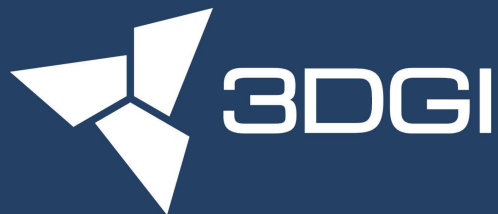
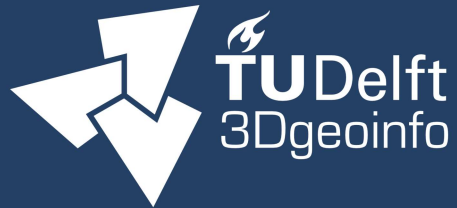


3DBAG-AHN4 en andere ontwikkelingen

AHN - BM congres

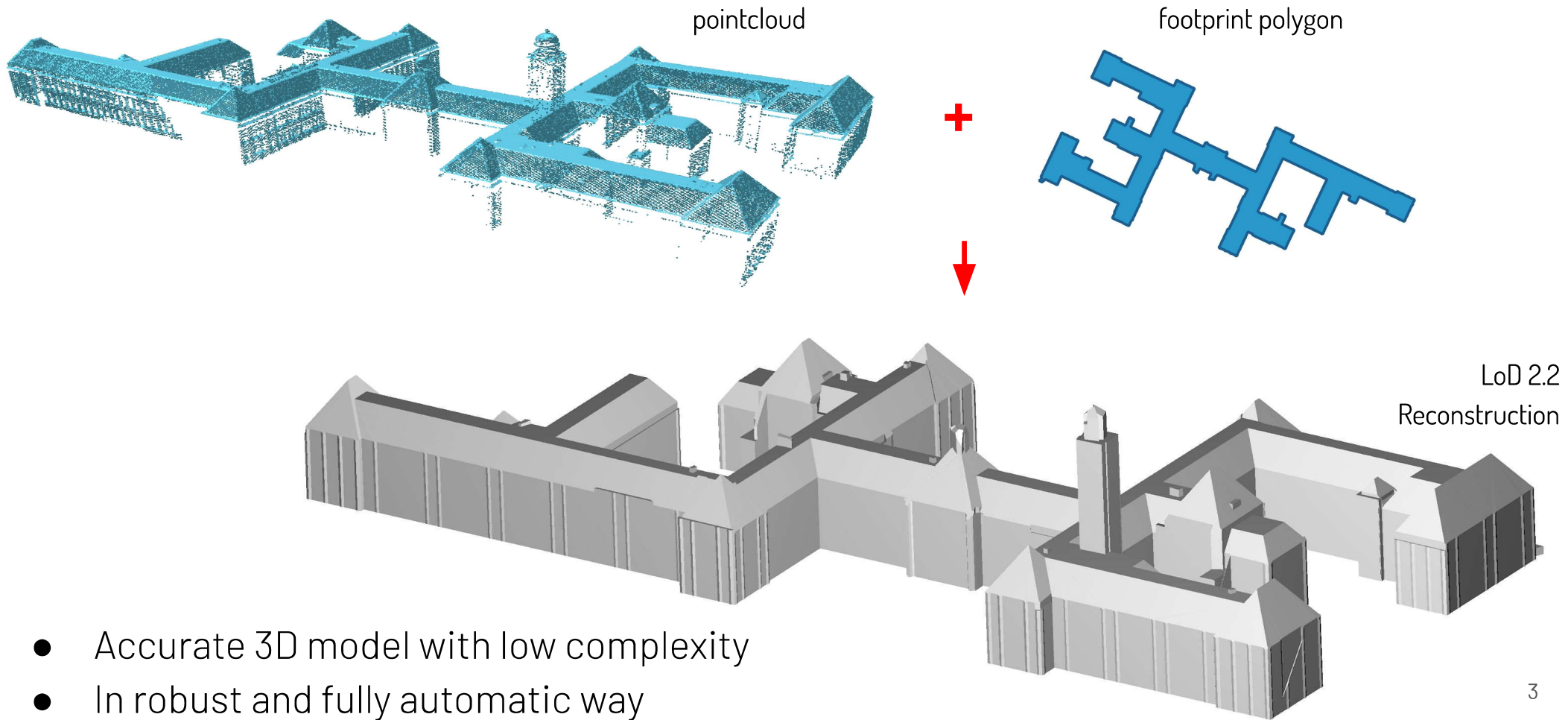
09-05-2023 - Amersfoort

Ravi Peters, Weixiao Gao,
Balazs Dukai, Jantien Stoter



Hoe werkt het?

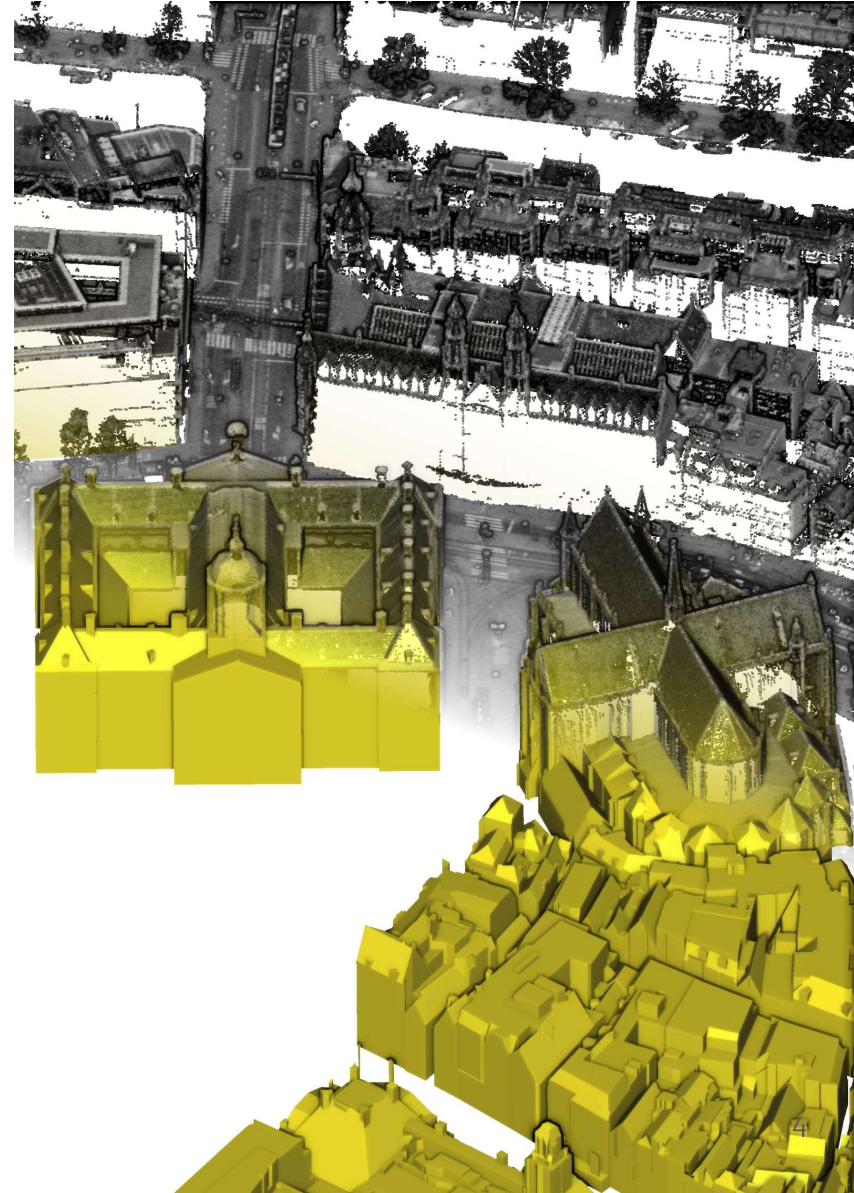
Building reconstruction



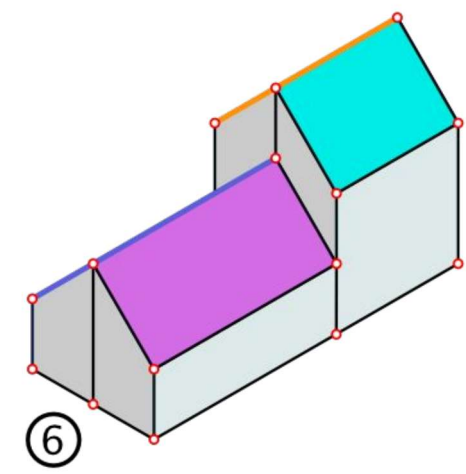
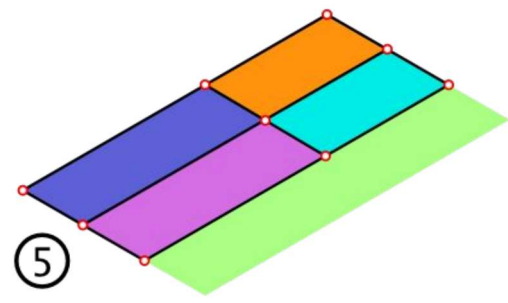
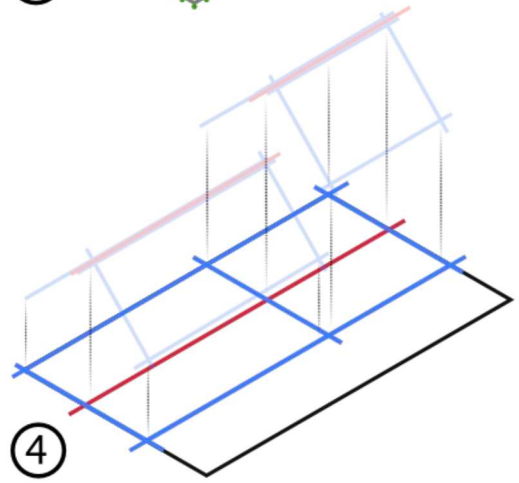
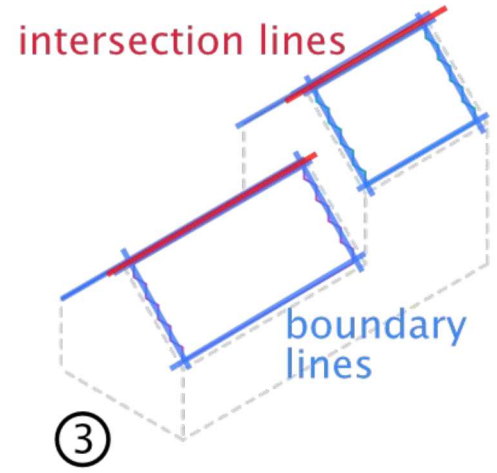
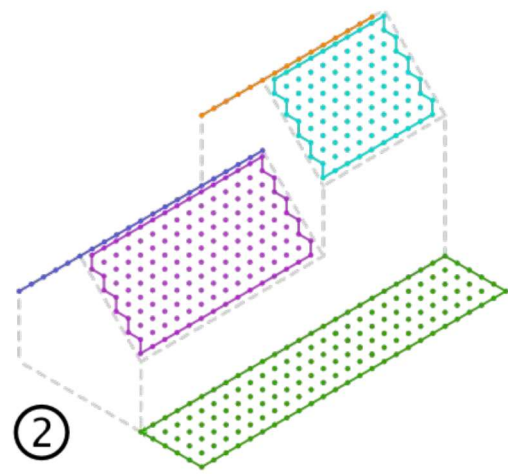
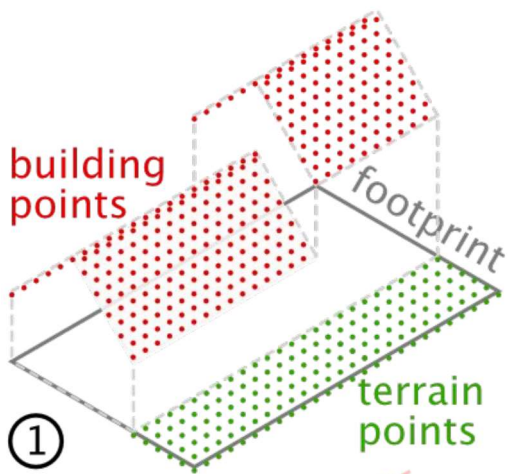
Mogelijk dankzij open data

- **BAG** <https://www.kadaster.nl/bag>
- **AHN** <https://ahn.nl>

Waarvoor veel dank!

