

Visualisations for Informed Decision-making in a Smart City and Digital Twin context

Case visualisations Version 1.0

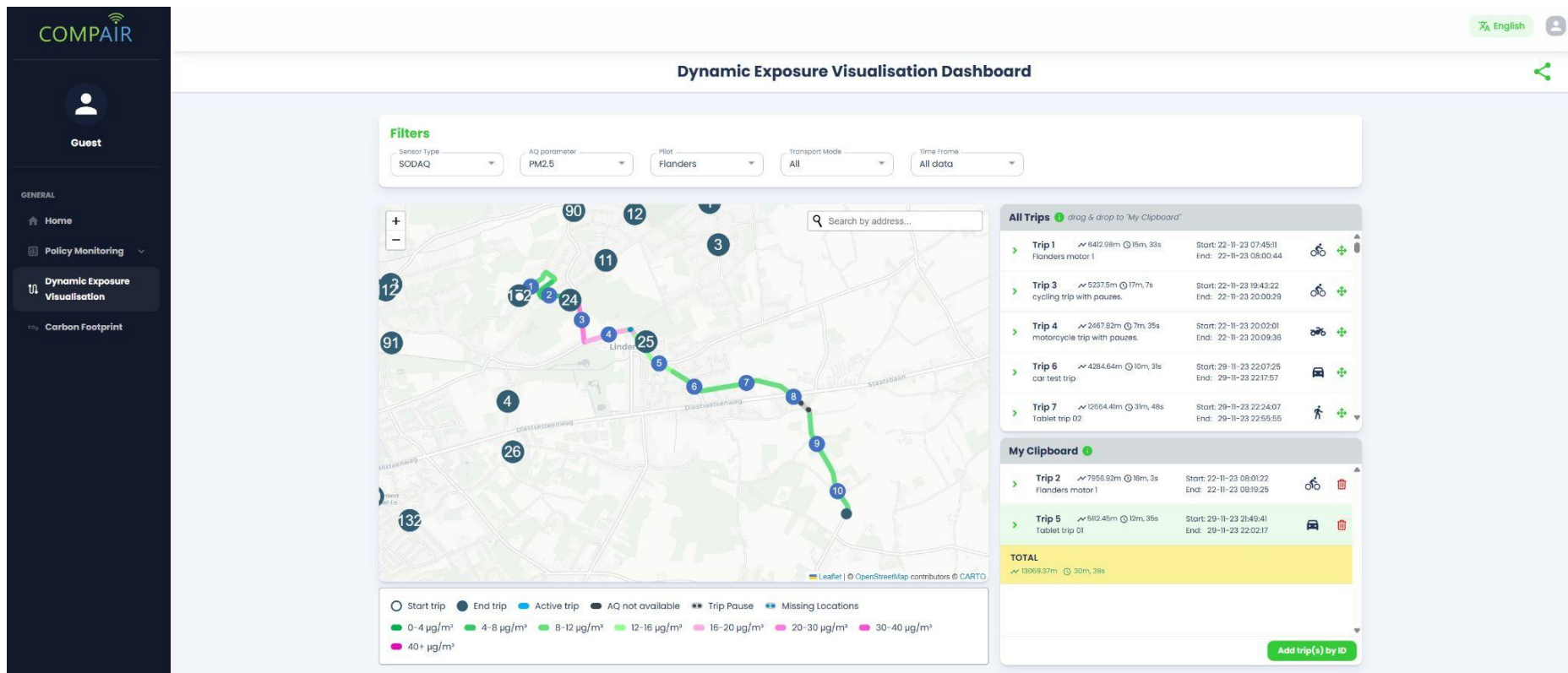
Cases

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1 - Berlin (DE), Flanders (BE) - Dynamic exposure visualisation dashboard

1.1 2D Trip visualisation map



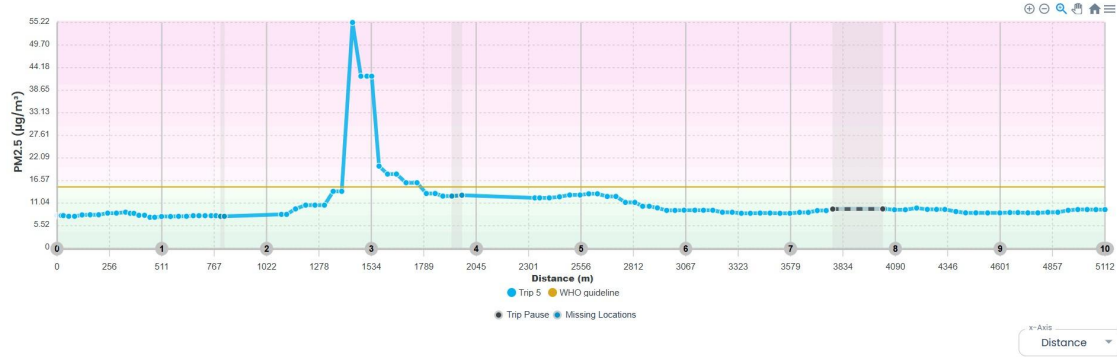
DISCLAIMER

The WHO guideline shown below is indicative and based on average 24-hour exposure.

Occasionally exceeding the curve **does not imply any health risk**.

However, if the WHO guideline remains systematically higher for 24 hours, the WHO daily recommended value will be exceeded, which is permitted for 3 to 4 days per year.

Air quality measurement



Cumulative Exposure

This graph shows the cumulative evolution of local exposure to an aerial pollutant for the selected trip(s) for corresponding local time intervals. The resulting value tells you something about the health of the environment you are moving in while making your trip. Such values are used in epidemiological studies (often time averaged).



1.2 Air Quality exposure line chart

1.2 Air Quality exposure cumulative line chart

Inhaled Dose Simulator

This graph offers an estimate of the pollutant dose you might have inhaled on your trip. We calculated this based on your breathing rate and the pollutant levels measured during your trip. Your breathing rate is estimated based on your age, gender, and activity level. Remember, these are all estimations, so keep that in mind while interpreting the data.

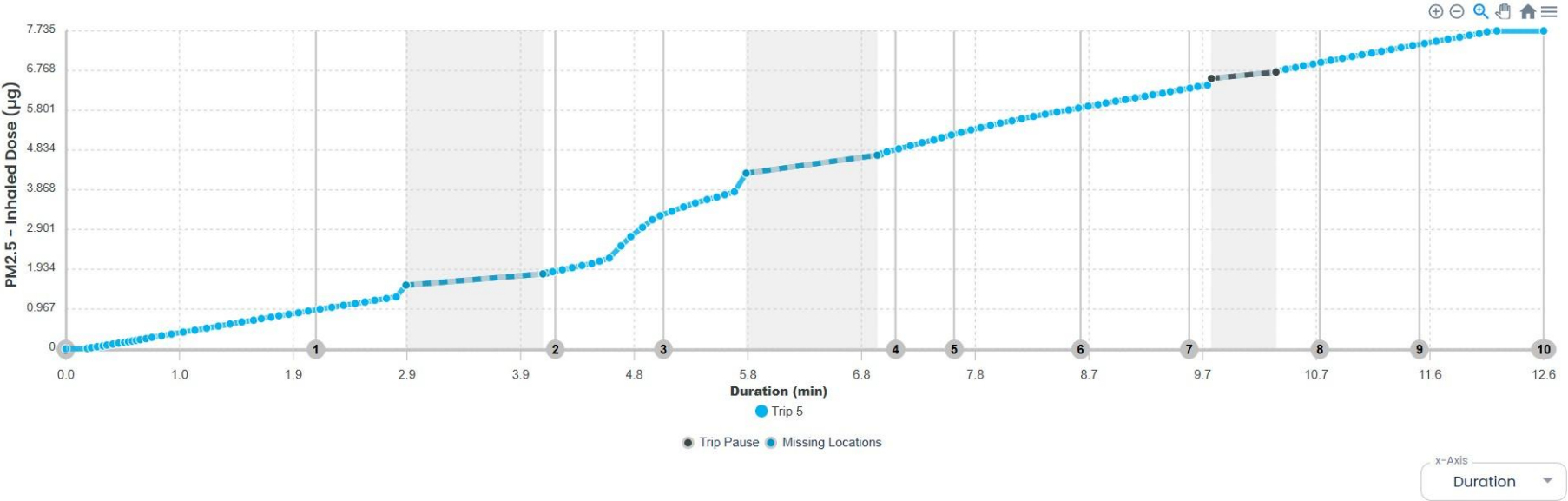
I believe my breathing rate aligns best with that of a Male

I am 52 years old.

My main activity during this trip*: Cycling middle (not flat, 19–22.5 km/h)

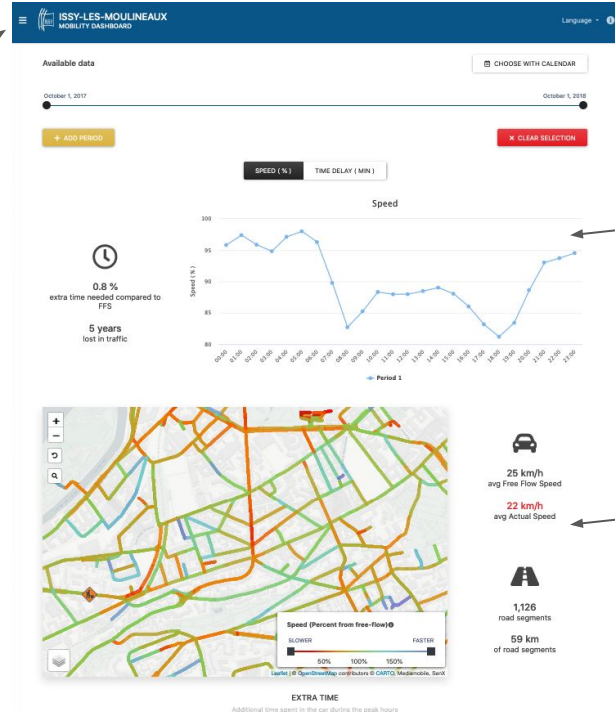
*If your mode of travel is not listed, please choose the option that closely matches the breathing rate you experience during your trip.
For e-bike riders, choose "bicycle-easy" as an estimate.

