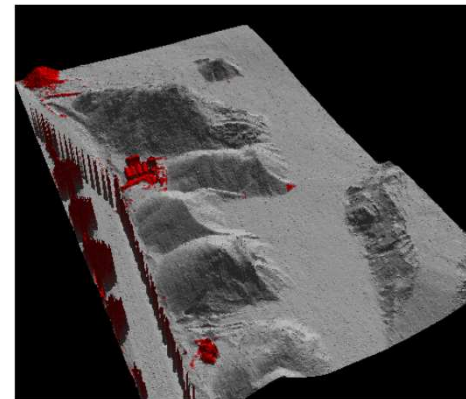
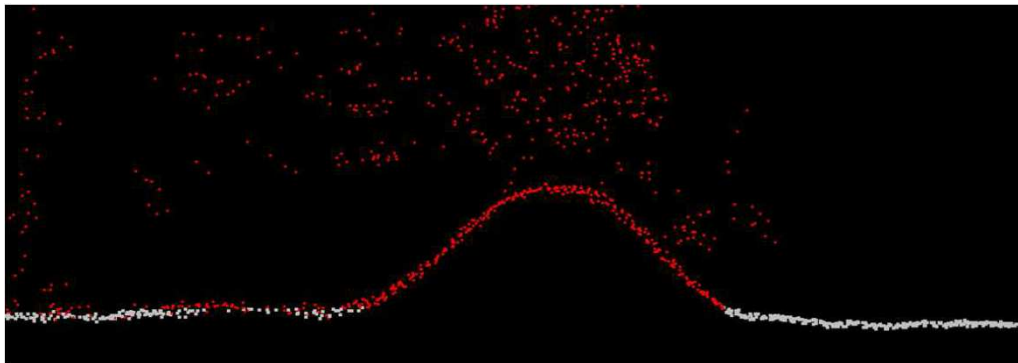


Point Classification & QC

- Basic point classification
 - distinction between
 - “terrain”
 - “non-terrain”
 - “water”
 - detailed descriptions
 - focus on automatisisation
 - manual intervention only in difficult situations supported by the aerial imagery

Point Classification & QC

- Basic point classification
 - difficult situations
 - temporary features (e.g. building sites)
 - dense vegetation
 - water bodies



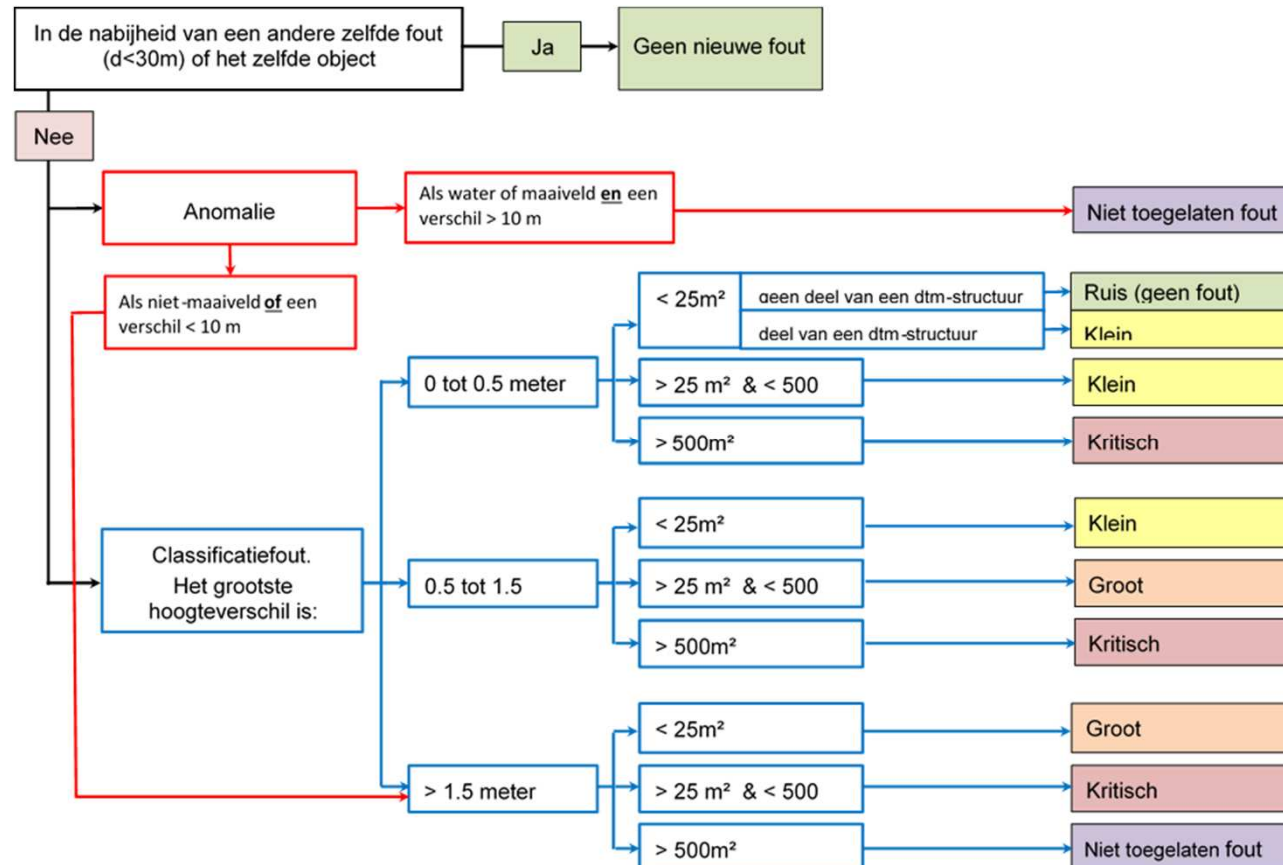
Point Classification & QC

- Quality control by FGIA
 - smart sampling strategy
 - based on ISO 2859-1
- 125 sample areas of 500x500m / 640km²
- 4 error classes:
not-allowed, critical, large, small

