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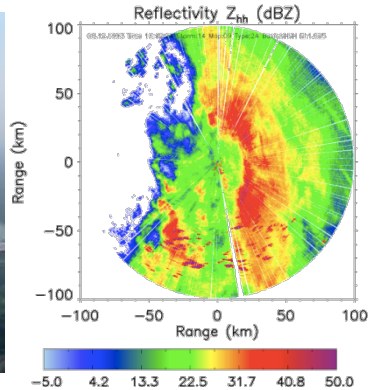
Contracting Radar



The Radar

SSBV
Aerospace & Technology Group

Radar Specs

- Type — Polarimetric Doppler Weather Radar
- Freq — 9.3 – 9.5 Ghz
- Range — 200 m – 60 Km
- Resolution — > 30m
- Sweep rate — Up tp 2500 Hz
- Transmit Polar. — Sweep to Sweep H V
- Recieve Polar. — Simultaneous H/V, dual channel reciever
- Transmit power — <± 0.1 dB per sec, < ± 1.0 dB per day
- Phase noise — 1° per second
- Required sens — > 10 dBZ at 30Km

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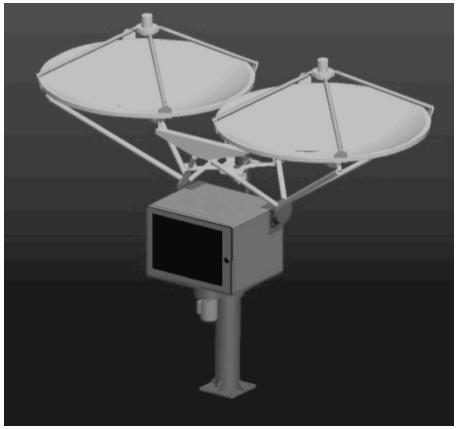

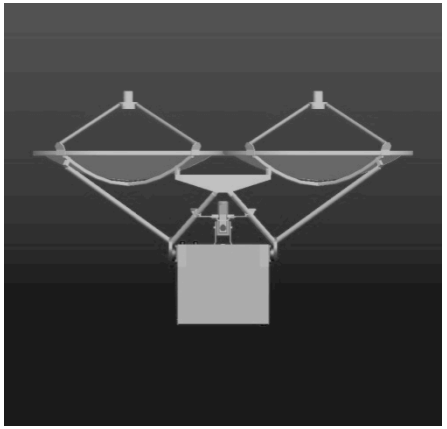

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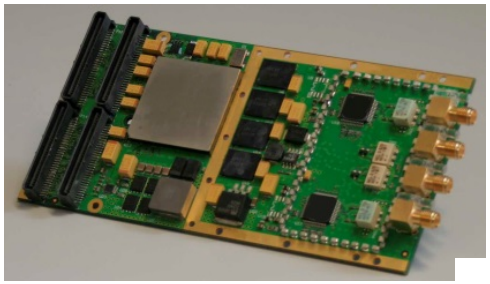
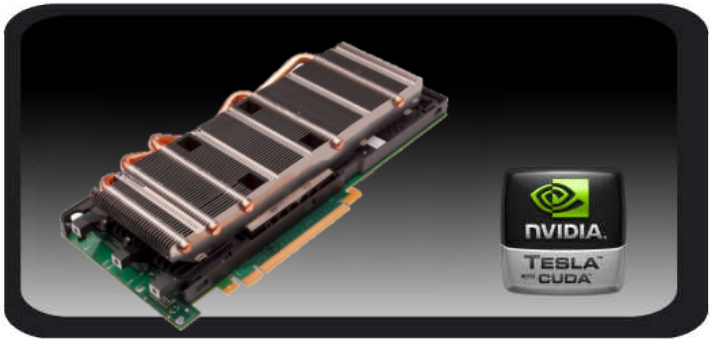
High-Performance and high-reliability components
From RF to Data Processing





