# PROCeed Laboratory

PROCeed Laboratory can help the user find the optimal way out in the following exemplary problems:

- <u>Evacuation:</u> Which places can be deemed "safe"? Failure to evacuate which areas will cause the most casualties? Where should the evacuated people be directed to? How will different weather conditions affect the evacuation?
- <u>Health services:</u> What will be the occupancy in certain hospitals (how many patients coming in)? If a given hospital needs to be evacuated, where should the patients be transported?
- <u>Traffic:</u> Can the traffic be organised in a way that no casualties are suffered? How will the flooding of certain roads affect the traffic in this area? What if we choose to let traffic "control itself"? How will prioritizing the flow of traffic on selected roads (sending police officers to control the intersections) affect evacuation time in critical areas?
- <u>Infrastructure:</u> Can damage to infrastructure be avoided? What will be the extent of the damage to the electrical greed? How will the damage to infrastructure affect evacuation?

During the crisis the commanders face the problematic moments in which they have to make decisions and choose one of a few possible alternatives of actions.
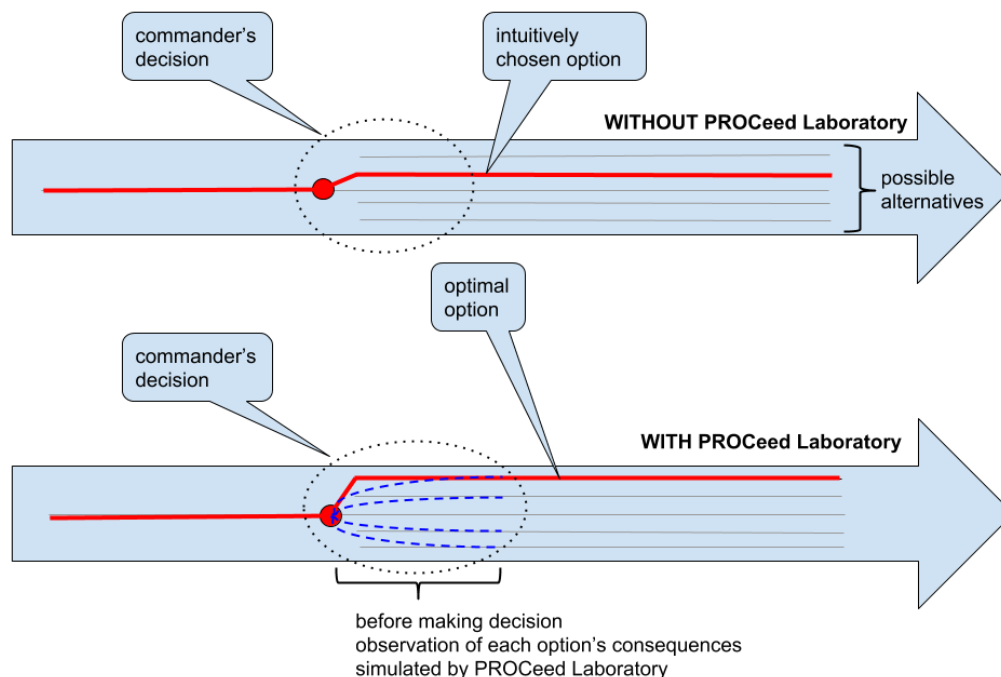
These actions have impact on the efficiency of use of the limited resources and/or effectiveness of rescue and evacuation operations. Each of these actions will have different preconditions and different consequences. Depending on the commanders' choices, **PROCeed Laboratory** will simulate different events. It presents consequences (a cascade effects) of the possible decisions. **PROCeed Laboratory** shows the state of crisis situation after simulation. It may be described in the report and with

information such as the area affected, damages in goods, infrastructure and environment or people injured. The content of such report is defined depending on the scenario and users' needs.

