

2016 annual  
Polis conference  
Rotterdam

Friday 2 December 2016

Robert Kooijman

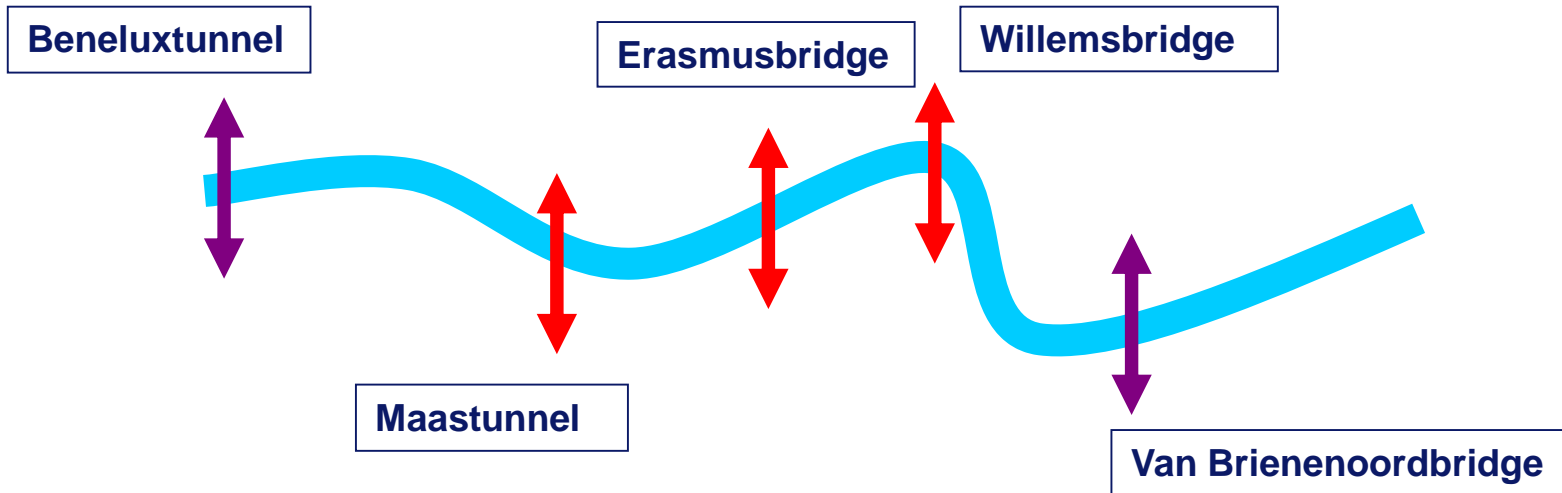
# Adaptive traffic management and C-ITS challenges in Rotterdam



