



# Initiative for Global maNagement of blg fires through Simulation

ECHO/SUB/2015/718664/PREP01

Objectives, activities and results

Vitor Reis

Escola Nacional de Bombeiros - Portugal

## Coordinator

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**ENTENTE - Entente pour la Forêt Méditerranéenne – France**  
**L'Ecole d'Application de Sécurité Civile (VALABRE)**

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## Partners

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**Corpo Nazionale dei Vigili del Fuoco (CNVVF) – Italy**

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**Escola Nacional de Bombeiros (ENB) – Portugal**

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**Northumberland Fire and Rescue Service (NFRS) – UK**

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## WP 1 – Project Management and Coordination

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## WP 2 – Transfer and test of a simulation training tool at a transnational level

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## WP 3 – Assessment and pooling of the simulation tool

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## WP 4 – Communication and dissemination activities

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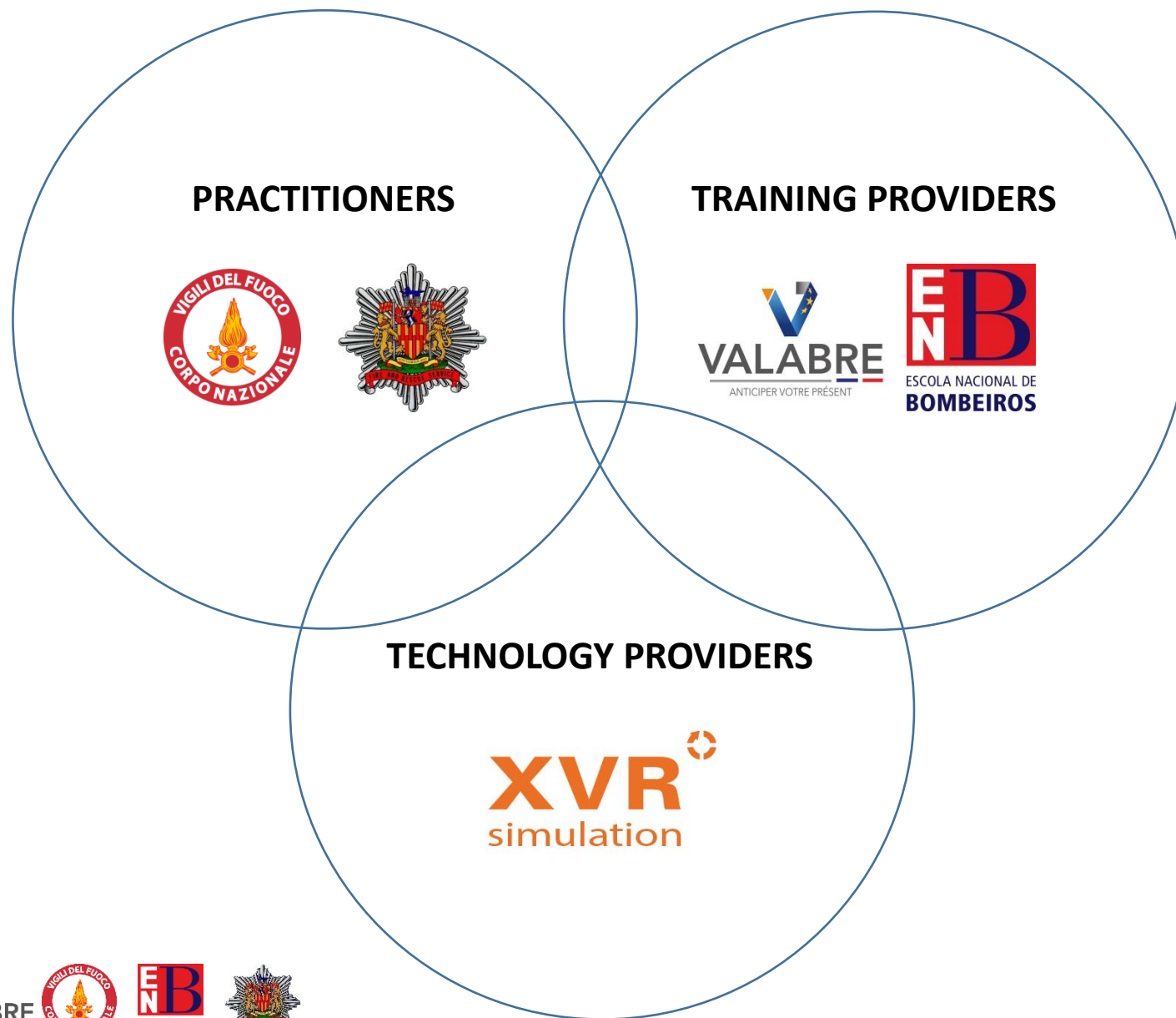
Jan 2016 – Jan 2018

The key aim of IGNIS Project is to **improve the preparedness and response to cross-border large forest fires**, through a simulation tool that can be used across Europe to increase the ability to conduct cross-border exercises involving several EU countries.

The Project also aims to **improve the command and coordination competencies** through the development of **simulation training of large forest fires for incident commanders**.

During the Project it was developed a **mobile simulation tool and training packages** that can be used within the four partner countries (Portugal, France, Italy and the UK).

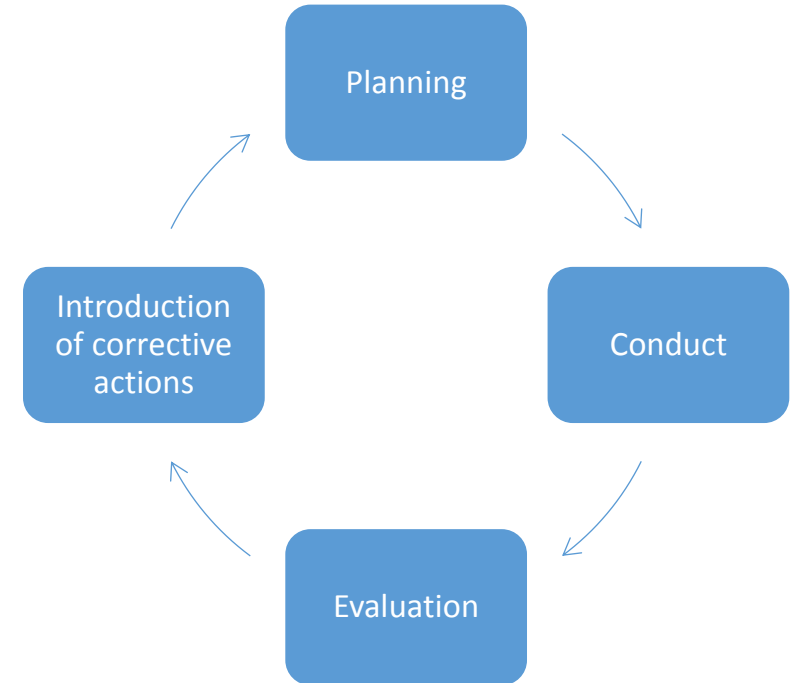
The **training resources** can also be used across Europe to **train fire officers in how to safely and effectively command and suppress large forest fires**.