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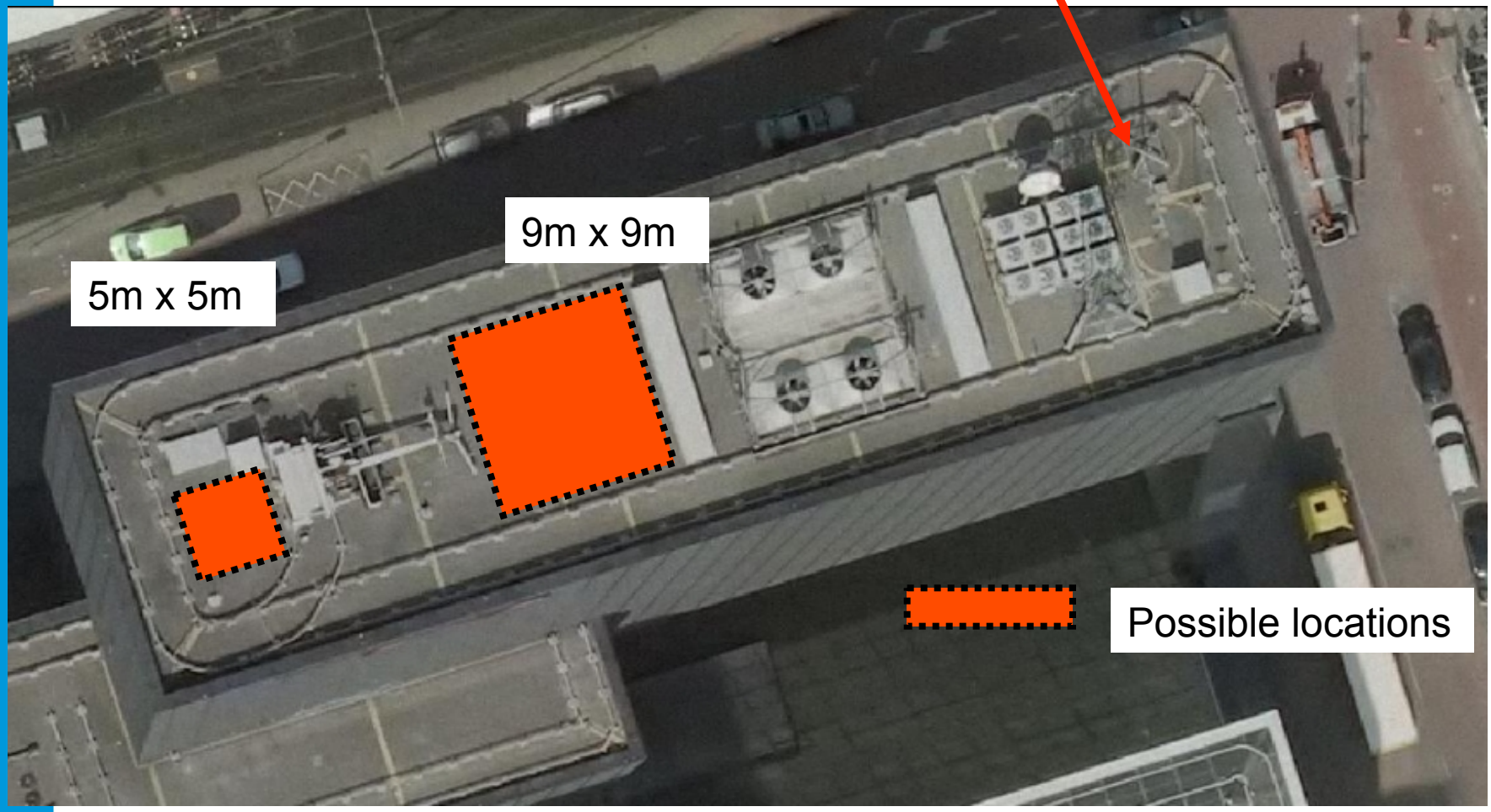
9m x 9m
5m x 5m
Possible locations