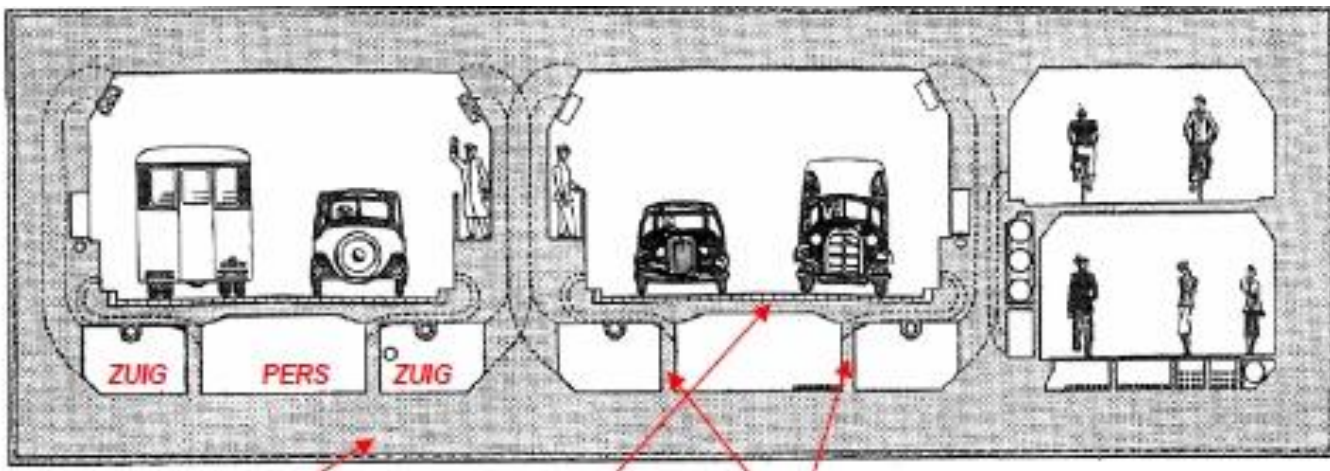
# Network and river crossings



# Maastunnel – Facts & Figures



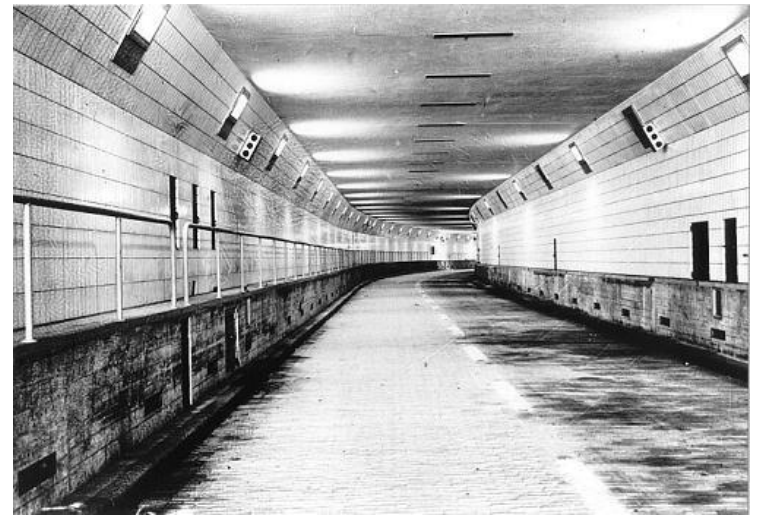
	Beneluxtunnel	Maastunnel	Erasmusbridge	Willemsbridge	Van Brienoordbridge
Motor vehicles/day	130.000	<b>60.000</b>	30.000	20.000	230.000





# Renovation Maastunnel – Why?

- In 2017 75 years old: regular maintenance
- Asbestos contermination 2012: concrete corrosion
- New European regulations for tunnel safety
- National monument status



# Adaptive Flow Management system (AFM)

- **AFM principles:**

- At least 15 km/h in the tunnel
- Sufficient buffer space downstream
- Support for manual intervention (e.g. car breakdown)

- **Goal:**

- No negative impact on the network performance (liveability, safety, flow)