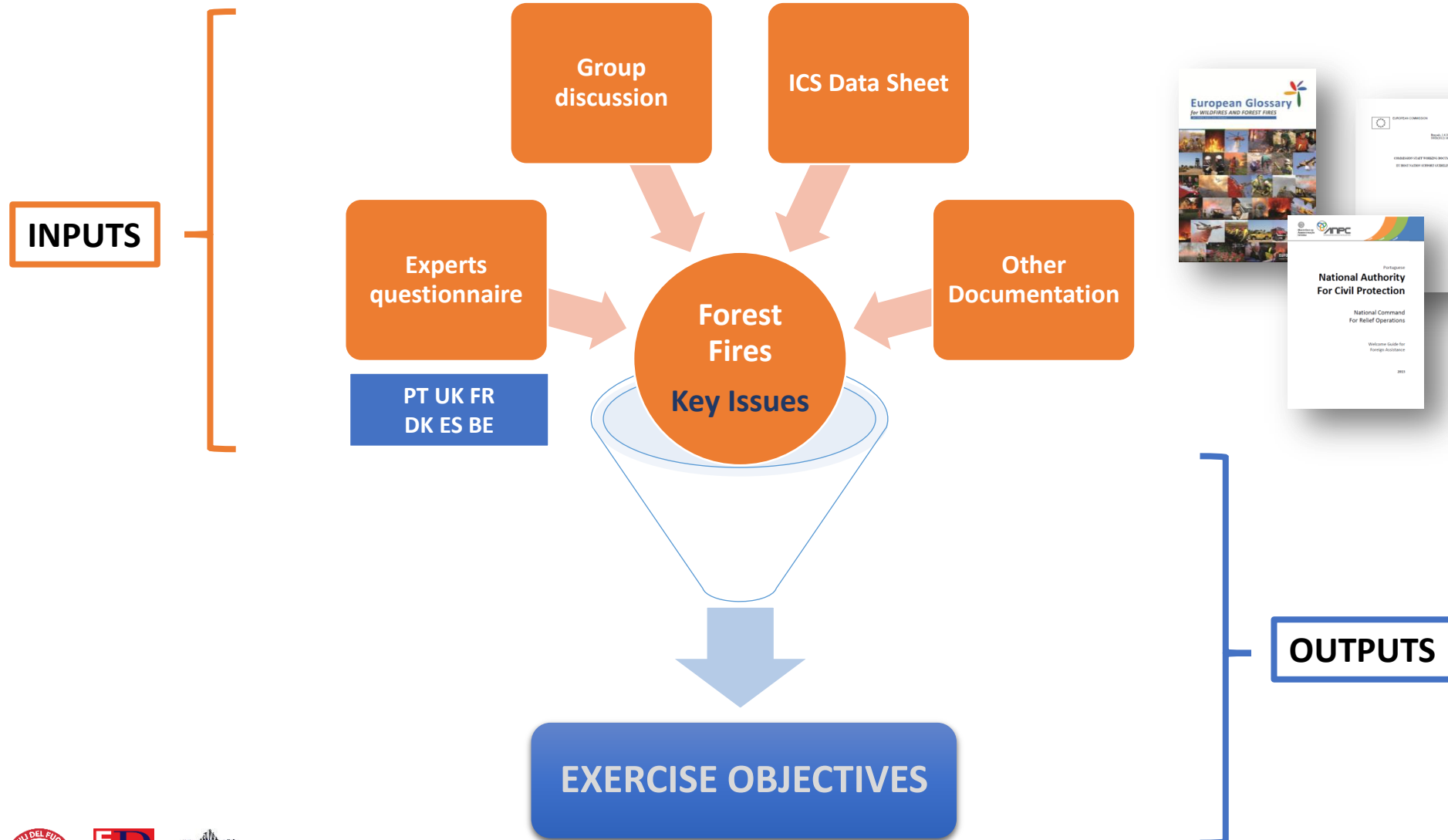
- How to design an exercise program that addresses the main constraints identified in cross-border operations of large forest fires?
- How to design large-scale exercises for Virtual Reality?
- How to evaluate effectively the performance of the participants?
- How to achieve the right balance between technology and training?

- Definition/adoption of a common exercise planning methodology applied to all exercises.
- Training of partners in the application of the methodology and supporting documents (templates).
- Each partner has developed its own scenario for the exercise according to the guidelines.





# PLANNING METHODOLOGY



## CROSS-BORDER AND TRANSNATIONAL OPERATIONS

**Different concepts of Incident Command System**

**Different tactics and operational procedures**

**Difficulties on language/language barriers**

**Different firefighting terminology**

**Different communication systems and procedures**

**Lack of interoperability between resources**

**Difficulties on the logistic support of the operation**

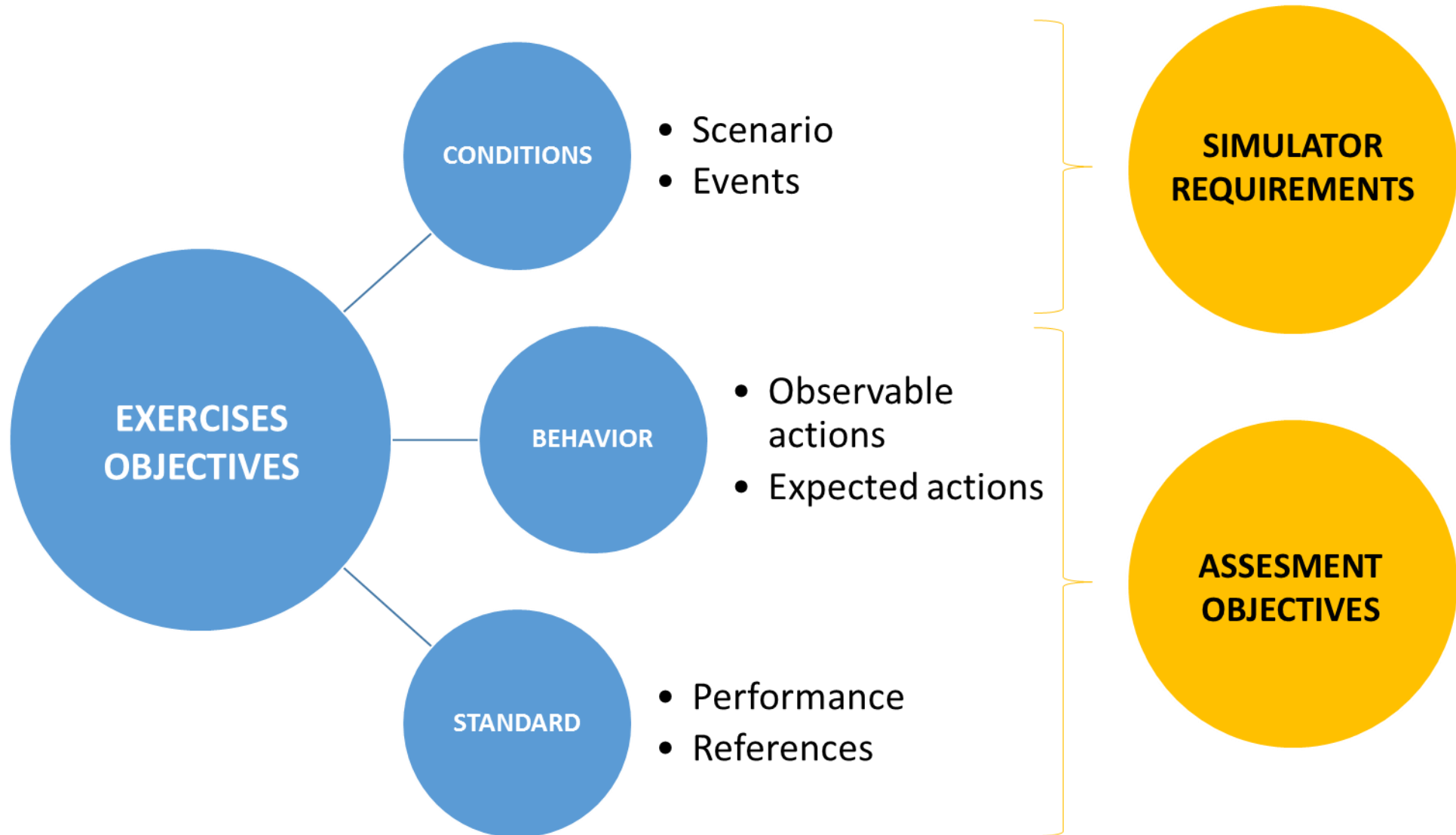
**Lack of specific procedures for receiving aerial means (including logistical support)**

