National and Kapodistrian University of Athens

EFIIA

European FIre Integrated management plAtform

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HORIZON 2020
The EU Framework Programme for Research and Innovation

European FIre Integrated management plAtform

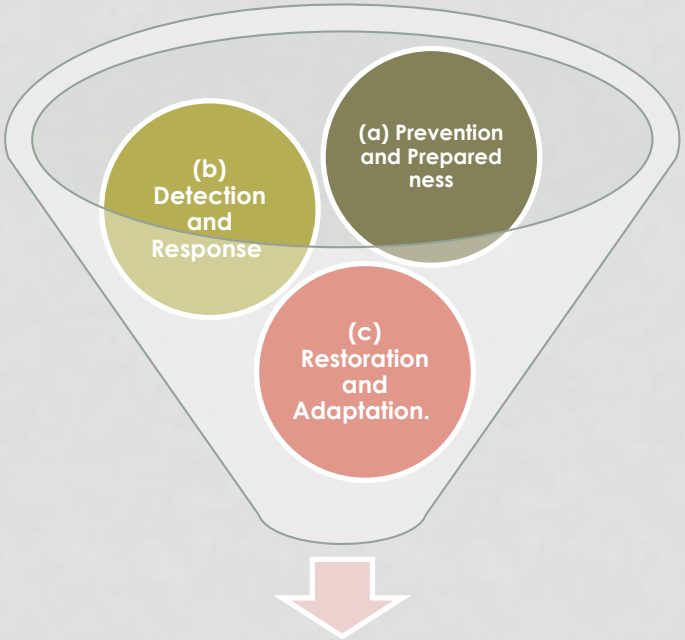
“Preventing and Fighting Wildfires”

EFIIA (**intelligence**) introduces an ecosystem for the holistic management of fires. This ecosystem brings together domain experts and technological advances in an effort to address the three important pillars of fire management:

- Prevention and preparedness
- Detection and Response
- Restoration and Adaptation

EFIIA Concept

EFIIA aims to address the complex problem of dealing with forest fires by employing state of the art technologies that interconnect and interoperate assisting in the three faces of a fire management incident



