FIRE-RES

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bombers

IA 5.9: "Tools for international collaboration through shared operational information for specialized stakeholders"

Information management

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FireRES IA
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1. Share Information - Communication - Interoperability
2. Extreme Wildfire Events Framework
3. EWE Communication - Challenges
4. Catalonia Living Lab case study
   - 4.1 Manage information system
   - 4.2 Collect information
   - 4.3 Share information with other agencies
   - 4.4 International collaboration example cases:
     - Remote assessment
     - Share information with deployed units
     - Collect and share when deployed outside

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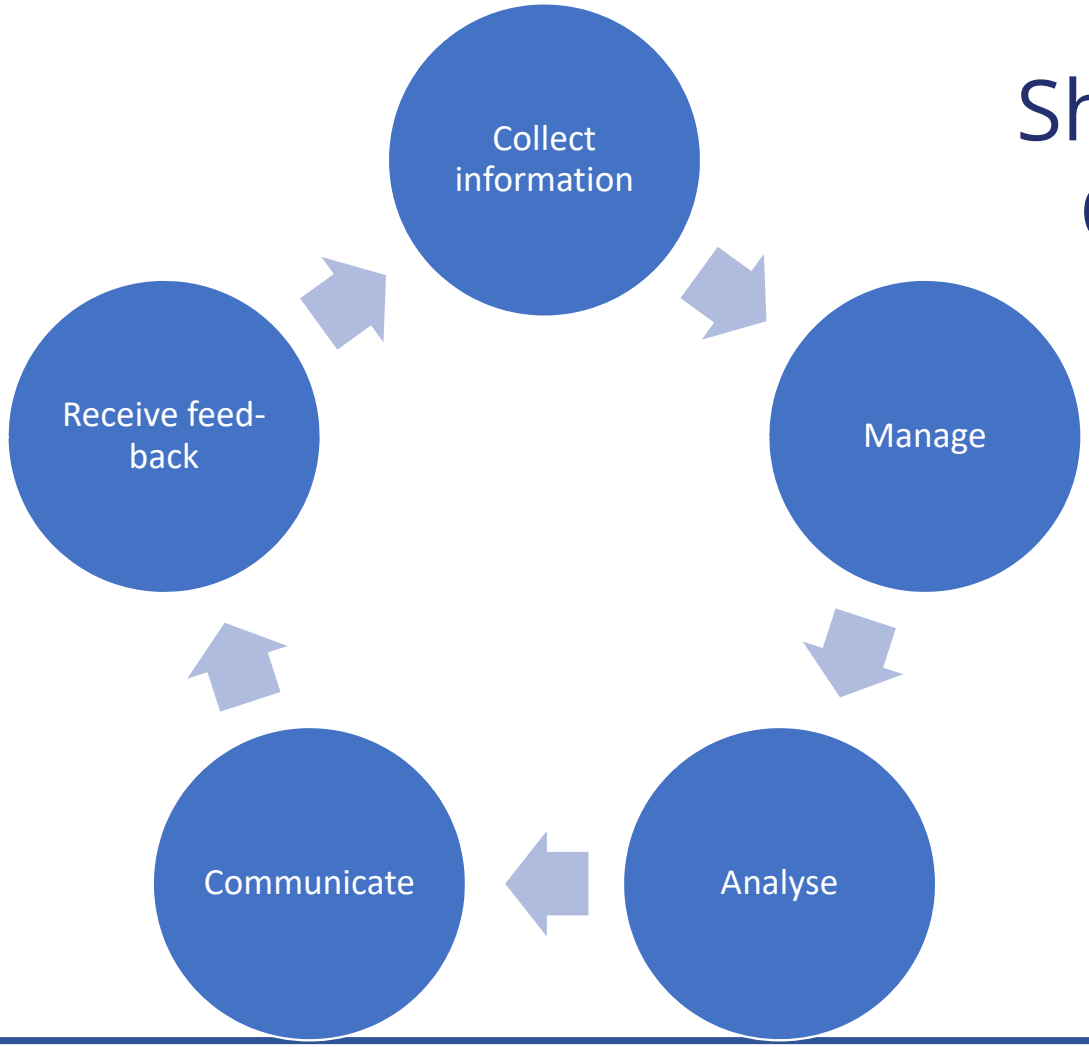
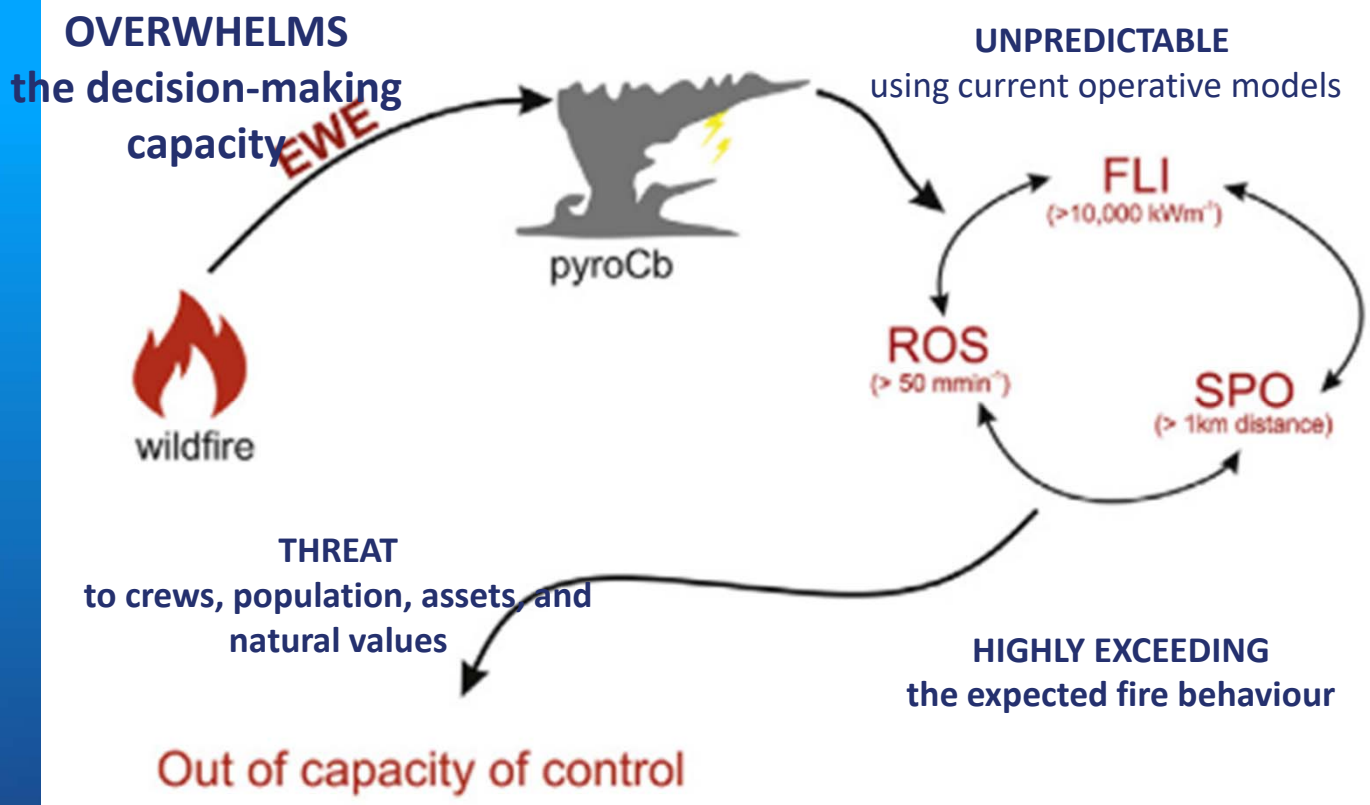


