

Amsterdam Institute for Advanced Metropolitan Solutions

Re-inventing the city

Smart, sustainable, resilient and just

Stephan van Dijk PhD, Director of Innovation
24th of February, 2022

About me



2019 Director of innovation AMS Institute

2015 Program leader research AMS Institute

2011 Program manager sustainable cities TU Delft
Rotterdam, Schiphol Airport, Ministry EA

2008 Start-up incubator manager TU Delft

2003 PhD innovation strategy

2000 Strategy consultant

1994 BSc + MSc Systems engineering

Worldbank Knowledge Exchange Session

- What is the Amsterdam Institute for Advanced Metropolitan Solutions?
- Recent work in the areas of digitalization, urban mobility and transportation, climate mitigation, and stakeholder and citizen engagement
- How do we help cities, public and private partners?
- Q&A

Amsterdam Institute for Advanced Metropolitan Solutions

Inventing the future city

Smart, sustainable, resilient and just

AMS Institute is a young and ambitious scientific institute located in Amsterdam. In this institute science, education, government, business partners and entrepreneurs are working tightly together to create solutions for the complex challenges a metropole like Amsterdam is facing. Now and in the future.



AMS

“ If we expect the extraordinary achievements of human culture to survive, we have to drastically change our self-destructive patterns. ”

URBANIZATION IN CRISIS



City life around 1900 - Detroit



City life around 2000 - New York



City life around 2600- London (London Futures)

Working on metropolitan challenges



Smart Urban Mobility

Ensuring an accessible and liveable city by developing smart and sustainable and seamless mobility solutions that can be integrated into the urban fabric.



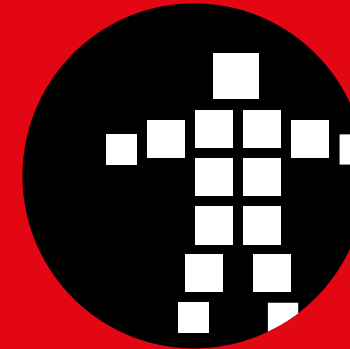
Metropolitan Food Systems

Designing inspiring scenarios to make food systems more sustainable and future-proof, by focusing on core elements such as: economic development, health, mobility and regional attractiveness.



Urban Energy

Accelerating the urban energy transition, by combining integrated innovations in energy systems with urban (re-)development.



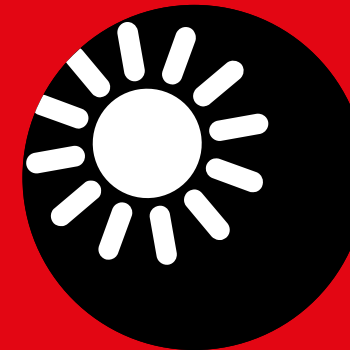
Urban Data & Intelligence

Mobilize new analytical tools to better use urban (big) data and improve city life, while strengthening and safeguarding the democratic values of citizens and society.



Circularity in Urban Regions

Redesigning resource flows that drive urban activities, whilst establishing integral sustainable urban ecosystems, supported by a new, resilient economic model.



Climate Resilient Cities

Building preparedness and resilience by reducing cities' weaknesses and the impact of climate change: environmental, health related and societal.