# Motion graphic AFM



SPEED

NO  
SPILLBACK

NO  
SPACE



# Inputs

## Inside tunnel

- loop detection for traffic intensity and speed



## AFM road network

- Traffic lights: red/green and settings through IVERA and V-log
- Radars



## Tunnel Management System

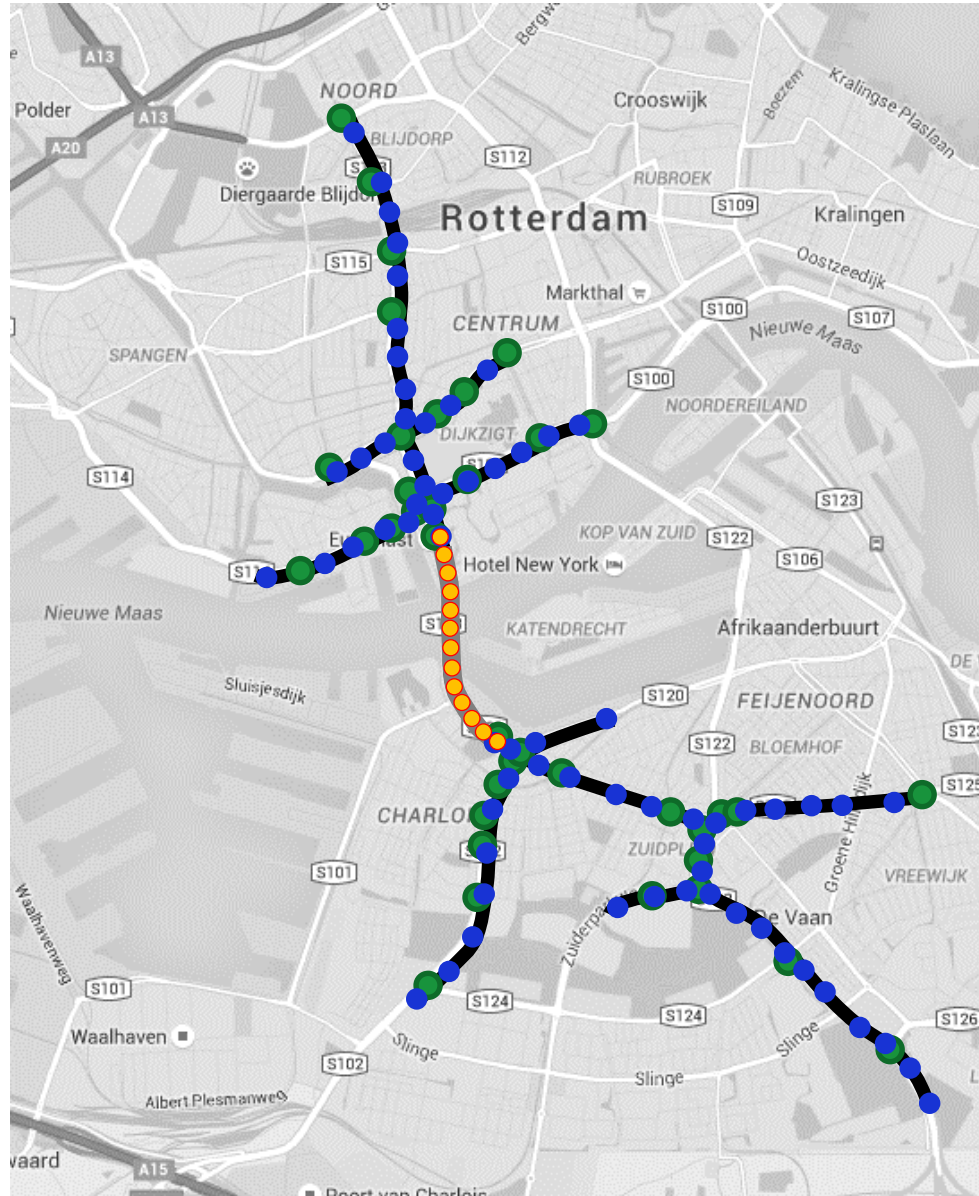
- Manual intervention in case of emergencies





