



**SMART CITIZEN EDUCATION  
FOR A GREEN FUTURE**

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# D3.3 – GreenSCENT platform

## *“Technical architecture and user guide”*

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## Acronyms

Acronym	Description
CO	<b>C</b> onfidential <b>D</b> ocument
EAB	<b>E</b> xternal <b>A</b> dvisory <b>B</b> oard
EAC	<b>E</b> xploitation <b>A</b> dvisory <b>C</b> ommittee
EC	<b>E</b> uropean <b>C</b> ommission
ECAS	<b>E</b> uropean <b>C</b> ommission <b>A</b> uthentication <b>S</b> ystem
EPM	<b>E</b> xecutive <b>P</b> roject <b>M</b> anagement
GA	<b>G</b> eneral <b>A</b> ssembly
IMB	<b>I</b> nnovation <b>M</b> anagement <b>B</b> oard
MB	<b>M</b> anagement <b>B</b> oard
PC	<b>P</b> roject <b>C</b> oordinator
PU	<b>P</b> ublic <b>D</b> ocument
QP	<b>Q</b> uality <b>P</b> lan
QMC	<b>Q</b> uality <b>M</b> anagement <b>P</b> lan
WP	<b>W</b> ork <b>P</b> ackage



## Executive Summary

This document reports the top-level architecture of the GreenSCENT web platform. It describes the main components, their interactions, and the features each one offers.

Most components are considered as black boxes, so the details of their inner architecture are not described. However, some components are detailed further to highlight the most relevant features of the system, such as scalability or performance.

The guidelines reported in the deliverable D3.1 (**GreenSCENT platform design and integration**) which focus on the management of multimedia content related to green deal topics, laid the ground for the architectural choice of the web platform and the definition of the web interfaces and component/functionality interactions.

Furthermore, this document proposes a section specifically designed to guide end-users on how to use the web application. This section describes web interfaces in terms of:

- The proposed features (filters, buttons, etc).
- How to read the data.
- The data required (mandatory/optional) to perform an action.
- Any other information useful to help the users to understand the interface.



## 2. Introduction

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**GreenSCENT** – Smart Citizen Education for a Green Future – is a research and innovation project funded by the European Union's Horizon 2020 programme, under Grant Agreement N° 101036480.

**GreenSCENT** aims at developing a competence framework embracing all the Green Deal focus areas through an iterative, participatory, experience and learning-by-doing based design approach.

**GreenSCENT** activities embrace both experts' and researchers' inputs and advise, citizen participation and stakeholder engagement initiatives; different European regions, different educational levels (from primary schools to higher education), at different engagement levels (from observation to data collection and processing, to contribute to scientific and policy agenda).

**GreenSCENT** legacy will consist of the Competence Framework (GreenComp), its Methodology, Use Cases, User Guides; Training kits co-designed for implementing the framework; SCENTbox, the set of digital, physical and hybrid demonstrators developed by the project; and ECCEL, a European “driving license” for Climate and Environmental competencies and skills, that will be tested during the project.

This document - **GreenSCENT platform "Technical architecture and user guide"** - describes the top-level architecture of the GreenSCENT web platform and provides a user guide on how to use the web application.

The contents of this document can be summarised as follows:

- *Chapter 3* details the top-level architecture designed for GreenSCENT web platform in terms of components, functionalities, and interaction mode.
- *Chapter 4* provides guidance on how to use the web platform. This section describes all the web interfaces in terms of how to read the proposed data, the mandatory/optional data needed to perform an action, etc.



### 3. Architecture definition

The GreenSCENT web platform has been designed as a seamless pipeline that can effectively store and manage various types of multimedia content, including video, photos, documents, and data, all of which are generated by or made available by the users of the platform.

Figure 1 presents a comprehensive overview of the entire GreenSCENT platform, highlighting the primary functional components and their interactions. The image not only depicts the components, but also showcases the Environmental Monitoring mobile app, which serves as the primary input channel for the platform. Every time a new environmental report is generated, the mobile app communicates with the platform via Restful APIs to stream the environmental report data. Once the report data is stored in the platform, the report becomes immediately visible and ready for processing.

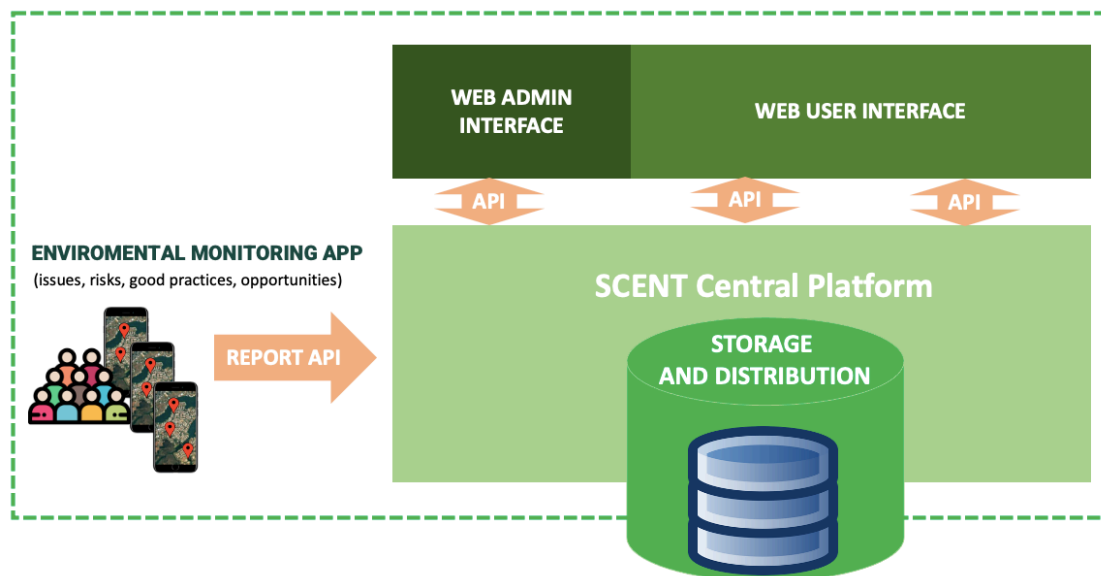


Figure 1 – GreenSCENT Web Platform logical view

The GreenSCENT web platform (Web Admin and Web User interface) is a robust web-application that is accessible through any modern web browser, including popular options such as Google Chrome, Mozilla Firefox, and others that support the HTML 5 standard and WebGL.

The platform was developed using a state-of-the-art open-source middleware stack called MERN (MongoDB, Express, React, Node), which enables the creation of modern web/mobile user interfaces that interact with complex backend system.

To ensure a cohesive and efficient system, the platform adheres to the widely adopted three-tier architecture convention, consisting of a client-tier, a business logic tier, and a database tier. With this architecture in place, the platform provides users with an intuitive and seamless experience, as each tier performs its designated function to the best of its ability.

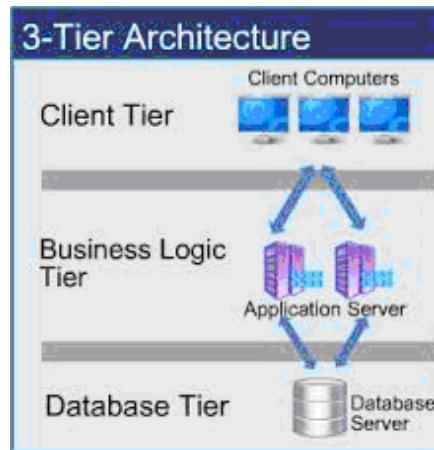


Figure 2 – 3 tier architecture convention

- **Client Tier**

The Client Tier represents the layer of the software responsible for providing all the functionalities related to the user interface and interaction with human users, who act as editors. Its primary role is to bind data from the service layer to HTML templates, which are displayed to the users on a computer or mobile device through a web browser.

To create the "Citizen Journalism" and "Interactive Documentary" tools, which comprise the macro-component of the web user interface, the software libraries React and Three.js were utilized.

React was leveraged to establish the relationships between the service layer and the visual components displayed on the screen while Three.js was employed to synchronize these components.

Moreover Three.js played a crucial role in constructing the "Interactive Documentary" tool, enabling the creation of immersive and interactive experiences by enriching background photos and videos (2D and 360°), with audio, multimedia panels, and links to other scenes. Specifically, Three.js was employed to create the 3D environment where to build the video/image background file enriched with additional elements to then make them available on the web page through an I-Frame.

Since the I-Frame is synchronized with the 3D environment, all changes are immediately visible on the web page thus avoiding the user having to constantly refresh the page to see them.

This implies that, whenever a change is made to the 3D environment, such as adding, modifying, or removing an object, it is dynamically synchronized from the I-Frame without the user having to refresh the web page to view them.

HTML5 post-messages is the communication channel used to exchange data between React and Three.js.

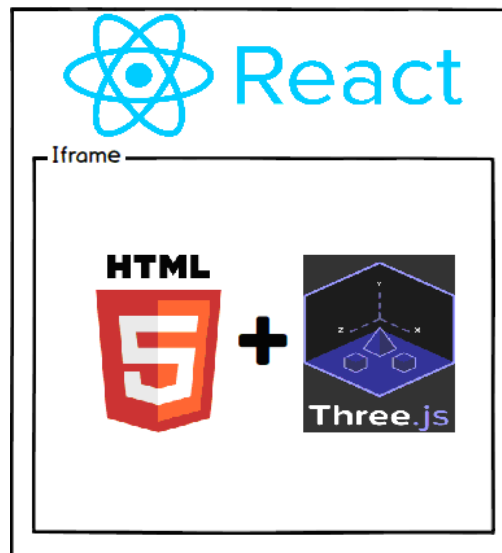


Figure 3 – Frontend components

- **Business Tier**

The Business Tier represents the software layer responsible for the retrieval, processing, transformation, and management of application data. This tier coordinates the application, processes commands, makes logical decisions and evaluations, and performs calculations. It plays a crucial role in ensuring that the application logic operates efficiently, effectively, and in a way that meets the needs of the users.

For example, the business tier logic is responsible for detecting and resolving positional conflicts between different hotspots added to the 360-degree video. It manages the properties and events associated with each hotspot, enabling the user to interact with the video seamlessly. The business tier also facilitates the management of user accounts, login credentials, and access control, ensuring that the system is secure and that only authorized users can access sensitive data.

Moreover, the business tier is responsible for managing the communication between the user interface and the data storage system. It receives requests from the user interface, processes them, retrieves data from the data storage system, and sends the response back to the user interface. It ensures that data is retrieved and processed efficiently, and that the user interface is updated in real-time.

In summary, the Business Tier is a critical component of the software system, responsible for managing the application logic, processing data, and coordinating the interaction between the user interface and the data storage system.

- **Database Tier**

The Database Tier is responsible for managing the interaction with the DBMS (Database Management System), where data is stored and retrieved from a Database or a File System. The retrieved information is then passed back to the Business Tier for processing before being returned to the user. To interact with the DBMS, a set of REST services has been developed that are used both by the web application and external clients.

Was decided to use Mongo DB as the database system for several reasons. Firstly, Mongo DB uses the JSON format to store data, and the same format is used to exchange data among the various layers



of the system, ensuring consistency and ease of use. Secondly, MongoDB is a distributed database system that offers high availability, making it easy to use for a variety of applications. Finally, MongoDB is free and open source, published under the GNU Affero General Public License, making it an affordable and accessible option for organizations of all sizes.

