

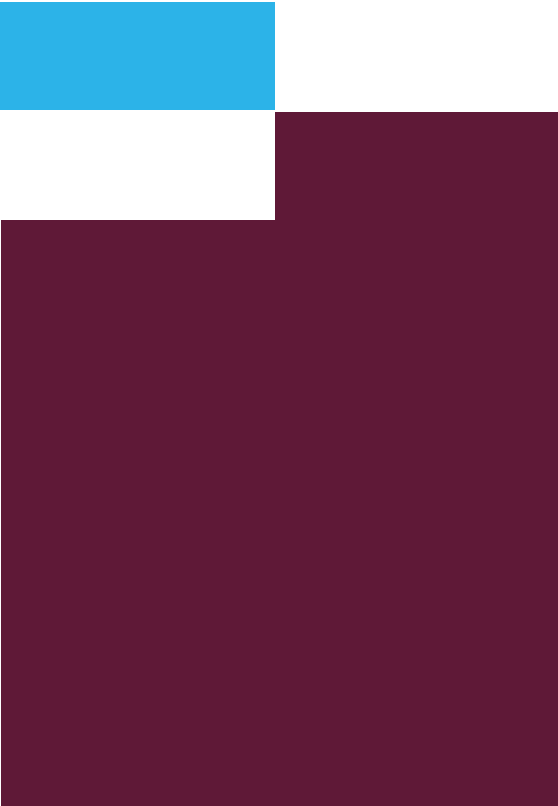
Faced with the growing number and intensity of vegetation fires, the EDHEC Climate Institute is making the SecuFire Action tool available to public bodies engaged in the prevention of and fight against forest fires.

SECUFIRE
ACTION®





Forest fires: taking action through research



Climate change is sharply increasing the risk of forest fires. Rising temperatures, more frequent droughts and drier vegetation are extending the fire season and helping fires spread.

The raison d'être of the EDHEC Climate Institute rests on a simple conviction: faced with the environmental emergency, research must serve action. It must give decision-makers in the field the tools they need to act.

Let's fight fire risk together

Research has made major advances in forecasting climate events over the short and medium term.

That is why the EDHEC Climate Institute has decided to make SecuFire Action, a tool born of its research partnership with the DeepTech company Climate Innov, available free of charge to public bodies engaged in the prevention of and fight against forest fires.

By sharing this cutting-edge predictive technology, we turn research into concrete impact and societal responsibility into the capacity to act in the field.

Together, we can strengthen the resilience of our territories against fire risk.

Camille ANGUÉ

Director of the EDHEC Climate Institute

I – A new geography of risk

Climate change is redrawing the geography of fire risk. Rising temperatures, the progressive drying out of soils and vegetation, and the lengthening of at-risk seasons are all helping fires spread well beyond their historical zones. From the Mediterranean coastline to the forests of the North, no territory can now be considered safe.

Crisis factors are piling up:

- Depleted soils and prolonged water stress;
- Steadily rising temperatures;
- Unpredictable, violent weather outbursts;
- Growing pressure at the interfaces between nature and human infrastructure.

This shift confronts field operators with an unprecedented challenge: making critical decisions — often under extreme pressure — involving human lives, the survival of infrastructure and the future of entire territories, on the basis of information that is most often scattered.

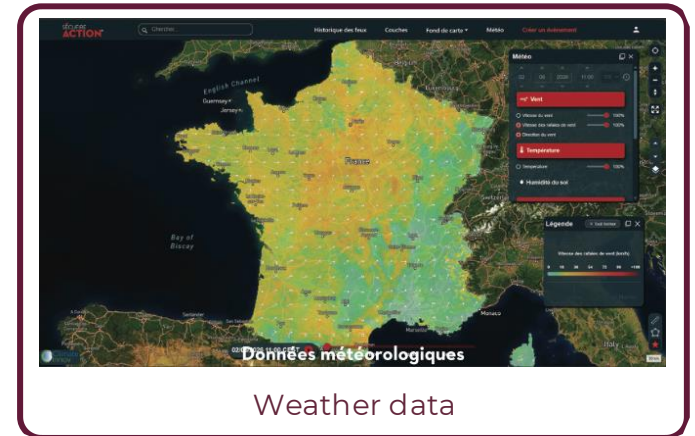
II – SECUFIRE ACTION: an ecosystem of modules serving the authorities (1)

SecuFire Action, developed with our scientific partner Climate Innov, supports firefighting stakeholders in their decision-making; in all circumstances, the decision remains with the operational teams. **Each module is a decision-support tool.**



The main modules

- **Weather Module:** high-precision weather forecasts, enriched with satellite data. In parallel, launch of a website dedicated to forest weather, with risk forecasts at a 3 km scale.
- **Topography and Digital Terrain Model Module:** Visualisation and analysis of the topography.