MODELLED SCENARIOS

PROCeed Laboratory contain currently four different ready-to-use models e.g.:

- **Train derailment and fire caused by hazardous materials at the Belgium/German border** – involves the International Union of Railways, DB Security Corporate Unit, Infrabel, Aachen Fire Department, German Federal Police, German Emergency Services, German Civil Protection, Belgium Civil Protection;
- **Flooding in the Netherlands** – involves the South-Holland-South Safety Region, Safety Region, Water Board, National Government, Municipalities, Drinkwater & Energy suppliers, ICT & Telecom, Industry, Transport & Logistics;
- **Maritime incident in Finland** – involves the Finnish Environment Institute, Finnish Border Guard & Customs, Finnish Environment Institute, Finnish Navy, Finnish Meteorological Institute, Helsinki harbour, Helsinki Rescue department, Finnish Transport Safety Agency, Finnish Transport Agency, Oil company, VTT;
- **Flood in Greece** – involves Fireservices EMAK 1i and Diikisi Ditikis Attikis, Attica's Regional Authority in downtown Athens, General Secretary of Civil Protection, Unified Fund for Subsistence and Lump-sum Benefits, Deputy Finance Minister, European Parliament , Nireus Aquaculture, National Bank, Greek Tourism Confederation, Johnson & Johnson Group of Consumer Companies.

These models were used in demonstrations with practitioners in the PREDICT and NEPTUNE EU projects. Another **PROCeed family** application – **PROCeed Decision Gaming** is commercially used by almost 20 institutions in Poland.

All application of the **PROCeed family** are developed by ITTI and are its properties. ITTI ran many projects in the domain of Crisis Management (e.g. FP7 PREDICT - PREparing for the Domino effect in Crisis siTuations, H2020 RESIN - Climate Resilient Cities and Infrastructures, FP7 iSAR+ - On-line and Mobile Communications for Crisis Response and Search and Rescue, FP7 SECRICOM - Seamless Communication for Crisis Management, FP7 SOTERIA - On-line and Mobile Communications for Emergencies), SICMA - Simulation of crisis management activities.

