Deliverable

D2.3 Final list of user requirements for the DUET solution

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1.0	20.07.2020	Jurgen Silence	AIV	Final version

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1. Executive Summary

With D2.3 we further refine the user requirements in an agile way. Based on the outcome of the "Policy value network analysis" and the user stories of "Scenario specifications of the DUET solution" of respectively D2.1 and D2.2.

User stories were selected and bundled into larger scoped epics for each of the DUET pilots. During a following prioritisation step, epics were objectively scored. Overlaps were detected and technical restrictions were taken into account resulting in 6 general high priority epics.

A dynamic mind map was developed in order to further sharpen and prioritize the withheld epics from the policy making perspective and to assess new or updated epics in the future.

For each pilot, meetings with local experts and stakeholders (based on guidelines provided in this deliverable) will further translate the epics to more detailed user requirements. Together with a selection of well thought-out wireframe/mockup examples, they will serve as a starting point for the first operational version of the DUET.

In brief, D2.3 can be seen as the recipe for the development of the alpha version of the DUET.

As next steps we see the development of a set of master mockups, their presentation to a selection of end users for feedback and the integration of the various digital twin components into the DUET solution.

2. Introduction

This deliverable presents the next step in the refinement of the **user perspective** on DUET and builds on the work in D2.1 "Policy value network analysis" and D2.2 "Scenario specifications of the DUET solution".

D2.3 focuses on the methodology and selection of user requirement definitions to be used further on in the project in an iterative approach. The outcome of this analysis is applied to the material gathered so far as an example.

The fine-tuning exercise on user requirements made in D2.3 will directly feed WP4 (T4.3) and WP6 (T6.1) towards the further visual development of the solution and the scoping of the pilots.

Section 3 of this document describes the epic selection process methodology and the outcomes in the three pilot cities and regions. It also comprises a mind map overviewing the different elements of an overarching Digital Twin.
The user requirement section describes the methodology to get a more co-creative insight into Digital Twin user requirements and includes examples from the three pilots.
This report ends with preliminary conclusions and next steps.

DUET follows an agile approach, where user requirements will change and be detailed during the DUET development cycles. This document describes mainly the methodology documented by examples from the pilots.

3. Epic selection

3.1. Epic selection procedure

DUET fully embraces the **agile methodology** and as such the requirements for the system will be gathered and translated into **user stories**. To manage the complexity and uncertainties of a project the size of DUET, teams typically start creating coarser grained, larger stories called **epics**.

The set of epics described help understand the system that is discussed by grouping functionality in what are basically user stories with a larger scope.

To kickstart the development activities in DUET in scope with the user needs, a selection needed to be made of **epics** to pursue in the first instance. The selection is based on a number of criteria and discussion among the pilots and were introduced at the end of D2.2. The criteria that were considered are:

- Availability of the required data, or clear time horizon for availability of certain sets
- Potential legal hurdles
- Support from local policy makers / decision makers (high-level officials)
- Technical complexity and feasibility
- Alignment with the project ambitions (assess the similarities and differences between the cases)

Each user story included in D2.2 was scored for each of the criteria above on a scale from 1 to 5. In agreement with the pilot sites, weights were attributed to the criteria. The availability of data and local support were deemed to be most important in selecting user stories as these are necessary conditions for a solution to be successful. Legal issues and technical feasibility were second and alignment with the project ambitions was weighed lowest, as each user story already aligns with these ambitions to some extent.

Description	Factor
1. Availability of required data or a clear time horizon for the availability of certain datasets	3
2. Potential legal hurdles	1.5
3. Support from local policymakers / decision-makers (high-level officials)	3
4. Technical complexity and feasibility	1.5
5. Alignment with the project ambitions (assess the similarities and differences between the cases)	1
TOTAL	10

Table 1: Weight factors used for scoring user stories

3.2. Example of a score sheet :

User story 1	
As a public servant of the mobility department and spatial planning department, I want to have insights into the mobility flows and on how changes in the traffic flow influence mobility. (Mobility epic 1)	
Criteria	**Score**
1. Availability of required data or a clear time horizon for the availability of certain datasets	3
2. Potential legal hurdles	3
3. Support from local policymakers / decision-makers (high-level officials)	5
4. Technical complexity and feasibility	4
5. Alignment with the project ambitions (assess the similarities and differences between the cases)	5
Argumentation	
Traffic data is partially available from counting loops and citizen science sensors. ANPR data has some legal hurdles, and also data from traffic lights is difficult to get. The legal obstacles are mainly related to ANPR data. The overall support of policymakers is high because this use case is always top-ranked in every Smart City and mobility questionnaire. The city flows project in Antwerp already shows the concept is feasible. The alignment with the mobility ambition of the Digital Twin Use Case is prominent.	
Overall evaluation	
Maximum ambition level (Production ready (PR), Viable product (VP), Proof of concept (POC))	**VP**
Criteria score	**39.50**

3.3. Results

The following gives an overview of the highest ranked **epics** for each pilot site.

3.3.1. Pilsen

Four epics were selected as a priority for implementation.

Theme	Epic	Score	Ambition

Urban Planning	As a city urban planning expert, I want to connect existing data resources of the city to the digital twin and make sure they are up-to-date, interoperable, and include all available attributes, with the goal to make my daily work more efficient thanks to working with different data sources in a single environment, especially by
	1. including attributes for all buildings and objects (as we do not want to build another Google maps)
	   a. having the 'object composition' (objektovou skladbu) and attributes of the 3D buildings
	2. including not only data on buildings but also other data on public space (and public infrastructure) such as
	   a. surfaces (plochy), bridges, walls and earth banks, public green (veřejná zeleň)
	   b. e.g. include data layer with trees containing attributes such as tree type, height, diameter of trunk, diameter of treetop
	3. including the 'z' dimension for all objects and surfaces (e.g. streets/pavements etc.) which is an attribute currently not supported by the GIS solution of the city (Marushka), and allowing its import to ESRI ArcGIS used by the Urban Planning Unit (UKR)
	4. styling objects based on available attributes,
	5. making the digital twin data compatible[1] with ESRI GIS Environment, i.e. ArcGIS Desktop, ArcGIS Pro, ArcGIS Online, and also with AutoCAD and Google Sketchup,
	6. allowing import/export of the 3D data (i) from investors and (ii) 3D data created by UKR
	7. and to make the points above possible, by setting up data management processes in the city that will define ownership and data update responsibilities.
		42.50	PR

Health & Environment	As an urban planner, I want to understand trends in the historical noise levels (at various spatiotemporal resolutions) and predict/model future scenarios, with the goal to take measures to reduce noise levels (such as sound walls, rerouting traffic, green space, physical interventions, noise absorption materials).	41.00	PR

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[1] - viewing/browsing; importing; editing; exporting data from/into 3D model

Public Engagement & Co-creation through Open Data	As a city 3D expert, I want to create high-res 3D models of selected public buildings or areas (e.g. the cathedral or football stadium) with the goal to stimulate the further use of the 3D data (both commercial and non-commercial) by the data enthusiasts, students and professionals.	41.00	PR
Urban Planning	As a city urban planning expert, I need to work with the 3D representation of the city (which for my work is sufficient in a lower level of texture detail), with the goal to achieve a higher quality of the public space, by using tools that allow to better simulate, plan in scenarios (e.g. related to the urban planning,), and regulate the future development of the city.	40.50	PR

Table 2: epics selected for implementation - City of Pilsen

3.3.2. Athens

Three epics were selected as a priority for implementation.

Theme	Epic	Score	Ambition
Pollution reduction and environment	As a city official, I would like the city to achieve an environmental change, green spaces to be increased and promoted such as the National Garden of Athens and finally alternative ways of transport/mobility to connect the green spaces/areas.	44.00	VP
Pollution reduction and environment	As a city employee, I will suggest green routes within the city in order to decrease the pollution level. Moreover, I will raise awareness through diverse environmental initiatives in order to incorporate new behavioural attitudes in our everyday life.	44.00	VP
Pollution reduction and environment	As a citizen I would like to assist the city in promoting green routing within the city and to contribute to improvement of my city's environment. Finally, I would actively take part in initiatives that focus on my city, to express my opinion and to contribute to a greener Athens.	44.00	VP

Table 3: epics selected for implementation - City of Athens

3.3.3. Flanders

Six epics were selected as a priority for implementation.