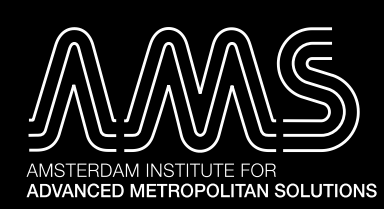
EDUCATION



**RESEARCH AND
INNOVATION**



**COLLABORATION AND
ENTREPRENEURSHIP**



Partners



Talent

EDUCATION



RESEARCH AND INNOVATION



COLLABORATION AND ENTREPRENEURSHIP

Knowledge



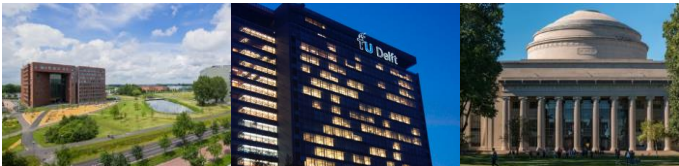
AMS Institute model

Integral challenges, city framework



Complex urban challenges

World class academic excellence



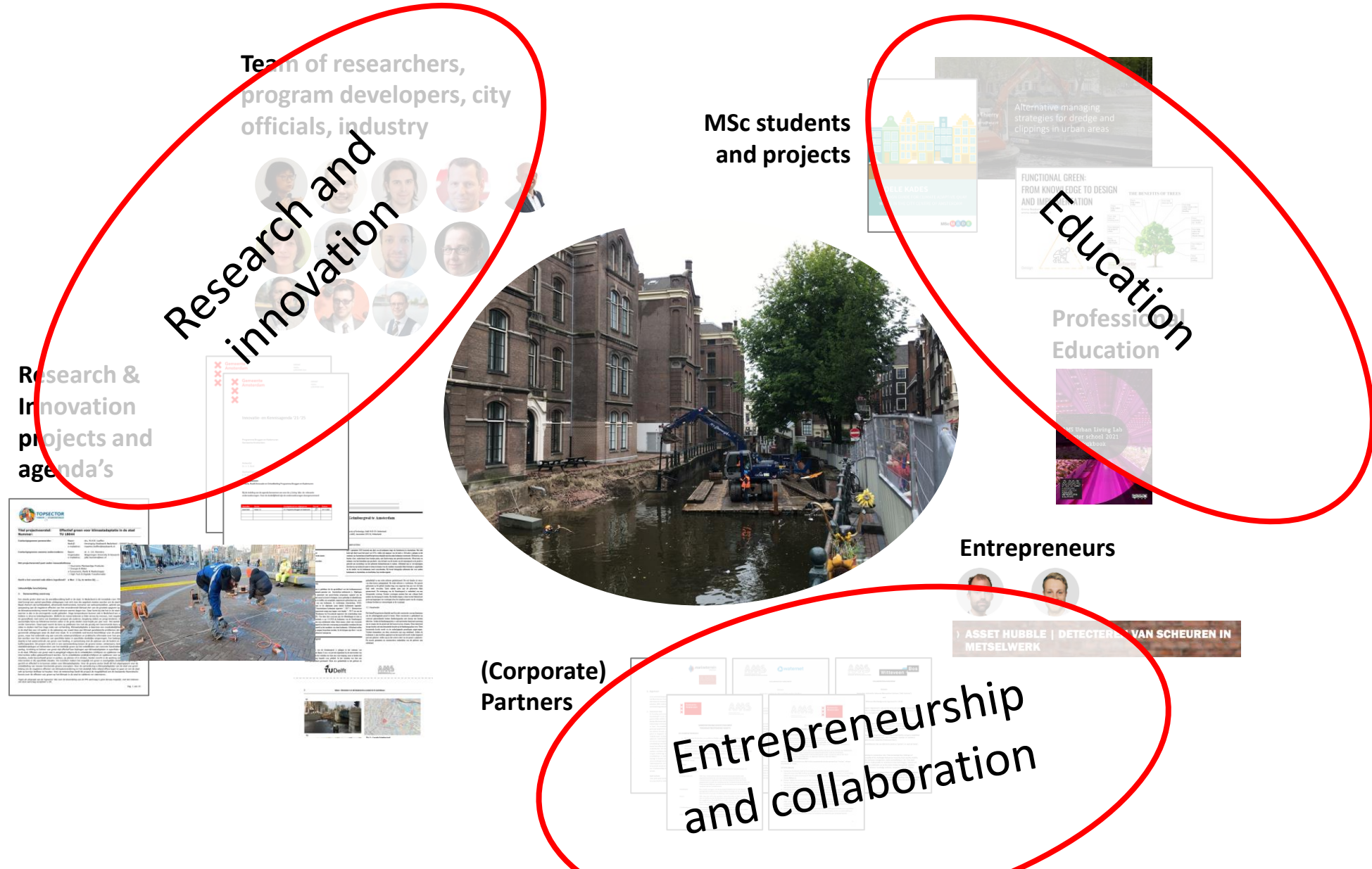
Discipline based, academic framework



Gemeente
 Amsterdam



Urban challenge driven and focused on impact

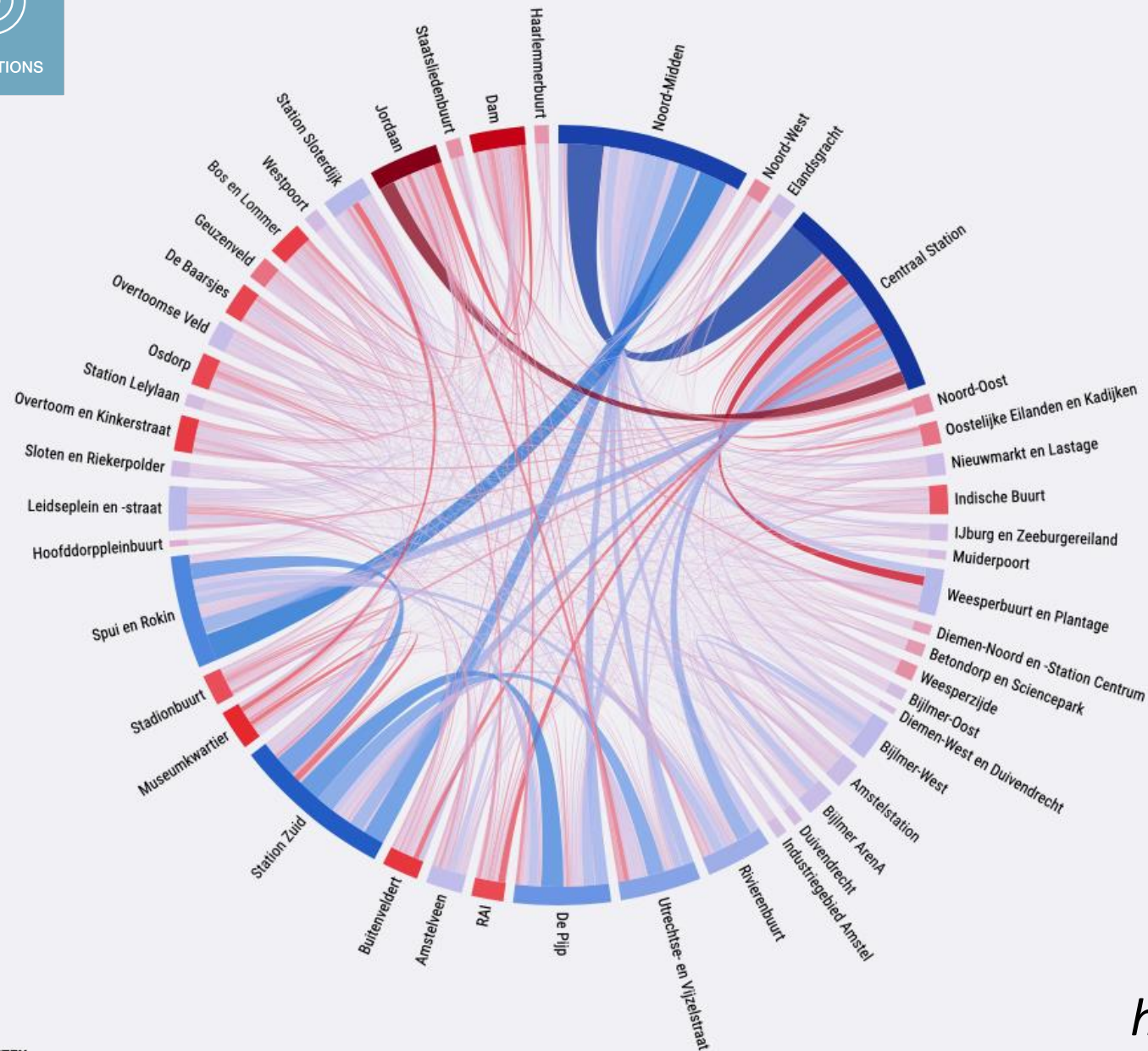


Recent work



Impact assessment North/South Metro

Partners: City of Amsterdam, Delft University of Technology, VVA,
GVB, CWI, Free University, University of Amsterdam



Verandering in reizigersstromen tussen najaar 2017 en najaar 2018

Hier is duidelijk de impact van de Noord/Zuidlijn op reizigers in Amsterdam te zien. Vanuit elke zone waar een Noord/Zuid metrostation ligt (Noord-Midden, Centraal, Spui (Rokin), Vijzelgracht, de Pijp) is groei te zien in de richting van de andere zones.