MODES OF OPERATION

The following screenshots illustrate selected operations that can be done using **PROCeed Laboratory** application, i.e. in the following modes: browsing, object management and scenario management.
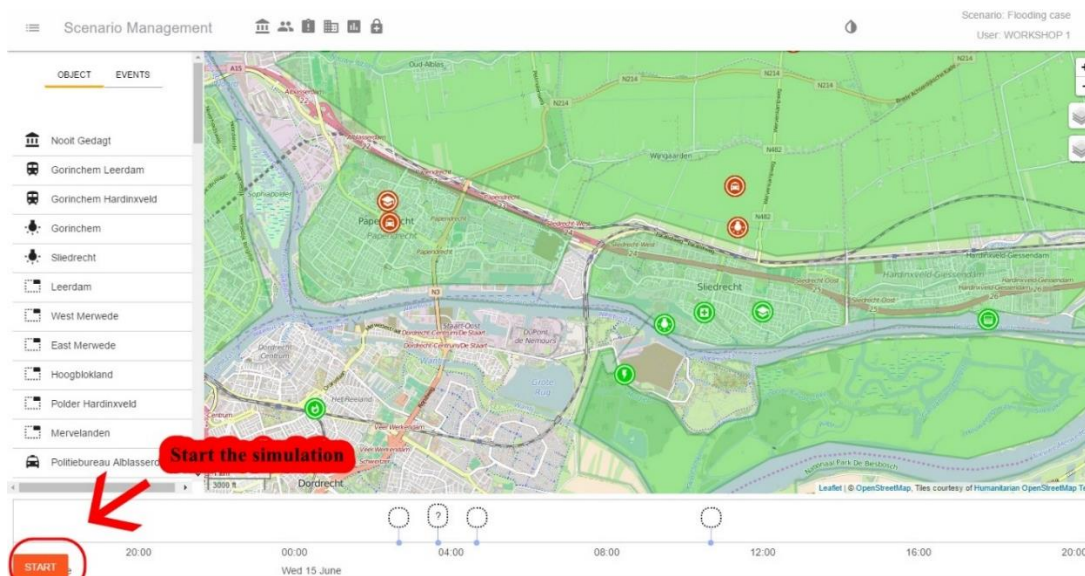
<u>Browsing mode</u>
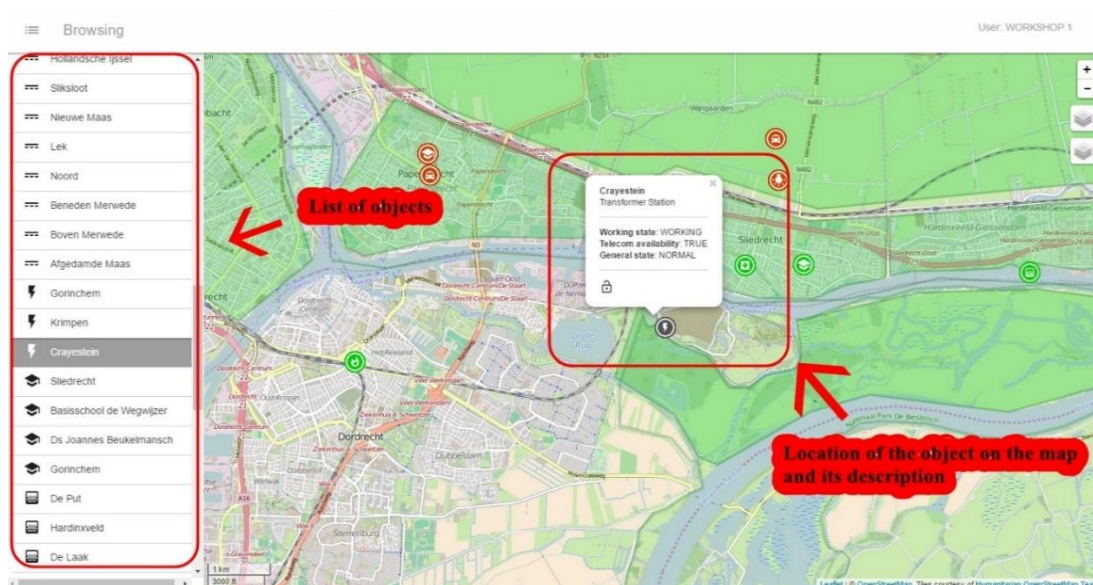
In this mode user can see the information on objects and their properties. On the figure above the Crayestein electric transformer station has been selected from the menu on the left side. The properties of this object may be seen e.g. location, general state, working state, telecom availability.

Object Management mode
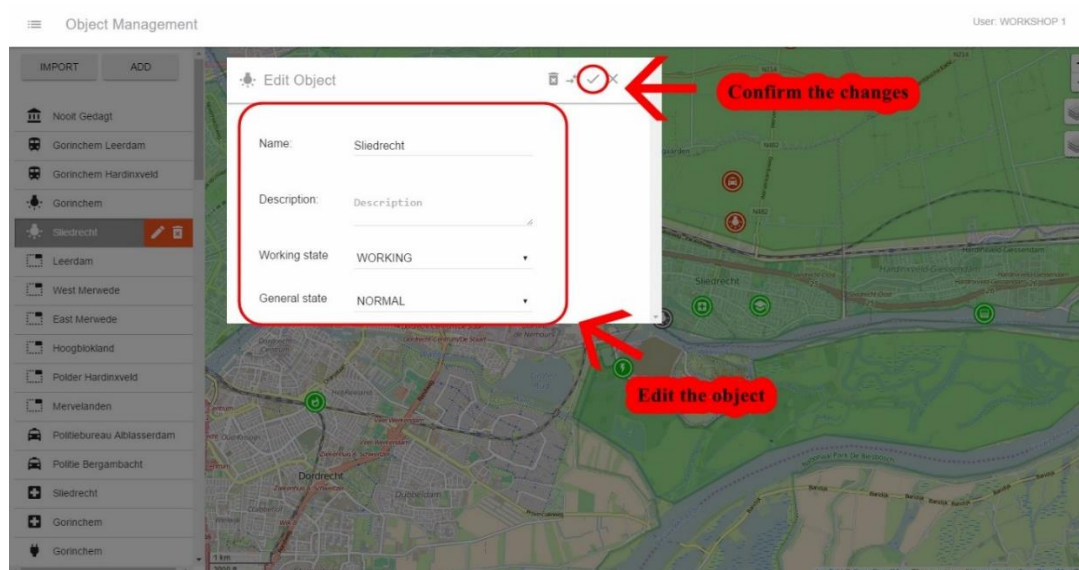
In the Object Management mode a user can change the object properties. On the figure above an electric power station in Sliedrecht has been selected from the menu on the left side. User can change the properties of this objects e.g. name, description, working state, general state.