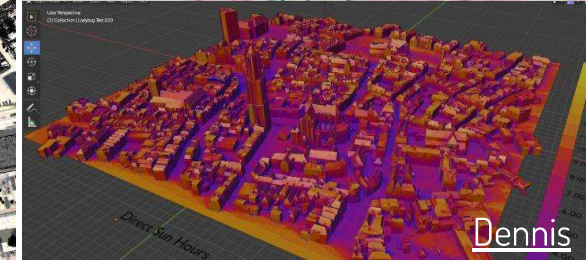
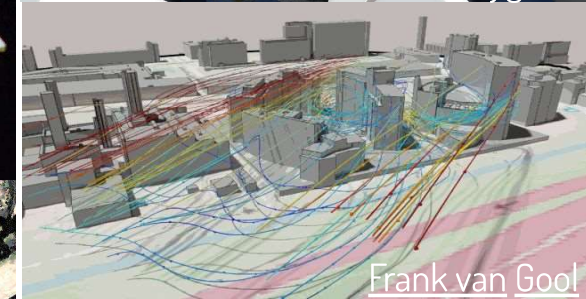
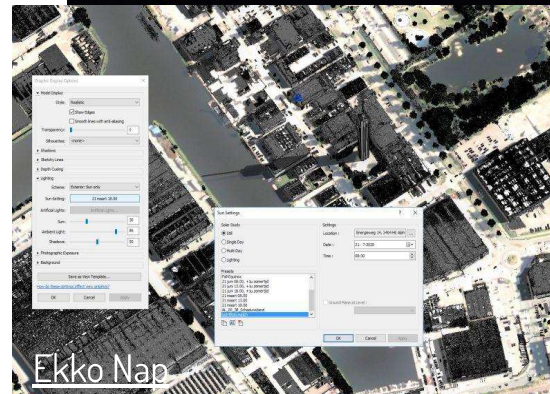


Overzicht reconstructie algoritme



Huidige versie 3DBAG

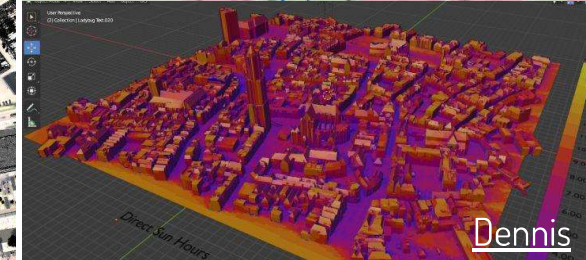
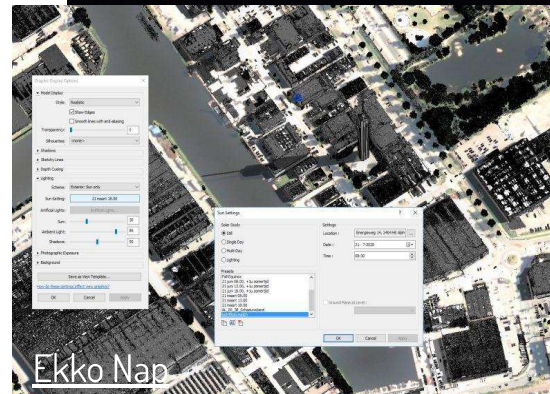
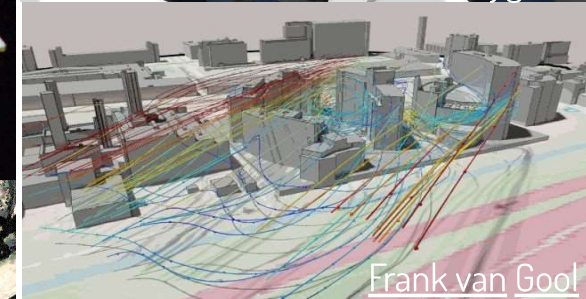
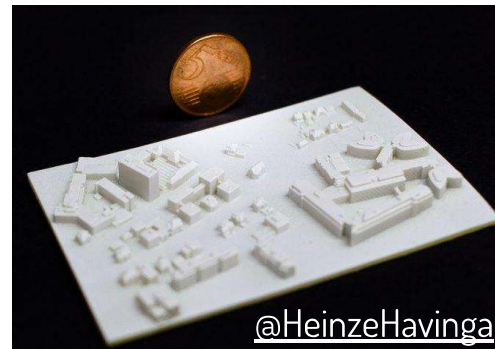
- Succes, veel gebruikers
- Op basis van AHN3



Huidige versie 3DBAG

- Succes, veel gebruikers en toepassingen
- Op basis van AHN3

Waar blijft 3DBAG op basis van AHN4?!

