Dronitaly
Working with Drones

4-5 APRIL 2019
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PALAZZO DELLE STELLINE
MILAN

Convegno

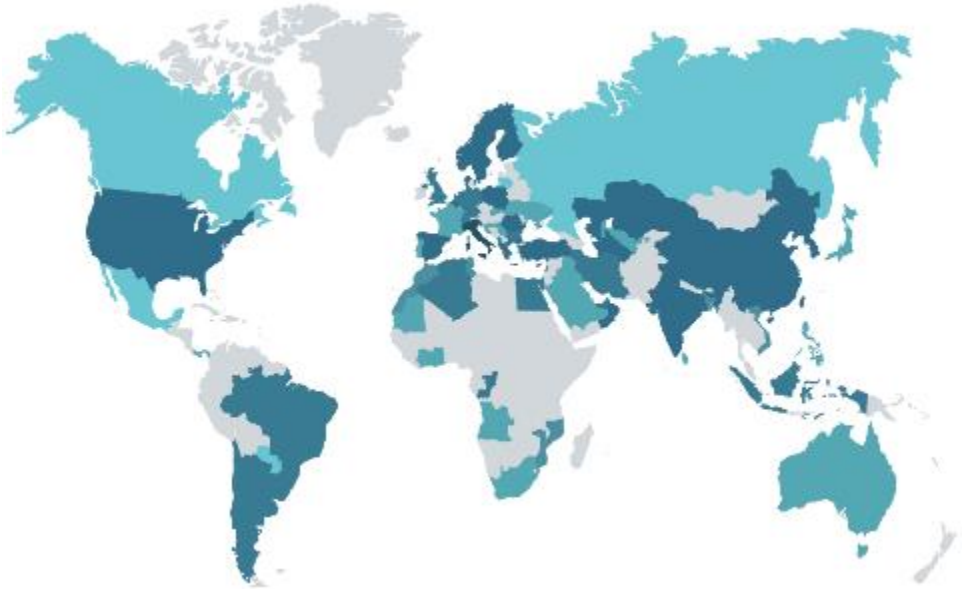
Use of drones in emergency response planning: the Brigaid project

Clemente Fuggini

RINA

organizzato da miramir

What is RINA today



3700
Colleagues

170+
Offices

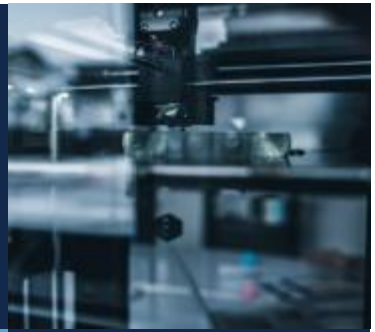
65+
Countries

LEVEL OF RINA PRESENCE

Our markets

Marine

Industry



Energy

Transport & Infrastructure

Certification

RINA & Resilience Engineering

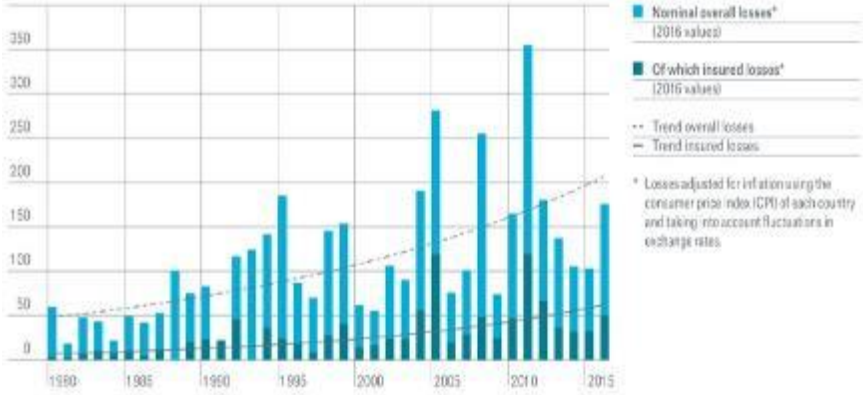
We believes that a **Resilience Engineering Approach** needs to be promoted, spread and adopted across our institutions, infrastructure, citizens and communities

Costs of Natural Disasters

The **costs** associated to the **recovery from disruptions** caused by natural and man-made events **are huge as well as the complexities we have to deal with**

- In the period 1998-2017, disaster-hit countries reported direct economic losses of US$2,908 billion of which climate-related disasters accounted for US$2,245 billion or 77% of the total
- In 2017 only, losses from natural disasters worldwide were close to US$200 billion worldwide, caused by around 700 events
- Around 20% of these losses were re-insured
- Since 1980, EU Member States have lost over EUR 360 billion in weather and climate events
- In 2016, the economic costs in EU are close to €10 billion in damages

