# xR4DRAMA

Extended Reality For DisasteR management And Media planning

H2020-952133

# D4.6

# VR AUTHORING TOOL v2

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| **Dissemination level:** | Public |
| **Contractual date of delivery:** | Month 27, 31 January 2023 |
| **Actual date of delivery:** | Month 29, 27 March 2023 |
| **Work package:** | WP4 Interactive AR/VR solutions for media production and hazard management |
| **Task:** | T4.6 VR authoring tools and interactions |
| **Type:** | Demonstrator |
| **Approval Status:** | Final version |
| **Version:** | 1.0 |
| **Number of pages:** | 29 |
| **Filename:** | D4.6_xR4Drama_AuthoringToolV2_20230327_v1.0.docx |

**Abstract**

This deliverable describes the second and final version of VR Authoring tool.

co-funded by the European Union

# History

| Version | Date | Reason | Revised by |
|---|---|---|---|
| V0.1 | 19.12.2022 | Table of contents | Yash Shekhawat |
| V0.2 | 15.01.2023 | First Version | Yash Shekhawat |
| V0.3 | 31.01.2023 | Second version | Holger Kuerten |
| V0.9 | 27.02.2023 | Deliverable for review by AAWA | Yash Shekhawat |
| V1.0 | 27.03.2023 | Final version | Yash Shekhawat |

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# Executive Summary

The deliverable provides the final prototype of the Authoring tool. Section 1 introduces the deliverable with the structure and the contents.

The next section provides the overview of the updated requirements from the use cases. The requirements gave us a starting point to implement the new features for the final version of the Authoring Tool.

The third section of the deliverable gives the information on the final product, from the internal architecture, updated features to installation requirements along with the demo information and screenshots.

The final section concludes the deliverable.

# Abbreviations and Acronyms

| | |
|---|---|
| **POI** | Point of Interest |
| **PUC** | Pilot Use case |
| **UI** | User Interface |
| **UX** | User Experience |
| **VR** | Virtual Reality |

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# 1  INTRODUCTION

This deliverable is a supporting document to the software components delivered as part of 2nd and Final prototype of the entire xR4DRAMA, developed as part of WP4. The deliverable covers the updated requirements from the users concerning the Authoring tool and the product development, from architecture of the tool to the functionalities and the installation requirements.

The main aim of the xR4DRAMA Authoring tool is provide the entrance to the platform from a PC and will be mainly used by producers as well as control room operators dealing with an emergency situation.

The tool will allow access to the entire system where the users will be able to create projects that will include one emergency or production. The tools main motive is to provide the situational awareness while the people are far away from the actual geographical location.

The deliverable provides the overview about the tool and the work completed.

## 2 FINAL REQUIREMENTS FOR THE TOOL

The use cases provided updated requirements which were documented in D6.3 – Evaluation of the 1st prototype, published in Month 20 of the project. The main updated requirements concerning the Authoring tool are noted here.

### 2.1 Disaster Management Use case requirements

| Info-ID | Category | Name | Description | Implementation status/Comments |
|---|---|---|---|---|
| PUC1-01 | Geography, Surroundings | Rivers, Embankments | indication of rivers, water courses, riverbanks | Implemented, more layers required |
| PUC1-02 | Geography, Surroundings | Manholes, electrical and gas pipes | indication of manholes, electrical and gas pipes | Not implemented already, should be in the final version |
| PUC1-03 | General information | Areas of attention, safe waiting places, shelters | Information on the presence of areas of attention, safe waiting/parking places, shelters, sand-bag distribution areas | Not implemented already, should be in the final version |
| PUC1-04 | Flood risk management | Flood maps | Raster data of flow velocity and water depth in flood scenarios | Not implemented, in the final version maps will be visualized only in the authoring tool |
| PUC1-05 | Flood risk management | Risk maps | Information on flood risk level in the territory | Not implemented, in the final version maps will be visualized only in the authoring tool |
| PUC1-06 | Flood risk management | Flood reports | Information about flood reports localised by audio analysis and categorised according to the problem issue | Not implemented already, should be in the final version |
| PUC1-07 | Flood risk management | Flooded elements | Information on flooded elements (e.g. cars and people inside the river) | Not implemented already, should be in the final version |

| PUC1-08 | Flood risk management | River embankment's overtopping and/or breaking | Information related river embankments overtopping or breaking | Not implemented already, should be in the final version |
|---|---|---|---|---|
| PUC1-09 | Flood risk management | Elements at risk | Information on the presence of elements at risk and the degree of emergency | Not implemented already, should be in the final version |
| PUC1-10 | Environmental factors | Sensor measures | Information on environmental variables: water level, rain, temperature, humidity | Not implemented already, should be in the final version |
| PUC1-11 | Environmental factors | Radar meteo | Information available on radar meteo | Not implemented |
| PUC1-12 | Human factors | Physiological parameters | Physiological parameters of first responders in the field | Implemented but need to be integrated in authoring tool |
| PUC1-13 | Human factors | Stress level | detect by stress analysis the stress level in first responders affected by flooding/involved in rescue operations | Implemented but need to be integrated in authoring tool |
| PUC1-14 | Accessibility | Navigation routes | Possibility to define an appropriate escape route or a suitable way to reach an intervention area | implemented |
| PUC1-15 | Geography, Surroundings | Land use change, past flood events' extent | Information derived by satellite images analysis | Not implemented, should be in the final version |
| PUC1-16 | Flood risk management | Population potentially in danger | Information on the potential presence of people in areas at risk | Not implemented, should be in the final version |
| PUC1-17 | Flood risk management | Cultural heritage/natural sites | Information on the potential presence of | Not implemented, should be in the final version |

| | | potentially in danger | cultural heritage/natural sites | |
|---|---|---|---|---|
| PUC1-18 | Flood risk management | Civil Protection Plan procedures | Information on the localisation, type of action, activation threshold of the Vicenza Risk Management Plan procedures | Not implemented, should be in the final version |

Table 1: Disaster Management requirements

## 2.2 **Media Production Use case requirements**

| Info-ID | Category | Name | Description | Implementation status/Comments |
|---|---|---|---|---|
| PUC2-01 | Environmental factors | Noise pollution | identification of possible sources like busy roads or highways, crowds of people, factories, airports, railway Station, railway tracks | Automatic aggregation not implemented yet; manual edits possible via POI |
| PUC2-02 | Environmental factors | Light Pollution | identification of possible sources like streetlights, ads etc. | Automatic aggregation not implemented yet; manual edits possible via POI |
| PUC2-03 | Accessibility | Parking | availability of parking | Automatic aggregation implemented (parking lots displayed as POI) |
| PUC2-04 | Legal Issues | Necessity of filming permit on the ground | necessity of a permission for filming on the ground with a crew | Automatic aggregation not implemented yet, Manual editing feature ('legal section') under construction |

| Info-ID | Category | Name | Description | Implementation status/Comments |
|---------|----------|------|-------------|-------------------------------|
| PUC2-05 | Legal Issues | Necessity of filming permit in the air | type of permission for filming with drones, possible restrictions for filming | Automatic aggregation not implemented yet, manual editing feature ('legal section') under construction |
| PUC2-06 | General information | General information on site/buildings | textual information on specific sites/buildings in the area of interest | Automatic aggregation not implemented yet, manual edits possible, buildings can be annotated via POI feature |
| PUC2-07 | Environmental factors | solar altitude during the day | simulation of the course of the sun during a day | Implemented (via 'sun slider') |
| PUC2-08 | Facilities | Power | availability and accessibility of power outlets | not implemented yet (missing POI category) |
| PUC2-09 | Facilities | Bathrooms | availability and accessibility of bathrooms | automatic aggregation via POI, manual edits possible |
| PUC2-10 | Facilities | Restaurants, Cafés etc. | list of/indication of available places to eat/drink | automatic aggregation via POI, manual edits possible |
| PUC2-11 | Facilities | Props & Gear | Possibility to put props/decoration/etc. in the environment | not implemented yet, in the making (AR+VR mode) |
| PUC2-12 | Simulation | Drone flights | Possibility to simulate various flights of drones in VR | partly implemented; UX/UI needs to be improved |

| Info-ID | Category | Name | Description | Implementation status/Comments |
|---------|----------|------|-------------|-------------------------------|
| PUC2-13 | General information | Travel- and Security Advice | Information on the security situation in the designated country | automatic aggregation not yet implemented, manual edit not yet possible |
| PUC2-14 | Environmental factors | Noise situation on site | the noise situation on site recorded by the location scout via a Smartex device as mp3-file | implemented; audio files can be uploaded/attached to POIs (ambisonic files currently played back in stereo only) |

Table 2: Media Production requirements

# 3 **2<sup>ND</sup> PROTOTYPE**

The 2<sup>nd</sup> prototype of the Authoring tool was merged with the final prototype due to the amount of work to be done and the testing periods aligned with the user partners. After testing of the first prototype, Gitlab was used to document and track the issues faced by the users. A total of 63 issues were opened which required work on the Authoring tool, more than 60 issues have been closed in this context.

