

# Increasing Resilience of Assets Facing the Risk of Wildfires

David Almeida/REN; Raquel Costa/REN; José Moreira/REN; Pedro Marques/REN; João Gaspar/REN; Domingos Xavier Viegas/ADAI/UC; Luís Mário Ribeiro/ADAI/UC; Carlos Viegas/ADAI/UC; Pedro Pacheco/ADAI/UC

**CENTRODEC - Decision Support Centre with Multi-Sensory Data for Forest Protection**



## Motivation

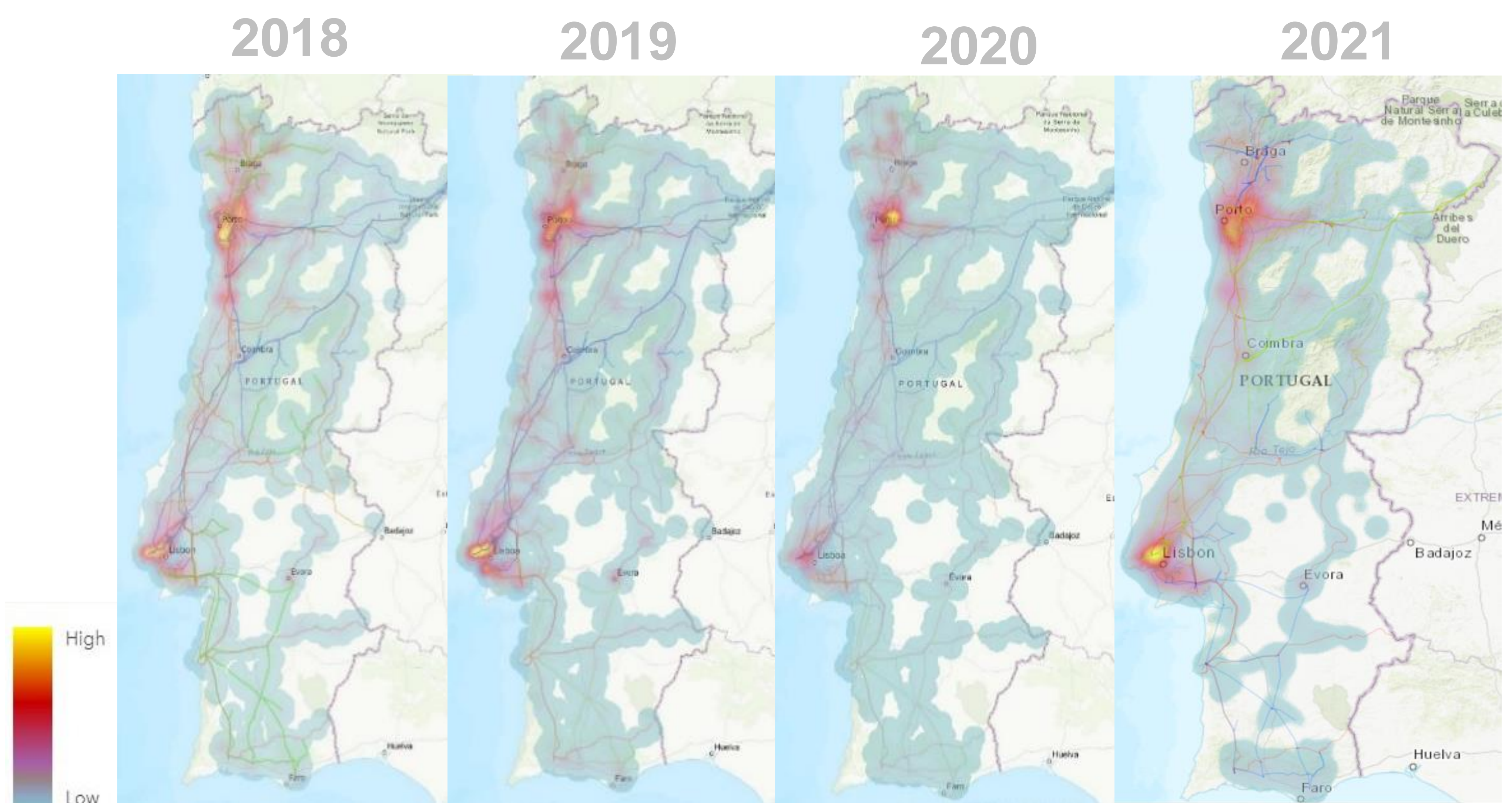
- Average of **5000 fires detected per year near REN infrastructures**
- Almost all **network is affected by wildfires**
- More than 195 occurrences** registered in a **single day** (13 July 2022)