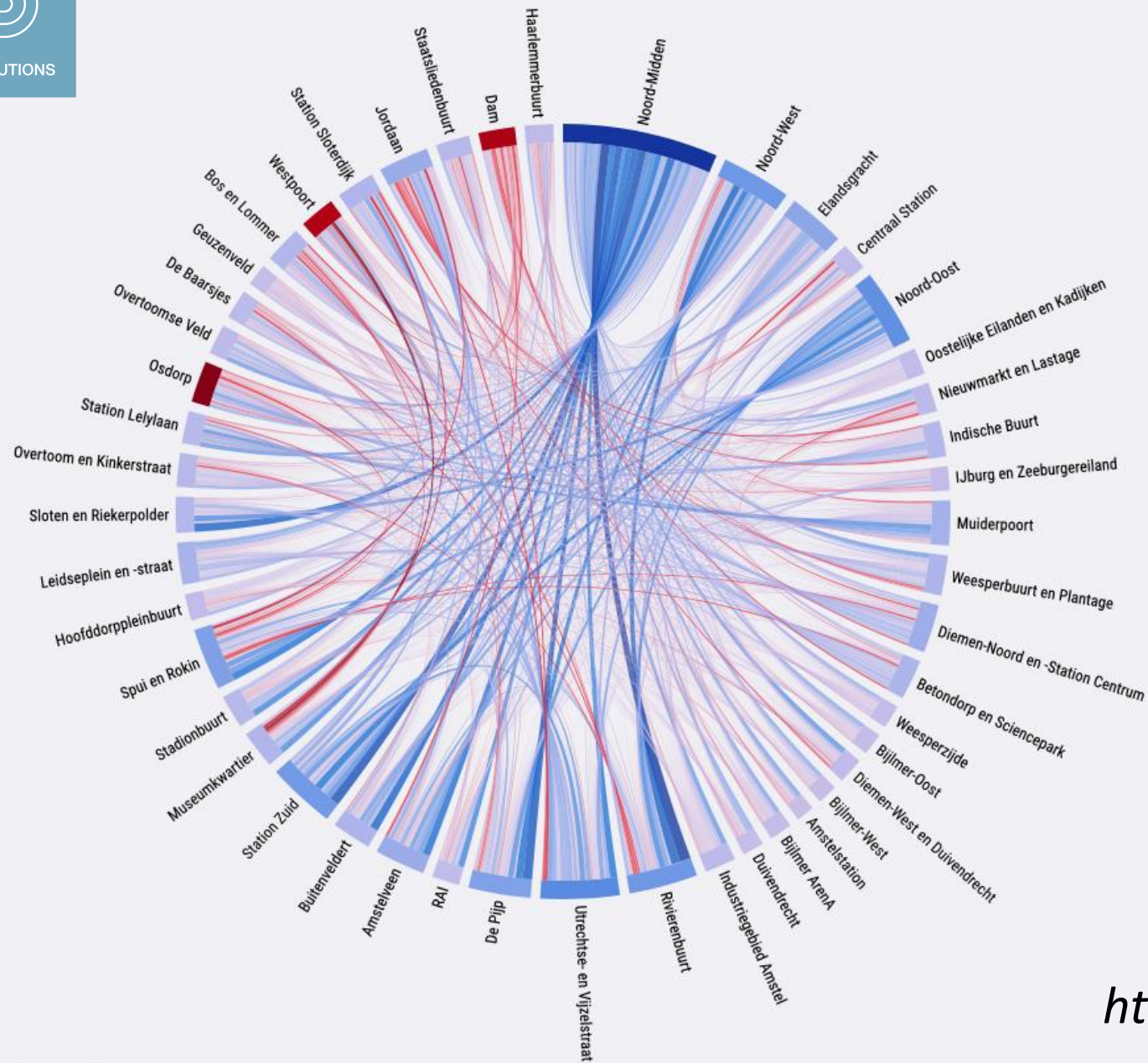
Ook andere effecten van de Noord/Zuidlijn zijn te zien: reizigers uit IJburg en de Oostelijke Eilanden zijn vaker via Centraal Station gaan reizen, waarschijnlijk om daar over te stappen op de Noord/Zuidlijn.

7/7

VERANDERING AANTAL REIZEN



<http://nzlijn.ams-institute.org>



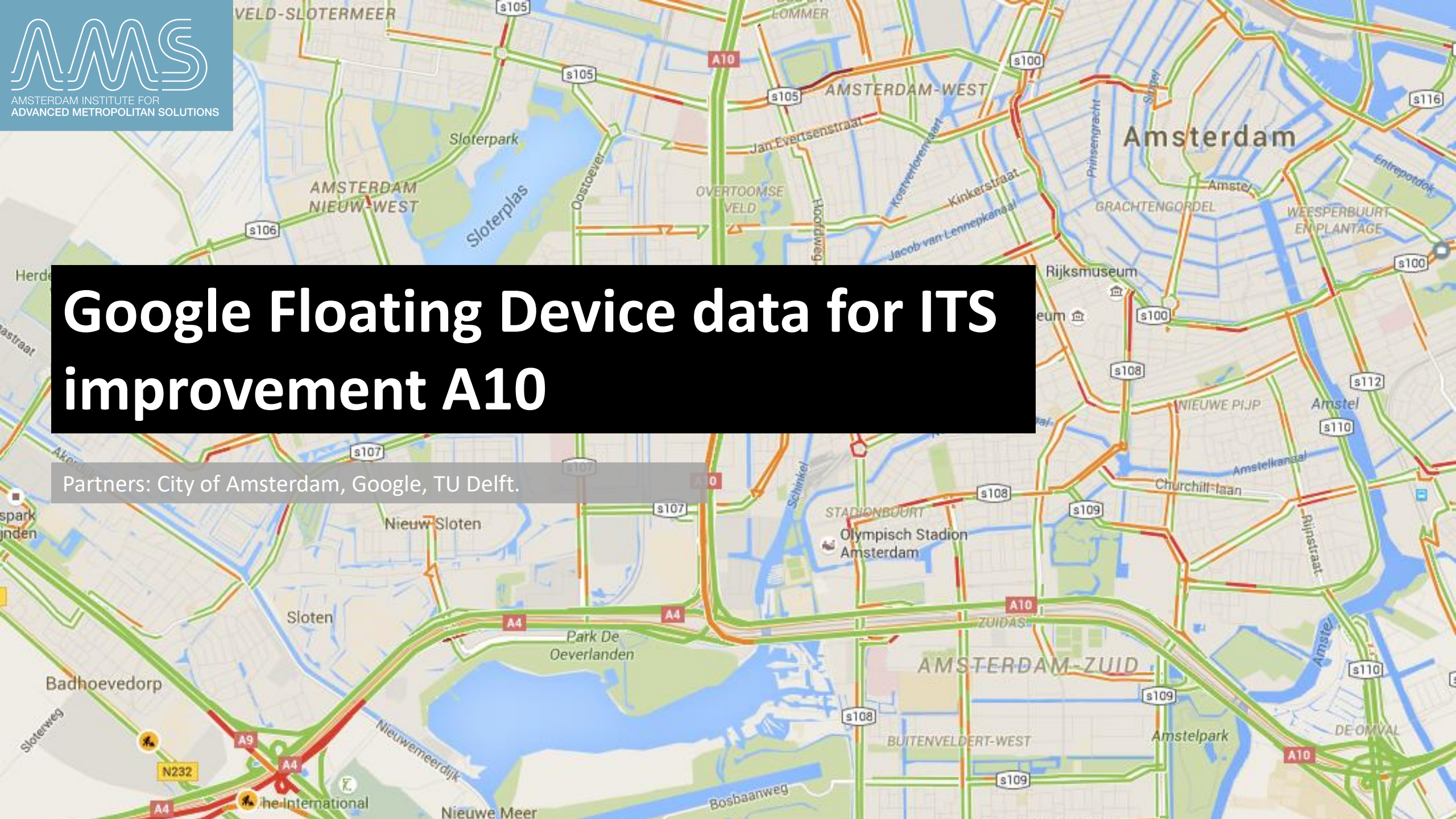
Verandering in gemiddelde reistijd tussen najaar 2017 en najaar 2018