1.3 Air Quality exposure cumulative line chart



2 - Issy-les-Moulineaux (FR) - Traffic dashboard

2.1 Floating car data mobility dashboard



2.2 Traffic speed and delay time distribution histogram

2.3 Line-based free flow map

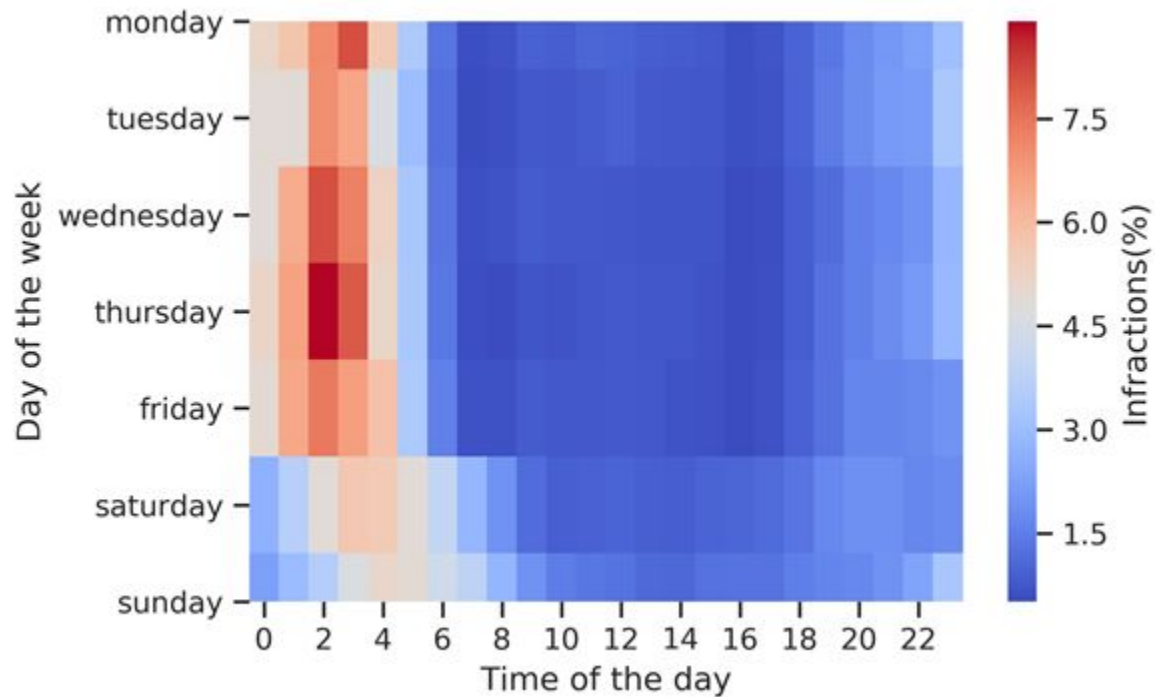


2.4 Table (lost time)

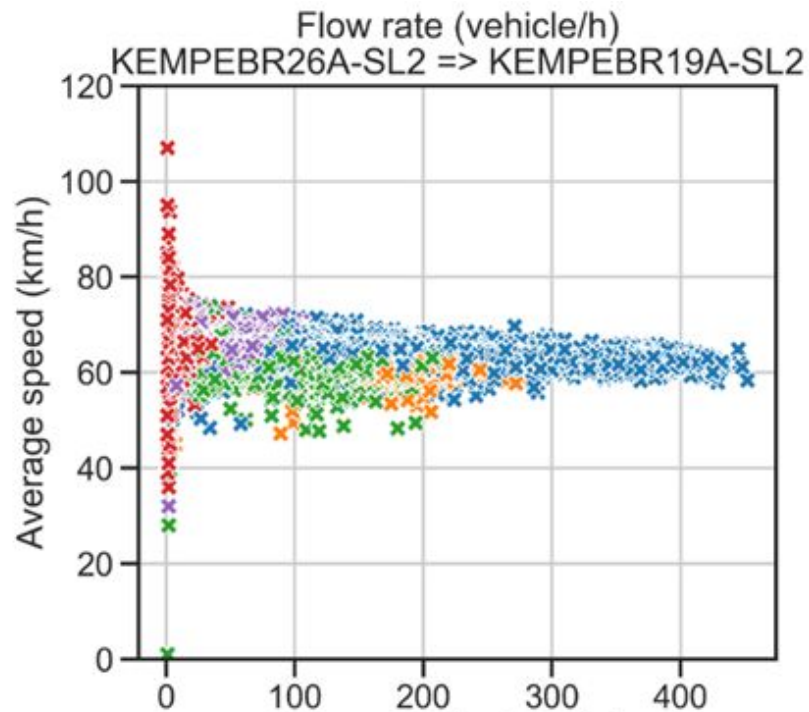
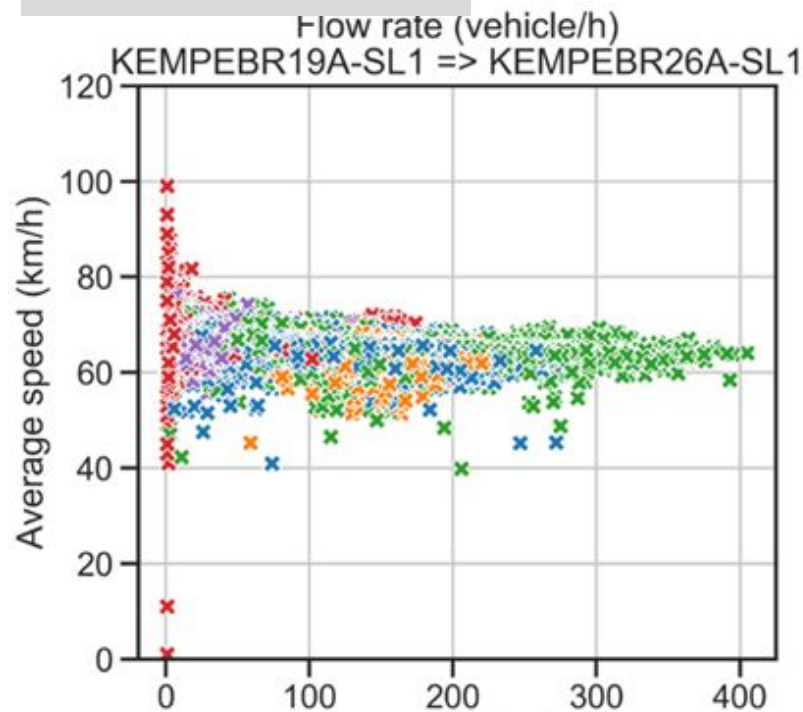
2.5 Free-flow distribution heatmap matrix

3 - Police zone Voorkempen (BE) - Trajectory speed limit enforcement dashboard

3.1 Heatmap (time, infraction percentage)



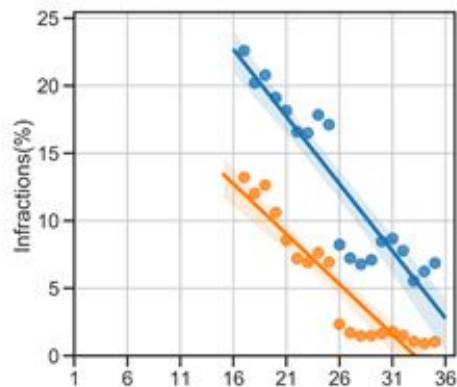
3.2 Flow rate diagram (average speed, number of vehicles)



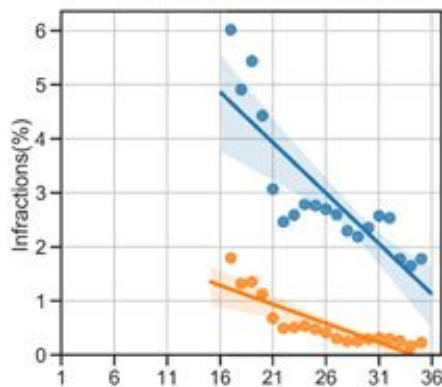
0h - 6h 6h - 12h 12h - 15h 16h - 20h 20h - 24h