NOT-ALLOWED	CRITICAL	LARGE	SMALL
0	7	21	44

Point Classification & QC

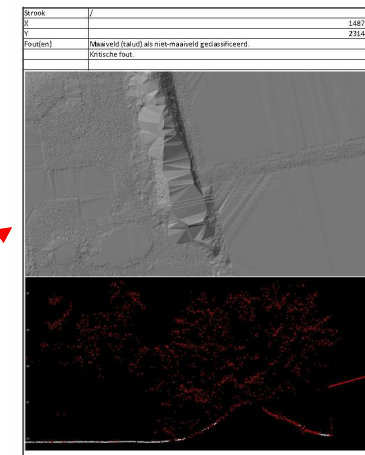
- Quality control by FGIA
 - error decision tree



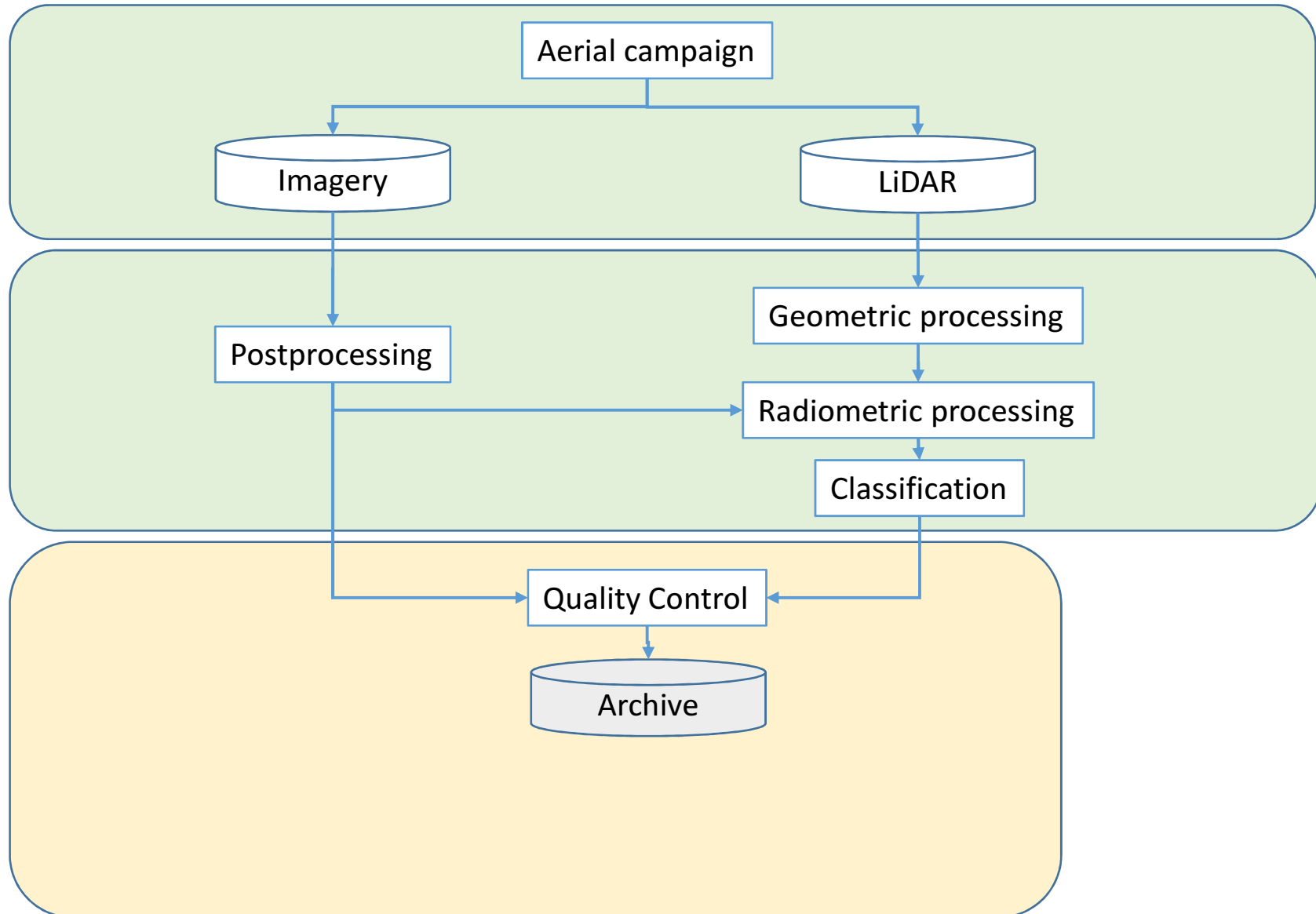
Point Classification & QC

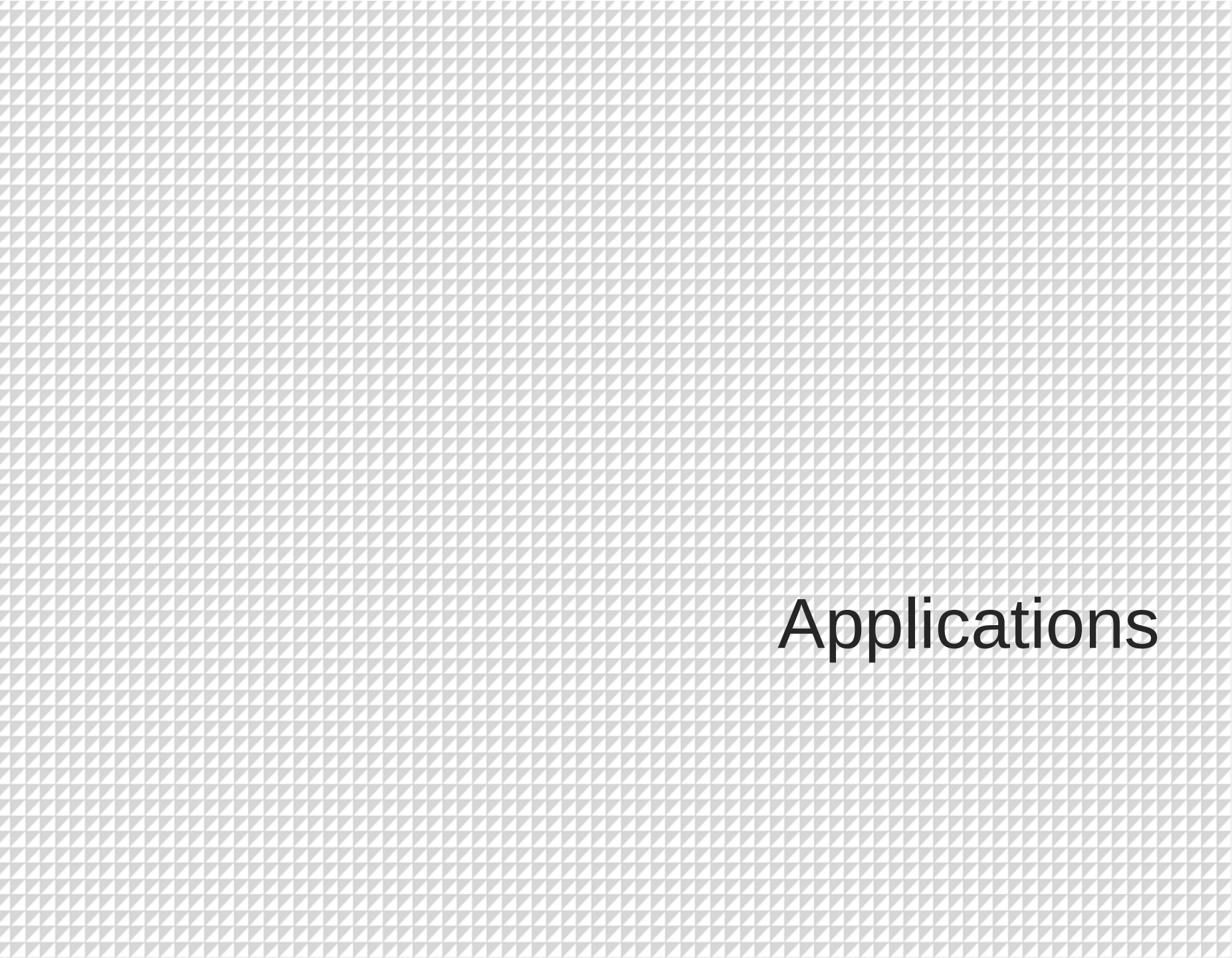
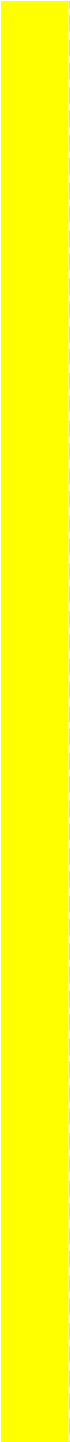
- Quality control by FGIA
 - smart sampling strategy
 - error decision tree
 - continuous feedback & examples
 - largely manual work (5-10 WD/block)

Nr	X	Y	Omschrijving	Type fout
1	157673.3	219703.8	Anomalie	Grote fout
2	155232.2	220340.8	Anomalie	Grote fout
3	159513.1	228746	Anomalie	Grote fout
4	135832.6	221894.9	Maaiveld als niet-maaiveld	Kleine fout
5	135905	221902.2	Maaiveld als niet-maaiveld	Kleine fout
6	139632.6	223947.1	Maaiveld als niet-maaiveld	Kleine fout
7	139737.4	223794.2	Maaiveld als niet-maaiveld	Kleine fout
8	138421.9	221590.6	Maaiveld als niet-maaiveld	Kleine fout
9	138596.5	221654.8	Maaiveld als niet-maaiveld	Kleine fout
10	146169.7	223496.5	niet maaiveld als maaiveld	Kritische fout
11	145668.5	228757.6	Maaiveld als niet-maaiveld	Kleine fout