Theme	Epic	Score	Ambition
Mobility	As a public servant of the mobility department, spatial planning department and environmental department, I want to know the impact of road closures, road redirections in the city and more specifically in neighbourhoods.	42.50	VP
Spatial planning	As a citizen, I want to know the impact of new city developments, and I want to participate and co-create to mitigate the impact.	41.00	VP
Mobility	As a public servant of the mobility department and spatial planning department, I want to have insights into the mobility flows and on how changes in the traffic flow influence mobility.	39.50	VP
Health and environment	As a public servant of the mobility and environmental protection department, I want to know the level and impact of air and noise pollution, the reasons and the impact on citizens well-being in the city. (Health and environment epic 1)	38.00	VP
Mobility	As a citizen, I want to have an idea about the mobility flows in my city and neighbourhood. (Mobility epic 1)	38.00	VP
Health and environment	As a citizen, I want to know the level and impact of air and noise pollution, the reasons and the impact. (Health and environment epic 1)	36.50	VP

Table 4: epics selected for implementation - Flanders region

3.4. Selection for the first DUET development

For DUET, we started creating a **mind map** with the different dimensions the DUET system can help in policy making. This mind map will be edited and used throughout the project in order to define the next set of user stories to be tackled by development.

Each set of user stories will be detailed further and together with **mockups**, **technical requirements** and **information related to datasets and sensors** to be used form the requirements from the users towards the development team.
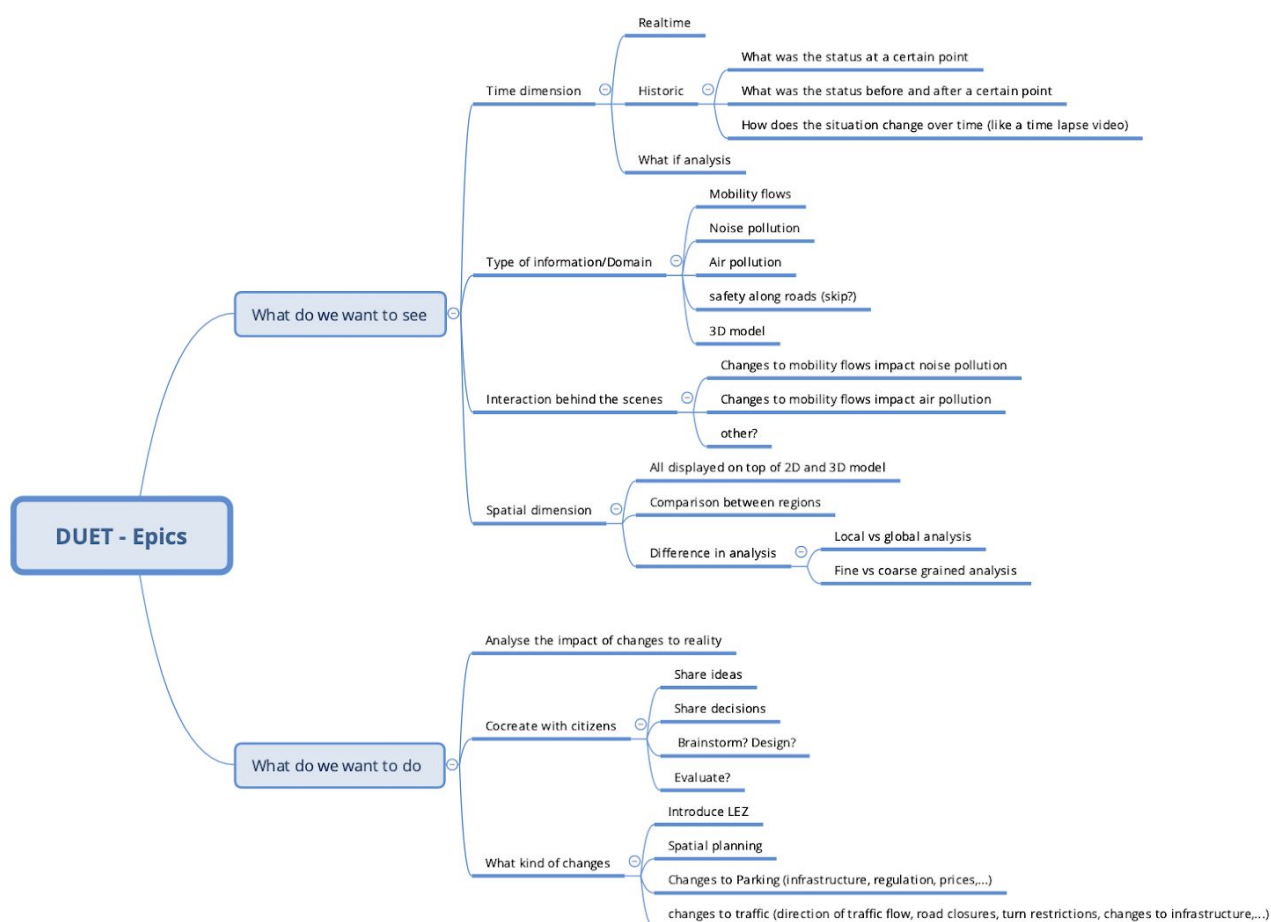
Figure 1: Snapshot of Epics mindmap

3.4.1. First selection

The work of refining the user stories will continue during the next months of DUET, based on the methodology outlined above. In order to kickstart the development, the basic epics below will be developed first.

Theme	Epic
Basis infrastructure - View current state	As a user of the digital twin, I can browse the **3D model of the area of interest** so I can get a detailed look at the surrounding of areas I want to inspect
Basis infrastructure - View current state	As a user, I can browse the **2D road network** on top of the 3D model so I can see where the roads are and can get extra attributes by clicking on a road
Basis infrastructure - View current state	As a user, I can see the **real time information** being sent out by **sensors** on top of the 3D model, so I get an accurate indication of the current local status
Traffic model	As a user, I see the **prediction of traffic flows** (e.g. the KUL, P4All model) as calculated in the traffic model of the area, so I can correlate predicted traffic flows with the current traffic flows.
Traffic model	As a user, I see the **measurements done by the sensors interpolated** (by a model that fuses information coming from different sensors from different sensor types) so I can get an approximation of the **density of people** also in places there are no sensors
Air quality model	As a user, I see the **real time air quality model** as calculated (by a model that fuses information coming from different sensors from different sensor types) so I can get an approximation of the **air quality** in places there are no sensors

Table 5: Basic epics for the DUET Digital Twin development

4. User requirement development

This section outlines the methodology to be used when defining user requirements in an iterative way throughout the project lifetime of DUET.

4.1. Methodology

To guide the pilot sites in translating their user stories to requirements a basic methodology in the form of an interview guide was created. This approach can be used repeatedly throughout the course of DUET as a way to translate a high-level idea into more workable requirements for the technical teams.

Each pilot organises meetings to discuss the epics with local experts and develop them further into **user requirements**. During the meetings, basic **mockups** of what the final solution should look like and its basic functionalities were developed. The local experts can also contribute additional questions that support the development of more detailed user requirements. Basic questions to guide these interviews or sessions are provided below, as well as some basic templates to support making a simple mockup that can be used to facilitate the conversation.

4.1.1. Approach to the session/interview

Goal	The goal is to translate the user stories into more specific requirements and come up with some <u>basic</u> ideas of what the solution should look like and do.
Target audience	Local experts related to the user stories. Try to include experts with different backgrounds, either from within or outside your organisation.
Outcomes	A set of user requirements per user story and a very basic visualisation or mockup of what the solution should look like.
Method	- Briefly explain the user story to the participants. - Go over the basic questions provided below and discuss them with the participants. - Based on those questions, collaboratively or individually make a basic mockup (e.g. in Powerpoint, drawn and photographed, collaborative online whiteboard like in Zoom, Teams, Miro···) - Discuss these mockups and use the answers to the basic questions to formulate user requirements pertaining to the solution. - Time permitting, use the extra questions listed below to further detail the user requirements. - Either record the session or note down some telling quotes from the participants, influencing certain design decisions. Always approve quotes with participants.
Tools	- A Powerpoint file can be used to create basic visualisations to discuss during the meetings (see annex 1 and the illustrations below). - The topic guide and questions in the next section.