3.3 Average speed control infraction histogram (infraction percentage, time)

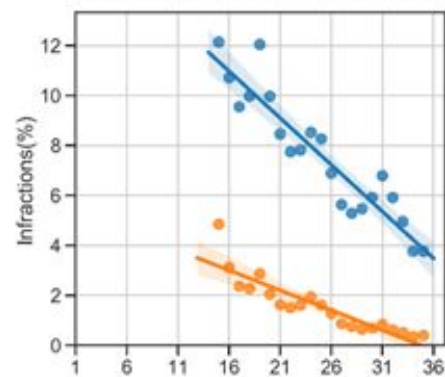
Brecht -> Hoogstraten



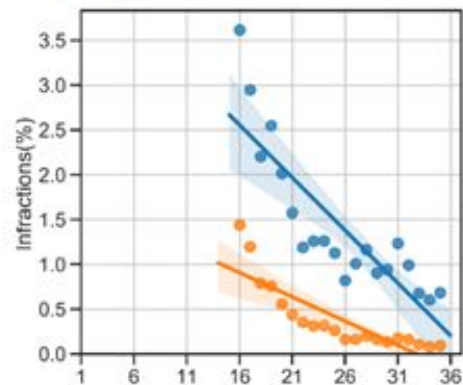
Sint-Antonius -> Zoersel



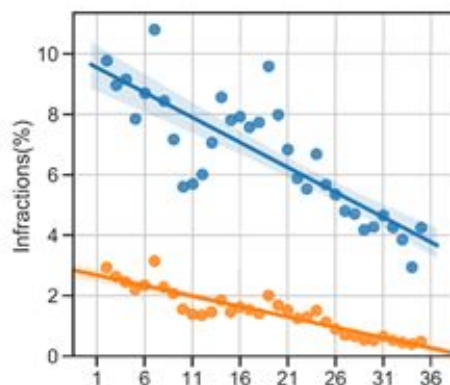
Wuustwezel -> Brecht



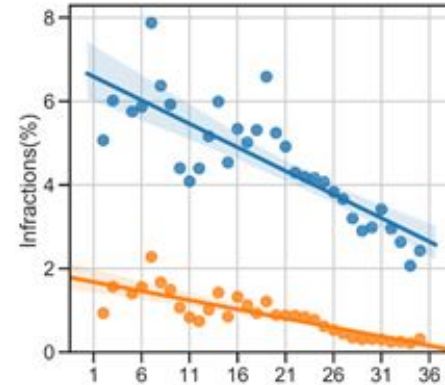
Wijnegem -> 's Gravenwezel



Brecht -> Bethaniëlei



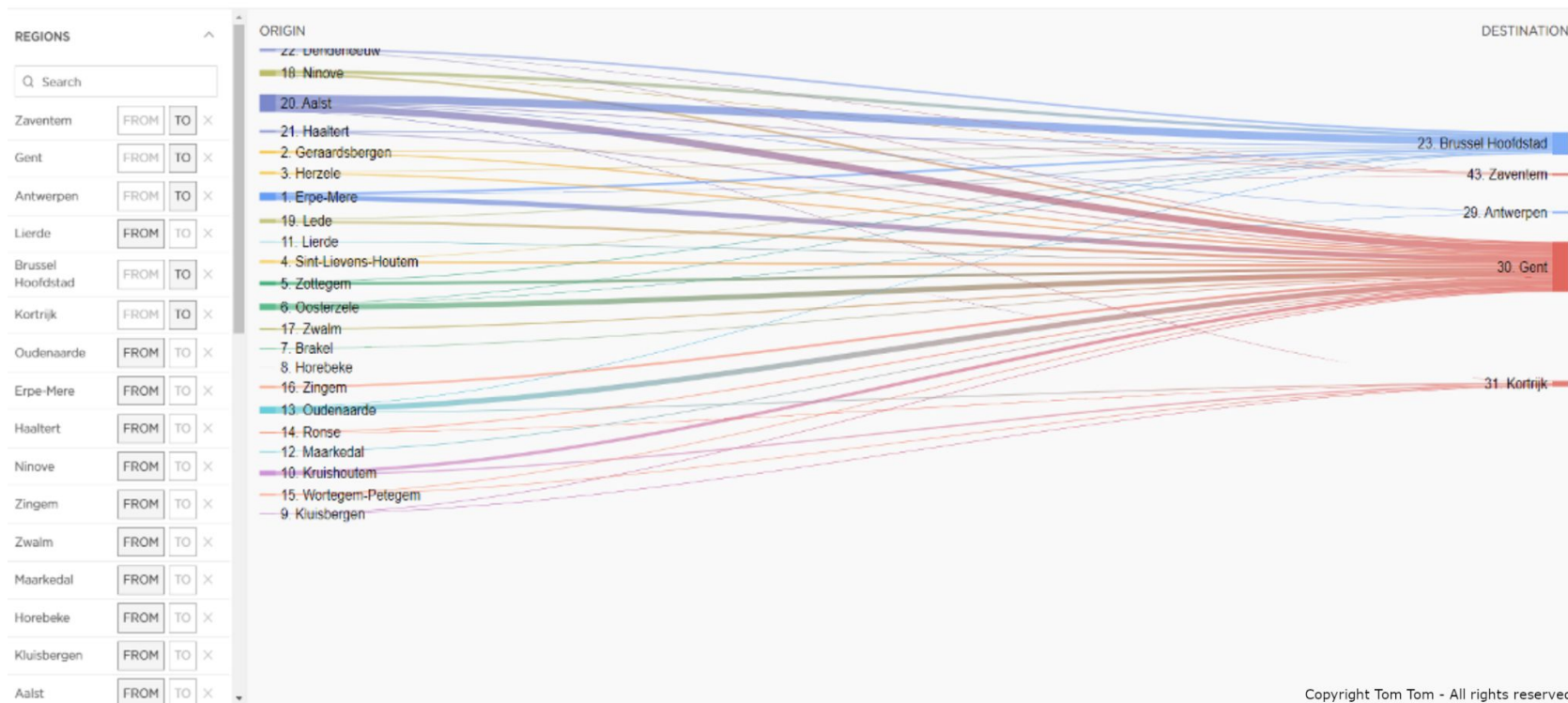
Bethaniëlei -> Schilde



4 - Solva region (BE) - Regional traffic behaviour

4.1 Sankey route distribution diagram

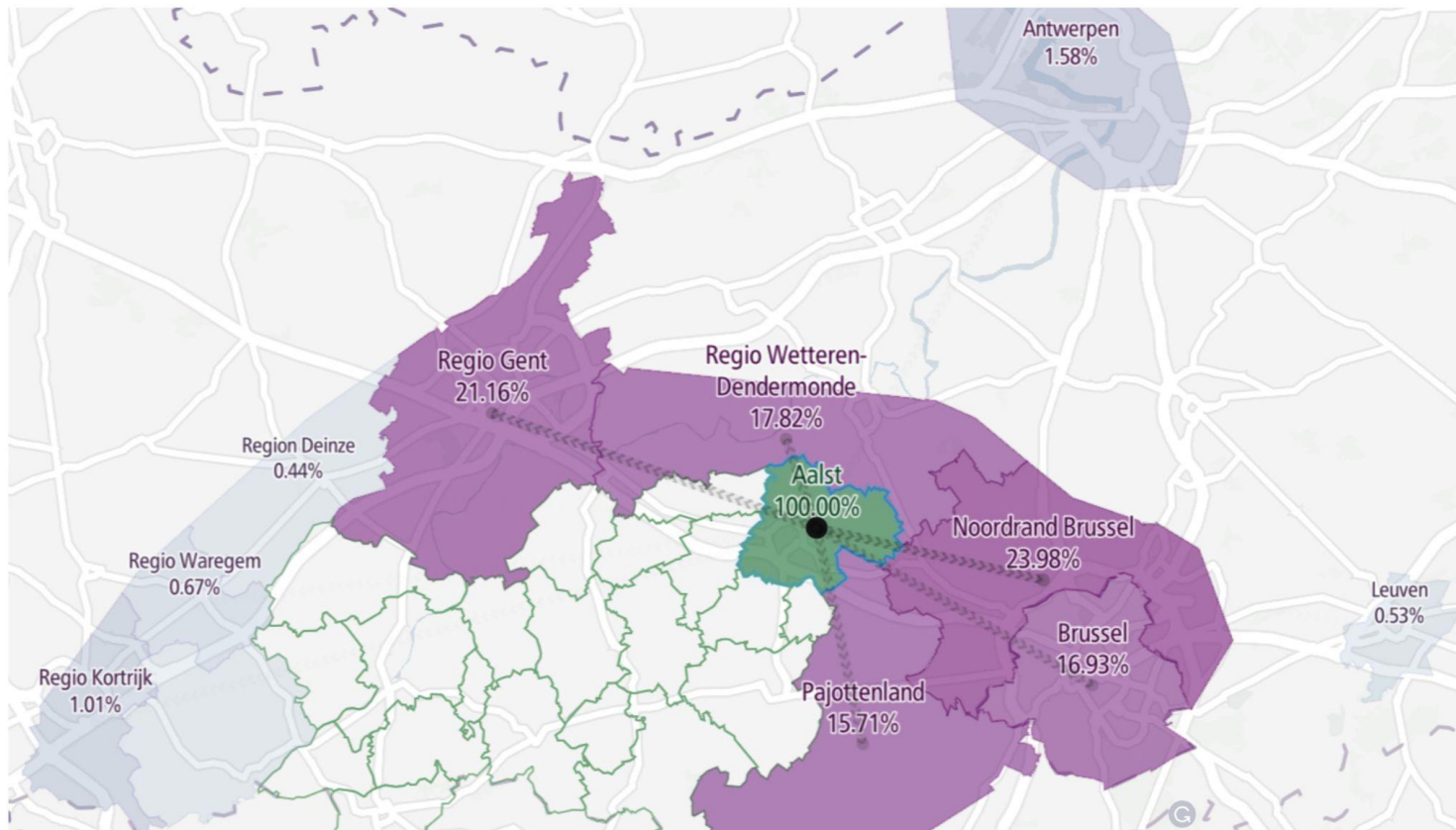
< SOLVA EN STEDEN / SANKEY DIAGRAM



4.2 Origin-destination matrix diagram combined with a heatmap

	Erpe-...	Geraar...	Herzele	Sint-Li...	Zotteg...	Ooster...	Brakel	Horeb...	Kluisb...	Kruish...	Lierde	Maark...	Ouden...	Ronse	Worte...	Zingem	Zwalm	Ninove	Lede	Aalst	Haaltert	Dende...
Erpe-Mere	2301	49	277	144	127	29	12	2	2	20	2	4	38	7	1	4	12	228	489	1706	244	83
Geraardsbergen	64	5850	203	28	305	93	242	6	2	5	300	4	100	81	8	21	20	1010	14	366	111	118
Herzele	398	281	1617	140	809	127	61	1	2	4	30	8	37	22	2	6	25	258	45	341	55	40
Sint-Lievens-H...	228	24	172	858	265	193	7	2	1	2	1	1	29	6	1	2	13	59	119	257	21	14
Zottegem	106	249	497	152	4216	500	232	17	7	14	176	27	241	93	12	21	282	92	25	272	25	31
Oosterzele	71	43	87	118	473	1816	17	2	2	23	10	1	73	16	2	15	53	15	23	230	7	11
Brakel	26	366	47	12	396	24	1984	41	10	21	228	33	436	219	24	29	153	131	4	78	26	8
Horebeke	14	8	2	1	49	3	46	115	4	10	12	18	183	17	2	12	46	6	0	29	1	1
Kluisbergen	1	3	1	0	10	1	8	2	707	32	0	18	413	286	79	5	3	1	0	15	0	0
Kruishoutem	15	4	1	4	18	3	11	4	15	1173	3	19	467	58	102	133	6	3	1	58	4	1
Lierde	17	427	54	9	267	19	305	5	0	5	575	4	42	49	4	3	4	159	7	63	29	9
Maarkedal	5	22	6	2	15	3	63	21	41	34	3	637	671	356	12	28	12	15	3	13	1	2
Oudenaarde	19	42	54	16	195	50	154	91	181	280	6	331	7744	466	360	385	199	53	11	94	6	2
Ronse	4	39	9	5	46	12	156	11	225	55	18	277	702	3657	46	46	23	38	2	20	6	0
Wortegem-Pet...	3	6	0	0	13	4	5	5	30	170	0	11	733	41	517	45	8	0	0	11	0	1
Zingem	8	5	2	6	25	8	14	4	10	139	1	8	549	53	17	750	105	5	3	22	9	8
Zwalm	22	40	29	18	356	64	105	50	6	22	4	10	386	28	12	79	750	5	1	49	3	3
Ninove	212	665	134	30	167	20	56	7	0	2	36	2	45	12	1	3	4	6079	28	1102	510	482
Lede	504	20	25	88	49	21	2	1	2	8	2	2	10	3	0	2	3	34	1923	1127	42	20
Aalst	989	117	107	117	110	34	18	9	0	48	12	1	51	10	1	7	4	646	545	16976	615	621
Haaltert	272	121	98	30	46	10	12	1	2	1	12	1	7	3	2	5	5	626	44	1346	1739	325
Denderleeuw	83	49	29	11	9	9	10	1	0	0	7	0	3	4	0	2	0	395	46	782	147	2096

4.3 Traffic flow line/trip distribution map



5 - Herzele (BE) - Interactive school street dashboard

5.1 2D map view sensor locations, sensor type

English



Schoolstraat Sint-Paulusinstituut



Dashboard info

The objective of this dashboard is to visualise the impact of specific policy decisions on traffic and air pollution.

At the top of the dashboard, you see a map and a set of sensors that are linked to the dashboard. The sensors are split into two groups: one group monitors the situation of the area of interest (e.g. the targeted street of the school), and another monitors the possible impact on the neighbourhood.

Below you will find a Quicksan box with charts showing high level the impact on the different aspects.

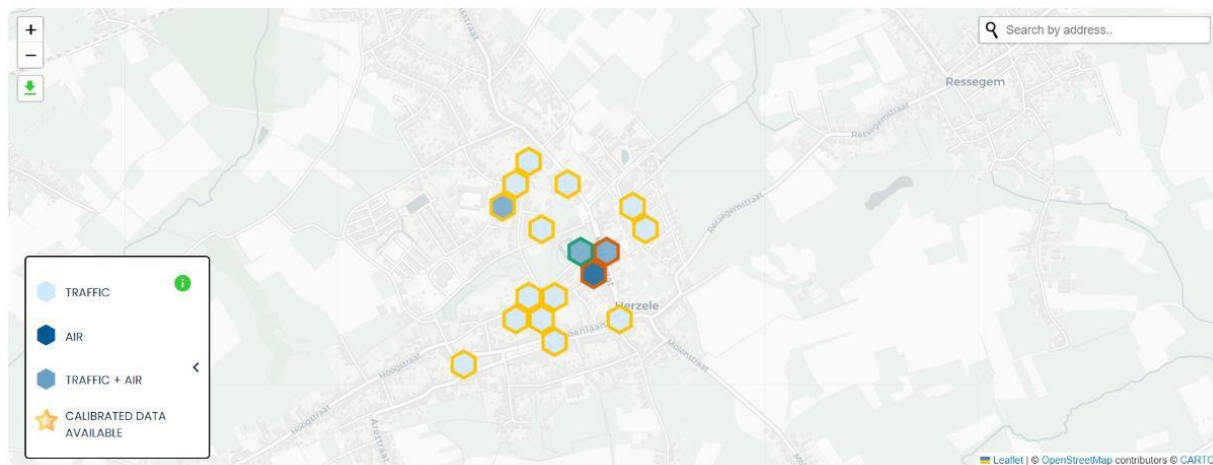
Clicking the "advanced graphs" button at the lower right corner allows for more detailed inspections.

[More info](#)

Project info

In the Burgemeester Matthyssstraat in Herzele, a test installation of a school street is planned from April 17 until June 16, 2023. Citizen Scientist together with 3 school monitor the effect of this measure on traffic in this street and the surrounding streets, with a Telraam. The effect on Air quality will soon be measured also.

[More info](#)



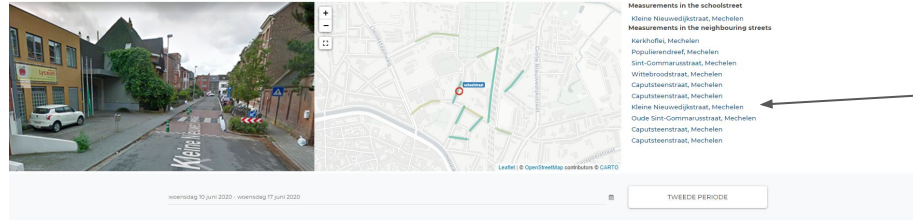
STREET NAME	SENSOR TYPE	GROUP
▼ Graaf du Parclaan	TRAFFIC	Buurt
▼ Oudendries	TRAFFIC	Buurt
▼ Kloosterstraat	TRAFFIC	Buurt
▼ Kerkstraat	TRAFFIC	Buurt
▼ Kloosterstraat	TRAFFIC	Buurt
▼ Bevrijdingstraat	TRAFFIC	Buurt
▼ Groenlaan	TRAFFIC	Buurt

5.2 Bar chart, traffic mode, changes is pollutant exhaust

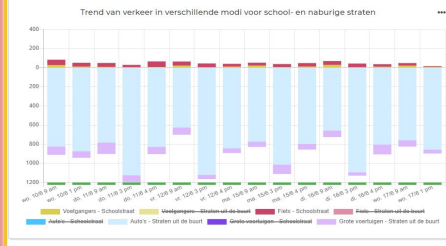
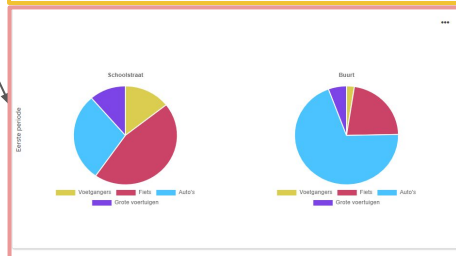
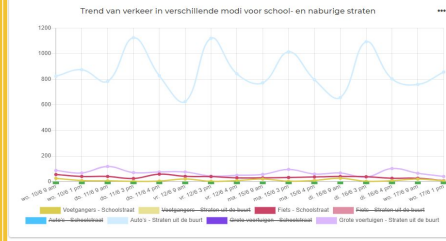
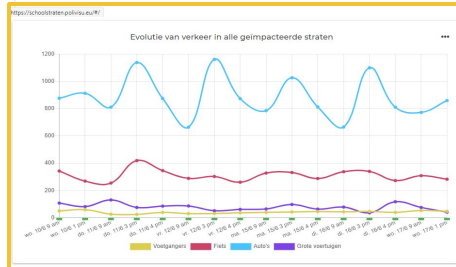
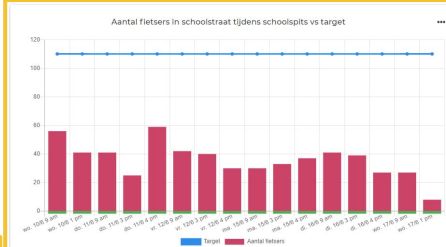
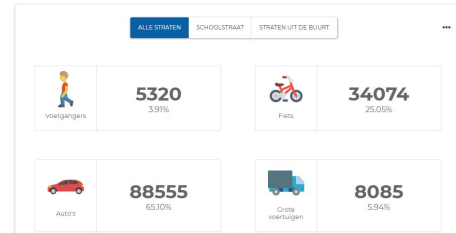


6 - Mechelen/Flanders (BE) - Interactive school street dashboard

6.1 School street implementation dashboard



6.2 2D Map (sensor locations)



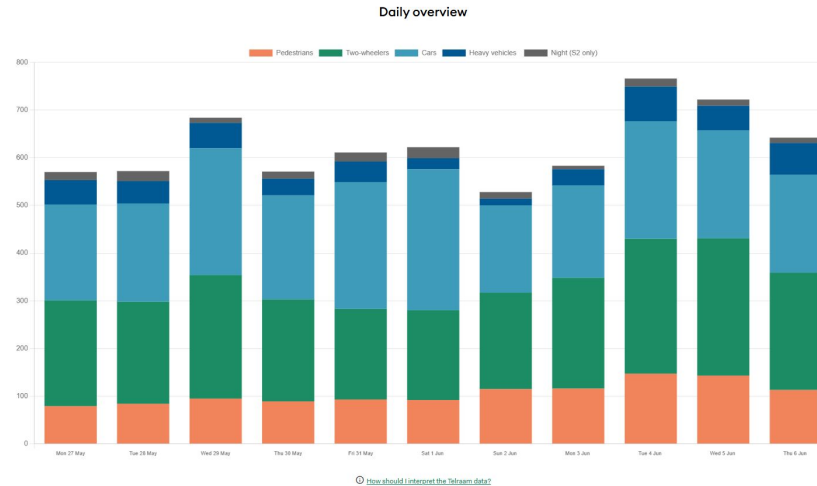
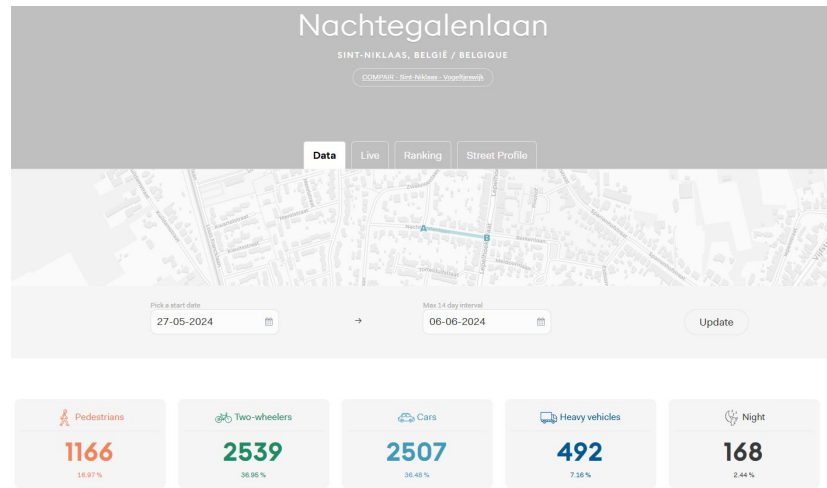
6.3 Bar charts (advanced) & comparative trend analysis line chart

6.4 Pie chart (Modal split)

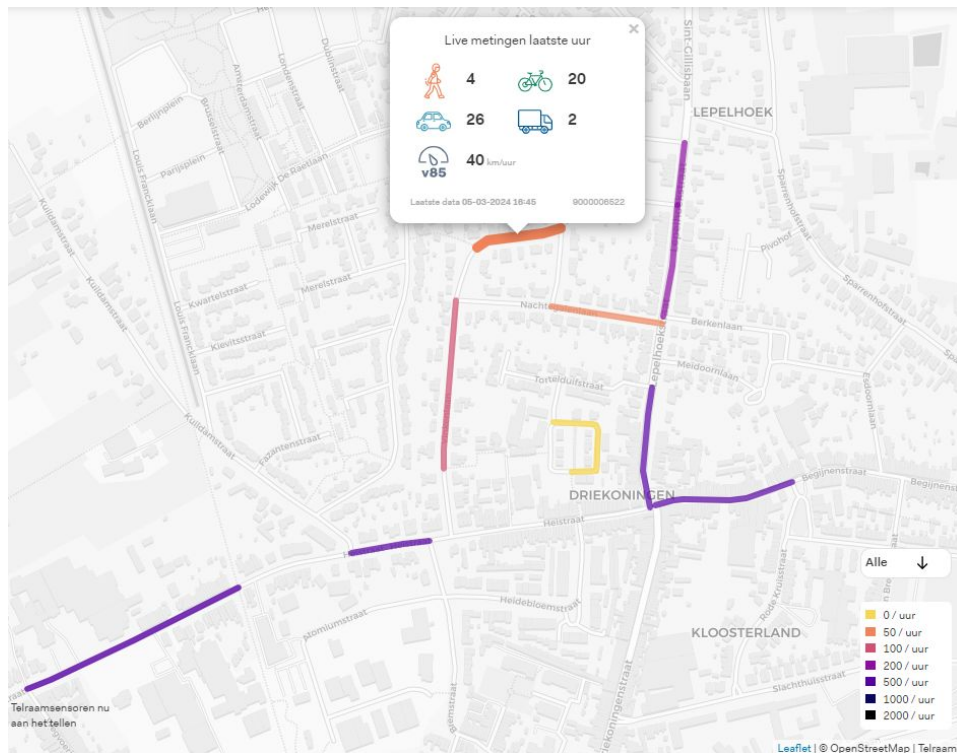
7 - Sint-Niklaas (BE) - Local mobility scheme/plan dashboard