## 3.1 **Internal Architecture**
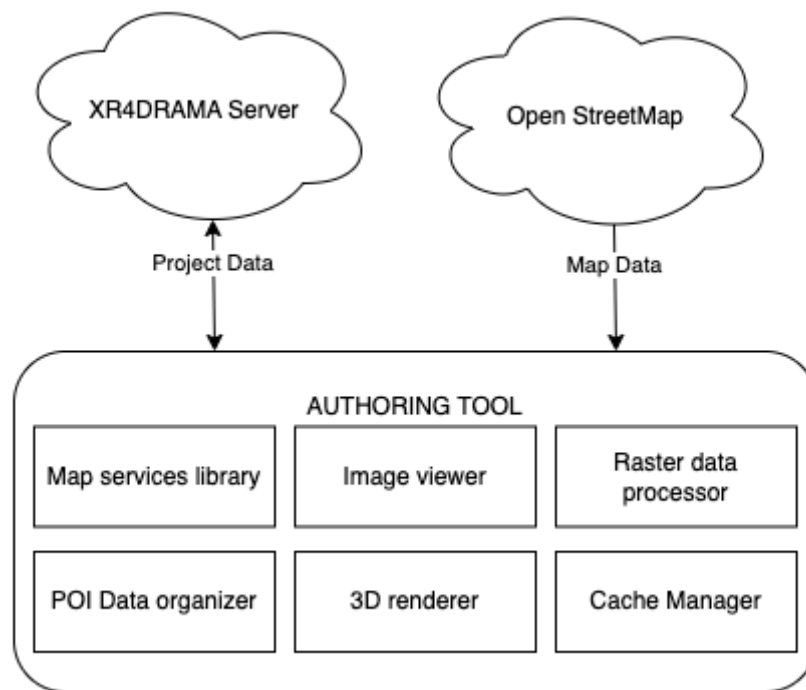


Figure 1: Internal Architecture of xR4DRAMA Authoring Tool v2

Th Authoring tool is connected to 2 major servers to retrieve and save data, the xR4DRAMA backend using the REST API component and the OpenStreetMap servers to retrieve Map and location information. The tool consists of 6 major components:

1. Map Services Library: This library helps in downloading and loading of the Map from OpenStreetMap
2. Image Viewer: This component works on viewing the user generated images
3. 360° Image Viewer: This component helps display the 360° images uploaded by the users
4. 3D Map Visualisation: This component views the Map in 3D and with different layers
5. POI Data Viewer: The component views the various POIs on the Map specific to the location
6. Custom Map Data Editor: This component helps users add and modify the data on the map. This data is saved to the xR4DRAMA backend allowing visualisations on other frontend tools of the platform.

## 3.2  **Updates in v2**

The following are the major updates done for the v2 of the platform:

1. Updated UI and UX: We updated the menu bar on the left side of the screen to help in navigation of various screens. This can be seen in Figures 5,6,7,8,9 and 10.
2. Integration of Text Generation: For creating better situational awareness, we integrated the text generation which uses the data found on the internet to create a text which will be helpful for the users. This can be viewed in Figure 7
3. New user profile personalisation: We added new 2D avatars to the profiles of the users. This can be viewed in Figure 28.
4. Integration of Satellite Data: Satellite maps help create a new informational layer for the user. This can be seen in Figure 18.
5. Integration of Flood Maps and forecast models from AAWA Servers: For the disaster management use case, we worked on integration of flood maps and data coming from various sensors. This can be viewed in Figures 13,14,15 and 17.
6. Integration of Population Map: Population Maps helps in analysing the population density of people in various sectors of the city. This can viewed in Figure 16
7. New File Management system: The new file management system handles the tags and visual analysis data. This can viewed in figure 25.
8. Integration of the new 3D model reconstruction pipeline: The 3D model reconstruction pipeline helps in integrating 3D models into the Authoring tool. This can be seen in Figures 11 and 12s
9. Add and edit essential contacts: The user is able to add and edit essential contacts, this is shown in the dashboard as shown in figure 7.
10. Process Management: The process management shows the tasks running in the backend of the authoring tool, this is shown in figures 5 and 7 in the bottom left.
11.  Broadcast messages to Citizens: The Authoring tool allows the users to send messages to the citizen app, figure 9 depicts this.
12. Integration of Global search: Global search is a backend enabled search for all the POIs and data stored for a project. Figure 21 shows this.
13. Easier way to add files, danger zones, POIs and Media Content: The top "+" button allows users to add multiple types of files and data.
14. Integration of Stress levels: Stress level screen as shown in figure 23, shows the stress levels coming from the physiological sensors for the disaster management use case.
15. Integration of Visual Analysis results for Images and uploaded content: Visual analysis results are shown with each image in the tool. This is shown in figure 25.
16. Upload 3D models to be used in AR App and VR: The users can use the file browser to upload 3D models which can be used in the AR App to create AR scenes.

Further smaller updates were also made in the Authoring tool along with the above-mentioned updates.

## 3.3  **Installation Requirements**

The tool requires the following to run with VR Capabilities:

- OS: Windows
- CPU: Intel i5/i7/i9

- RAM: Minimum 16 GB
- HDD: Minimum 5 GB Free
- Graphics Card: Dedicated card

To run the tool with and be able to launch the Collaborative VR Tool, the following is required:

- OS: Windows
- CPU: Intel i7/i9
- RAM: Minimum 32 GB
- HDD: Minimum 5 GB Free
- Graphics Card: NVIDIA GTX 2080 or above
- VR Headset: HTC Vive

A "VR Ready" Laptop will also be able to run the tool.

## 3.4  **Screenshots and Demo details**

The demo can be downloaded at the following link: https://drive.google.com/drive/folders/1WQsctB4RLUwoTPYTNnUb6gmj8KtcKozB?usp=sharing
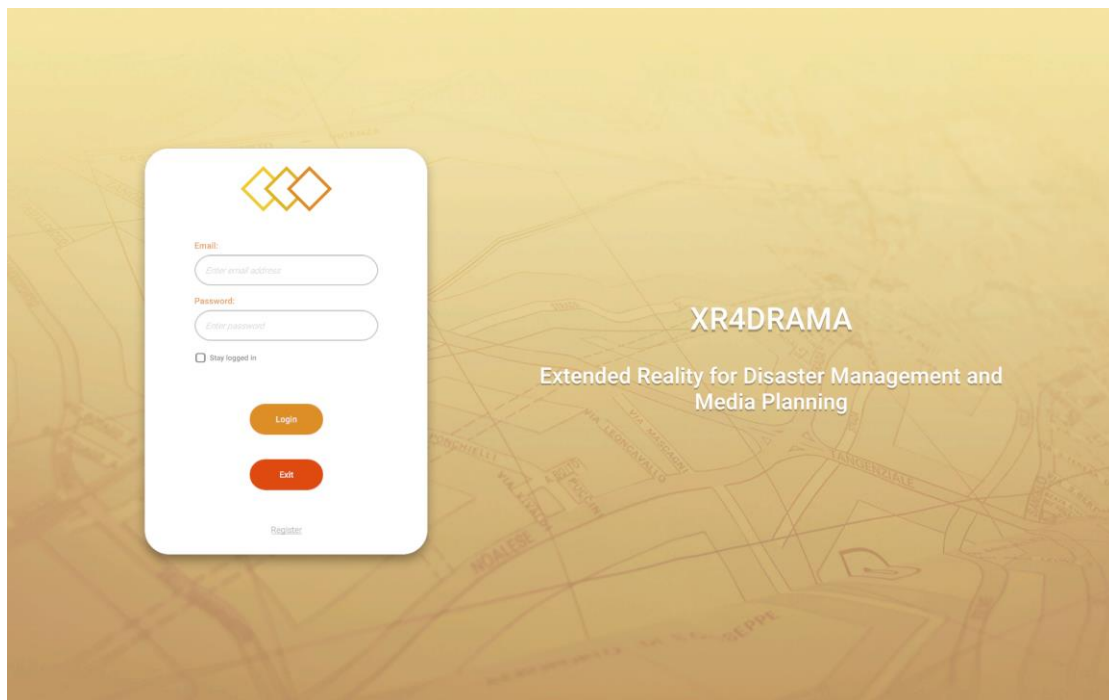