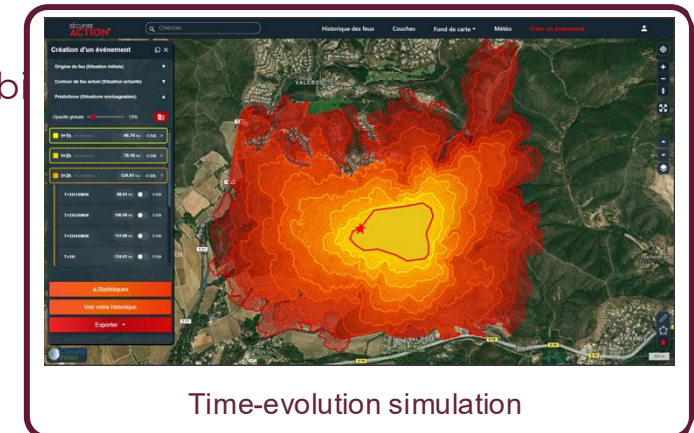
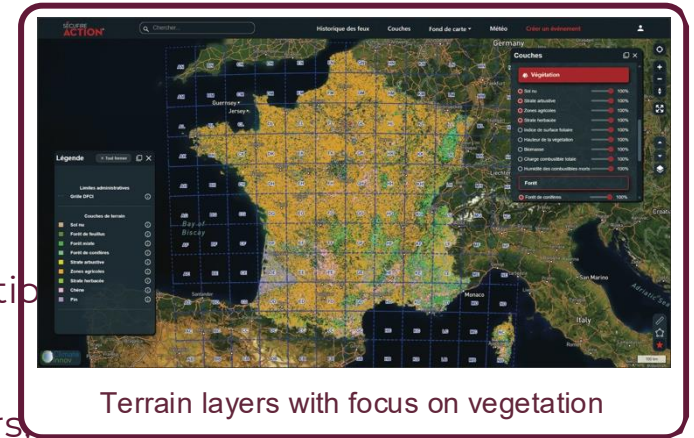


Weather data

II – SECUFIRE ACTION: an ecosystem of modules serving the authorities (2)

The main modules (2)

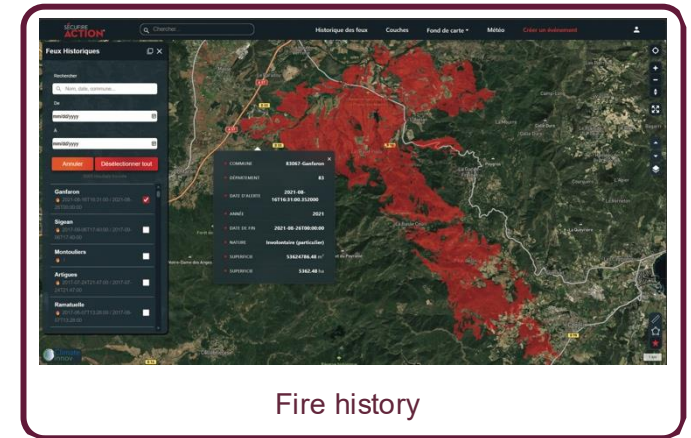
- **Vegetation Module:** Mapping and physical characterisation of vegetation (fuel, water stress)
- **Land Use Module:** Sensitive points (gas stations, electrical transformers, roads, infrastructure)
- **Fire Spread Prediction Module:** Physical modelling of fire spread (Balbi model)



II – SECUFIRE ACTION: an ecosystem of modules serving the authorities (3)

The main modules (3)

- **Tactical Memory Module:** History of past fires and operational lessons learned
- **DFCI Module with 3 dynamic zoom levels:** geographic grid designed for Forest Fire Defence (DFCI)
- **Natural and Artificial Water Points Module:** Updated with reservoir capacities and an accessibility inventory



III - A measurable impact



- Reduction in burned area: **up to 30%**
- Reduction in CO₂ and fine-particle emissions: **target 10-30%**
- Reduction in infrastructure losses, biodiversity losses and reforestation costs

