

GEO|Design+BIM for Smart Cities

How new technology helps to create smart cities

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Henri Veldhuis



Sweco

- Europe's leading architecture and engineering consultancy
- Organised in seven geographically based business areas
- Approx. 14,500 employees in 15 countries



Henri Veldhuis



WE PLAN AND DESIGN
THE COMMUNITIES AND CITIES
OF THE FUTURE



Microsoft HoloLens



- Sensors
- Processors
 - Microsoft Holographic Processing Unit
- Spatial sound
- Gaze tracking
- Gesture input
- Voice support

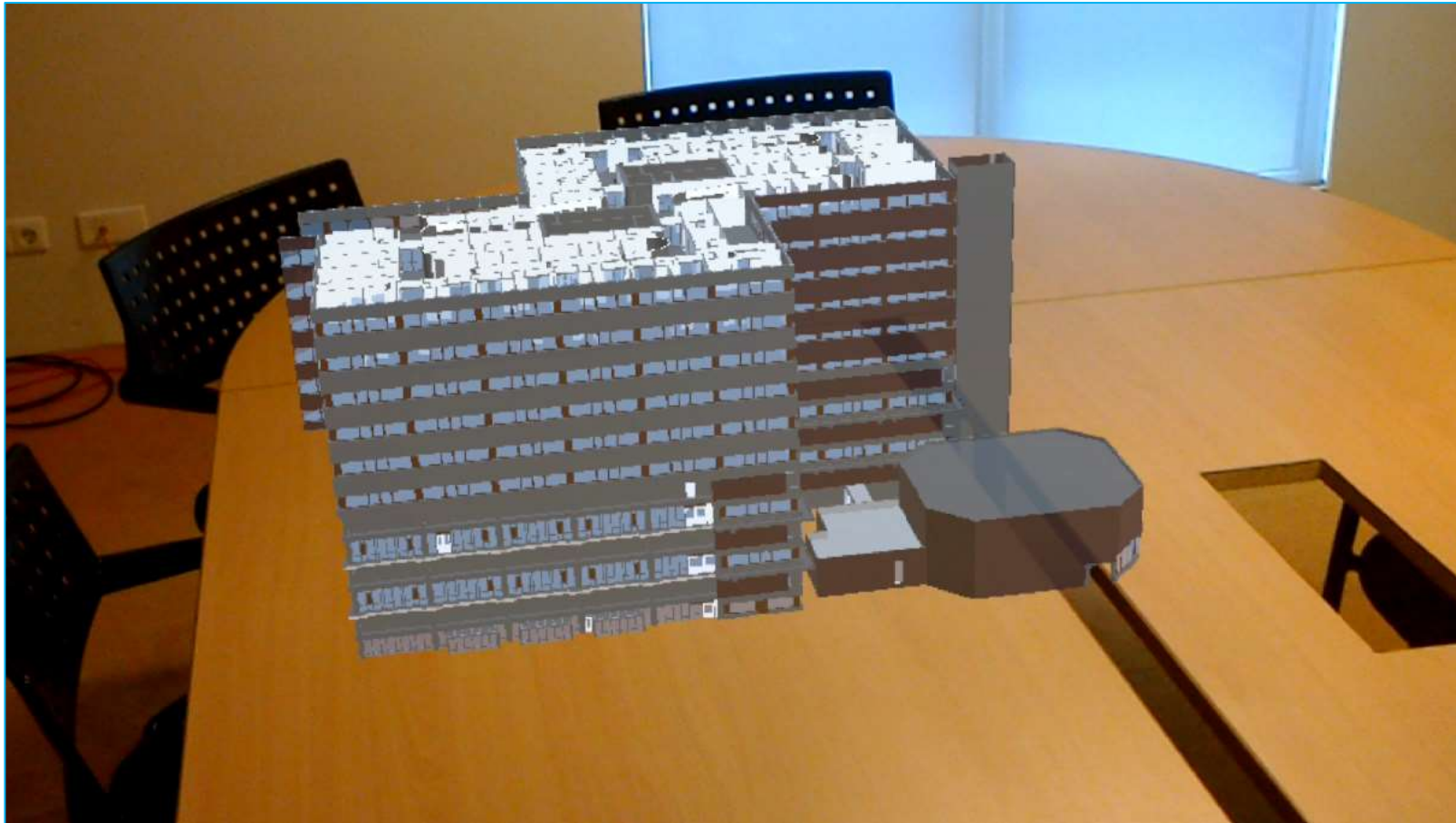