Scenario Management mode

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In this mode a user can analyse the alternative courses of action. A user can begin the simulation by clicking on the START button. On the timeline there are also marked events and decision points for a user.
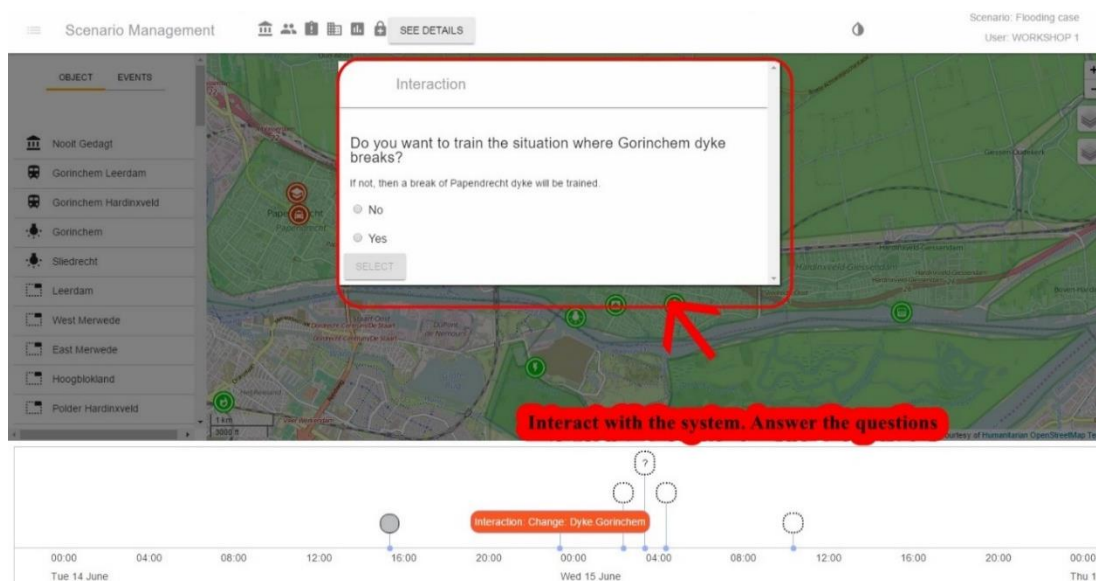