Share information – Communication-Interoperability

Integrated Fire Management

1. Els Incendis Forestals Extrems i Reptes als que dona resposta la Gestió Integrada del Foc



1:Tedim, F.; Leone, V.; Amraoui, M.; Bouillon, C.; Coughlan, M.R.; Delogu, G.M.; Fernandes, P.M.; Ferreira, C.; McCaffrey, S.; McGee, T.K.; et al. Defining Extreme Wildfire Events: Difficulties, Challenges, and Impacts. Fire 2018, 1, 9. https://doi.org/10.3390/fire1010009

Extreme Wildfire Events (EWE)

These are wildfires with **large-scale complex interactions** between **fire and atmosphere** generating **pyroconvective behavior and coupling processes**, resulting in fire behavior that is fast, intense, uncertain, and rapidly changing.

This leads to fire behavior that exceeds the limits of control (fireline intensity of 10,000 kW/m; rate of spread >50 m/min; spotting distance >1 km and massive spotting based on Tedim et al. 2018, and extreme growth rate values (surface per hour, ha/h)).

At the same time, given current operational models, this extreme fire behavior is **unpredictable** using existing operational models, with observed fire behavior often far exceeding the expected behavior. This **overwhelms the decision-making capacities of the emergency system** (firefighter crews and emergency managers, infrastructure managers, and the civilian population).

It may represent an increased threat to crews, populations, assets, and natural values, as well as have significant negative socioeconomic and environmental impacts.

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3. Extreme Wildfire Events Communication - Challenges

Regarding the communication challenges detected during the D1.1 **Transfer of lessons learned on extreme wildfire events to key stakeholders ,** of the FIRE-RES project the following have been identified:

1. Internal communication should assure that emergency service knows about the current fires, the strategy, and tactics, when they are active or before a shift, and make them able to develop their work but also inform the population if necessary.

2. External communication with other agencies should contribute to avoid collapse by looking for external help but also to build trust and interact with other agencies.

3. External communication with society:
    1. Organizations must be able to manage the communication while coping with the EWE.
    2. Information must be translated to be understandable by other groups, and it is important to avoid noise.
    3. Boosting transparency and trust.
    4. Communication during the preparation phase is highly important.
    5. The consideration of different communication channels to reach all the population.

Castellnou, M., Nebot, E., Estivill, L., Miralles, M., Rosell, M., Valor, T., Casals, P., Duane, A., Piqué, M., Górriz-Mifsud, E., Coll, Ll., Serra, M., Plana, E., Colaço, C., Sequeira, C., Skulska, I., Moran, P. (2022). FIRE-RES Transfer of Lessons Learned on Extreme wildfire Events to key stakeholders. Deliverable D1.1 FIRE-RES project. 119 pages. DOI: https://doi.org/7358311

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4. Catalonia Living Lab case study.

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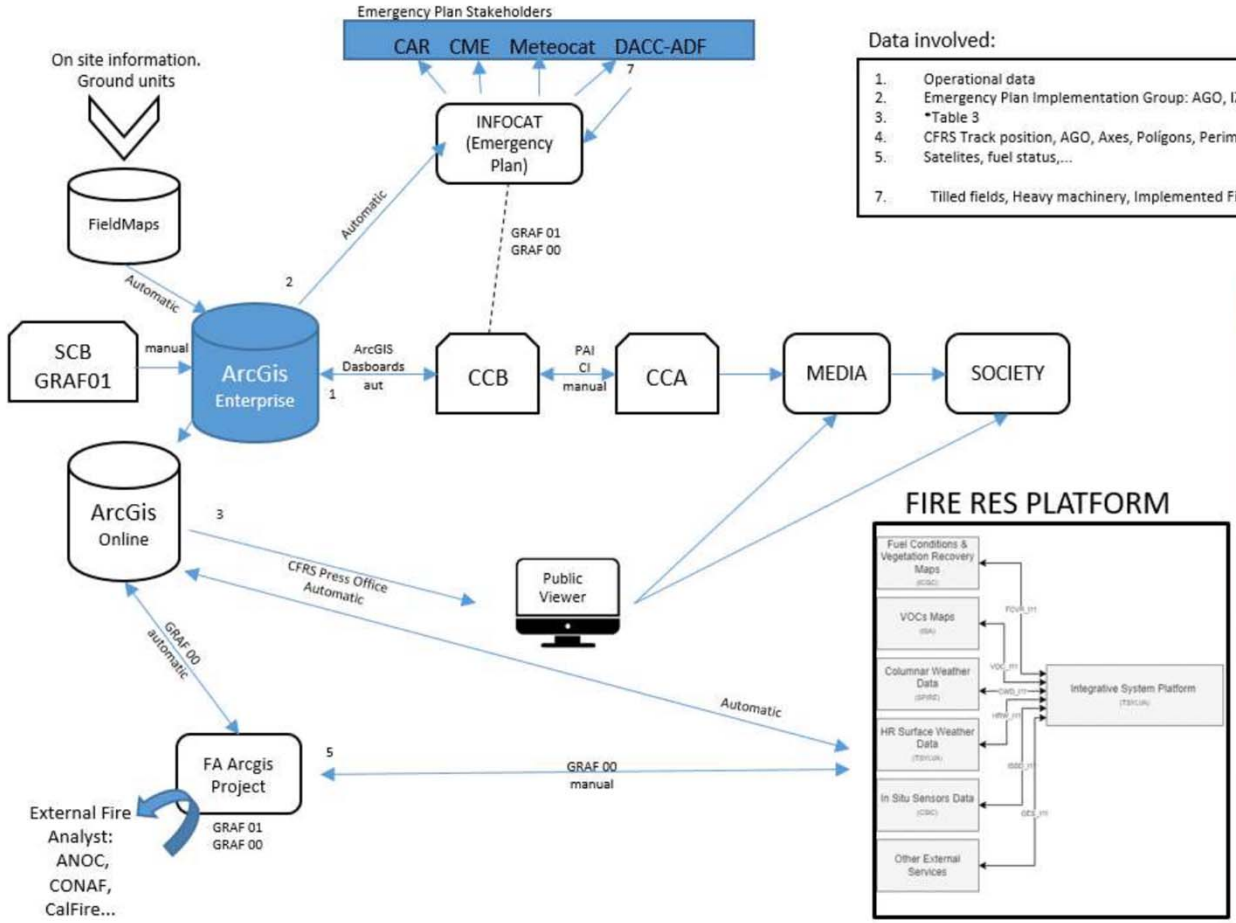
4. Catalonia Living Lab case study. 4.1 Manage information system