## CENTRODEC - DECISION SUPPORT SYSTEM

The project aims to increase the resilience of forest and infrastructure against wild fires and other extreme climate events, through a multi-sensory data collection and analysis system

In 2017, a Forest Fire Alert System was developed to send alerts on fires detected inside a 5 km buffer of the infrastructure



Heatmap of rural fire occurrences inside a 5 km buffer of REN infrastructure



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## rePLANT: INNOVATIVE WAYS FOR INFRASTRUCTURE MONITORING

As part of the rePLANT project, REN installed eight infrastructure monitoring systems in three demonstration zones, representing three different types of territories in regions prone to forest fires



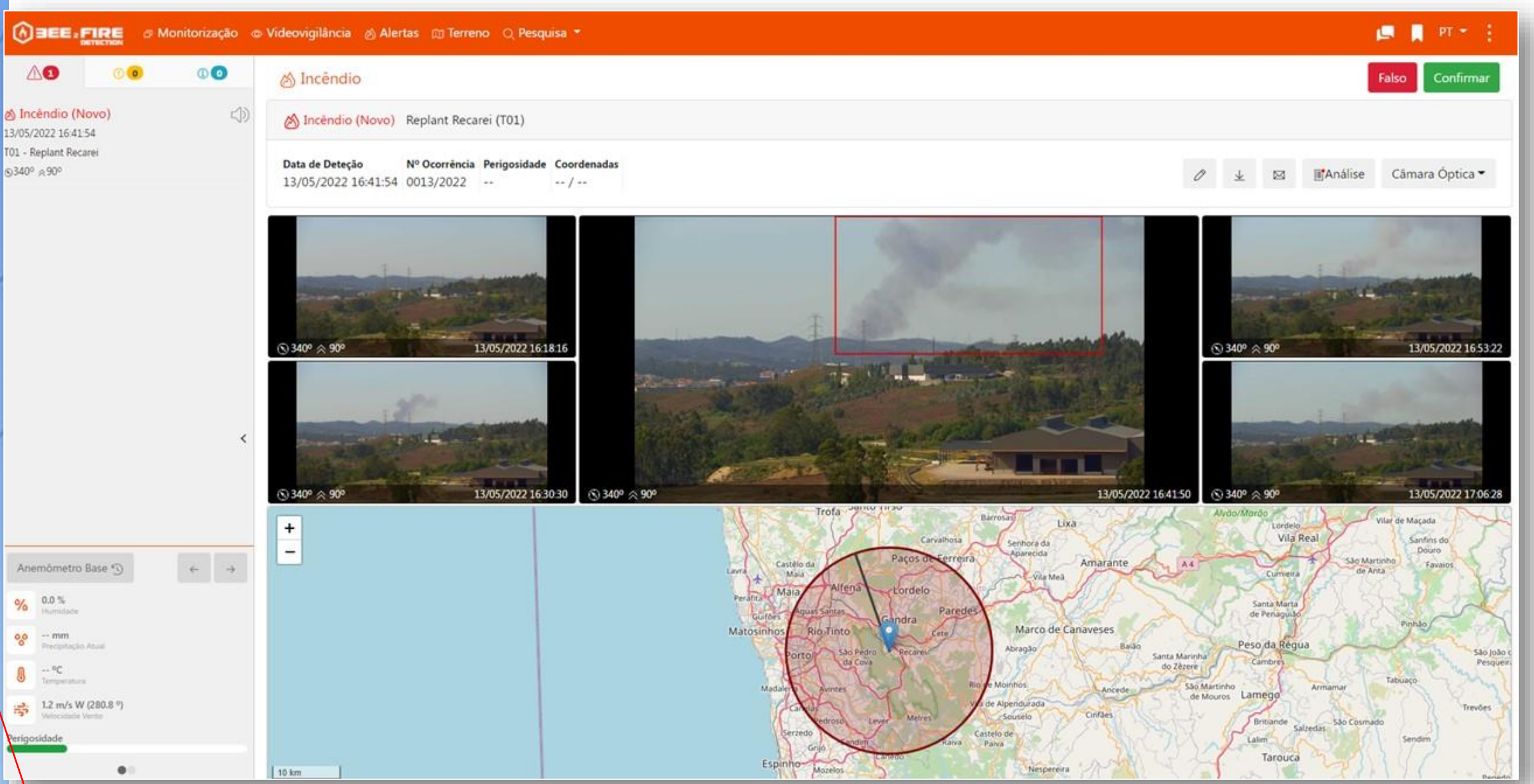
### Ultrasonic Anemometer

- Wind speed and direction (at 10m and 40m)