Figure 2: New login screen with Exit button

Figure 3: Project screen



Figure 4: Project Overview
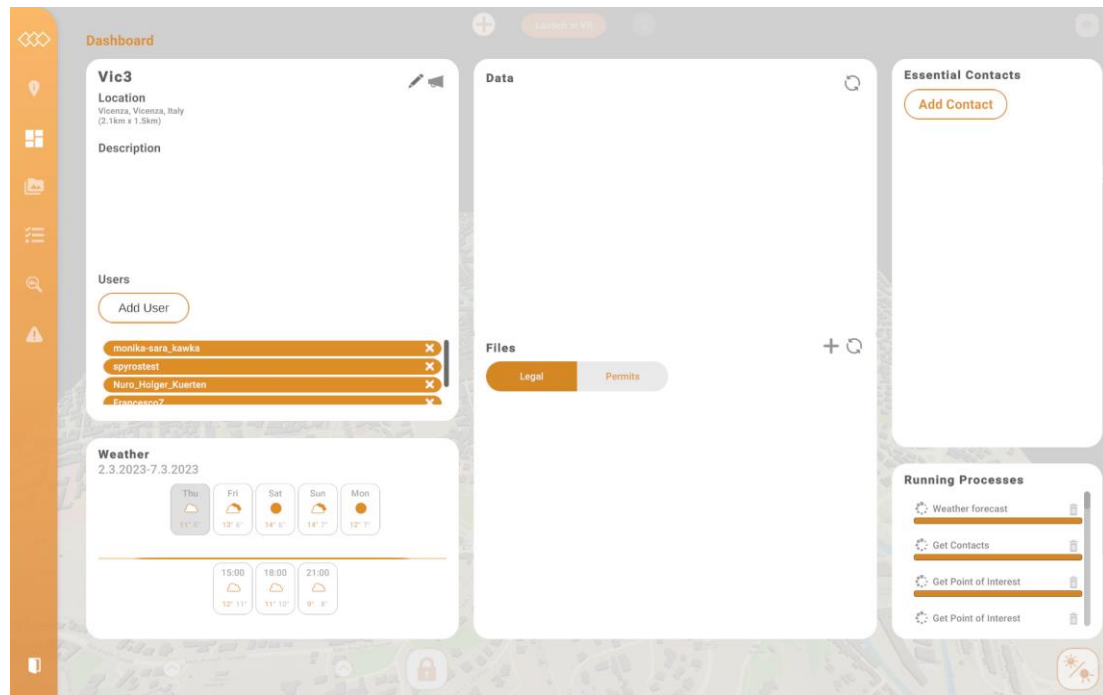
Figure 5: Dashboard with processes running information
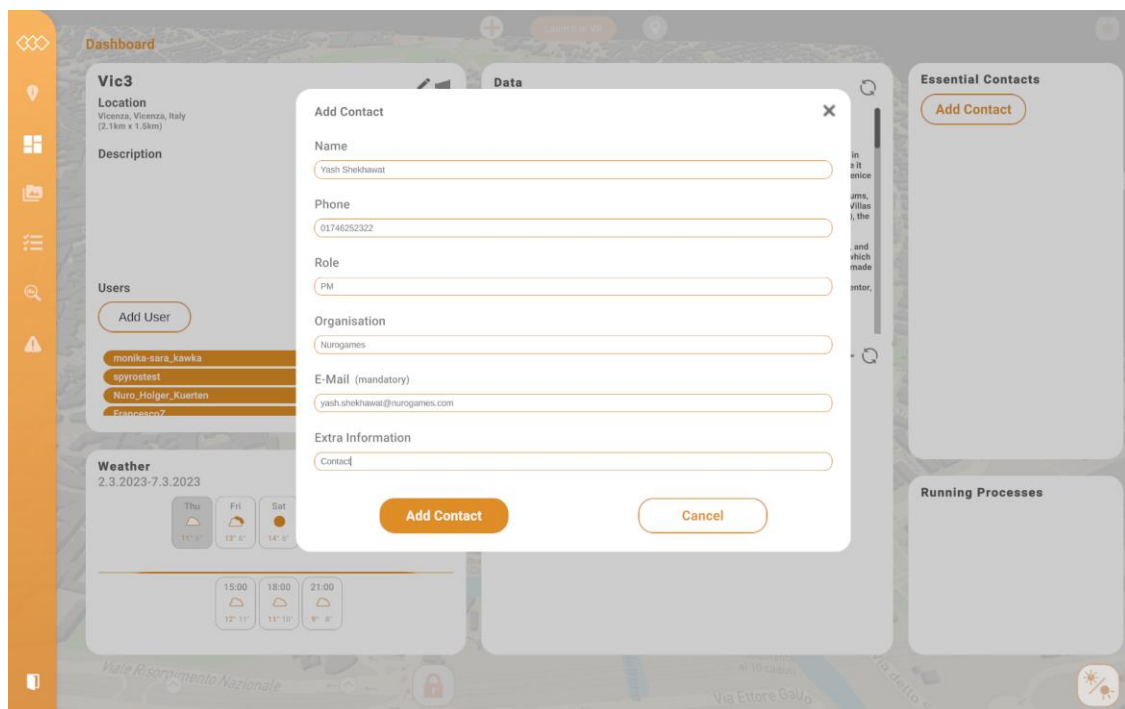


Figure 6: Add new contact screen
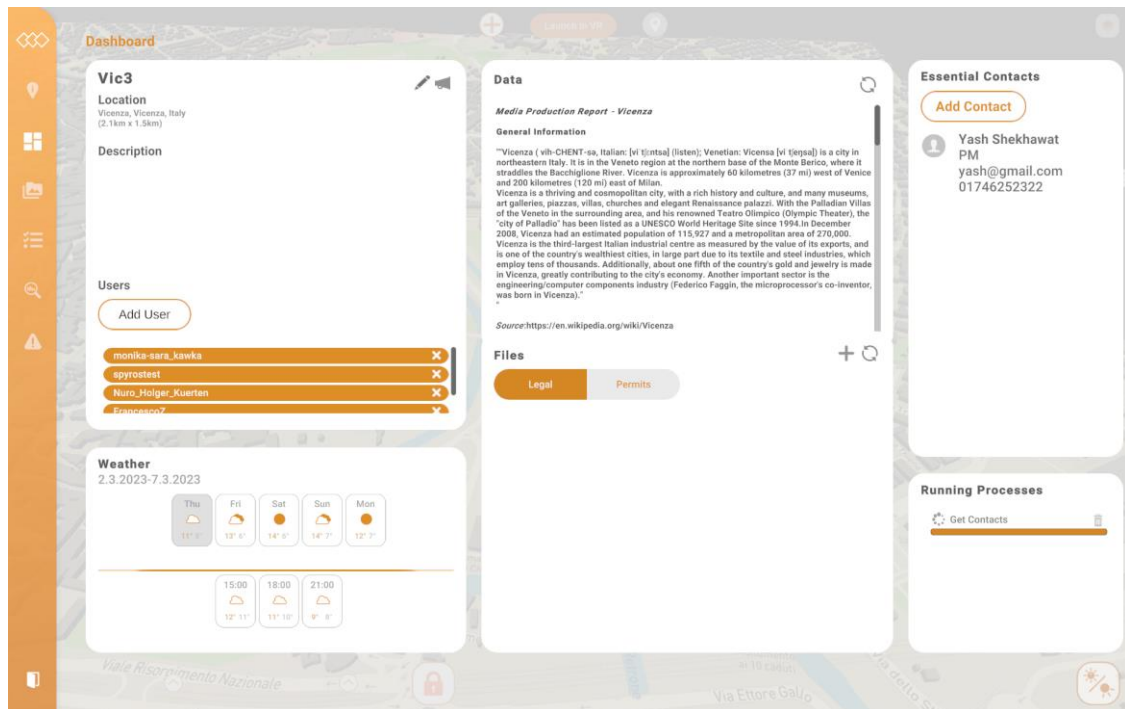
Figure 7: Dashboard with information loaded
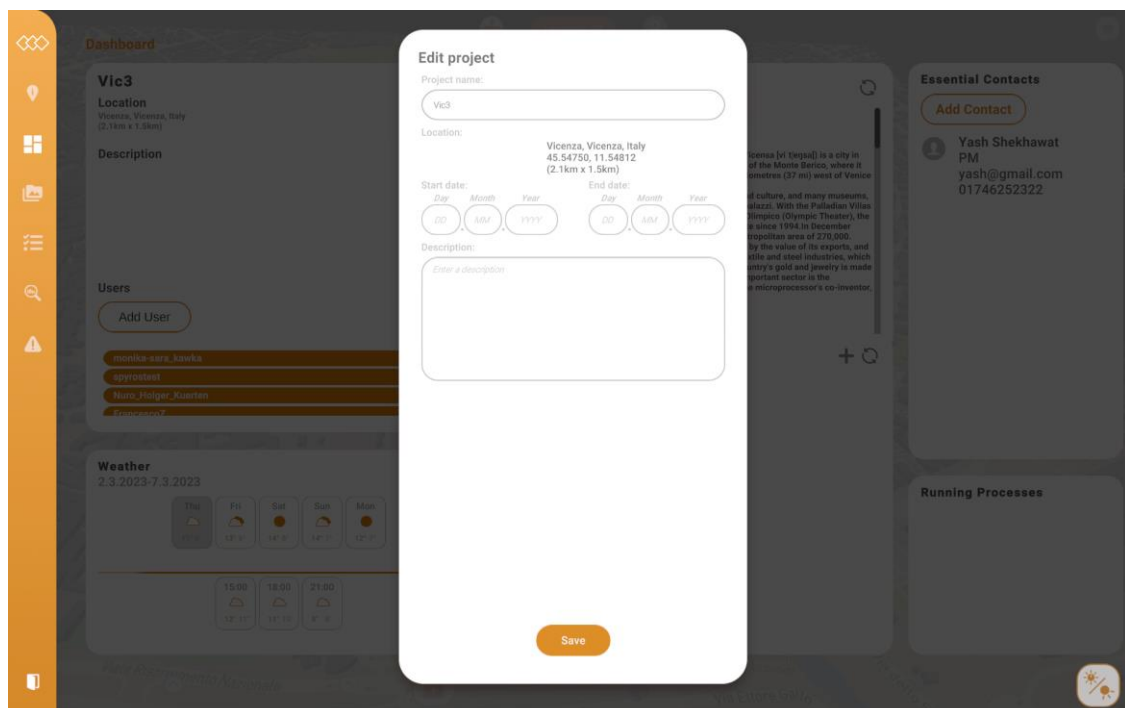


