# Capgemini

# The *TREEADS project:* innovation and technology for forest fire prevention, detection, and restoration

As societies grow increasingly vulnerable to natural disasters, the ability of different stakeholders to manage and mitigate their impact in a safe, coordinated, and efficient manner is becoming increasingly important

The combination of multiple next-generation technologies has the potential to improve fire prevention as well as the speed and effectiveness of emergency response and subsequent ecosystem recovery. This minimizes the frequency of fires and their environmental impact, reducing the risk of accidents to personnel and reducing costs.

However, this will not be possible without an integrated approach in which each phase feeds back to the previous one, enabling a more coordinated and sustainable response to forest fires.

Despite the availability of multiple technologies that can significantly contribute to preventing, anticipating, combating,

**Client:** European research consortium

**Region:** Europe and Taiwan

**Industry:** Public sector

**Client Challenge:** There are multiple technologies that can help fight wildfires, but the lack of integration among them is a major obstacle

**Solution:** An integrated platform that enables interaction between different stakeholders and covers the three stages of wildfire management: prevention, detection, and restoration

**Benefits:**

- Enhancing the response capacity to wildfires and the recovery of affected ecosystems

- Creation of a new advanced service for planning and communicating missions to unmanned vehicles

mitigating, and recovering from the effects of environmental disasters, there are several barriers that currently prevent the full potential of these technologies from being exploited. The main barrier is the lack of integration, interoperability, and standardization between different systems and technologies. This lack can hinder information exchange and complicate real-time decision-making. Research into interoperability standards and protocols is essential to overcome this obstacle and ensure that different technologies can work together effectively.

## The TREEADS Project

The TREEADS Project, part of the European Union's Green Deal program, is a collaborative effort involving 47 partners from 14 European countries and Taiwan, aiming to combat wildfires through advanced technological solutions and demonstrate the effectiveness of a holistic approach.

The TREEADS Project proposes a comprehensive forest fire management system that includes state-of-the-art products. Its holistic approach involves considering and integrating all facets and stages of fires in their different phases (prevention, detection, and restoration) to create a global and interconnected solution.

In the TREEADS project, this approach is managed by the integration of various innovative technologies and methods, such as:

- Virtual reality for firefighter training.

- Aerial drones equipped with LiDAR and EO/IR cameras for real-time monitoring.

- Seed capsules with restoration gel for ecological and recovery use.

- Fire detection systems based on social networks.

- Decision support systems.

- Insurance models and risk transfer solutions to provide comprehensive coverage and response.

*"Capgemini is making a very strong commitment to having sustainability as a priority in all projects. This initiative is a clear example."*