**Different coordination procedures for aerial means (ground-air-ground)**

**Difficulties in ensuring cross national training and exercising in wildfires/forest fires**

# PLANNING METHODOLOGY





Training Level: **Exercise**

Number of Participants: **10**

## Environment

*“In what concerns the morphology of the terrain (topography), vegetation (fuel), weather and infrastructures.”*

- ✓ Different types of elevations and reliefs. Forest and shrub native species;
- ✓ Meteorological conditions including temperature, wind direction and speed, relative humidity, rainfall, clouds, and time of day;
- ✓ Wildland-Urban Interface with buildings of different uses and risks;
- ✓ Roads and paths of different types;
- ✓ Water resources like hydrants, lakes, rivers and sea.

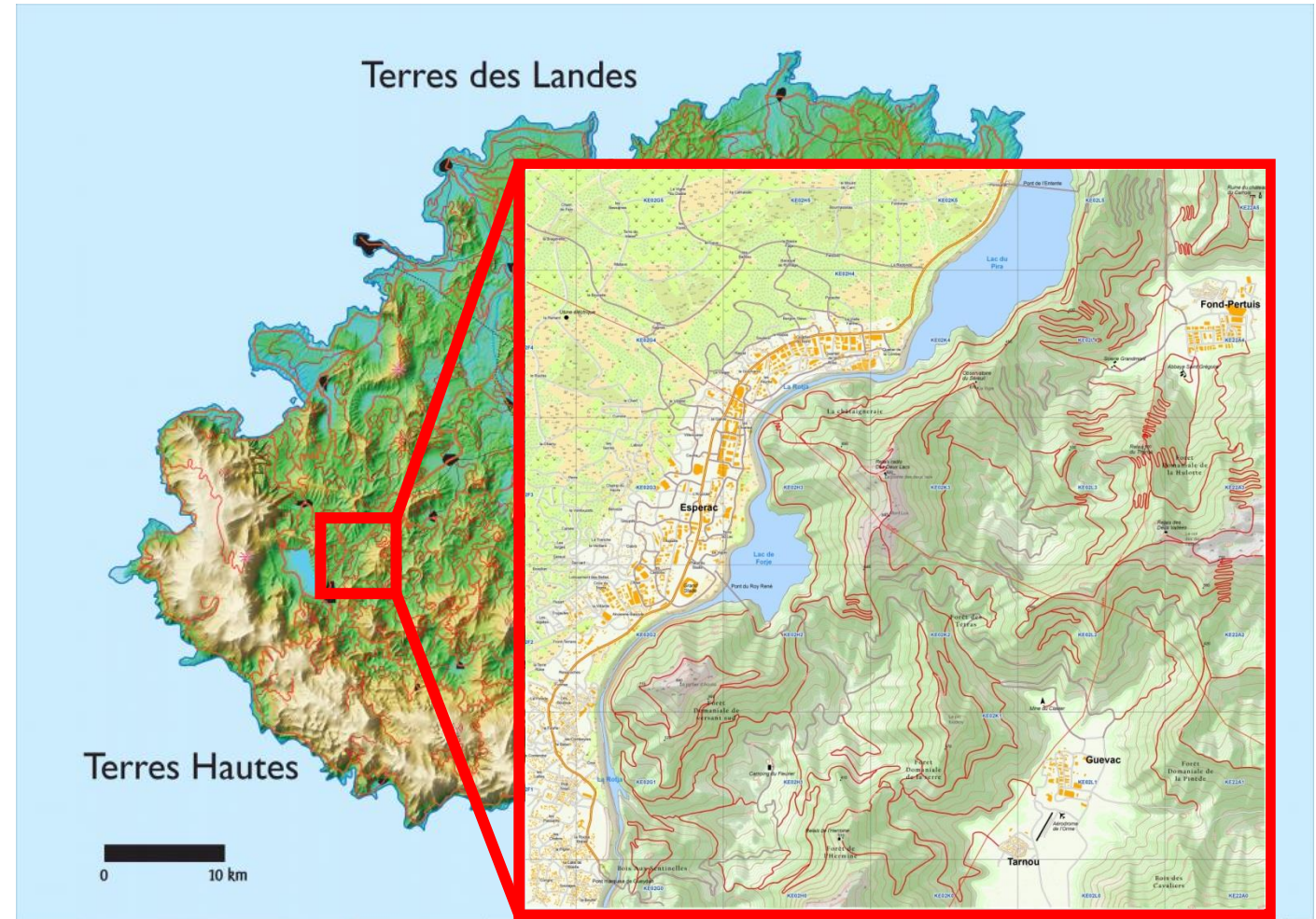


# SIMULATOR REQUIREMENTS

## Valabre Island

Island Size 80x80km

City of Esperac area  
10,5km x 10,5km





Training Level: **Exercise**

Number of Participants: **10**

## Resources

*“Types of available resources, especially land, air and human resources.”*



Fire-fighting vehicle, tank vehicle, command vehicle, heavy helicopter, medium/light helicopter, heavy aircraft (Canadair), medium aircraft (Air Tractor Fire Boss or similar), ambulance, bulldozer, excavator and drones;



Firefighters with structural PPE and forest PPE including fire shelter. Firefighters with hand tools;



Pilots with uniform of their country. Civil protection, military, nature protection, medical services, police, political authority. Other national agencies.