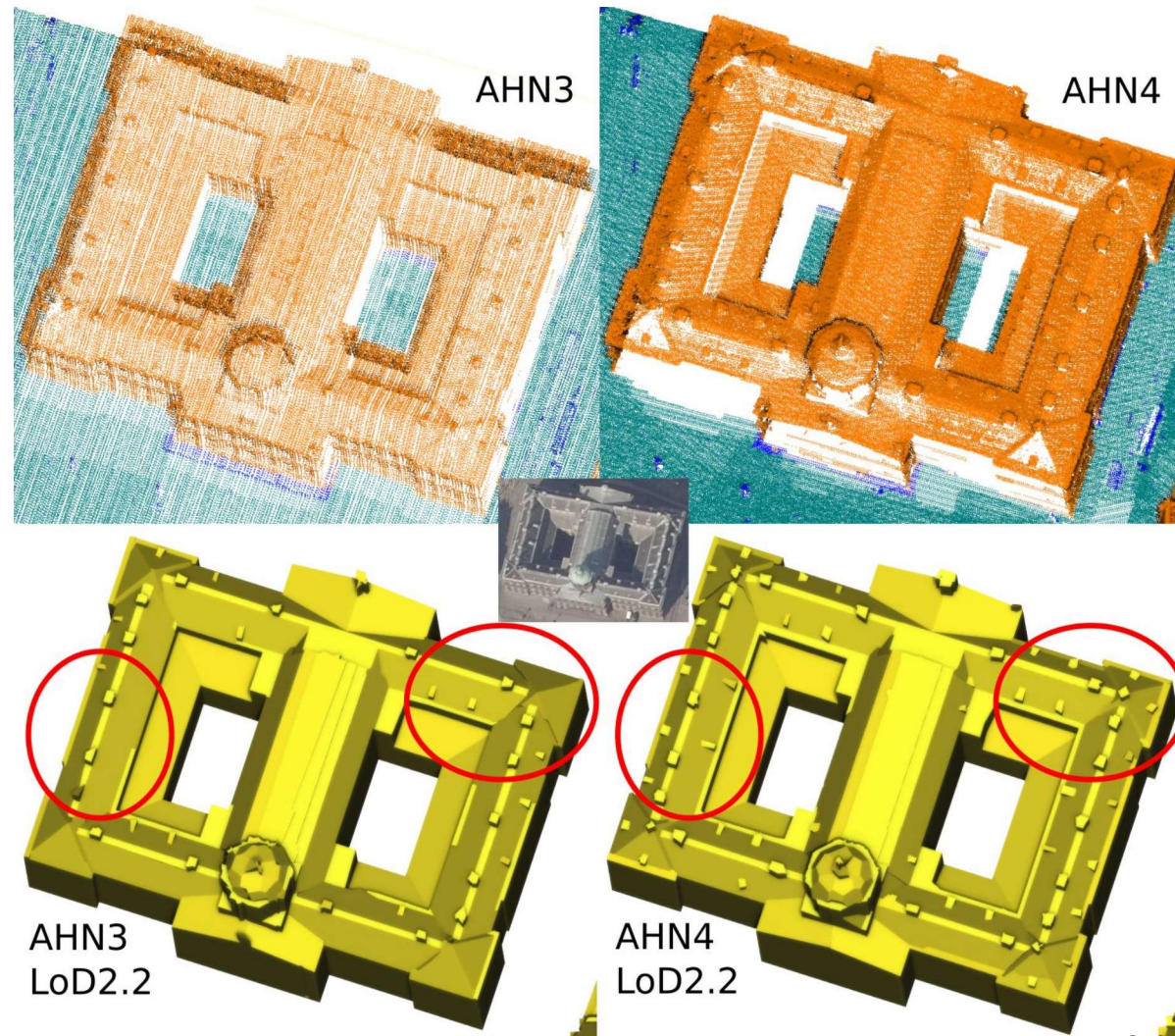


Vergelijking AHN3 & 4

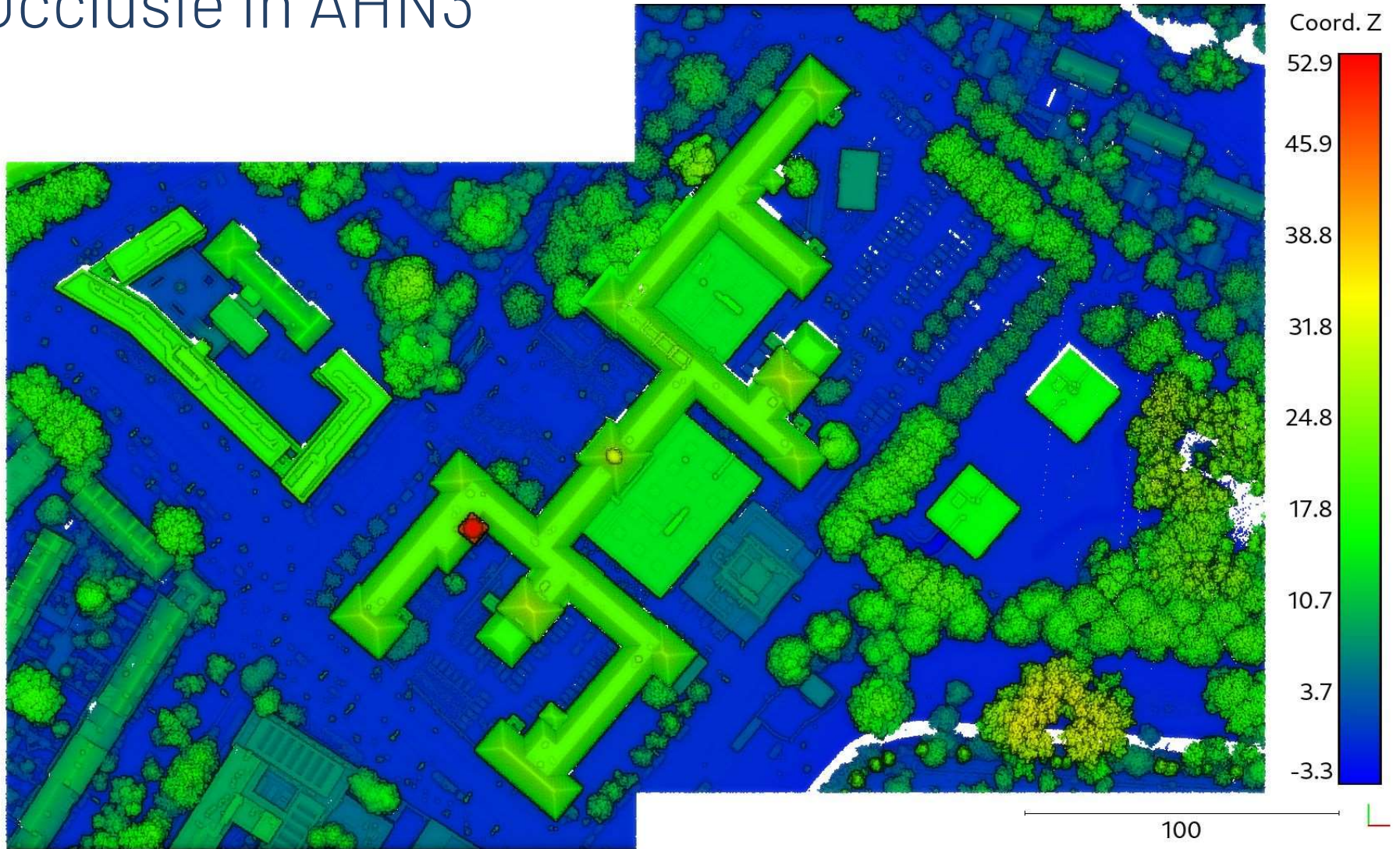
AHN4

Veel hogere puntdichtheid (2x)
Randstad gebied

→ Meer detail in reconstructie



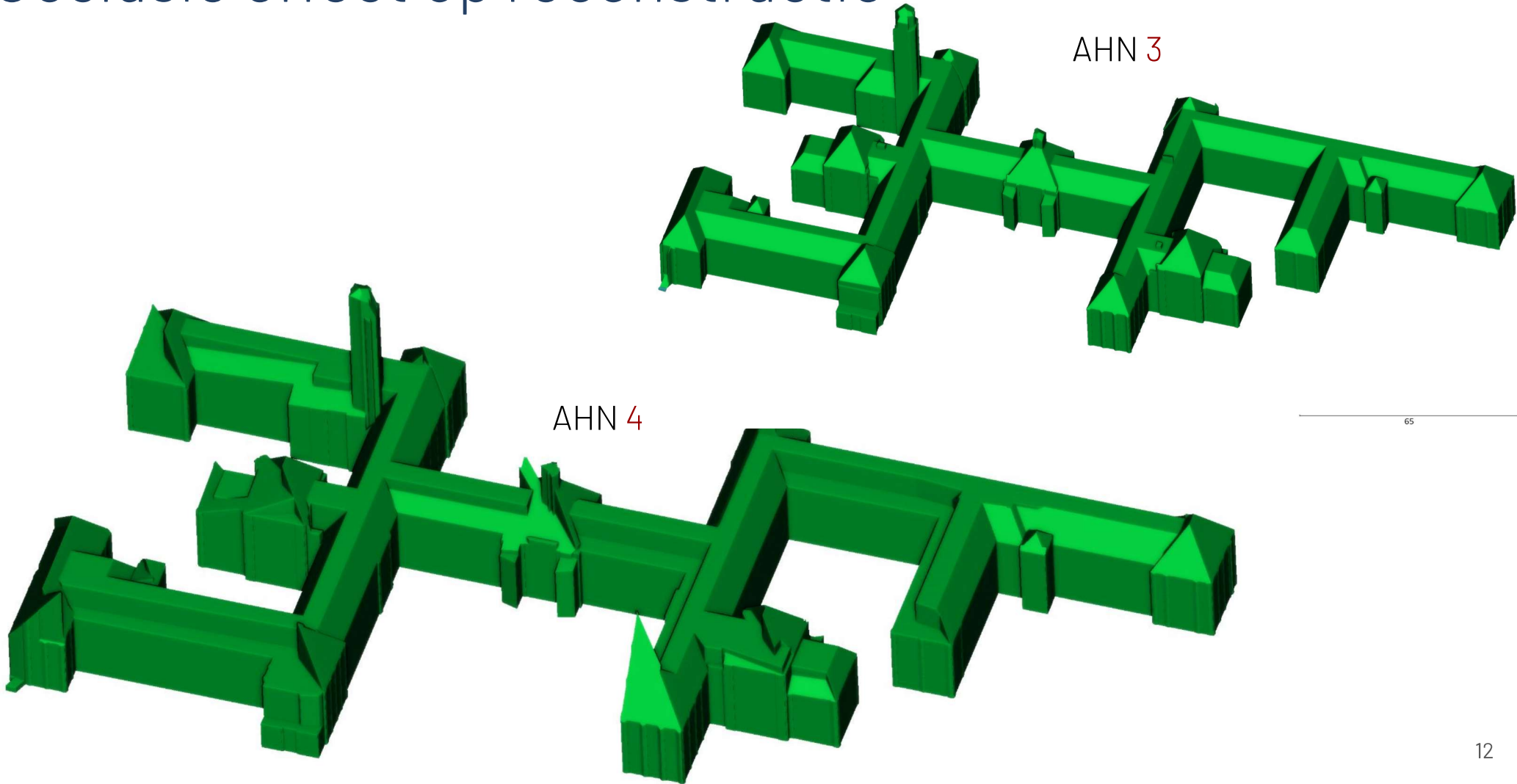
Occlusie in AHN3



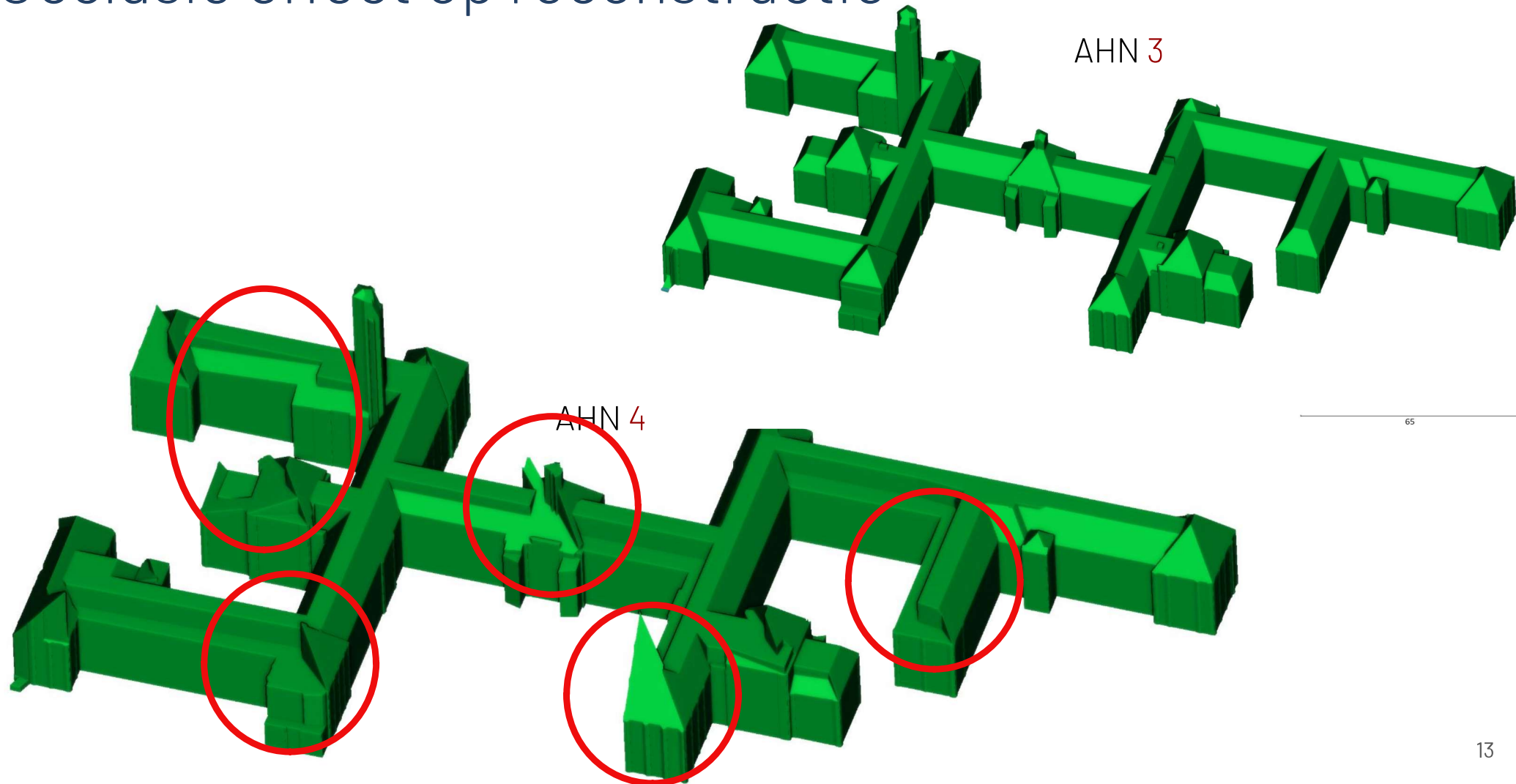
Occlusie in AHN4



Occlusie effect op reconstructie