**Aurora Ramos, Lead 5G/6G Connectivity & Networks at Capgemini Engineering Spain**
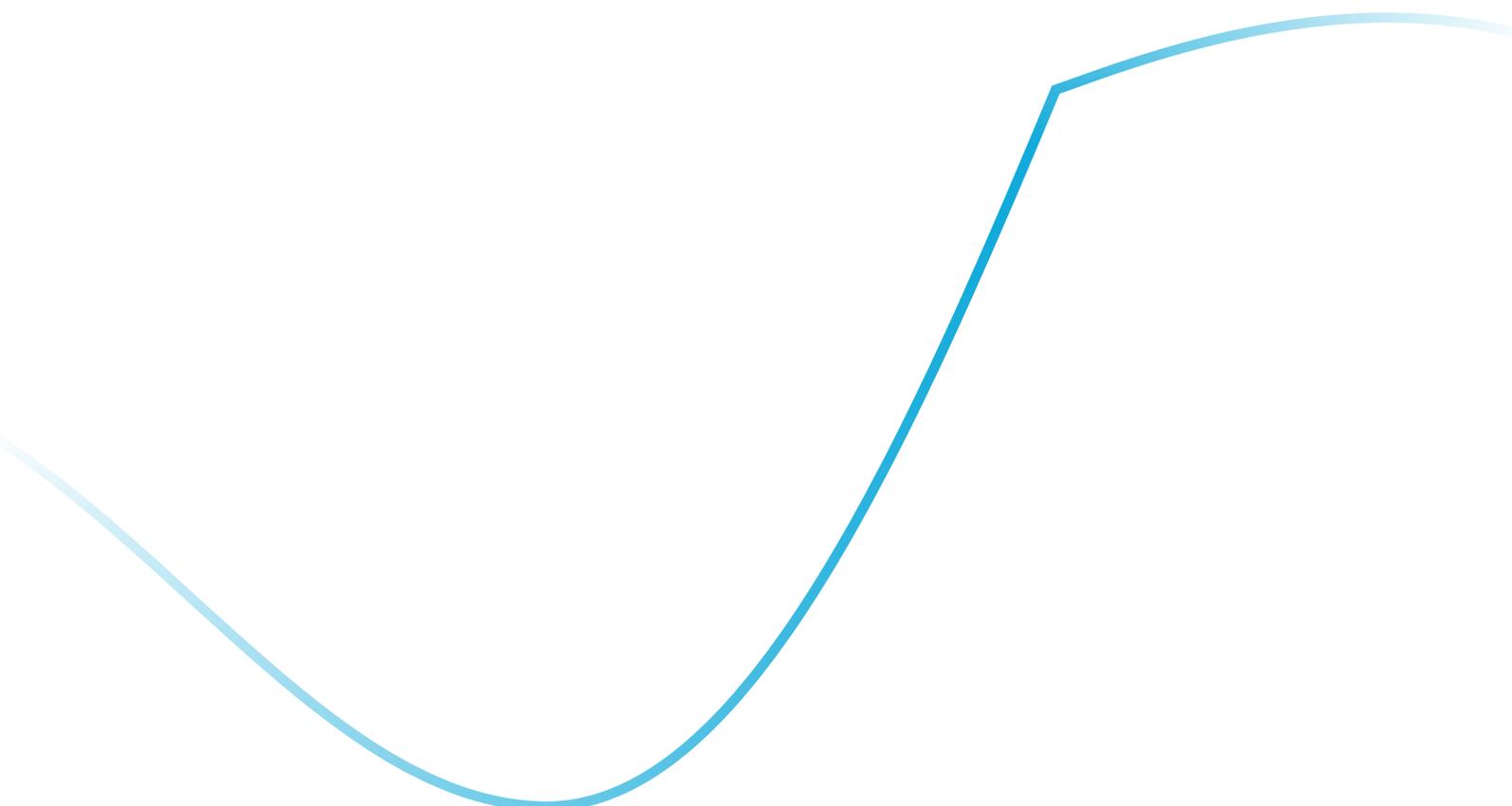
## Capgemini's unmanned vehicle command and control center

The Command and Control Center (CCC) is a service designed to compose missions and communicate them to unmanned vehicles in real time during a field operation. In addition, it enables the visualization of telemetry and on-board sensor information.

This service functions as a central hub for control and visualization of the approach in four layers, integrating information from ground sensors, on-board sensors on low- and medium- altitude drones, and high-altitude platforms (HAPs), such as hot air balloons equipped with multispectral cameras.

The system is capable of determining the communication protocols that enable the governance and monitoring of each available aerial vehicle. This makes it possible to obtain information on their payload and onboard sensors, receive position and telemetry data, send them orders to carry out the missions, and receive the data provided by the sensors at critical points of the mission, such as video and hyperspectral images.

> *"The open and extensible architecture of the Command and Control Center makes it possible to incorporate and control other autonomous systems in the future, such as terrestrial or underwater robotic platforms."*
>
> **Noel Ruiz, Solution Architect & Presales at Capgemini Engineering Spain**

## The Spanish pilot

Capgemini has coordinated the activities of the Spanish pilot, one of eight that make up the TREEADS project, to field test the various technologies developed by the partners.

This validation has been carried out in the mountains of Avila in different stages and through different exercises that involved the participation of the project's technological partners, local authorities, public bodies, homeowners' associations, and emergency teams.

A total of 56 technologies have been tested throughout 13 exercises, which have also enabled the validation of support provided to firefighting teams. Meanwhile, these tests have captured, integrated, merged, and analyzed data from different sources to provide useful information for forest fire prevention activities and fire risk indicators supported by Geographic Information Systems (GIS).

The Spanish TREEADS pilot stands out for its comprehensive and advanced approach to forest fire management, demonstrating how technology and innovation can converge to address critical environmental challenges.

Under Capgemini's leadership, this pilot has not only improved immediate response capacity but also promoted the sustainable recovery of affected ecosystems.