# Inputs AFM system

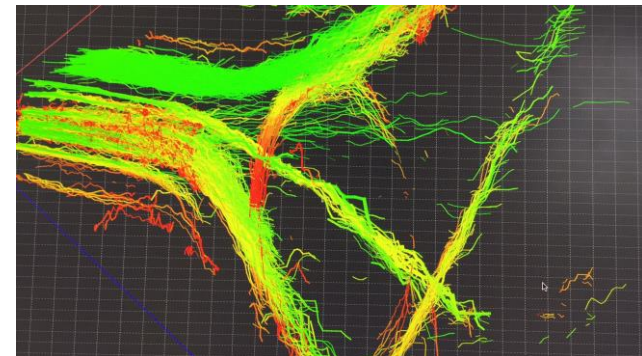
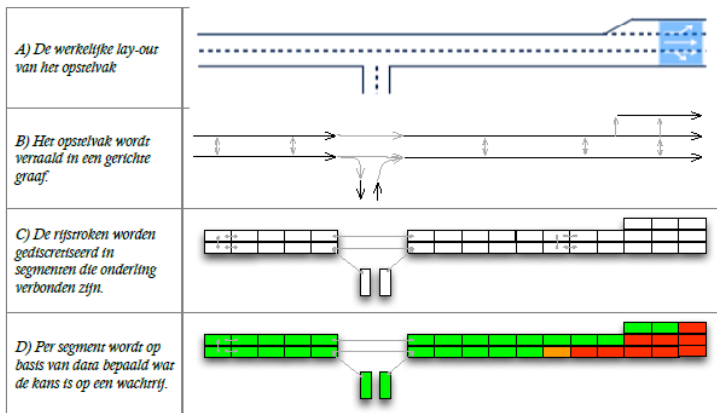
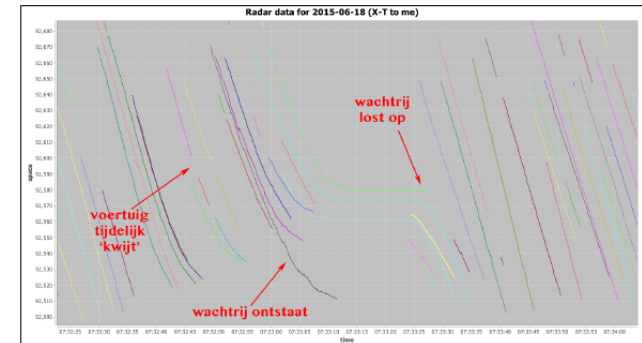
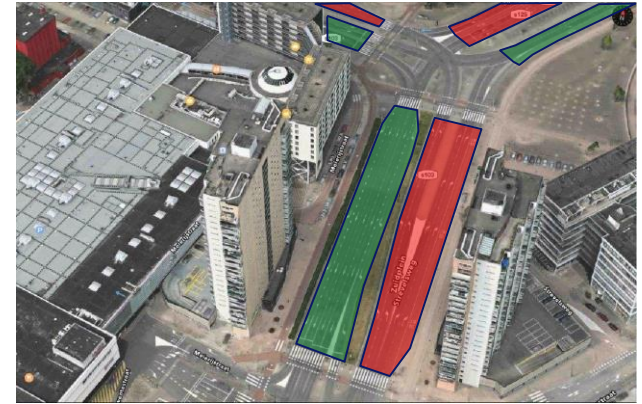
- TLC's (45)
- Loop detection
- Radars ( $\pm 80$ )