(Telraam Dashboard)

7.1 Traffic count data mobility dashboard

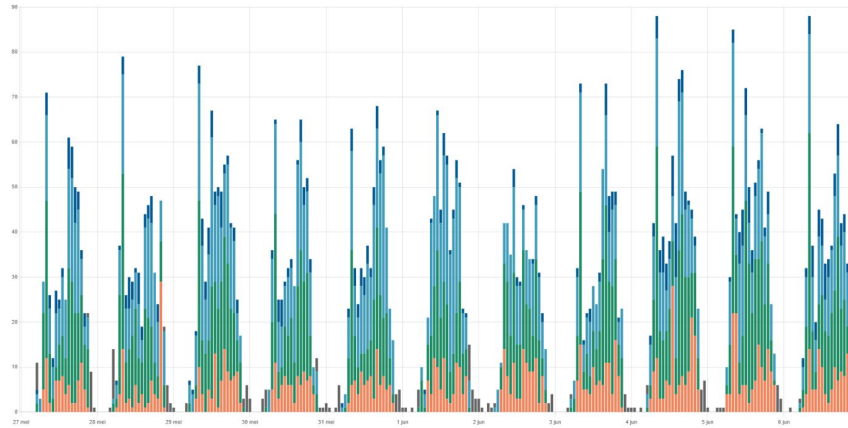


7.2 2D Sensor Location Map

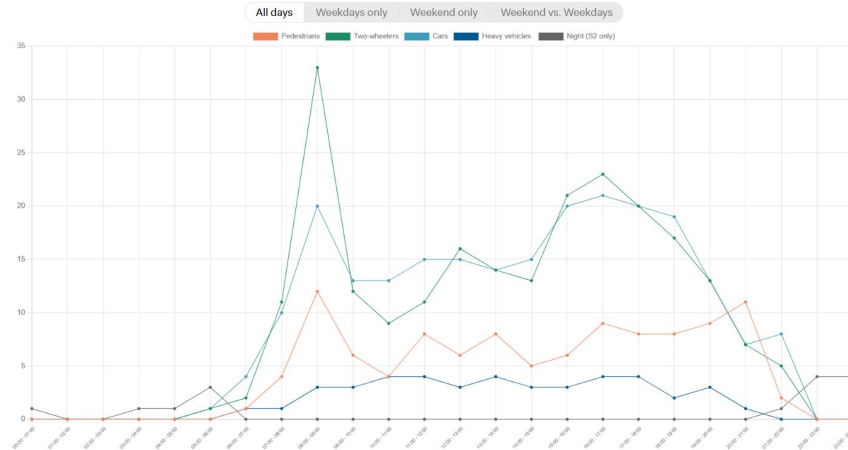


7.3 Stacked bar and line charts (traffic volumes)

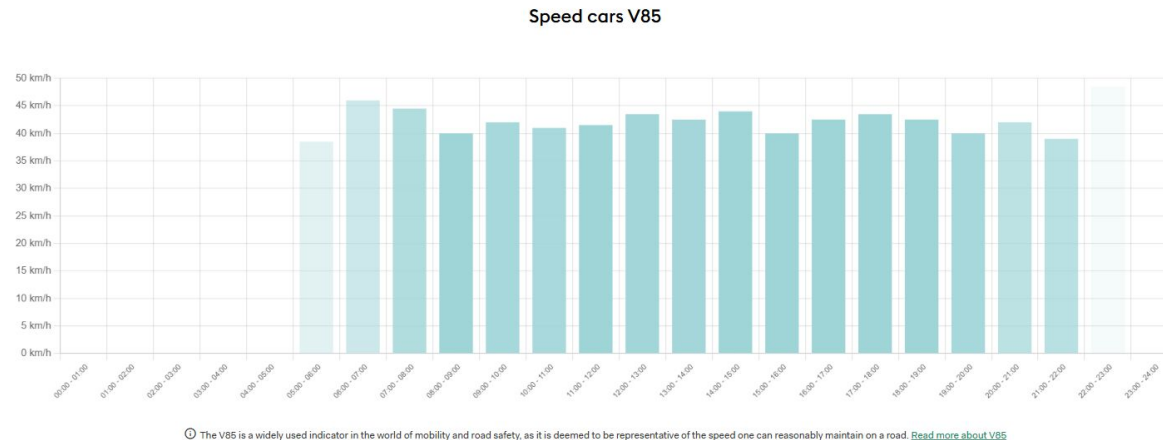
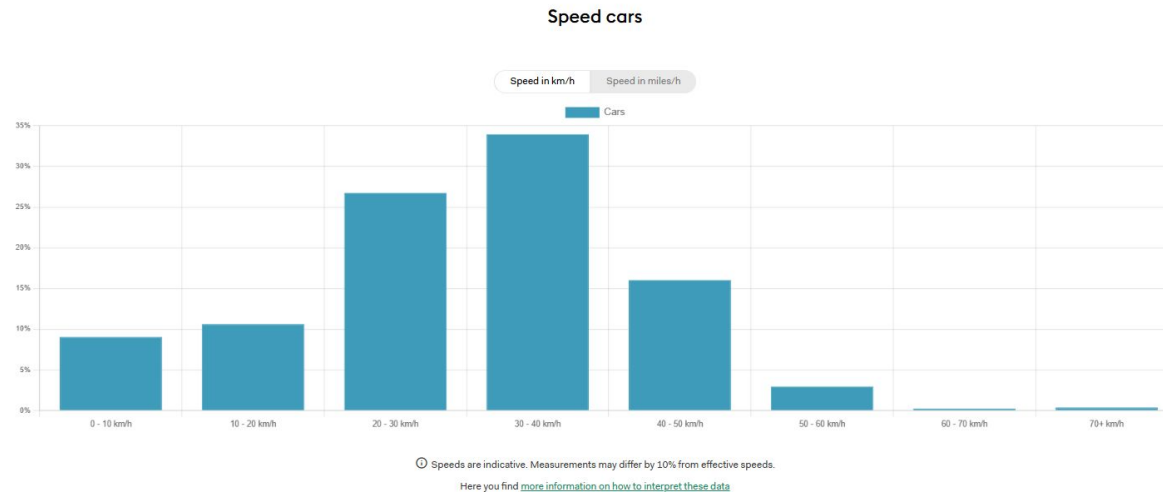
Overview in detail



24 hour average



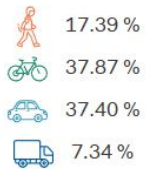
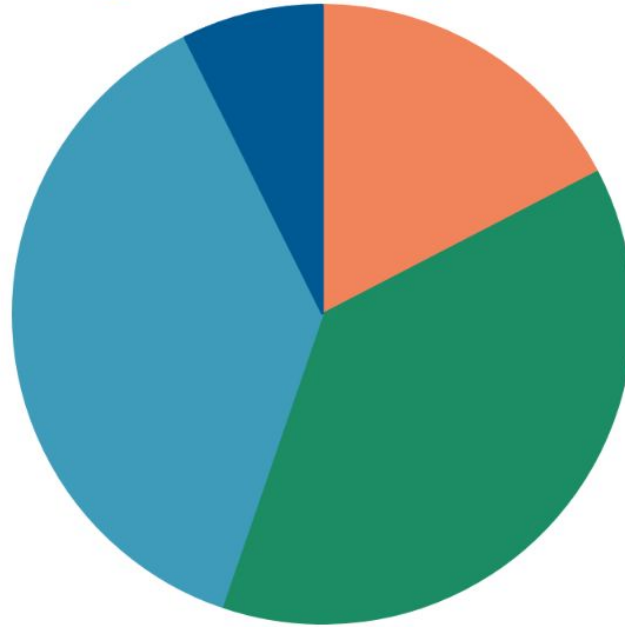
7.4 Histogram (driving speed)



7.5 Pie chart (modal split)

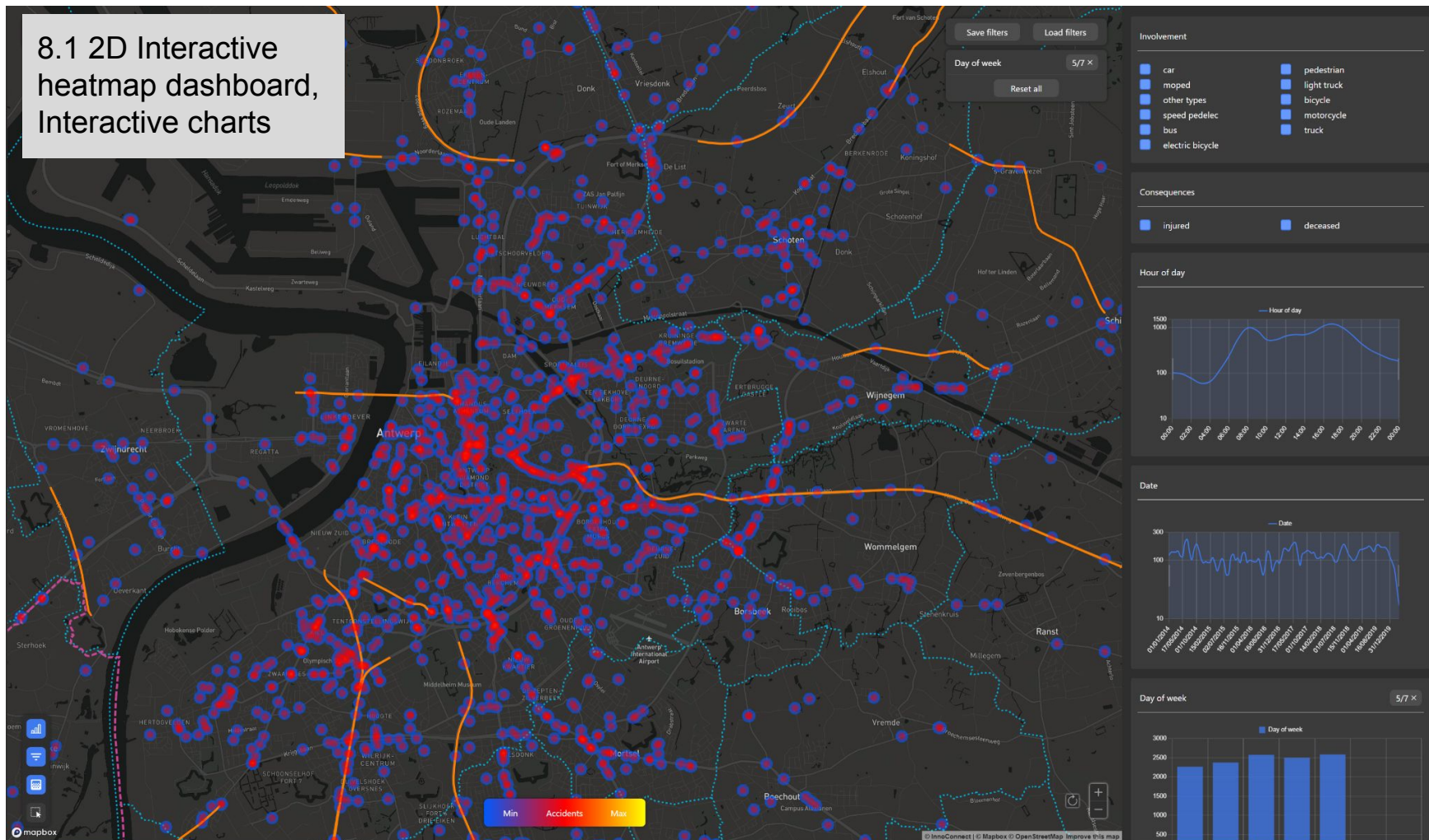
Modal split

Pedestrians Two-wheelers Cars Heavy vehicles



8 - Flanders (BE) - Interactive road safety map

8.1 2D Interactive heatmap dashboard, Interactive charts



9 - Ghent (BE) - Student displacements

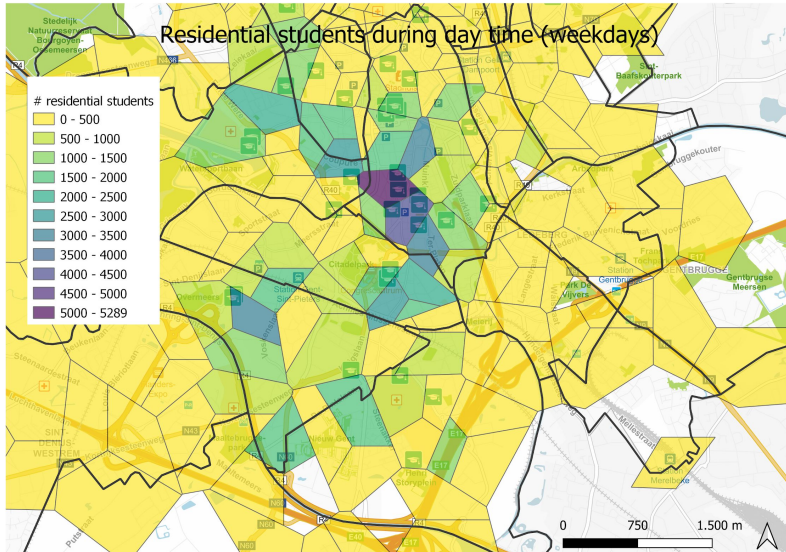
9.1 Polygon choropleth map & histogram of student locations