IV – Integrated scientific armour

A scientific methodology built around 5 divisions

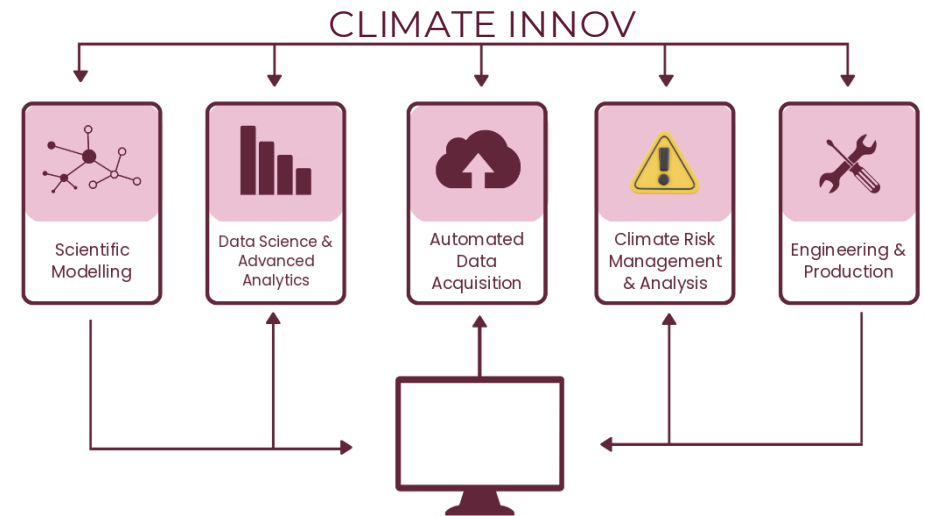
Scientific modelling: The physics of fire put into equations

Data Science & advanced analytics: The mathematical intelligence that anticipates shifts in fire behaviour

Automated data acquisition: Satellite feeds connected continuously and in real time

Climate risk management & analysis: The operational translation of terrain vulnerability

Engineering & production: Hardened, highly available software infrastructure built for crisis situations

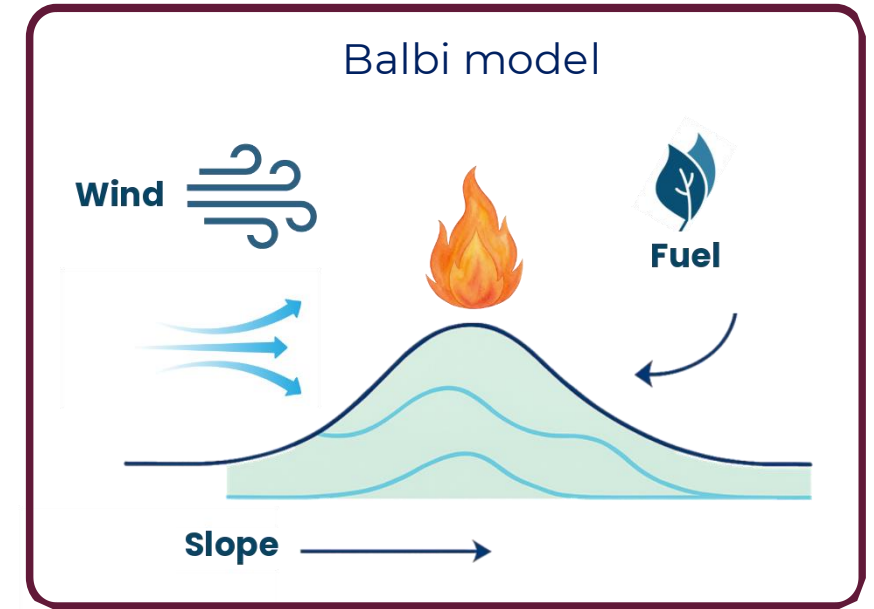


V – A rock-solid scientific foundation: The Balbi model (1)

The application is based on the **Balbi et al. physical fire-spread model**, developed by the “Projet Feu” (SPE Laboratory, CNRS - Università di Corsica Pasquale Paoli).

Climate Innov carried out its implementation and operational industrialisation (numerical solving, 1D→2D extension). The model was evaluated in collaboration with the IMATH Laboratory of the University of Toulon as part of a “Med’Innov” University Innovation Programme.

The **integration of satellite data** (terrain, weather and vegetation) was carried out by the scientific teams of Climate Innov.