### Weather Station

- Wind speed, air temp. and moisture, atm. pressure, rainfall, bearing, solar rad. and electric. discharges detection (at 2.5m)



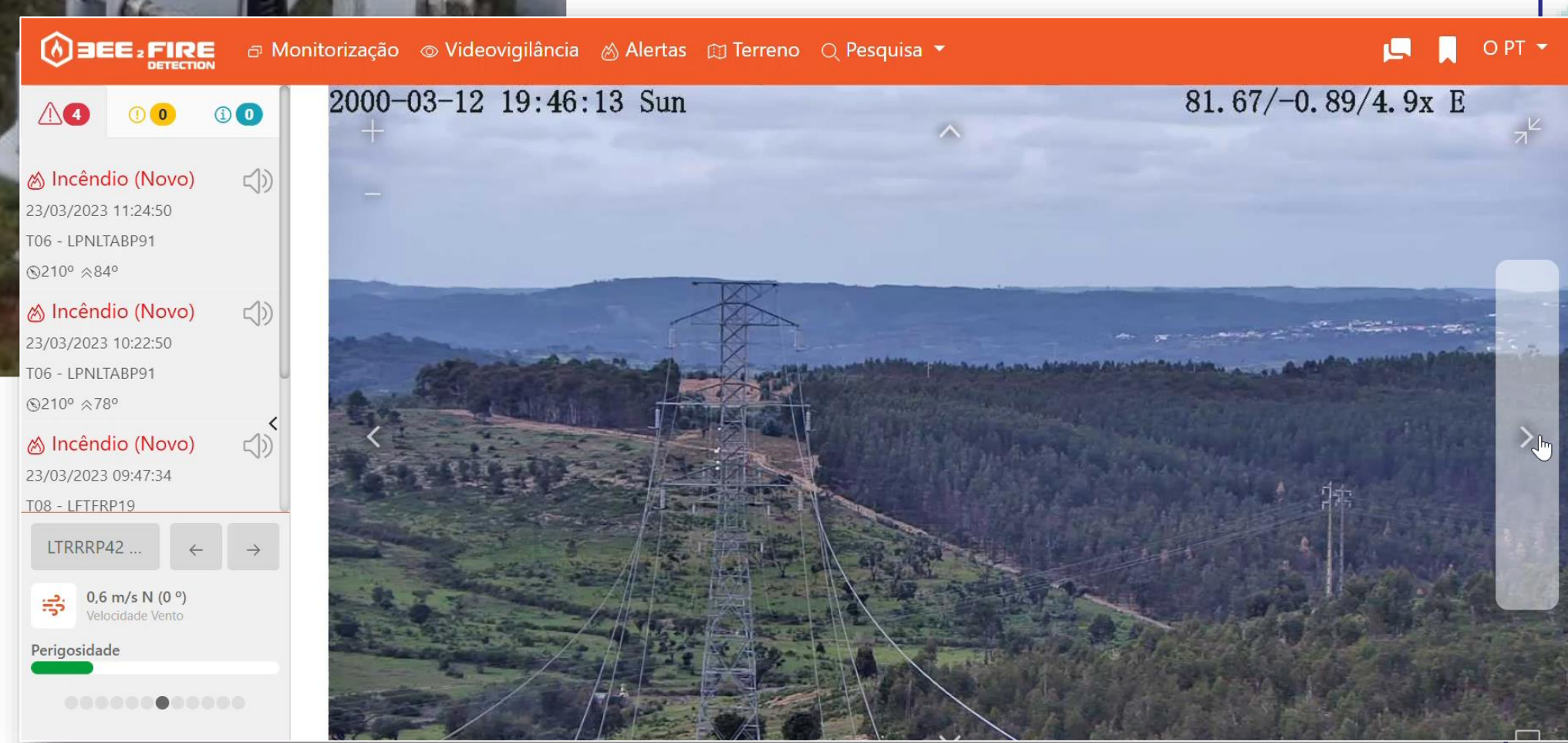
### Main Camera

- Smoke and fire detection with AI based on IR and visible cameras
- It works 24/7
- Detection of more than 10km, with uninterrupted operation and continuous 360° scanning