Mongo DB offers several benefits over other database systems, including its ability to handle large amounts of data, high availability, and ease of use. It also provides a flexible data model that allows for easy integration with other systems and applications. The REST services used to interact with the DBMS ensure that data can be accessed securely and efficiently, providing a robust and reliable solution for managing data in the system.

### 3.1. Web Interface

The Web Interface (front end) enables users to interact with a web page running on a remote server via a web browser. The web page is downloaded from the web server, and the user can interact with its content using a web browser, which acts as a client. The web application can only run on modern web browsers that support the HTML5 and WebGL standard. Test sessions are underway to certify all the web browsers capable of running the web application.

The web interface layer comprises two main sections: the "Web User Interface" and the "Web Admin Interface."

#### 3.1.1. The Domain Concept

First, we need to talk about the concept of domain.

Each institution wishing to use the GreenSCENT services establishes a "domain" and has a separate space on the platform in which to store its content and which the users of the institution are authorized to access.

Each domain has its own administrator who manages the space, authorizes users who want to register, checks reports, and so on.

GreenSCENT web platform will provide a set of pre-configured folders according to the institutions that will participate to the project, but new ones can be added according to the needs. It is worth noting that when a new domain is created by the user admin, the GreenSCENT web-platform will immediately make available a new area for such user's domain to upload the raw background videos/images.

#### 3.1.2. Web User Interface

The Web User Interface offers an intuitive and user-friendly interface that allows both registered and non-registered users to access a variety of features. The UI's functions can be grouped into three macro areas: "*creating, searching, and updating content*," "*annotating content*," and "*issue management*."

"*create, search and update content*": The interface allows registered users to have a complete sight of the whole content stored in the platform, to formulate complex semantic searches by merging



keywords and tags, such as Green Deal topics, author, location. The search result is shown as a list of cards where each one of them stand for a multimedia content - *useful for building the knowledge of the Environmental Competence Framework* - and/or reports on environmental issues.

For each card, the most significant information is displayed, such as type of multimedia content, author, date, place, and current state of environmental issues (available only for reports on environmental issues).

In addition to displaying search results as a list of cards (default output), the interface also allows users to view results on a map. By selecting the "Geographical Visualization" option, all the content is displayed as markers on a map, placed according with their GPS coordinates. By clicking on the card/marker, the user can access a dedicated webpage with detailed information about content. Users can further enrich the content by proposing additional information such as comments, links to other content, etc. Only registered users can add more information, while unregistered users can only view information.

The interface also enables registered users to create content. To create new content, in addition to choosing which multimedia content to archive, the user must provide additional information by entering it in the fields proposed by the interface. The most significant information to be provided are:

- "IDENTIFIER": the name that identifies the content.
- "RIGHTS": the rights associated with the content (e.g., CC0, CC-BY-SA, etc.).
- "POSITION": the geographic coordinates associated with the content.
- "CREATOR": the person or institution name that wants to create the content.
- "RIGHTS HOLDER": the person/institution that holds the rights.
- "FILE or URL": FILE to load the file from an external storage area; URL to identify the file by a Uniform Resource Locator.

*"Issues management"*: Issues management is a crucial aspect of the interface, as it provides registered users with the ability to create reports on specific environmental issues. To create a report on an environmental problem, users must provide detailed information, such as a detailed description of the problem, one or more photos or videos showing the issue, and its associated geographical coordinates. Once the report is created, it becomes immediately visible to the domain admin to be processed.

Worth noticing that, as depicted in the Figure 1, the environmental reports can be produced also through the mobile app available on iOS and Android.

The issue lifecycle comprises four statuses: **to be approved**, **approved**, **rejected**, and **solved**. Whenever a new environmental issue is created, it is assigned the *"to be approved"* default status. Once all the necessary checks have been performed, the domain administrator can validate the issue by changing its status to *"approved,"* or reject it by changing its status to *"rejected."* Rejected reports will remain accessible only to the owner and domain admin for a short period before being permanently removed. Finally, whenever an environmental concern is resolved the domain administrator as well as the owner of the concern can change its status from *"approved"* to *"solved"*.

To handle the data exchange between the mobile app and the front-end user web interface a set of dedicated Restful APIs has been created. JSON has been chosen as the exchange data format to ensure seamless data transfer.

The Figure 4 depicts the issue workflow adopted to manage the Environmental issue reported by the users.

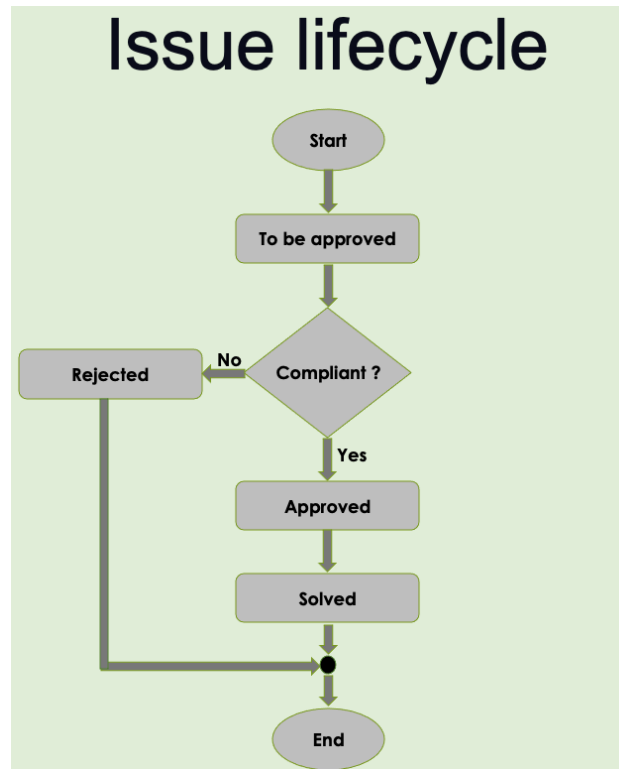


Figure 4 – Environmental Issue Lifecycle

As stated, the issue lifecycle comprises four statuses: **to be approved**, **approved**, **rejected**, and **solved**.

Below is the transition table – Table 1 – showing from which initial state to which other state you can switch and who can do it (owner and/or domain admin)

Current State	New State	Who can do it
	<b>To be approved</b>	Any registered user (via Mobile APP or SCENT Web Platform)
<b>To be approved</b>	<b>Approved</b>	Domain admin
<b>To be approved</b>	<b>Rejected</b>	Domain admin
<b>Approved</b>	<b>Solved</b>	User who reported the problem or domain admin

Table 1 – Environmental reports transition state

“*annotate contents*”: The SCENT web platform offers a powerful feature called "Interactive Documentary", which enables the creation of immersive and interactive experiences. With the "Interactive Documentary" video editing tool, users can enrich the background photos or videos (including 360° footage) stored in the SCENT platform with additional elements. The tool provides a wide range of elements to overlay on the background videos/photos, including images, HTML links,



2D videos, and text. For each element, the user can define properties that specify its visual appearance and events that define interactive actions to trigger during playback (e.g., displaying an image when the element is clicked).

The architecture adopted for video/image editing is depicted in Figure 5. The software component involved to create a new immersive and interactive experience, are:

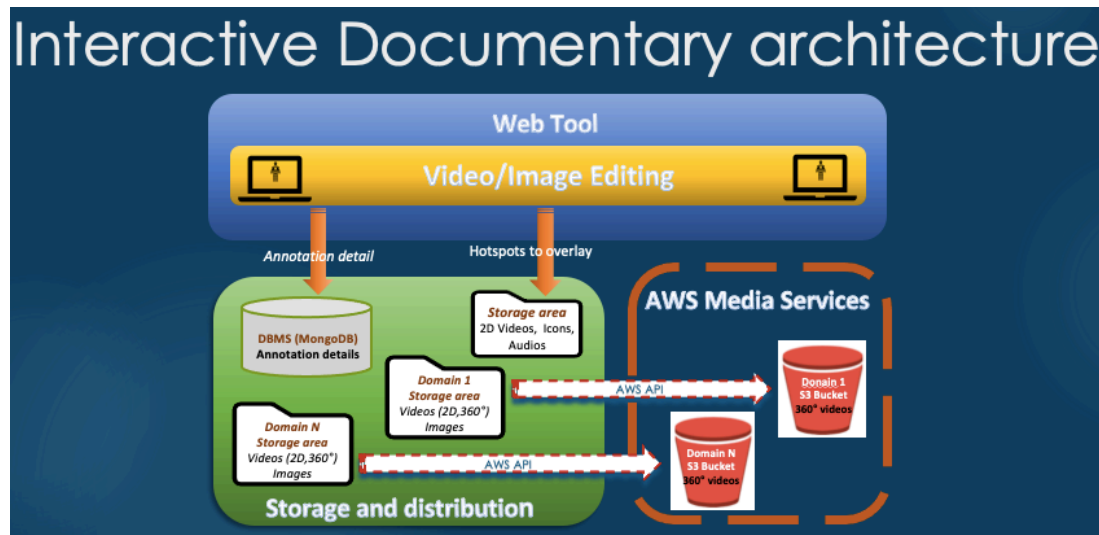


Figure 5 – Video/Image editing architecture

- **Storage Area:** This area serves as a repository for the raw interactive elements (hotspots). Different types of hotspots such as videos, audios, and icons are stored in this area, which users can use to enrich a background video/image. New hotspots can always be uploaded to this repository if needed.
- **DBMS (MongoDB):** MongoDB is the database where the annotation details of each hotspot used for enriching a background video/image are stored. For each hotspot are stored the properties set by the user such as color, size, its vectorial coordinates - *to identify where it should be placed on the background video* - and duration - *to identify for how long it should appear* - as well as the URL to locate it. Furthermore, if set by the user, all the events associated with it will also be stored and the related actions to be activated are stored in MongoDB.
- **Domain (1..n) Storage Area:** This area stores all the raw background videos (360° and flat) and images that can be enriched to create new immersive and interactive experiences. Each area can be broken down into folders to classify different types of raw background files (2D video, 360 video, and image). GreenSCENT web platform provides a set of pre-configured folders, but new ones can be added according to the users' needs. It is worth noting that when a new domain is created by the Platform administrator, the GreenSCENT web-platform will immediately make available a new area for such user's domain to upload the raw background videos/images.
- **S3 Buckets (1.. n):** To smooth and improve performance for both interactive video editing and playback the raw background video enriched can be processed in a dedicated pipeline to copy them in a high-performance streaming video server. This feature is optional as it requires an AWS. Currently as streaming server is supported AWS Amazon (*EC2 and Cloud Front*) but test sessions are underway to certify other streaming servers. It is worth noticing that if the user does not have an AWS Amazon account or does not want to use it, the tool can still work

by accessing the raw background file locally, even if there will be a significant performance degradation during streaming.

The Figure 6 depicts the architecture adopted for video/image fruition.