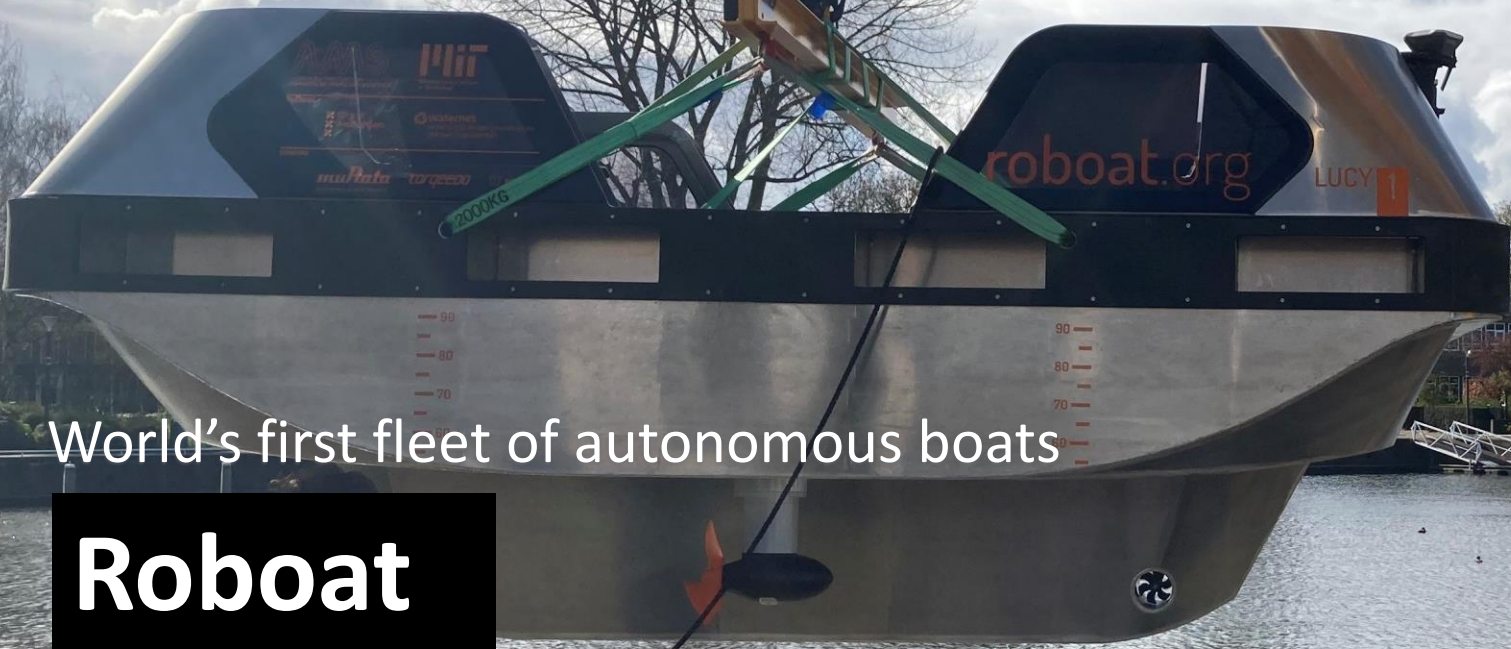
Hier is duidelijk de impact van de Noord/Zuidlijn op de gemiddelde reistijd in het OV in Amsterdam te zien. Vanuit elke zone waar een Noord/Zuidlijn metrostation ligt (Noord-Midden (Station Noord, Noorderpark), Centraal, Spui (Rokin), Vijzelgracht, de Pijp) is een lagere reistijd te zien naar praktisch alle andere zones.

Verder valt op dat het Amsterdamse OV over het algemeen genomen sneller lijkt te zijn geworden. Voor bijna elke herkomst/bestemmingsrelatie geldt dat de gemiddelde reistijd op een gemiddelde werkdag gedaald is. Slechts in enkele zones is een geringe groei van de gemiddelde reistijd te zien.

Google Floating Device data for ITS improvement A10

Partners: City of Amsterdam, Google, TU Delft.





World's first fleet of autonomous boats

Roboat

Partners: MIT, Waternet, City of Amsterdam, TU Delft, Murata, Vetus, Torquedo, Stormer









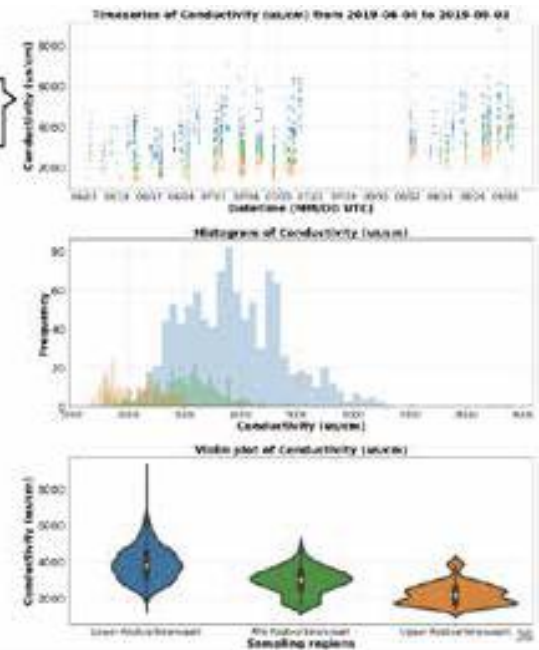
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ADVANCED METROPOLITAN SOLUTIONS
Massachusetts
Institute of
Technology

AquaTroll measurement analysis

Kostverlorenvaart spatial variability
Conductivity (us/cm) measurements
(2019-06-04 to 2019-09-03)