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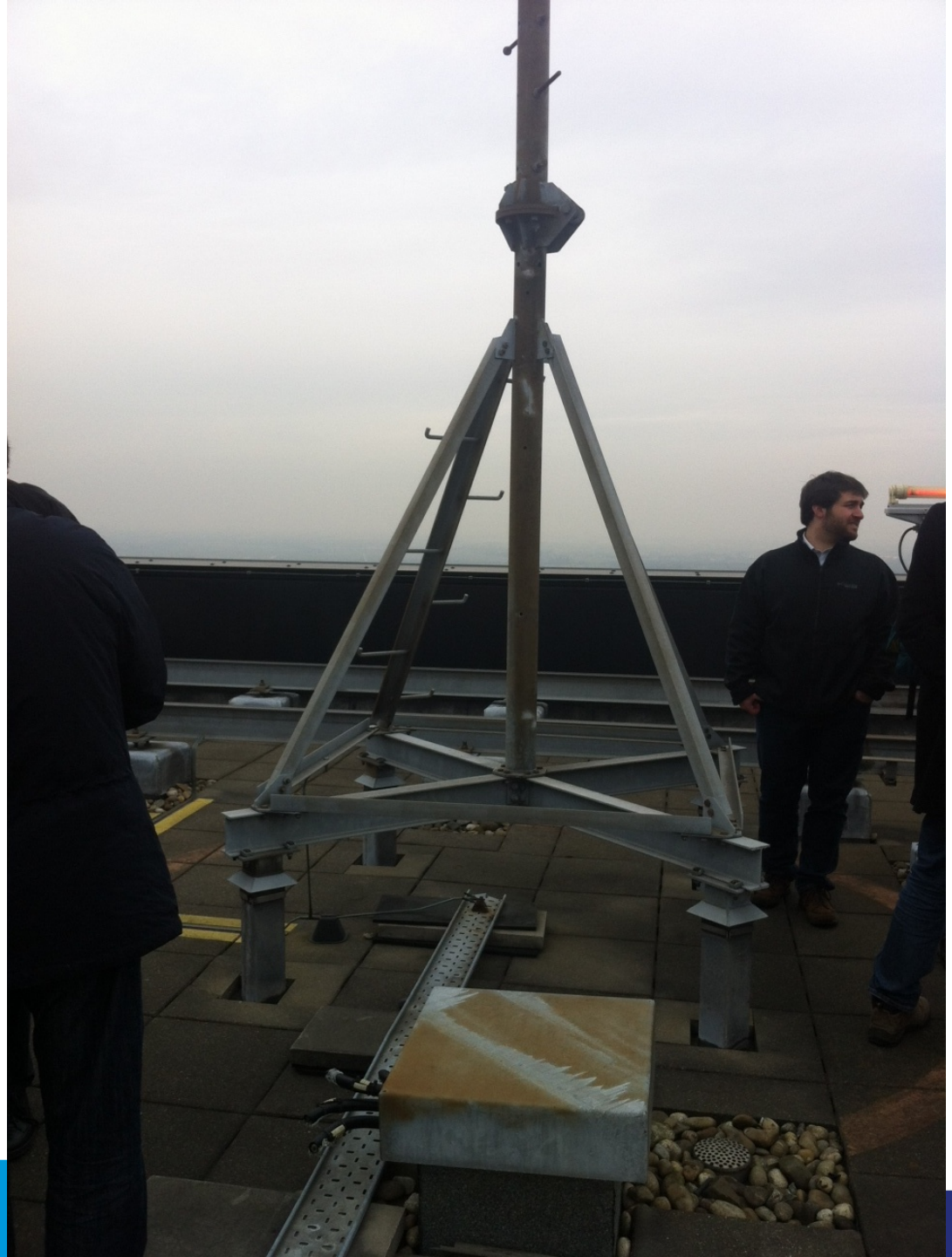

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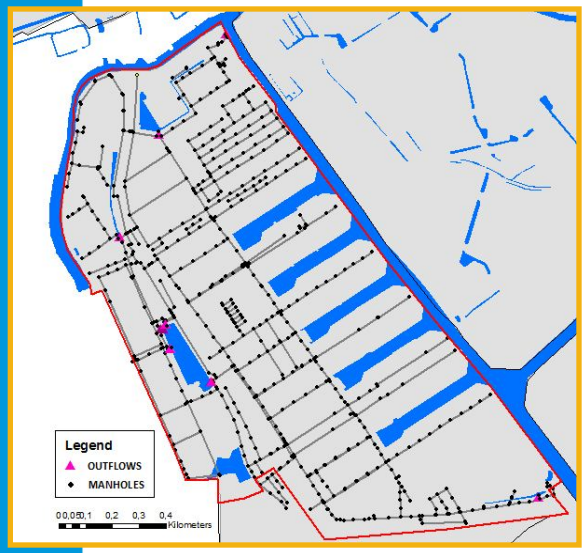
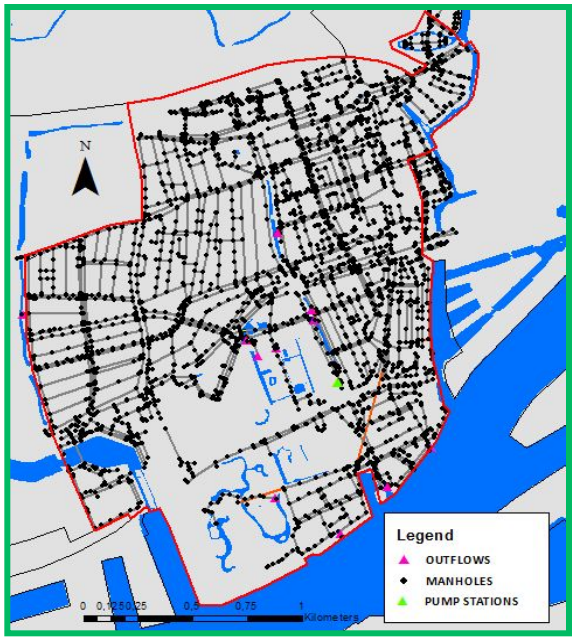
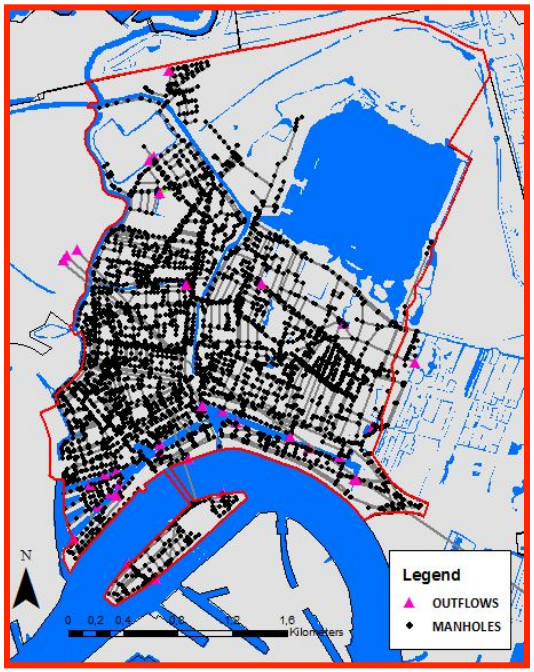
Rotterdam pilot locations