Sensors



Sensors

- 1 IMU
- 4 environment understanding cameras
- 1 depth camera
- 1 2MP photo / HD video camera
- Mixed reality capture
- 4 microphones
- 1 ambient light sensor

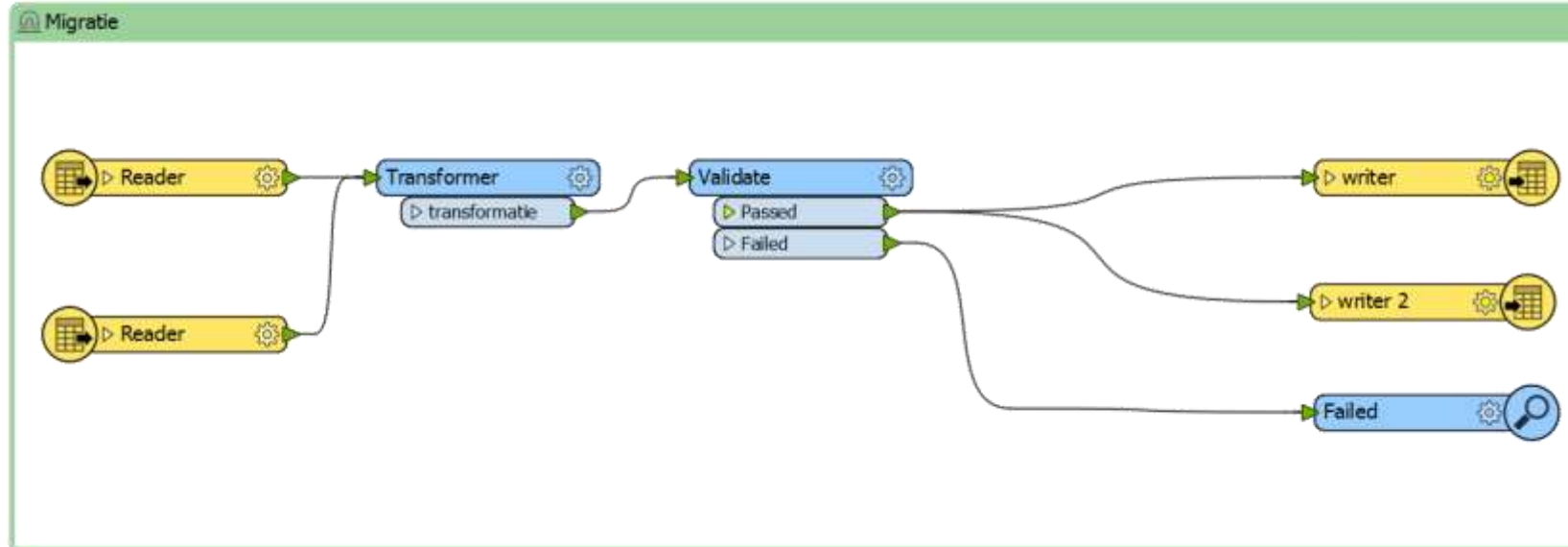
Visualize your 3D data (Academic Medical Centre Amsterdam)



Added Value of VR:

- Interactive design
- Visualize a design
- Hazardous locations
- Visualize hidden data












Take control of your 3D data with FME










Sweco

- Platinum Partner of Safe Software
- <https://www.safe.com/partners/sweco>
- Over 20 years of experience using FME