**TREEADS**

www.treeads-project.eu    @treeads-h2020    @TREEADSH2020
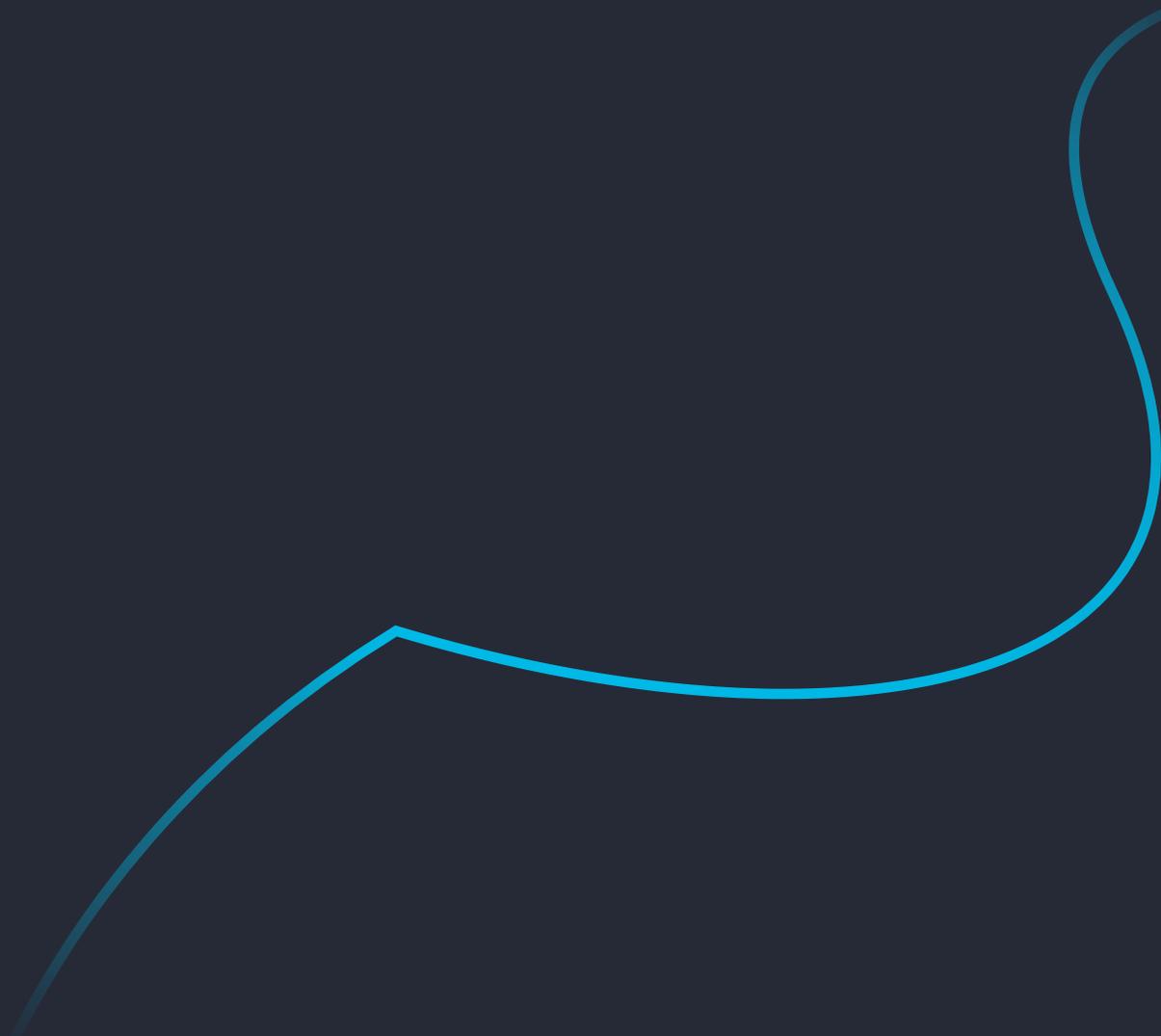
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Capgemini is a global business and technology transformation partner, helping organizations to accelerate their dual transition to a digital and sustainable world, while creating tangible impact for enterprises and society. It is a responsible and diverse group of 340,000 team members in more than 50 countries. With its strong over 55-year heritage, Capgemini is trusted by its clients to unlock the value of technology to address the entire breadth of their business needs. It delivers end-to-end services and solutions leveraging strengths from strategy and design to engineering, all fueled by its market leading capabilities in AI, cloud and data, combined with its deep industry expertise and partner ecosystem. The Group reported 2023 global revenues of €22.5 billion.

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