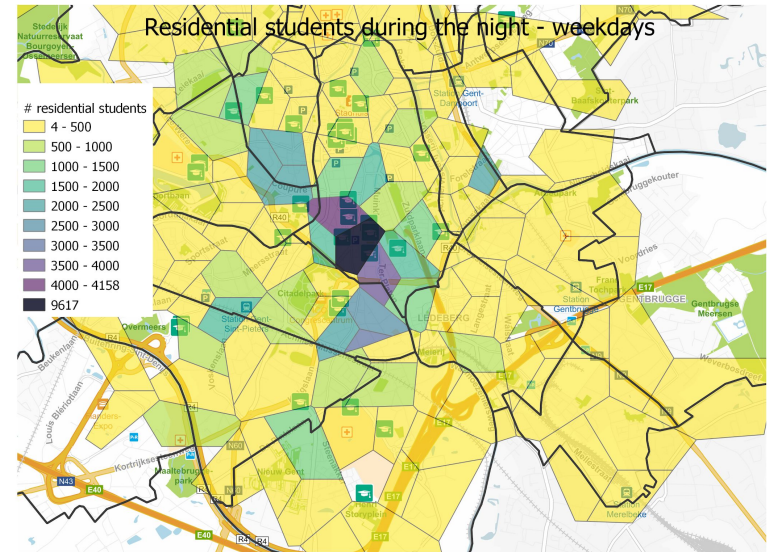
9.2 Polygon choropleth map student locations day/night

Student facilities (buildings of institutions for higher education where classes take place) on a map, overlaid with count of residential students per cell

Day

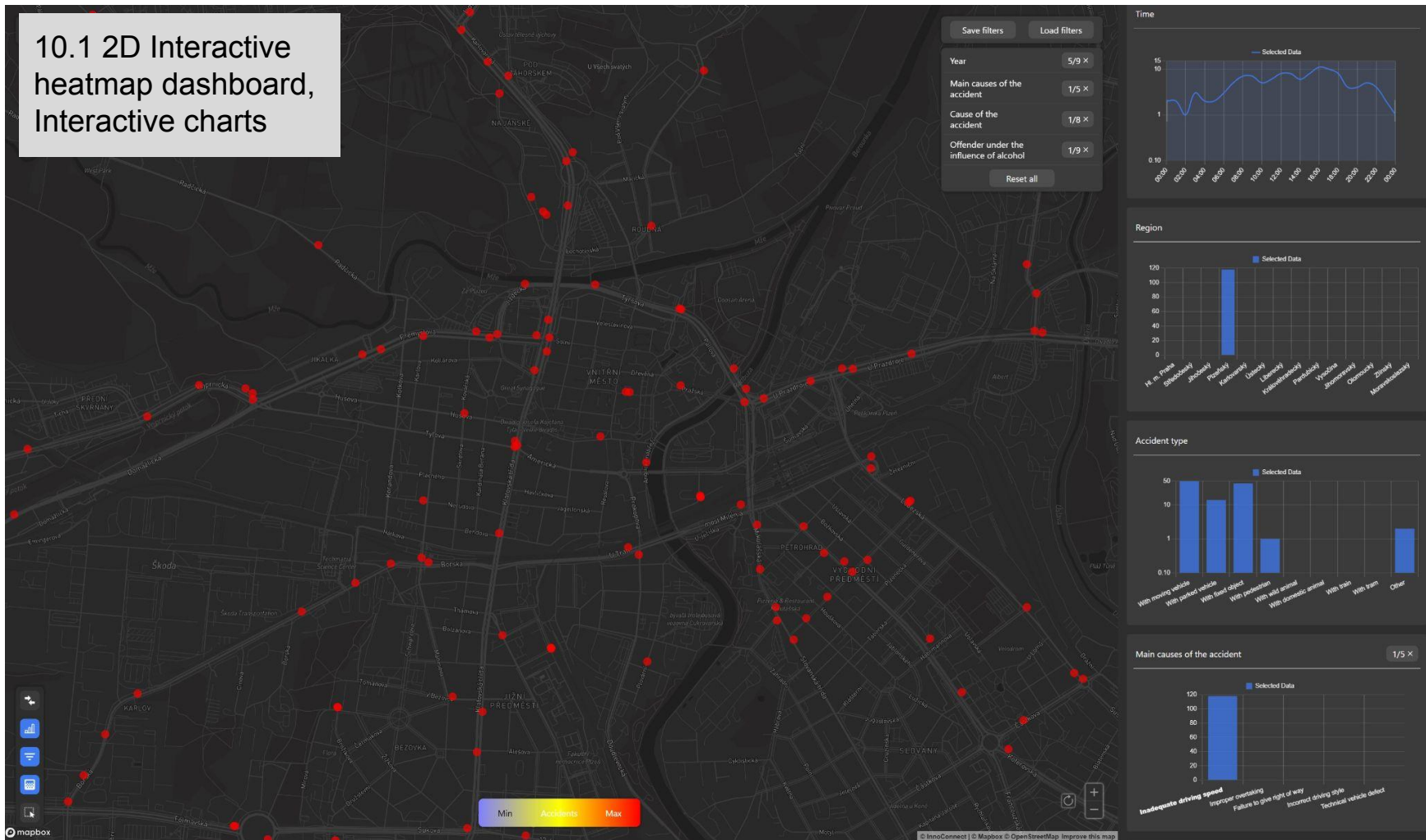


Night



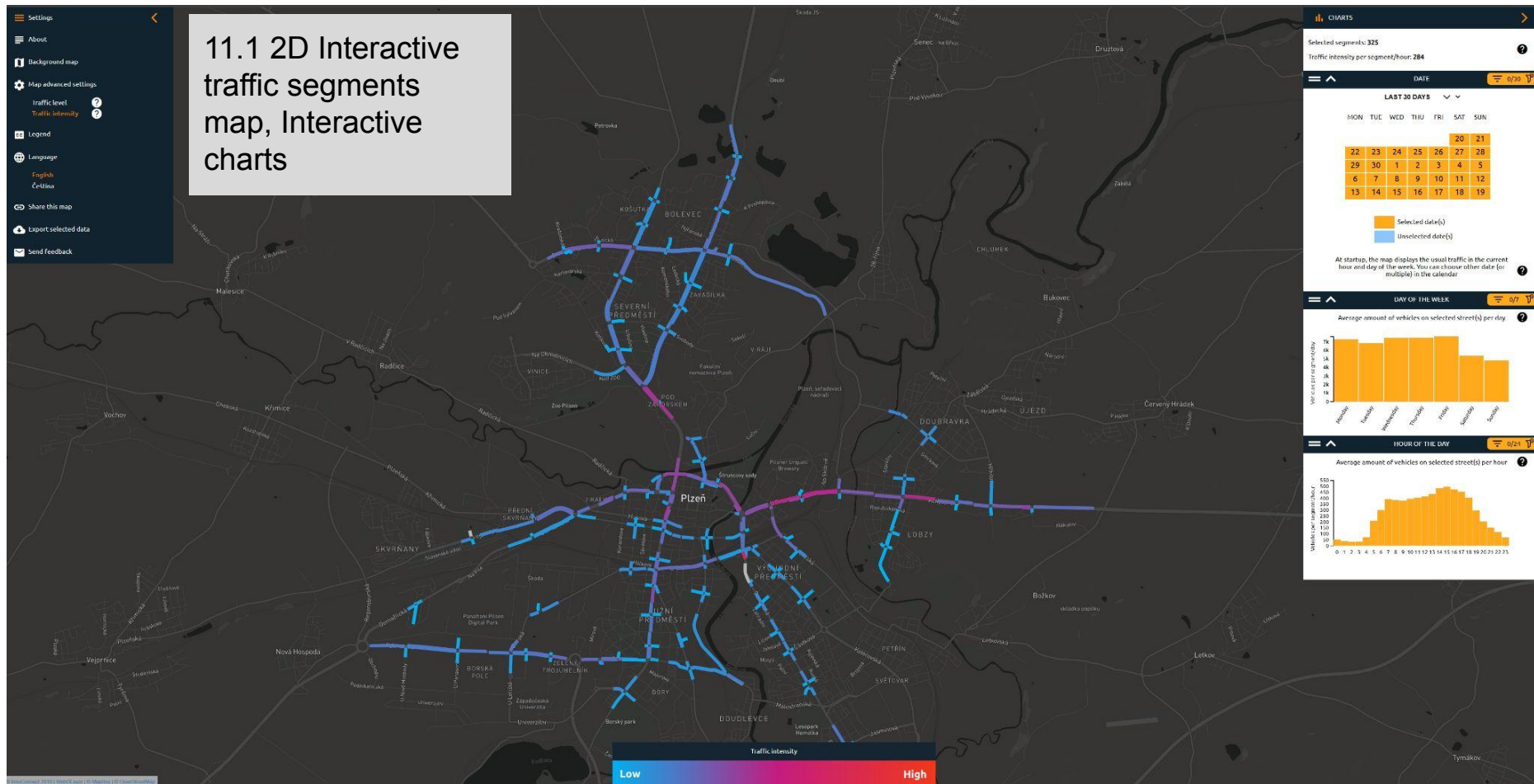
10 - Pilsen (CZ) - Interactive road accident map