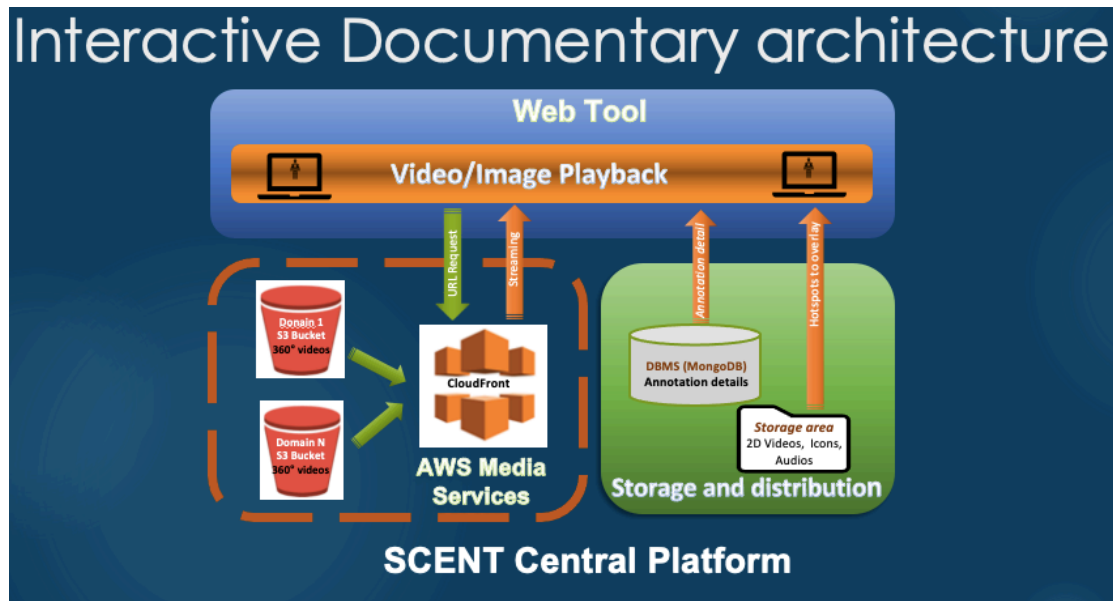


Figure 6 – Video/Image Playback

When a new immersive and interactive experience is produced, the background raw file, as reported above, can also be uploaded to a high-performance streaming video server to enhance performance during video editing and playback (this feature requires an AWS account). This ensures that the user experience during playback remains fluid, even for high-definition videos (above 4k, 30 fps) even though, network bandwidth limitations can affect the fluidity of the playback experience.

Moreover, the choice to store in a dedicated area the interactive elements and fetched them on the fly during playback, never alter the background raw file so that it can be reused for further annotation.

The software component involved to create a new immersive and interactive experience, are:

- **Storage Area:** The video/image playback accesses this area to retrieve the raw interactive elements (hotspots) to overlay during the video/image fruition.
- **DBMS (MongoDB):** MongoDB is accessed to retrieve the annotation details of each hotspot. This includes retrieving properties set up by users during the annotation process, such as the hotspot's colour, size, coordinates for placement and duration, and the URL to locate the raw interactive element (hotspots) stored in the "Storage Area." Additionally, the events associated with each hotspot and their corresponding actions to be triggered during fruition are also retrieved for each hotspot.
- **AWS Media Service:** To playback the immersive and interactive videos, the user must fill in the video URL in a web-browser that supports HTML5 and WebGL. In such a way the web player will be able to start interacting with the AWS media services to access the video streaming.





When the video fruition starts, the video player interacts both the "Storage Area" to get the raw interactive elements to overlay and with MongoDB - DBMS (MongoDB) - to retrieve, for each of them, the annotation details in term of properties and events.

If the user doesn't have an AWS Amazon account or doesn't want to use it, the player can still work by accessing the raw background file locally, but there will be a significant performance degradation during streaming especially whether many users are going to stream the same content at the same time.

The "Interactive Documentary" feature is particularly useful for creating engaging and informative stories about environmental issues. Citizens, youth, and students can leverage this tool to create original content that evolves over time, thereby improving the quality of the results. By combining different types of content such as images, 360° videos, and flat videos, the Interactive Documentary tool allows for the creation of immersive and interactive experiences that capture the attention of viewers and help them better understand complex issues. The tool also provides users with the ability to archive and manage their content using distributed database and file system technologies, making it a reliable and scalable solution for content creators.

### 3.1.3. Web Admin Interface

The web admin interface is a user-friendly platform accessible only by administrators. This interface offers several features that can be grouped into three main areas:

*"User Monitoring"*: The administration web interface provides a range of features to monitor logged in users such as running queries to filter users by status and/or domain and more.

*"Community Management"*: This area allows administrators to create new domains and update existing ones, approve, delete, or reject registration requests from new users to the web platform.

*"Content and Issues Management"*: This area allows administrators to approve or reject environmental issues changing their status to **"approved"** or **"rejected"**.

Moreover, the admin web interface could be enriched with external module responsible of backup policies, checking disk space, and more.

### 3.1.4. Storage and distribution module

The storage and distribution module of GreenSCENT plays a crucial role in the platform by providing a reliable and scalable storage solution for different types of content and ensuring high-performance delivery when required.

Through the storage and delivery module several media formats such as images, 360° and flat videos, audio and so on can be stored and distributed efficiently. To ensure optimal performance and efficient management of content, the archiving layer was built on using a distributed database and file system.

As we have already said MongoDB was selected as the database for its ease of use, high availability, free and open-source nature and published under the GNU Affero General Public License. MongoDB offers a plenty of features that allow for efficient data management and organization, making it an ideal choice for GreenSCENT needs. Several collections have been defined in MongoDB to store the



content details (i.e.: description, metadata, URL for direct access, rights, ...) as well as the annotation elements and their details (hotspots to overlay) whenever a new immersive and interactive experiences is produced. These collections are designed to provide a structured approach to store and retrieve content-related data, ensuring that the data set is consistent and easily accessible.

The file system is another critical component of GreenSCENT storage and distribution module. It is widely used to upload and download raw files, such as images, 360° and flat videos. This ensures that the content can be accessed efficiently and provides a seamless user experience.

To interact with the DBMS, a set of REST services has been developed that are used both by the web application and external clients. A set of RestFul services has been developed to allow external clients to interact with the MongoDB. Such services are extensively used by Environmental Monitoring APP to query, archive, and update data in MongoDB.

Overall, the storage and distribution module is an essential component of the GreenSCENT platform that enables efficient content management and delivery to end-users.



## 4. Web Platform Handbook

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### 4.1. Introduction

The purpose of this document is to provide a comprehensive guide to the interface of the GreenSCENT web platform. The document aims to outline the platform's features and tools in detail, providing step-by-step instructions for users to navigate and effectively use the interface.

To help illustrate the features and functionalities of the interface, screenshots and diagrams will be provided throughout the document.

This document is divided into several chapters:

- Chapter 4.2 provides an overview of the main features available on the home page, such as accessibility and language settings. It also provides information about the different types of users who can access the platform.
- Chapter 4.3 focuses on the web interfaces for access and domain management. This chapter provides detailed instructions on how to manage user access and domain settings.
- Chapter 4.4 covers the web interfaces for content management. It offers guidance on how to read and manage the data, including both mandatory and optional data required to perform specific actions.
- Chapter 4.5 focuses on the "Interactive Documentary" web interfaces, which allow users to create immersive and interactive experiences. This chapter provides detailed instructions on how to use this feature to its fullest potential.
- Chapter 4.6 focuses on citizen journalism web interfaces for creating and managing environmental reports. This chapter provides detailed instructions on how registered users can create the environmental reports and how these are managed by the domain administrator.

Overall, this document aims to provide users with a comprehensive understanding of the GreenSCENT web platform's interface, enabling them to use it effectively and efficiently.

Please note that the platform will be fully launched after the pilot phase. As such, the web interfaces depicted in the following paragraphs may be modified and improved in the future based on the feedback received.

### 4.2. Home Page - Overview of the main features

#### 4.2.1. What the home page looks like

To access the GreenSCENT web platform, users can simply visit the website's URL at [greenvrse.net](https://greenvrse.net). Once on the home page (as shown in the Figure 7), users will find a top ribbon that displays the project logo and a set of clickable icons. These icons provide access to a range of useful functions, such as enabling or disabling accessibility options, changing the interface language, editing user profiles, and more.

The central area of the home page consists of five sections, each catering to specific user needs. The "CREATE" section allows registered users to access a repository of videos and images (plain and 360°) that can be used as a background for creating new immersive and interactive content (image and video). The "LIBRARY" section offers registered users access to a repository of immersive and interactive content (images and videos) produced by the user community to which the individual belongs. The "ALL MEDIA" section provides registered users with a library of multimedia resources of all types generated by the user community to which the individual belongs. These multimedia resources can be shared via URL or QR Code, and they can also be used as annotation elements to create new immersive and interactive content. Additionally, the "CITIZEN JOURNALISM" section provides registered users access to a list of all environmental reports, along with comprehensive information for each report, such as its status, a detailed description, geographical coordinates to locate the issue, and more. In this section, registered users can also create new environmental reports. Lastly, the "EXPLORE" section grants access to a public archive area that is open to both registered and unregistered users. This section contains all the contents that have been made public by the platform's users, providing a wealth of knowledge and inspiration for exploration.

The home page also includes a lower ribbon that displays the logos of the consortium partners and provides information about the funding received from the European Commission.



Figure 7 – Web Platform Home Page

#### 4.2.2. Multi-languages

The Web Platform allows for language management. To access this feature, click on the "languages" icon as depicted in Figure 7. This will open a dialog page that displays a list of languages managed by the application (Figure 8). After selecting your preferred language, the web interface will appear in the selected language.

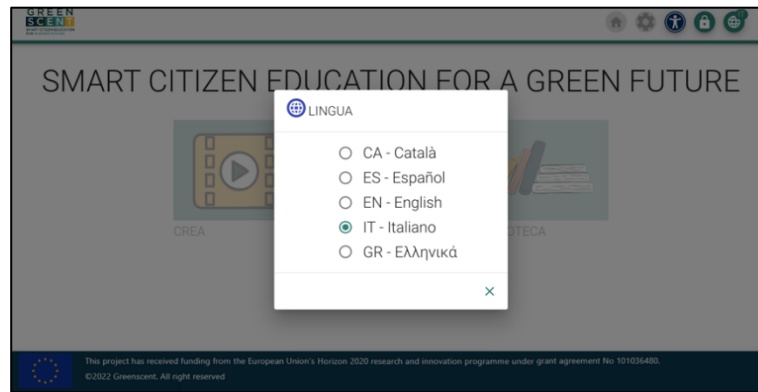



Figure 8 – Languages list supported.

Once the initial selection has been made, the web browser will remember the choice made by the user. However, the selection can be modified at any time.

#### 4.2.3. Accessibilities

The Web Platform offers a range of accessibility features to enhance user experience. To access these features, click on the  "accessibility" icon. This will open a dialog page as depicted in Figure 9, presenting the accessibility options managed by the application.

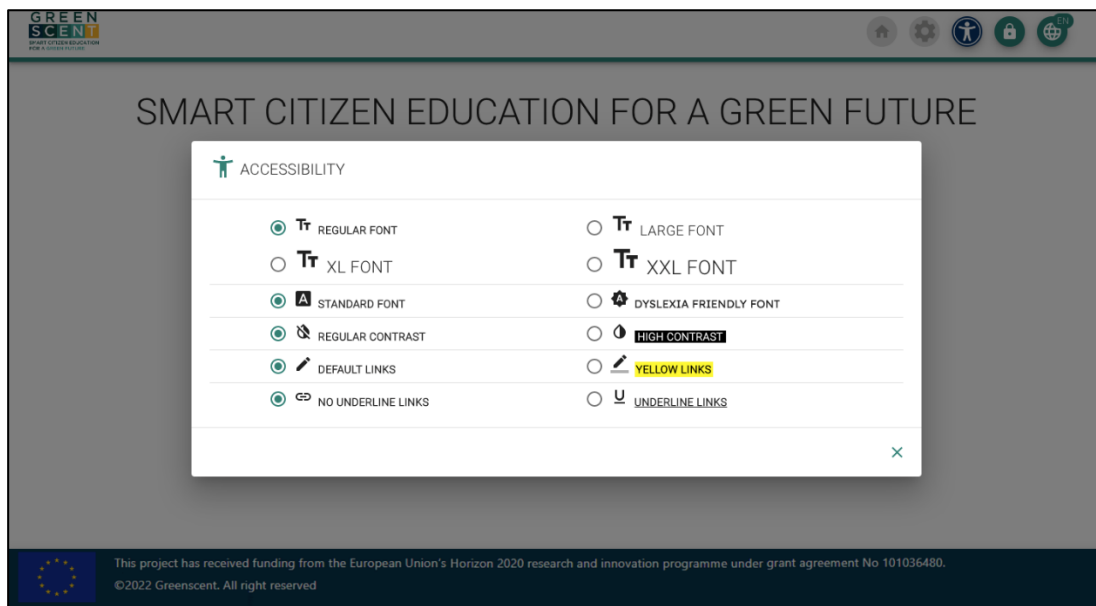


Figure 9 – Accessibility features.