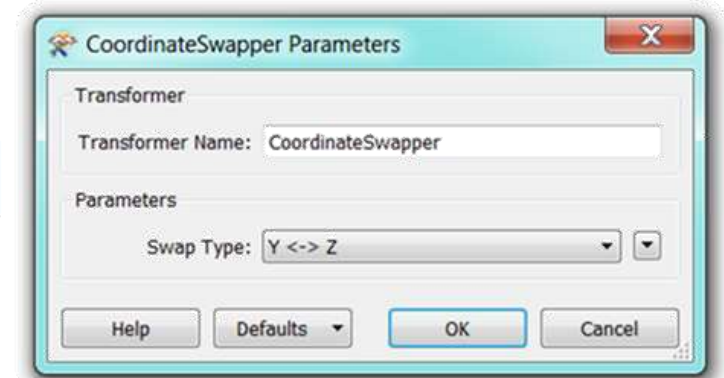
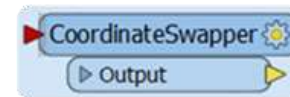
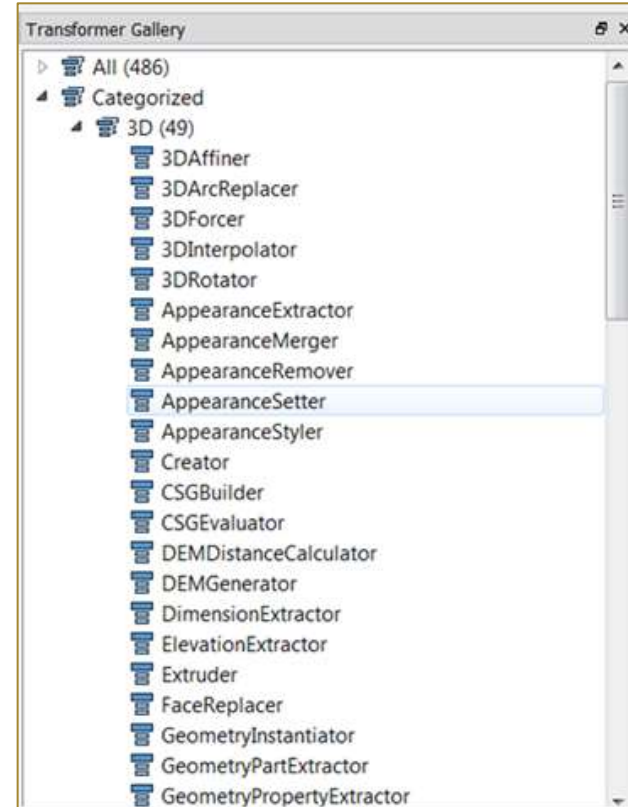
Reading / writing of most important 3D (BIM) formats

-  Adobe 3D PDF
-  Autodesk 3DS
-  AutoCAD Civil 3D
-  AutoCAD DWG/DXF/RealDWG
-  Bentley Microstation
-  CityGML
-  COLLADA/KML
-  DirectX
-  Esri Geodatabase/Shape
-  Free File Geodatabase API
-  Trimble SketchUP