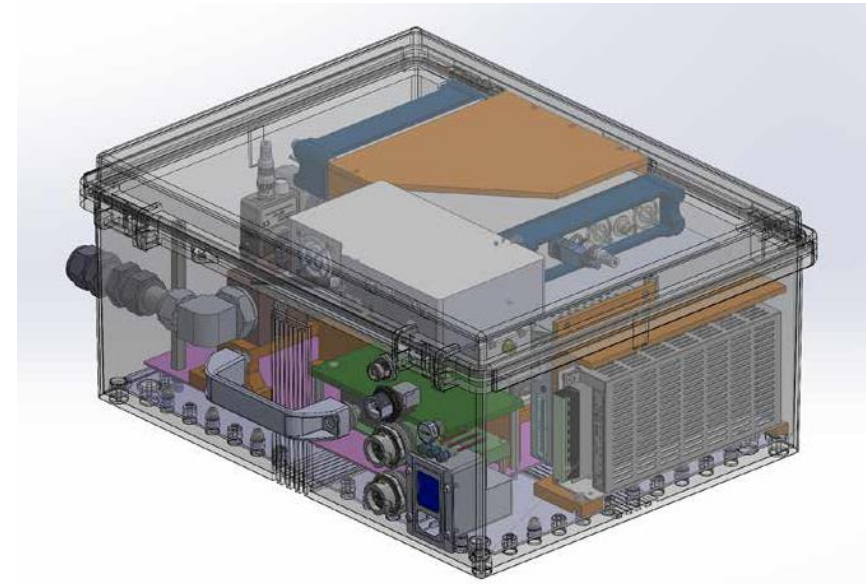
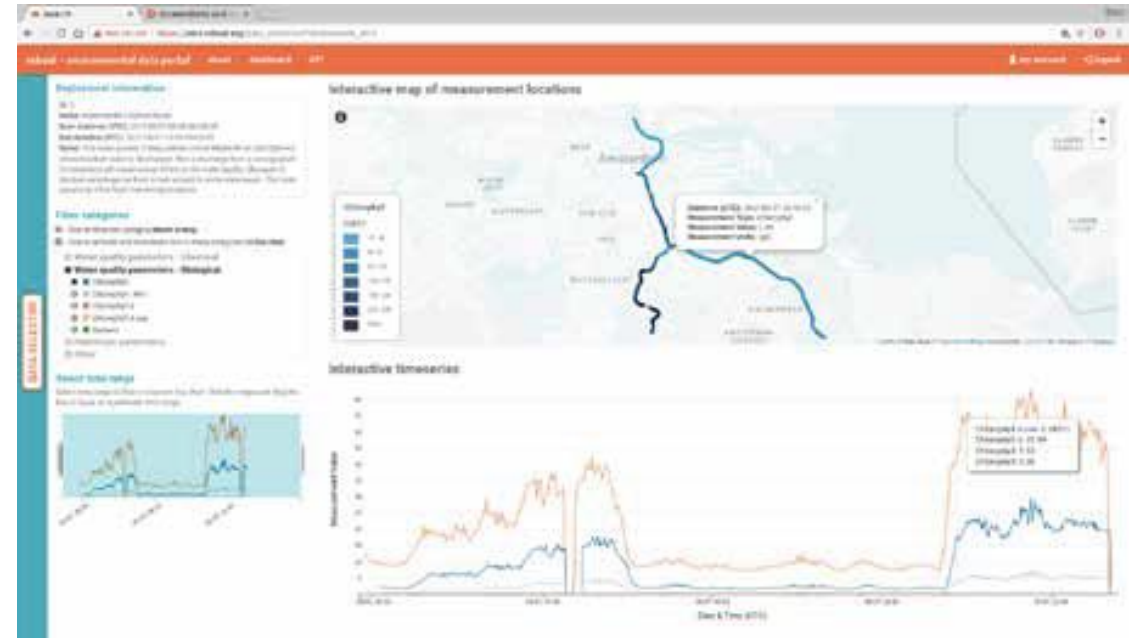
Reference:
Freshwater: 0-1,500
Sea water: ~30,000



Environmental sensing with Roboat

Surface water quality

LEDIF
Realtime spectrofluorometer



Sustainable, resilient and future-proof renovation

Smart Renovation Quays & Bridges

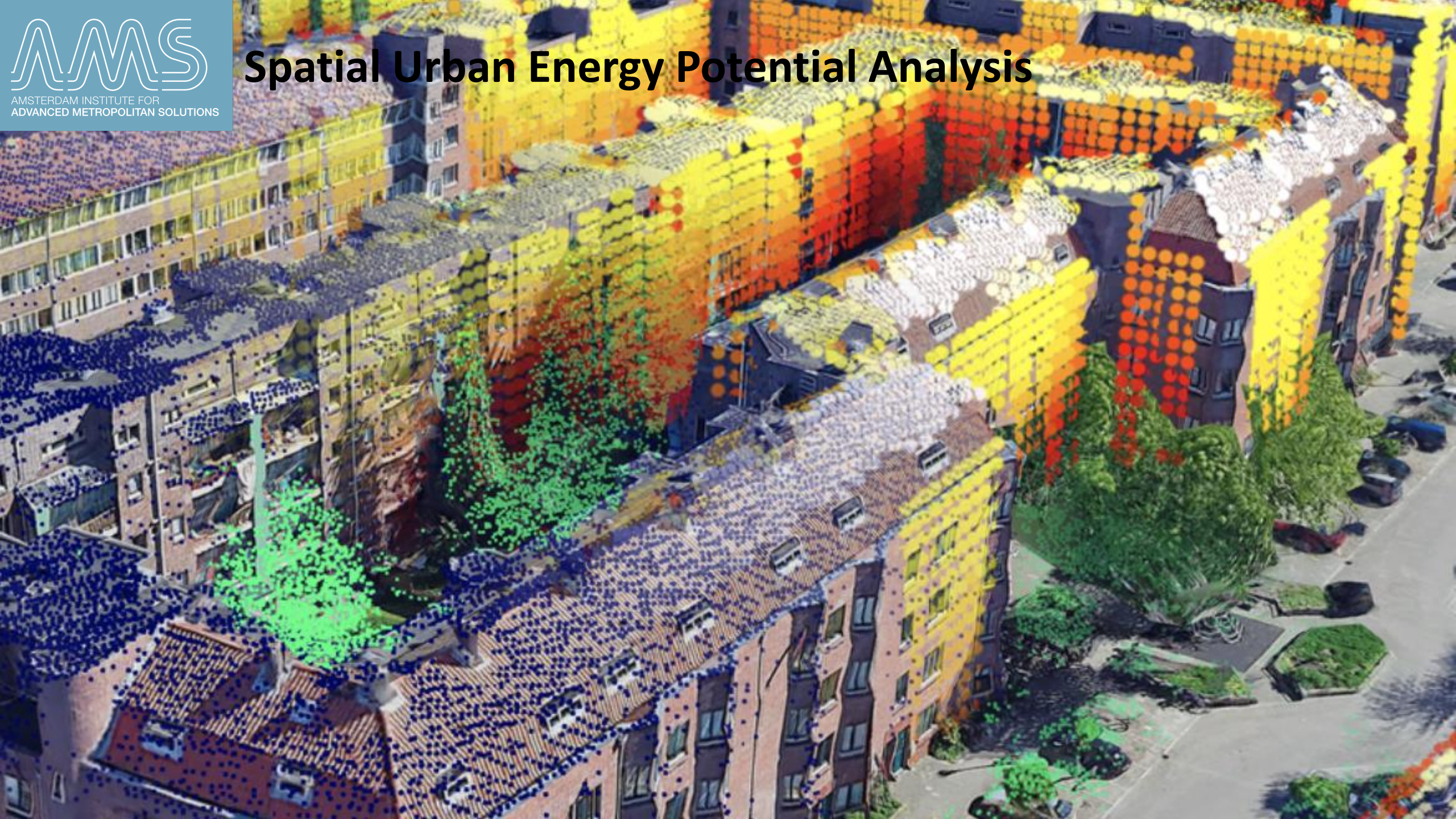
Fragile and old infrastructure in critical need of renovation