The accessibility options include:

- Changing the font size, with options for regular, large, X-Large, and XX-Large font sizes.
- Adapting the font for individuals with dyslexia.
- Adjusting the visualization contrasts for improved legibility.
- Highlighting links with a yellow background for better visibility.
- Underlining links to optimize visualization.

By making use of these accessibility features, users can tailor their browsing experience to their specific needs, ensuring greater comfort and ease of use.

#### 4.2.4. Setting

By clicking on the "setting" icon, registered users can access a web page where they will see one, two, or three web tabs displayed based on their user profile.

If the logged-in user is an **"Institution associated user"** (see section 4.3.1 Type of users), as shown in Figure 10, only the "USER PROFILE" web tab will be displayed. This tab summarizes the user's information, such as their "NAME," "EMAIL," "ROLE," "INSTITUTION," and "REGISTERED" (registration date). They can also change their profile picture and password from this tab.

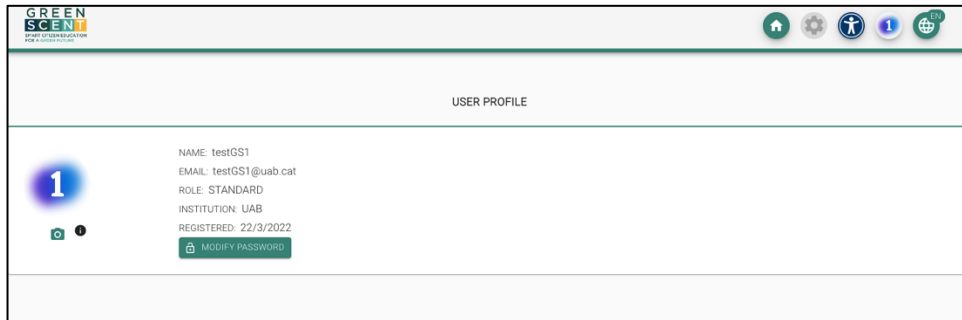


Figure 10 – Setting web page.

If the logged-in user is an **"Institution admin"** user (see section 4.3.1 Type of users), as depicted in Figure 11, both the "USER PROFILE" and "USERS" web tabs will be displayed. The "USERS" tab lists all the "associated users," and each user is represented by a line on the list. For each user, the most significant information is displayed, such as their "NAME" and "ROLE," and an EDIT/DELETE icon allows the admin user to change the user's state (as shown in Figure 12).

NAME ↑	EMAIL ↑	INSTITUTION SHORT NAME ↑	ROLE ↑	STATUS ↑	REGISTERED ↑	ACTION
Marina Pujadas Ferreras	marina.pujadas@uab.cat	UAB	STANDARD	APPROVED	17/06/2022	
Marta Brescia	marta.brescia@uab.cat	UAB	STANDARD	APPROVED	17/06/2022	
Pilar Orero	pilar.orero@uab.cat	UAB	STANDARD	APPROVED	17/06/2022	
Sarah Anne Mcdonagh	sarahAnne.mcdonagh@uab.cat	UAB	STANDARD	APPROVED	17/06/2022	
test	test@uab.cat	UAB	STANDARD	TO APPROVE	26/05/2023	

Figure 11 – Users management page.

Clicking on the "EDIT" icon, the **"Institution admin"** user accesses a dialog web page (as shown in Figure 12) where they can change the user's state.

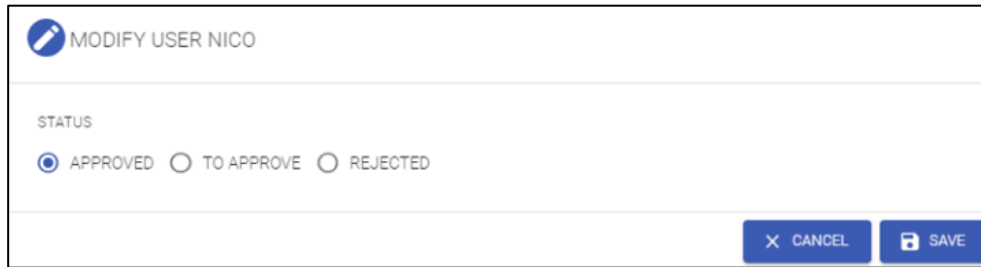


Figure 12 – Dialog page to change user state.

The transition table below (Table 2) shows from which initial state to which other state the user can switch.

Current State	New State
To be approved	Approved
To be approved	Rejected

Table 2 – Transition state

If the logged-in user is the **"GreenSCENT Platform administrator"** (see section 4.3.1 Type of users), as depicted in Figure 13, all three web tabs, "USER PROFILE," "INSTITUTIONS," and "USERS," will be displayed.

The "INSTITUTIONS" tab, as shown in Figure 13, lists all the institutions currently registered, with each institution represented by a line on the list. For each institution, the most significant information is displayed, such as their "LEGAL NAME" and "COUNTRY," as well as the information related to its administrator user (i.e., "ADMINISTRATOR NAME" and "ADMINISTRATOR EMAIL"). An "EDIT" icon allows the admin user to update the institution data.

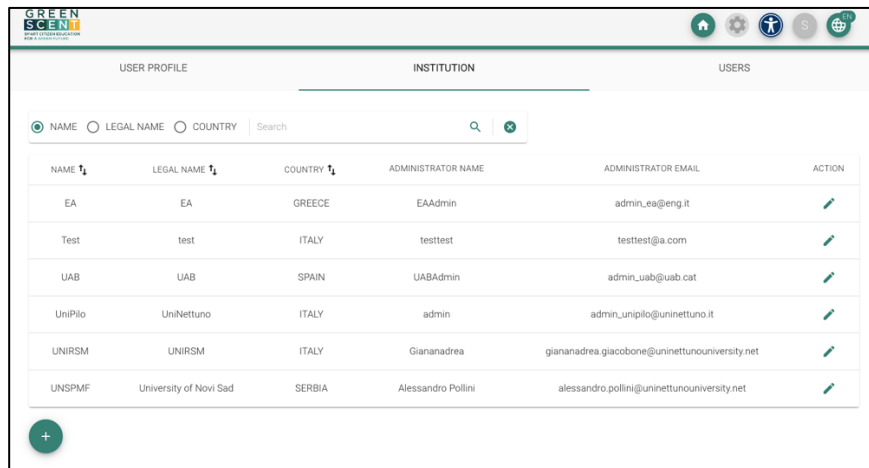


Figure 13 – INSTITUTION tab with the list of the institutions currently registered.

By clicking on the "ACTION" icon, the administrator can access a dialog web page (as shown in Figure 14) where it is possible to update institution data such as its legal and short name, change the institution's admin user, or update the administrator's email address.

Figure 14 – dialog page to update institution data.

Furthermore, on the "INSTITUTIONS" web page, clicking on the icon provides the **GreenSCENT Platform administrator** access to a dedicated dialog page for creating a new institution (as shown in Figure 15).

Figure 15 – dialog page to create a new institution.

To create a new institution, the administrator will need to fill in the following fields:

- "INSTITUTION SHORT NAME" with the short name of the new institution to register.
- Choose the institution country from the dropdown list "COUNTRY."
- "INSTITUTION LEGAL NAME" with the legal name of the new institution to register.
- "NAME" with the administrator's name.
- "PASSWORD" with the administrator's password.
- "EMAIL" with the administrator's email.

Then, they can press the "SAVE" button to submit the new institution creation request. A mail will be sent to the institution administrator in several languages to inform him/her that he/she has been chosen as the administrator of the new cultural institution.



## 4.3. Access and domain management


### 4.3.1. Type of users

The GreenSCENT web platform offers different levels of access and permissions to its users, based on their user type and responsibilities. This helps ensure that users can perform their tasks effectively and efficiently, while maintaining the security and integrity of the platform.

The types of users managed by GreenSCENT are the follows:

- **Institution admin users:** They act as administrators for their respective institutions and are responsible for managing new registration requests, creating and/or annotating content, and managing environmental reports. Each institution can have only one defined administrator user.
- **Institution associated users:** These users belong to an institution for which they have requested registration and are authorized to collaborate by creating several types of content such as videos, images, audio, texts, etc. They can also update content metadata or create new ones.
- **Unregistered users:** These are users who have not registered on the GreenSCENT web platform. They can only view the content listed in the "EXPLORE" section.
- **GreenSCENT Platform administrator:** This user, commonly referred to as "superuser", is defined during platform setup. He/ she has high-level privileges that allow him/her to manage the portal and to register and update cultural institutions and their administrative users.

### 4.3.2. Login

To access the web platform, users need to click on the  "LOGIN" icon, which will redirect them to the login web page. On this page, users are required to provide the following information:

- Enter their username in the "EMAIL" field.
- Enter their password in the "PASSWORD" field.
- Select their institution name from the "SELECT INSTITUTION" dropdown list.

Figure 16 shows an example of the login web page. Once users have entered their login credentials and selected their institution, they can log in to the web platform by clicking on the "LOGIN USER" button. If there are any errors or incorrect information entered, the system will display an error message.



Figure 16 – Login web page.

Additionally, the login web page also provides users with links to access the user registration web page by clicking on the "Register now" link (see section 4.3.3 for more information) and to recover their password by clicking on the "forgot password" link (see section 4.3.4 Forgot password. for more information).

### 4.3.3. Register.

By clicking on the "**Register now**" text link displayed on the login web page, users can access the registration form as shown in figure Figure 17. The form requires users to fill in several fields, including their nickname, email, password, and confirmation of the password. Additionally, users must select their institution from the dropdown list and read and agree to the disclaimer by checking the appropriate box.

Figure 17 – Registration web page.

Once users have completed the registration form, they should press the "REGISTER" button to submit their request. If the request is successful, a message will appear indicating that the registration request has been sent to the institution's administrator. However, if any errors occur during the submission process or if the information provided is incorrect, error messages will be displayed on the page.

After submitting their registration request, users must wait for the institution's administrator to verify and approve their request. Once the administrator approves or rejects the request, users will receive a notification email informing them of the decision. If their request is approved, they can access the portal and enjoy its features. However, if it is rejected, they will not be able to access the portal.

### 4.3.4. Forgot password.

By clicking on the "forgot password" text link displayed on the login web page, users can access the forgot password form as shown in Figure 18. In the forgot password form, the users are required to provide the following information:

- Enter the email address associated with their account in the "EMAIL" field.
- Select the institution name from the dropdown list "SELECT INSTITUTION".