Figure 8: Edit project window
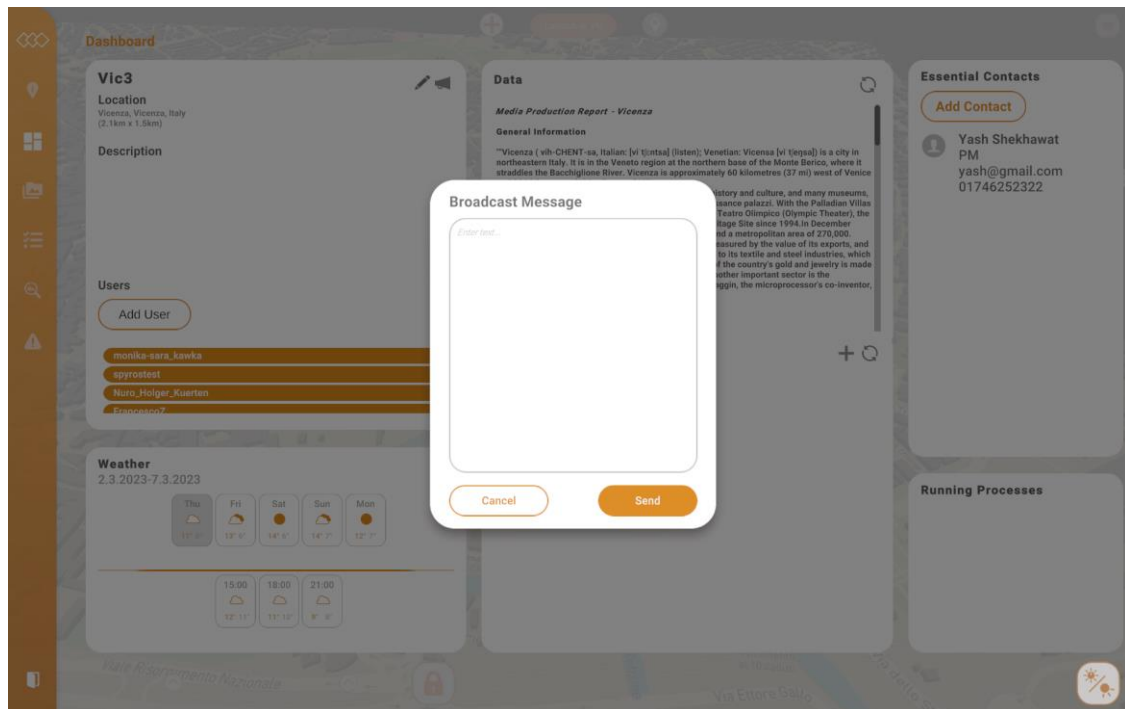
Figure 9: Broadcast message window
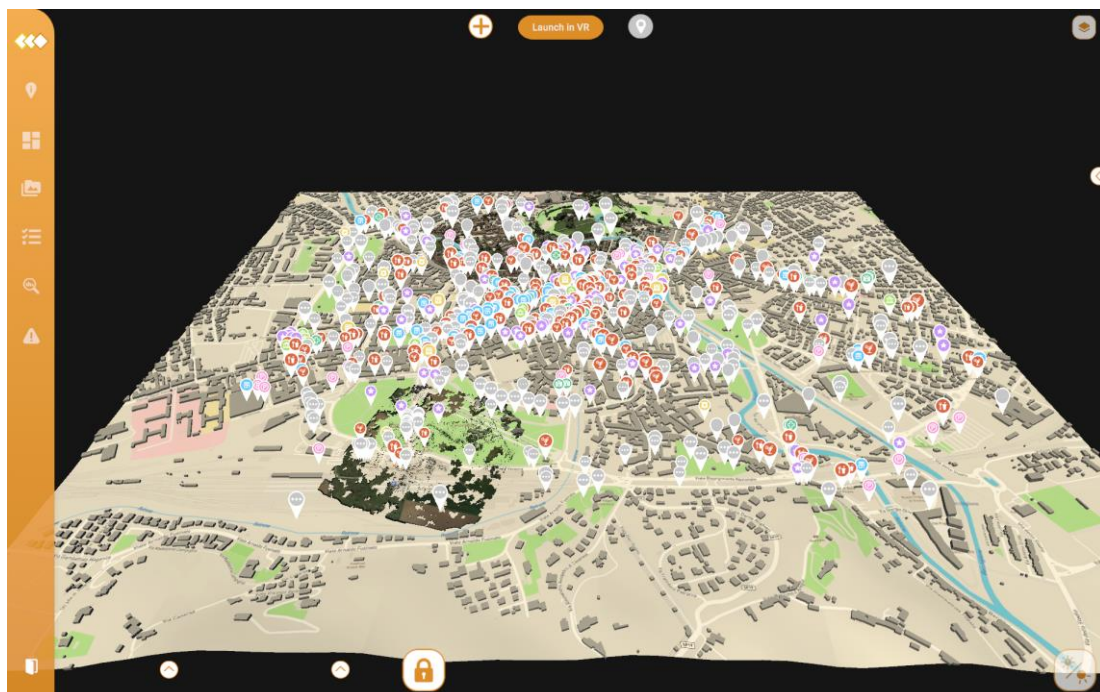


Figure 10: Map screen with the new UI
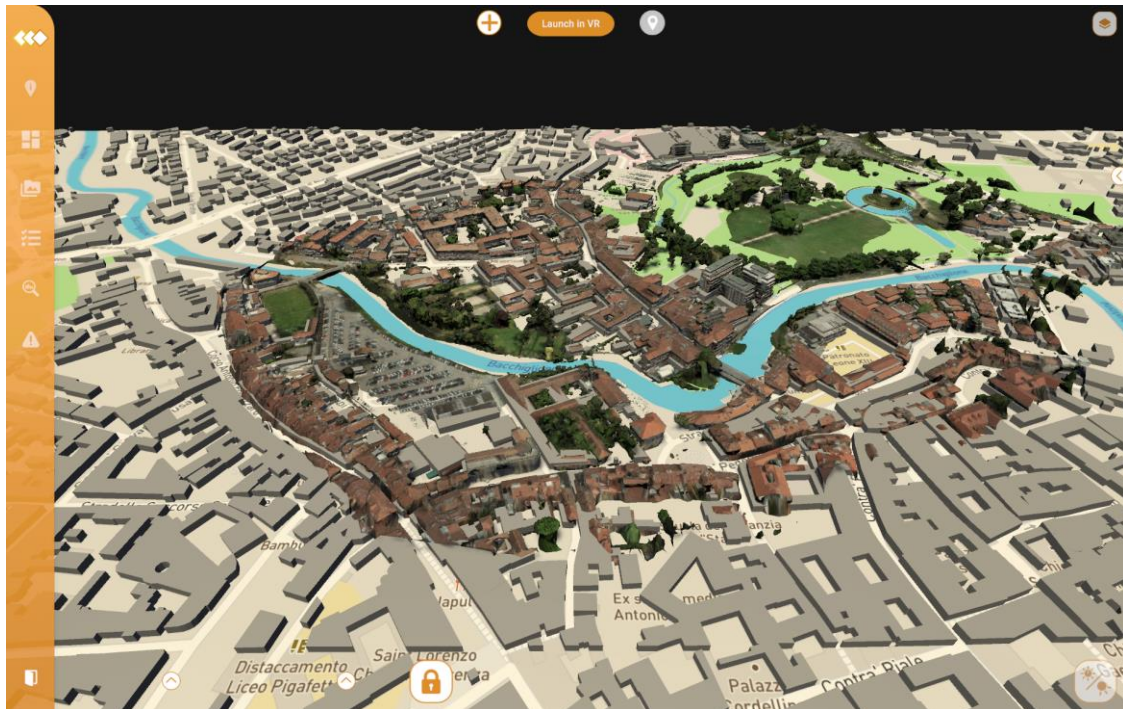
Figure 11: 3D Model integration
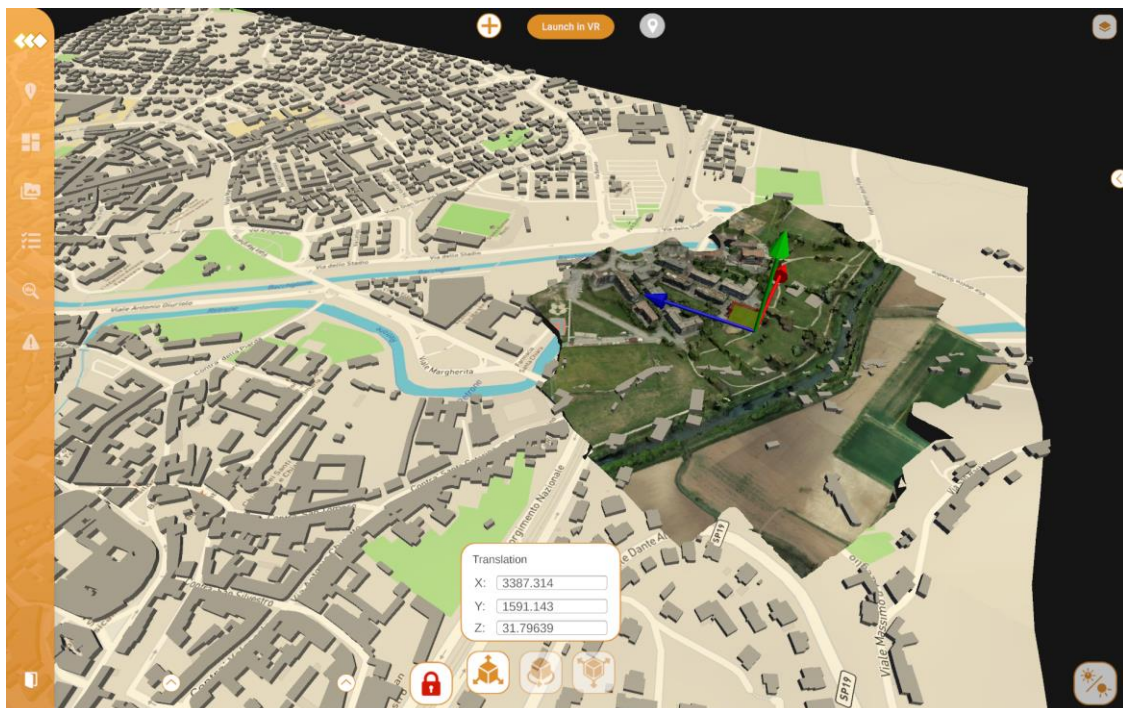