After starting the simulation a user encounters to a decision point. User can decide whether he or she wants to analyse the alternative situation assuming the Gorinchem dyke breaks. User can answer the question affecting the application to go to a different route.
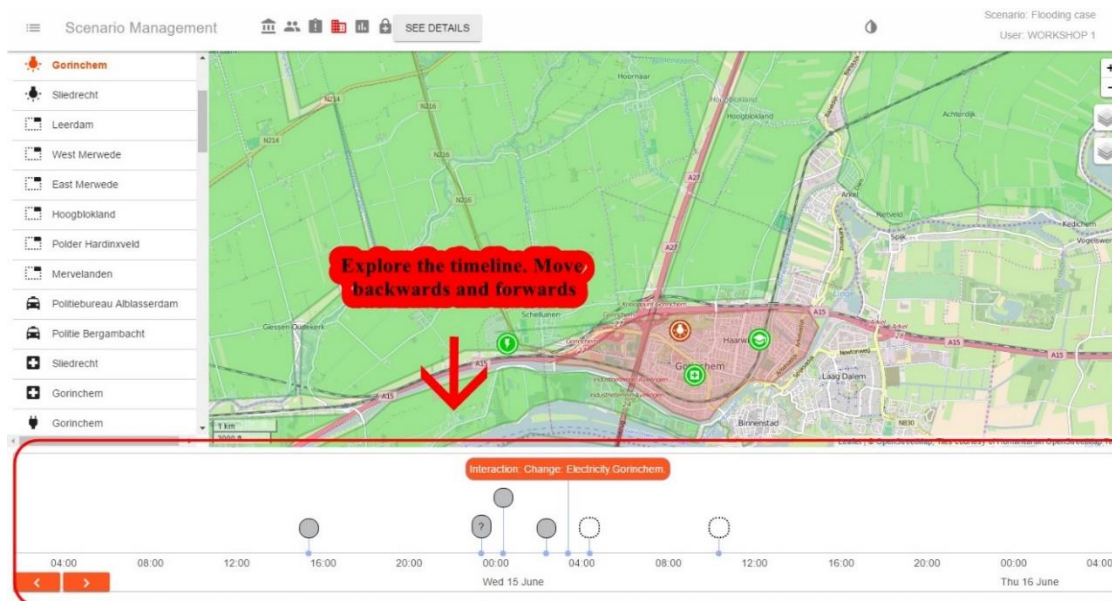
During the simulation a user can freely go forward and backward in the scenario. In order to do this he or she can use the control buttons next to the timeline. By using this mechanism user can get back and try another answer to the question to test alternative situation.
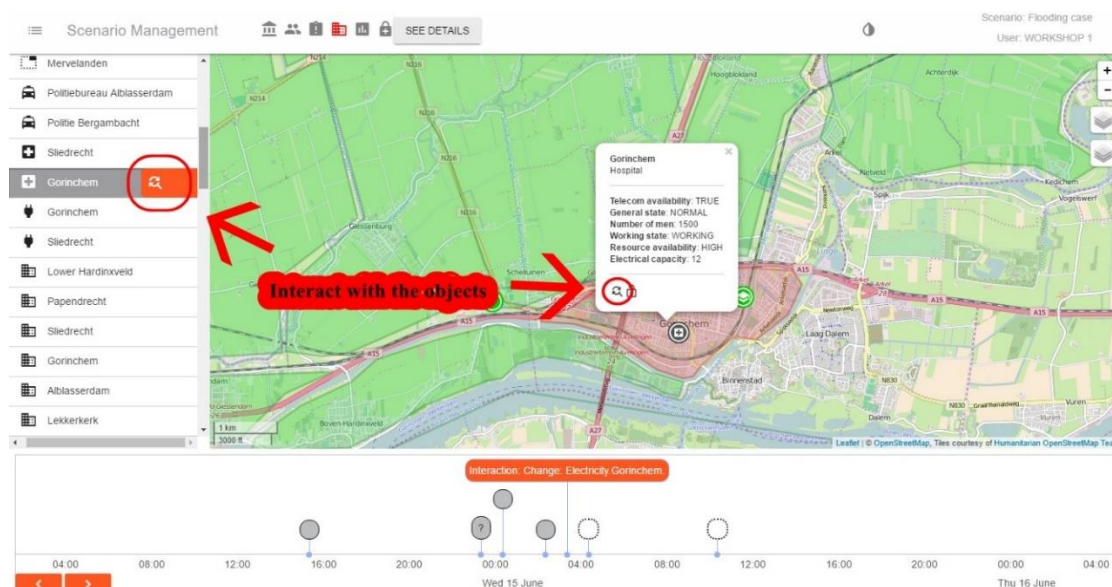
Moreover, in this mode a user can force the change of selected objects' properties. On the figure above, it is shown that by clicking on the indicated icon he or she can change the momentary properties of the hospital in Gorinchem.
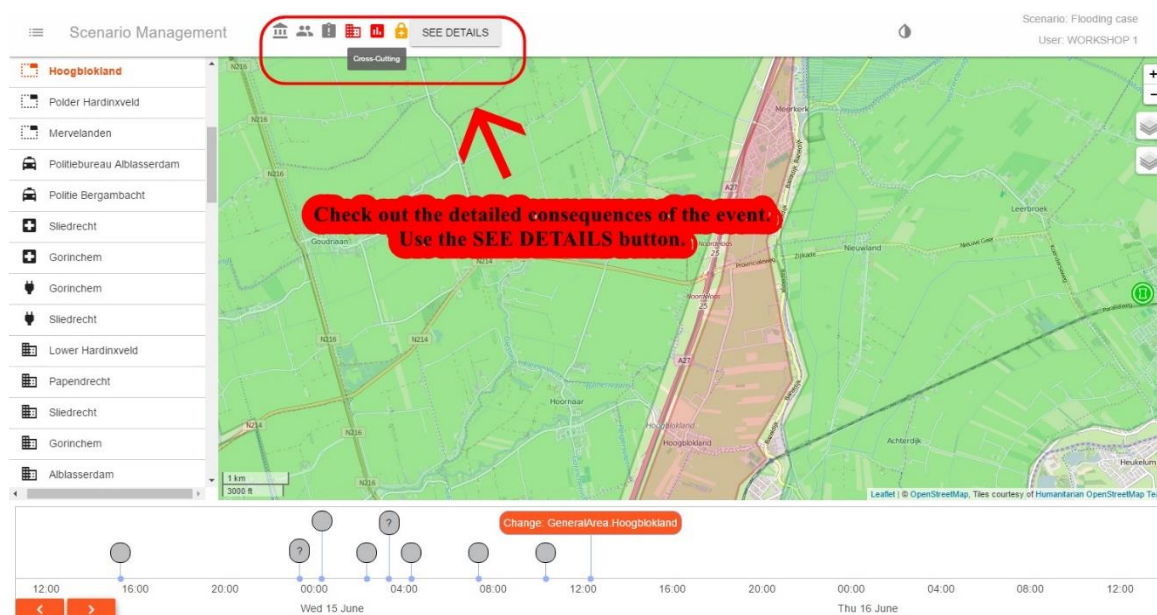
Additionally, in this mode a user can test what is the impact of the user-forced changes on the crisis scenario. He or she may do it by clicking on the button "SEE DETAILS".