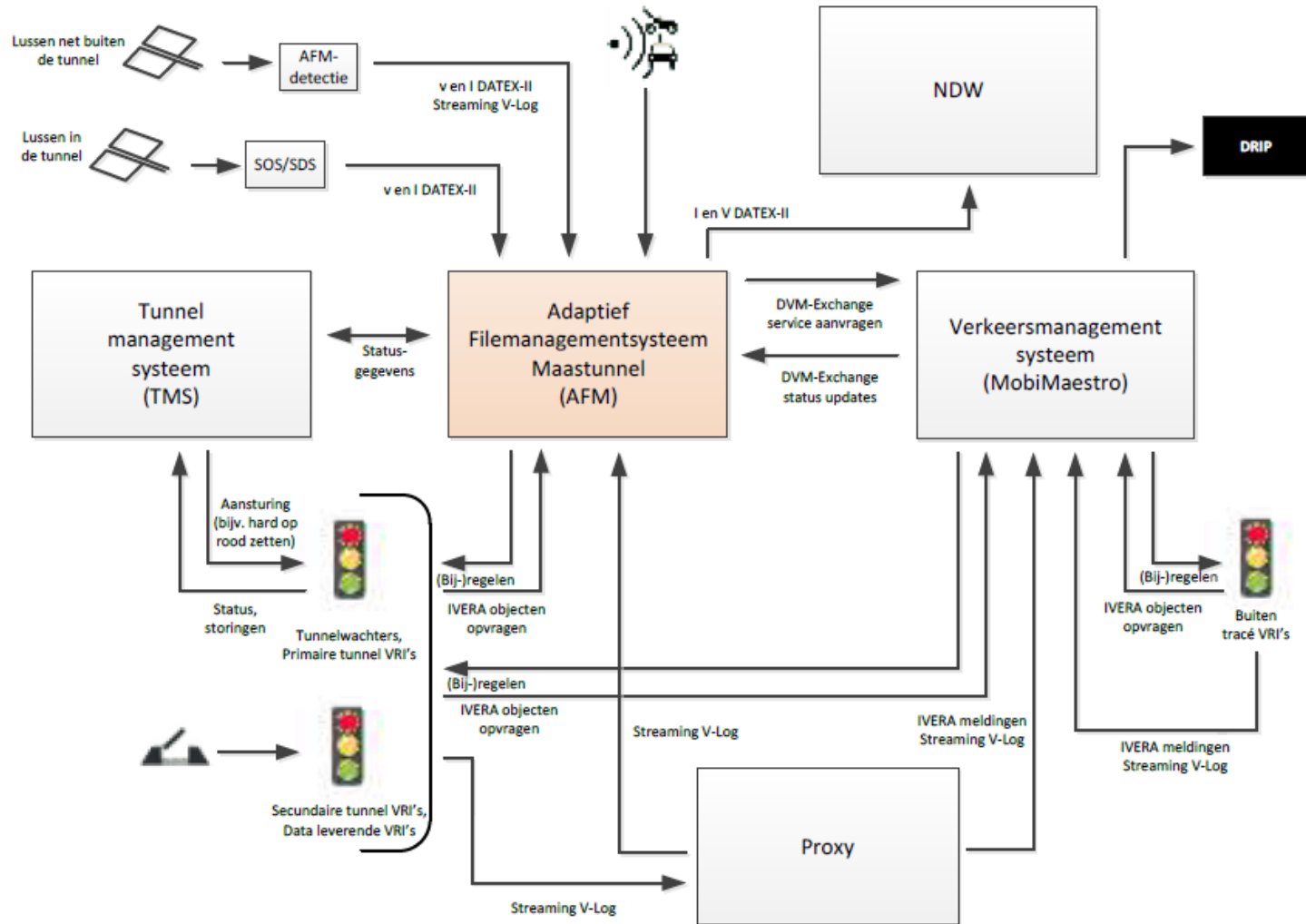


# Radars

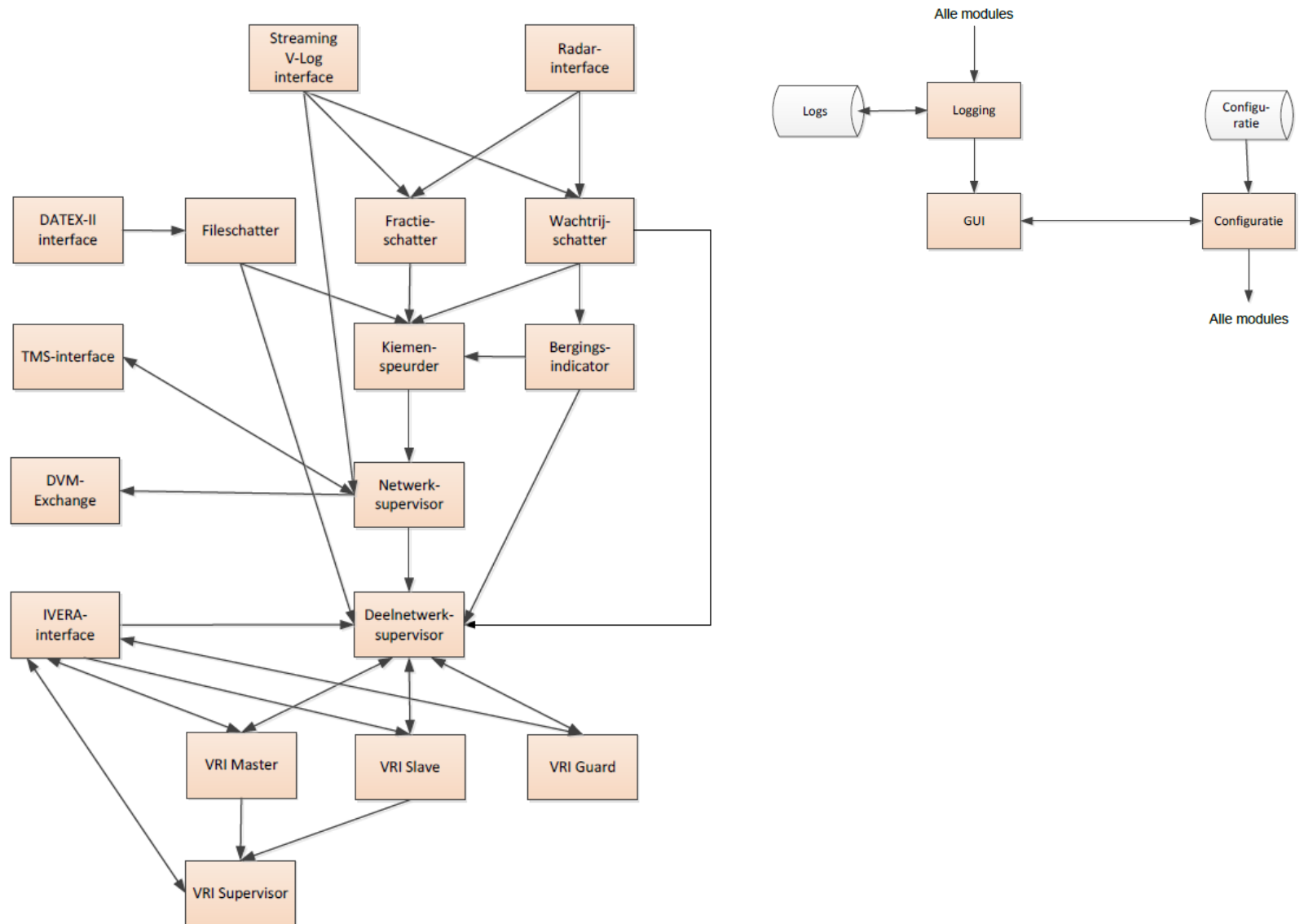
- Radar detection to calculate queue length of road sections (x,y speed; x,y position)
- Coverage : about 150m.
- Trajectories
- Projection on map
- Calculate the length of a queue



# Processing



# Processing



# Control

- **Adjusting green times of traffic lights through IVERA**

- Increase outflows



- Reduce inflows



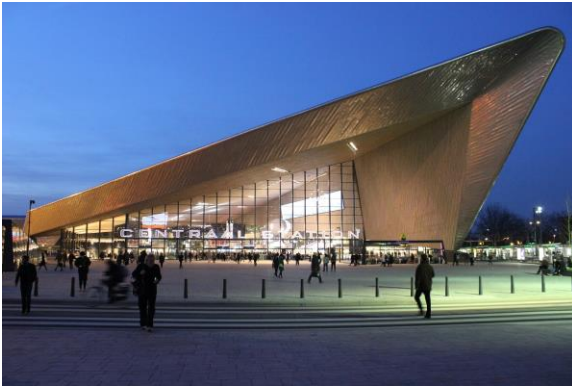


# Planning

- **Contracting: 2016**
- **Develop software: now – summer '17**
- **Testing on small network: april '17 – summer '18**
- **AFM 'live tests' : summer '18 – summer '19**
- **AFM ready: august '19**



# The End



Enjoy your stay in Rotterdam!



## Further information

For further information and /or explanation on the renovation of the Maastunnel of the Adaptive Flow Management, feel free to contact me!

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