Data involved:

1. Operational data
2. Emergency Plan Implementation Group: AGO, IZ, vulnerable elements, Implementation Plan
3. *Table 3
4. CFRS Track position, AGO, Axes, Polígons, Perimeters
5. Satelites, fuel status,...

7. Tilled fields, Heavy machinery, Implemented Fire prevention Plans

Table3. Public Information

Data	Format	Font	Responsable
Incident Name	automàtic	Despatx-ArcGis	SCT – Automàtic
Localització	UTM/LatLong	Despatx-ArcGis	SCT – Automàtic
Municipi	Text automàtic	Despatx-ArcGis	SCT – Automàtic
Tipologia IV	VA/VU/VF	Despatx-ArcGis	SCT – Automàtic
Date	DD/MM/AA HH:MM	Despatx-ArcGis	SCT – Automàtic
Fase de l'incendi	Actiu/Estabilitzat/Controlat/Extingit	Despatx-ArcGis	SCT – Automàtic
Número de Recursos assignats		Despatx	SCT – Automàtic
"Zona d'alerta"	Polígon	ArcGis Enterprise - manual	GRAF/suport
ICP Localisation	point	ArcGis Enterprise - manual	GROS01
COE. Operative Cartography	Imatge base	WMS Servidor Bombers	Cartografia