600 km of quay walls and waterways

1800 bridges

> 5B Euro reserved for renovation and maintenance

Spatial Urban Energy Potential Analysis



Closed-loop Urban Vertical Farming Systems



**URBAN
FOOD
TOWER
AMSTERDAM**

MARINETERREIN




Responsible Sensing Lab


QR code links to public platform for scancar data access

Web portal makes scancar data open to the public and actionable

Live Stream



Notifications

 A refrigerator on the curb is available for pickup 1.2km away

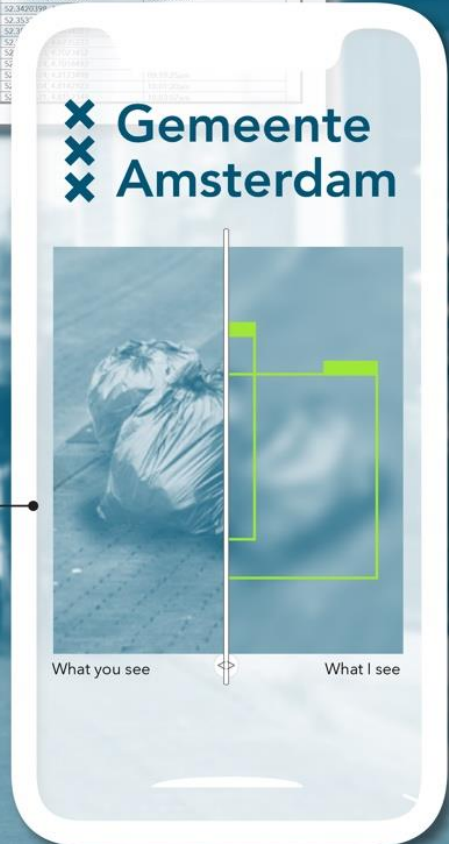
Scancar Data

Object Type	Geotag Coordinates	Timestamp
Trash Bag	S2.3192502, 4.7027184	08:42:15am
Trash Bag	S2.3142103, 4.7452671	08:44:27am
Trash Bag	S2.3192604, 4.7152671	08:46:10am
Bicycle	S2.3142103, 4.7152671	08:46:13am
Trash Bag	S2.4123863, 4.7992184	08:47:11am
Bicycle	S2.3910457, 4.8142075	08:49:25am
Refrigerator	S2.3927525, 4.8540278	08:52:52am
Trash Bag	S2.3851486, 4.9104987	08:53:58am
Trash Bag	S2.3846251, 4.8312345	08:54:23am
Trash Bag	S2.3823451, 4.8923456	08:54:27am
Chair	S2.3823453, 4.8504982	08:58:14am
Chair	S2.3821423, 4.8215122	08:59:29am
Table	S2.3829102, 4.5234522	09:02:12am
Trash Bag	S2.3951231, 4.5234562	09:03:14am
Trash Bag	S2.3981022, 4.5734562	09:03:52am
Bicycle	S2.4012341, 4.6123049	09:04:22am
Trash Bag	S2.4023452, 4.6198723	09:04:27am
Bicycle	S2.4022948, 4.6230452	09:04:58am
Bicycle	S2.4098234, 4.6293487	09:06:27am
Bicycle	S2.4199263, 4.5123489	09:08:10am
Dustster	S2.4123498, 4.5133988	09:11:15am
Microwave	S2.4102239, 4.5182384	09:25:12am
Trash Bag	S2.4012987, 4.6274234	09:26:15am
Trash Bag	S2.4029873, 4.6823498	09:26:19am
Bicycle	S2.3912341, 4.7298723	09:27:08am
Trash Bag	S2.3923984, 4.7287463	09:29:15am
Spider	S2.3979874, 4.7240291	09:31:26am
Trash Bag	S2.3995382, 4.7324098	09:41:02am
Chair	S2.3712304, 4.7123092	09:41:10am
Chair	S2.3612348, 4.7020992	09:41:52am
Trash Bag	S2.3623488, 4.6923458	09:42:28am
Dustster	S2.3645098, 4.6824395	09:44:20am
Oven	S2.3623452, 4.6923462	09:45:13am
Trash Bag	S2.3523498, 4.6823482	09:46:16am
Trash Bag	S2.3420199	
Trash Bag	S2.335	
Microwave	S2.335	
Trash Bag	S2.335	
Trash Bag	S2.335	
Bicycle	S2.335	
Bicycle	S2.335	
Trash Bag	S2.335	
Bicycle	S2.335	



Scancar searches its environment for objects like trash, donated furniture, or missing bikes.

AR tool creates transparency on what types of information the scancar collects.