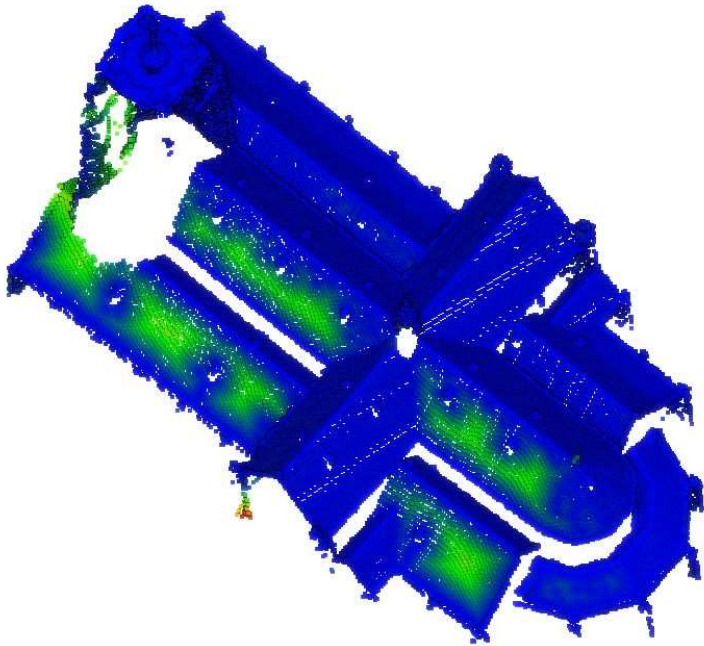


Occlusie effect op reconstructie

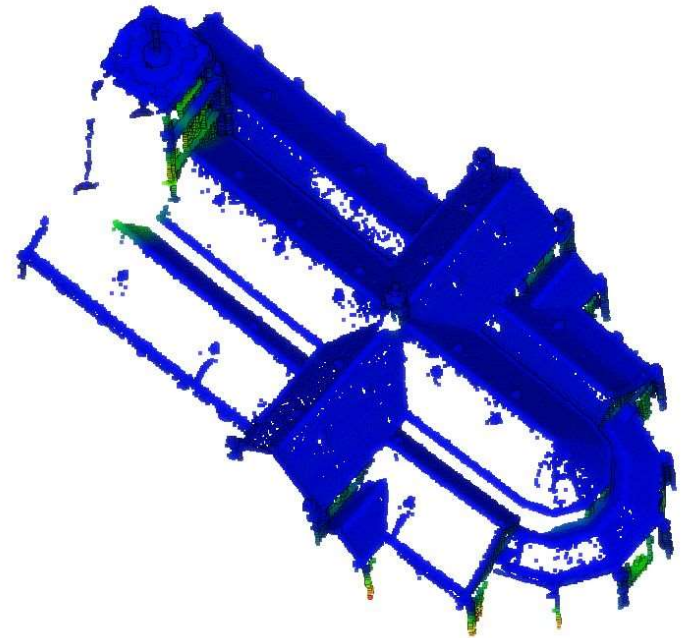


Occlusie AHN3/4

AHN 3

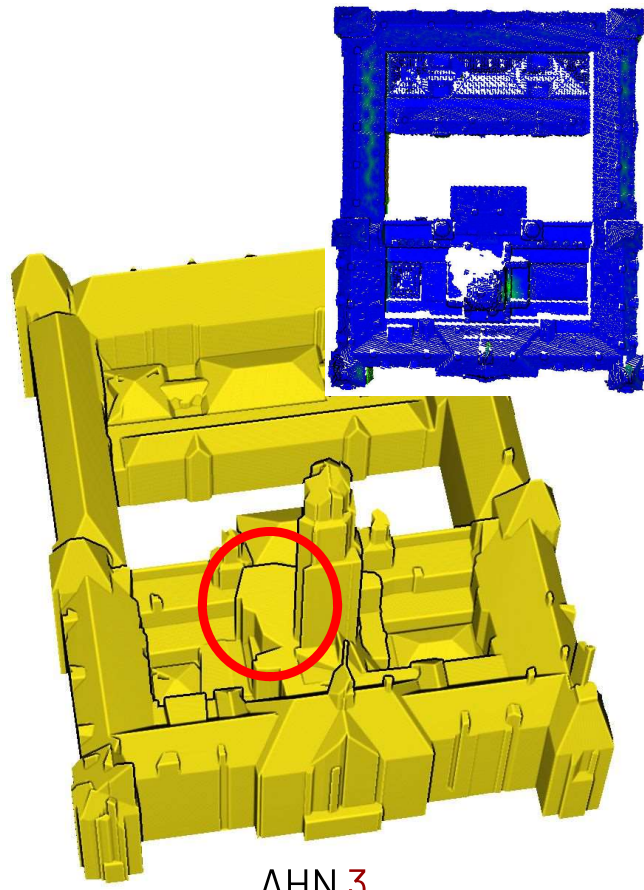


AHN 4

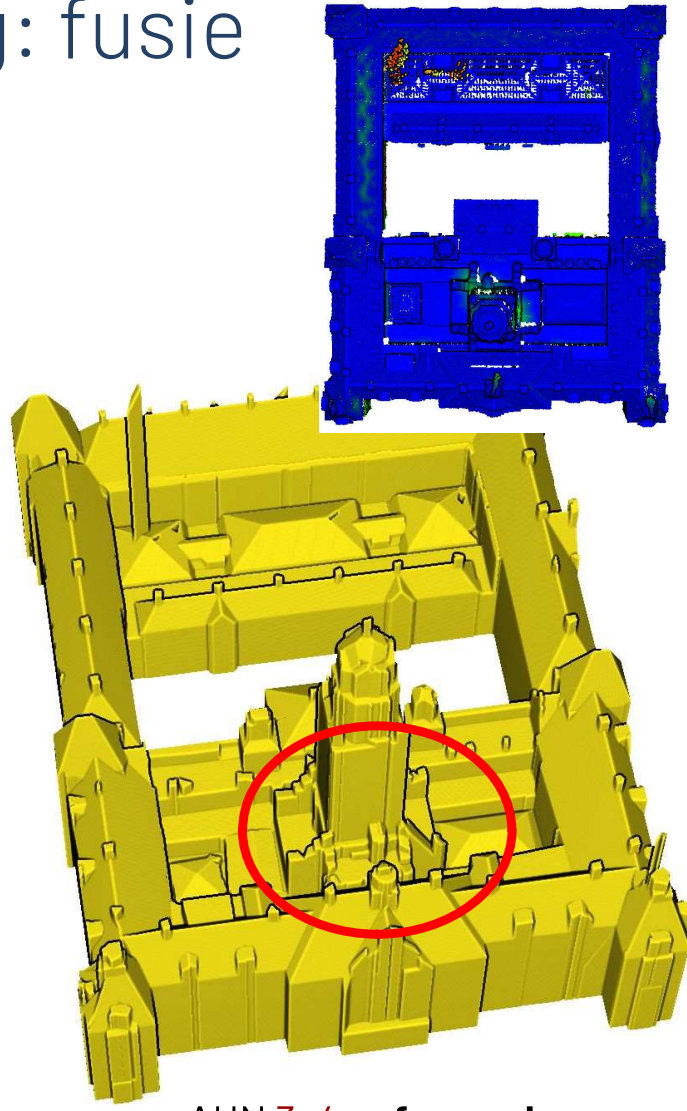


Simpele oplossing: fusie

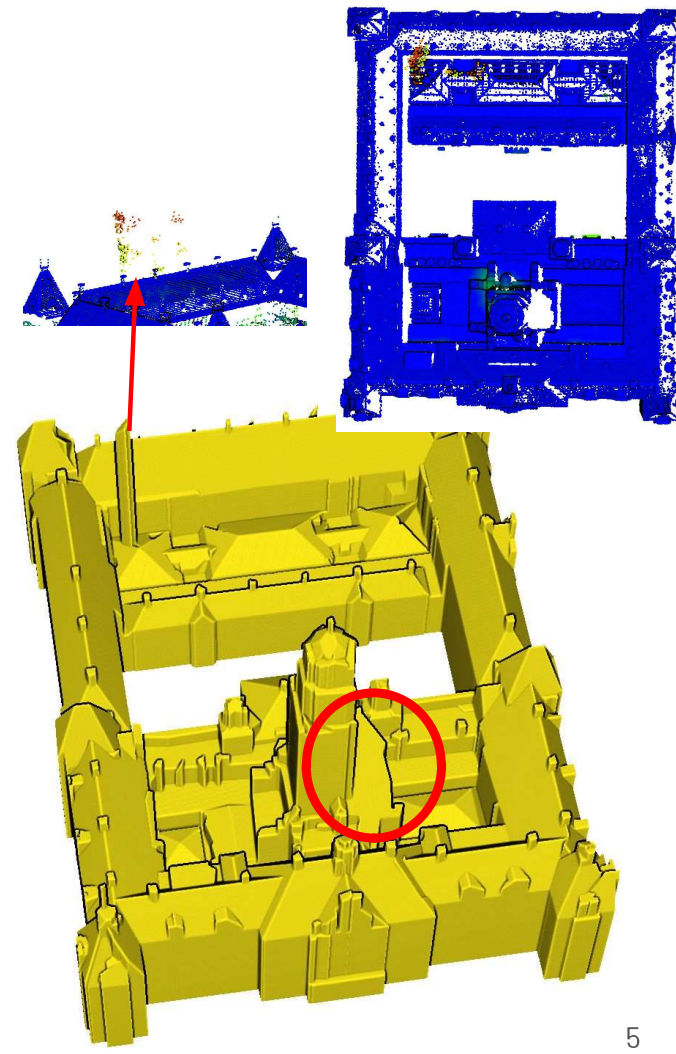
Vereist change-detection