10.1 2D Interactive heatmap dashboard, heatmap dashboard, Interactive charts

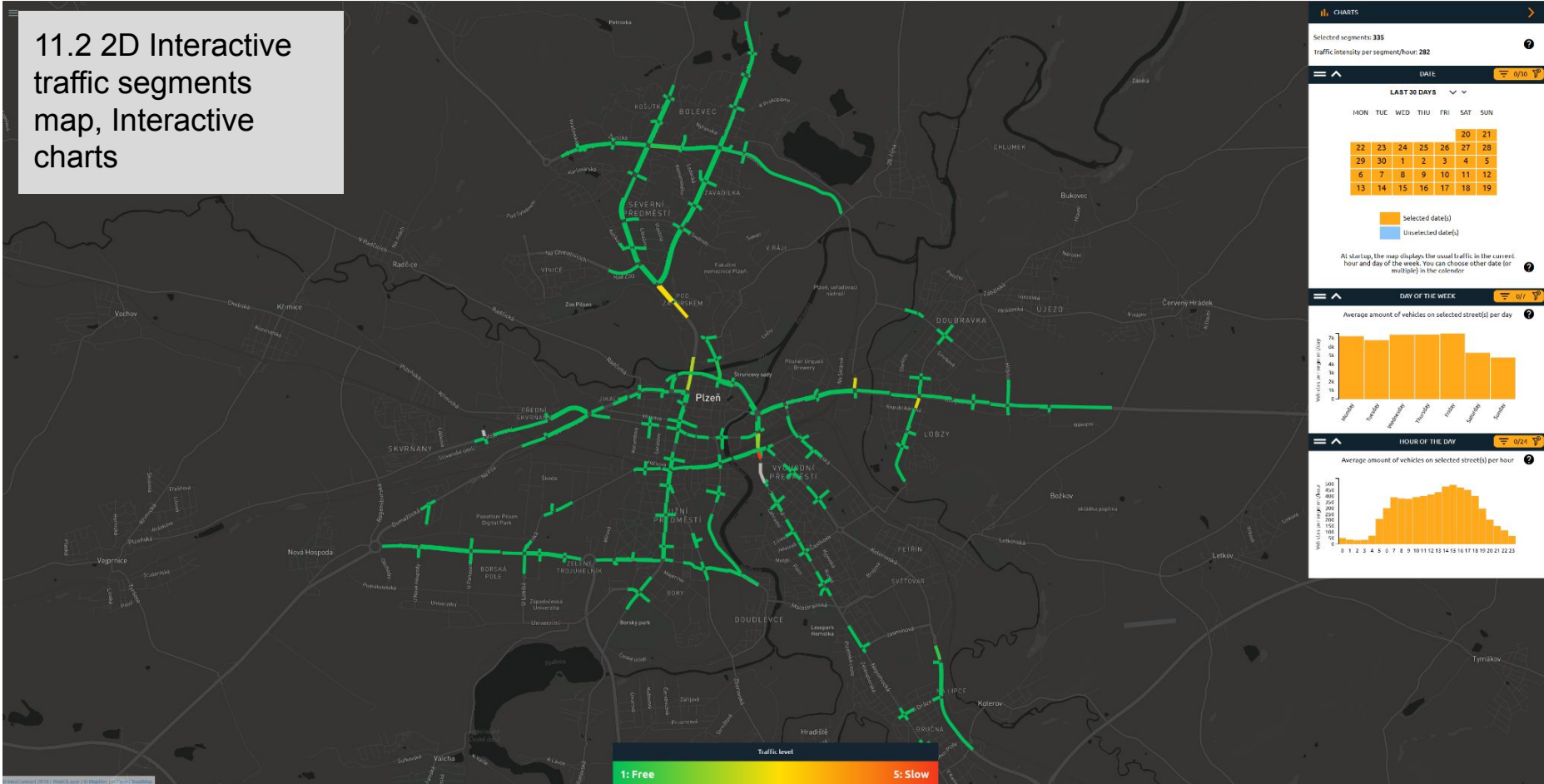


11 - Pilsen (CZ) - Interactive sensor based live and historic traffic map

11.1 2D Interactive traffic segments map, Interactive charts

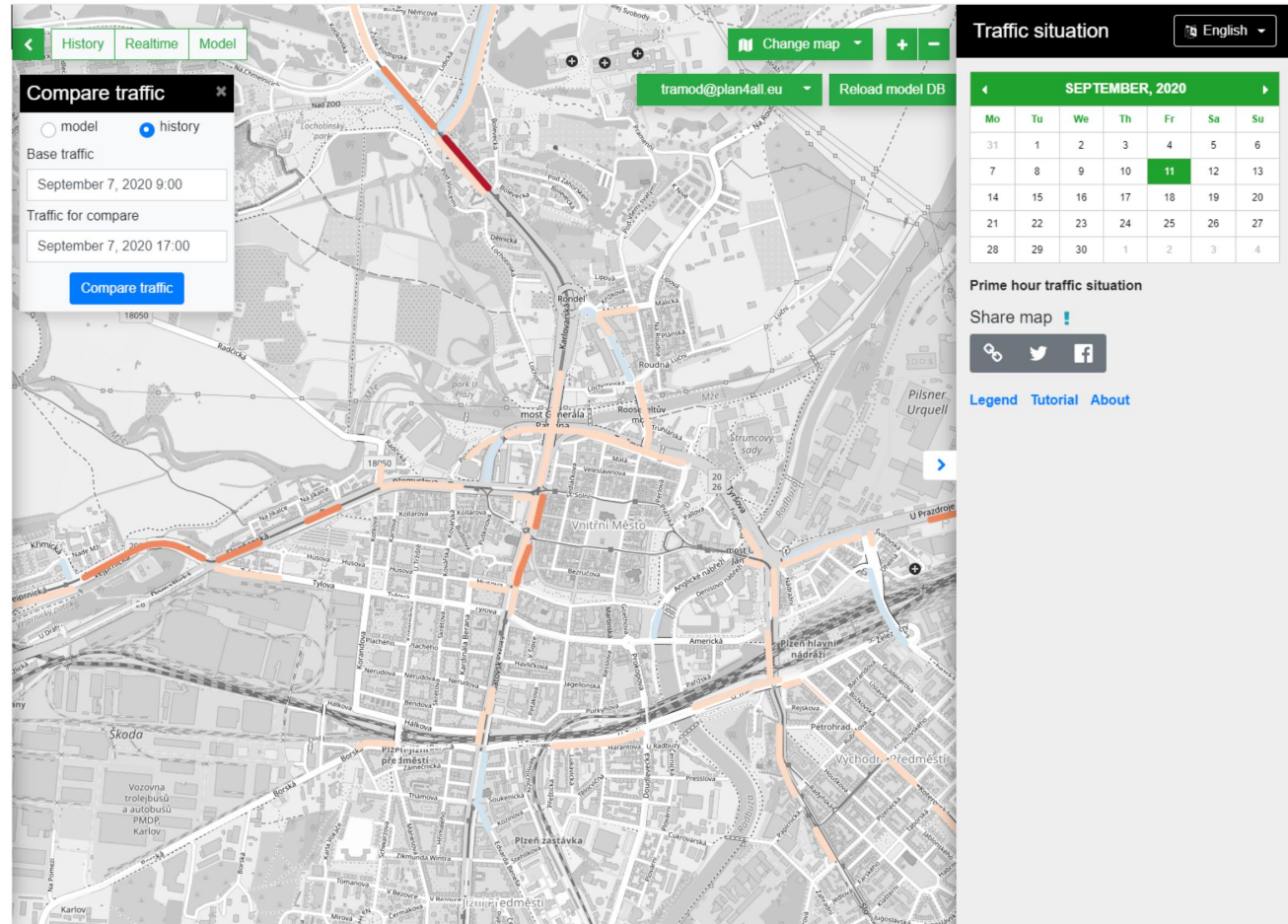


11.2 2D Interactive traffic segments map, Interactive charts



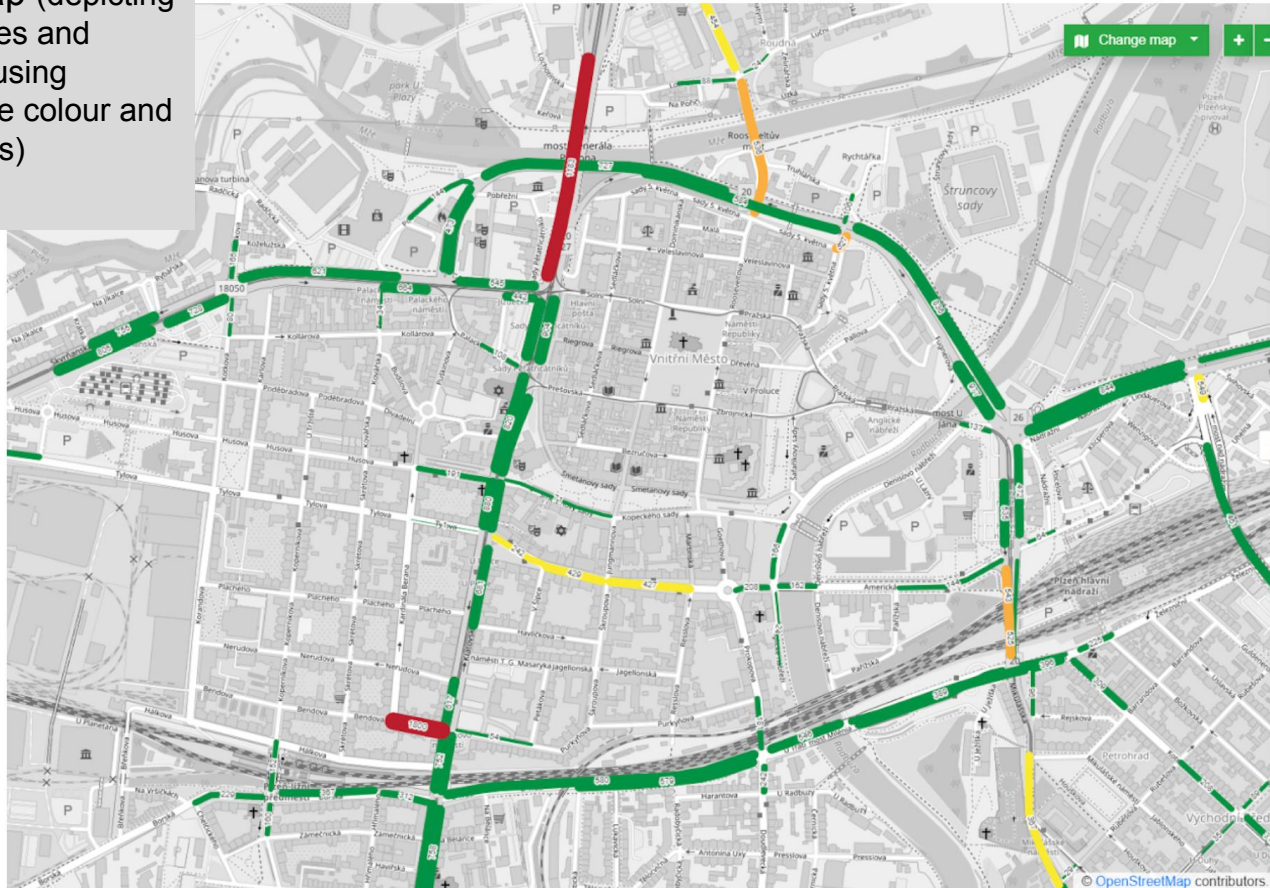
12 - Pilsen (CZ) - Traffic measure impact modelling comparison

12.1 2D Traffic volume delta map (depicting changes in traffic volume levels as a result of historic data or model calculation comparisons)



13 - Pilsen (CZ) - Traffic volume impact simulation modelling

13.1 Traffic model volume map (depicting traffic volumes and traffic flows using numbers, line colour and line thickness)



Traffic situation English

AUGUST, 2020

Mo	Tu	We	Th	Fr	Sa	Su
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

00:00 23:00

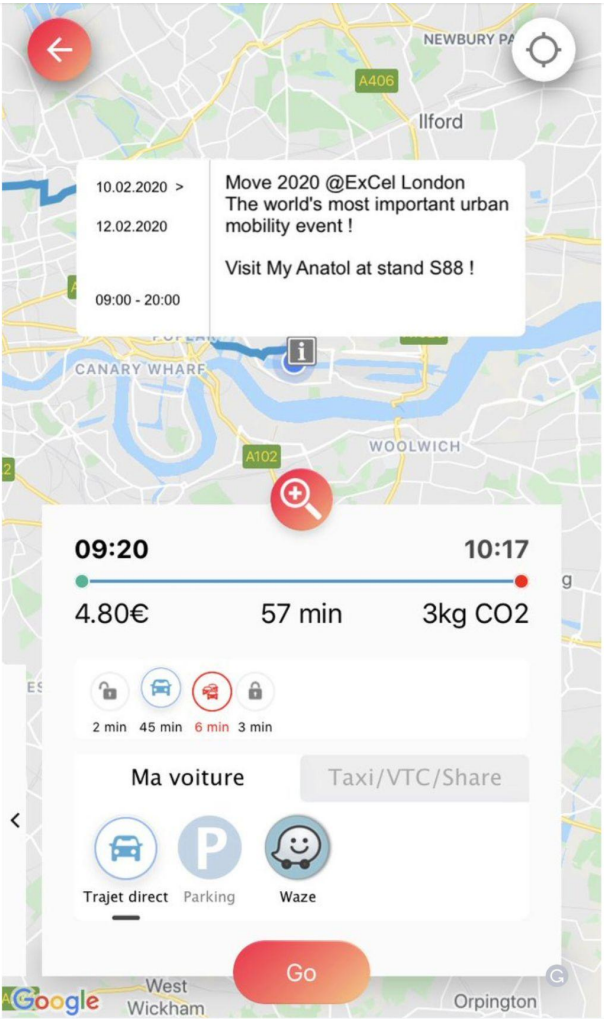
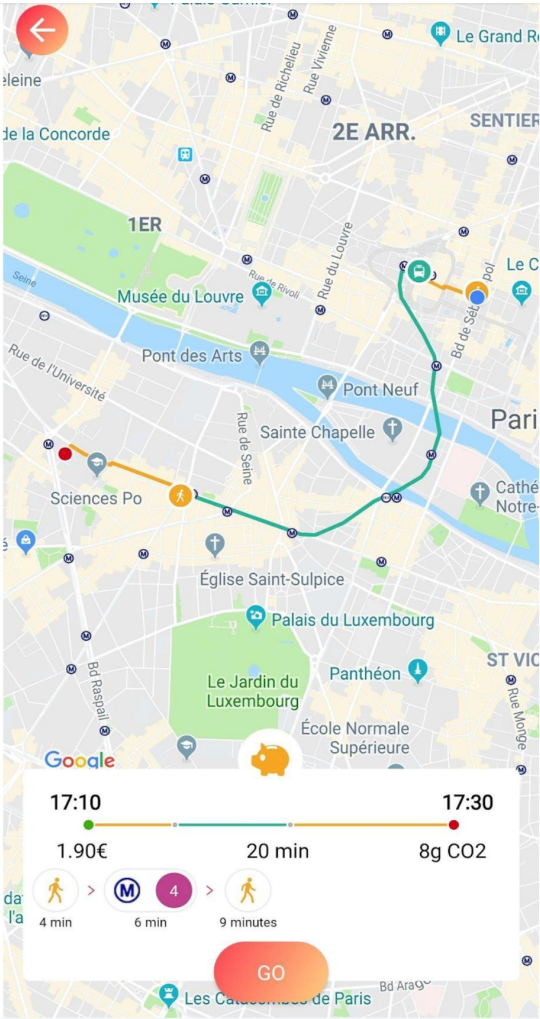
29.8. -h. 13:00 8/30/2020 +h. 31.8.

Share map

[Legend](#) [Tutorial](#) [About](#)

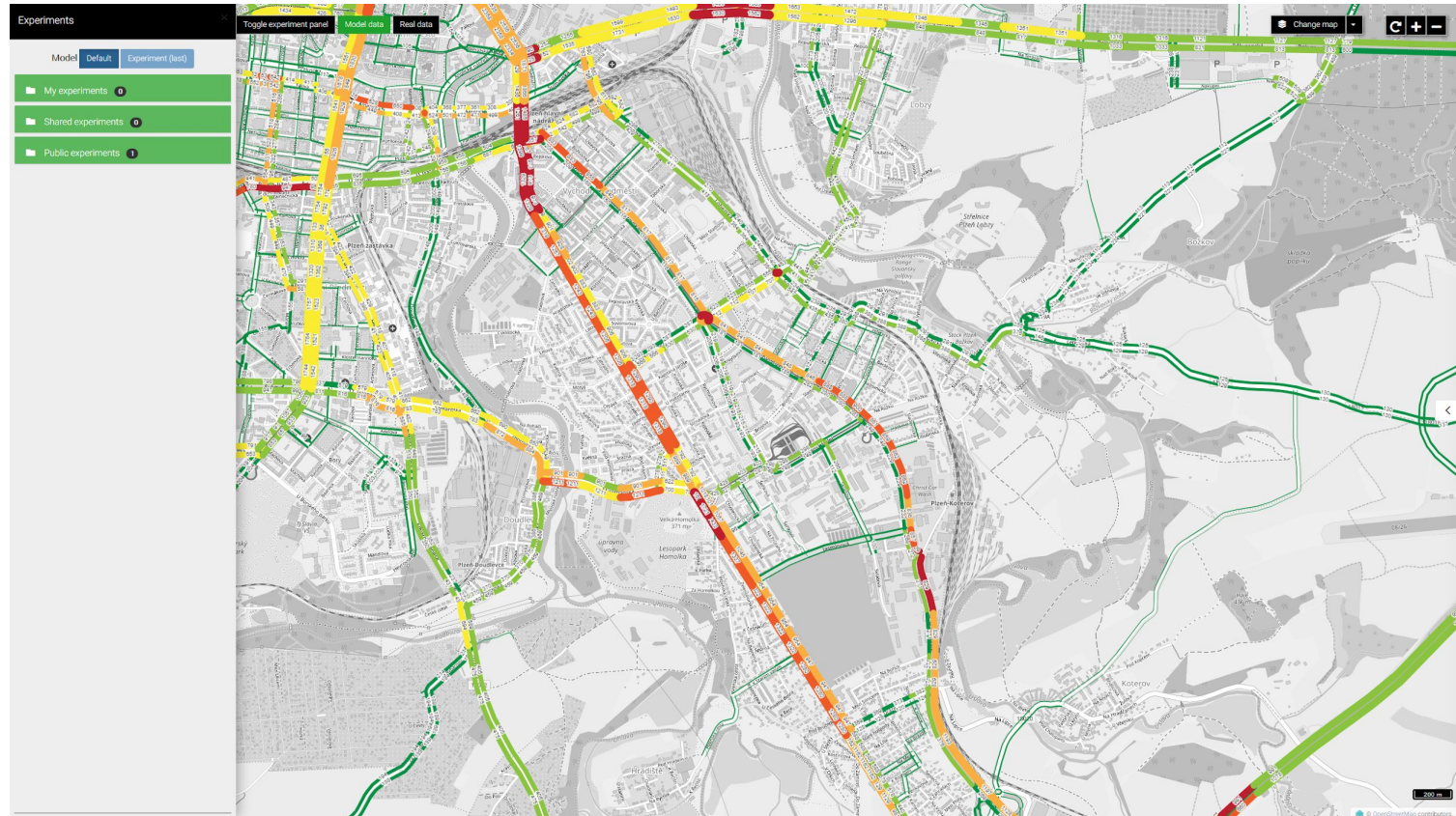
14 - Issy-les-Moulineaux (FR) - Travel planning app