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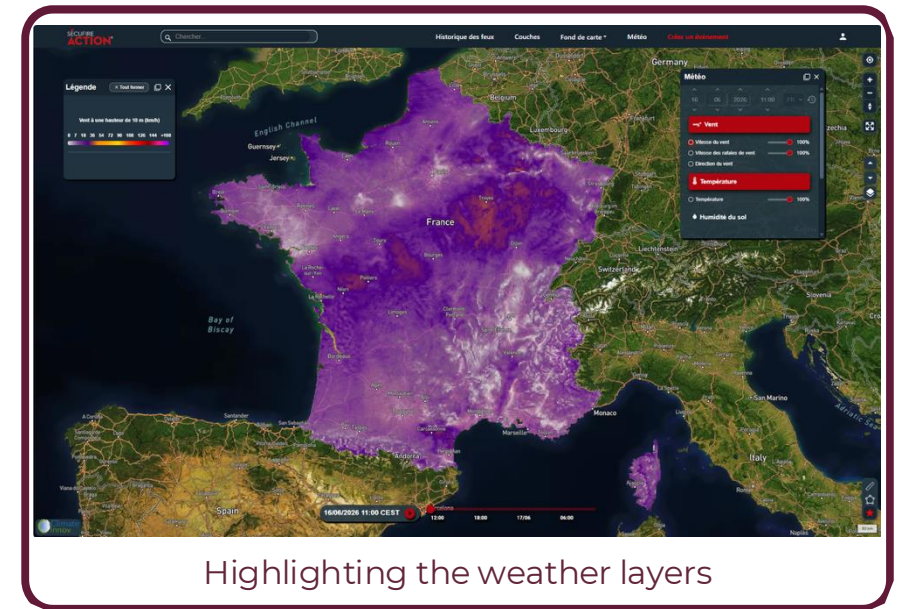
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V – A rock-solid scientific foundation: The Spire Global partnership (2)

To feed its algorithms, **SecuFire Action** relies on the most **recognised satellite constellations and global databases** (Sentinel-2, EUMETSAT, Spire Global, GFS, ERA5 ...).

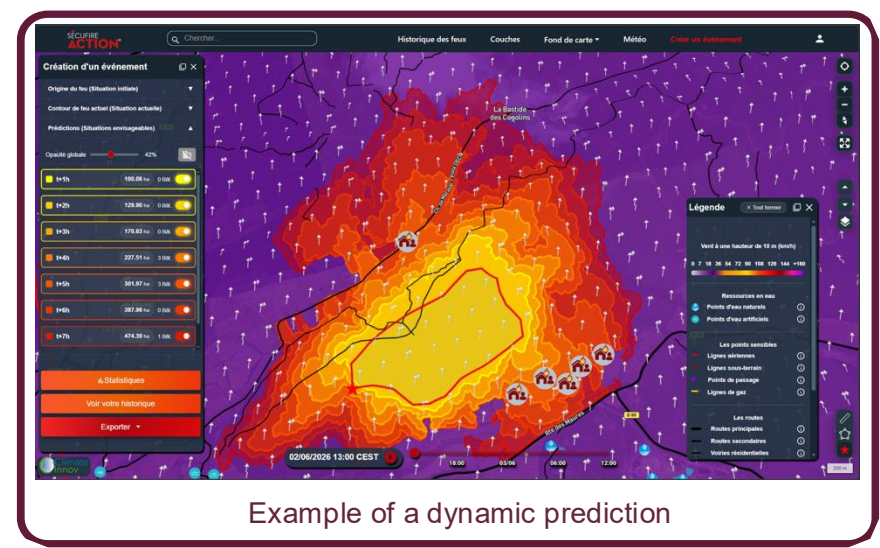
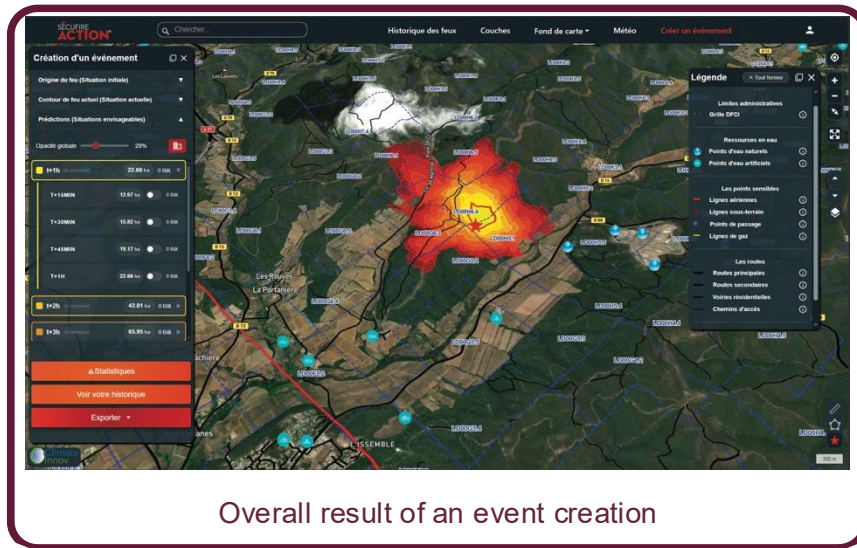
A partnership with Spire Global, owner of the world's largest commercial constellation of radio-occultation smallsats, feeds this data stream, making it possible to anticipate wind micro-variations, pressure shifts and local humidity changes even before they affect fire behaviour on the ground.