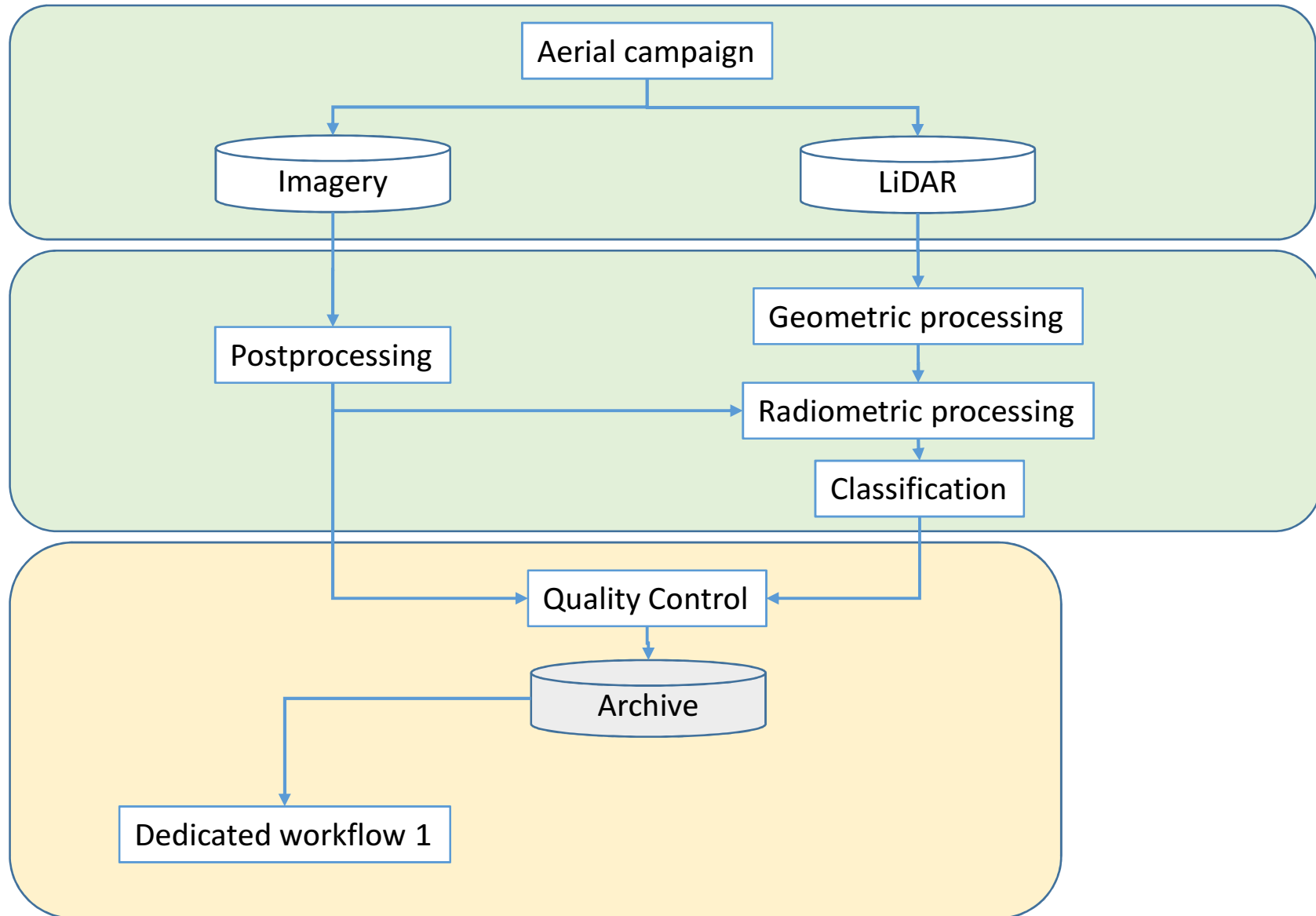
Point Classification & QC





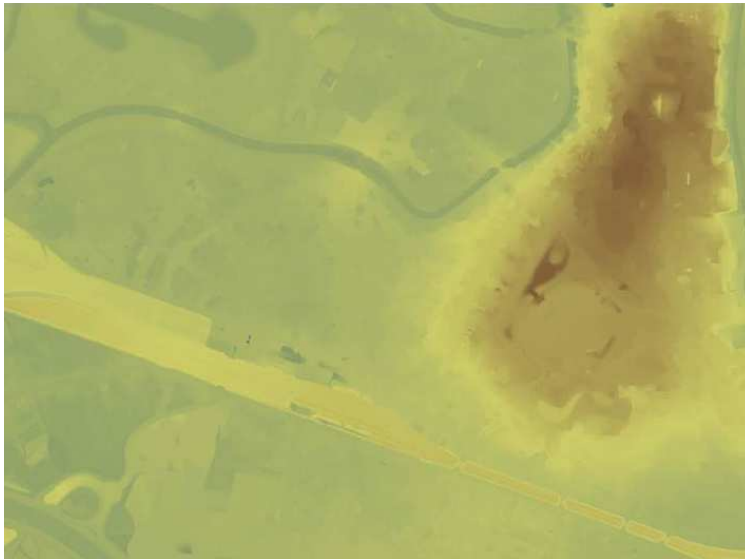
Applications

Applications



Applications

- Easy-to-use products
 - using automatic vectorization and rasterization techniques
 - e.g. raster DTM & DSM (1m, 5m, 25m, 100m)

