

Development of a geolocation web service during the transport of DSRS to the long-term storage

Nowadays, in the age of the digital transformation, the control and monitoring of assets has transcended, becoming a strategic dominant. Asset geolocation web services emerge as a cutting-edge solution that unifies satellite tracking technology with a robust and scalable software architecture. This work details the structure and key components of a platform designed and developed for software engineers from Fundación Cendit to suit the requirements control during transport of DSRS to the long-term storage.

1. Software Architecture.

The core of this implementation lies in its software architecture, designed to guarantee performance, security and adaptability. The platform is based on a web server with a public IP address, acting as the central brain that processes and distributes information. Interaction with the user is through a dynamic and responsive user interface. The HTML language provides the base structure of the pages, while Cascading Style Sheets (CSS) elevate the aesthetics and visual experience. Interactivity and user-side logic powered by JavaScript, a language that gives the application dynamism and responsiveness in real time. To streamline the design process and ensure an impeccable presentation on any device, a tool like Canva is integrated, guaranteeing a clean and adapted user interface.

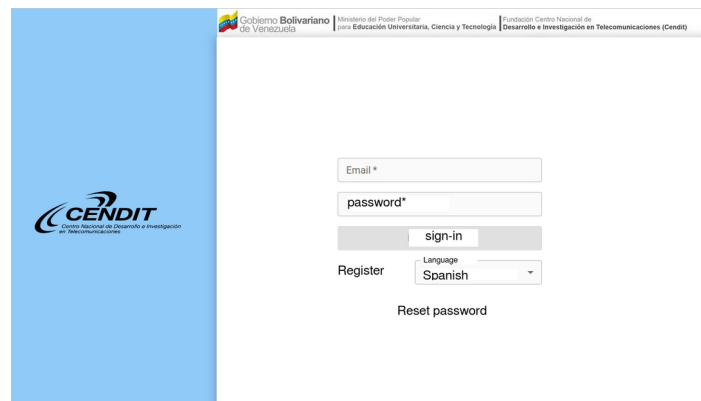


Figure 1. Register and Sign-in section.

2. Satellite Tracking and Geographic Visualization.

The web service has the ability to display the position of DSRS and the vehicles that transport them on an interactive map. To do this, a leading open source library such as Leaflet is used, optimized for real-time satellite tracking. The map module not only shows the location of assets, but also offers advanced filtering and search capabilities, allowing users to identify devices by their connection status (online, offline) or by their name. The system receives and processes data from satellites in orbit,

decoding the positioning information to obtain the precise location of each vehicle. This data is visually represented on the map through interactive markers, which update in real time as the vehicle moves using encryption protocols.

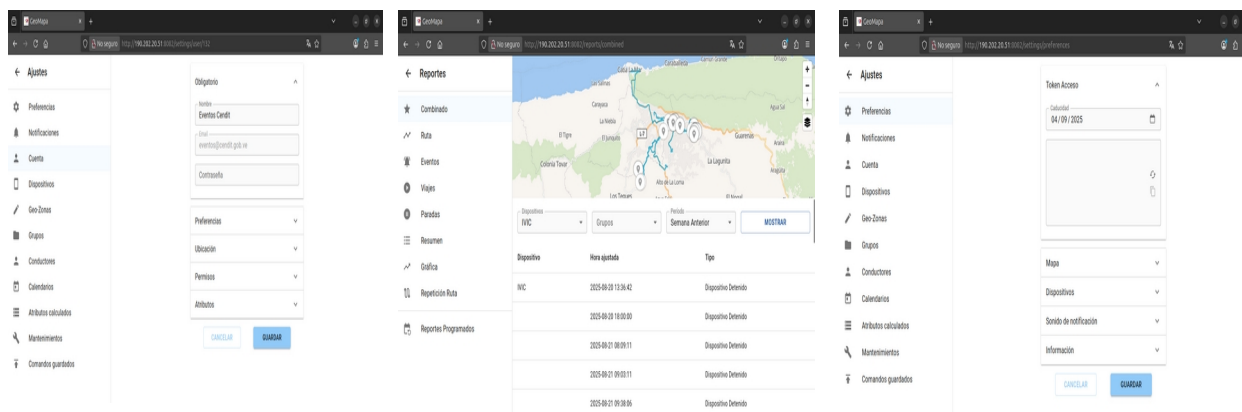


Figure 2. Menu and sections.

3. Control and Management Modules.

Beyond simple tracking, the platform offers a set of management modules that transform data.

- **Reports Section:** Allows data analysis, customization of reports and event summaries. It is an indispensable tool for optimizing routes, monitoring route efficiency and making strategic decisions based on historical performance. In this section, you can view reports customized with information by routes, trips, each monitored device, events (separated by date and time) with graphs and statistics.
- **Settings Section:** Offers control over system preferences. Users can configure crucial parameters such as time zones, language, and date format. In this section, you can configure notifications, user permissions, default zones or maps, tracking devices, drivers, calendars, maintenance and more.
- **Account Section:** Gives users the ability to manage profile of the users, change passwords, manage permissions for each profile of users and more.

This geolocation web service is not only a monitoring tool, but a comprehensive ecosystem that enables informed decision-making, operational optimization and proactive security of DSRS during their collection and transport to the long-term storage, driving efficiency in an increasingly dynamic environment which has already been field tested in the last two years and certified by the national regulatory authority.