AHN 3



AHN 3+4 gefuseerd

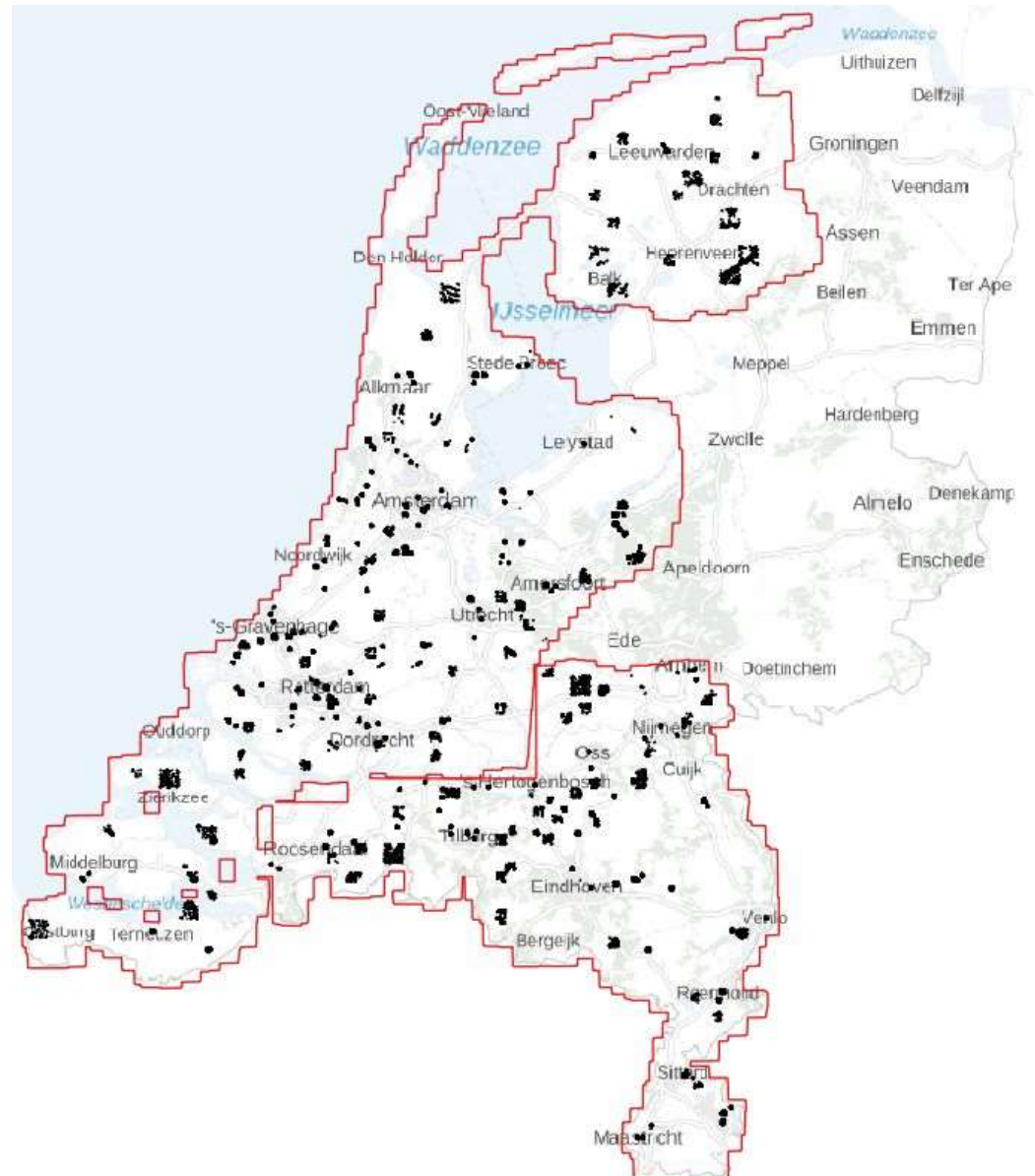


AHN 4

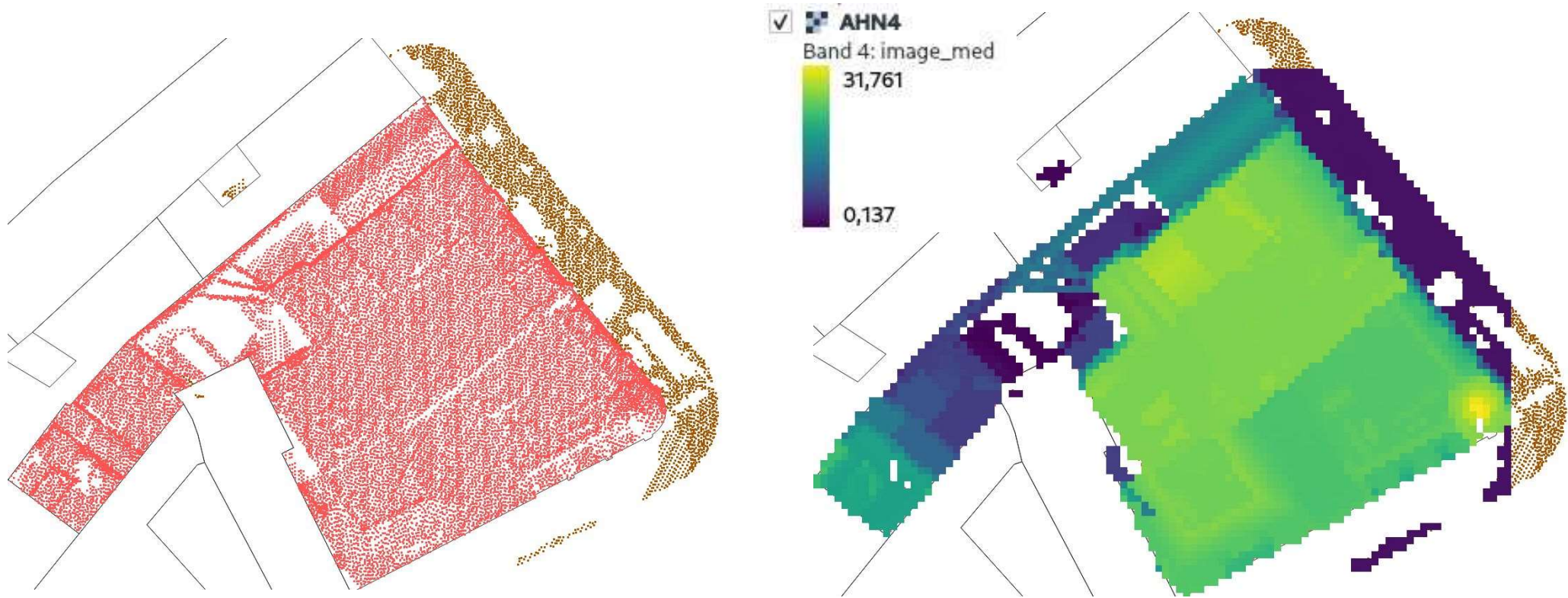
Test gebied NL

~5% random selectie
uit gebied met AHN4 beschikbaar

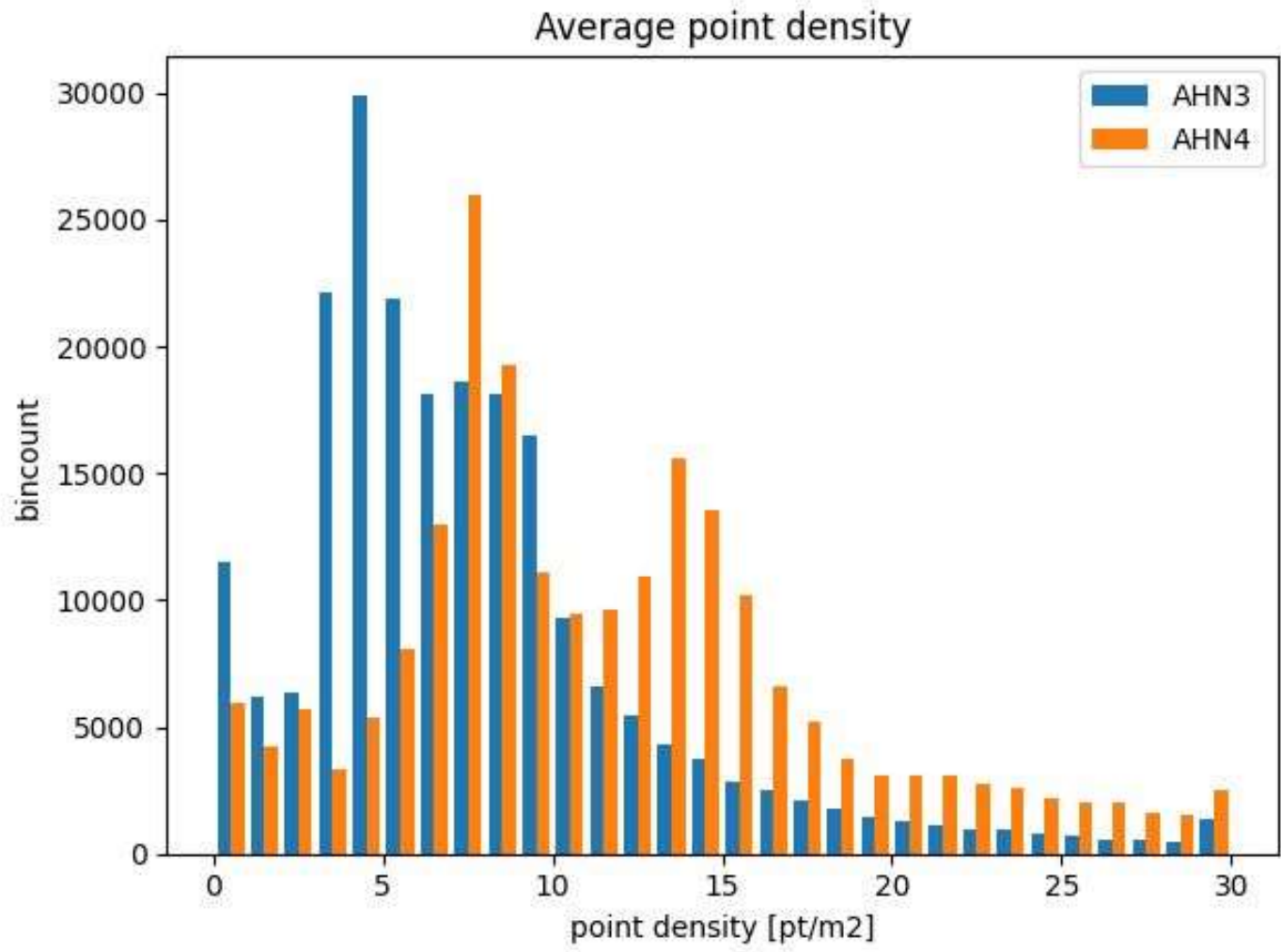
~280 000 gebouwen



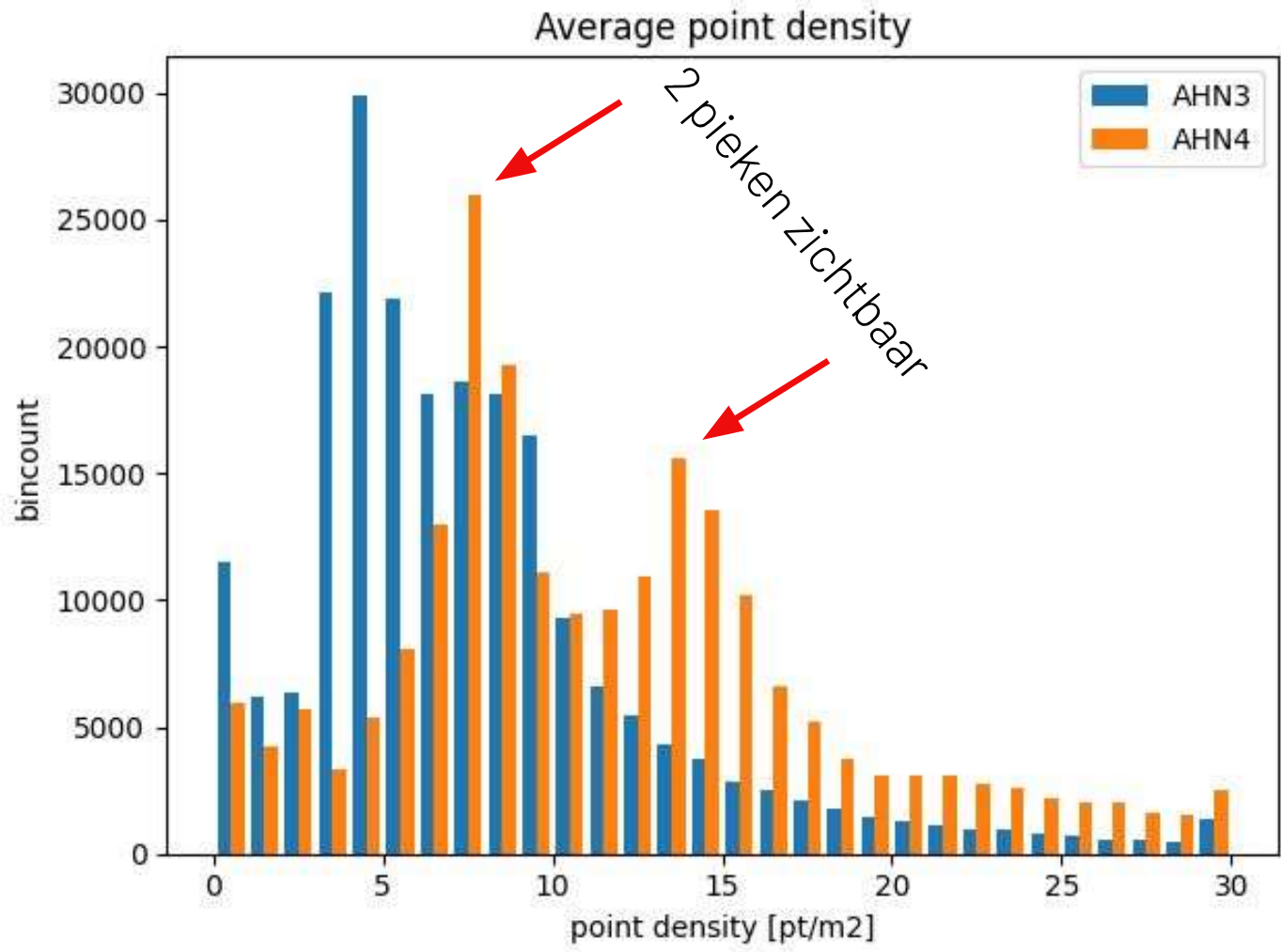
Rasterisatie puntenwolk per gebouw (0.5m)