Training Level: **Exercise**

Number of Participants: **10**

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## Actions

*“Actions that can be performed  
in a virtual environment.”*

- ✓ Reconnaissance;
  - ✓ Ground attack with water or tools;
  - ✓ Firebreak with tools or vehicles;
  - ✓ Aerial reconnaissance;
  - ✓ Aerial coordination;
  - ✓ Aerial operations with drops of water or retardant;
  - ✓ Suppression fire;
  - ✓ Logging and land clearance;
  - ✓ Linear and perimeter defences;
  - ✓ Protection of buildings
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Training Level: **Exercise**

Number of Participants: **10**

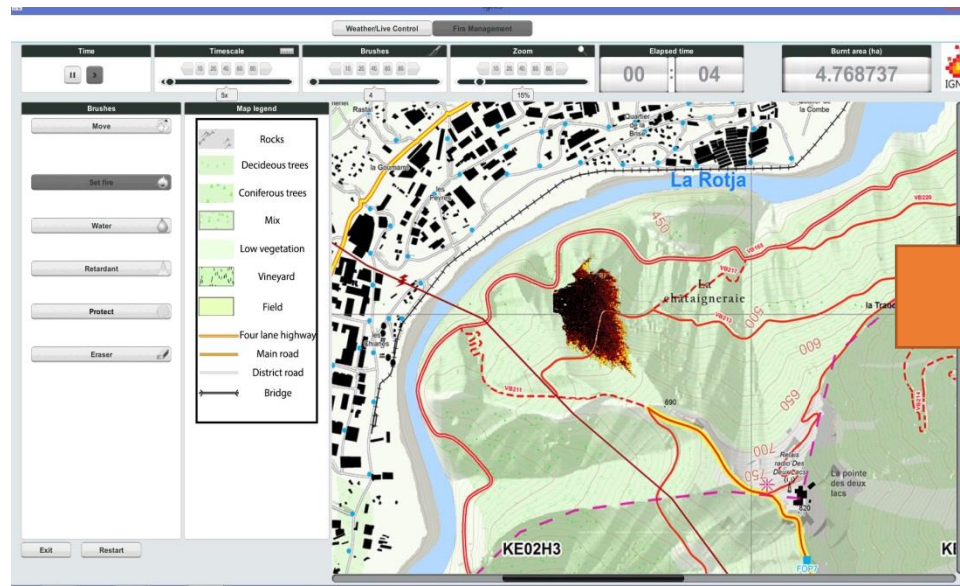
## Events

*“For example, reception and dispatch of means, evacuations, progression and decline of the fire, etc.”*

- Beginning, progression and decline of the fire;
- ✗ Crowning;
- ✓ Secondary outbreaks (spotting);
- ✓ Mop up;
- Receiving ground and air resources;
- Resources allocation and demobilization;
- Establishments of means of action;
- Evacuation and confinement of population;
- ✓ Incidents with firefighters, vehicles and aircrafts.

# SIMULATOR REQUIREMENTS

Calculation of fire propagation



IGNIS Software

Visualization of fire propagation

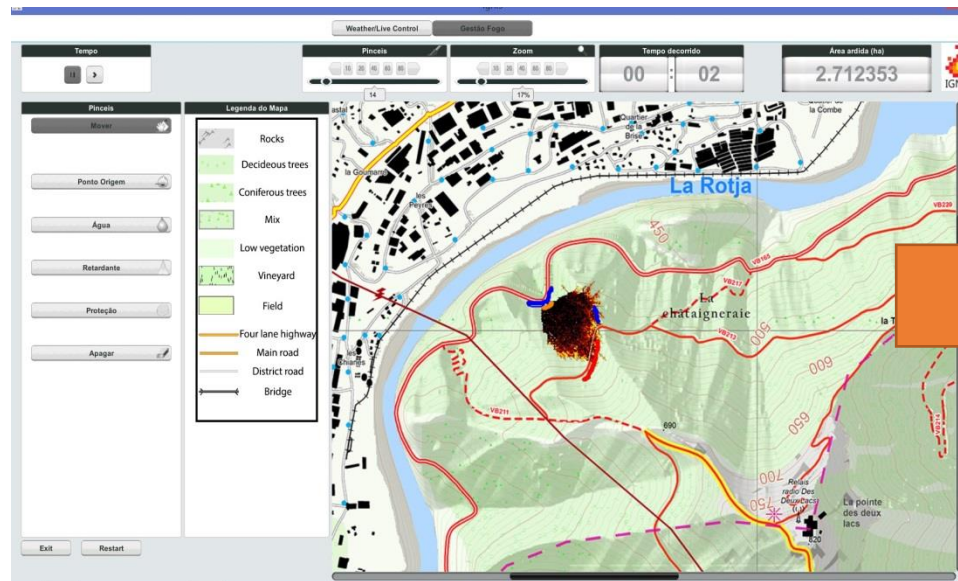


XVR Software



# SIMULATOR REQUIREMENTS

## Calculation of extinction capacity



IGNIS Software

## Visualization of extinction capacity



XVR Software

Large forest fires involving cross-border means (bilateral and multilateral agreements - UCPM).

The exercises were based on real fires:

- Portugal – 2013
- Italy – 2013
- France – 2013
- United Kingdom – 2016

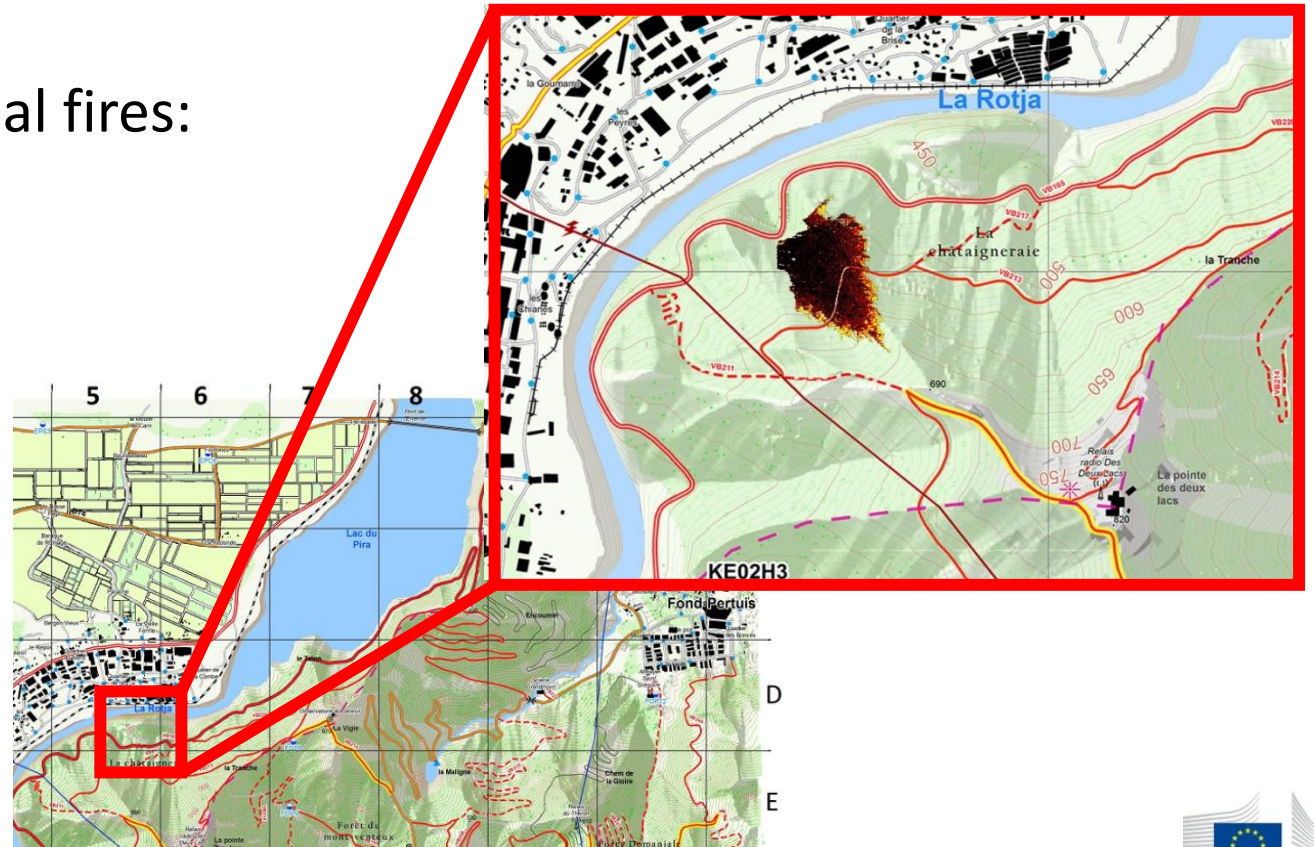




Large forest fires involving cross-border means  
(bilateral and multilateral agreements - UCPM).

The exercises were based on real fires:

- Portugal – 2013
- Italy – 2013
- France – 2013
- United Kingdom – 2016



Test, learn and return to planning...



September 2016 (Valabre)



- PT EXERCISE – 14 to 18 November (Sintra)
- IT EXERCISE – 8 to 12 May (Rome)
- UK EXERCISE – 12 to 16 June (Cramlington)



- Functions:
  - ✓ Exercise Director
  - ✓ Exercise Direction
  - ✓ Injection Team
  - ✓ Simulators
  - ✓ Role Players
  - ✓ Evaluation Team
  - ✓ Public information

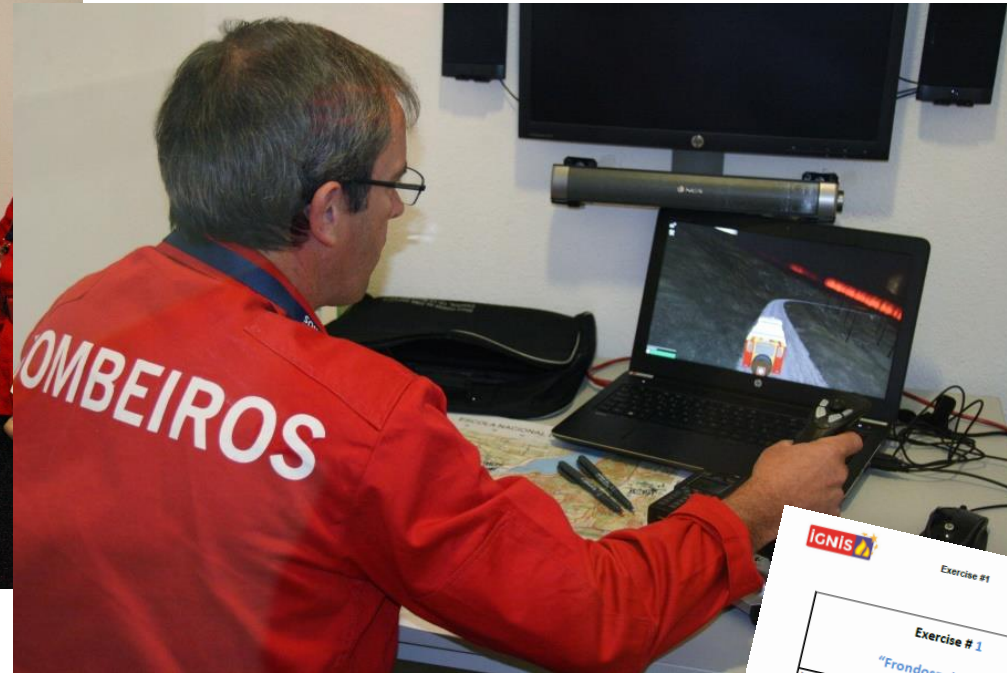




- Participants: Fire Officers with different ranks according to fire evolution and complexity of the operation.



# SCENARIO DESIGN



Participants were expected to respond as in a real emergency to events that occur during exercises.

IGNIS

Exercice #1

Exercice # 1  
"Froncosa de Cima"

Level of difficulty: High  
Module: IGNIS  
Version: 1.2  
Type: Exercise

Approvals:

Name	Title	Entity
		IGNIS
		IGNIS
		IGNIS
		IGNIS

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VALABRE  
ANTICIPER VOTRE PRESENT