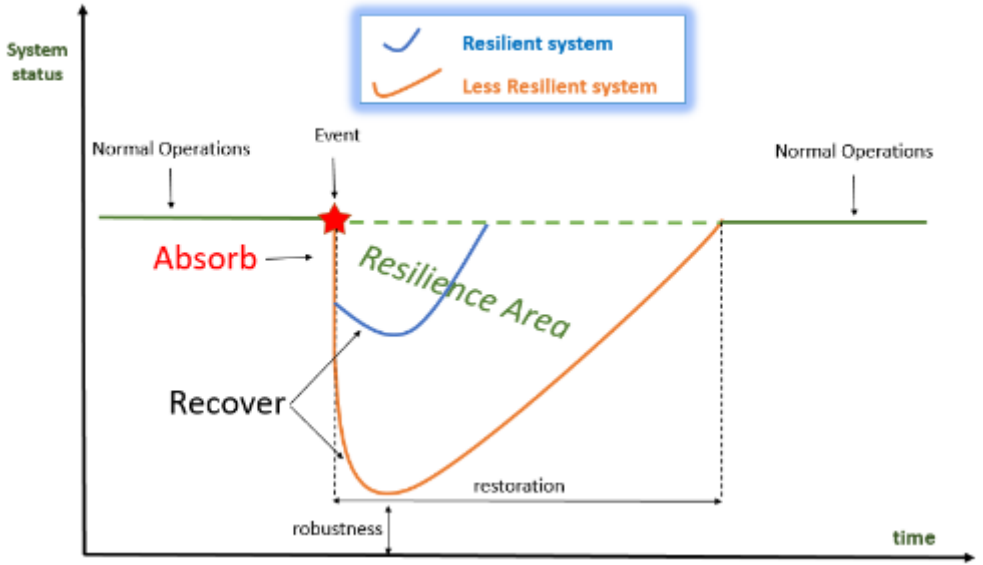
Losses from Natural Disasters



Source: Munich RE (https://www.munichre.com/en/reinsurance/business/non-life/natcatservice/index.html

What is Resilience

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions [UNISDR]



Disaster Resilience

An integrated approach is needed

Disaster Resilience

Disaster Resilience: An integrated approach

Prevention

A structured and integrated collection of information from lessons learnt, risk analysis, emergency procedures, in-field data, as a key-enabling element to increase risk assessment capabilities for a better adoption of measures to limit and reduce crisis/disaster impact.

RINA offers multi-criteria decision support tools relying on risk assessment based on the presence of critical infrastructures, environmental risks, type of organization needed/available, emergency procedures

Preparedness

The coherent combination and interaction of information coming from different simulation tools can enhance evaluation capabilities over hazards scenario (e.g. floods, forest-fire, etc.) of different nature, size and relevance.

RINA offers simulation tools for disaster preparedness setting the scene for the implementation of response plans. The output are simulated, interactive and dynamic disaster-related scenarios useful to improve planning and training capabilities

Response

Strengthening local inter-organizational coordination in the response phase means being able to integrate information coming from in-field and remote sources, provide a dynamic and updated common operational picture and track the on-going response operations (useful for reporting activities, post-assessment and lesson learnt).

RINA offers Decision Support Tools (DSTs), to enhance Situational Awareness (SA) and Common Operational Picture (COP), integrating an awareness view providing the coordinator on site with a means to identify the actions to be performed and the tasks to be assigned, complemented with a contingency plan simulator, to verify and refine the adequacy and effectiveness of contingency plans.

R&D projects in Disaster Resilience

SPARTACUS

Satellite Based Asset Tracking for Supporting Emergency Management in Crisis Operations

EU co-funded project Grant n. 313002 - Period: 2013 - 2016

S(P)EEDKITS

Rapid deployable kits as seeds for self - recovery

EU co-funded project Grant n. 284931 - Period: 2012 - 2016

ANYWHERE

EnhANcing emergencY management and response to extreme WeatHER and climate Events

EU co-funded project Grant n. 700099 - Period: 2016 - 2019

R&D projects in Disaster Resilience

PEC

Post - Emergency, multi - hazard health risk assessment in Chemical Disasters

ECHO/SUB/2015 - 713844 - PREV11 - Period: 2016 - 2018

BRIGAID

BRIdges the GAp for Innovations in Disaster resilience

EU co-funded project Grant n. 700699 - Period: 2016 - 2020

EU-CIRCLE

A panEuropean framework for strengthening Critical Infrastructure resilience to climate change

EU co-funded project Grant n. 653824 - Period: 2015 - 2018

R&D - OPERANDUM

Project Title: *OPEn-air laboRAtories for Nature baseD solUtions to Manage environmental risks*
Funding Agency, Timeline: European Commission, 2018-2022

Problem: Severe hydro-meteorological phenomena are having a high impact in European territories and are of global concern.
The employment of nature-based solutions (NBS) to mitigate the impact of hydro-meteorological phenomena is not adequately demonstrated, therefore not reaching full potential.

