Urban Strategy Digital Twins for Sustainable and Liveable Cities

Netherlands Innovation Network – October 2023

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Urban Challenges

- Urbanisation
- Aging population
- Scarcity of space
- Pollution
- Infectious diseases
- Decarbonisation
- Reliable & affordable Energy
- Traffic / Mobility / Accessibility
- Legacy infrastructure / heritage
- Slum formation / equity
- Crime

City: a complex organism

Everything influences everything else

Problem statement

Increasing complexity of decision making

Silo's lead to costly, sub-optimal solutions

Time to decision

Quality of decision

Infrastructure decisions: 10's to 100's of Millions of taxpayer's EUR/USD

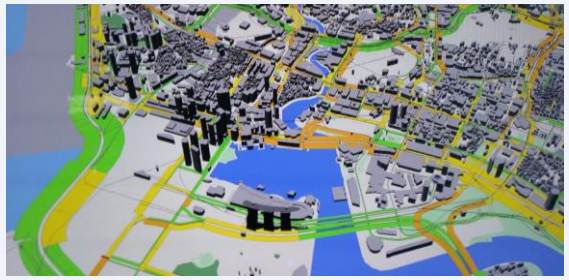
Urban Strategy: making complexity manageable

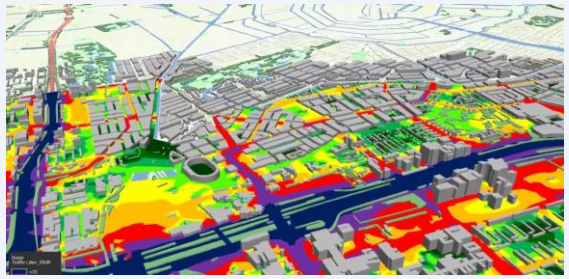
Interactive analysis of complex what-if scenario's

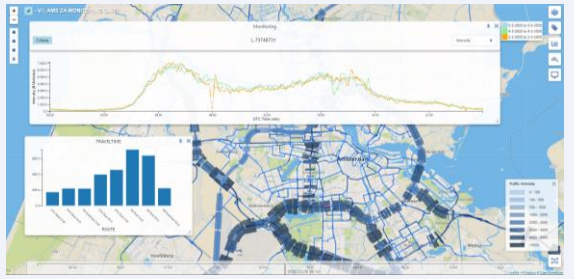
Complexity	Silo's	Decision times	Quality
Entire City in One View	**Cross-domain Impact Assessment**	**Interactive Decision Making**	**Balanced solutions benefit well-being**