VIGILI DEL FUOCO  
CORPO NAZIONALE

ENB  
ESCOLA NACIONAL DE BOMBEIROS

Civil Protection  
Humanitarian Aid

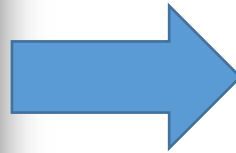


# SIMULATION EXERCISES

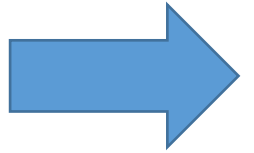
- Exercise sequence



Briefing



Familiarisation session



- Exercise sequence



Exercise

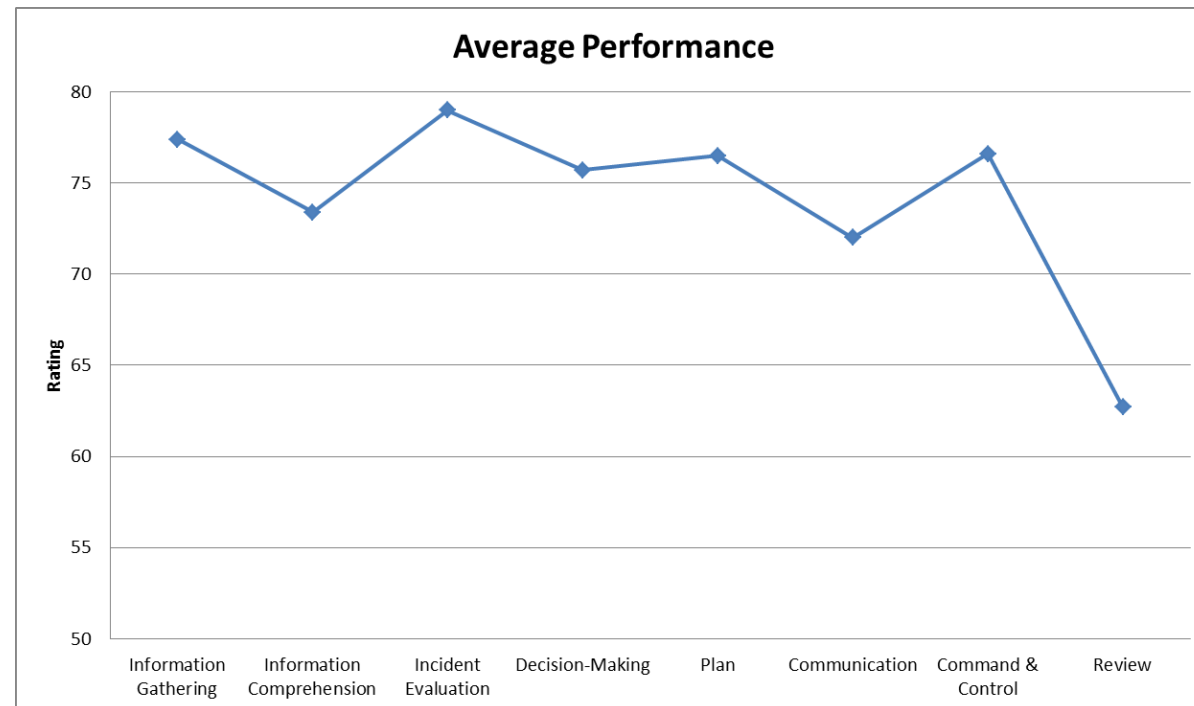


Debriefing

- Performance assessment
- Participants Debriefing
- Participants' assessment questionnaire
- Evaluation of the planning and conduct team (Lessons learned)
- Experts assessment (Advisory Board)

- Performance assessment

**Effective Command** focuses on the assessment of appropriate decision making behaviors





- Participants Debriefing

Positive	Less Positive
<ul style="list-style-type: none"><li>Contact with virtual reality</li><li>Real-time interaction</li><li>Design of the exercises</li><li>Exercises dynamics</li><li>Actions observed</li></ul>	<ul style="list-style-type: none"><li>Time to familiarize with 3D environment</li><li>Location unknown (Valabre Island)</li><li>Cartography (maps) used</li><li>Scenario navigation with vehicles</li><li>Actions not observed</li></ul>

Independent panel of advisors to **observe, assess, evaluate** and **provide constructive feedback** on the project activities.

The IGNIS partners approached leading experts in the fields of **wildfire suppression, incident command** and **emergency service training** from different European countries.

While attending the national exercises, the advisory board members observed the exercises taking place and completed assessment forms to provide their **feedback about the design and implementation of the exercises**.



# ADVISORY BOARD

Name	Position	Country
Andy BOWERS	Assistant Chief Officer Hampshire Fire & Rescue Service	UK
Pablo CALVO	Firefighter Training Department Chief National School of Civil Defense	ES
Francis DIXHEURES	Training Director DINAPHI rescue area	BE
Gilles DUSSERRE	Head of Risk Department Ecole des Mines d'Alès (Mines – Telecom network)	FR
Sinisa JEMBRIH	Chief Fire Officer Zagreb Fire Department	CRO
Kim LINTRUP	Director Frederiksborg Fire & Rescue Service	DK
José MOURA	National Operational Commander National Civil Protection Authority	PT

- Operational perspective
  - Common language (Glossary)
  - Common graphic symbology
  - “Common” Operational Procedures
  - Liaison Officer
  - Cartography interoperability
  - Host Nation support guide (aerial and ground means)

- Pedagogical perspective
  - Common methodology of training and exercise design
  - Common methodology of training evaluation - measurement and comparison of results
  - Evaluation of the transfer of learning to the real context of work

- Technological perspective
  - Geo-specific virtual environments
  - Functional connection between prediction system and visual system (fire behavior and actions)

- Significant **reduction in costs** compared to large scale field exercises, that are costly to arrange and implement;
- The simulation software can be run in real time, allowing training for both **simple and more complex scenarios**;
- The **resetting of the starting conditions of the exercise** is at the distance of a button;

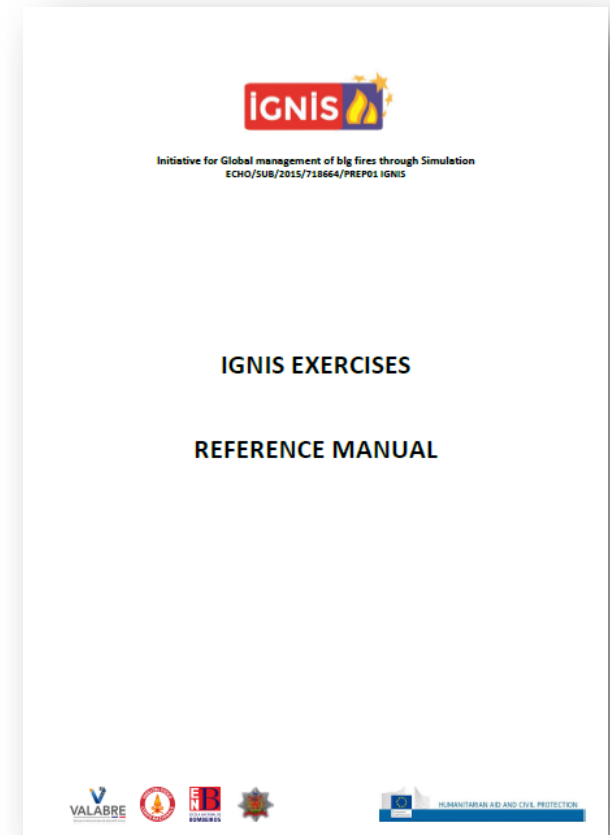


- Simulation tools provide a **wide range of different scenarios and provide instructors with the flexibility to change conditions during each scenario** (e.g. weather conditions such as wind direction), ensuring that incident commanders constantly review and adapt their tactics accordingly;
- Simulation tools can **record what actions are taken by the incident commander**, allowing assessment, reflection and performance improvement.