Figure 12: Ability to move and rotate 3D models
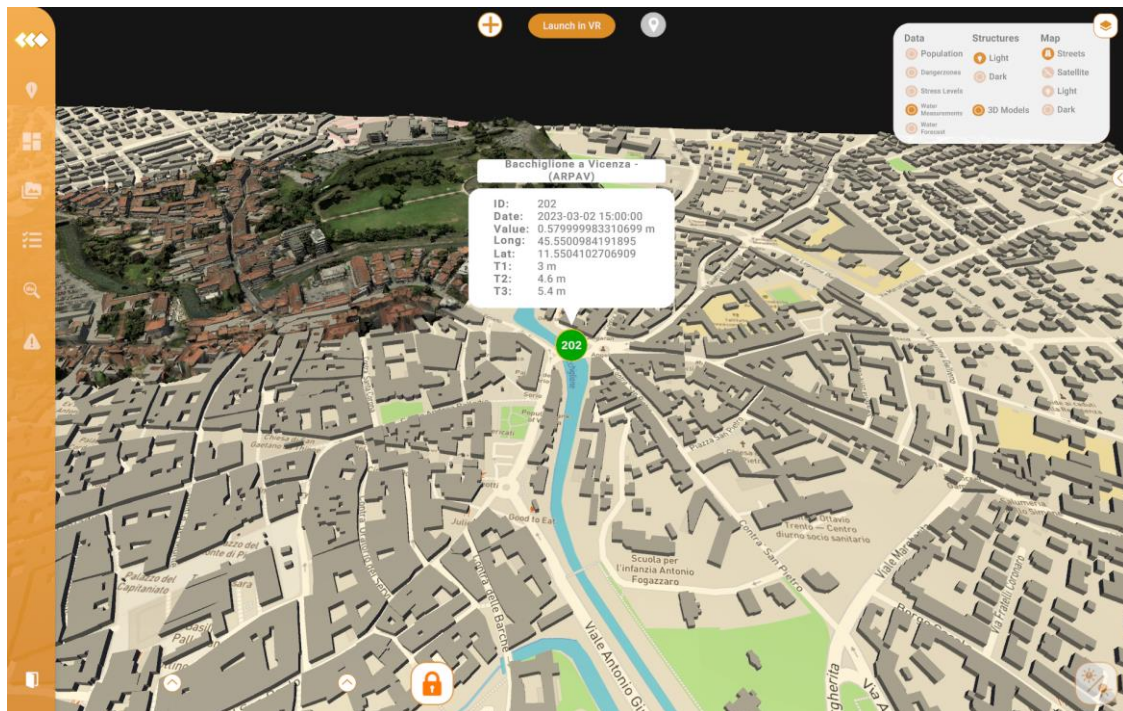
Figure 13: Integration of Water measurement sensors
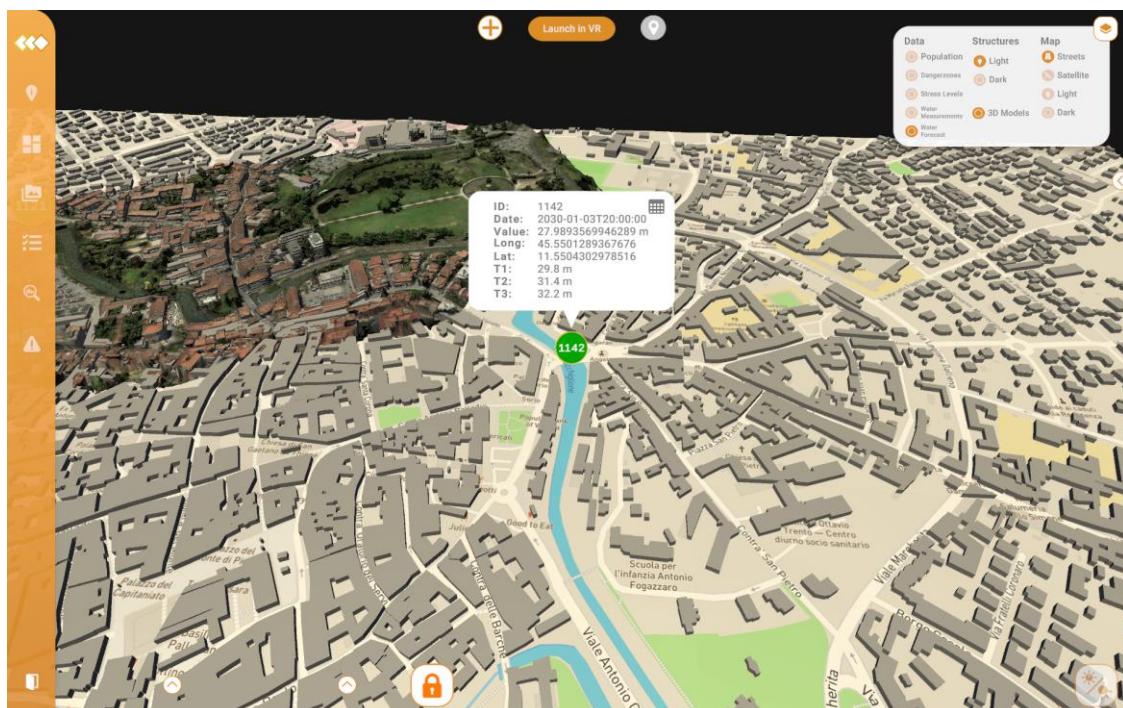


Figure 14: Flood forecast sensor integration
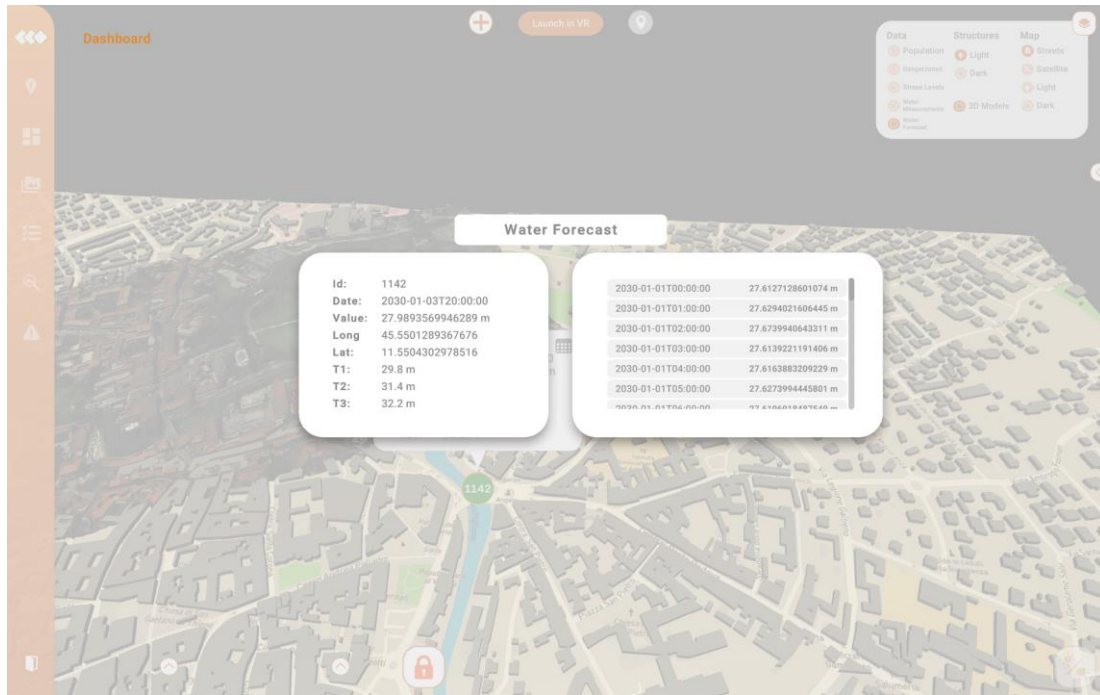
Figure 15: Viewing historical sensor data
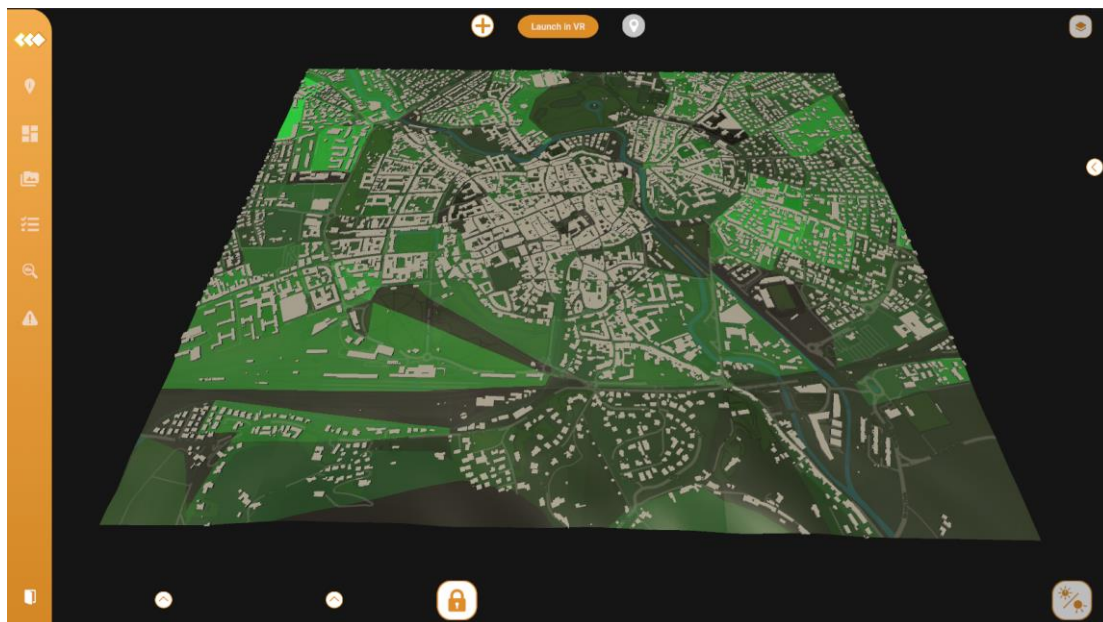