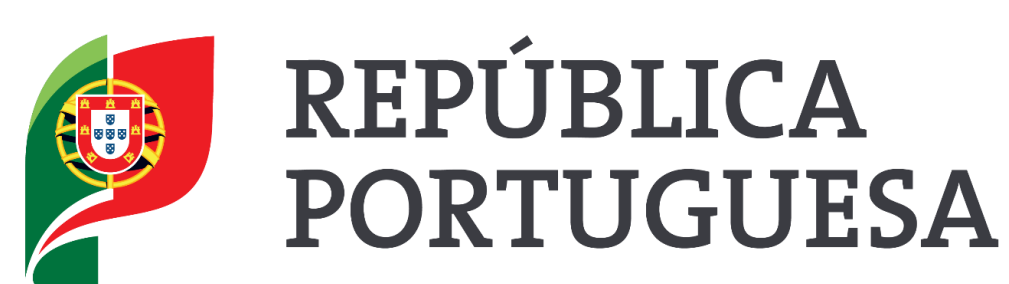


### Secondary Camera

- Tracking events based on visible camera
- 35x optical zoom capability



✓ The project will build upon the solutions developed in rePLANT, extending its coverage to a larger, high-risk fire area across the country. It will integrate various data sources to enhance decision-making during emergencies



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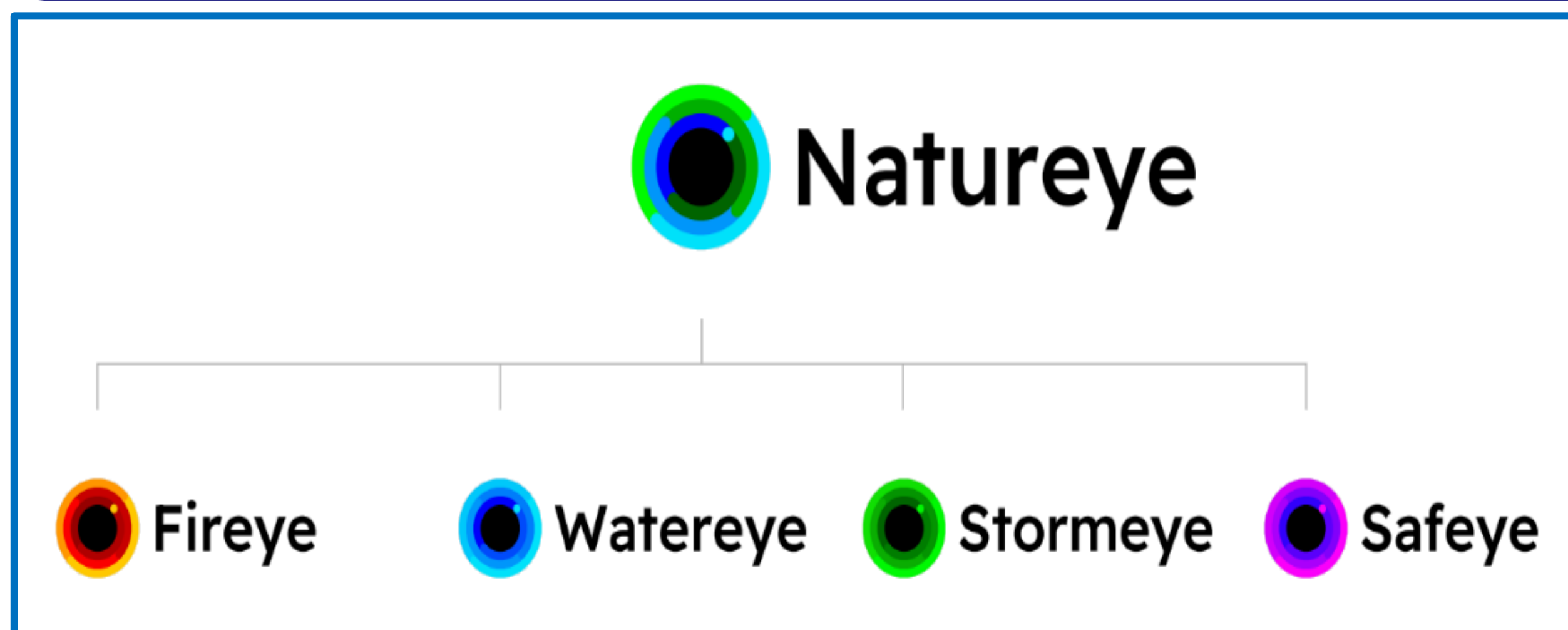
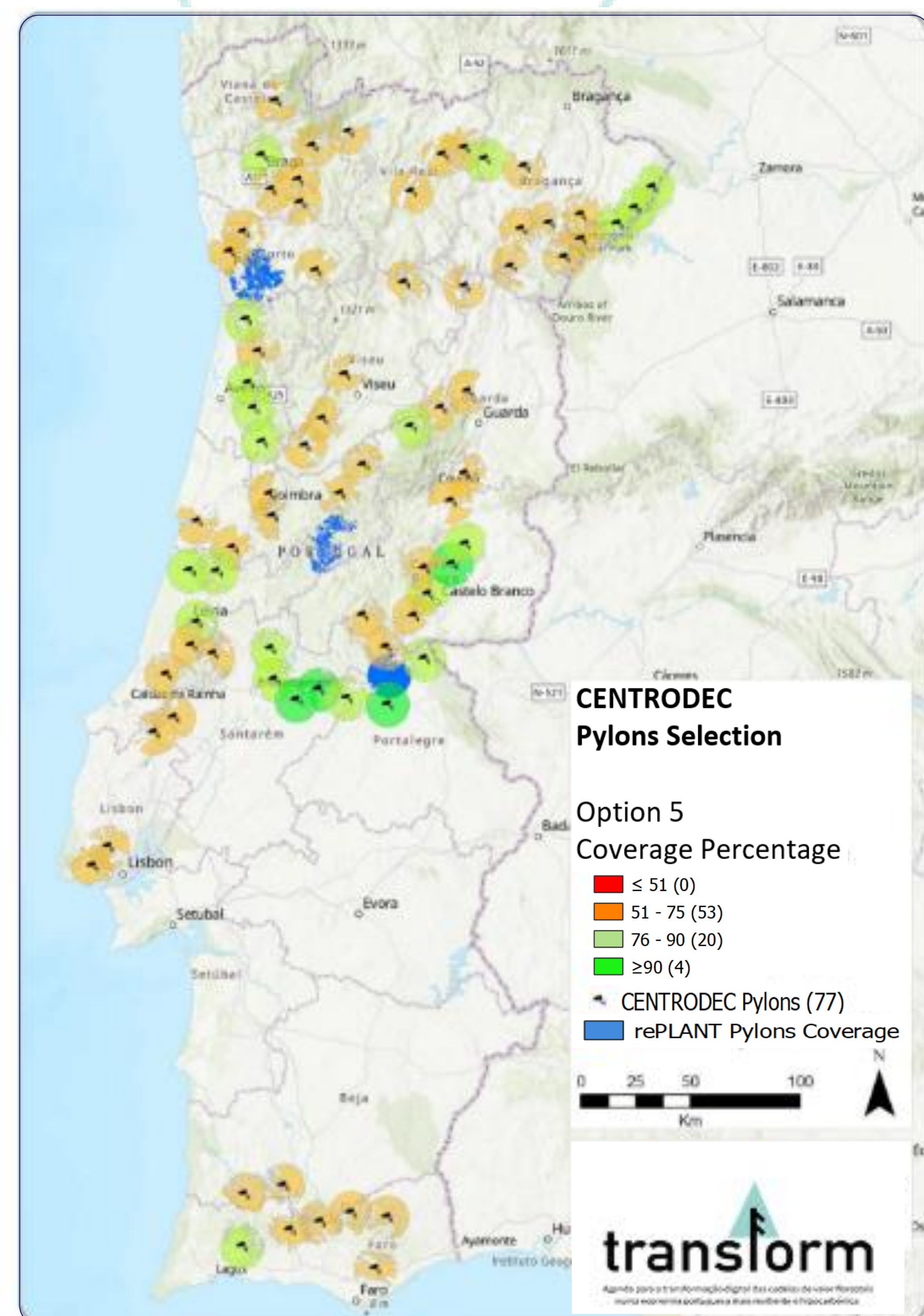
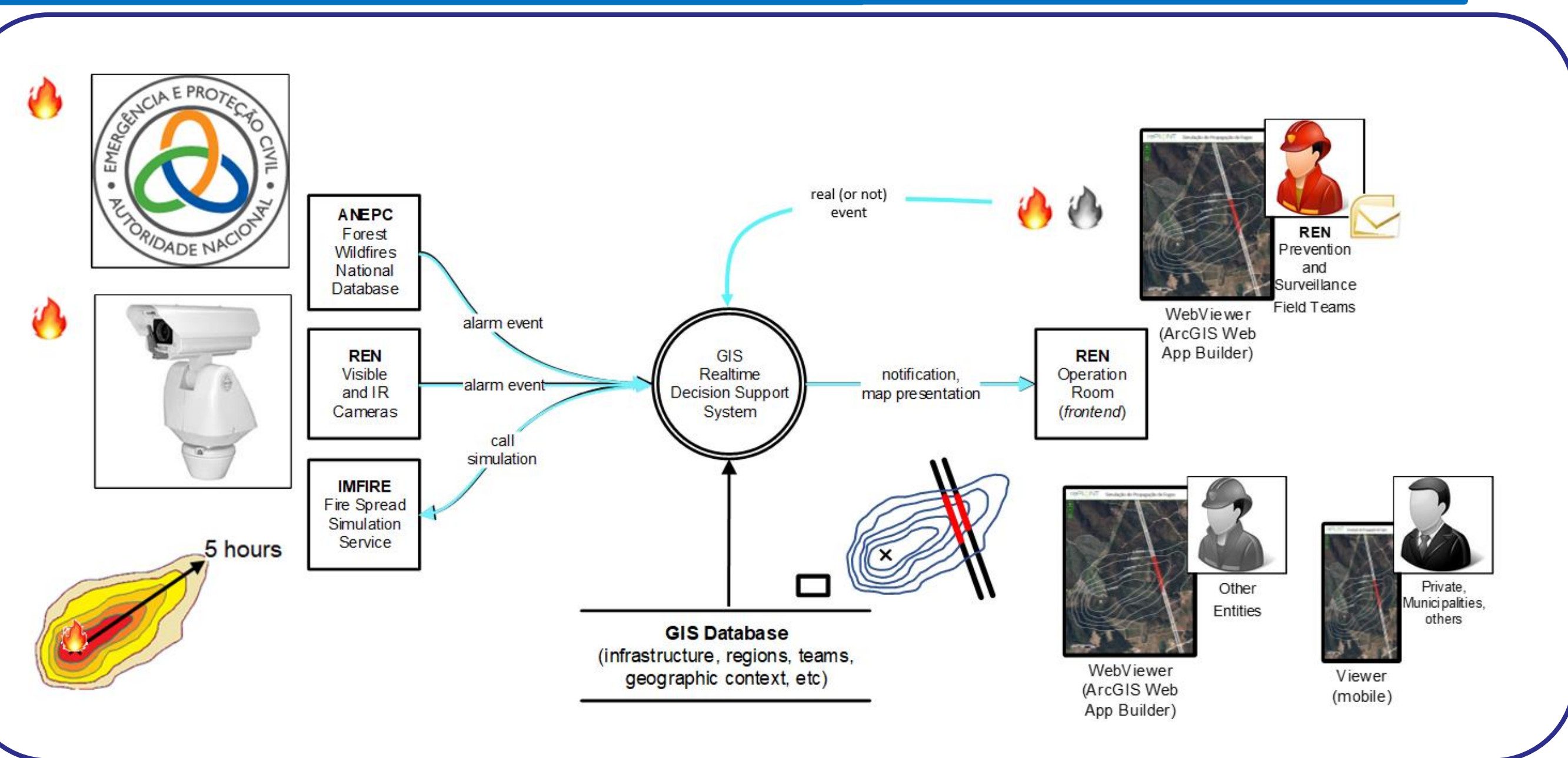
## CENTRODEC - DECISION SUPPORT SYSTEM

The solution described involves a Decision Support System (DSS) that integrates the IMFire fire simulator, developed by ADAI at the University of Coimbra, and is triggered through a web-based geographic information system interface. The simulator displays the initial location of the fire and generates predictions, in under 3 minutes, of fire spread up to 5 hours after ignition, intersecting this information with critical infrastructures to determine potential impacts. Automatic reports are sent to stakeholders when there is a risk of impact on infrastructures, such as electric and gas networks.



### Main conclusions are:

- Monitors fires that can impact the infrastructure – Reduction of alerts
- Focus on the time and place where it may impact the network – Not on ignition point
- Monitors fires outside the 5 km buffer
- Improve efficiency in dispatch and operation rooms
- Providing services to other entities, helping companies and communities



## NEXT STEP - CENTRODEC

- Expand for more than 80 cameras
- Develop a Decision Support Center
- Integration of Electric and Gas Security Centers

The centre will provide complementary support to energy dispatch and command centres in Portugal, with the capability to also assist other infrastructures. Additionally, it will enhance risk prediction and anticipation, and support public and private entities in managing assets in rural areas



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