Table 6: Interview guideline table

4.1.2. Interview guide

As a first step, the goal is to consider the perspective of the end user of the solution. The following general statements guide this consideration: for each of them consider whether it is a required functionality, given the user story. If so, describe what is needed to make this possible.

4.1.2.1. Basic questions from the user perspective

- Who is the end user of the solution in this case?
- I want to import data into the system from different sources. Y/N - How? Why?
- I want to do my own analyses by exporting data from the system. Y/N - How? Why?
- I want to use pre-defined analytical tools within the system. Y/N - How? Why?
- I want to visualise evolution over time. Y/N - How? Why?
- I want to visualise at street/city/region/country level. Which? Why?
- I want to be able to compare results to other cities. Y/N - How? Why?
- I want data to be visualised in (near) real time. Y/N - How? Why?
- I want to open the data to other actors from within the system. Y/N - How? Why?
- I also want to be able to··· because···
- I want to perform what-if analysis Y/N. Why?
- I want to do local analysis in a small area or for my complete region?

4.1.2.2. Detailed questions

Time permitting, these additional questions can be used to guide the discussion and further detail the user requirements.

There are three types of topics that could be detailed further, which are listed here as inspiration:

1. **Organisation** (e.g. who in the organisation needs to work with the solution?)
2. **Technology** (e.g. which standard should be used to exchange data with existing systems?)
3. **Process** (e.g. which existing processes for data exchange need to change?)

Organisation

- Which specific profile(s) in the organisation will need to work with the solution?
- Who is responsible for inputting/updating data and will this change after implementing the solution? Why?
- Who is responsible for managing data and will this change after implementing the solution? Why?
- For which department(s) in the organisation do they work?
- Which third parties are involved and how do they interface with the solution?
- What organisational strategies (development plans, national directives etc.) will this solution need to support?
- What are the future initiatives which are confirmed / expected that this solution might need to support?

Technology

- Which existing applications does the solution need to interface with? Why?
- Describe how and which data should be ingested by the solution. Why?
- Describe how and which data should be managed by the solution. Why?
- Describe how and which data should be stored by the solution. Why?
- Describe how and which data should be published by the solution. Why?
- Describe how data are discovered by end users. Why?
- Describe how data are consumed by end users. Why?
- Are APIs available to facilitate all of this or do they need to be developed?
- Are datasets currently available to provide a solution or will they become available in the foreseeable future?
- Are models currently available to provide a solution or will they become available in the foreseeable future?

Process

- Which level of detail/granularity is required by the solution and how does it differ from the current situation?
- Are there policy goals which this solution should provide input for? What are concrete KPIs to measure success of the solution?
- Should this solution be public facing? If so why? What kind of engagement should it create? Why?
- I want to co-create solutions with the citizens Y/N Why? How? Share ideas, Share decisions, Brainstorm? Design?, Evaluate?, others?
- What internal processes might reference the solution? Why?

4.1.3. Basic wireframes as a discussion tool

This **presentation file** is intended to support the process of better understanding the needs of users and informing the user stories for technical development. The sketching / mockup tools included are not intended to provide specifications for development, but rather to aid and encourage users to express specific needs that they have from a system or tool.

This is a conversational aid, and will create a research artefact, a boundary object, which should enhance the insight gained and inform the creation of valid user stories for application development.

Guidelines for use:

- Conducting the user interview as planned, introduce the tools only when necessary as part of a given line of questioning.
- Assure the respondent that sketches created here are not by way of specification documents, rather just a way for them to illustrate what it is they aspire to see in a tool.
- Do not focus on feasibility, or restrict the user to "the realm of the possible".
- Encourage the user to add / invent new components (outside of the provided library) if needed.
- Insist that the user either explain verbally, or label (using comment notes in Powerpoint) the elements they choose to use, with the emphasis being on **why** they are making those decisions in their work.
- It is entirely likely that more slides might be needed in order to express all possibilities, in this event, duplicate slide 2 to provide more blank templates.

The basic template is provided in annex to this deliverable and some screenshots are provided here.
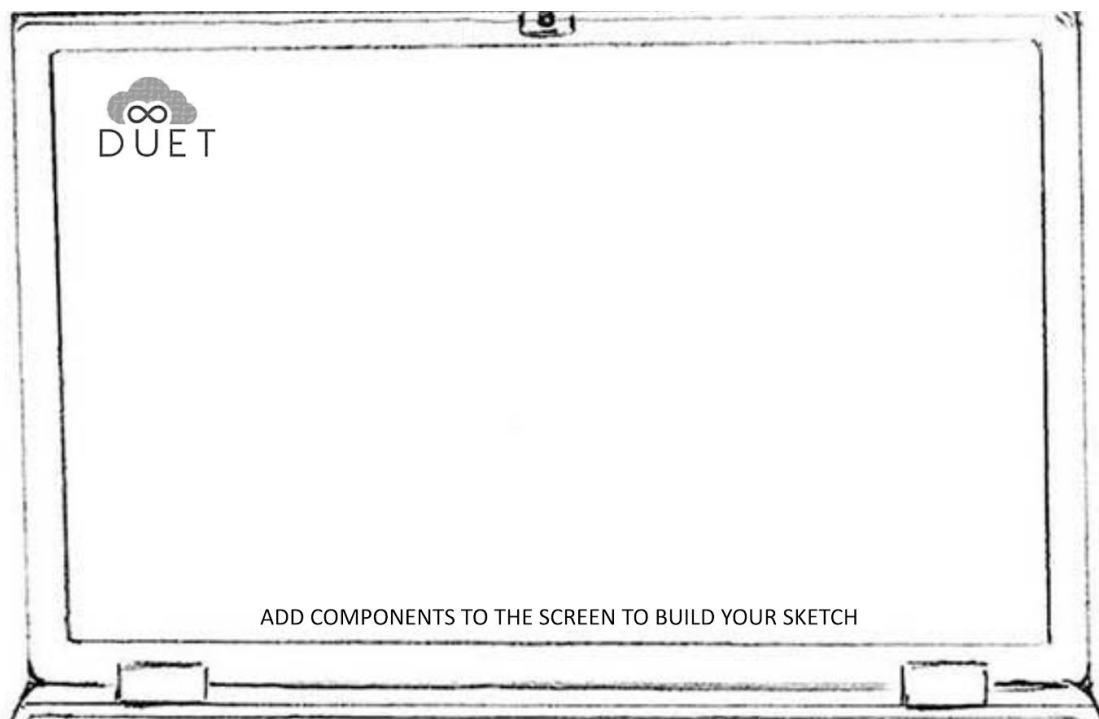
Figure 2: Example 1 of the DUET wireframe tool

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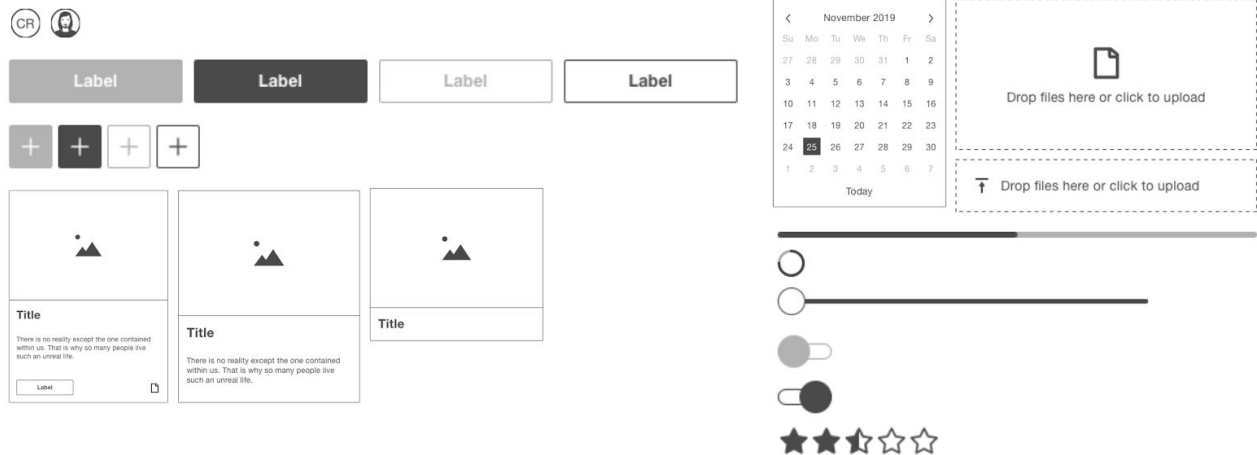
Figure 3: Example 2 of the DUET wireframe tool