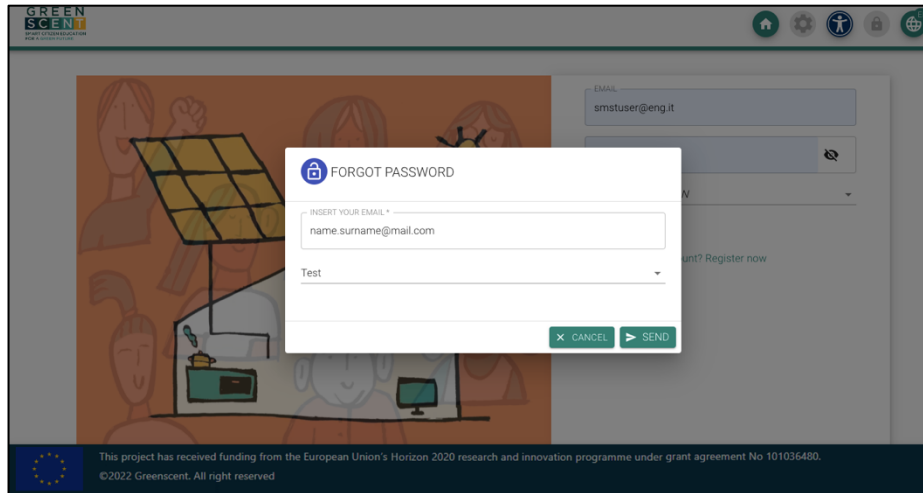


Figure 18 – Forgot password web page.

After filling in the required information, users can submit the recovery password request by clicking the "SEND" button. Once the request is received, the system will perform an internal check to ensure that the email and domain belong to a registered user on the platform. If the email and domain are valid, an email will be sent to the email address provided in the "EMAIL" field with instructions on how to recover the password.

## 4.4. Content management

### 4.4.1. Explore section.

On the website's homepage, [greenvrse.net](https://greenvrse.net), users, both registered and unregistered, can access publicly shared content by clicking on the "EXPLORE" section (Figure 19).



Figure 19 – GreenSCENT Home Page

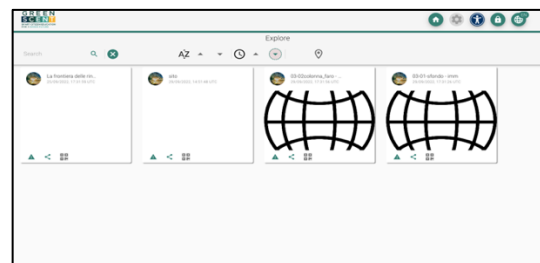


Figure 20 – Explore Web Page.

The Explore Web Page (Figure 20) provides a top toolbar that allows users to:

- search for content by keyword (in titles),
- display the content alphabetically (in ascending or descending order),
- display the content by the latest updated date,
- search for geo-referenced content

The central area of the Explore Web Page presents a list of clickable cards, each of which represents a content.

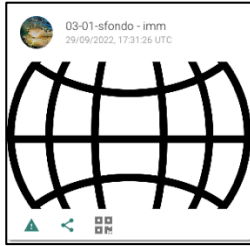


Figure 21 – Clickable card

Each card (Figure 21) is composed of a top ribbon that displays the user's avatar who created the content, the content's title, and its creation date. Below this ribbon is an image that identifies the content and a brief description. Finally, a bottom ribbon contains a set of icons to share the link or get the QR code.

By clicking on the card, the user get access to a dedicated web page that displays detailed information about the content's metadata, such as the "date of creation," "copyright," "grants," and so on (referring to Figure XX). Furthermore, on the same web page, the native multimedia content is displayed in its original size if it is an image. If it is a video or audio, it can be played using the built-in video player, including 360° videos. If it is an external link, it is shown as clickable text that directs the user to the external resource.

#### 4.4.2. Create section.

Upon clicking on the "CREATE" section, the user will be directed to a dedicated web page where the contents produced by the user's institution are displayed (as shown in Figure 22).

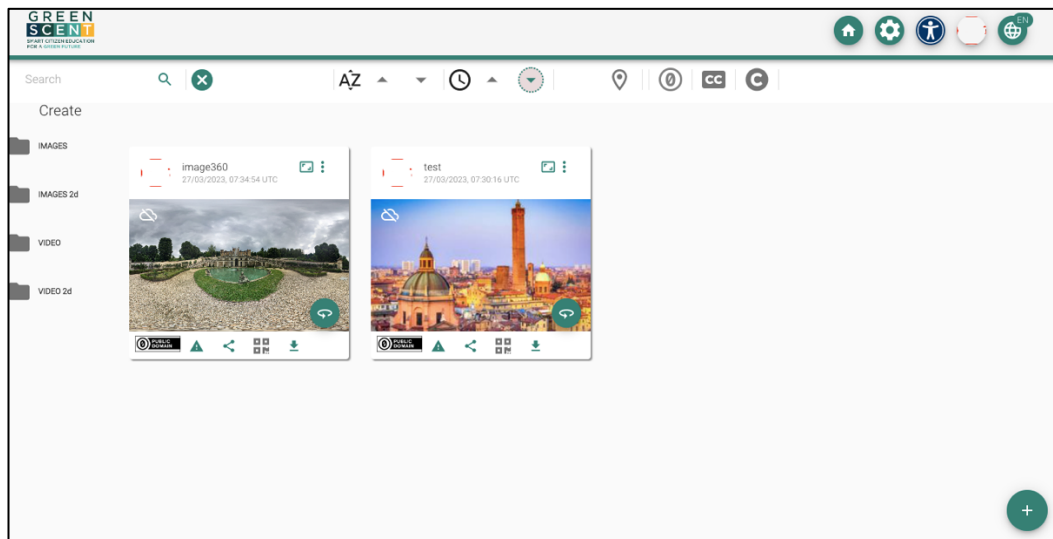


Figure 22 – CREATE Section

The web page contains a top toolbar that offers a range of functionalities to:

- search for contents by keyword (based on titles),
- display the content alphabetically (in ascending or descending order),
- display the content by the latest updated date,
- search for geo-referenced content,
- display only images file,
- display only audios file,
- display only videos file,
- display only documental content,

- display contents with rights type CC0.
- display contents with rights type CC.
- display contents copyrighted.

The web page also features a vertical panel that contains a single-level hierarchical directory structure, which is pre-configured with several directories. These directories include:

- /**IMAGE**: which contains equirectangular and panoramic images
- /**IMAGE 2d**: which contains plain images
- /**VIDEO**: which contains 360° videos
- /**VIDEO 2d**: which contains plain videos

A central area features a list of clickable cards that represent the contents and a clickable icon to access a dialog web page for adding new content.




Figure 23 – CREATE section list of cards

Each card (as seen in Figure 23) consists of a top ribbon that displays important information such as

- avatar of the user who created the content,
- title and the creation date of the content.
- an icon that indicates the type of content ( documental; audio; video; image)
- a clickable icon will be displayed for users who are also the content owners that provides additional options such as editing, duplicating, or deleting the content

Each card also features an image that best represents the content, a clickable icon above it to access the "Interactive Documentary" tool - *for creating engaging and interactive experiences by enriching the selected image as background* - and finally a ribbon at the bottom showing information about:

- an icon that indicates the content's rights,
- a clickable icon that allows users to get and share the content link,
- a clickable icon to download the QR code
- a clickable icon enabled only for content owners, to allows them to download the content.

When the user clicks on the  icon, they are granted access to a dedicated dialog page that enables them to create a new resource (as displayed in Figure 24).

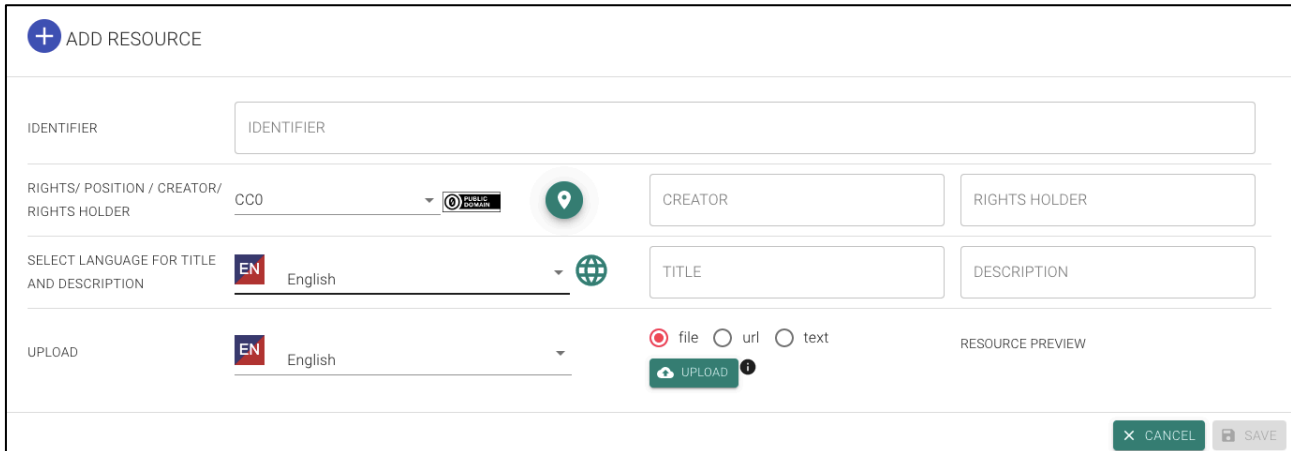





Figure 24 – New resource creation

In the “ADD RESOURCE” dialog page, the users are required to provide several essential pieces of information:


- Fill in the “IDENTIFIER” field with a short text that easily identifies the resource.
- Select the appropriate rights to be assigned to the resource from the "RIGHTS" drop-down list.
- Click on the  icon to access a geographical map to geo-reference the resource.
- Fill in the “CREATOR” and “RIGHT HOLDER” fields with information about the creator and right holder of the resource (i.e.: a person, an organization etc.)
- Select the language for title and description fields from the "SELECT LANGUAGE FOR TITLE AND DESCRIPTION" drop-down list.
- Click on the  icon to insert a title and a description in another language different from the default “English.”
- Fill in the “TITLE” field with the title to assign at the resource.
- Fill in the “DESCRIPTION” field with a brief description of the resource.
- Select the language of the resource to manage (i.e.: file to upload; URL; text), from the "UPLOAD" drop-down list.
- Depending on the selection, users must then select the media type to manage by choosing one of the predefined options:
  - “**file**” option selected: users must upload a media file by clicking the button , which will prompt them to select the multimedia resource from their local hard disk or cloud area.
  - “**url**” option selected: users must choose the media type from the "Media Type" drop-down list and fill in the field “URL” field with the resource’s URL.
  - “**text**” option selected: users must fill in the text field with the resource.
- In the preview area will be playout the media file according to the resource loaded.

Once all the required information is filled in, users can create the resource by clicking the "SAVE" button. The newly created resource will immediately appear as a new tab in the central area of the CREATE section web page.



#### 4.4.2.1. Interactive Documentary

Upon clicking on the "CREATE" section, the user will be redirected to a dedicated web page where the contents produced by the user's institution are displayed (see section 4.4.2 Create for more information), as demonstrated in Figure 23.

The central area of this page shows a list of cards – each one represents a content - where, some of these, have a clickable icon  depicted above them.

By clicking on this icon, the user can access an interactive documentary tool for annotating the selected resource with additional interactive elements, whether it's an image or a plain or 360° video file, to be used as a background.