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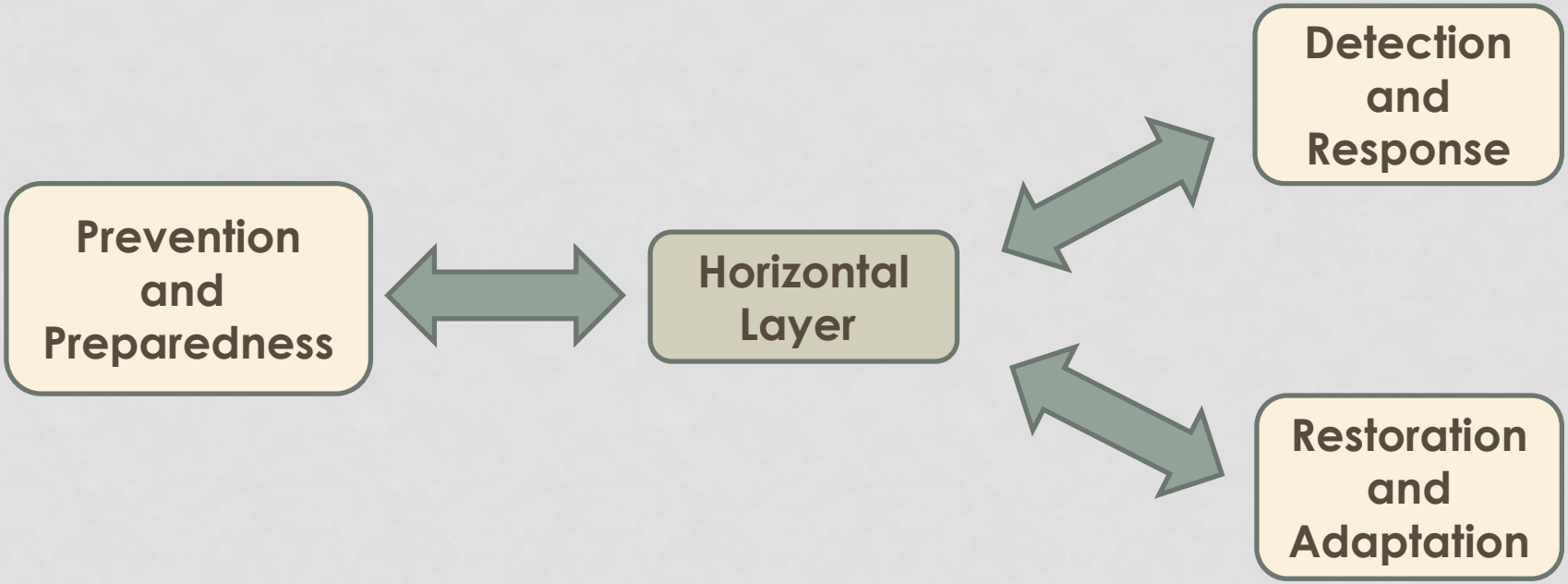