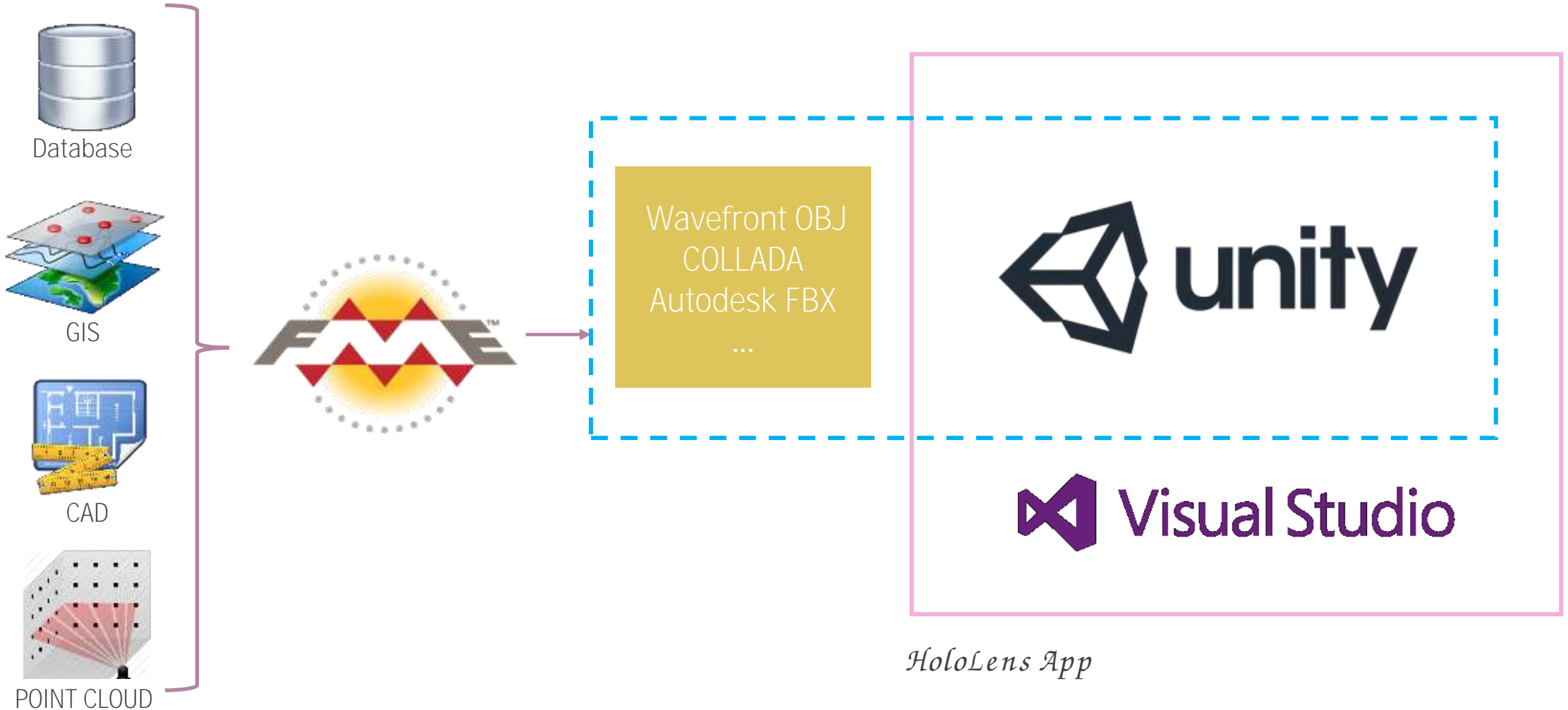
-  MINECRAFT
-  LandXML
-  LAS/LAZ
-  Oracle Spatial Object/Point Cloud
-  Point Cloud
-  Revit
-  Three.js
-  VRML
-  Wavefront OBJ
-  XML/GML
-  X3D

Issues to solve

- Amount of data
 - Number of faces in the model
 - Number of materials
 - Number of objects
 - Because FPS has to be higher than 60
- Geometry of data
 - Every mesh is made out of triangles
 - Cylinders are complex
- Origin of coordinate system
 - Real world coordinates have to many digits for Unity
- Axis of coordinate system
 - Y and Z are interchanged / swapped



Get your data on the Microsoft HoloLens



HoloLens App

Amsterdam (Asset Management for Sewer Systems)



Obsurv (www.obsurv.com):

- Life Cycle Asset Management
- Inspection video's

FME:

- Creating building from 2D GIS data and 3D point cloud
- Creating BIM objects from database with dimensions of sewer system

[Link to video](#)