Figure 16: Population Map visualisation
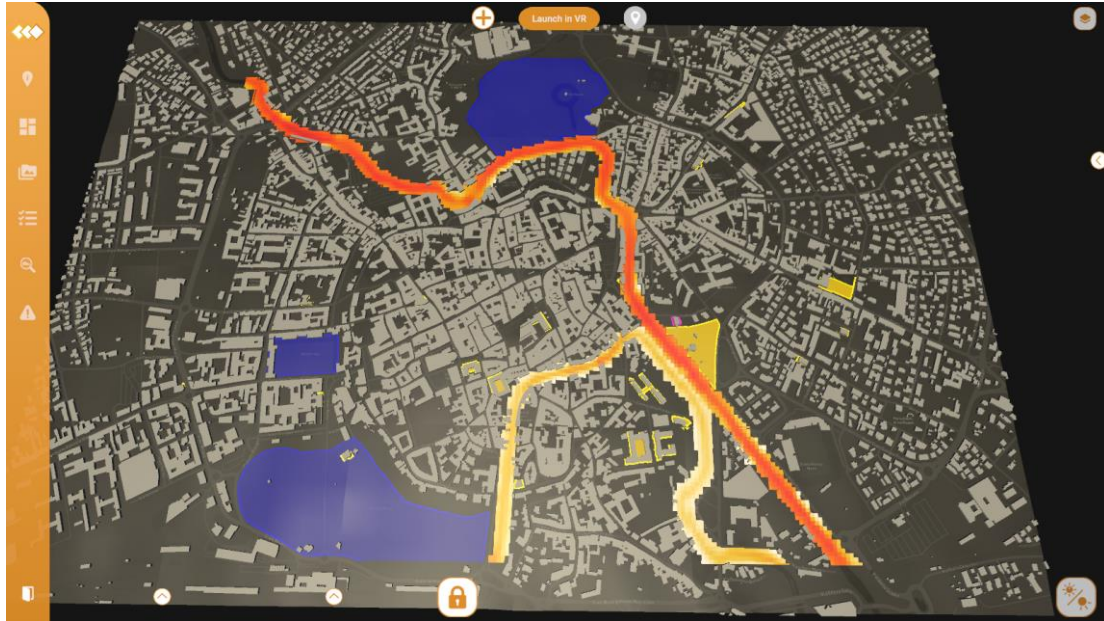
Figure 17: Flood Map and Elements at Risk integration
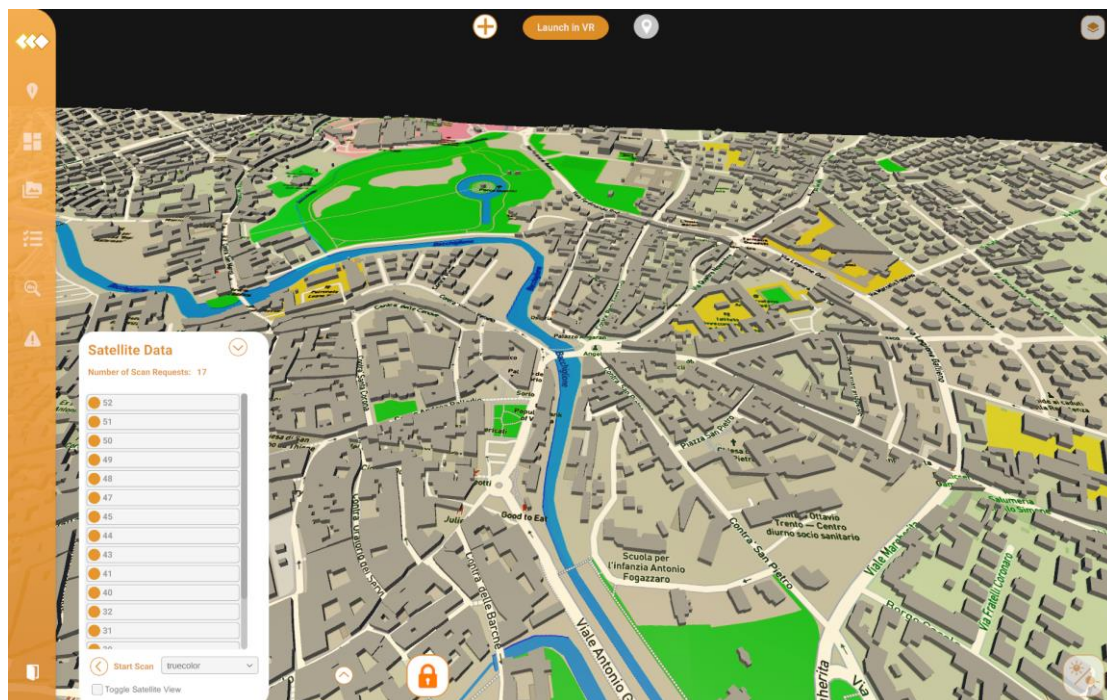


Figure 18: Satellite Data Window
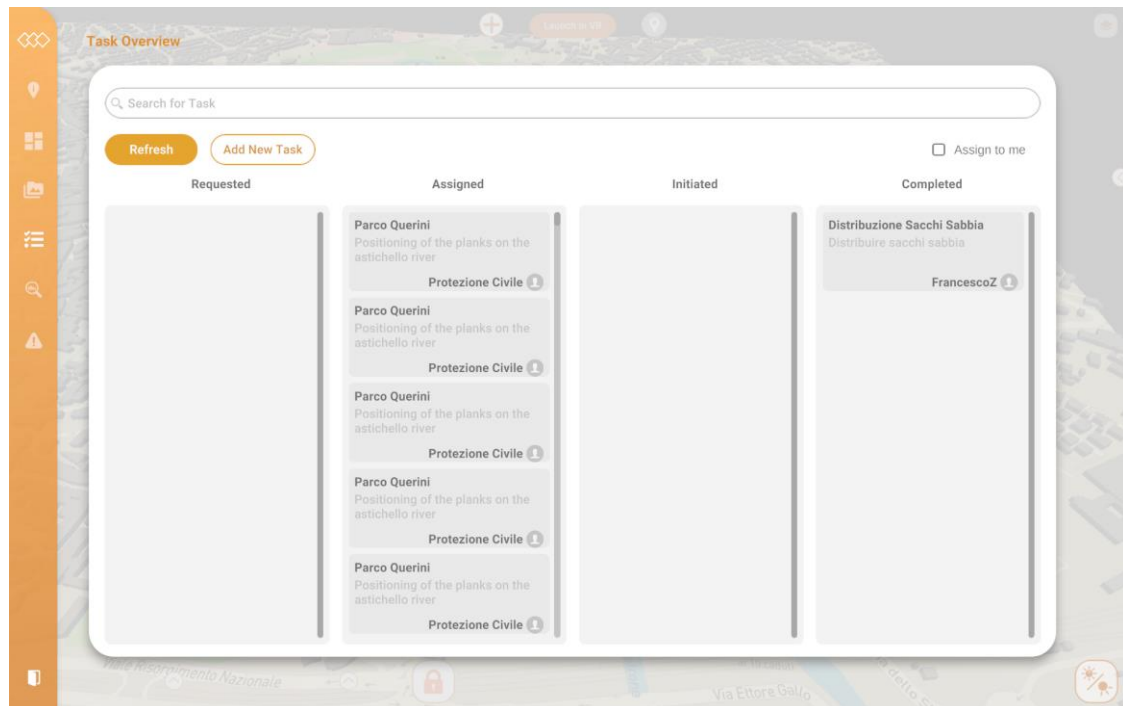
Figure 19: Task management UI update
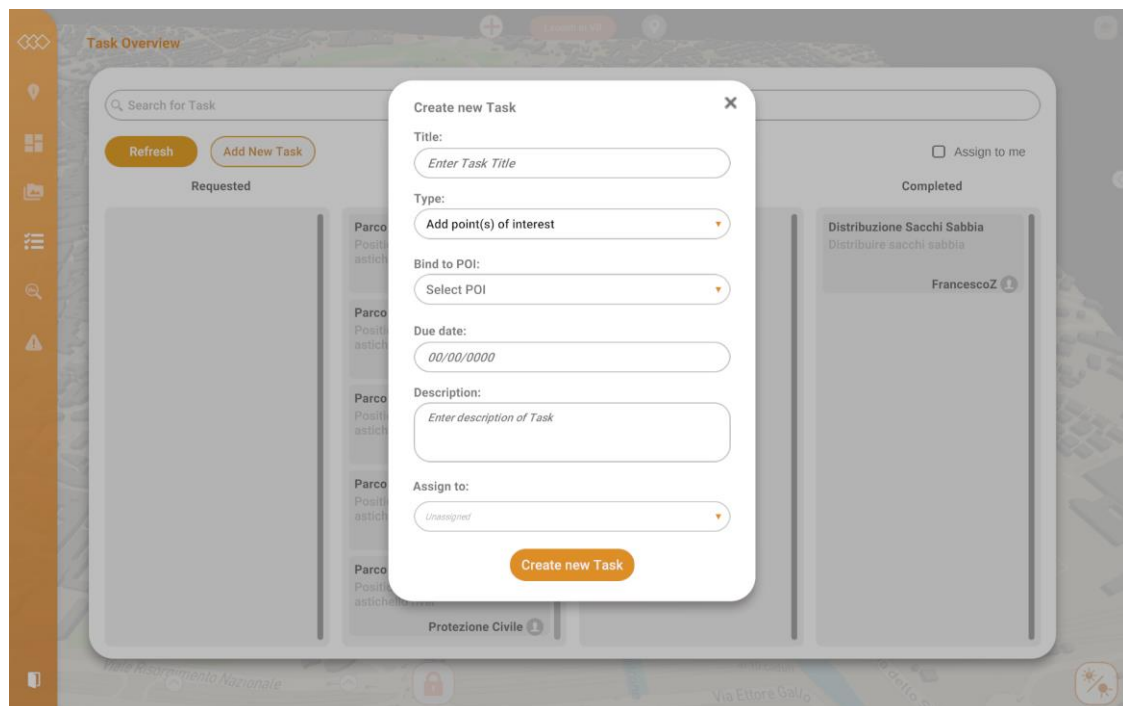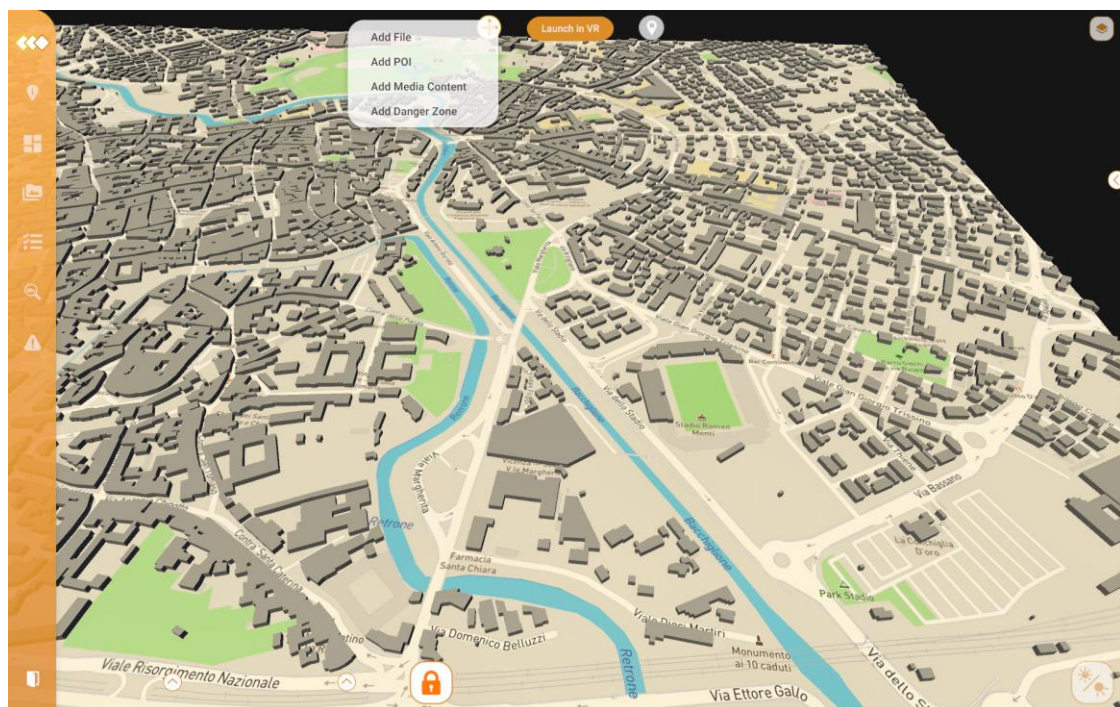