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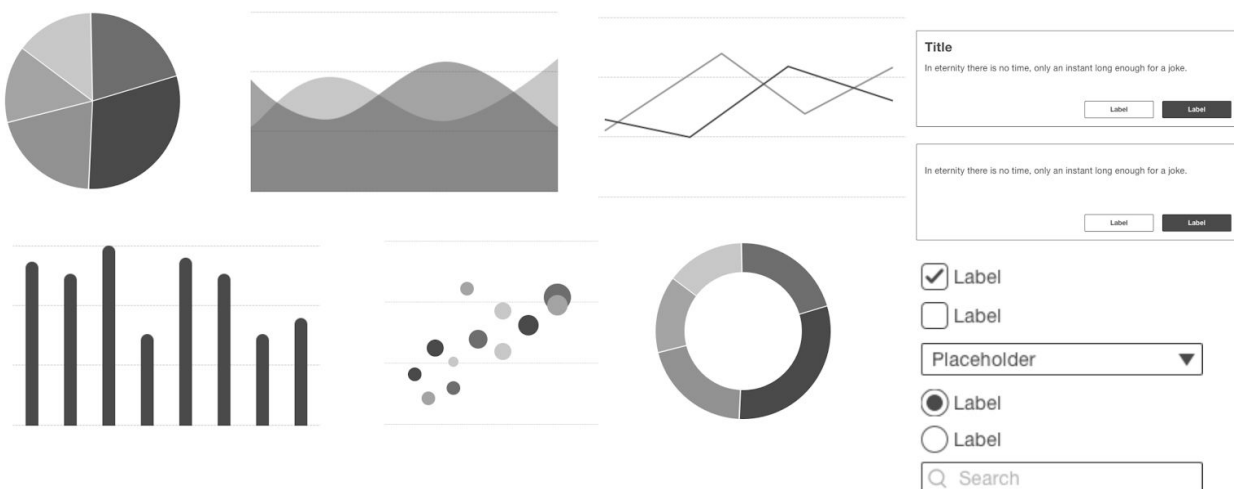
Figure 4: Example 3 of the DUET wireframe tool

4.2. Examples from the pilots

The withheld epics and the following user requirement analysis are included in the development of 3D-maps and will be used as a starting point to develop the dashboards in more detail.

In this section, the result of this exercise is reflected for each pilot region in more detail.

4.2.1. Pilsen

Following the methodology above, epics and user stories have been discussed with involved Pilsen users (policy makers, city managers, civil servants) during several meetings. The user stories have been further detailed and the first set of user requirements was captured.
The following meetings were held in June 2020:

Date	Audience
9 June	Meeting with Mr. Vlastimil Gola, the City Councillor for Smart City and Business Support)
10 June	Meeting with urban planning experts from the Urban Planning Unit
11 June	Meeting with Mr. Michal Vozobule, the Deputy Mayor and City Councillor for Mobility and Environment
30 June:	Workshop with the Mayor of Pilsen (Martin Baxa), the Councillor Vlastimil Gola nad approx. 30 entrepreneurs representing innovative businesses in Pilsen

Table 7: stakeholder meetings in Pilsen

A clear support and interest in the DUET Pilsen epics and user stories has been expressed by the city policy makers during these meetings. The following elements have been highlighted as of special interest:

- Detailed **3D model** for the **urban planning** purposes. Seamless compatibility with the currently used ESRI, Autocad and Sketchup softwares needs to be maintained. Data exports and imports for external subjects shall be implemented in the DUET system. Additional data layers (such as public green, traffic signs and public surface) shall be integrated in the 3D model.
- **Air quality and noise** measuring and modelling: the city is ready to install and test sensors to measure air quality (and noise levels).
- **Mobility-related data collection and visualizations** (traffic intensity, shared bikes, collecting other data on sustainable transport mode) + **traffic modelling**.
- **Data ownership responsibilities** within the city, together with the responsibility for its accuracy, need to be clearly defined.

As a result, multiple elements and currently used solutions that shall be integrated in the Pilsen have been defined. The screenshot of these are provided below.

Figure 5: Urban planning - Visualisation of planned major constructions in the 3D model of Pilsen (outdated 3D data from 2009 will be replaced by new data later this years, as an outcome of the public procurement) (ArcGIS by ESRI software)
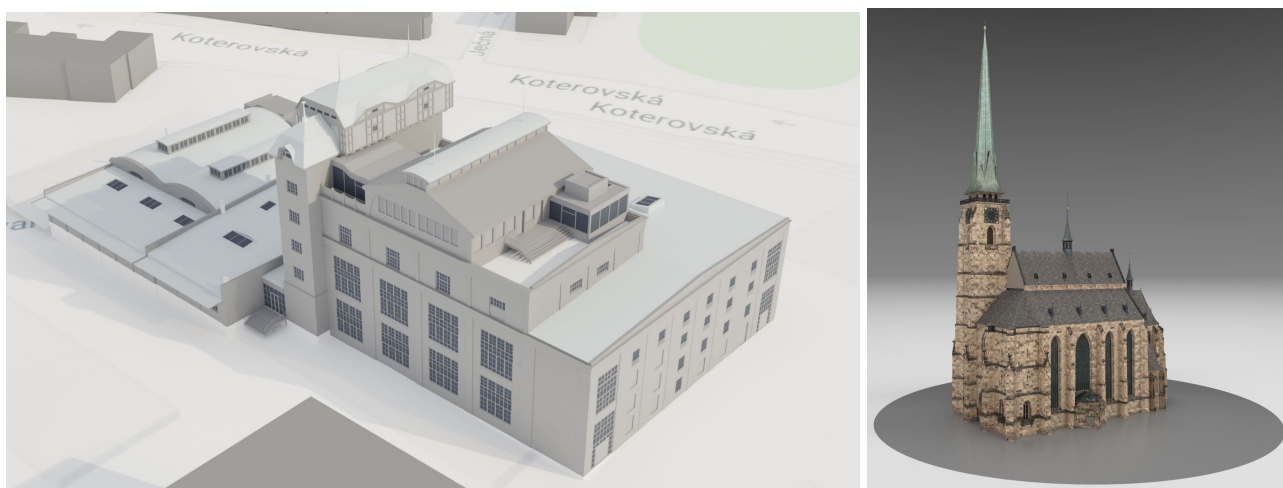

