EISAC.it

Italian node of the European Infrastructure Simulation and Analysis Centre (EISAC)

EISAC is an international initiative aiming at establishing a collaborative, european-wide platform in the **domain of protection Critical Infrastructure Protection**, **CI**, for supporting Operators and Public Authorities in better **protecting assets** and in enhancing their resilience with respect to natural and man-made hazards.

EISAC intends to create a constellation of national centres empowered by **advanced technologies** and available to support with **different services** all players involved in the management of CI.

EISAC.it, the Italian node of EISAC, is the result of a collaboration agreement established in 2018 between **ENEA**, Italian National Agency for New Technologies, Energy and Sustainable Economic Development, http://www.enea.it/en, and **INGV** National Institute of Geophysics and Volcanology http://www.ingv.it/en/

EISAC.it will offer advanced services to **Public Administrations, Critical Infrastructure Operators** and other stakeholders by providing **innovative analysis capabilities** for supporting the improvement of assets resilience and enhancing their protection with the aim of allowing their continuous functionality **for the benefit of citizens.**
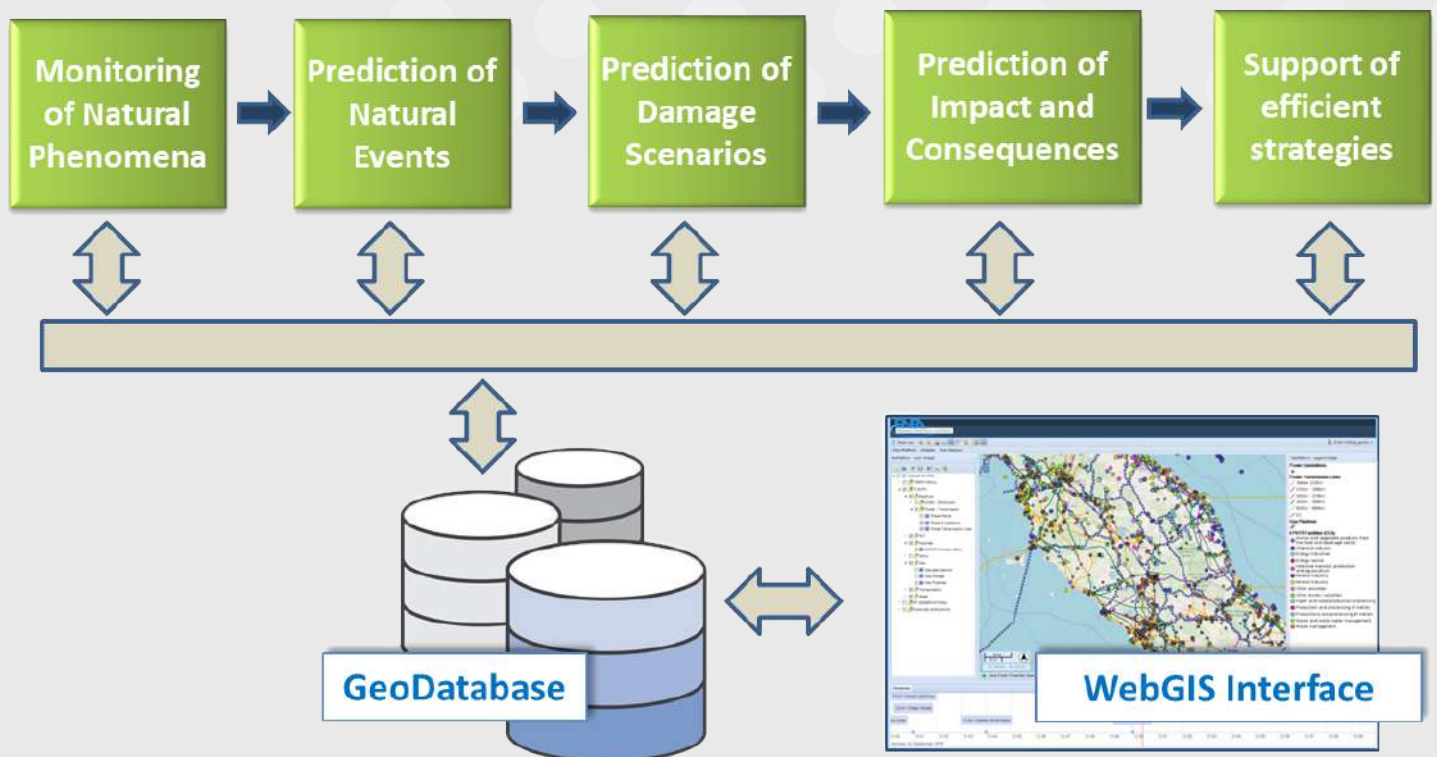
EISAC.it is empowered by the CIPCast DSS Decision Support System platform, along with a suit of innovative technological developments feeding data and information.