Figure 20: Creating new Tasks
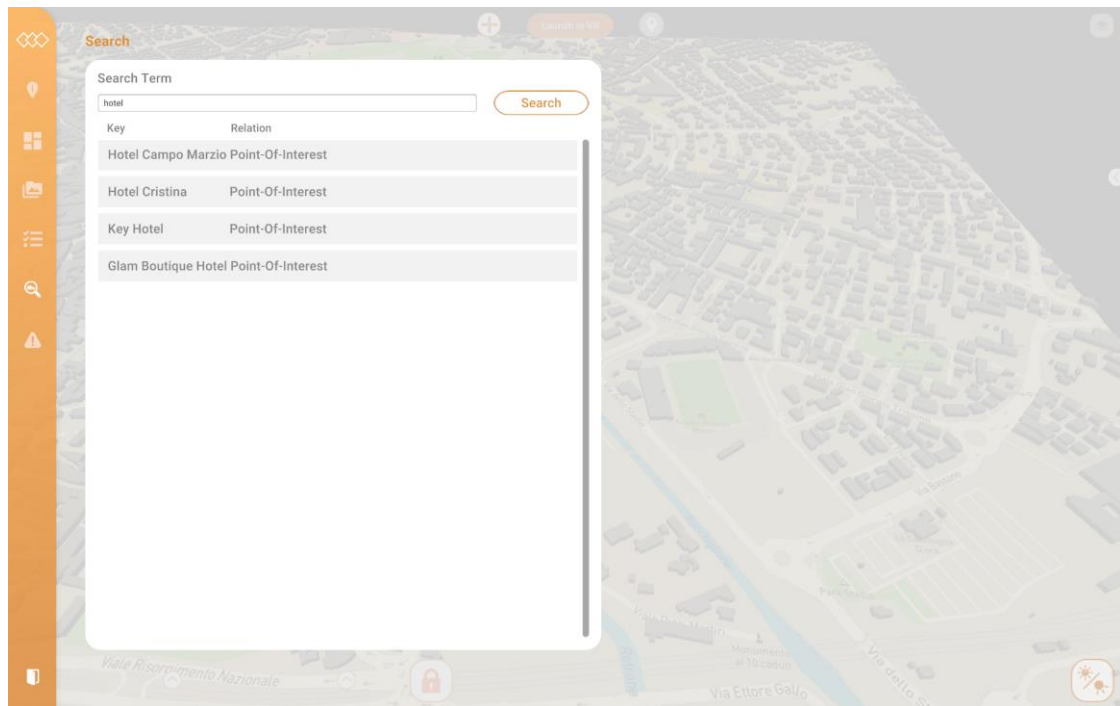
Figure 21: Global Search
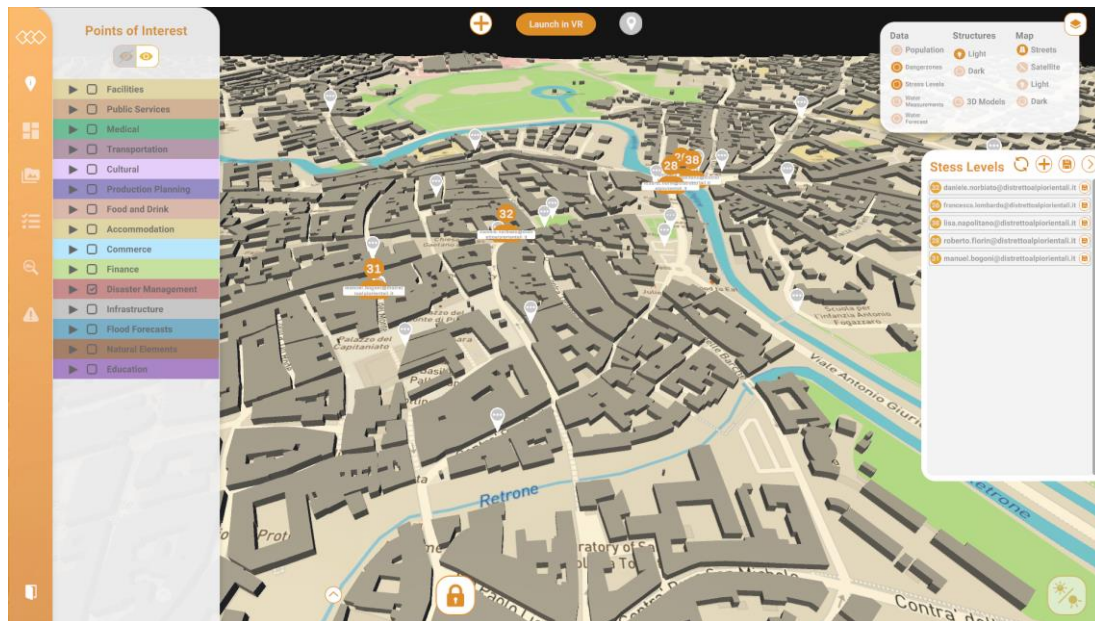


Figure 22: Easy adding of New info to a project
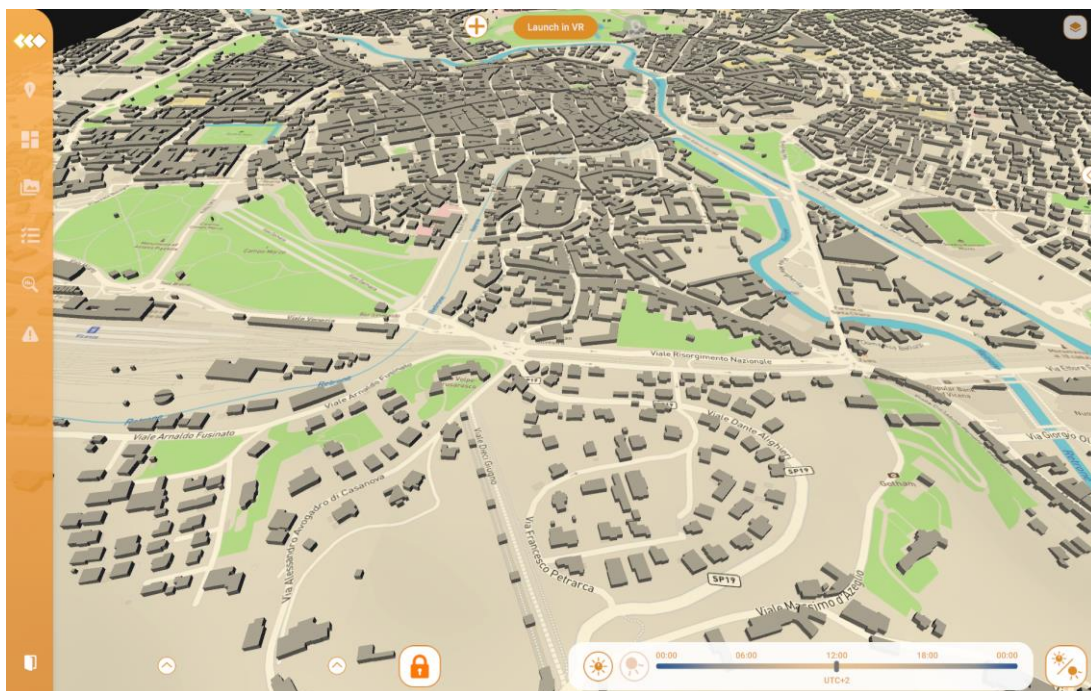
Figure 23: Stress level window
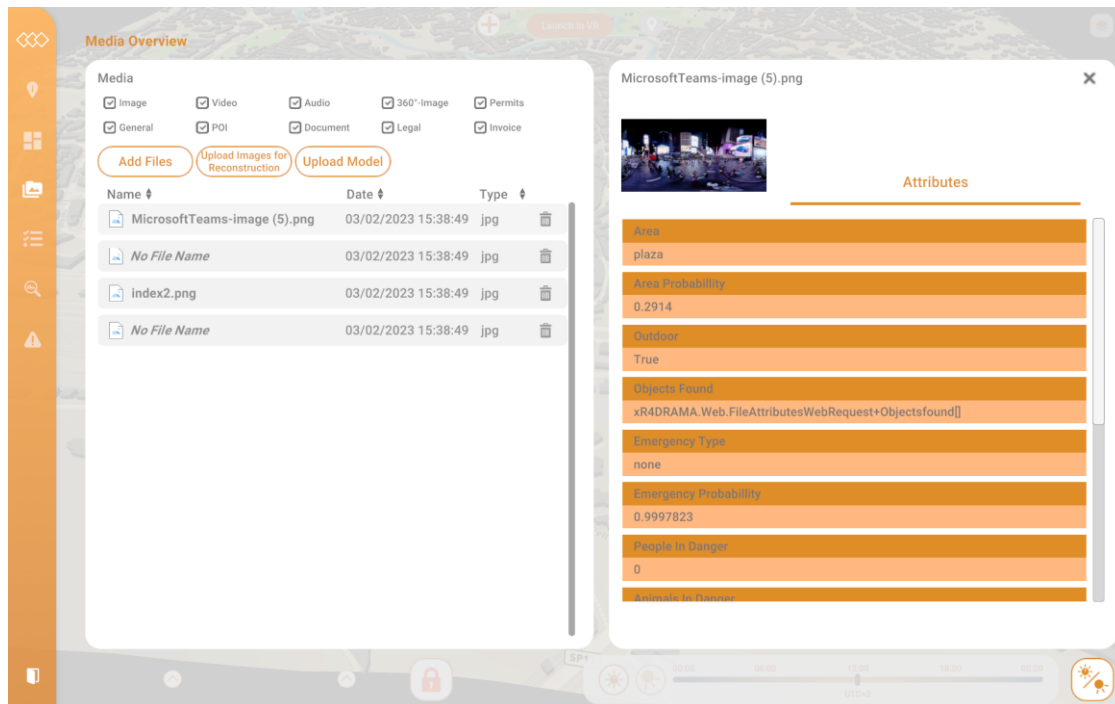
Figure 24: Time simulation