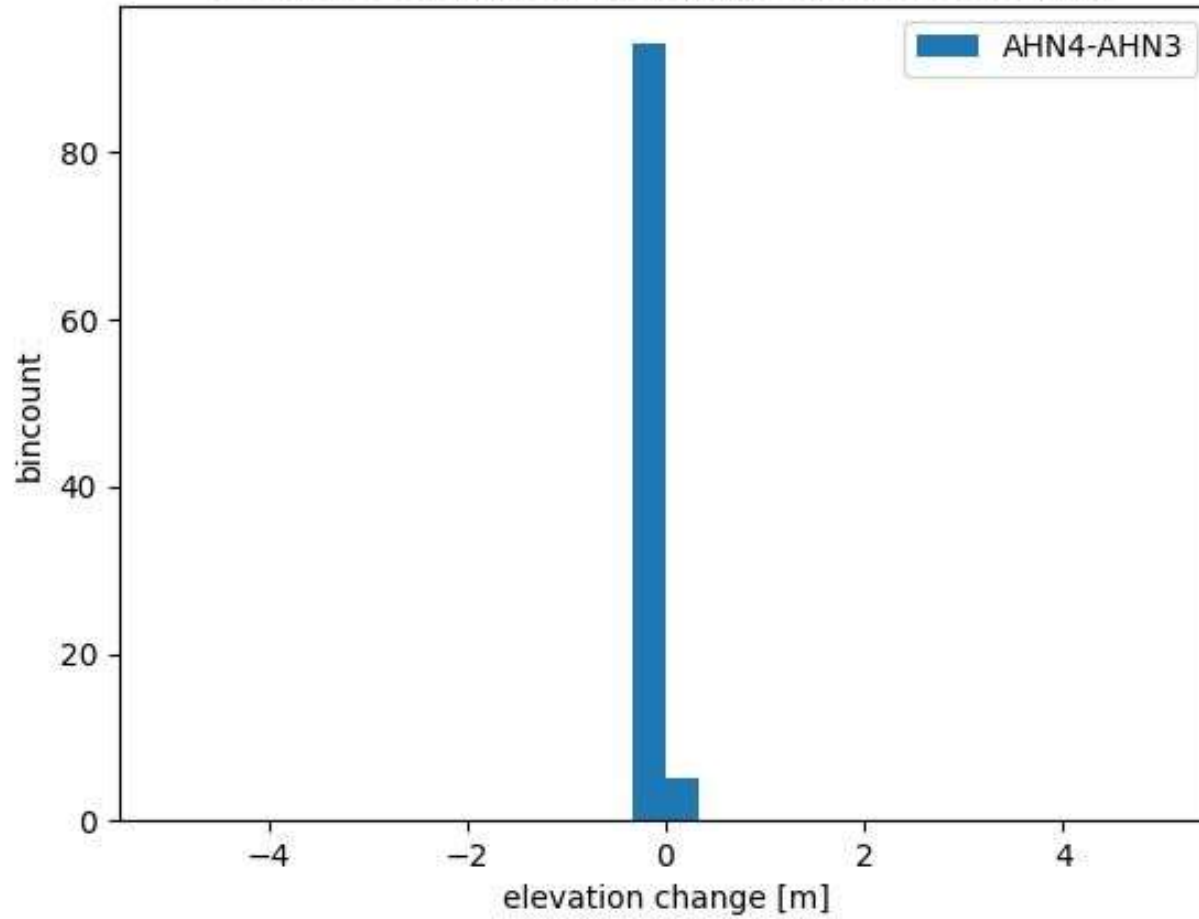
NL



NL



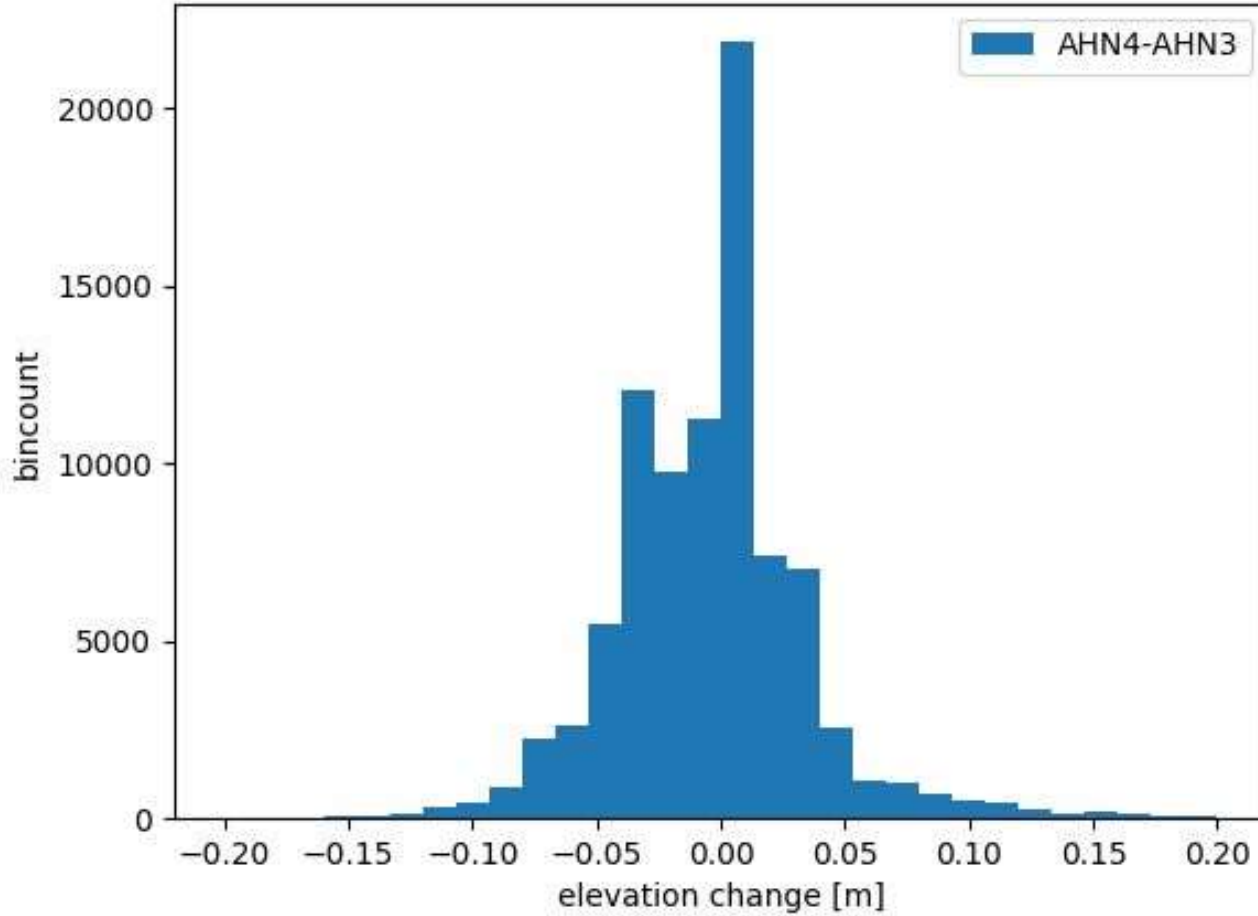
Elevation change in unchanged flatroof buildings