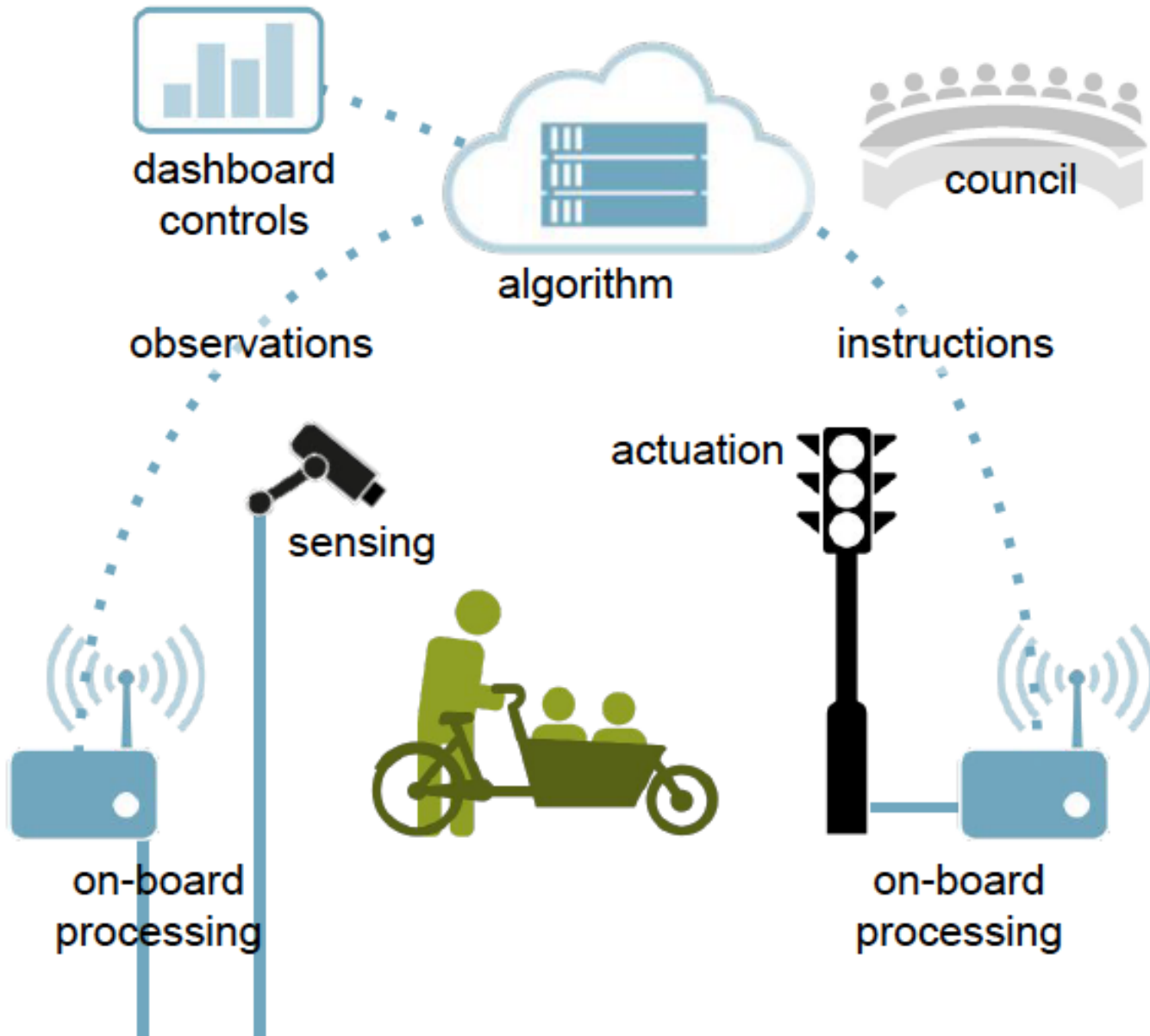
Can we have a responsible digital city as balance between the two?

SMART SYSTEMS
THAT BRING
THE CITY
MORE LIVABILITY
MORE SAFETY
MORE EFFICIENCY

TENSION

SMART SYSTEMS
THAT RESPECT
PUBLIC VALUES
AUTONOMY
TRANSPARENCY
HUMAN CONTROL
PRIVACY





Algorithmic

- Which local and cloud intelligence?
- How can we prevent bias & understand?

Hardware

- How can we prevent misuse & function creep?
- Can we minimize data collection?
- How can you know you can trust it?

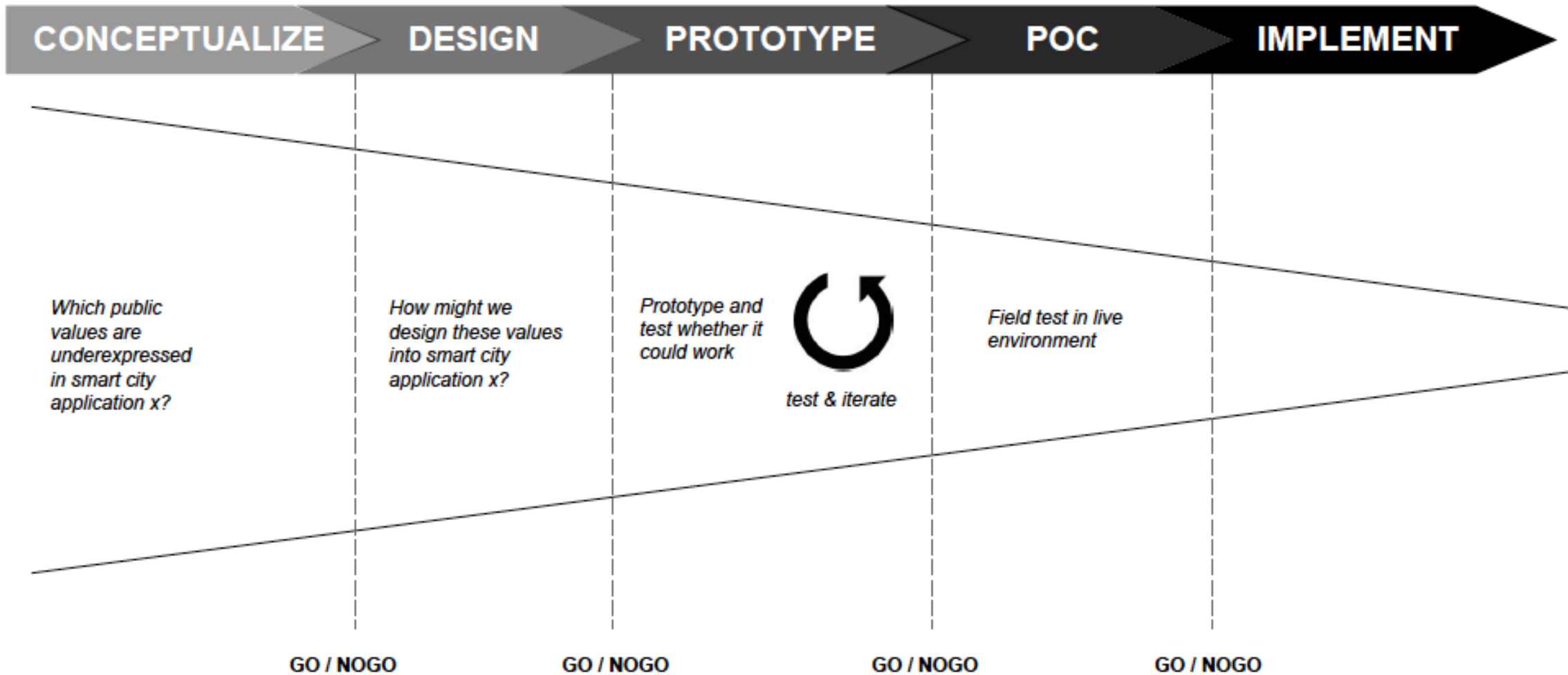
User interface design

- What does it explain about itself?
- How can you interact with it?

Governance

- How you you facilitate oversight?
- How can you contest the smart system?
- How to organize the governance of the system?

Operationalizing public values by prototyping



Urban Experimentation + Stakeholder Engagement



Marineterrein Living Lab



Responsible digitization, IoT lab
Circular construction, closed resource loops
Intelligent multi-modal traffic management
Autonomous vehicles, vessels and drones



EnergyLab ZuidOost



Energy neutral districts, citizen involvement
Flexible micro-grid solutions including storage and local trading

Green Tower Living Lab at Bajeskwartier



Green urban environments
Circular economy, closed loop urban food production

What can we do for cities and how do we work?