14.1 Travel planning algorithm
mobile app - Interactive 2D city map,
line segment visualisation depicting
transport mode, multimodal route
information (transport modes, cost,
emission)

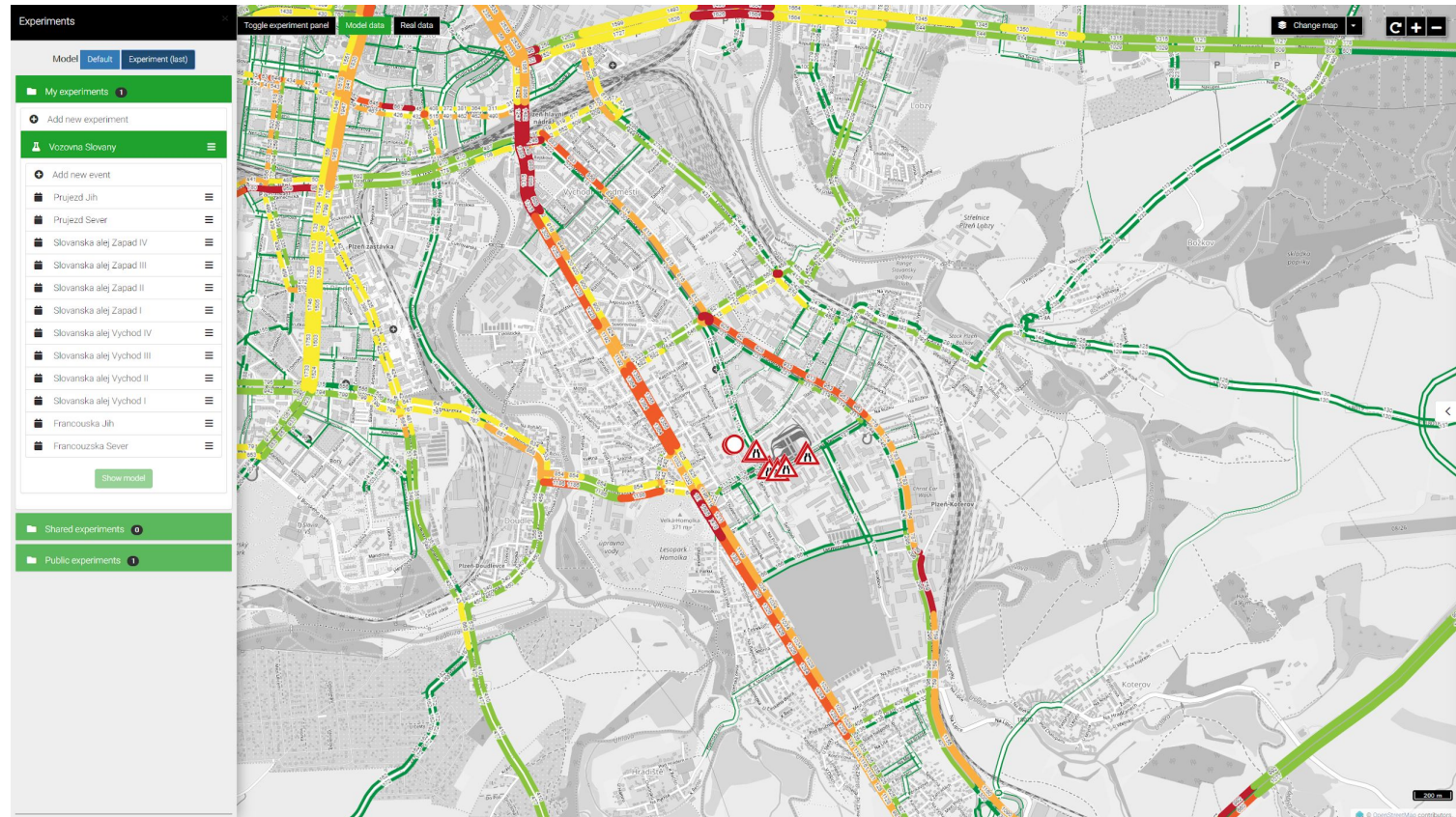


15 - Pilsen (CZ) - Impact of roadworks simulation

15.1A 2D Traffic model scenario analysis map - standard situation visualisation

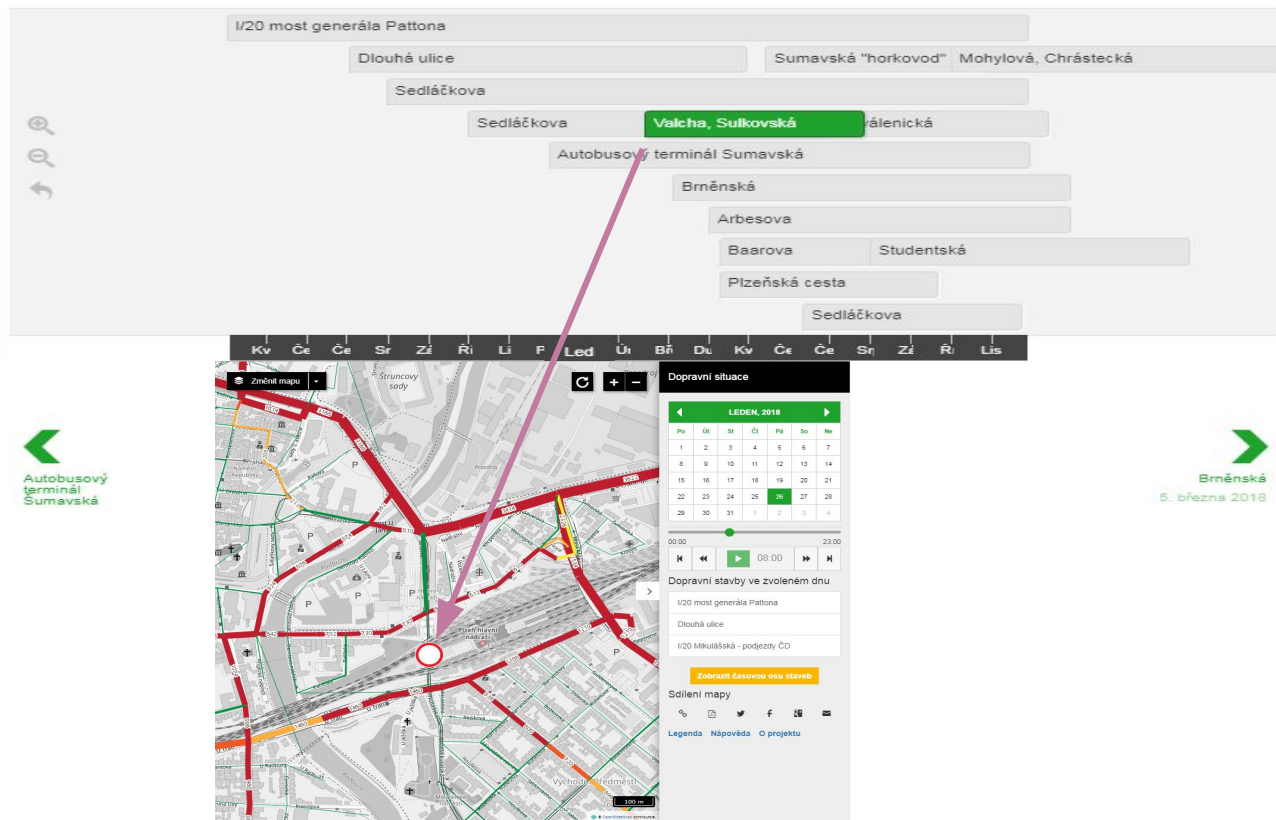


15.1B 2D Traffic model scenario analysis map - scenario simulation



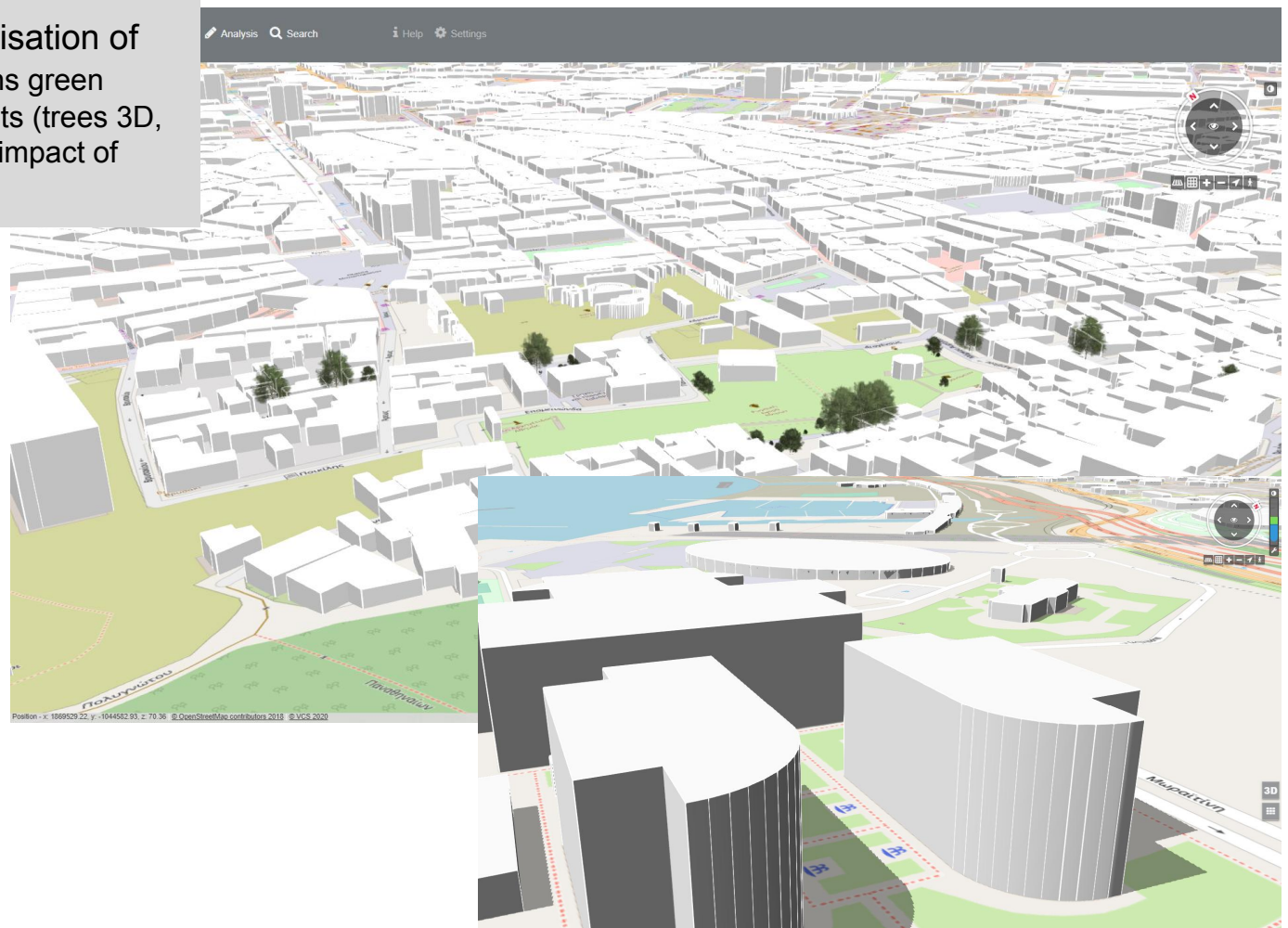
15.2 Timeline chart of (planned) roadworks

Roadworks planning



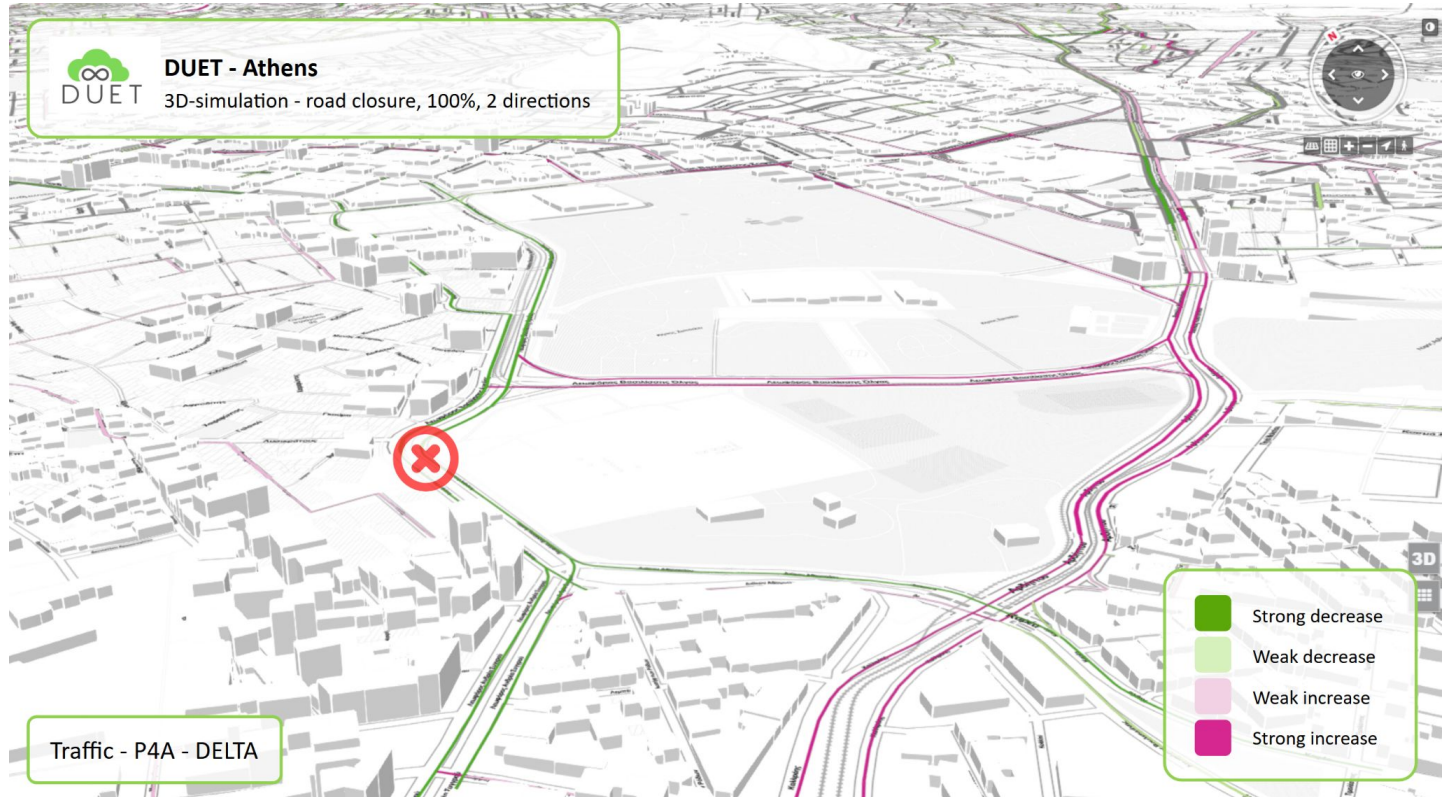
16 - Athens (GR) - Digital Twin, Green squares planning

