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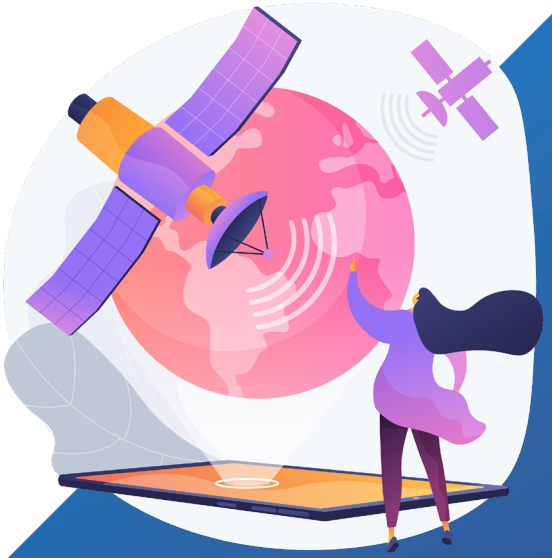
Project

UNICORN aims to contribute to building resilience against climate risks by developing Earth Observation-powered tools for early warning, forecasting, and hazard monitoring, empowering businesses and communities, and boosting emergency management.



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RISCOGNITION

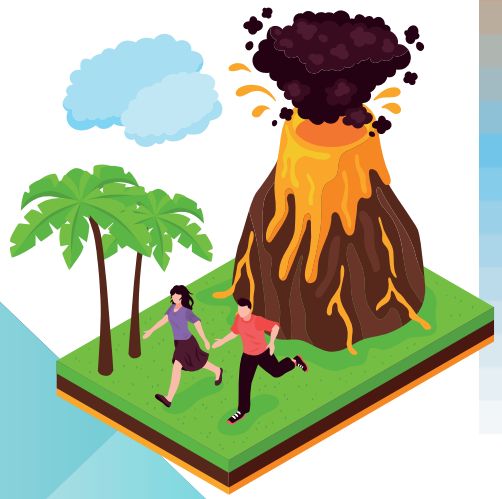
UNICORN

FROM DATA TO ACTION

Overview

UNICORN's primary objective is to provide businesses and policymakers with Copernicus-based applications. This aims to enhance the preparedness of local authorities, citizens, and industries for more frequent extreme events and geohazards. Additionally, it seeks to improve prediction, fostering better resilience to climate change.

The goal is to enhance local emergency management and facilitate short-term recovery processes. To do so, a series of tools for the early warning, forecasting, and monitoring of hazards are developed. UNICORN showcases the impact of these applications across 4 use cases through an end-user validation method towards building a resilient European landscape.



Use Cases

Use Case #1

Flood Forecasting integrating Copernicus data and weather forecast fusion, Mandra river basin, Greece

Floods in urban areas endanger lives, infrastructure, and economies, as seen in Mandra, Greece (2017, 24 fatalities). Use Case #1 enhances existing flood early warning capabilities by integrating Copernicus Earth Observation data, soil moisture data, high-resolution weather forecasts, and real-time in-situ measurements to provide flood extent and depth mapping forecast up to 2 days ahead for the Mandra basin area in Attica, Greece. The service employes dynamic matching of observed and forecasted conditions to select best-fit scenarios from pre-run hydrological and hydraulic simulations. This improves prediction accuracy, early warnings, and emergency response, supporting the work of the civil protection authorities and decision makers.

Use Case #2A

Copernicus-based wildfire early detection, mapping and nowcasting, Corsica Island, France

Use Case #2A enhances wildfire management in Corsica, France, tested in North Corsica after the 2017 Olmeta di Tuda fire. It employs a three-tier approach: AI-driven fire detection using multi-source satellite data (MODIS, VIIRS, Sentinel-3, Meteosat), precise burned area mapping and impact assessment via Sentinel-2, and fire propagation nowcasting with weather forecasts and AI-processed land cover data. Collaborating with SIS2B, forest services, and emergency responders, it utilizes Copernicus data and Artifical Intelligence (AI) to improve fire suppression strategies.

Use Case #2B

High-resolution fire danger forecast, North-Western Spain/Northern Portugal

Use Case #2B assesses wildfire risk in Europe, where most fires are human-induced, emphasizing the need for public-private collaboration as outlined in the EU Forest Strategy. It analyzes fire danger, mitigation measures, insurance sector involvement, and real-case scenarios in reforested areas, focusing on the northwestern Iberian Peninsula. Using data science, AI, HPC, and GIS, the study evaluates ignition potential prediction in this diverse landscape of public and private forests.

Use Case #3

Lava flow emergency management tool based on Copernicus data merged with numerical modelling, Sicily Island, Italy

Use Case #3 develops a lava flow emergency management tool, using Mount Etna (Sicily, Italy) as a case study. It combines lava flow alerts, satellite monitoring, simulations, and loss forecasts to support emergency managers, governments, and businesses in disaster response. Additionally, it aids parametric insurance structures, providing a valuable resource for the (re)insurance sector.