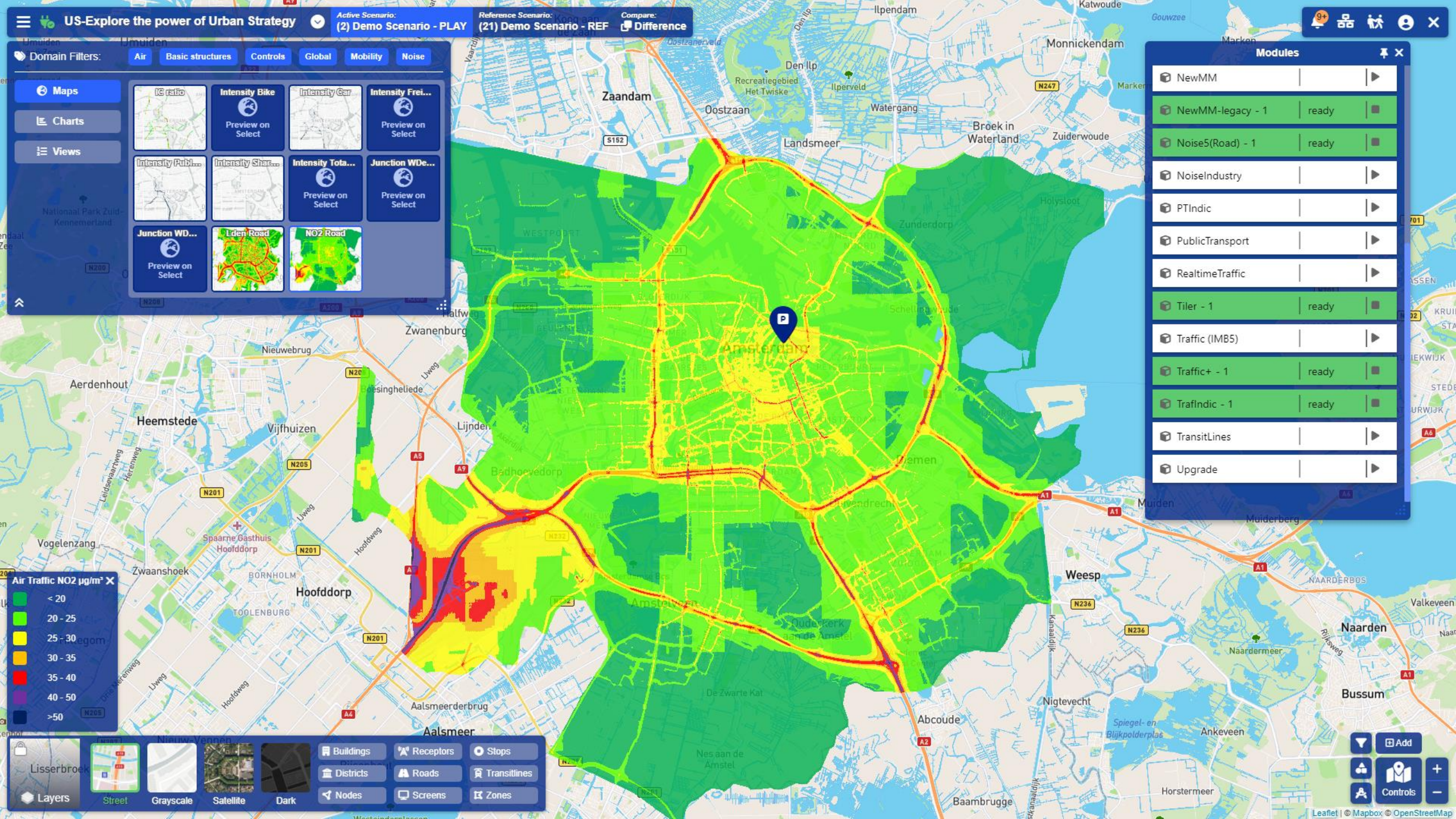
Digital Twins with Urban Strategy

Making Complexity Manageable – for multiple stakeholders







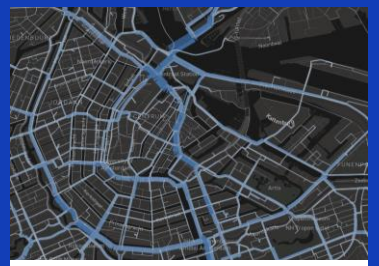

US-Explore the power of Urban Strategy
Active Scenario:
(2) Demo Scenario - PLAY
Reference Scenario:
(21) Demo Scenario - REF
Compare:
Difference
Domain Filters:
Air
Basic structures
Controls
Global
Mobility
Noise
Maps
Charts
Views
IC ratio
Intensity Bike
Preview on Select
Intensity Car
Intensity Frei...
Intensity Publ...
Intensity Shar...
Intensity Tota...
Junction WDe...
Junction WD...
Lden Road
NO2 Road
Modules
NewMM
NewMM-legacy - 1
ready
Noise5(Road) - 1
NoiseIndustry
PTIndic
PublicTransport
RealtimeTraffic
Tiler - 1
Traffic (IMB5)
Traffic+ - 1
TrafIndic - 1
TransitLines
Upgrade
Air Traffic NO2 µg/m³
< 20
20 - 25
25 - 30
30 - 35
35 - 40
40 - 50
>50
Layers
Street
Grayscale
Satellite
Dark
Buildings
Receptors
Stops
Districts
Roads
Transitlines
Nodes
Screens
Zones
Add
Controls
Zaandam
Oostzaan
Landsmeer
Amsterdam
Zwanenburg
Heemstede
Aerdenhout
Hoofddorp
Weesp
Naarden
Bussum
Abcoude
Nigtevecht
Aalsmeer
Leaflet | © Mapbox © OpenStreetMap