Highlighting the weather layers

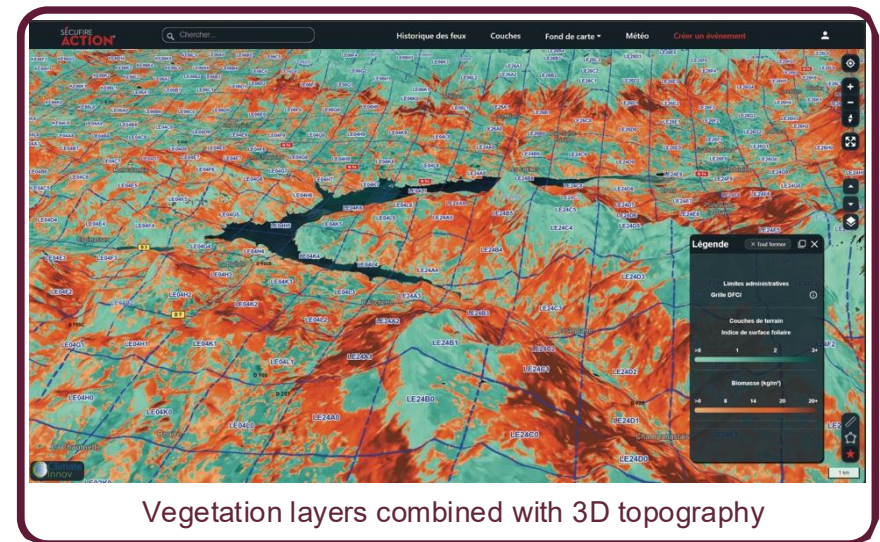
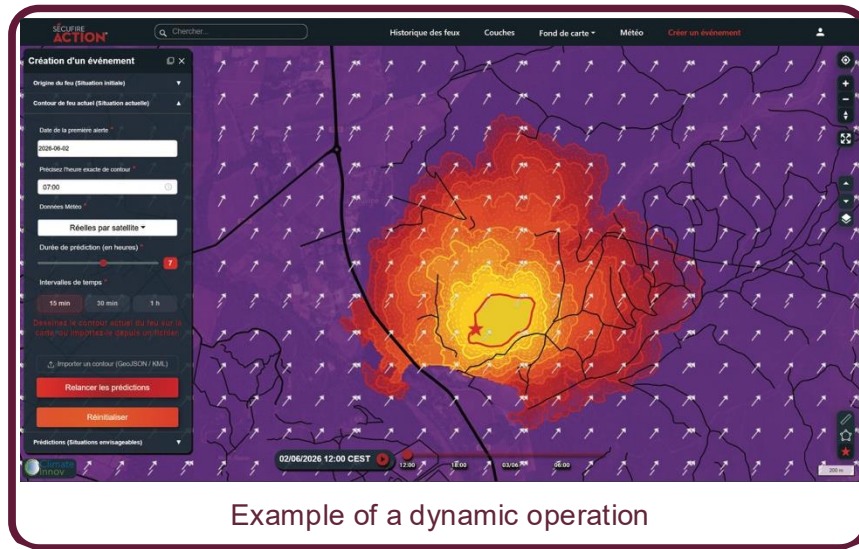
VI – Key features (1)

Anticipate: Instant dynamic prediction - the module computes the spread and projects the fire front over several hourly horizons.