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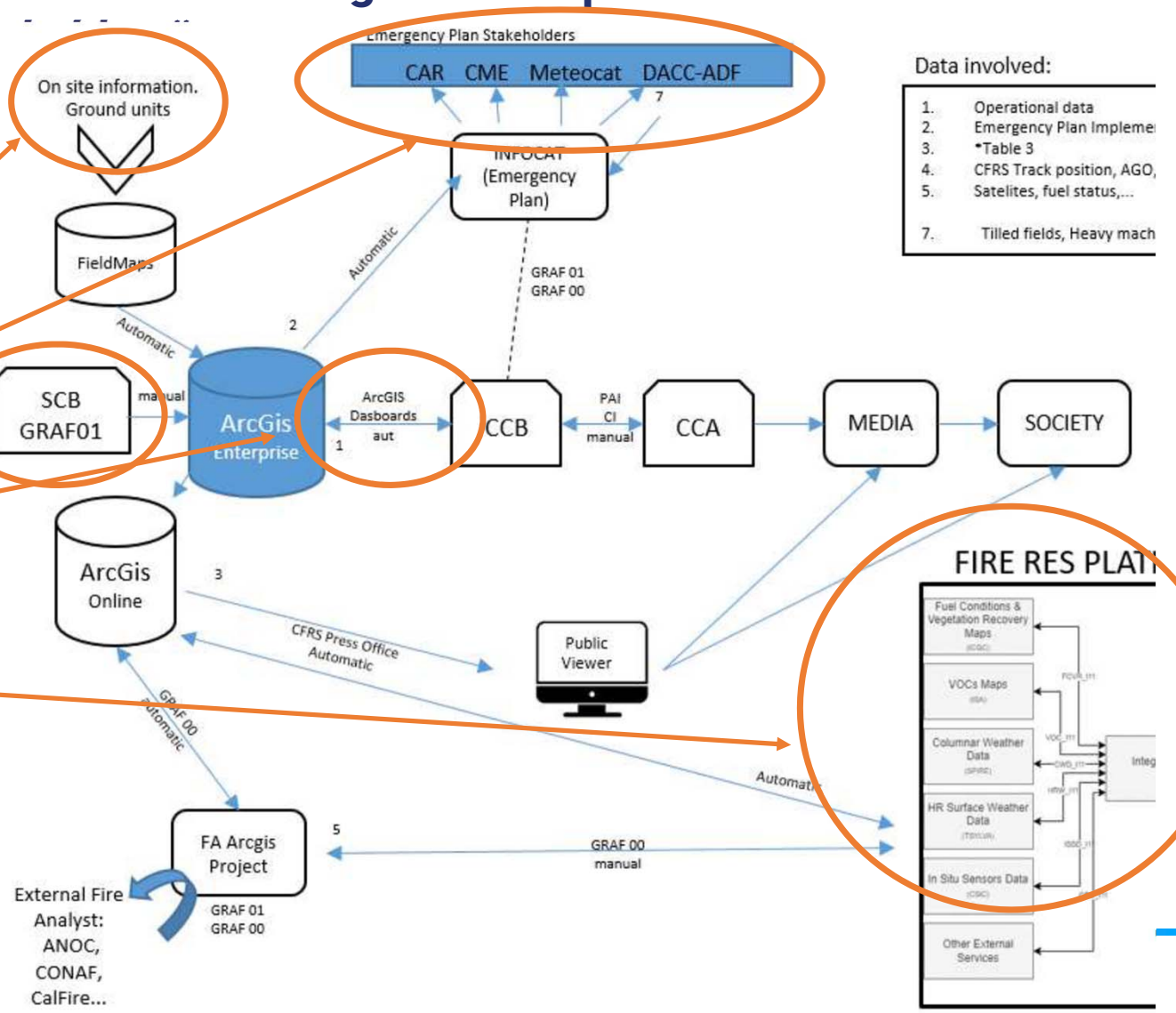
4. Catalonia Living Lab case study.

Collect information:

- **On Field by ground units**
- **From Other agencies**
- **From the standard procedures on the organization**
- **From internet an online platforms by the Fire Analyst**