Solution: To reduce hydro-meteorological risks in European territories through co-designed, co-developed, deployed, NBS. A multiple level of stakeholders engagement from the local community up to the international level to leverage widest possible NBS acceptance to promote its diffusion as a good practice.
RINA is in charge of the design and development of one of the Open Air Laboratories, located in Italy in the delta of river Po, an area subjected to coastal erosion

DRONES: MAIN ACTIVITIES

Inspection

Suppliers

Atex

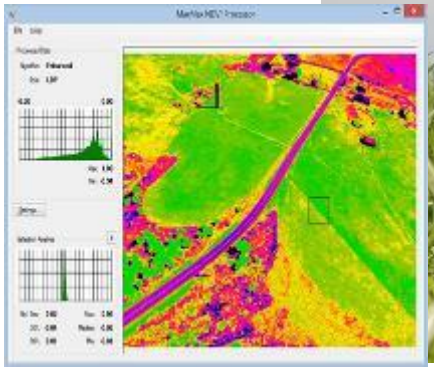
Training

Operation

Precision Agricolture

Infrared checks for controlled weeding and water saving

The use of the drone in the agricultural sector allows performing photographic surveys made with thermo-cameras and infrared lenses. These sensors provide valuable data to increase yields while saving water and pesticides



Project BRIGAD

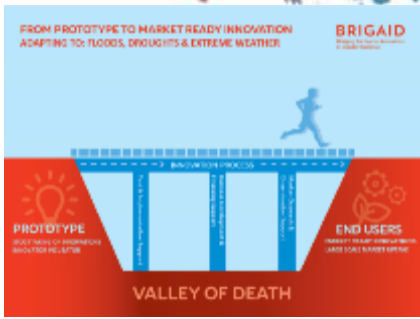
The mission of BRIGAID is to provide integral support for innovations for climate adaptation, focusing on climate-driven disasters like floods, droughts and extreme weather.

Increasing disaster Resilience by establishing a sustainable process to support

Standardization of technologies and services

Provision of structured support for innovations in climate adaptation by developing an innovative mix of methods and tools, that should become a standard for climate adaptation innovations.

BRIGAID strives to become the quality label for climate adaptation and structural reduction of climate-related disaster impacts in Europe and beyond



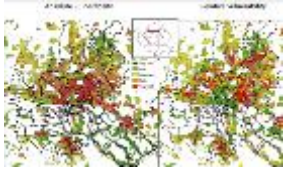
Brigaid innovations

Coastal Floods (2)

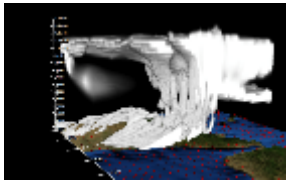
River Floods (20)

Droughts (29)

Heatwaves (4)



Heavy Precipitation (21)



Wildfires (7)

Multi-hazard (36)

Application Framework with Drone system

System for early warning and monitoring composed by:

- On site sensors (e.g. along a river)
- An automated application framework to provide warning system features
- A fleet of drones that can perform a variety of monitoring tasks providing data to the application framework

The system is intended to gather, analyse and visualise context information retrieved from stationary and mobile sensors (e.g. drones)

Application Framework with Drone system

The sensors aim at monitoring the river in real time, looking for readings outside normal parameters to detect problems. In case of problems, an automated warning system will ask to the drones fleet to inspect the affected area, taking pictures, recording videos or even deploying extra sensors. This makes it possible to have a complete report to be sent to the public bodies in the required format, thus speeding up the process to solve the emergency and preventing its extension

The warning system should use different input:

- sensors data (e.g. level of the river water)
- calls from citizens (automated call center);
- social media analysis to automatically see if anyone is talking about problems in the river.

Application Framework with Drone system

WHO ARE THE USERS?

USERS			
Municipalities	Civil protection agencies	Public safety bodies	Citizens

Resilient approach in disaster management users

Application Framework with Drone

Conclusions

Resilience has emerged as **a core principle** in Engineering

Various initiatives, including R&D project, are **showing the benefits and impacts** of the adoption of a Resilient Approach in the management of Disaster Resilience

Innovation is an enabling factor for the growth of applications (including drones) in Disaster Resilience

Investing in prevention is less expensive than intervening in reconstruction and restoration!

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Leading Resilience Engineering at EU R&D Level, through initiatives and participation in associations (e.g. EU-VRI, IMG-S)

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RINA

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