Figure 6: High-resolution 3D models of selected buildings (left: Tech Tower Světovar, right: St. Bartholomew's cathedral)
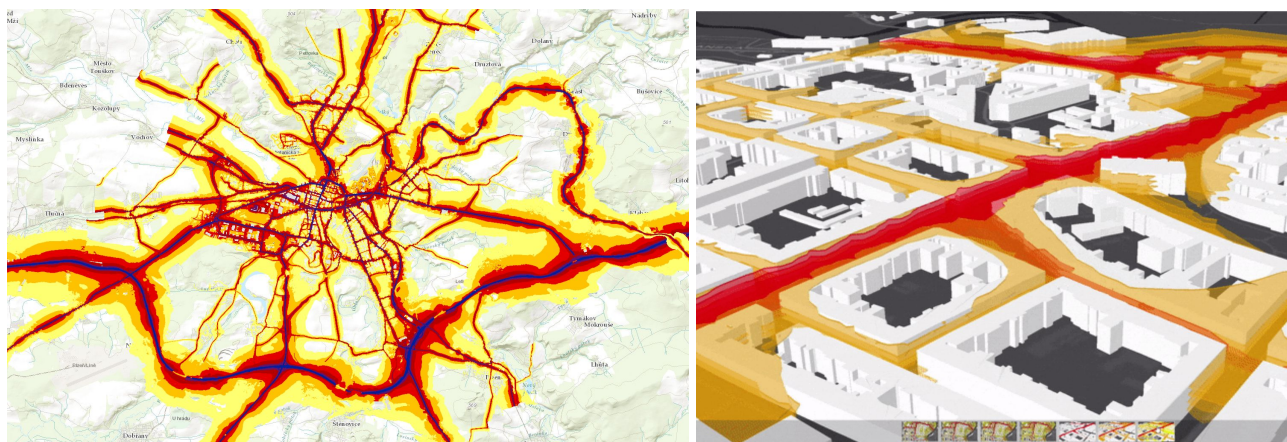
Figure 7: Noise maps - Left: noise map published by the Ministry of Health. - Right: sample noise model of Pilsen developed by Plan4All)
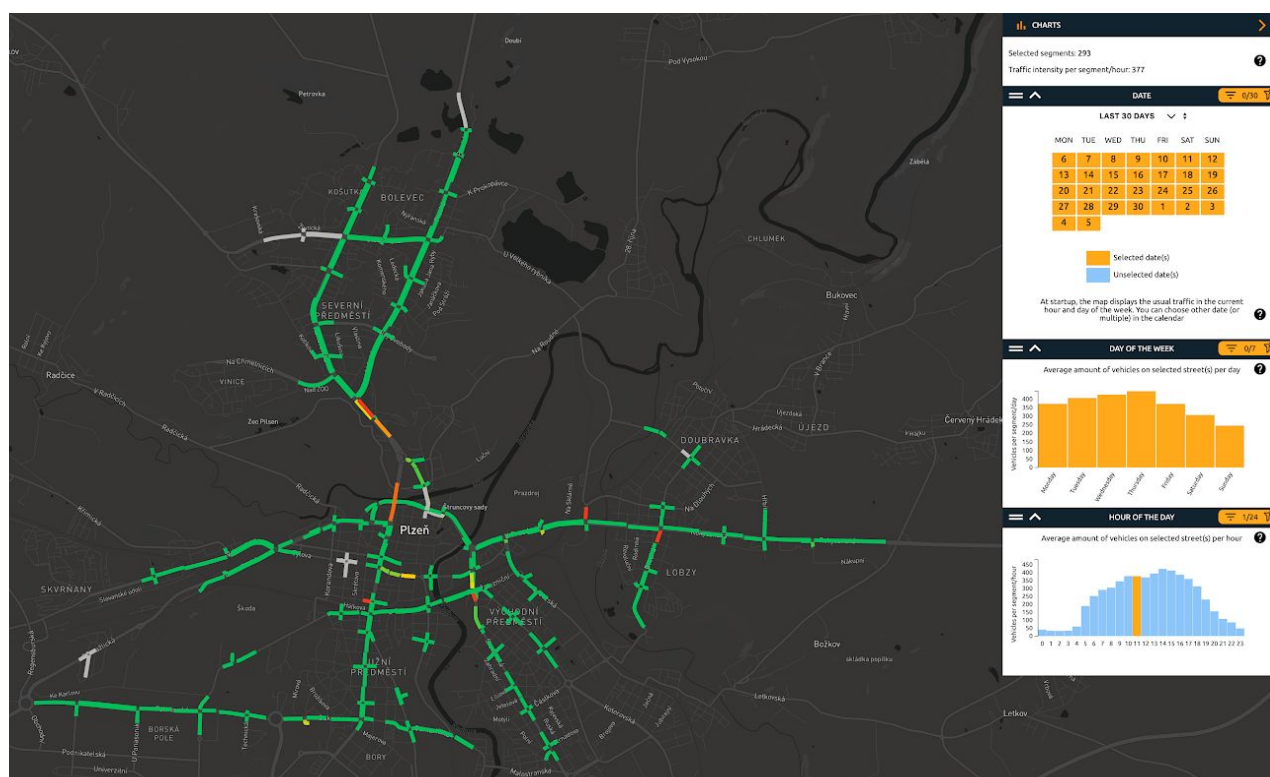
Figure 8: Traffic & Mobility - Pilsen traffic intensity data from detectors (map visualisation developed by InnoConnect in the H2020 PoliVisu project)
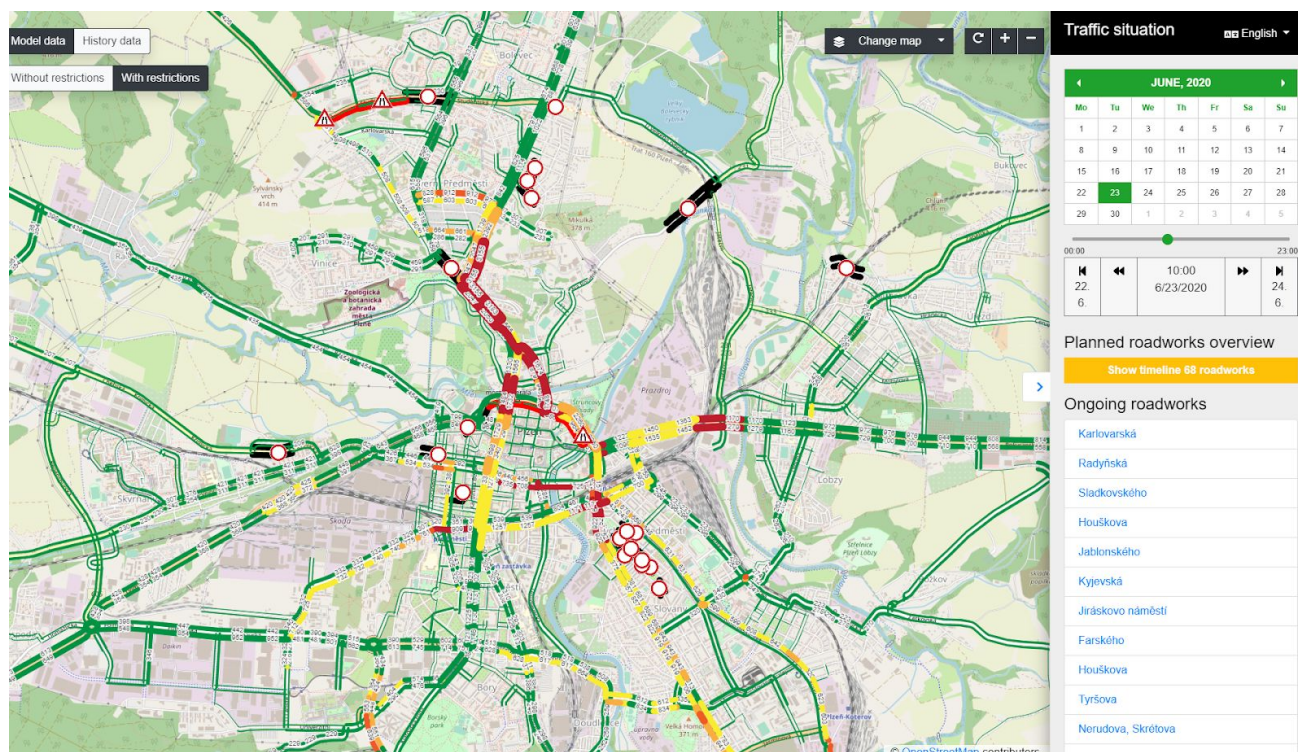
Figure 9: Traffic modeller (developed by Plan4All in the H2020 PoliVisu project)
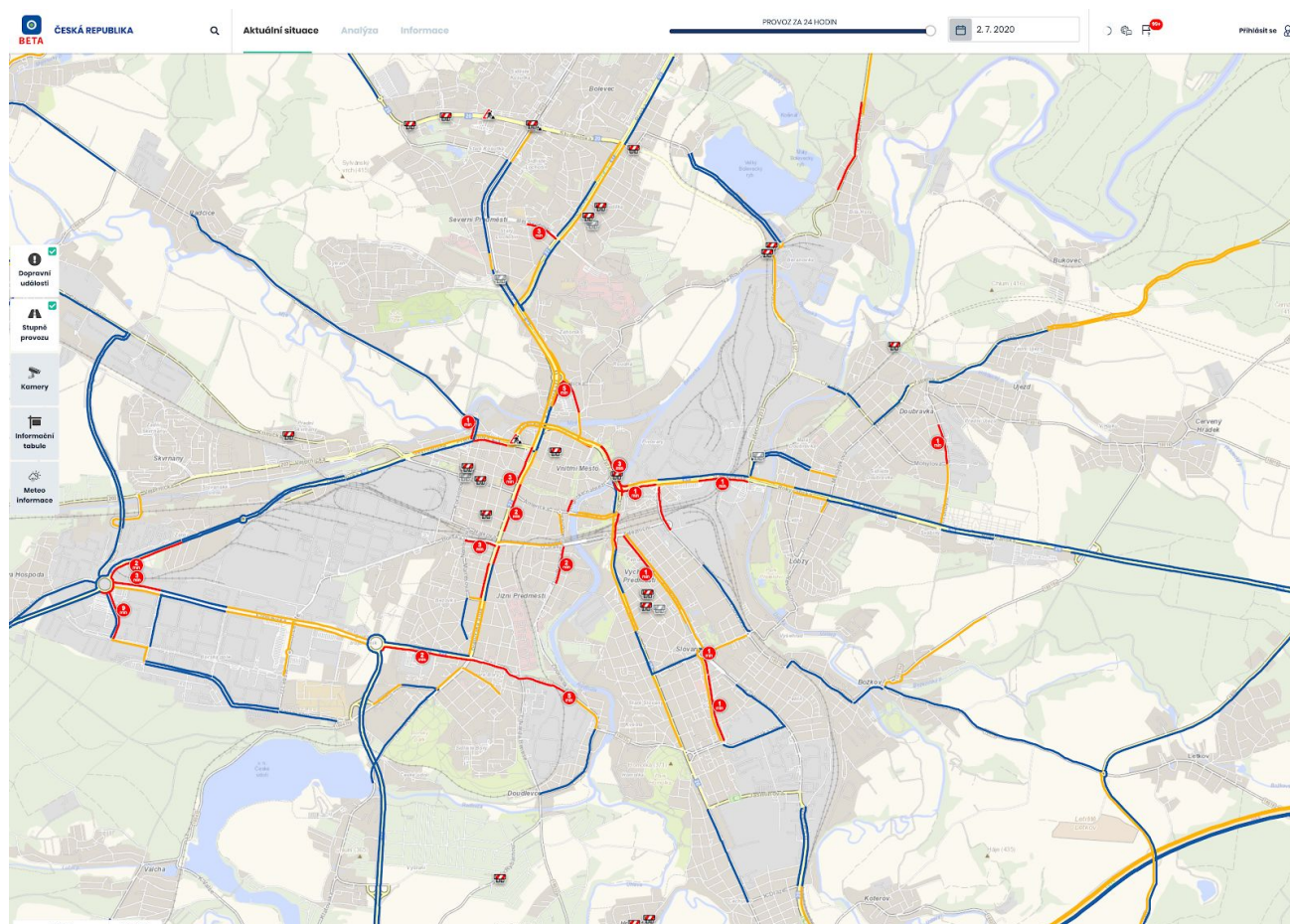
Figure 10: Floating car data (source data shall become available soon from Directorate of Roads and Highways of the Czech Rep., currently only available here).