NL

70ste percentiel
dakpunten

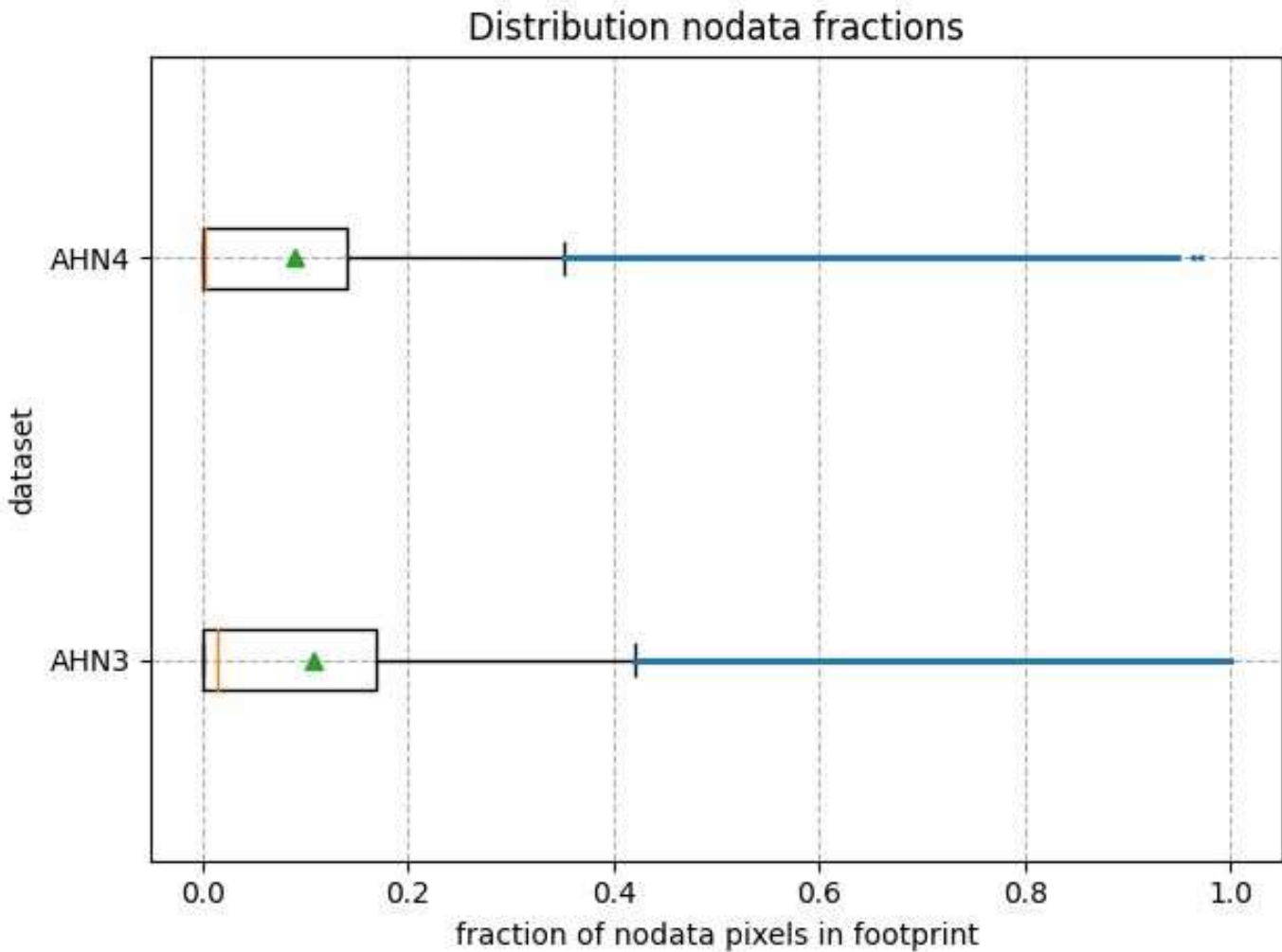
Elevation change in flatroof buildings



NL

70ste percentiel
dakpunten

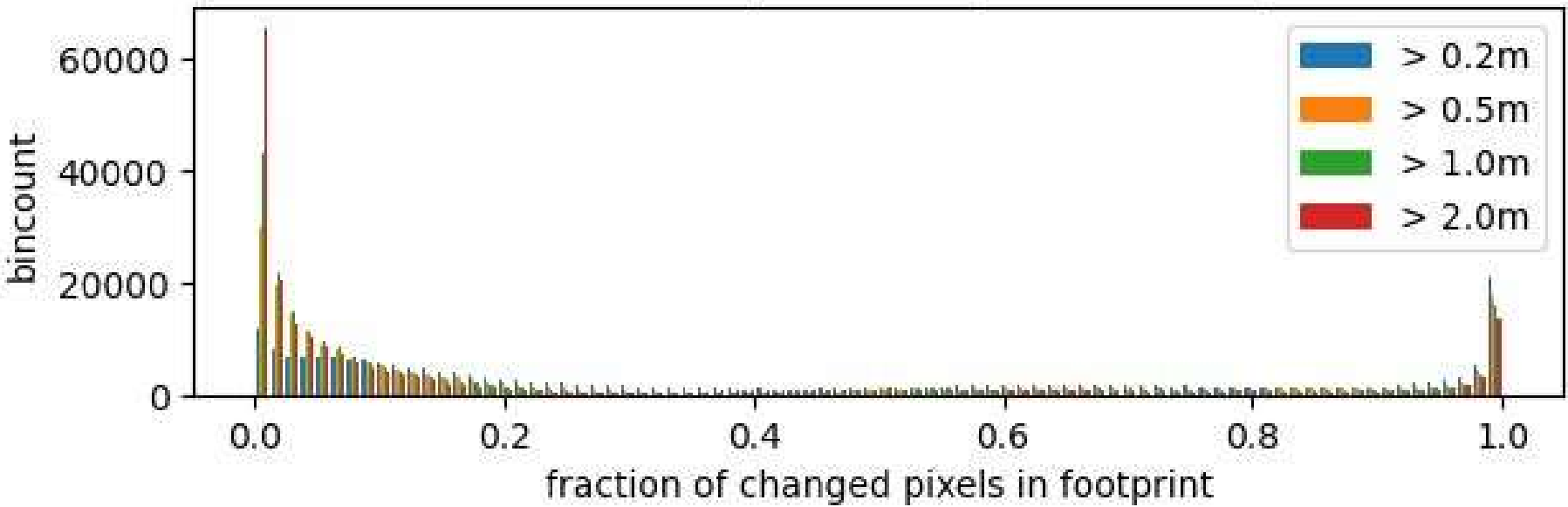
NL



Nodata probleem
lijkt beperkt tot een
aantal specifieke
situaties

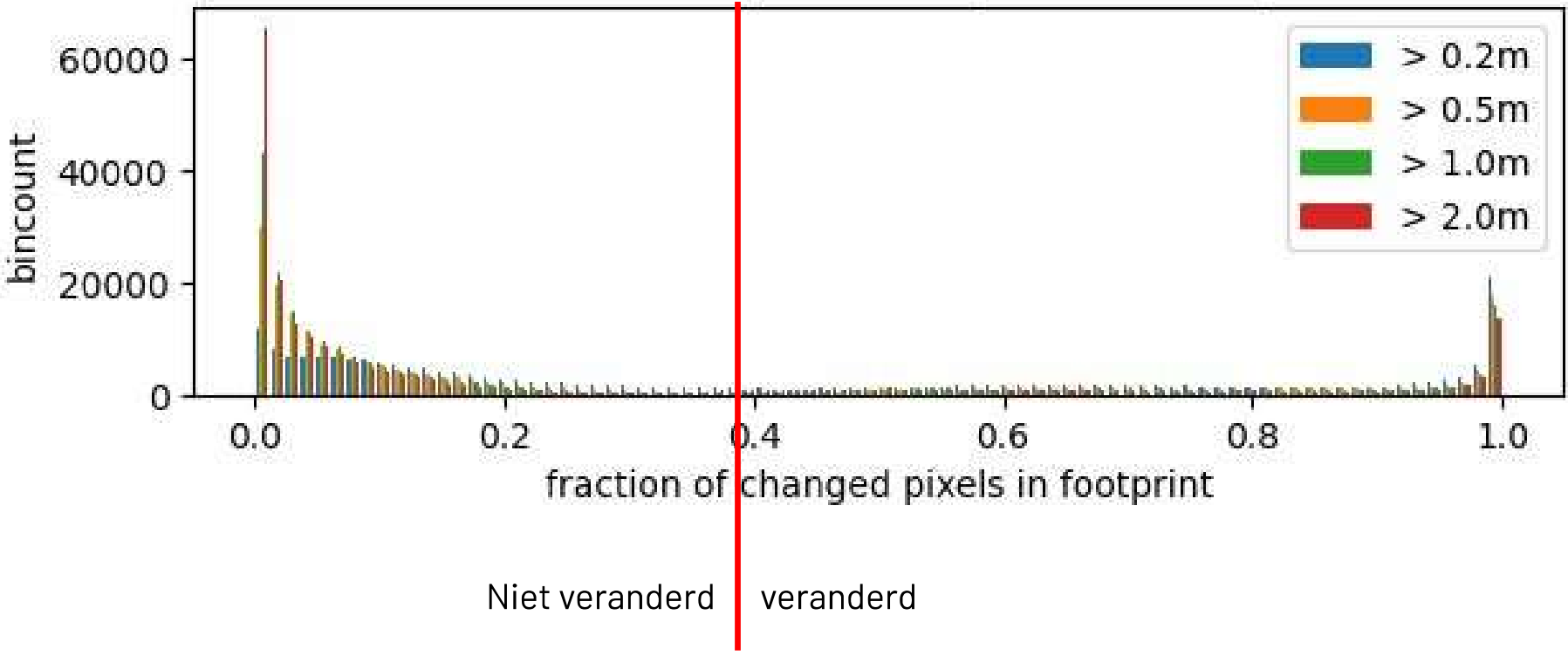
NL

Fraction of footprint change in max height



NL

Fraction of footprint change in max height

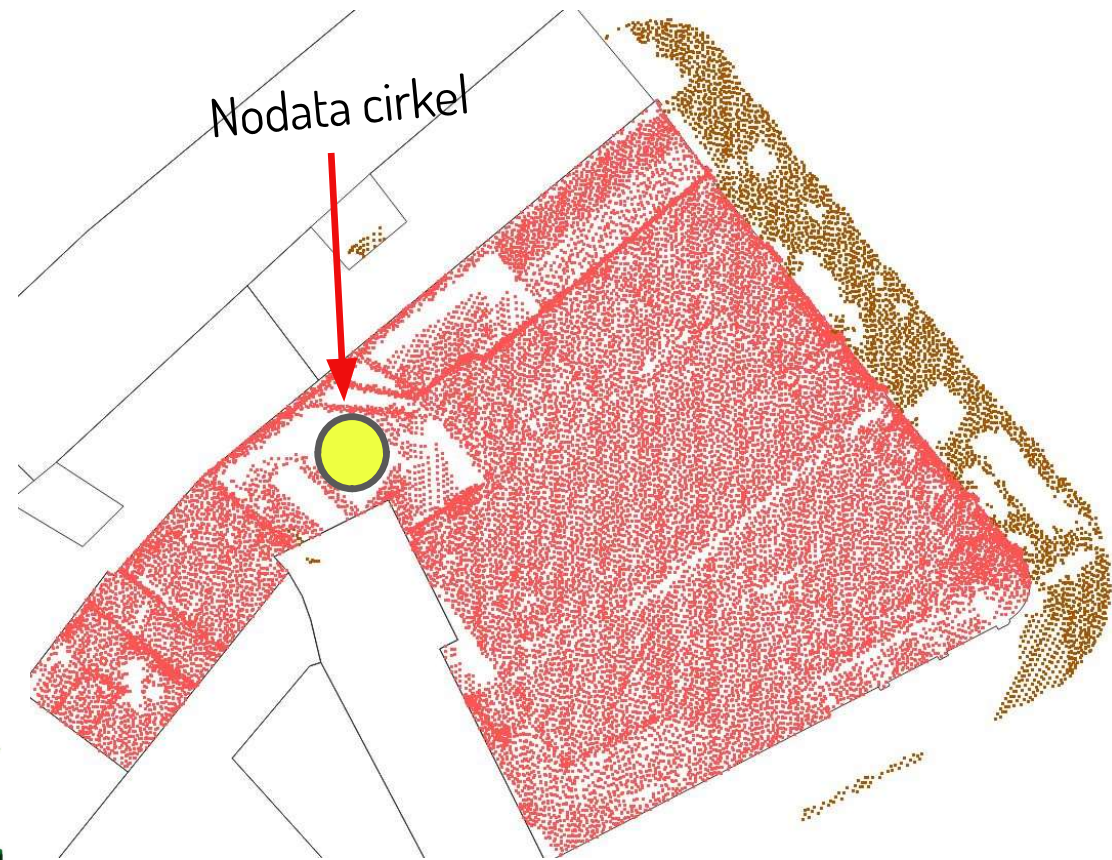
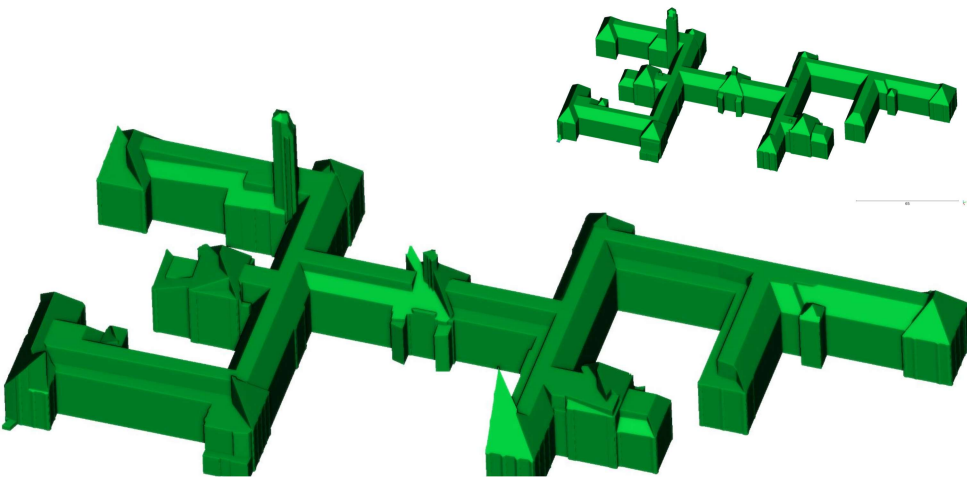


Simple mutatie detectie

Conclusie AHN4 in 3DBAG

Voor een BAG pand

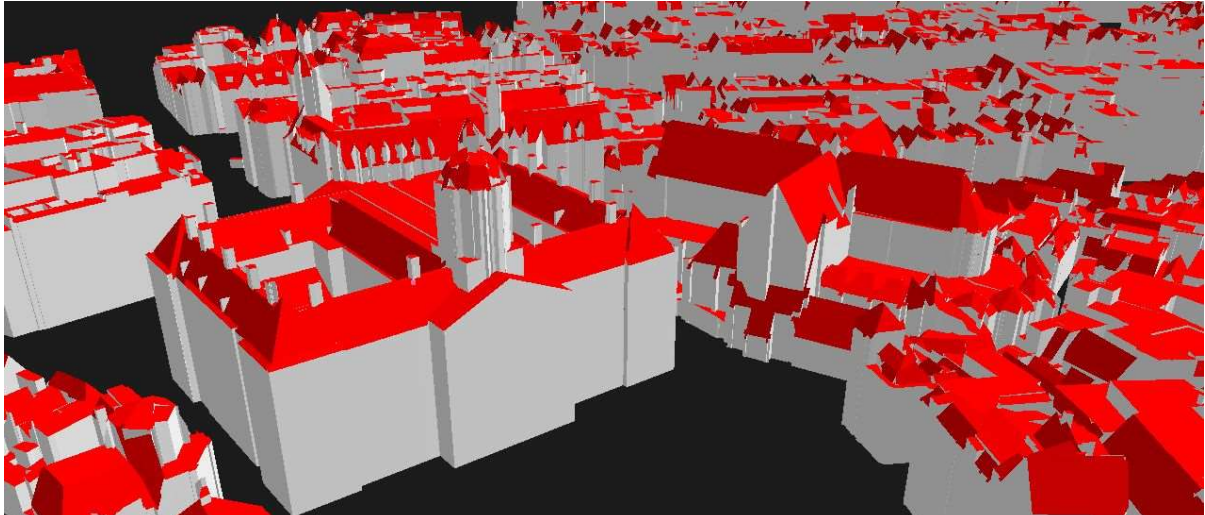
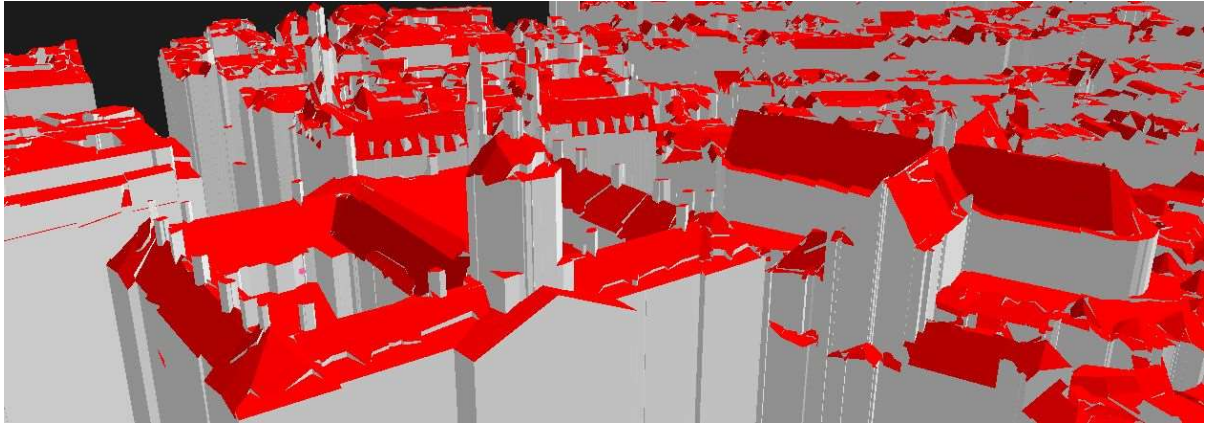
- Gebruik principe AHN4
- Tenzij nodata een probleem is **en** er geen mutatie is
- Val dan terug op AHN3



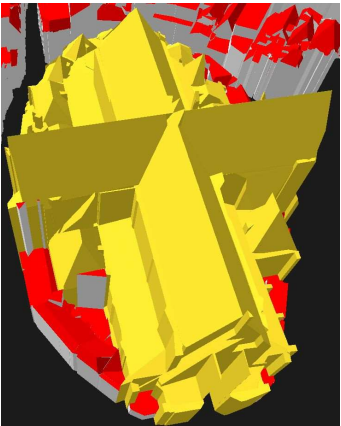
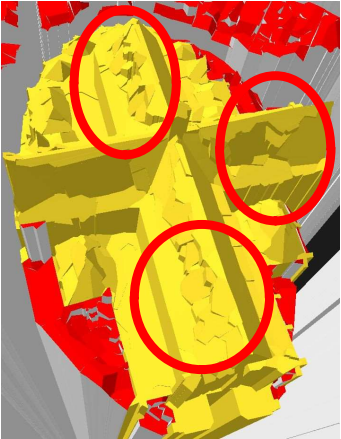
Experiment

Lijn detectie uit BM

Lijn detectie uit DIM puntenwolk niet altijd ideaal



Kadaster 2020 (BM, TMA)



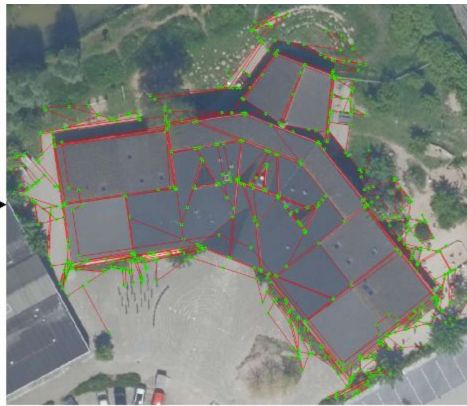
AHN 3



Lijn detectie rechtstreeks uit BM?