Video example of collecting and sharing information

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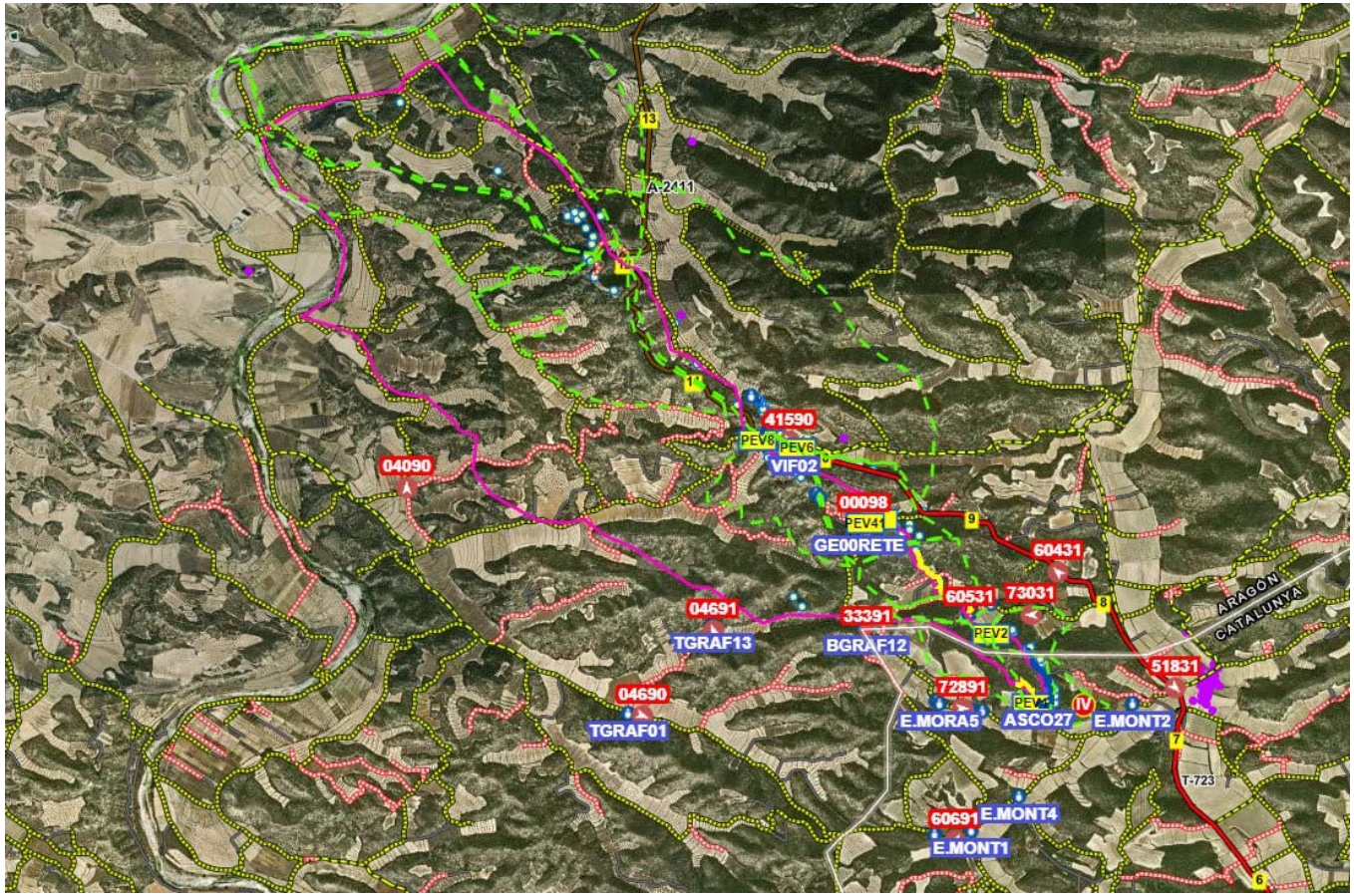
What information is commonly shared?

Emergency services utilizing GIS platforms typically share similar operational information to describe:

- Fire location: perimeter, starting point, propagation isochrones, etc.
- Wildfire phase (referring to the phase of the fire: active, stabilized, controlled, or extinguished).
- Location of firefighting resources: vehicle and unit positions, planned and implemented manoeuvres, etc.
- Emergency scenario: work zone, access points, firefighting resources, risk elements, heliports, etc.
- Assets to protect human settlement, houses, industries, transportation infrastructures, energy facilities, etc.
- Fire behaviour characteristics: isochrones, perimeter, propagation axes, alignments, secondary focuses, fire severity, etc.



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Adapt the existing GIS platform:

With the current knowledge, the new elements that the shared GIS platform must integrate to be useful in EWE management are:

- Layer or a group of layers that would provide the **ability to compare different strategic scenarios** made by external Fire Analysts: graphics or schemes of fire potential polygons and fire flow probabilities to evaluate the various possible resolution scenarios in decision-making.
- Territorial **polygons of potential energy-released**. It is necessary to identify those polygons that, due to the state of the fuels and the way in which fire could reach them, could emit sufficient energy to trigger the transition to Pyrocumulus (PyCu) or Pyrocumulunimbus (PyCb). This means that the territory is polygonised based on the potential to emit sufficient energy per unit of time to allow the transition from pyroconvection behaviour to the upper layers of the atmosphere.
- Probable **area affected by the downburst process**: the fall of a smoke column is a violent, erratic, and complex process. Scientific knowledge is still analysing this process. In terms of impact on emergency management, as described by emergency services that have experienced it, it is characterized by very strong winds, on the order of 100 km/h, with massive secondary focuses and a territorial scope of several kilometres.

Adapt the GIS platform:

1. Readapt the existing GIS project to incorporate new layers needed for the EWE.
2. Discuss and decide security requirement in order to share information with external agencies.
3. A test will be published with minimum data in order to ensure the acceptance of the security requirements stablished by the fire service. Bombers - Visor d'actuacions incendis PRO (arcgis.com)
4. Create a new project to be shared with external Fire analyst.
5. Test the viability to work as an external with part of the CFRS data.
6. During the 2024 Catalan Fire Season, the platform will be used at operational level.
7. At the end of the season, if needed improvements and updates will be implemented.