EDUCATION

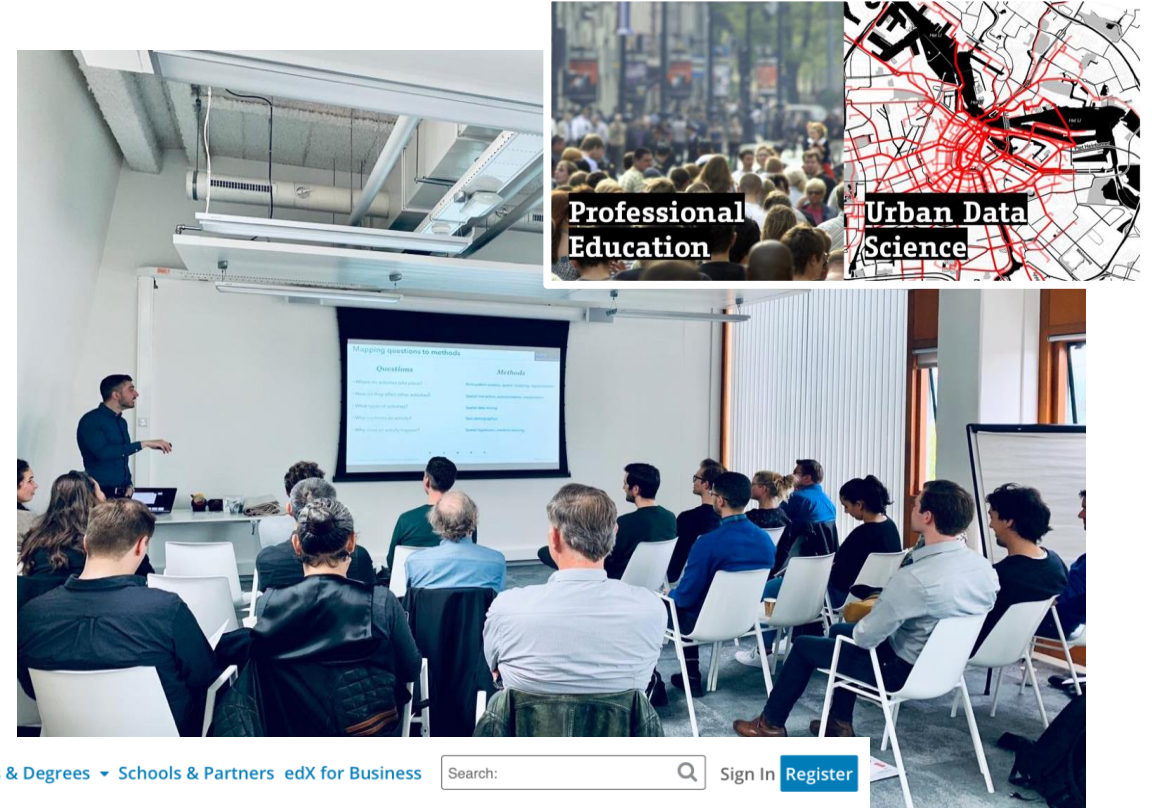
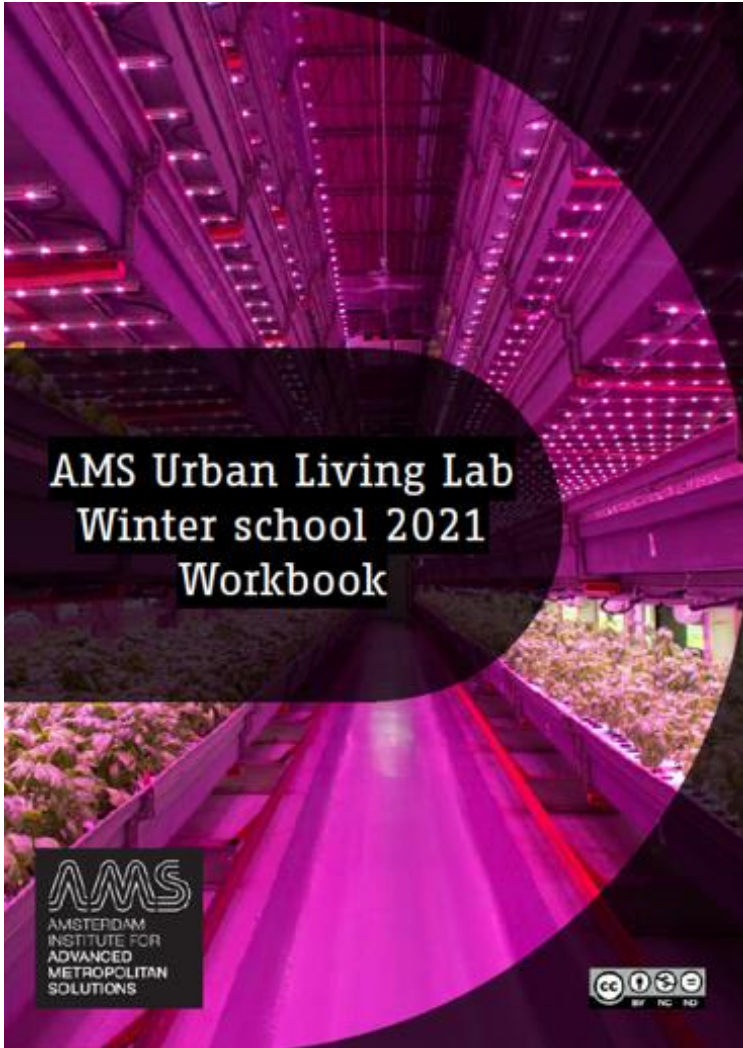


**RESEARCH AND
INNOVATION**



**COLLABORATION AND
ENTREPRENEURSHIP**

Professional education



edX Courses ▾ Programs & Degrees ▾ Schools & Partners edX for Business Search: Sign In Register

Home > All Subjects > Social Sciences > Sustainable Urban Development



Sustainable Urban Development

Learn why cities are key in resolving global urbanization and sustainability challenges and how you can engineer tomorrow's cities today.

Self-Paced
(more dates)

Enroll Now

I would like to receive email from Delft University of Technology & Wageningen University & Research and learn about other offerings related to Sustainable Urban Development.




AMS Institute model

Integral challenges, city framework



Complex urban challenges

World class academic excellence



Discipline based, academic framework



Gemeente
 Amsterdam

WAGENINGEN
 UNIVERSITY & RESEARCH

AMSTERDAM INSTITUTE FOR
 ADVANCED METROPOLITAN SOLUTIONS
 TU Delft

MIT





Thank you!

Stephan van Dijk PhD

Director of Innovation AMS Institute

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