- **IGNIS Exercises Reference Manual**

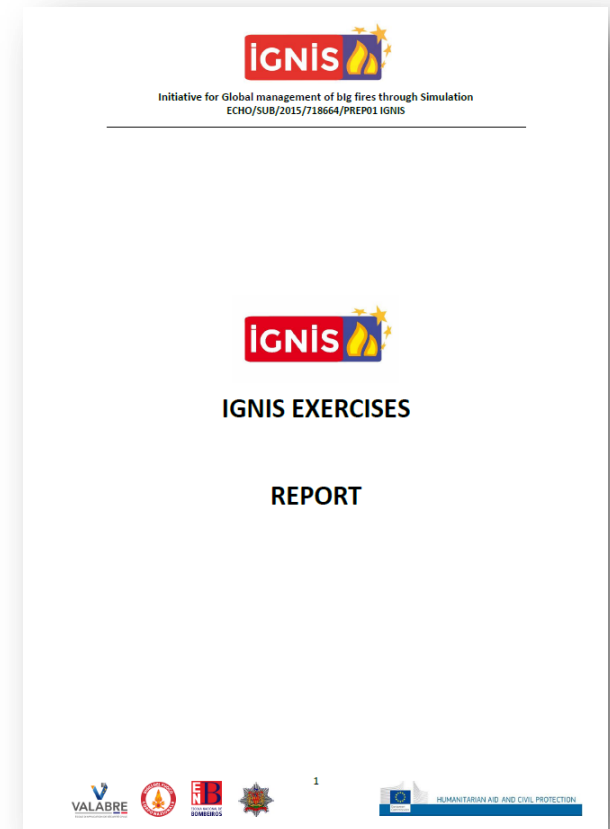
Description of the methodology used in the planning, design and evaluation of the exercises.

Definition of an exercise design model providing a common basis for the development of the work of all project partners.



- **IGNIS Exercises Report**

- PT EXERCISE – 14 to 18 November (Sintra)
- IT EXERCISE – 8 to 12 May (Rome)
- UK EXERCISE – 12 to 16 June (Cramlington)

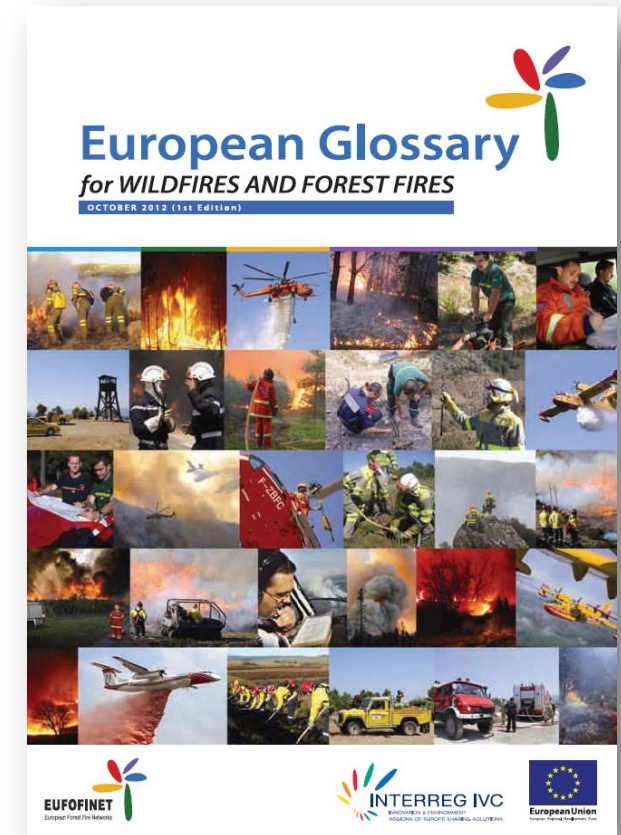


- **IGNIS Glossary**

The **European Glossary for Wildfires and Forest Fires (2012)** was created by EU co-financed European Forest Fire Networks (EUFOFINET) Project.

The glossary contains more than 800 terms and associated definitions organized within thirteen thematic chapters.

Does not include a chapter dedicated to training terminology and definitions.





Following the identification of the gaps in common terminology, the IGNIS partners decided to create new thematic chapters.

The **European Glossary for Wildfire Training, Exercises and Simulation (2018)** supplements the original glossary with more specialist terminology related to wildfire **training, exercises and simulation and virtual reality**.

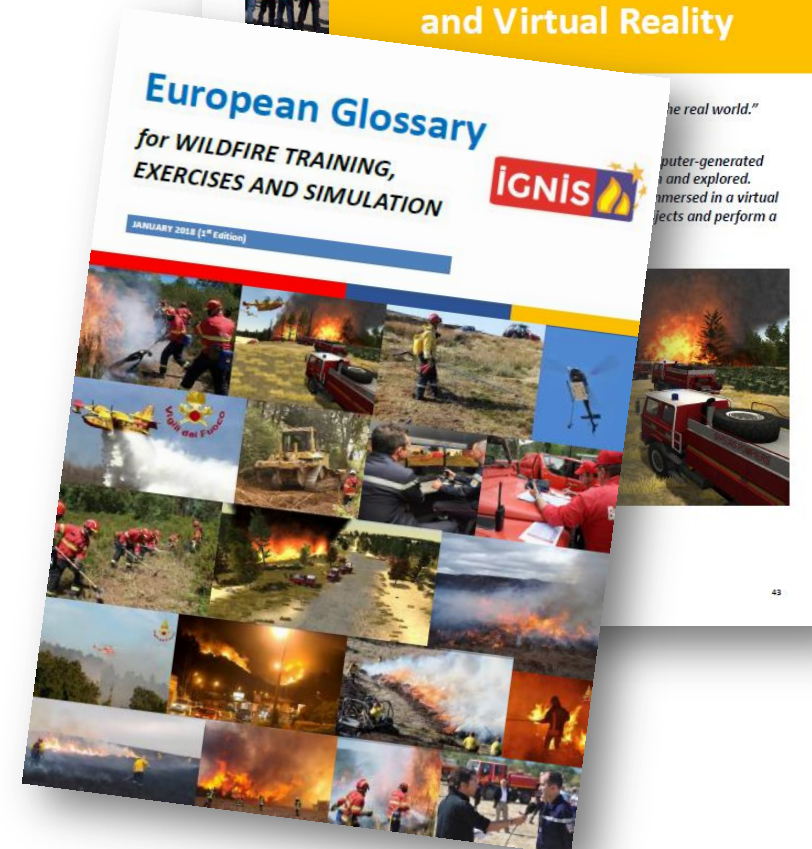
## Chapter 3 – Training

Training: "The process of teaching/learning new skills to enable an individual to complete a particular job or activity."