Urban Strategy simulation modules

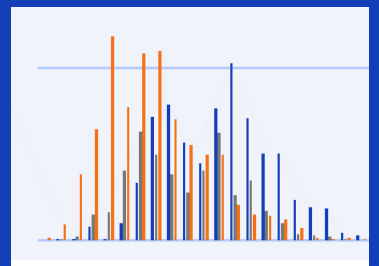
Making complexity manageable – multiple domains - multiple stakeholders

Mobility Demand

Multi-mode network allocation

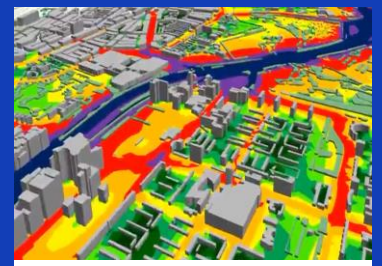


Active transport cycling & walking

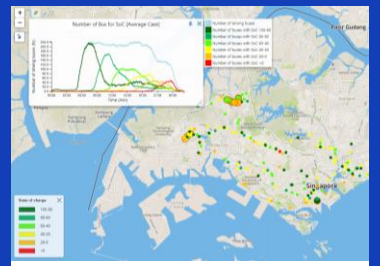


Distribution of accessibility

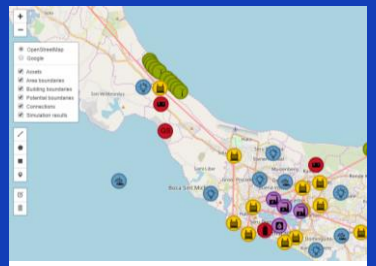
Air quality (road & Industry)



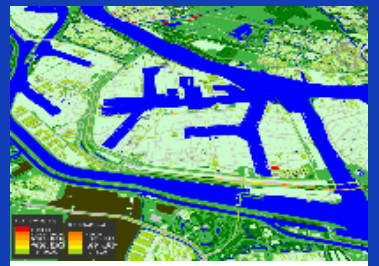
Noise (Road, Rail & Industry)