16 3D Digital Terrain visualisation of
landscape elements - Athens green
spaces, detail of terrain elements (trees 3D,
water elements,...), 3D shadow impact of
buildings

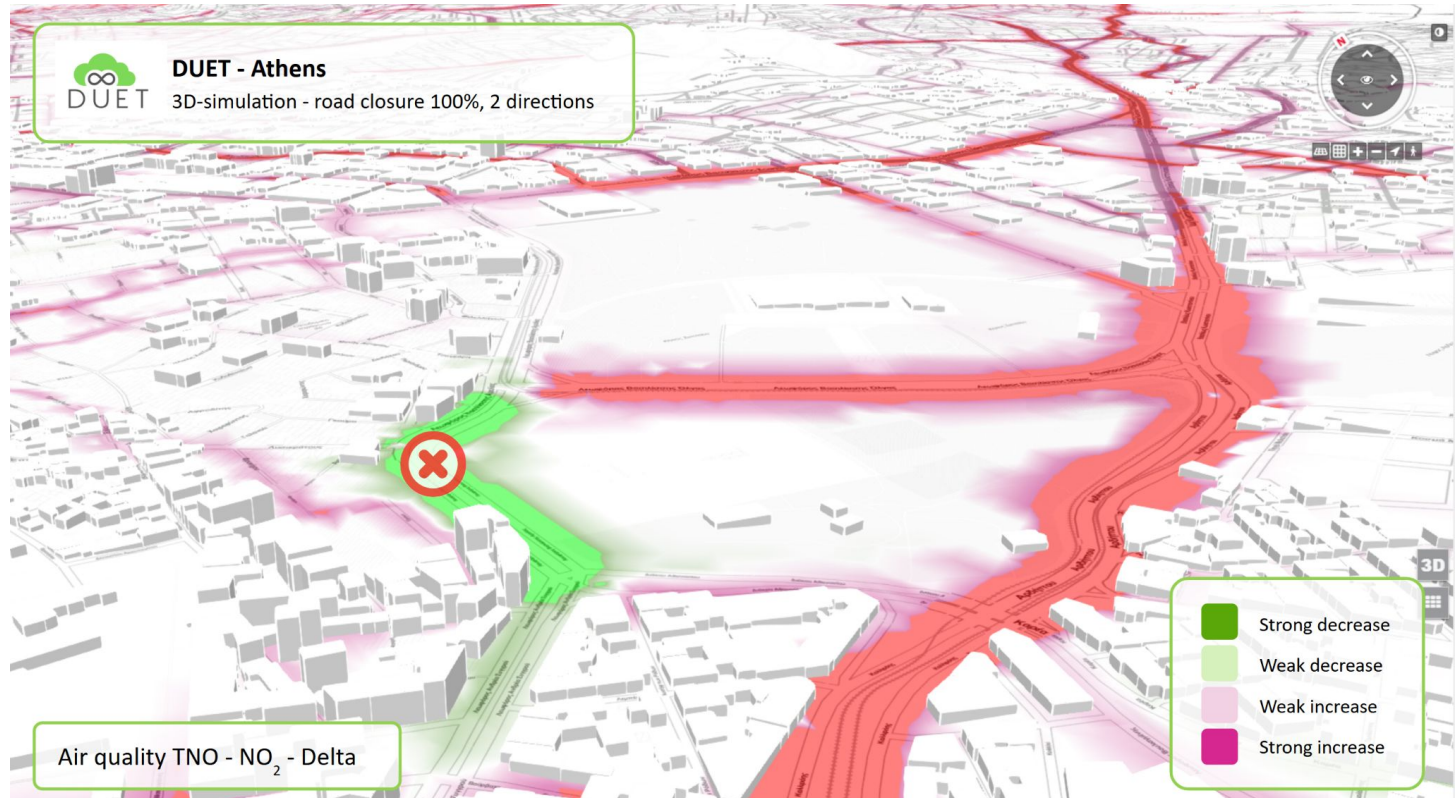


17 - Athens (GR) - Digital Twin, Traffic load & creation of a pedestrian and cycling route

17.1 3D Traffic volume delta map



17.2 3D Air quality delta map - (based on a traffic model calculation)

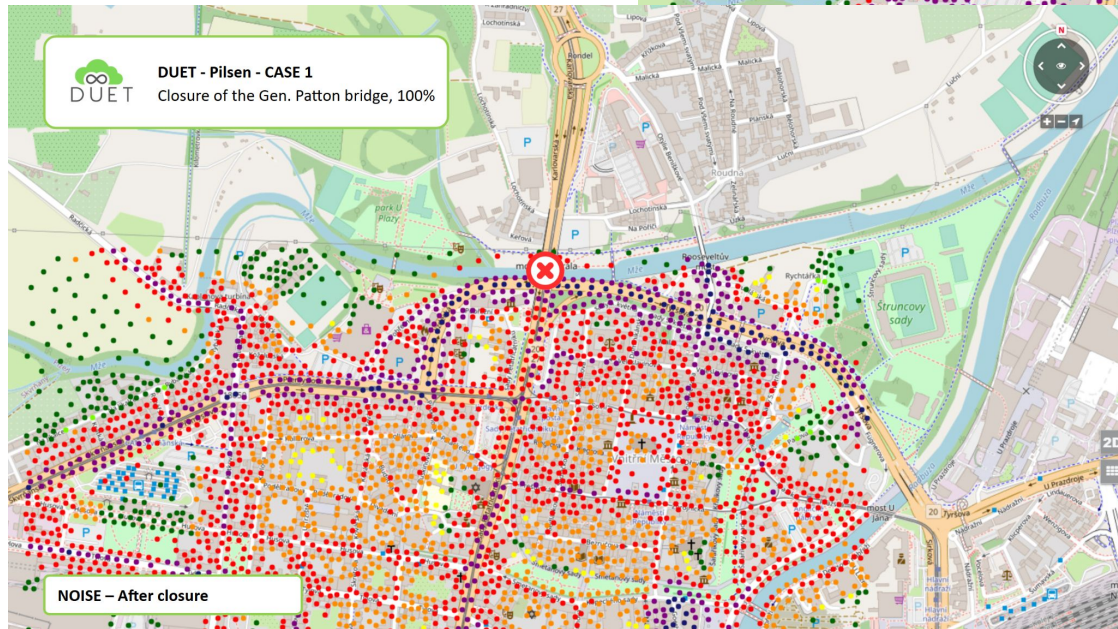
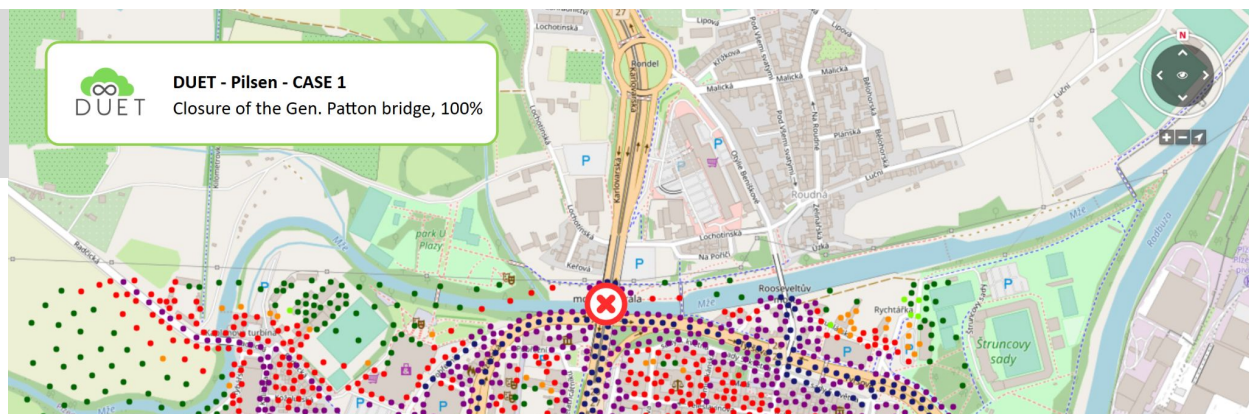


18 - Pilsen (CZ), Ghent (BE) - Digital Twin, Impact of road closures

18.1 2D Traffic volume delta map (as part of a Digital Twin)



18.2 3D Noise distribution point map (fictive sensors) - (based on a traffic model calculation)



18.3 3D Air quality delta map - (based on a traffic model calculation)

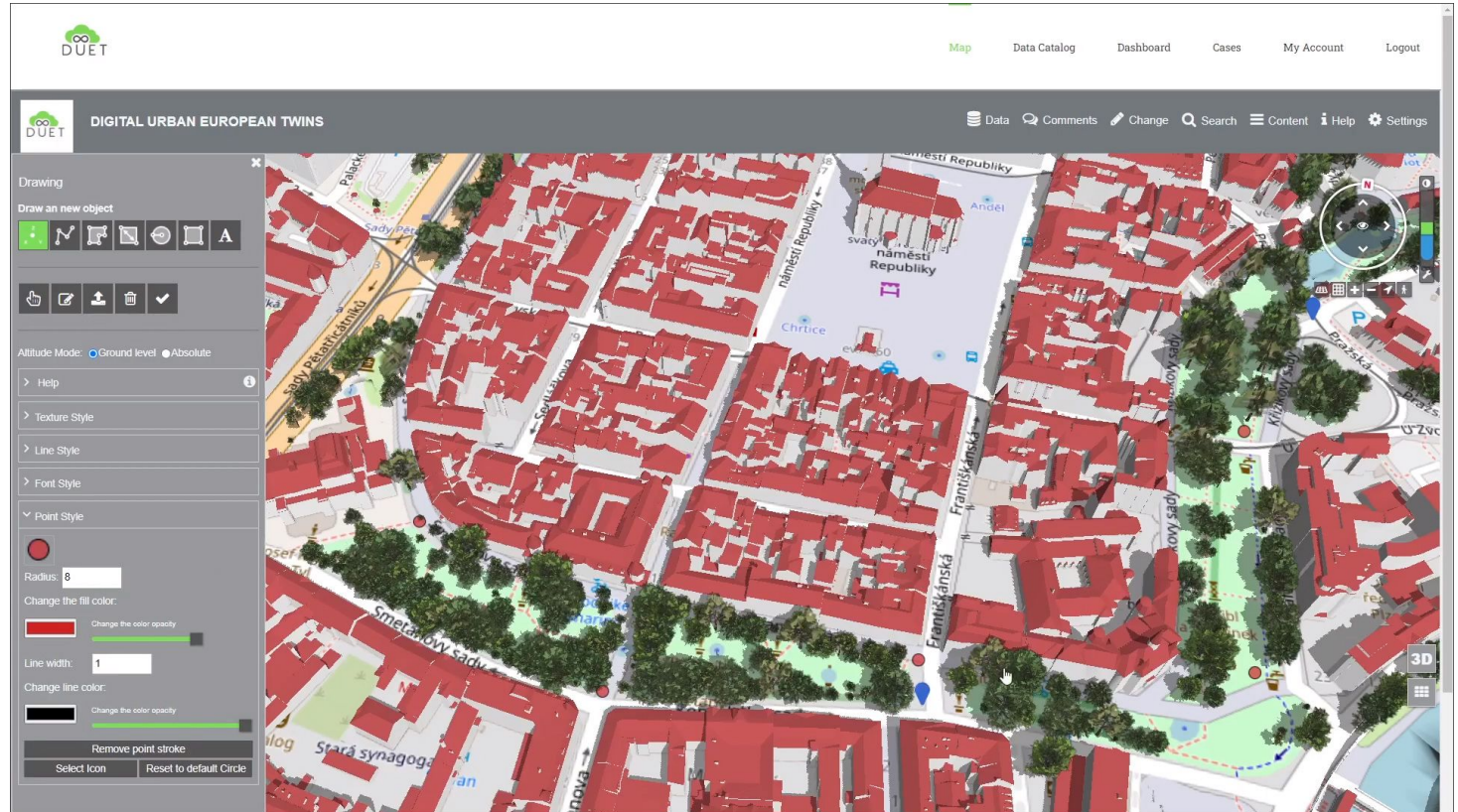


19 - Pilsen (CZ) - Digital Twin, Ring road construction impact

20 - Pilsen (CZ) - Digital Twin, Solar equipment locations
in the city park

20.1A 3D Solar impact map

- base map with equipment locations



20.1B 3D Solar impact map - simulation result