True orthophoto



Rooflines



Photogrammetric point clouds



LoD2 building model

Lijn detectie uit BM true-ortho

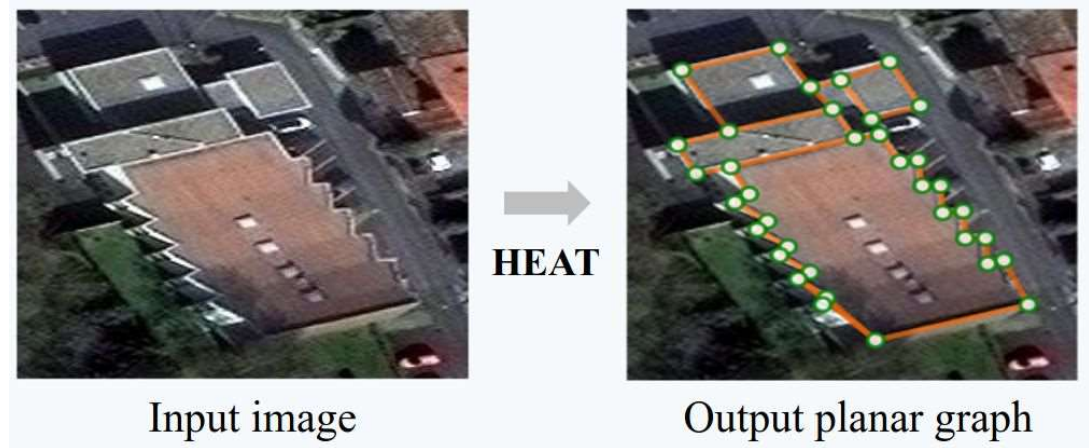
Vergelijking 2 methoden

- HEAT

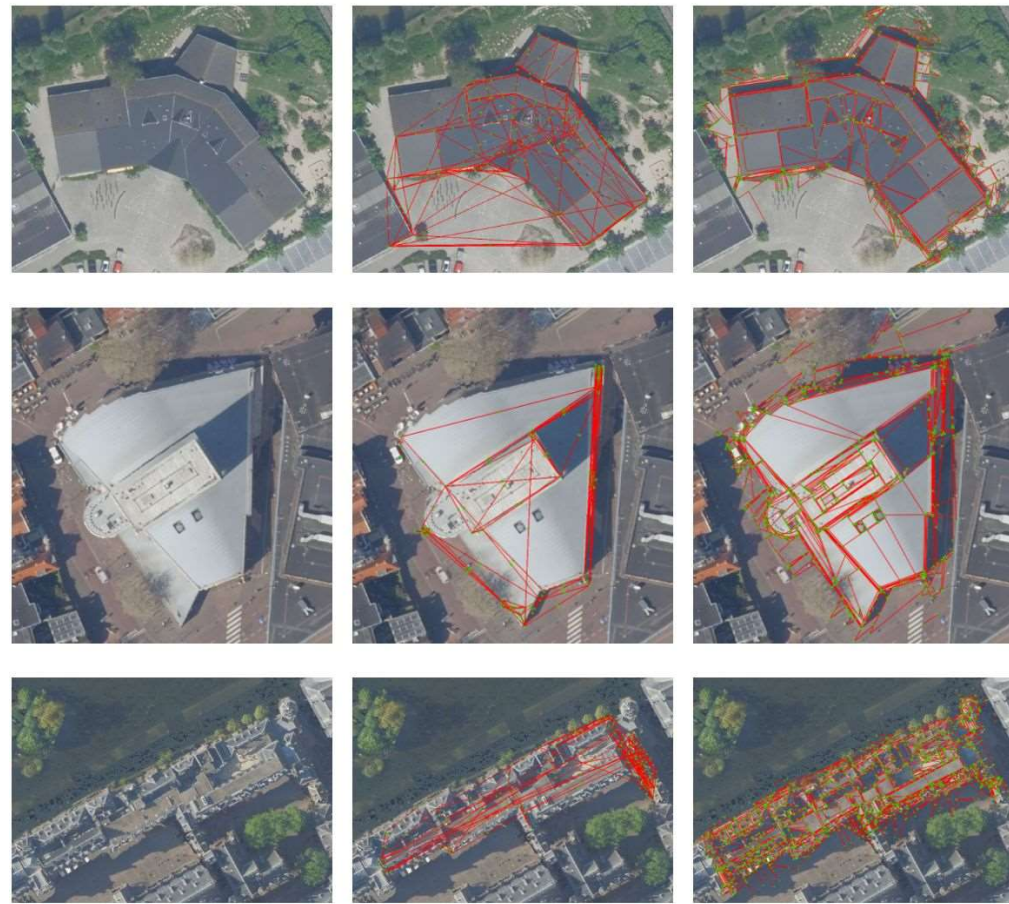
- Attention-based neural network
- Detectie hoekpunten en dan lijnen
- Training is erg belangrijk

- KIPPI

- Lijndetectie op basis van gradient in afbeelding
- Slim doortrekken en snijden van gedetecteerde lijnen + regularisatie
- Geen training nodig



Lijn detectie resultaten

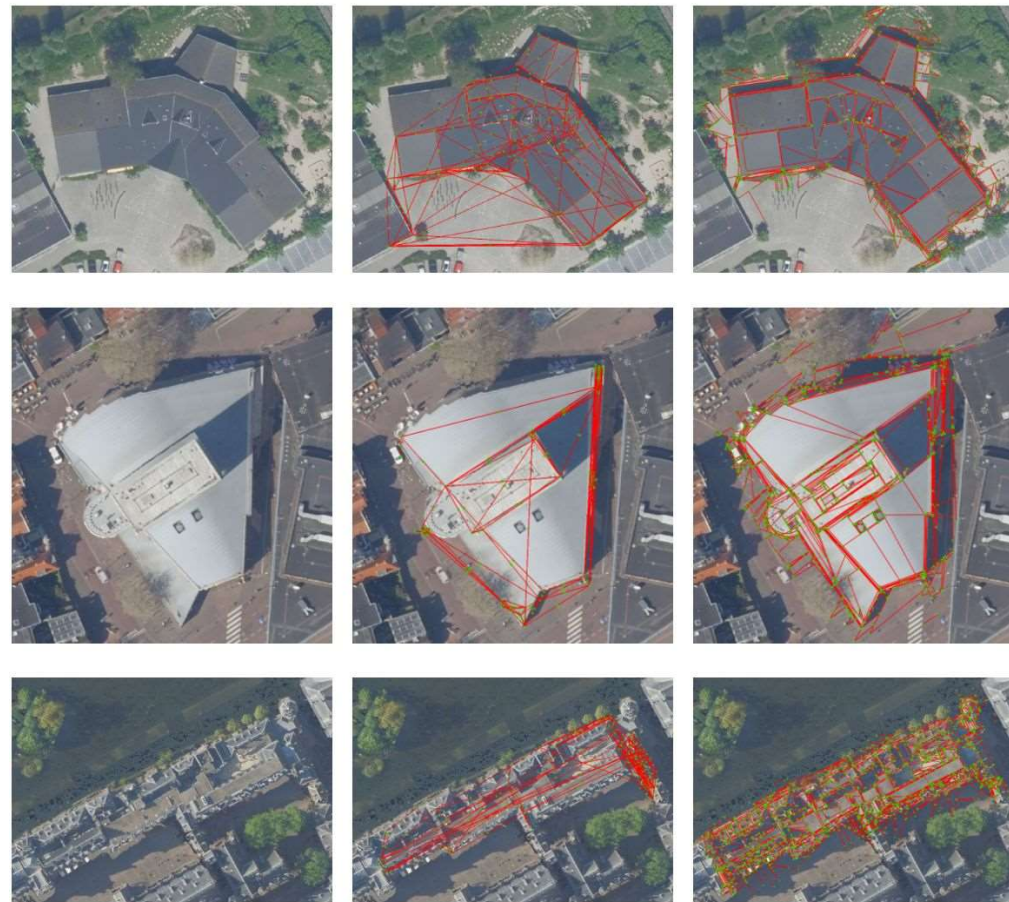


BM2020

HEAT

KIPPI

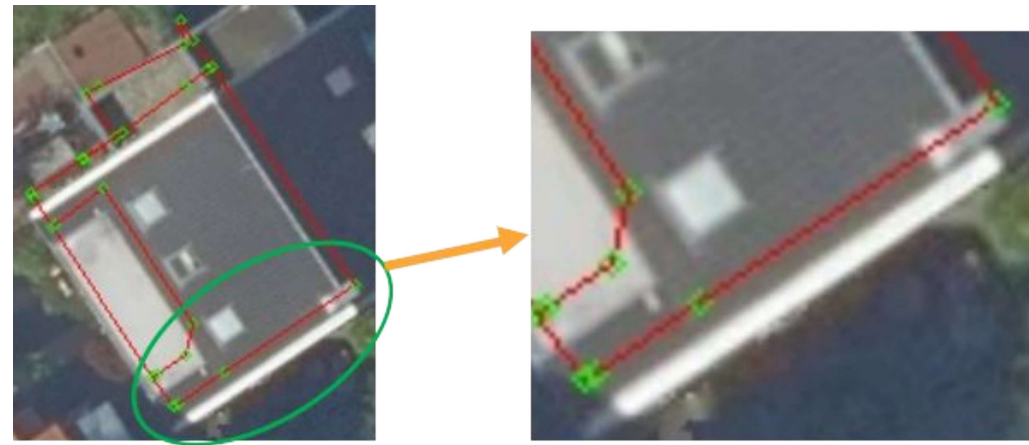
Lijn detectie resultaten



BM2020

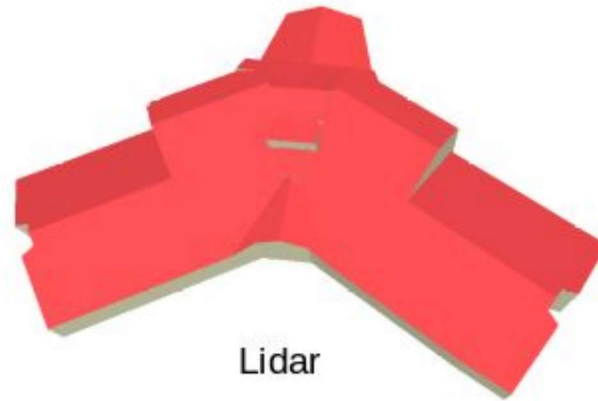
HEAT

KIPPI

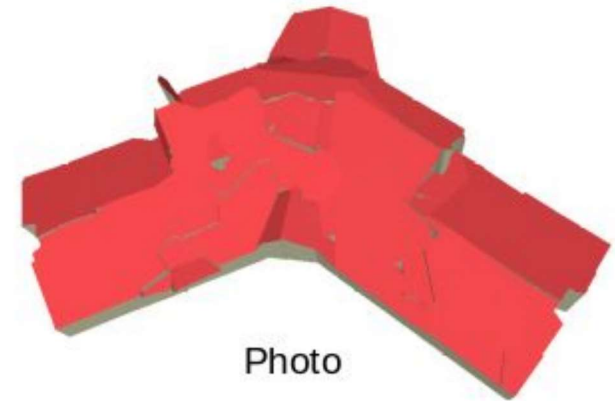


NB. Offset dakranden 3D BAG-BM
in HEAT trainings data

Reconstructie resultaten



Lidar



Photo



HEAT



KIPPI

	Faces	Mean	RMS
Lidar	598	-	-
Photo	3016	0.20	0.36
HEAT	376	0.44	1.11
KIPPI	1536	0.20	0.39

Conclusie lijn detectie uit true-ortho

- HEAT resultaten vallen tegen,
 - Lastig om goede trainings data te prepareren op grote schaal
 - Issue met offset tussen (3D)BAG lijnen en BM (met name dakranden)
 - Duur om te trainen
 - Resolutie afhankelijk van grootte gebouw
- KIPPI resultaten lijken bruikbaar
 - Geen training nodig
 - Verder kijken naar beste integratie in reconstructie pijplijn

Samenvatting

- 3DBAG AHN4 komt eraan!
 - Ongewijzigde gebouwen met no-data issues blijven op basis van AHN3
 - Verbeterde reconstructie pijplijn, met o.a.
 - betere validiteit 3D modellen,
 - verbeteringen voor overlappende BAG panden
- Toekomst
 - Gebouw reconstructie uit BM?
 - Toevoegen meer informatie zoals scheidingsmuren
 - Disseminatie dmv 3D OGC Features API

Dankuwel!

*AHN – BM congres
09-05-2023 – Amersfoort*

Ravi Peters, Weixiao Gao,
Balazs Dukai, Jantien Stoter

3dbag.nl