Key functionalities for a Pilsen Digital City Twin

The following key functionality has been identified that shall be included in the Pilsen Digital Twin. Please refer to epics provided in the section 3.3.1 Pilsen above to understand the intended use of these functionalities. The purpose of the following list is to provide overview of functionalities that should be included in the UI mockups:

- data layers and map views:
  - 2D map
  - 3D map
  - satellite imagery
  - noise levels
  - air quality
  - traffic (intensity, speed of the traffic flow)
  - high-resolution 3D models of selected buildings
  - additional map layers maintained by the City (GIS), Pilsen Region (Digital Technical Map) or national registries (cadastre)
- time dimension of data map views
  - historical
  - real-time
  - future (modelled)
- import and export of the 3D data by users

4.2.2. Athens

Epics and scope

One of the prioritized axes of the Municipality of Athens strategic plan is the digital transformation by introducing a more effective and technologically advanced policy-making and developing new services. Moreover, the enhancement of citizens participation in policy making is also highlighted - promoting a more democratic city by the inclusion of citizens in the decision-making processes. These main objectives of the strategic plan of Athens correspond to the DUET project scope. Through the development and execution of pilots, the Digital Twin technology will be tested in a large metropolitan city in order to improve understanding of city pollution causes and to predict its impact.

During the first phase all the potential user stories in diverse fields, relevant to the city of Athens action plan, have been examined and the most feasible to be developed and implemented are those under the epic of **pollution reduction and environment** and under the epic of city planning at a later stage. These epics were presented and justified in previous deliverables.

Methodology and current actions

For the development of the first epic and its user stories the process followed by DAEM is described below:

- Identification of stakeholders in the internal and external ecosystem of the Municipality of Athens
- Enlistment of available datasets within the city and datasets available by other organizations
- Organization of face to face meetings with groups of stakeholders and citizens communities, as well as other online and offline engagement actions
- Processing of feedback received

A meeting with the Head of Resilience and Sustainability Department and employees was held, presenting the project's objectives and Athens pilot idea and planning. During the meeting, it was discussed the implementation of the pollution reduction pilot case by adopting green activities, namely increasing green spaces and green routes, pedestrians' routes, alternative ways of transport etc. Along with the available data on air quality and green spaces and trees of the city, a plan of pilot execution will be designed in order to decrease the pollution level and the city and citizens to adopt a greener consciousness.

The initial feedback of this discussion is the confirmation of the need for a greener and healthier city and the enhancement of citizens participation in municipal initiatives. The impact will be the continuous contribution to a greener Athens and the incorporation of new behavioural attitudes improving the quality of everyday life. Also, the discussion referred to other potential stakeholders within the city for the DUET pilot, availability of data sets on environmental indexes, feedback on the potential mockup and UI (User Interface) of the Athens Digital Twin etc. Finally, the city administration proposed the active engagement of citizens not only in the form of public feedback but also as data contributors since citizens can be "sensors" of data collection that move in real-time within the city.

The overall approach of stakeholders follows the methodology for discussion and interviews that is proposed by DUET in the previous section. Additional stakeholders have been already identified and contacted and activities are planned for the next period. Hence, this is an ongoing process for the identification of Athens pilot requirements both on a technical point of view and on the specifications of the epics.