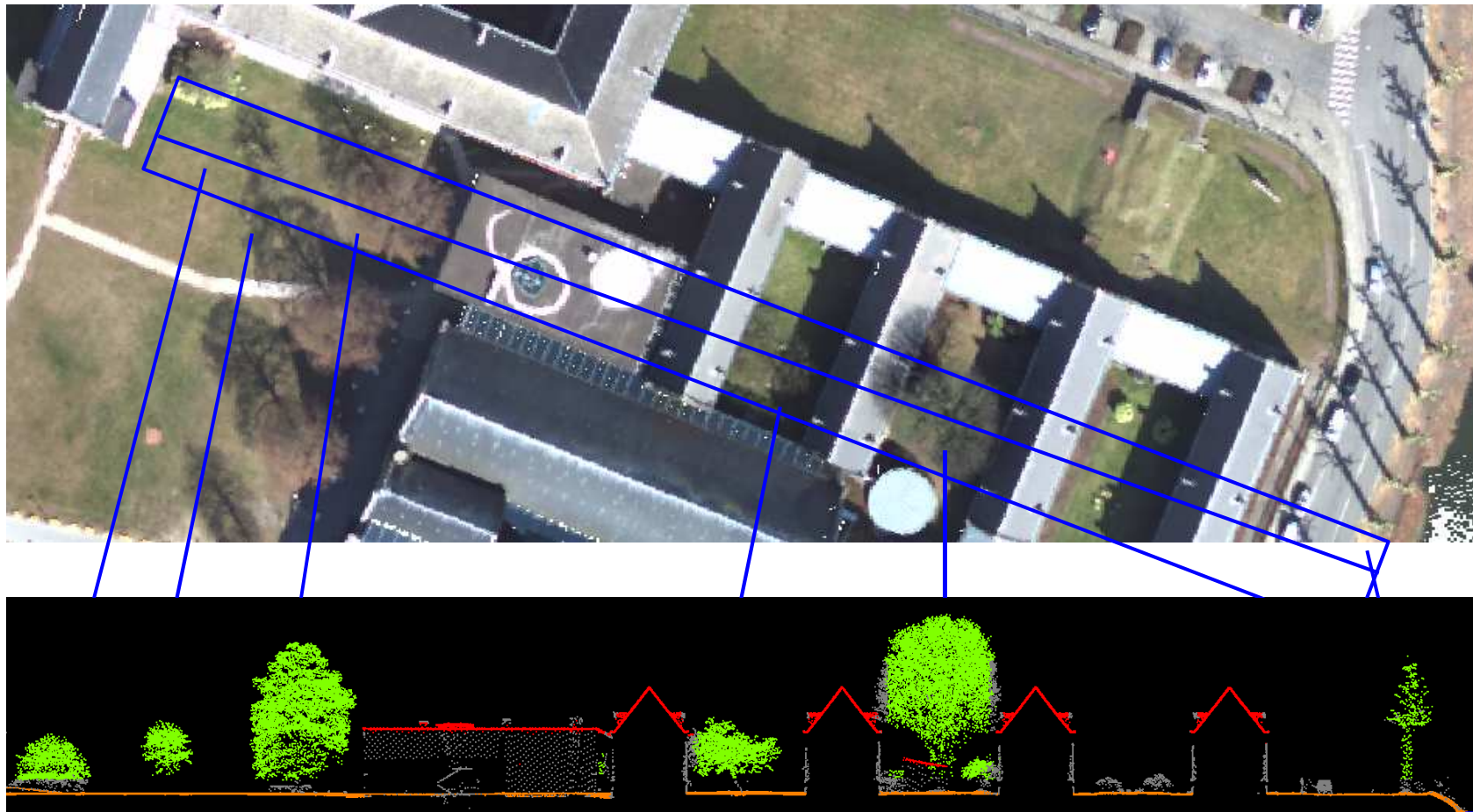


Applications

- More elaborate products
 - often require additional, semi-automatic classification procedures
 - mainly detailing the non-terrain class with additional classes
 - “building”
 - “vegetation”
 - “isolated points”

Applications

- More elaborate products



Applications

- LOD 1 buildings



Applications

- LOD 2 buildings (in research)



Test: city of Ghent

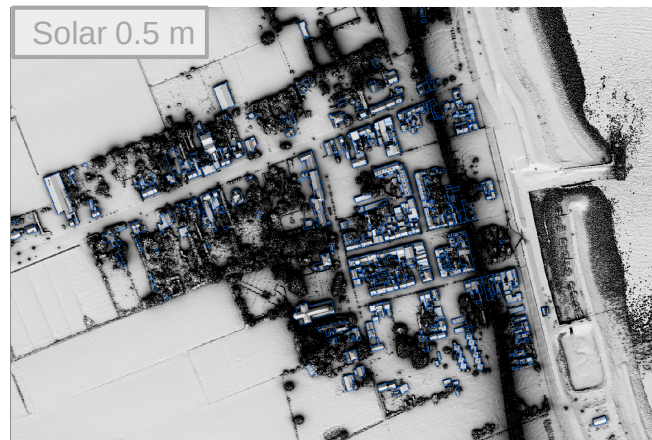
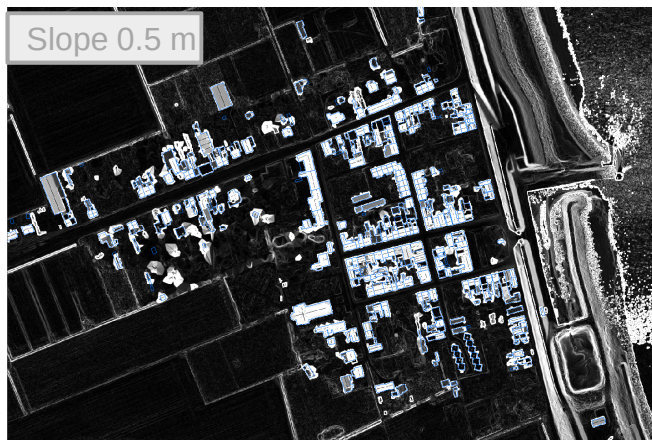
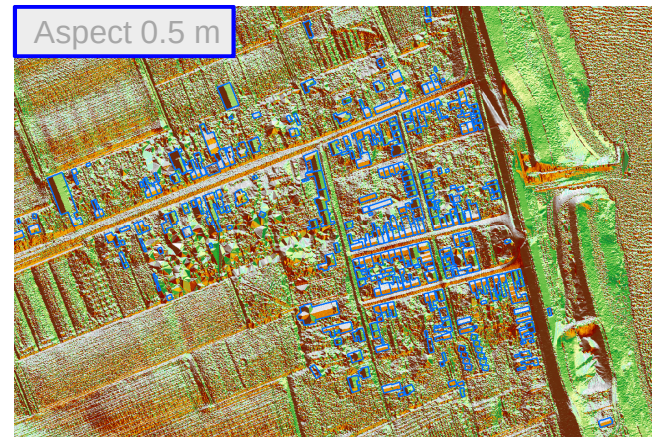
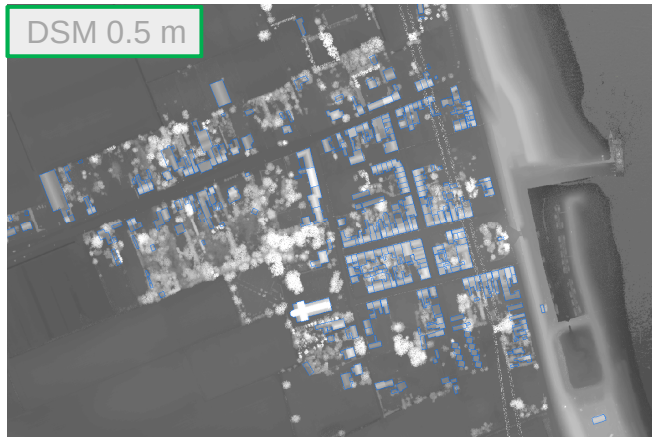
Applications