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CIPCast: an innovative Decision Support System (DSS) and interoperable platform for the operational 24/7 monitoring of CI and for the prediction of physical and unctional impacts induced by natural and man-made events on CI.

CIPCast is conceived as a combination of free/open source software environments and it is provided to customers through a user-friendly web **GIS interface** which allows:

> the access to a **large information database** for situational awareness

> the forecast of the **external event**, with the support of prediction models and real time update via field sensors, satellite data, crowd-sourced data

> the **estimate of the expected location** and severity of damages induced on CI elements and on the built-environment, by incoming natural and man-made events

> the **consequent outages** or reduced availability of critical services by accounting also for cascading and interdependency effects

> the estimate of the consequences experienced by citizens and other sectors of societal life, suggesting **optimized riconfiguration strategies to CI operators**

CIPCast can also be run for user -defined scenarios, in a what-if mode of operation, for supporting experiential learning and the planning of mitigation and emergency management strategies.

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## CIPCast-ES reproduces the effects of a seismic event in the affected area

CIPCast-ES simulates the shake maps produced by an **earthquake** event, by also accounting for possible geomorphological amplification effects; it then estimates the **expected damages to buildings** and Critical Infrastructures elements (such as cables, pipelines, roads etc.).

CIPCast-ES can be used to **simulate synthetic events** whose characteristics, i.e. location of the epicentre, depth of the hypocenter, and magnitude, could be directly defined by the end-user or selected from a database of historical events. CIPCast-ES can be run in "what-if" mode to support the design of appropriate contingency plans.
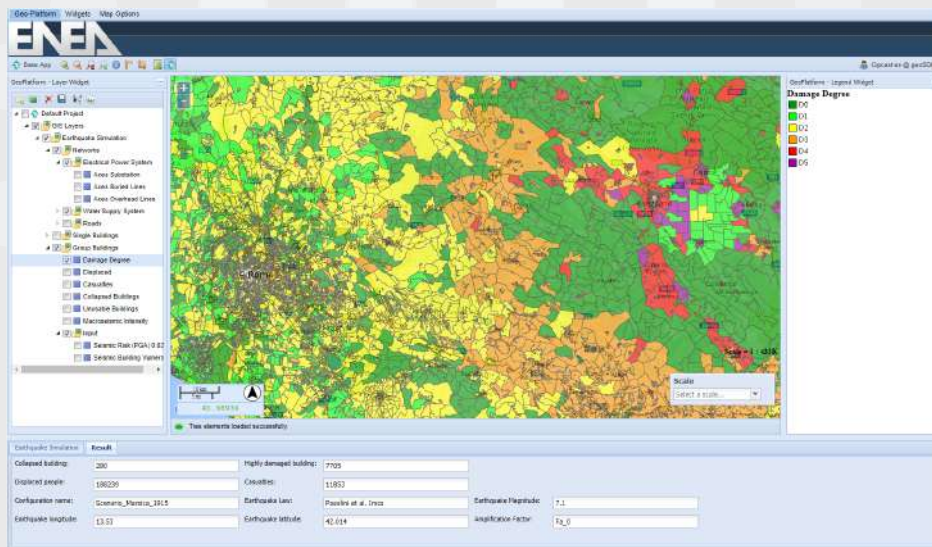
RecSIM is the CIPCast application for assessing the possible functional impacts on the electrical distribution system in an urban area, by accounting also for the dependencies with other infrastructures

RecSIM reproduces the expected dynamic of a service outage following the disruption of elements of the electrical network and the actions performed at the level of Control Room to restore the service. All possible Control Room actions are analysed to select the best possible strategy to be adopted to restore the system by minimazing the consequences for citizens. RecSIM can be offered in combination to CIPCast or as a stand-alone application, enabling the estimate of impacts induced by end-user defined scenarios, either due to natural or anthropic causes.
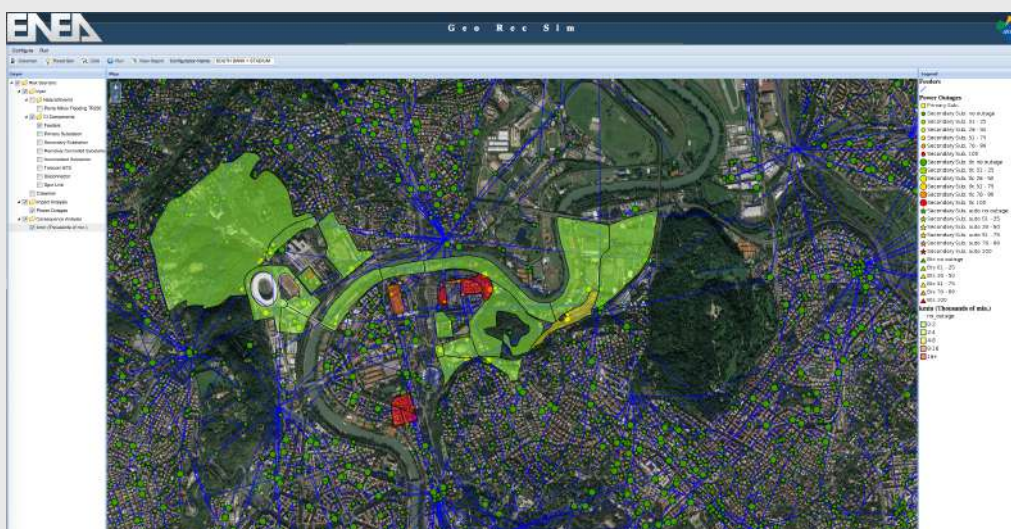
Outage development of a crisis
induced by an urban flooding (shaded regions represent city areas affected by the outage: color scale indicatse the severity of the expected outage in terms of number of affected people and outage duration).