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4.3 Share information with other agencies

4.4 International collaboration example cases:

- Remote assessment
- Share information with deployed units
- Collect and share when deployed abroad

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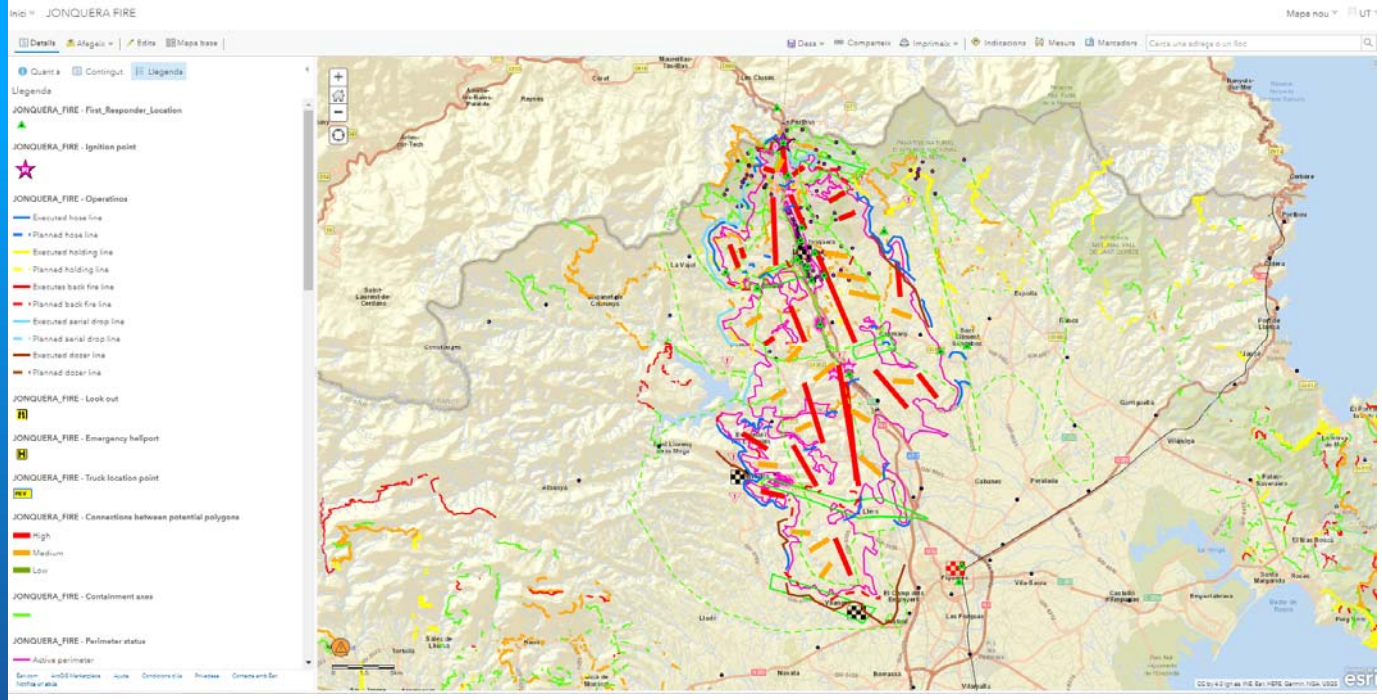
4.4 International collaboration example cases: Remote assessment



Sharing, with a restricted access, main information to allow external Fire analysts to assist and share proposals that can be easily incorporated in the host organization.