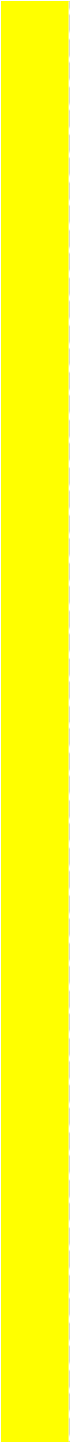
- Solar potential maps (in research)



Applications

- Solar potential maps (in research)



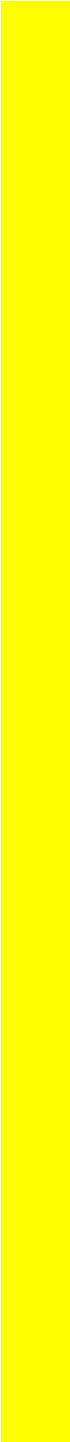


Open Data Policy

Open data policy

- In line with the general policy of the Flemish Government, all source data and products are made available as free open data to the public.



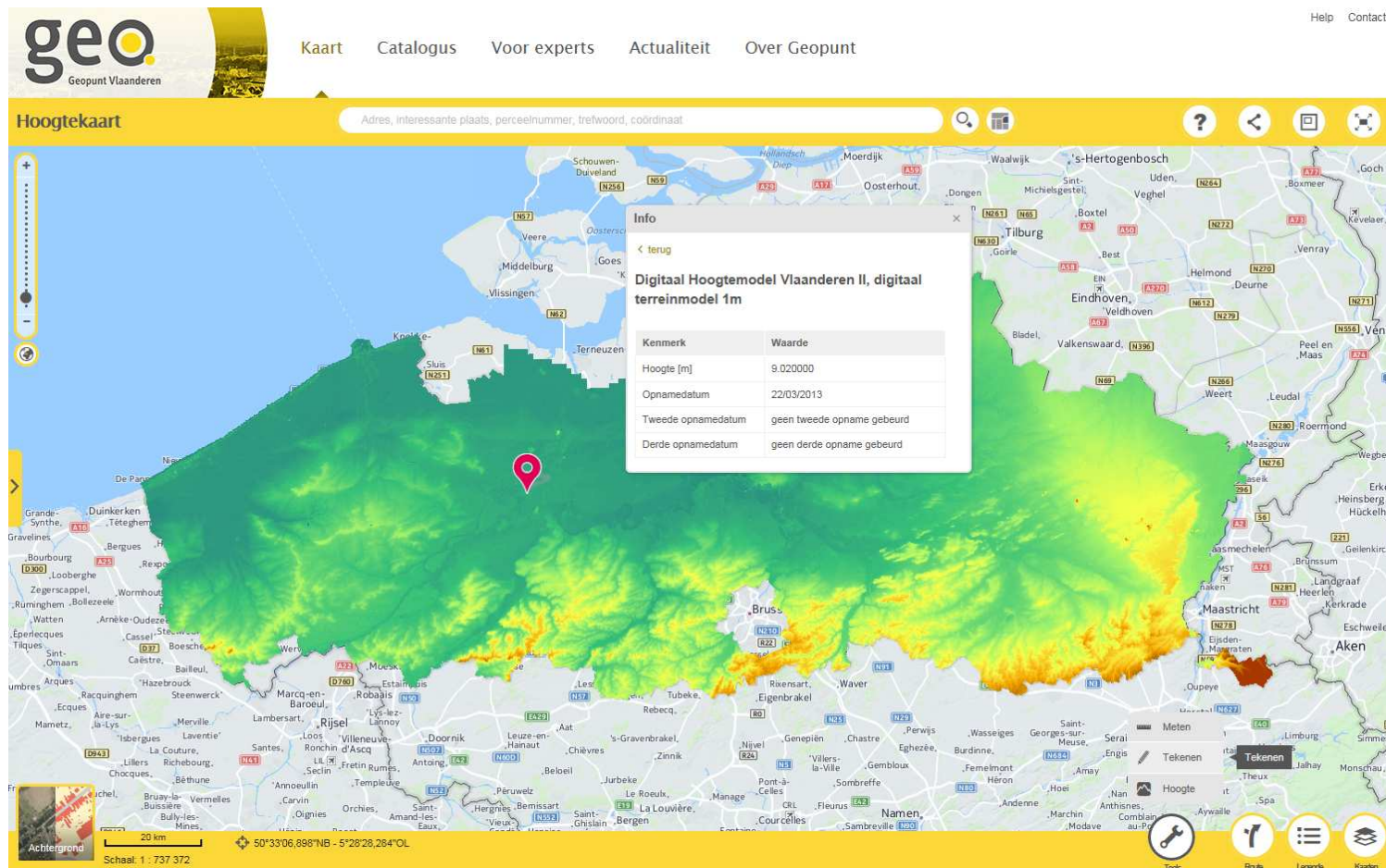


Open data policy

- Distribution channels
 - download
 - webservices
 - online applications & tools