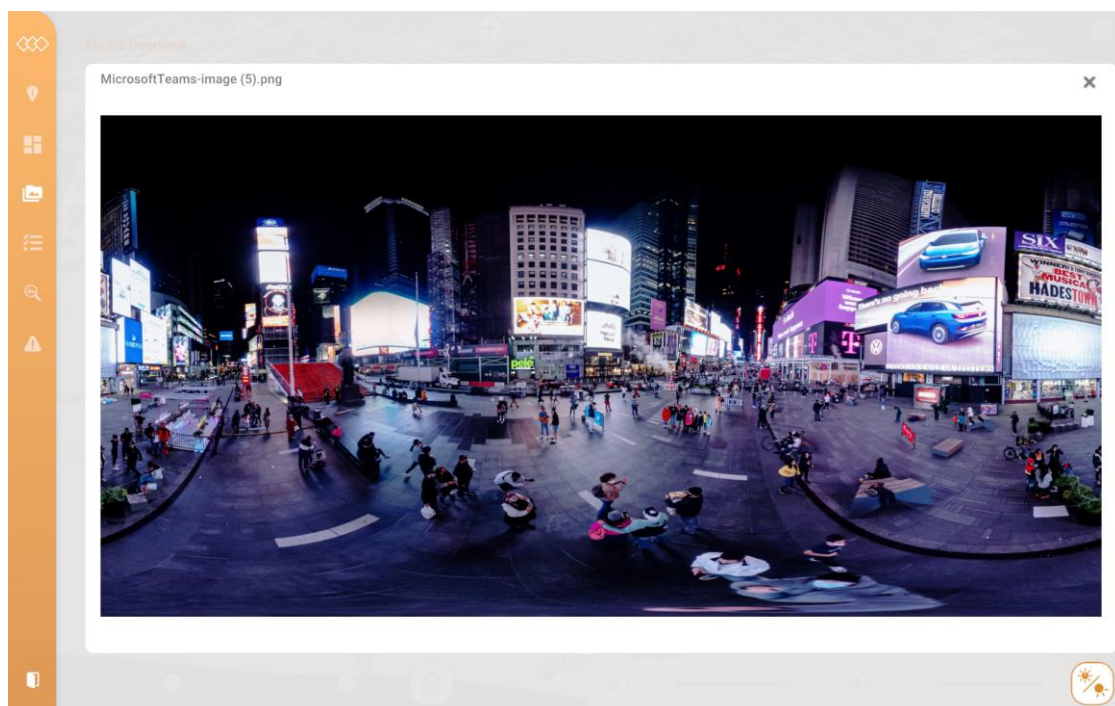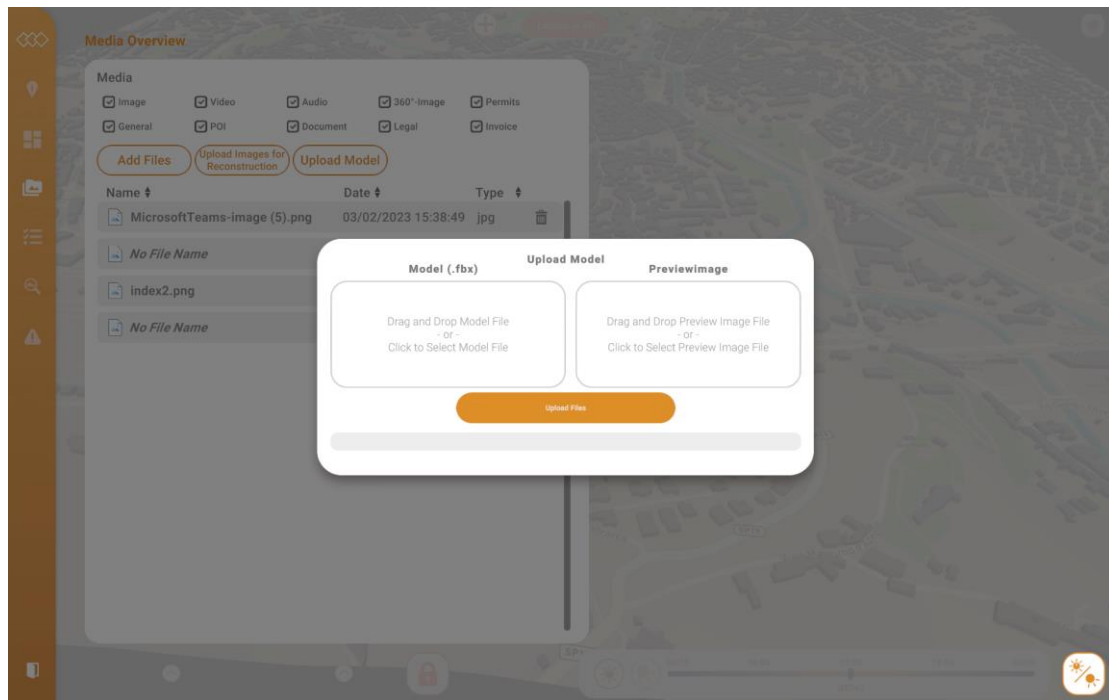Figure 25: Updated File Manager with Visual Analysis data



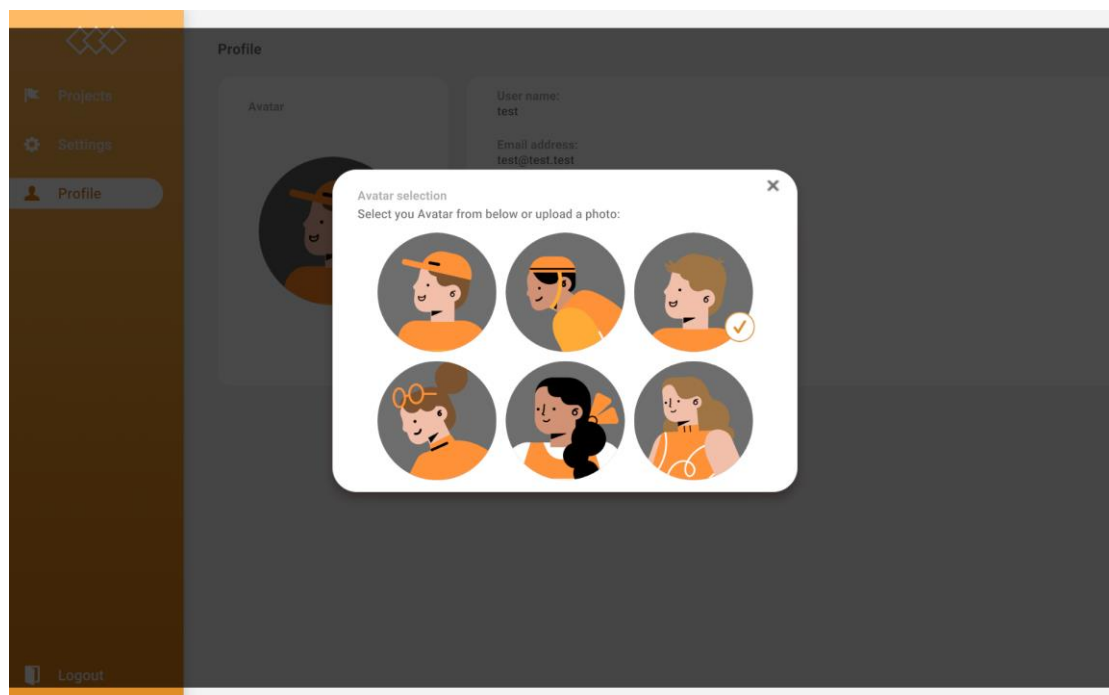Figure 26: File viewer

Figure 27: Upload 3D models



Figure 28: Update profile pictures

# 4 **CONCLUSION**

The deliverable provides an overview on the functionalities implemented in the Final prototype of the Authoring Tool. The final prototype of the Authoring tool of the project will delivered the functionalities needed for a successful product to be used by the users. The tool has been developed with the feedback received after the first prototype was delivered and has been developed with iterative feedback from the users.

The tool provides as the main interface for the xR4DRAMA platform. This deliverable is the final prototype, although the tool requires a bit more development to be able to be released commercially.