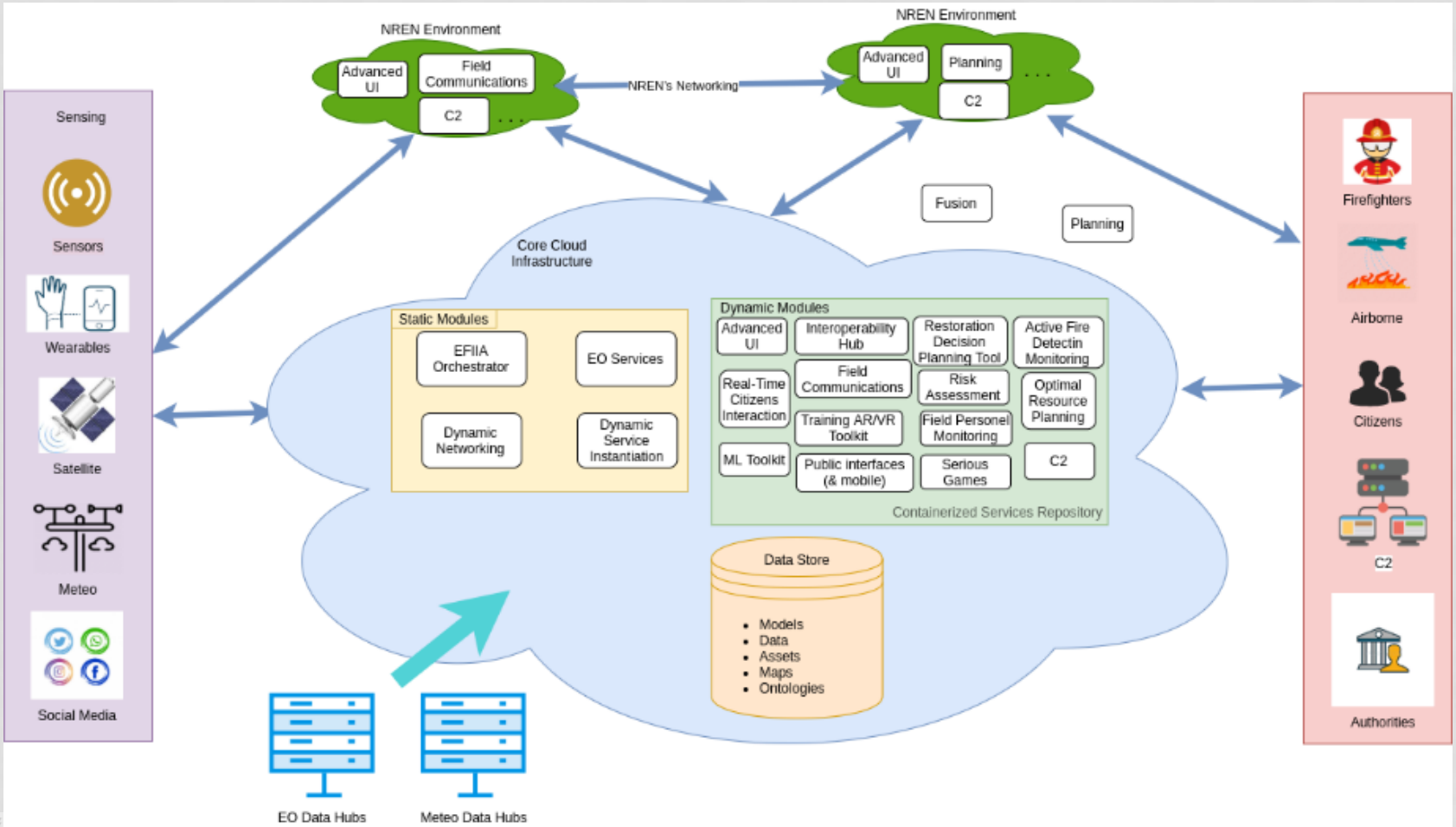
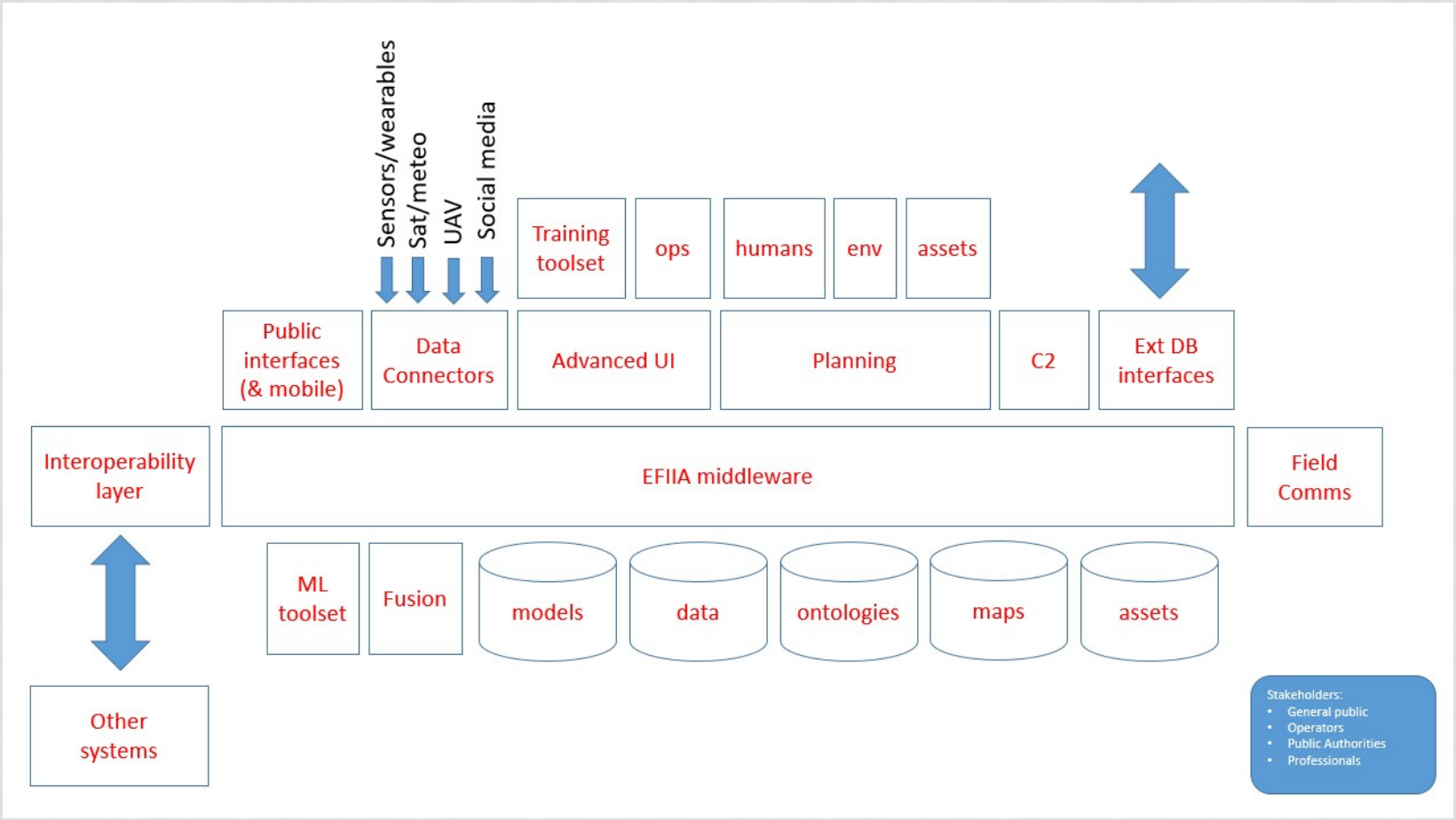