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Other services that can be specifically customized for the end-user, include among others:

- **Vulnerability estimate** of areas for the design study of new installation; remote sensing assessment of specific areas

- **Inspection of infrastructures** and territories using UAV (Unmanned aerial vehicle)

- **Multi-instrumented vehicle** (such as geo-radar, geo-electrical, thermo-cameras) for the discovery of urban sinkholes
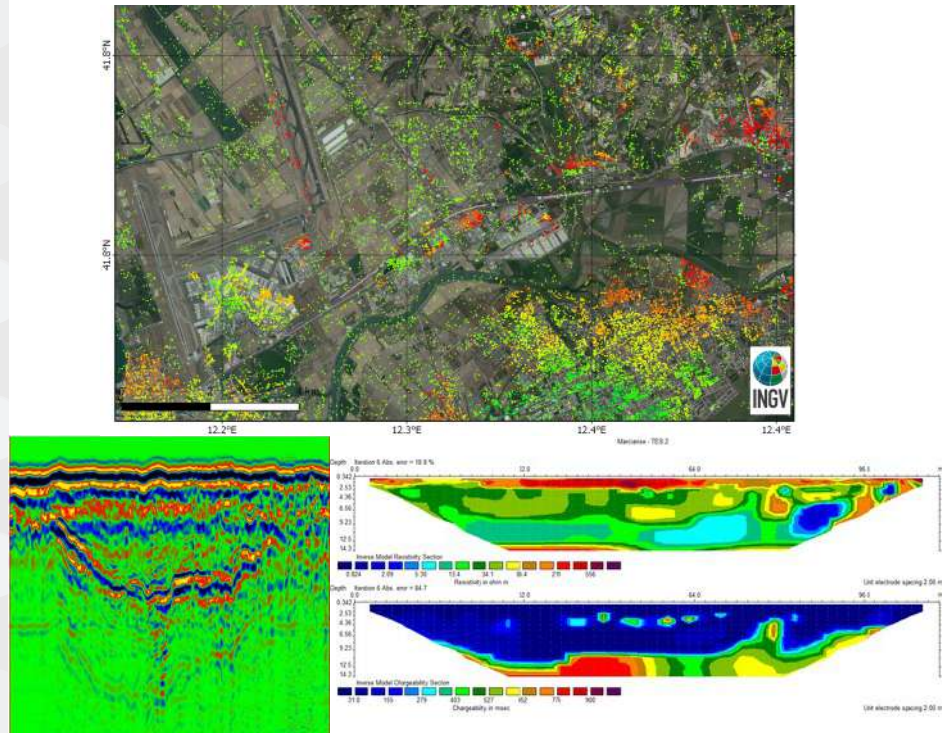
ENEA

ENEA has a long-lasting experience in the **development of new technologies** for CIP and has built a solid collaborations network in that field at national and international levels.

ENEA has also developed **R&D collaborations and partnerships with many partners in the domain of Critical Infrastructure Operators**. These partnerships deal with the development of advanced tools and methodologies aiming at describing potential risks, defining response strategies, empowering the necessary capabilities for enhancing assets resilience.

ENEA has an excellent track record in getting public funds (from national or international funding programs) with which it supports its major R&D activities.

Currently **ENEA has a relevant role in the international Association 2E!SAC which aims at realizing EISAC centres all over Europe.**

ISTITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA

Besides performing activities of scientific and technological research in the field of Earth Science, with particular emphasis on **seismology, volcanology, and environmental issues**, INGV is in charge of scientific and **technological support for Public Administration,** industrial companies and society in general.

INGV also provides support to the **department of Civil Protection** dealing with risks of seismic volcanic or sea flood nature, as well as support to the Ministry of Economic Development for geological aspects of exploitation of natural resources.

Among the duties of INGV which is participating in a wide range of **international collaborations**, is the designmanagement and continuous development of research infrastructure of international standard at top level.

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