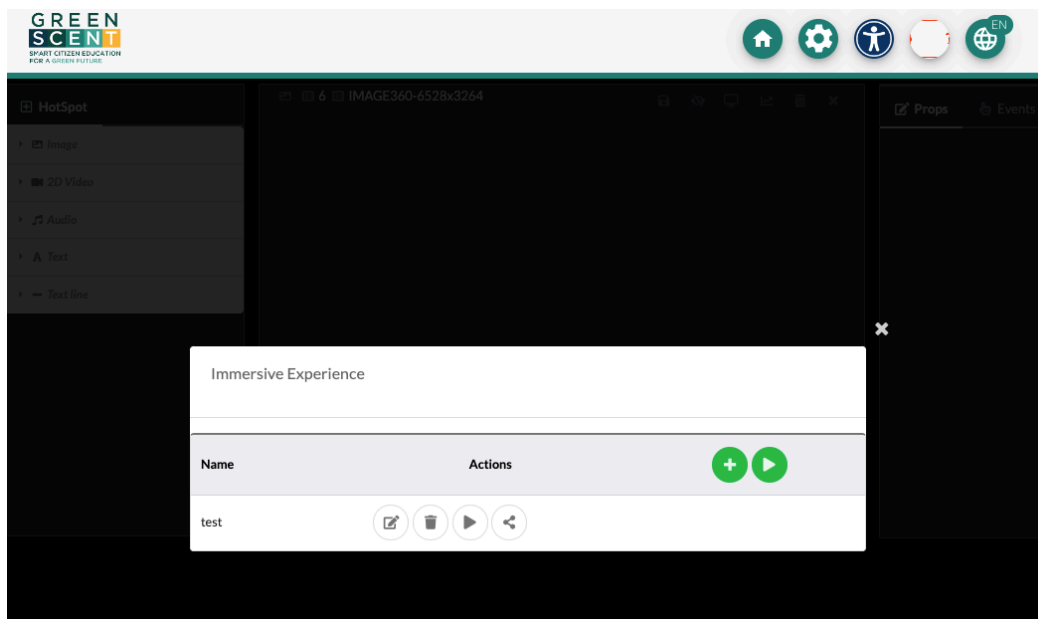










Figure 25 – List of registered immersive experience

Before proceeding with the video/image editing phase the interface shows a dialog web page (as shown in Figure 25) with the following information:

- A list of currently registered immersive experiences, where each row of the list shows a configuration with a name and a set of clickable icons for:
  -  update the configuration.
  -  delete the configuration.
  -  play the immersive experience file in a new browser tab.
  -  copy the link to share the immersive experience.
- Two clickable icons respectively  to create a new immersive experience using the video editing tool and  to play the background video/image only in a new browser tab.

After assigning a name to the immersive experience to be created, clicking on the icon  the user get access to the annotation interface, which is displayed in Figure 26.

It is worth noting that whenever a new configuration is created, it will be visible in the LIBRARY section as a new CARD.

This implies that only by accessing the LIBRARY section will it be possible to update the immersive experience by clicking on the icon  depicted above the CARD. Such icon will only be shown on cards (multimedia content) owned by the logged in user.

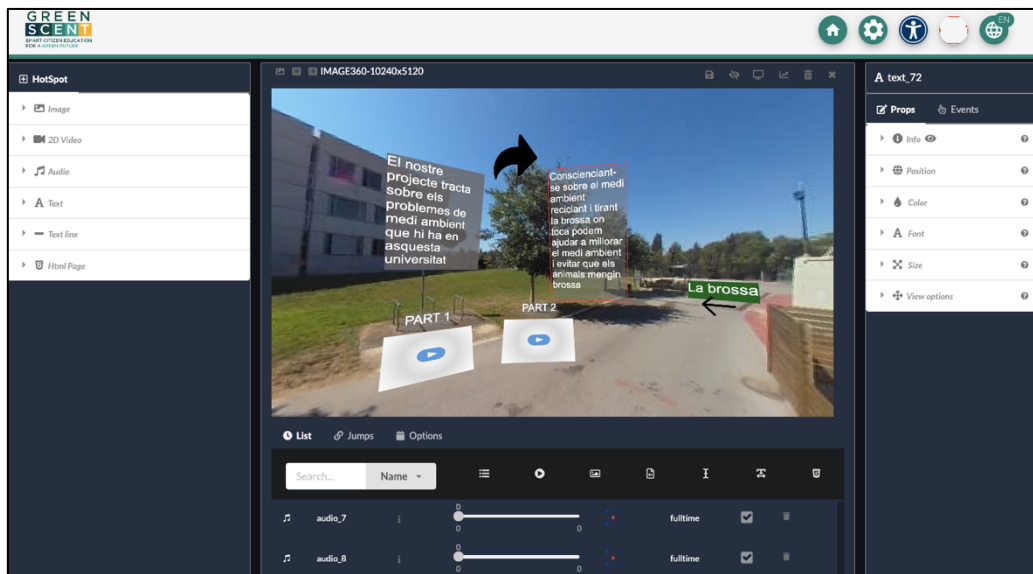


Figure 26 – Video editing web interface

The UI comprises a preview area where the background video/file is displayed for annotation with additional interactive elements. Two vertical panels are placed on the left and right sides of the preview area, and two ribbons appear above and below the preview area. The left panel displays all Hotspots, grouped by type, that can be overlaid onto the background video/image file. The right panel, instead, allows user to set the properties, such as colour, size, and timespan, for the selected hotspot on the "props" tab, and the related events.

The left panel, presents the following hotspot types as shown in Figure 27 including:

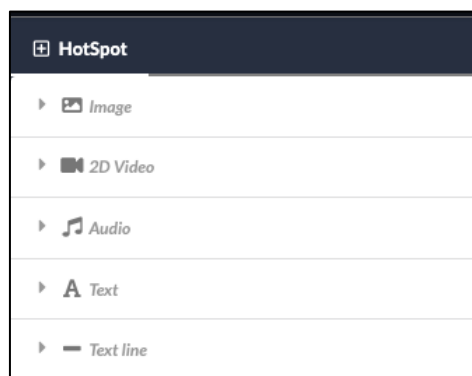




Figure 27 – Video editing hotspots type

The "Image" hotspot can be added to the preview area by clicking on the icon , which appears upon opening the menu button , and then clicking on the desired position on the video/image displayed in the preview area. Users have the flexibility to adjust the position of the hotspot by dragging it to the desired location.

Once the hotspot is added to the background video/image, users can view and modify its properties in the right panel as shown in Figure 27.



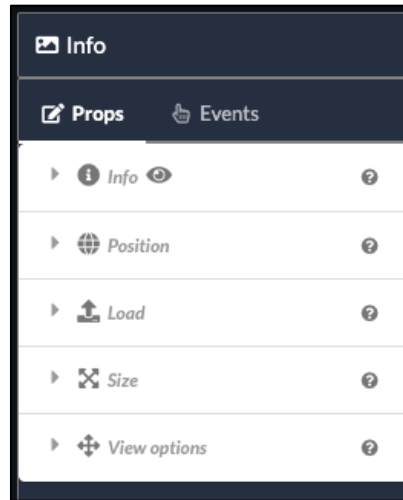


Figure 28 – Image properties

Table 3 list the properties that become available in the right panel after adding the hotspot to the background video/image.





 	Info	This property allows to assign a name and brief description to the hotspot image. - <i>Name</i> : enter a name. - <i>Description</i> : enter a short description.
	Position	This property allows to change the image position acting on the three-dimensional coordinates X, Y, Z
	Load	This property offers a set of option to load an image: - Load the image from your local storage area. It worth noting that the resource loaded will be automatically stored into the platform - Load an image resource by choosing one of those proposed in the list of resources stored in the platform
	Size	This property allows to resize the image size operating on width but maintaining the ratio between the two dimensions
	View options	These properties allow to set some optional choices about the way the image is shown: <ul style="list-style-type: none"> <li>- SHOW HOTSPOT (true/false, default true). If false, the hotspot is invisible, and it must be made visible (turned on) by some event.</li> <li>- BLINKING (true/false, default false). If true, the image blinks. It’s possible to choose the pace of the blinking (slow/medium/fast)</li> <li>- On background (default true), the image is nailed to the 360° background in the specific position.</li> <li>- Fixed on screen (default false), the image is not nailed to background but always in foreground and cannot be moved by dragging the immersive wallpaper</li> </ul>

Table 3 – Image properties list

The "2D Video" hotspot can be added to the preview area by clicking on the icon , which appears upon opening the menu button , and then clicking on the desired position on the video/image displayed in the preview area. Users have the flexibility to adjust the position of the hotspot by dragging it to the desired location.

Once the hotspot is added to the background video/image, users can view and modify its properties in the right panel as shown in Figure 29.

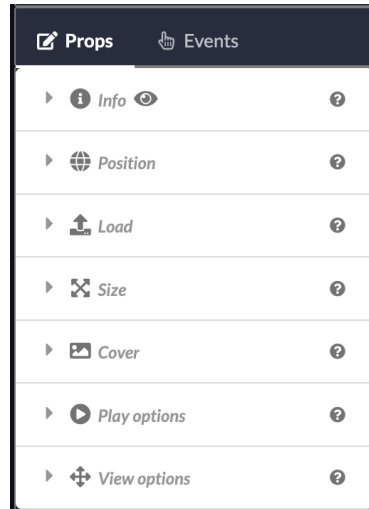




Figure 29 – 2D video properties

Table 4 lists the properties that become available in the right panel after adding the hotspot to the background video/image.

	Info	This property allows to assign a name and brief description to the hotspot 2D video. - <i>Name</i> : enter a name. - <i>Description</i> : enter a short description.
	Position	This property allows to change the 2D video player position acting on the three-dimensional coordinates X, Y, Z
	Load	This property offers a set of option to load a 2D video: - Load the 2D video from your local storage area. It worth noting that the resource loaded will be automatically stored into the platform. - Load a 2D video resource by choosing one of those proposed in the list of resources stored in the platform.
	Size	This property allows to resize the image size operating on width but maintaining the ratio between the two dimensions
	Cover	This property allows to add a cover image on top to the 2D video player. By clicking on the option button “Cover” the user get access to a subset of properties for: - <i>Create button</i> : to create and load the image resource - <i>Load button</i> : to load an image resource by choosing one of those proposed in the list of resources registered - Load an image resource by choosing one of those proposed in the list of resources registered - <i>slide bar</i> or a <i>spin button</i> : to resize the image width - <i>checkbox blinking</i> : to mark for activate the image blinking mode during the play. - <i>option buttons</i> to define the image appearance <ul style="list-style-type: none"> <li>▪ Embedded: the image will cover integrally the 2D video player during the play.</li> <li>▪ Full screen: the image will cover the entire screen area during the play.</li> </ul>
	Play option	This property allows to define the video play options. - <i>loop</i> : repeat continuously - <i>autoplay</i> : will automatically play when the background video/image file starts. - <i>stop background video</i> : when the video plays the background video/image file stops.
	View options	These properties allow to set some optional choices about the way the image is shown: <ul style="list-style-type: none"> <li>- SHOW HOTSPOT (true/false, default true). If false, the hotspot is invisible, and it must be made visible (turned on) by some event.</li> <li>- BLINKING (true/false, default false). If true, the image blinks. It’s possible to choose the pace of the blinking (slow/medium/fast)</li> <li>- On background (default true), the image is nailed to the 360° background in the specific position.</li> </ul> Fixed on screen (default false), the image is not nailed to background but always in foreground and cannot be moved by dragging the immersive wallpaper

Table 4 – 2D video properties list

The "Audio" hotspot can be added to the preview area by clicking on the icon , which appears upon opening the menu button , and then clicking on the desired position on the video/image displayed in the preview area. Users have the flexibility to adjust the position of the hotspot by dragging it to the desired location.