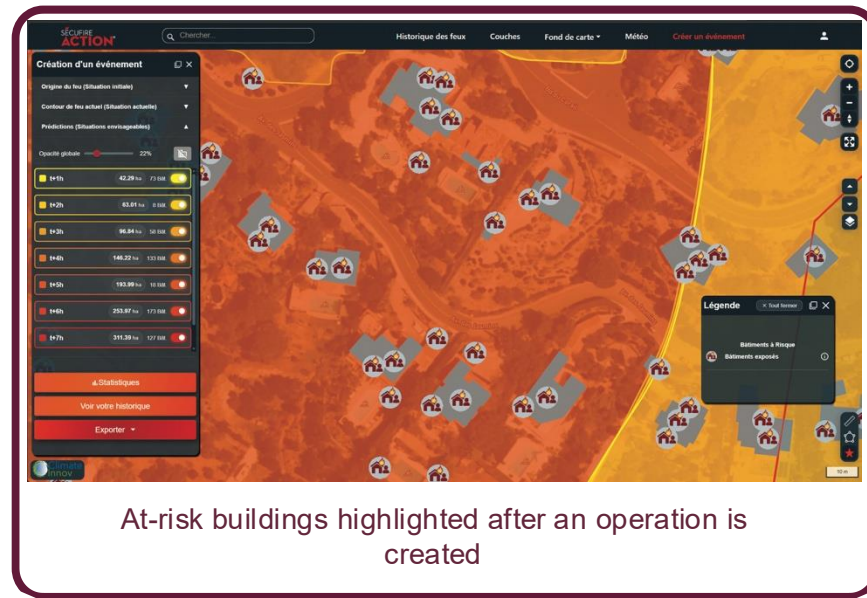
VI – Key features (2)

Analyse: Automatic environmental layers - fuels, natural barriers, road networks, hydrants.



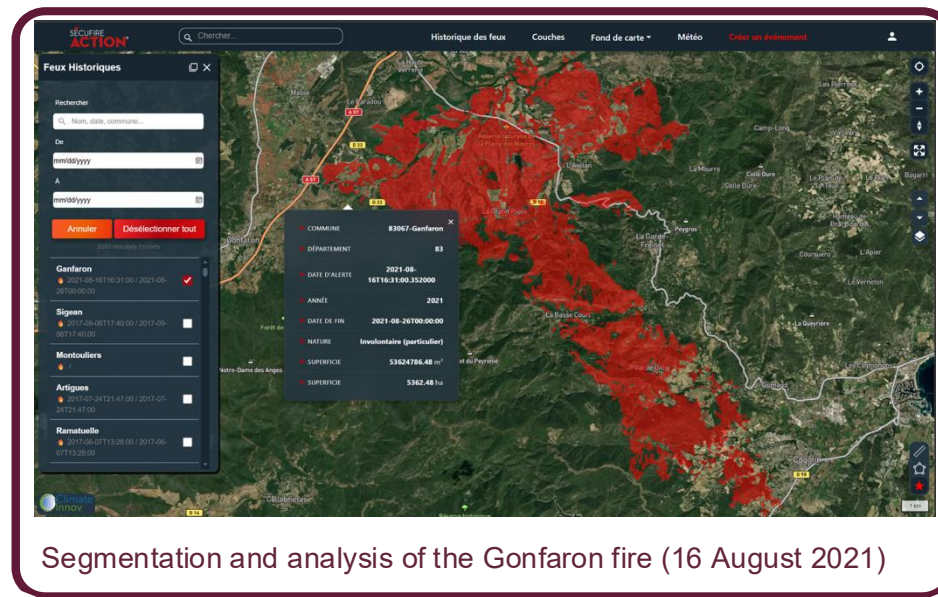
VI – Key features (3)

Decide: A unified, action-oriented dashboard to decide force deployment and coordinate evacuations.



VI – Key features (4)

Capitalise (lessons learned): A comprehensive fire history to train teams and build on field memory.



VII – Operational use scenarios

1. Real-time command support

From the moment the alert is raised, the “Fire Spread Prediction” Module automatically ingests the input data (weather forecasts, vegetation, topography, anthropogenic factors, initial fire perimeter) and projects the fire’s path. Within seconds, commanders identify the areas to evacuate, the sites to protect and the optimal positioning of ground and aerial resources.

2. Prevention & crisis-management preparedness

Ahead of the crisis, the modules make it possible to inject extreme weather scenarios to test limits, map vulnerabilities and refine Business Continuity Plans (BCPs).

3. Securing sensitive sites

For Seveso and industrial site managers, SecuFire Action integrates with Internal Operation Plans (POI) and technological risk prevention plans (PPRT). It provides physical modelling of fire risk where it is mandatory.

For more information, write to:
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