Data

The data sets identified for the implementation of the aforementioned epic are mainly in the fields of air-quality indicators, environmental indexes, green assets of Athens etc. Initially, the technical team of DUET has configured the 2D and 3D model of the city presented in the figures below:
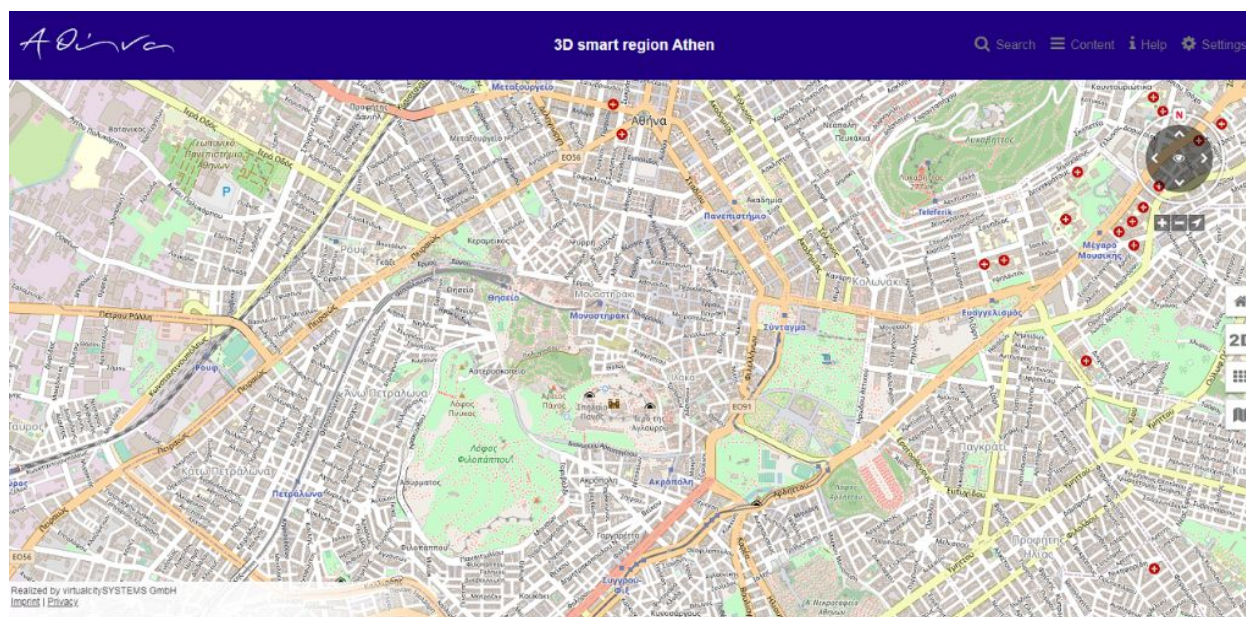
Figure 11: **2D model of Athens**
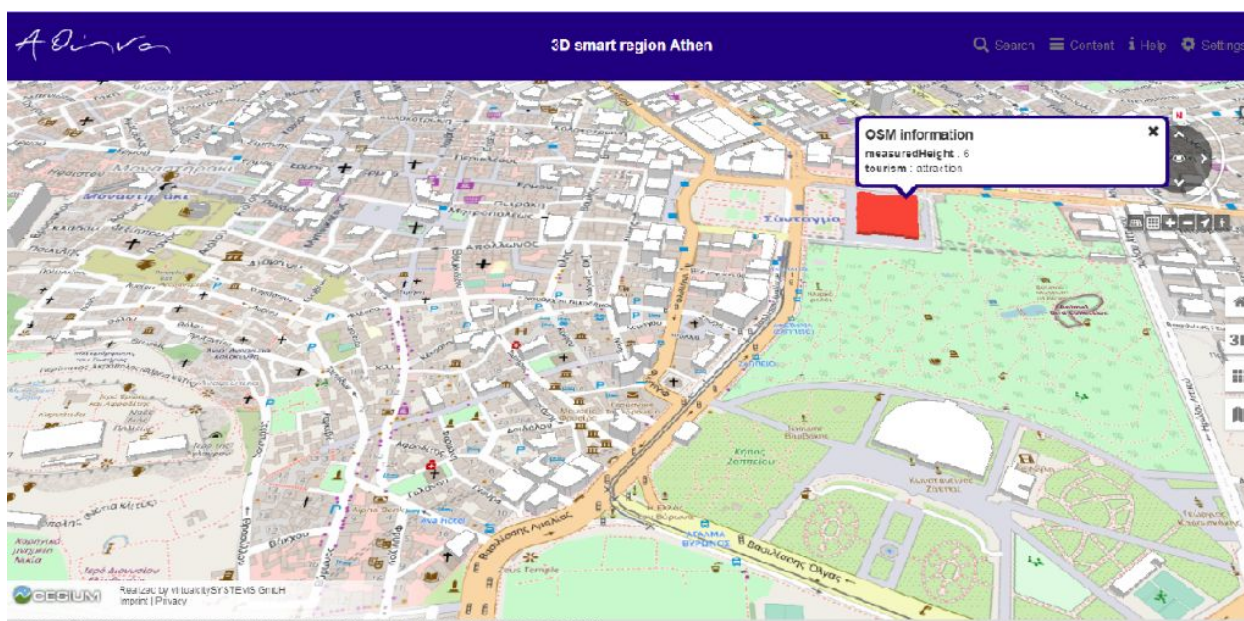
Figure 12: 3D model of Athens
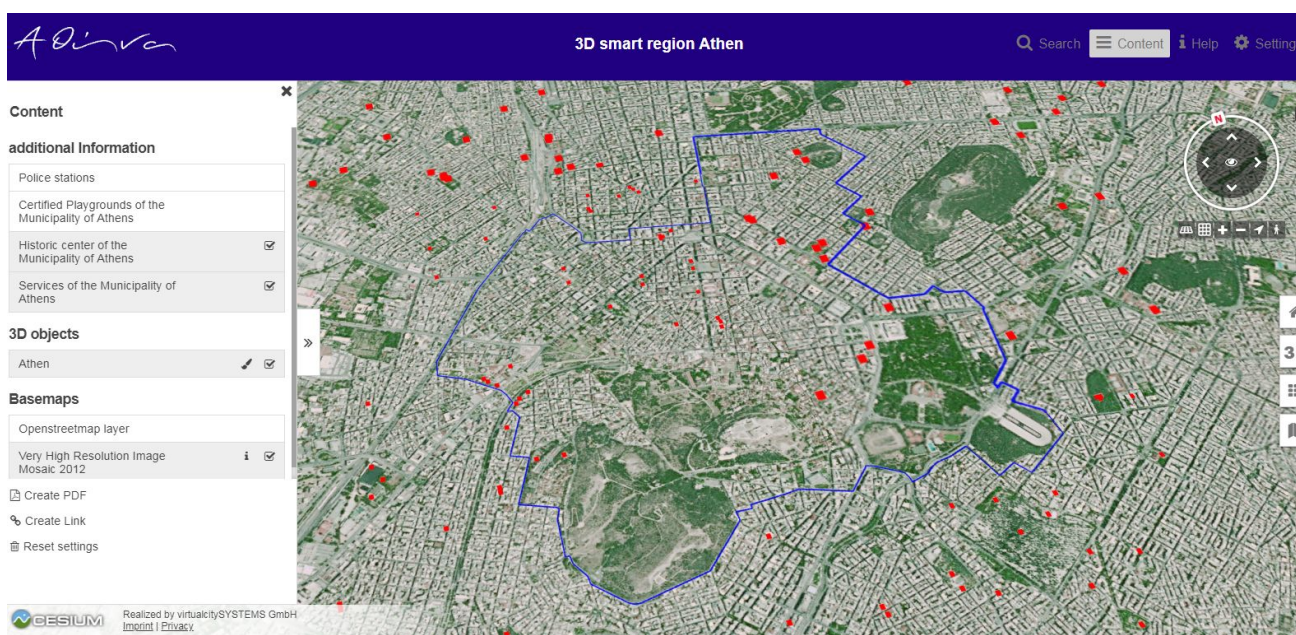
Figure 13: Historic center of Athens and municipal services

The existing configuration has to be further enhanced with terrain and surface data in order to complete the 3D model of Athens. Then, additional sets will be imported from data sources. The available sets that have been mapped fall in the categories:

- Historic and near real-time pollution and air-quality data
- Geospatial datasets from the Municipality of Athens
- Green routes and green spaces, bicycles routes and other urban planning GIS data
- Environmental city data etc.

The aforementioned sets can be sufficient for the implementation of the described epic of **pollution reduction and environment** for the Athens pilot, since the technical feasibility was one of the criteria for the selection. For the execution of additional epics it is foreseen to gather also traffic and other city data that currently are not on availability in open access. The latter is a throwback since in Greece the openness and accessibility of data sources was recently launched. Hence, many organizations and public/private bodies either do not store historic and real-time data or if they perform the collection of datasets the latter are not in open access and availability for research purposes. A potential mitigation action could be the purchase of data for the Athens pilot scope and this is a point of elaboration within the DUET consortium.

4.2.3. Flanders

For the Flanders region, the results of the epic analysis and following meetings with experts led to the establishment of user requirements assessments as described best by following mockups.

The need of a detailed 3D model of the Flanders Region as a basis:

Figure 14: simulation of 3D-map access for the Flanders Region

The need to visualise/map city traffic flows:

Movements of cars, bikes and pedestrians should be monitored by bundling various data streams over time. This gives us a clear view on where and how people move in the city and how these movements variate in time and space.

The image below is a still from a dynamic mockup showing the evolution of the density of pedestrians and cars over a period of 24 hours. The varying density of pedestrians and bikes are visualised by the line thickness and follows the dynamic progression through the timescale in the center of the image.