- **Will help to create awareness among the international WildFire community**
- **Will help to the host organization to receive specialized information from other Fire analysts**

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4.4 International collaboration example cases: Share information with deployed units

Sharing, with a restricted access, main information to allow external deployed units in gain in awareness and access to the information in real time:

- **Will help to create awareness among the deployed units regarding where they are.**
- **Allow the possibility to know about other resources deployed on the field.**
- **Access in real time to the updated infromationa about the fire: perimeter, potential, safety areas...**

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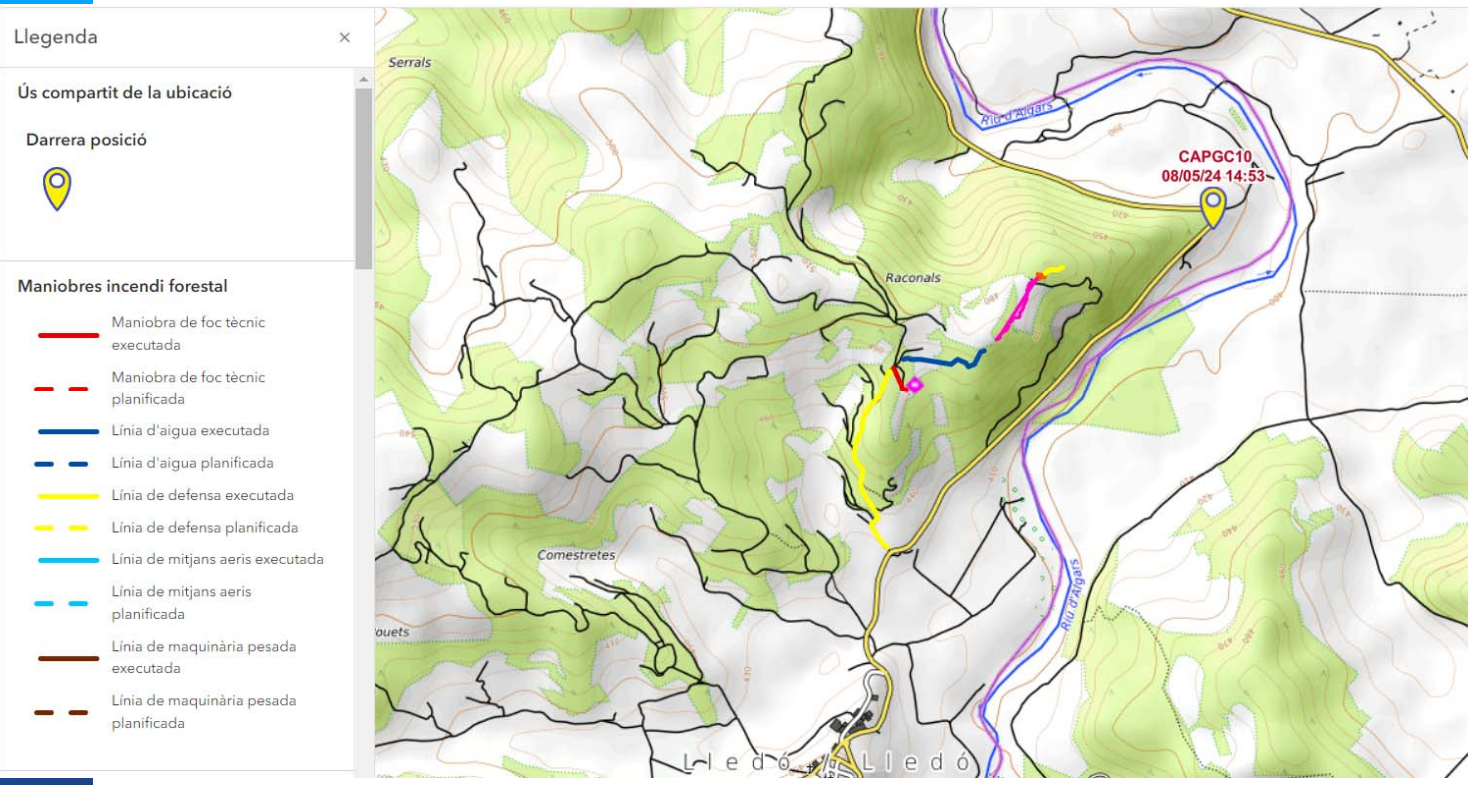
4.4 International collaboration example cases: Collect and share when deployed outside



When deployed outside of Catalonia our units cannot use the positioning of our radios, and other features that are available within our territory.

Enabling an Arcgis online project, that will allow:

- **Share with the main Fire Analyst and the command center real time information collected on field**
- **Have access to the position of the other CFRS units deployed on the same incident.**
- **Receive the results of the analyses from the main command post.**
- **Improve security during the operations.**

2024 26 03. Lladó Fire that traspassed the Catalonia border to the neighbour región, Aragon.

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