TECHNICAL INFORMATION

PROCeed Laboratoryoratory is a web-based application, hosted on the proprietary server. The server requires the following minimum configuration:

- CPU: 2x 2,5Ghz
- RAM: 4GB
- Storage space: 20GB
- OS: Ubuntu Server 14.04 LTS
- Other software: PostreSQL 9.3, PostGIS 2.1, nginx 1.4, Apache Tomcat 8, MapServer 7.

A user needs a computer with Internet connection and a web browser that supports HTML5:

- Mozilla Firefox version 30 or higher
- Google Chrome version 40 or higher
- Safari version 8 or higher
- Internet Explorer version 10 or higher.

PROCeed Laboratory is written in Java. Back-End uses such technologies as: Spring framework, Drools, PostreSQL and PostGIS. The rules engine is based on MVFLEX Expression Language (MVEL). User interface (Front-End) is written in JavaScript as a web-based application (Angular.js with Leaflet library). RESTful interfaces are used for communication between different modules of the application as well as with external data sources.

For the exchange of information/data with external applications and systems **PROCeed Laboratory** uses standard TSO (Tactical Situation Object), i.e. ISO/TR 22351:2015 also called as Emergency Management Shared Information (EMSI), which describes a message structure for exchange of information between organizations involved in emergency management.

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