Once the hotspot is added to the background video/image, users can view and modify its properties in the right panel as shown in Figure 30.

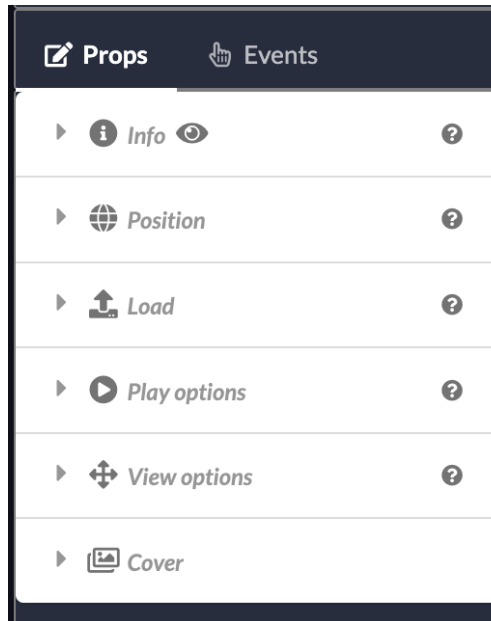


Figure 30 – Audio properties

Table 5 lists the properties that become available in the right panel after adding the hotspot to the background video/image.

	Info	This property allows to assign a name and brief description to the hotspot audio. - <i>Name</i> : enter a name. - <i>Description</i> : enter a short description.
	Position	This property allows to change the icon audio position acting on the three-dimensional coordinates X, Y, Z
	Load	This property offers a set of option to load a audio file: - Load the audio file from your local storage area. It worth noticing that the resource loaded will be automatically stored into the platform. - Load an audio resource by choosing one of those proposed in the list of resources stored in the platform.
	Play option	This property allows to define the audio play options. - <i>loop</i> : repeat continuously itself - <i>autoplay</i> : will automatically play when the background video/image file starts.
	View options	These properties allow to set some optional choices about the way the image is shown: - SHOW HOTSPOT (true/false, default true). If false, the hotspot is invisible and it must be made visible (turned on) by some event - BLINKING (true/false, default false). If true the image blinks. It’s possible to choose the pace of the blinking (slow/medium/fast) - On background (default true), the image is nailed to the 360 background in the specific position Fixed on screen (default false), the image is not nailed to background but always in foreground and cannot be moved by dragging the immersive wallpaper
	Cover	This property allows to add a cover image on top to the 2D video player.

Table 5 – Audio properties list

The "Text" hotspot can be added to the preview area by clicking on the icon , which appears upon opening the menu button , and then clicking on the desired position on the video/image displayed in the preview area. Users have the flexibility to adjust the position of the hotspot by dragging it to the desired location.

Once the hotspot is added to the background video/image, users can view and modify its properties in the right panel as shown in Figure 31.

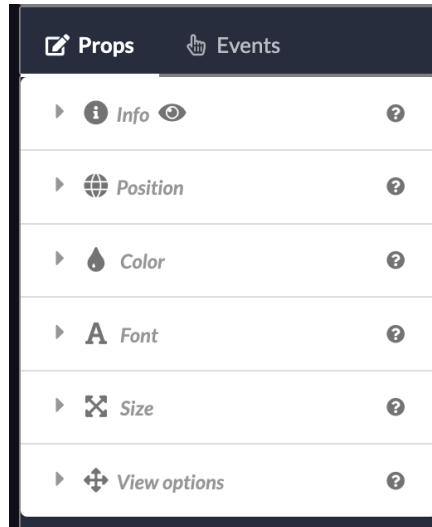




Figure 31 – Text properties

Table 6 lists the properties that become available in the right panel after adding the hotspot to the background video/image.

<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">▼ A Text</div> <div style="border: 1px solid #ccc; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">☰</div> </div>	Info	This property allows to assign a name and brief description to the hotspot text. - <i>Name</i> : enter a name. - <i>Description</i> : enter a short description.
	Position	This property allows to change the text field position acting on the three-dimensional coordinates X, Y, Z
	Color	This property allows to change the text field background color and its transparency acting on: - Background color button: to choose the background color of the text field. - Background Alpha slide bar: to set the transparency of the text field background color
	Font	This property allows to: - edit the text field with the string to display during the payout. - set the font style and size - set the font format (bold, italic, underlined)
	Size	This property allows to resize the image size operating on width but maintaining the ratio between the two dimensions
	View options	These properties allow to set some optional choices about the way the image is shown: - SHOW HOTSPOT (true/false, default true). If false, the hotspot is invisible, and it must be made visible (turned on) by some event - BLINKING (true/false, default false). If true, the image blinks. It's possible to choose the pace of the blinking (slow/medium/fast) - On background (default true), the image is nailed to the 360° background in the specific position  Fixed on screen (default false), the image is not nailed to background but always in foreground and cannot be moved by dragging the immersive wallpaper

Table 6 – Text properties list

The "Text line" hotspot can be added to the preview area by clicking on the icon , which appears upon opening the menu button , and then clicking on the video or image shown in the preview area. Unlike other hotspots, once the background video or image is clicked, the "text line" hotspot is automatically positioned at the top for the entire width of the background video/image.

However, it is possible to modify its properties as shown in Figure 32.

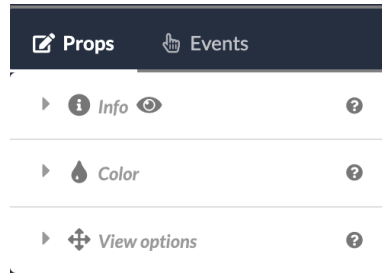


Figure 32 – Text line properties

Table 7 lists the properties that become available in the right panel after adding the hotspot to the background video/image.

	Info	<p>This property allows to assign a name and brief description to the text line hotspot.</p> <ul style="list-style-type: none"> <li>- <i>Name</i>: enter a name.</li> <li>- <i>Description</i>: enter a short description.</li> </ul> <p>In addition, you must also fill in the field:</p> <ul style="list-style-type: none"> <li>- <i>text</i>: with the string to show during playback.</li> </ul>
	Color	<p>This property allows to change the text field background color and its transparency as well as the text font color acting on:</p> <ul style="list-style-type: none"> <li>- Text color button: to choose the font color.</li> <li>- Background color button: to choose the background color of the text field.</li> <li>- Background Alpha slide bar: to set the transparency of the text field background color</li> </ul>
	View options	<p>This property allows to change several views options.</p> <ul style="list-style-type: none"> <li>- <i>show hotspot check button</i>: to mark for activate .....</li> <li>- <i>Position bar</i>: to define the text position during the playback <ul style="list-style-type: none"> <li>▪ <b>top</b>: the text line will be placed on top to the background video/image.</li> <li>▪ <b>bottom</b>: the text line will be placed on bottom to the background video/image.</li> </ul> </li> <li>- <i>Iteration bar</i>: to define the text scroll modality <ul style="list-style-type: none"> <li>▪ <b>oneshoot</b>: the text line will scroll only once.</li> <li>▪ <b>loop</b>: the text line will loop continuously.</li> </ul> </li> <li>- <i>Direction bar</i>: to define the text scroll direction <ul style="list-style-type: none"> <li>▪ <b>left</b>: the text line will scroll from left to right.</li> <li>▪ <b>right</b>: the text line will scroll from right to left.</li> </ul> </li> <li>- <i>Duration bar</i>: to define the text scroll speed <ul style="list-style-type: none"> <li>▪ <b>fast</b>: fast speed text scroll.</li> <li>▪ <b>medium</b>: medium speed text scroll</li> <li>▪ <b>low</b>: low speed text scroll</li> </ul> </li> </ul>

Table 7 – Text line properties list

For each hotspot it is possible define events that activate specific actions. As shown in Figure 33, the events managed by the web tool are:

- *onAppear*, when a hotspot that was previously not visible appears on the screen,
- *onDisappear*, when a hotspot that was previously visible disappears,
- *onclick/onTap*, when the hotspot is clicked or tapped (According to the device currently used by the final user)

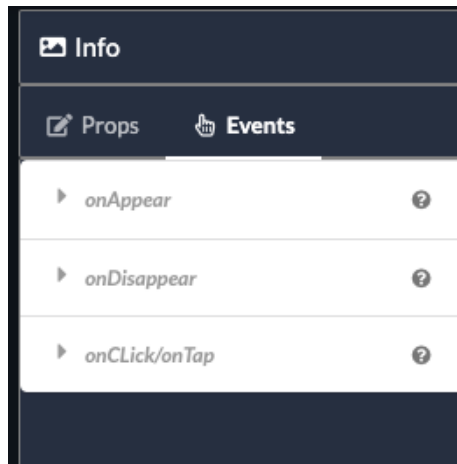


Figure 33 – Hotspot events

The actions that can be associated to these events are:

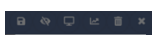
- *Jump*
- *OpenLink*
- *DriveHotspot*
- *SwitchBackground*






**Jump** implements the visualization of another immersive experience already defined in the platform. The effect for the final user is to jump in another environment. It can be used to change the place (the virtual location) of the user. The typical use is the following: clicking/tapping a hotspot you jump to another immersive experience.

**OpenLink** allows to open a website over the immersive experience. This website can be opened over the immersive background (“Full screen” option) or in another tab of the browser (“New Window” option”). The typical use is the following: clicking/tapping a hotspot you can open an external website that inside or beside the immersive experience.

**DriveHotspot** allows to command (make another hotspot appear/disappear) other hotspots already defined in the immersive experience. For instance, a user can configure an image as a button to make other hotspots appear/disappear in the scene.

**SwitchBackground** allows to change the immersive background (so a new background already present in the platform must be chosen) maintaining the hotspots configured for the experience. A typical use is to change the background of the scene with another one taken in the same place with a different light (for instance day/night switch or summer/winter).

The ribbon located above the video/image preview area on the right side displays a set of clickable icons  for:

-  Save the work in progress,
-  Publish/unpublish the enriched video,
-  Watching a full-screen video preview,
-  Delete selected objects or the whole configuration,
-  Save the current configuration and close the tool.

Moreover, in the same ribbon on the left side is displayed additional information  such as:

- the name of the configuration user is working on,
- the name of the background resource user is using,

- the type of background file along with its resolution (i.e.: VIDEO360 900x1200, IMAGE2D 900x1600, and so on.)

The ribbon located below the video/image preview displays three tabs.

The tab "timeline" (refer to Figure 34) shows a list of rows , each summarizing the most significant properties for one hotspot (e.g. visibility time interval, name,) and three buttons to remove it, describe it with a short phrase, or focus the play preview to it (when and where the hotspot first appears the point of view will be rotated toward it) respectively.

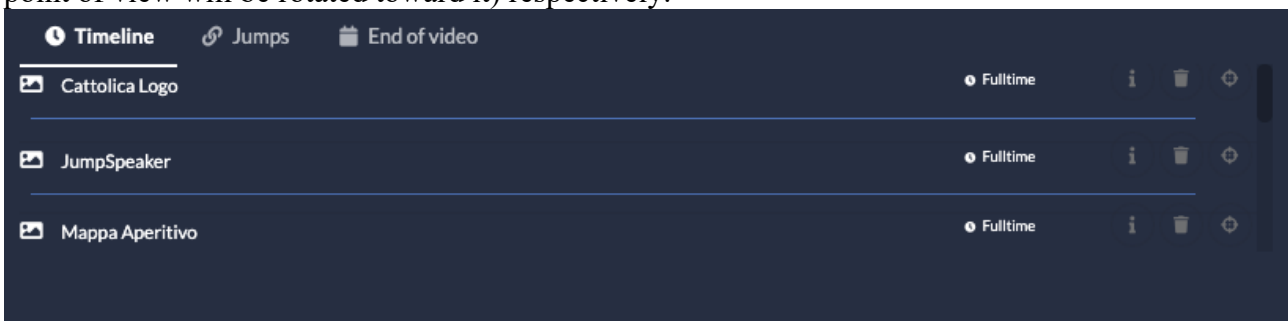


Figure 34 – Tab “timeline”

The second tab “Jumps” (Figure 35) gives a summary of all defined jump events. Each row shows the trigger hotspot, the target 360° video name and a button to choose the default viewing direction when it starts.