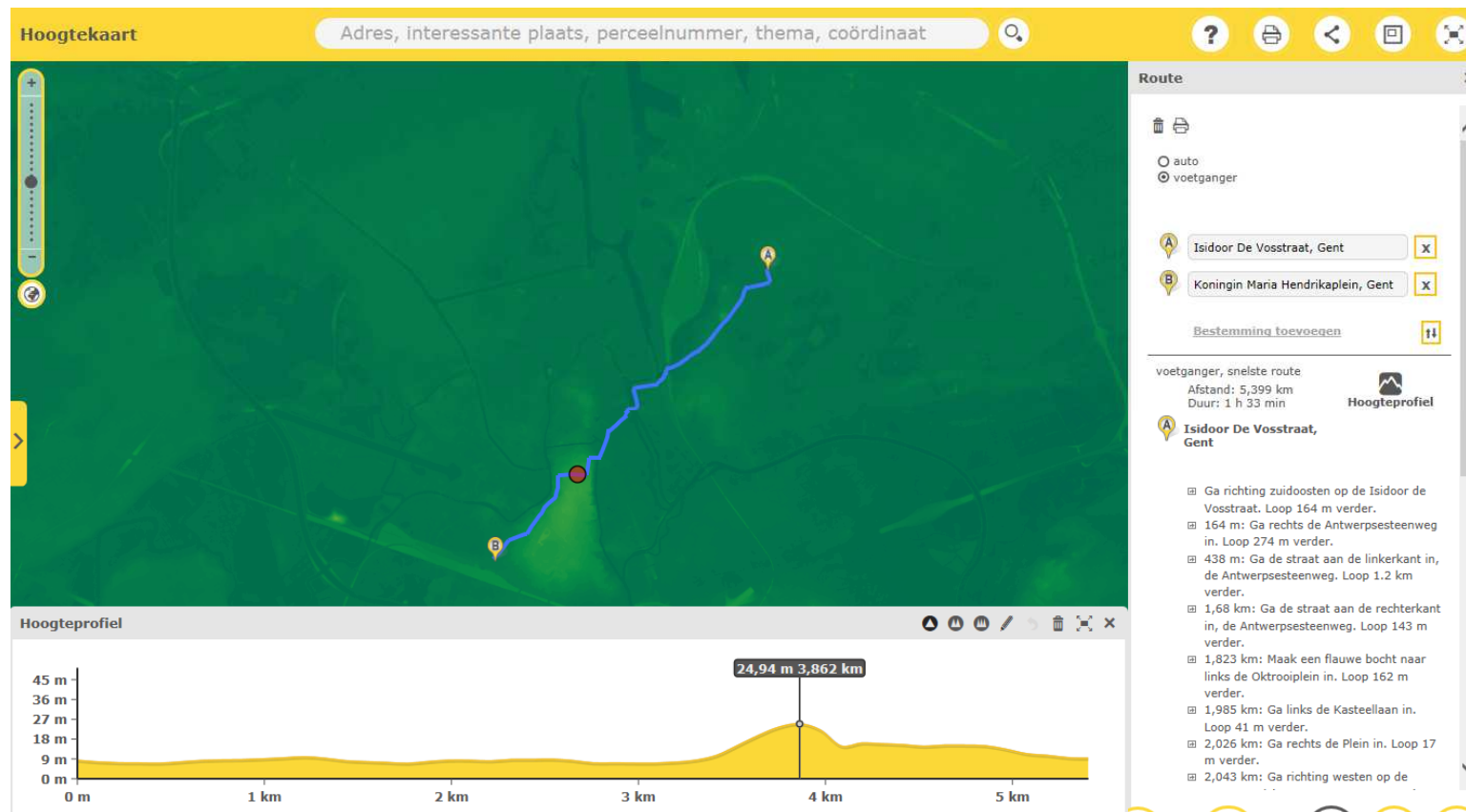
Open data policy

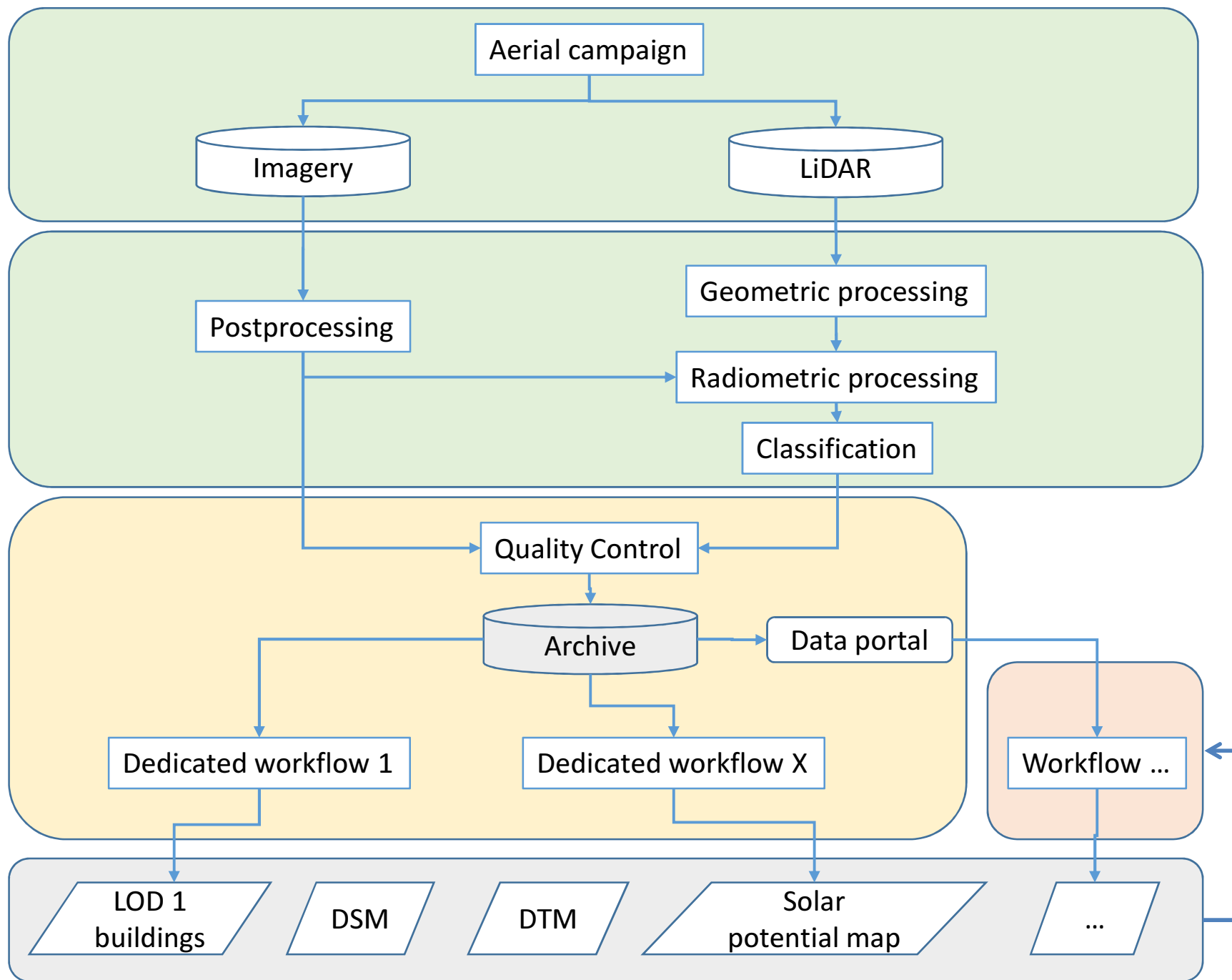
- Data portal: www.geopunt.be

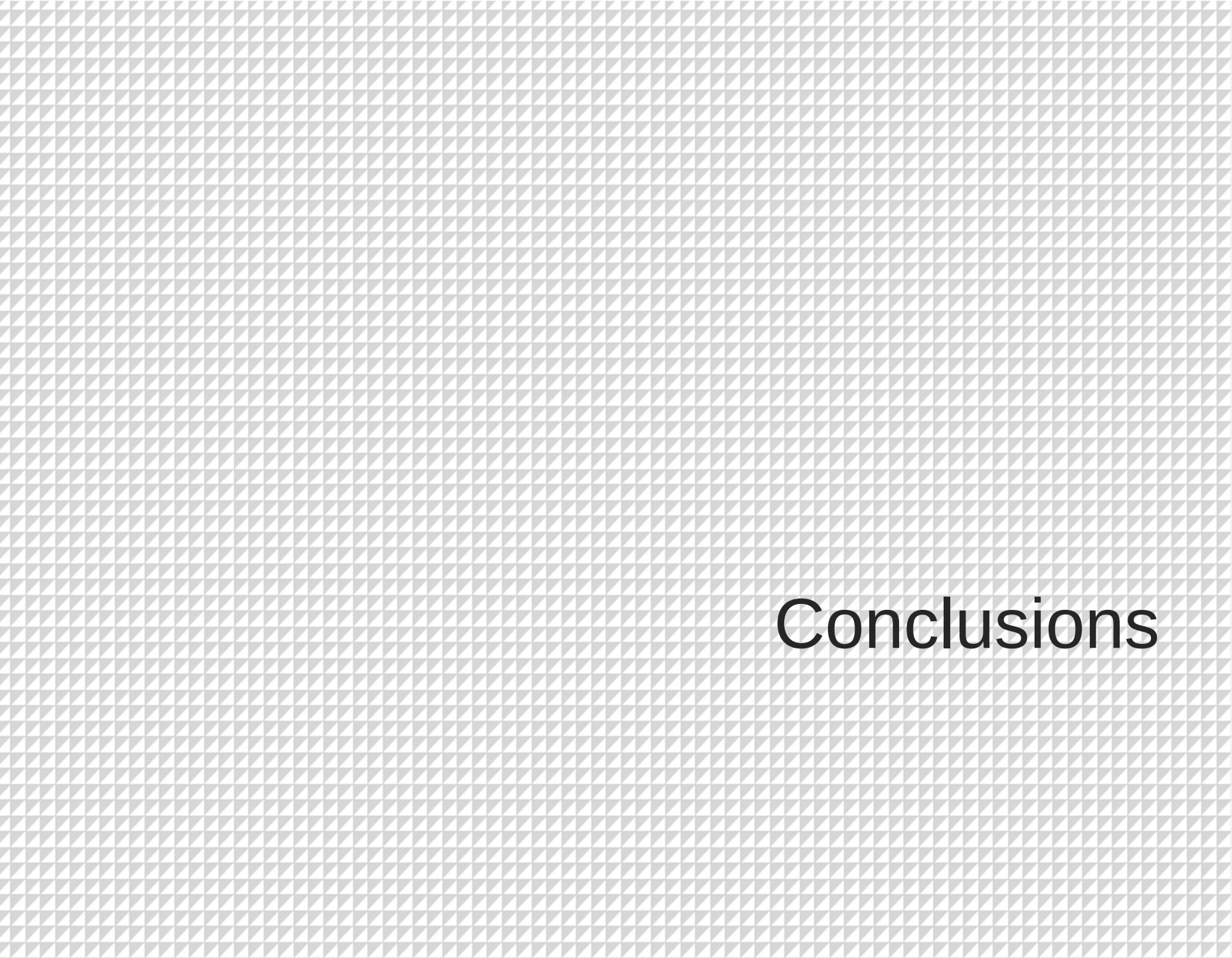
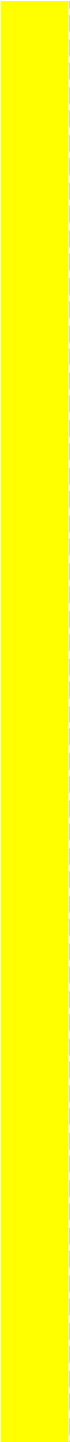


Open data policy

- Height profile service







Conclusions

Conclusions

- DHMF II
 - highly valuable data for multiple applications
 - 3 years for 1 update
 - ca. € 6 mln (€340/km²)
 - 20 Tb data
- Challenges
 - cost-effective, qualitative processing of source data
 - cost-effective updates

Agentschap Informatie Vlaanderen

Tony Vanderstraete, Toon Petermans,
Bart Verbeke, Jo Van Valkenborgh

Tony.vanderstraete@agiv.be