Electric fleet simulation



EV – power grid Interaction



Greenhouse gas emissions

Infrastructure Resilience

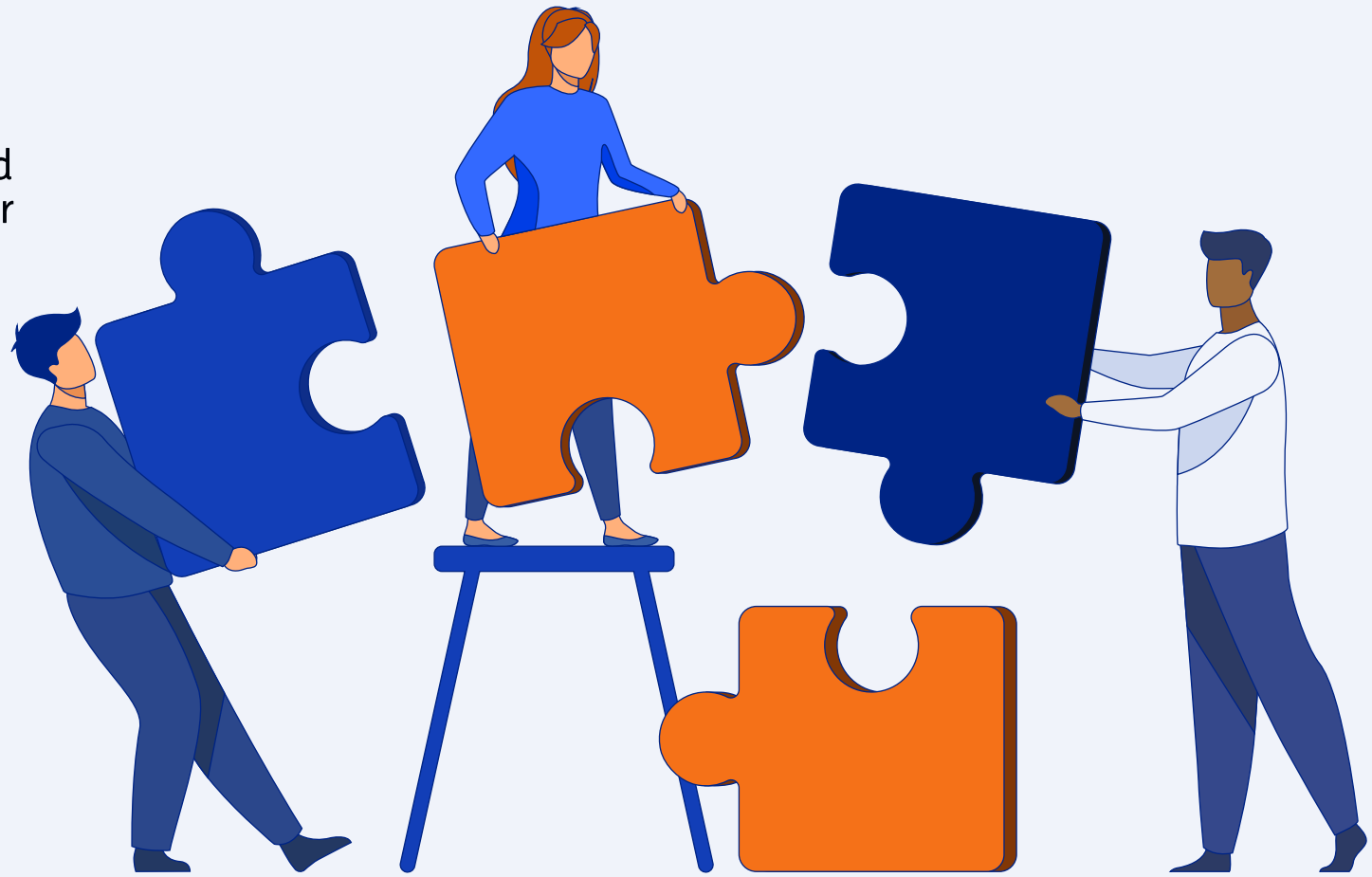
Spatial impacts

Well-being indicators

What makes Urban Strategy unique?

Sustainable Competitive Advantage:

- **Next Level HPC Technology**
  - Distributed (proprietary) computing and storage architecture Up to 1,000x faster than competition
- **Deep in-house expertise**
  - Multi-domain:
    - Traffic, Air Quality, Noise, Energy, …
  - Fast algorithms (proprietary)
- **User-friendly visualizations**
- **Modular by design**



Seamlessly integrated into one solution

Traditional Approach vs. Urban Strategy

	Traditional	Urban Strategy
Output	Paper report by external party, after 3 months	Instantaneous results by own staff, visualized in 3D
Decision process	1 scenario per day	50 scenario's per afternoon
Range of decisions	Limited ("Y"or "N)	Explore range of options
Cost of solution	Optimized for 1 policy domain	Assessed and optimized across multiple domains
Decision times	Weeks to months	Minutes to hours
Cost of decision process	Many inefficiencies in city silo's	Amsterdam: "every € invested 3x earned back in savings"

Urban Strategy

Digital Twins for Sustainable and Liveable Cities

Traction

Urban Strategy Digital Twins for Sustainable and Liveable Cities

TechTransfer Board Phase2 meeting 26 Oct. 2023

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