District 12. Spaanse Polder: 1,9 Km²



District 9. Centrum: 3,7 Km²



District 10. Kralingen-Crooswijk: 8 Km²

Urban pluvial flood mitigation options

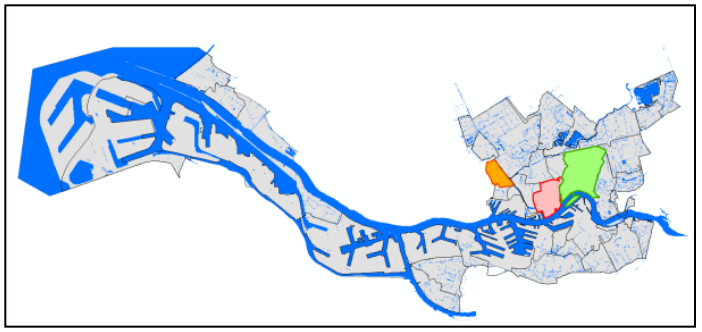
1. **Underground storage facilities** (e.g. Museumpark, 10000m³)

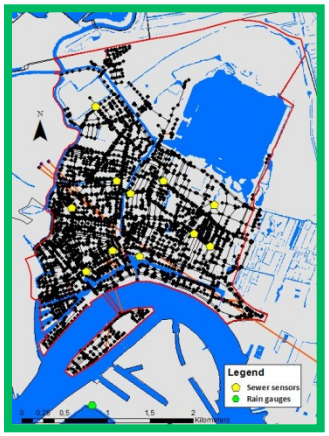
3. Further optimization of system operation:
Rotterdam has a combined sewer system with 40 pumping stations that can be operated from a central control room.

2. Water squares (e.g. Belamyplein, Benthemplein, 17000m³)

4. Green roofs: a durable solution for temporary water storage

Models





Software : Sobek-urban 212

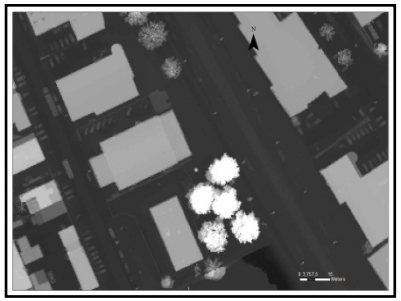
Modules:

The **sewer system** is modelled in 1-dimension (1D) in Sobek Urban;

The **rainfall-runoff** process is modelled in Sobek RR- runoff to the sewer system is computed by delay factor +losses+infiltration module, where the discharge into the system is computed as a function of rainfall and runoff factors, which in turn depend on slope, area and type of surface.

The **overland flow** will be set up using the 2-dimensional Sobek module

Digital Elevation Model



The Municipality provided a set of AHN-2 layers cropped to the administrative limits of the city. This **DEM** was produced using Light Detection and Ranging (LiDAR) of ground levels from an aerial platform.

The DEM is characterized by
- a **spatial resolution of 0.5 m × 0.5 m**,
- a vertical precision of 5 cm,
- a systematic error of 5 cm, a random error of 5 cm,
- a minimum precision under two standard deviations of 15 cm. [1]

[1] Citizens' complaints, overland flow networks and vulnerability to pluvial
Flooding (S. Gaitan et al., 2012)

Monitoring systems

1. C-Band radars: De Bilt and Den Helder (200 km range, operated by KNMI) [1]

2. X-Band radar: Nationale Nederlanden building, next to Central Station.

3. OVER THE WHOLE URBAN AREA:

- 8 fixed **rain gauges** from Municipality;
- 10-15 disdrometers from TUDelft;
- 2 KNMI raingauges (Airport and Hoek van Holland);
- At least 3 manual rain gauges from amaterus.

[1] Derivation of a 10-Year Radar-Based Climatology of Rainfall. A. Overeem et al. 2008

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Thank you