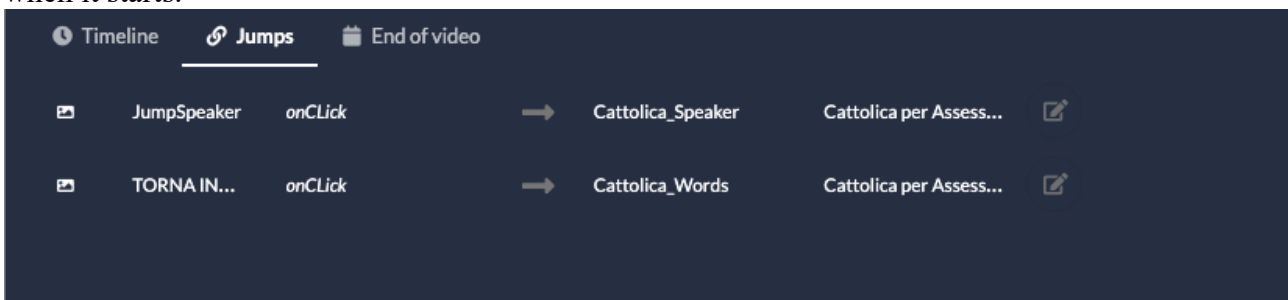


Figure 35 – Tab “Jumps”

The last tab “End of video” (Figure 36) lists all available options to manage the video ending actions:

- “Stop”: stop the 360° video when it ends,
- “Loop”: restart it when it ends,
- “Jump”: define another 360° video to play when the current one ends.

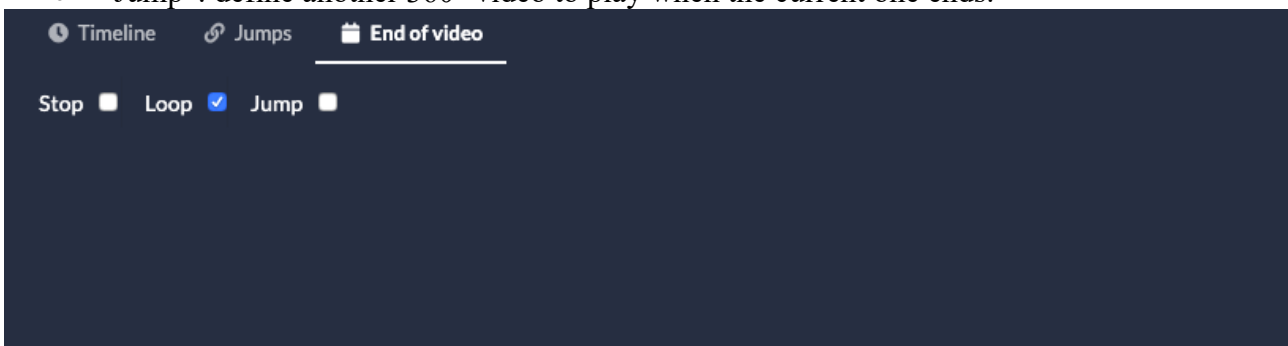


Figure 36 – Tab “End of video”

### 4.4.3. Citizen Journalism

By clicking on the "Citizen Journalism" section, the user gains access to a dedicated home page for managing the reports.

The "Citizen Journalism" (Figure 37) provides a top toolbar that allows to perform the following actions:

- search for report by keyword (in titles),
- display reports alphabetically (in ascending or descending order),
- display reports by the latest updated date.
- switch the home page report view mode from map to list view and access additional features to manage the reports. Please note that this icon will only be enabled if the logged-in user is an "Institution admin".

A central area that will allow him to see all the reports on a map (Figure 37) and a clickable icon that provides access to a dialog web page for creating a new report. Each report is shown as a marker on the map, placed based on its GPS coordinates that indicate the report's location.

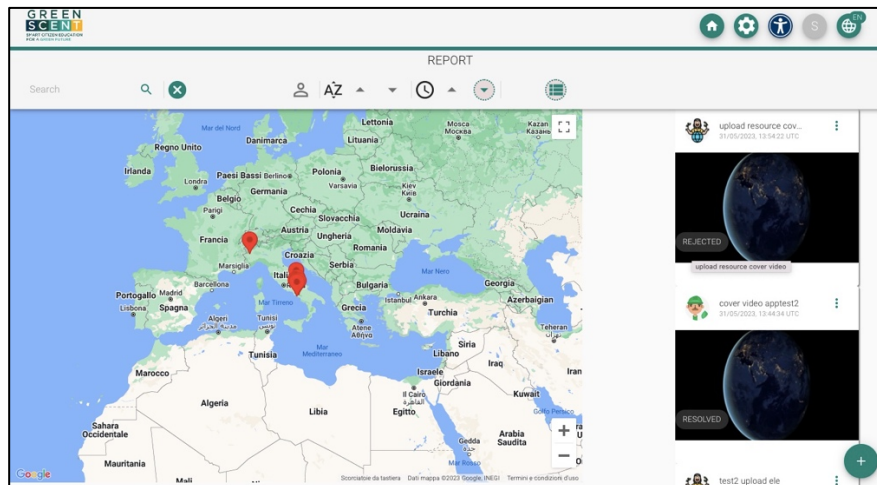


Figure 37 – Home page map view

Reports displayed as markers are also shown as cards on a right. Each card (as depicted in Figure 37) includes an image that best represents the report, a label above it that identifies its status and a top ribbon that displays a set of information such as:

- Avatar of the user who created the report.
- Title and the creation date of the report.
- A clickable icon that offers additional options:
  - Access to a dialog page to view the report details.
  - Delete the report.
  - Change the report's state from "approved" to "solved". Please note that this option is enabled only if the report is in "approved" state and the logged in user is the owner of the report.




When the user clicks on the icon, he is granted access to a dedicated dialog page for creating a new report (as depicted in Figure 38).






Figure 38 – Create report

The “CREATE REPORT” dialog page, requires users to provide several information:

- Fill in the “TITLE” field with a short text that easily identifies the issue.
- Fill in the “DESCRIPTION” field with a detailed description of the issue.
- Select the radio buttons to classify the report (i.e., #RISK, #EMERGENCY and/or #POLLUTION)
- Assign the severity level from “SEVERITY” drop-down list.
- Click on the button  to upload the image/video files from the local hard disk to attach to the report.
- Click on the button  to upload the image/video files from the resource manager to attach to the report.
- Click on the  icon to access a geographical map to geo-reference the report.

Once all the required information is filled in, users can create the resource by clicking the "SAVE" button. The newly created report will immediately appear in Citizen Journalism Home Page section.

The dialog page “REPORT DETAILS” (Figure 39) accessible by clicking the icon  display the following information:

- Report title
- Report description
- Tags used to classify the report (e.g.: #risk, #pollution, and so on)
- The assigned "gravity" level. (● low, ●● medium, and ●●● high)
- A text label that identifies the report's state.
- A map showing the report's location.
- Images or videos attached to the report.

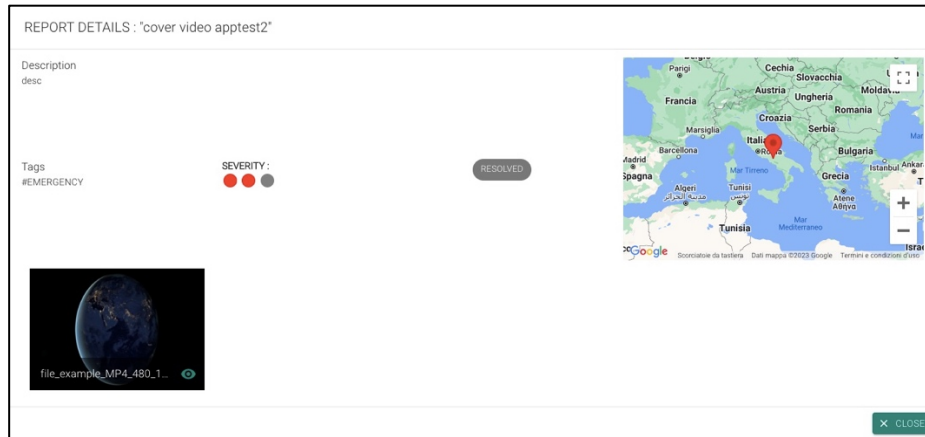



Figure 39 – Report details


In the “CHANGE STATUS” (Figure 40) dialog page, accessible by clicking the icon  the information needs to be provided:

- Set the new state from “STATUS” drop-down list.
- Fill in the “NOTE” field with addition information if needed.



Figure 40 – Change status

Once all the required information is filled in, users can save the change by clicking the "SAVE" button.

If the logged-in user is an "**Institution admin**" he can access the reports’ list view by clicking the icon  as depicted in Figure 41.

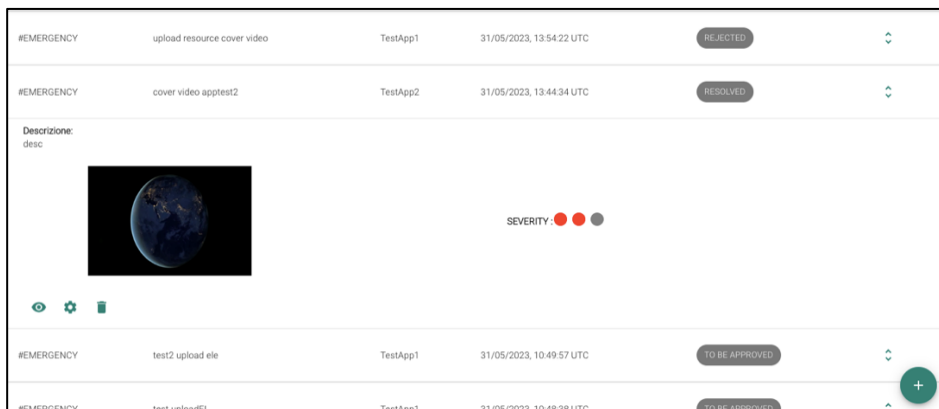






Figure 41 – Report list view

Each report is represented by one row in the list. The most significant information, such as “TAG”, “TITLE”, “USERNAME” and so on is displayed for each report. Furthermore, by clicking on the icon  the “**Institution admin**” will have access to detailed information about the report such as the attached images/videos, description, severity and more. The following set of icons is available:



-  Access to a dialog page to view the report details (referring to the section above that describes the dialog page "REPORT DETAILS").
-  Delete the report.
-  Change the report’s state.


By clicking the icon  the “**Institution admin**” can access a dialog page where it will be possible to change the report's state as shown in the Figure 42.

Figure 42 – Change status

Once the new state is selected from the drop-down list and, if needed, the field “NOTE” is filled in, the change can be saved by clicking the "SAVE" button.

The transition table below (Table 8) shows the possible state transition – from which initial state to which other state – that the “**Institution admin**” can perform to change the report’s state.

Current State	New State
To be approved	Approved
To be approved	Rejected
Approved	Solved

Table 8 – Transition state