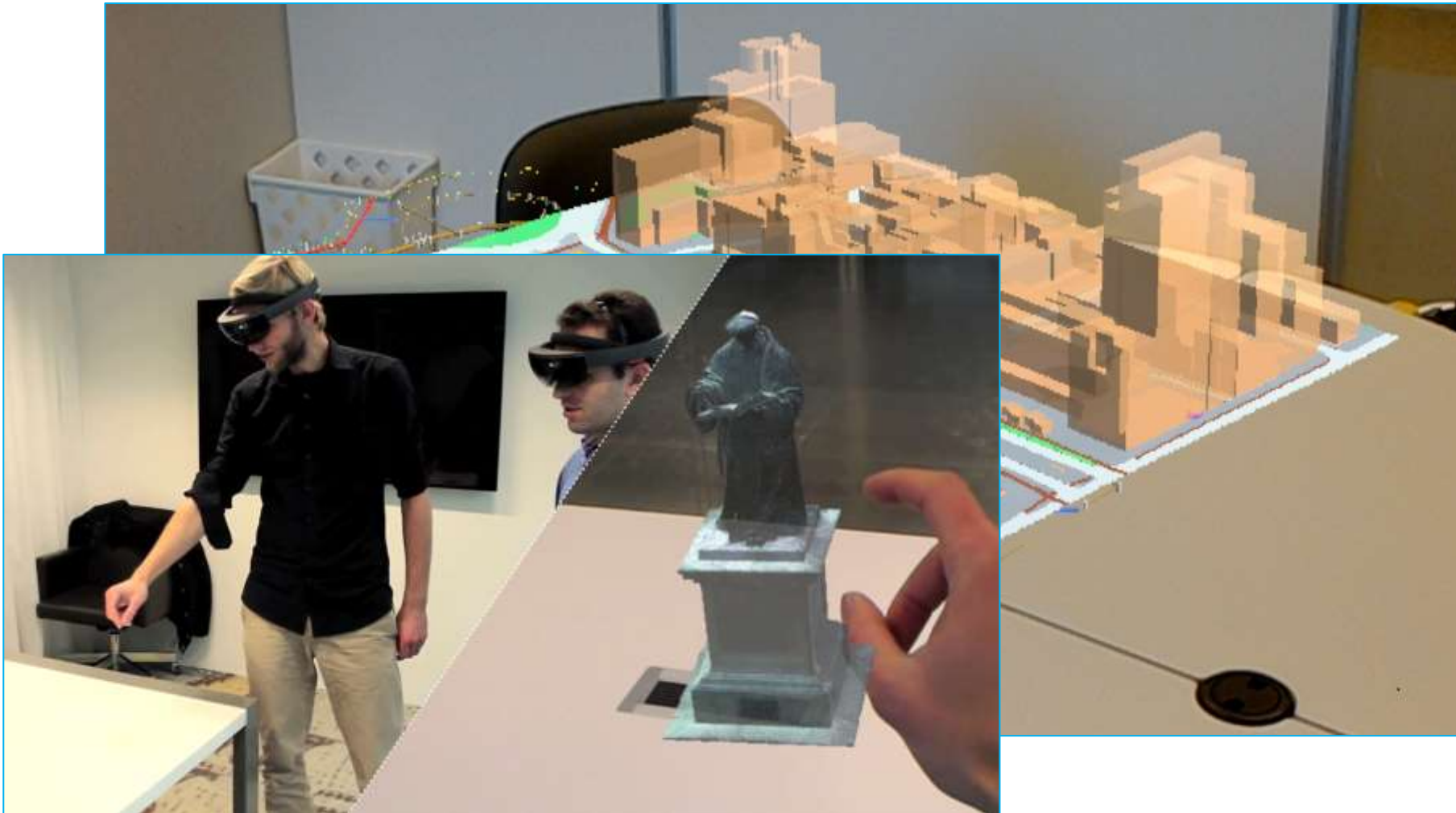
Rotterdam

Data sources

- Point Clouds
- Meshes
- 2D Map

Objects:

- Sewers
- Cables
- Buildings

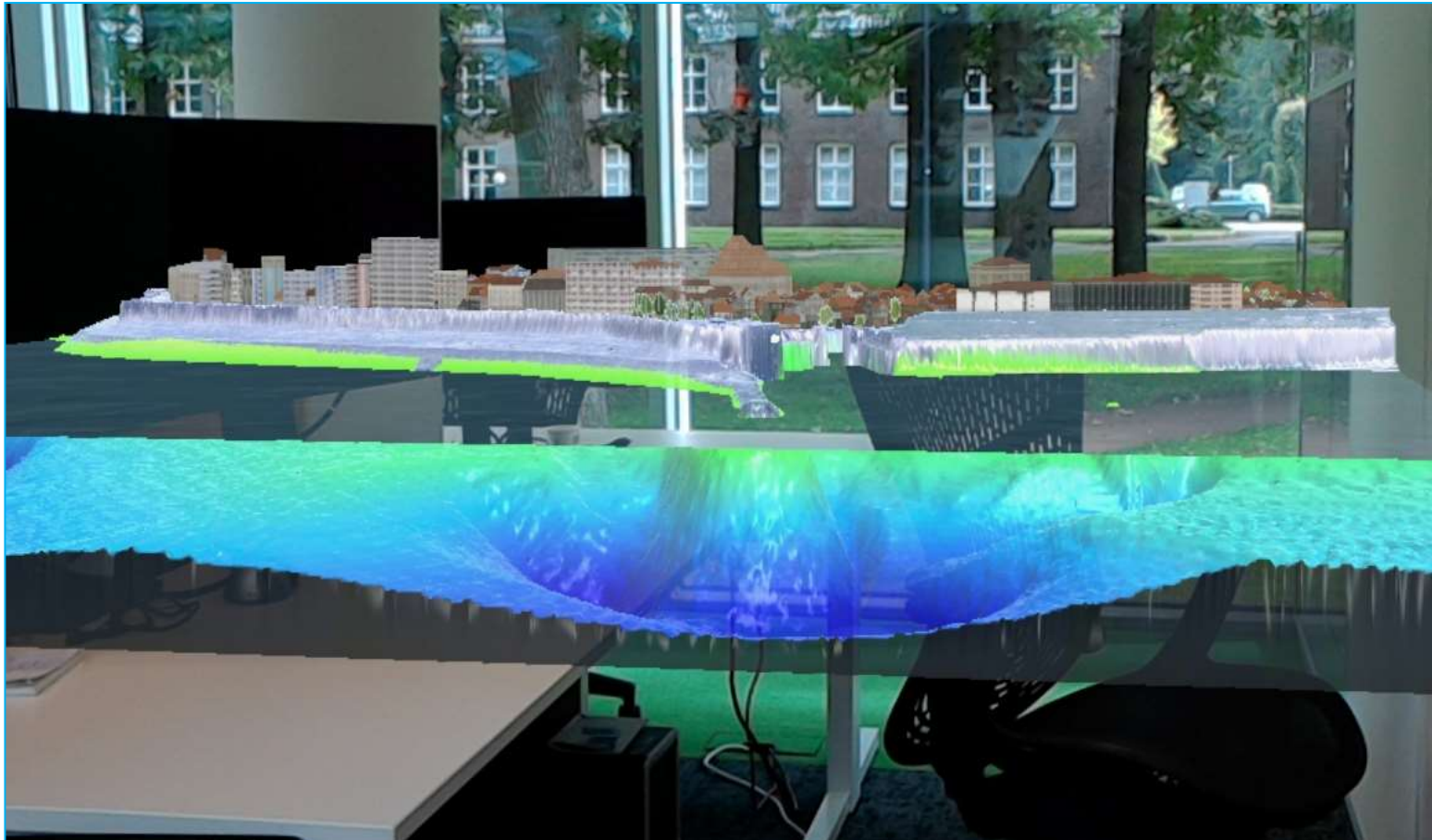


Viewing point cloud data (Sweco Belgium)



- 150.000 points per second
- 30.000 points per meter road-axis
- Accuracy approximately 5 - 10 cm
- Flemish region: approx. 960 x 109 points

Modelling the rising of the sea level



- Water Authority
- Over 500 km of dikes
- Data:
 - Sea bottom
 - Profile of dike
 - Buildings



Contact



Henri Veldhuis

Manager Business Development

+31 6 200 131 09

henri.veldhuis@sweco.nl



Marco Grimaudo

Lead Developer

+31 6 425 013 07

marco.grimaudo@sweco.nl

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