By analysing/comparing different spots in the city in time, detailed information is obtained about the multimodal mobility flows. This offers valuable information for policy makers at the level of urban planning and organisation.
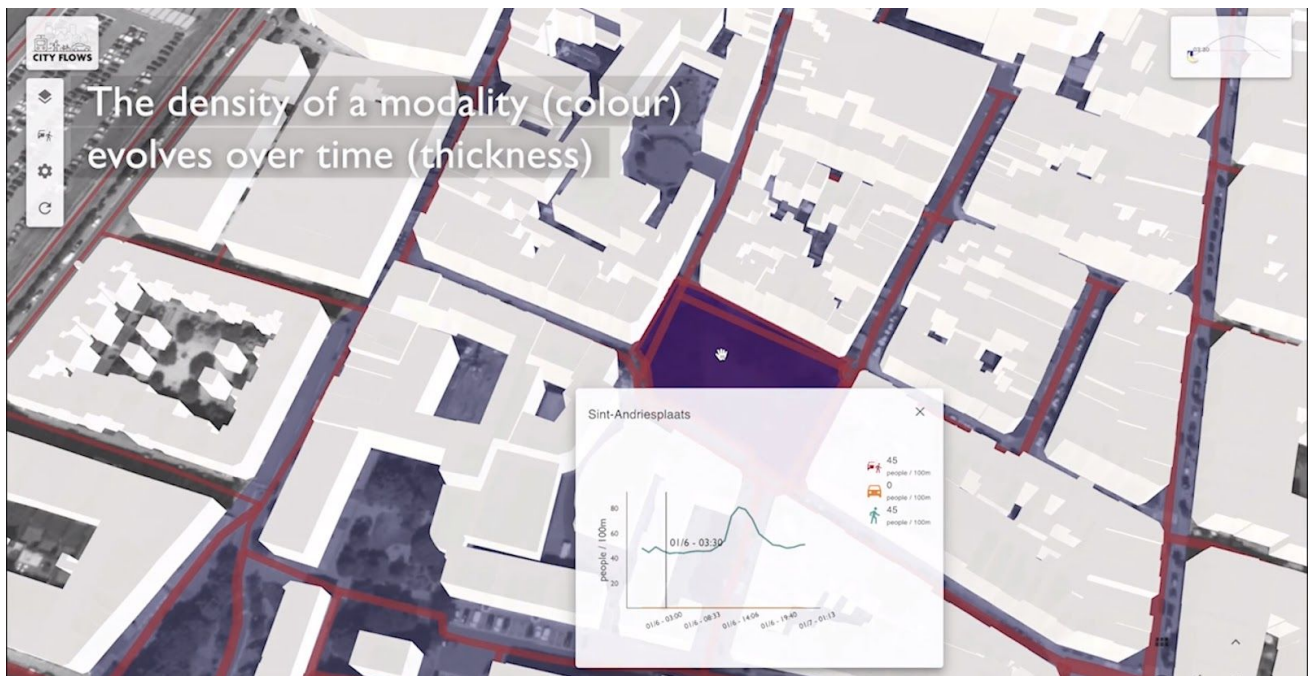
Figure 15: dynamic visualisation of the density of mobility flows in time on a specific spot in the city of Antwerp

Data are obtained by various sources: smart traffic lights, telecom, wifi-scanning, floating car data, statistics, open data, ⋯ Hydrodynamic modelling is applied to the bundled datasets.

The back-office mockup below visualises the various sources of data ingested in the background in the field.

Figure 16: visualisation of the positioning of IoT sensors in the city of Antwerp

Static layer data can be added on top of the available data to get more specific information.
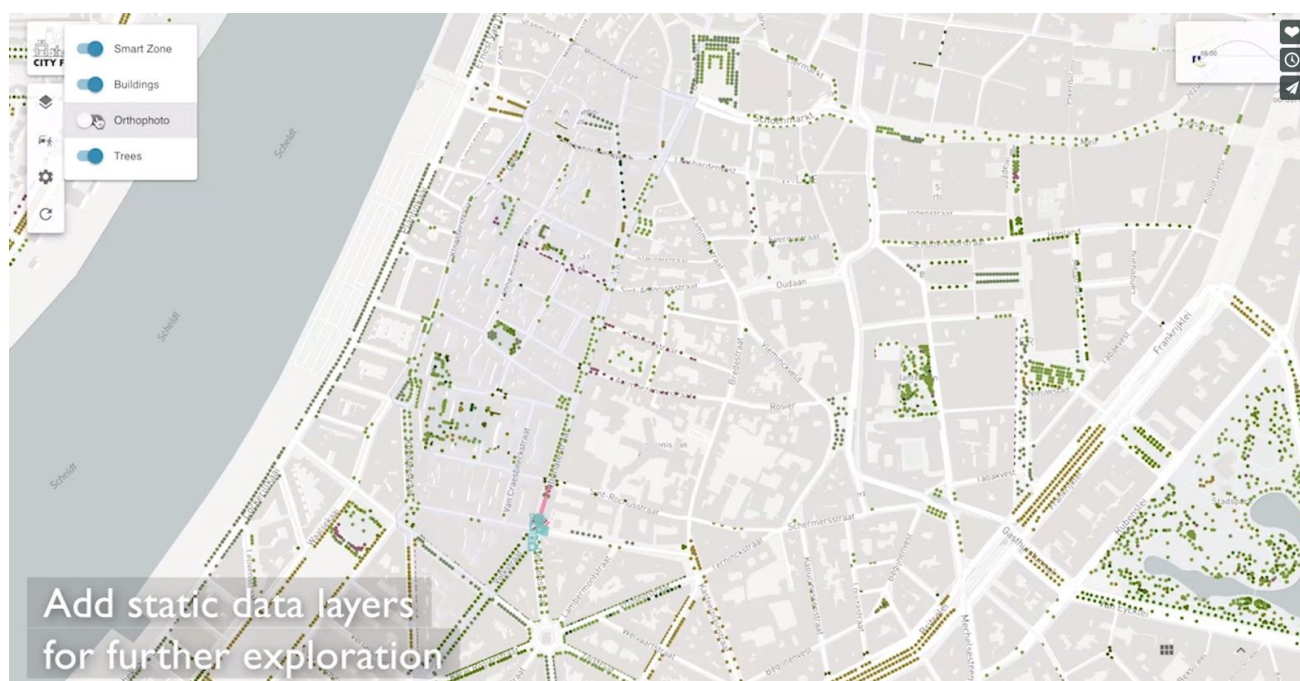
Figure 17: optional addition of static layer data

4.2.4. Conclusion and next steps

D2.3 can be seen as the recipe for the development of the alpha version of the DUET.

Based on individual user stories, more extensive epics were developed for each pilot study. The most relevant epics were selected using an objective scoring procedure. In a next step, the selected epics will be evaluated by relating them to a dynamic mind map and by discussing them with local experts and stakeholders.

This resulted in the determination of a series of user requirements that could be integrated into basic wireframes and mockups, offering a solid basis for further shaping the digital twin alpha version.

Initially, the available mockups will be bundled into a series of more general mockups that will be presented to a selection of end users for further fine-tuning and smoothening. In a next step, the various digital twin components will be integrated to obtain an elementary workable solution as illustrated by the next scheme.

Figure 18: general outline of the DUET front-end user interface approach. Green: not in scope for the alpha version.

5. Annex 1

Supporting Powerpoint file to facilitate interviews with local stakeholders.
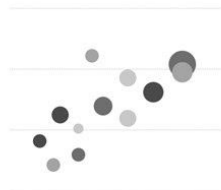
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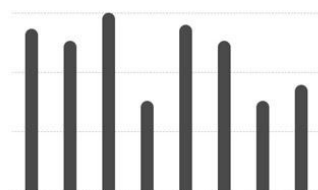Page 1 / 3

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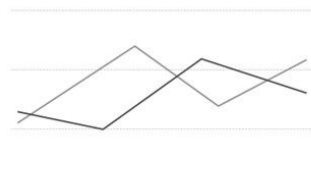Page 3 / 3


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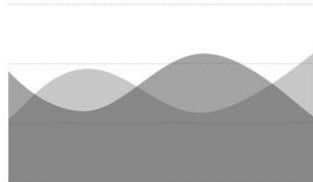
THANK YOU!