## Chapter 4 – Exercises

Exercises: "Activities in which players carry out tasks that would be expected in the real world. Exercises can be used to validate and explore mitigation, prevention, recovery capabilities."<sup>34</sup>

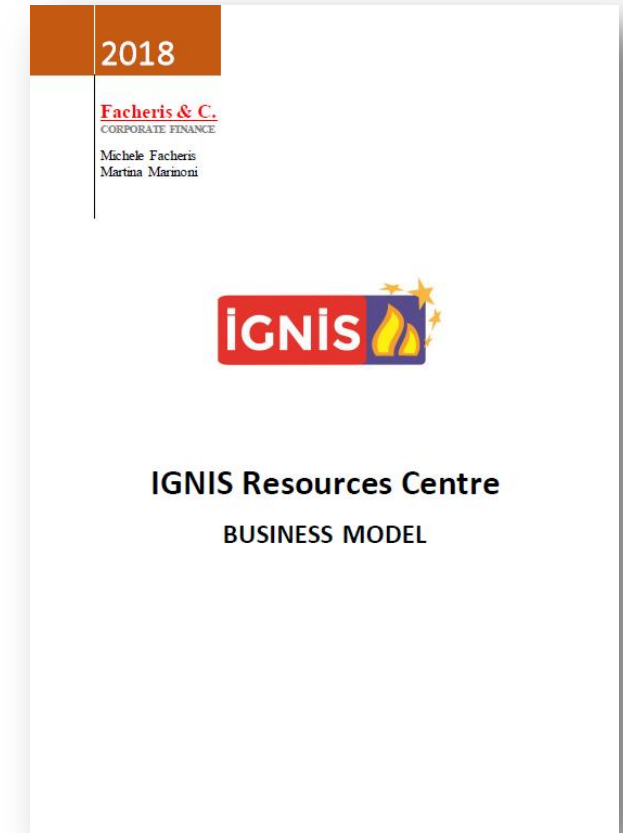
## Chapter 5 – Simulation and Virtual Reality



- **IGNIS Resource Centre Business Model**

The aim of the study is to propose a business model in which IGNIS Resources Centre could be able to provide sustainable training activities through simulation tools.

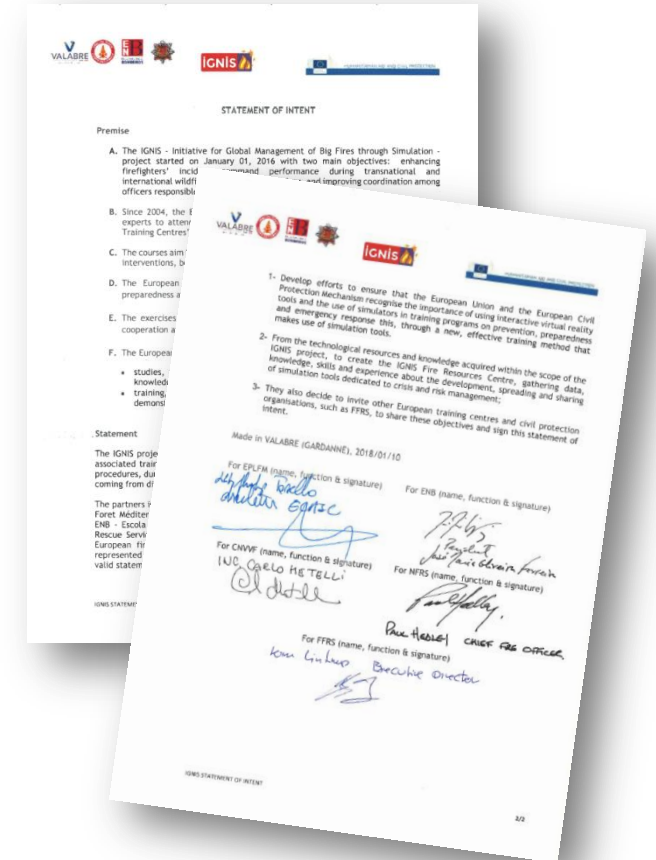
It is suggested that the resource center bases its activity around five main areas: research, development, education, training and dissemination.



- **Statement of Intent**

Commits the IGNIS partnership to:

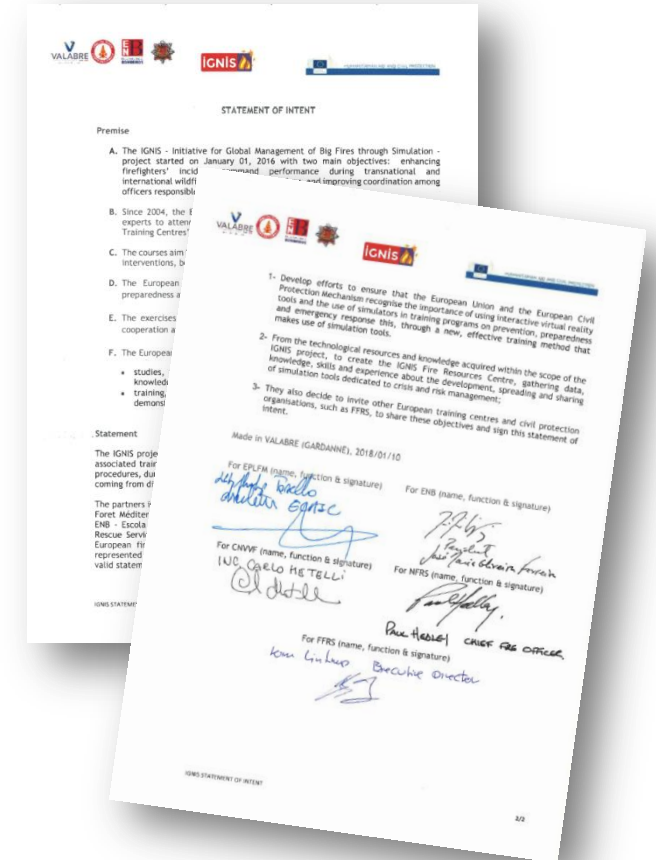
**1. Developing efforts to ensure that the EU Civil Protection Mechanism recognise the importance of using interactive virtual reality tools and the use of simulators in training programmes on prevention, preparedness and emergency response.**



- **Statement of Intent**

Commits the IGNIS partnership to:

2. **Create the IGNIS Fire Resources Centre**, gathering data, knowledge, skills and experience about the development, spreading and sharing of simulation tools dedicated to crisis and risk management.
3. **Invite other European training centres and civil protection organisations** to share these objectives and sign the statement of intent.





- **Communication Report**

- Newsletters
- Posters
- Press releases
- Social media
- Website (<https://www.ignis-project.eu/>)
- Videos
- Dissemination Events
- Final Project Conference

## IGNIS Project: Final Report for the Communication Work Package



- **Communication Report**
  - **Website** (September 2016 to January 2018)  
752 Visitors  
43 Countries
  - **Publications** (January 2016 to January 2018)  
66 Publications  
12 Countries

## IGNIS Project: Final Report for the Communication Work Package



- **Communication Report**

- **Dissemination Events**

Portugal (hosted by ENB) – 17th November 2016

Italy (hosted by CNVVF) - 11th May 2017

UK (hosted by NFRS) – 15th June 2017

- **Final Project Conference (10<sup>th</sup> January 2018)**

80 Participants

30 Key Stakeholders organisations

6 Countries

## IGNIS Project: Final Report for the Communication Work Package



- **Interest in the Agreement** (Statement of Intent)

- Denmark (Frederiksborg Fire & Rescue Service) – Jan 2018
- Croatia (Zagreb Fire Department) – May/Jun 2018

Other contacts in progress

- Germany (Waldbrandteam)
- Brasil (Bahia)





# Initiative for Global maNagement of blg fires through Simulation

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[www.ignis-project.eu](http://www.ignis-project.eu)