Network Architecture



System Architecture



EFIIA Features and Capabilities

- Pan-European federation of computing facilities (cloud, HPC) with quality-aware internetworking
- Tactical communications and deployable mobile networks for static/dynamic field communications
- A broad set of fixed and mobile sensors to meet the needs of all three fire management pillars
- A wide set of tools for policy makers, local authorities, operations, researchers and the wide public
- Interfaces to existing EU-level systems and databases (e.g., EO, Emergencies)
- Improved Methodologies and models to efficiently manage the needs of the platform
- Ability to manage aerial and ground means by improving their safety in the field and the efficiency of water-bombing at once, favouring the stretching from daylight to night-time combined, air-ground firefighting.

EFIIA Horizontal Layer

- Cloud system storage and processing capabilities - NRENs Dynamic networking and storage capabilities/Dynamic Service Installation
- Data Fusion
- Edge Devices
- Satellite and Meteorological Data Feed
- Advanced User Interface
- Training AR/VR Toolkit
- Interoperability Hub
- Unmanned Vehicles
- EO Services
  - Diachronic mapping of Burnt Areas
  - Forest Fire Information System
  - Global Mapping of Burnt Area
  - Fire Risk Assessment
  - Smoke Dispersion
  - Ecosystem Services
- ML Toolkit
  - Transfer Learning (TI)
  - Explainable Machine Learning (EML)
  - Multi-Task Learning (MTL)
  - End-to-end learning (EEL)
  - Graph Neural Network (GNN)
  - Deep Neural Network (DNN)

EFIIA Prevention and Preparedness

- Planning Tools for Fire/Landscape Management
- Forecasting Models for Predicting Fire Occurrence
- Fire Resistant Textiles
- Risk Assessment and Mapping
- Deterministic Framework for Fire Risk Assessment and Mapping
- Probabilistic Framework for Fire Assessment and Mapping
- Prevention and resilience into governance, community engagement and insurance models
- Enhanced incident management to public - Public Interfaces

EFIIA Detection and Response

- Command and Control (C2)
- Real-Time Citizen Interaction Tools – Social
- In-field personnel monitoring
- Satellite-based active fire detection and monitoring
- Airborne water & retardant bombing tools
- Model Improvement – UI
- Field Communications
- Optimal Resource Planning
- Serious Games

EFIIA Restoration and Adaptation

- Post fire adaptation plan for resilient WUI (Wild Urban Interface)
- Restoration decision planning tool
- Life Cycle Environmental Assessment

EFIIA Impact

- Enhance existing and develop novel early warning detection, prediction and response tools and procedures, in an integrated system, covering the whole lifecycle of wildfire management (from prevention and preparedness to detection, response, restoration and adaptation), so as to effectively respond to extreme wildfire events.
- Develop new awareness-raising methods to overcome attitude and behavioural barriers for citizens, local communities, and related economical sectors.
- Promote the multifunctionality of forests by supporting economic, recreational and amenity value chains.
- Enhance and extend existing wildfire protection strategies that deal effectively with both beneficial fires and detrimental fires, so as to improve understanding on how an ecosystem responds to fire
- Empower and prepare local communities with the incentives, tools, information and skills to recognise the benefits of integrated fire management and to apply it.

EFIIA Impact

- Promote incentive programmes for sustainable fuel management, such as payment for ecological services.
- Develop flexible fire management plans and policies that account for the differences in regional contexts across the EU and other parts of the world, tailored to geographical and socio-economic conditions, with different types of fuels, landscapes and biodiversity values and scales.
- Promote the beneficial aspects of prescribed fire use and develop the knowledge, capacity and technology to apply fire safely where needed.
- Reduce loss and destruction by extending beyond fire dynamics to include structural dynamics and human behaviour.
- Improve and expand the predictive capability of current fire models.
- Boost the use of native fire-resilient plant species during restoration processes.

European Fire Management Workbench

Operator	Italy	Portugal
Inputs	• UAV in Italy • Weather data from UK • EO products from Greece • Simulators from Poland	• EO products from Greece • Simulators from Poland • Historical data from Spain
Outputs	• Crisis Management (Command and Control) in Italy • Warning spreading in Italy	• Restoration plan for areas in Greece • Training of FF personnel in France

Use Cases

- Large Scale Demonstration in Mallorca (SP)
- Real Scale aerial / terrestrial firefighting demonstration (IT)
- Large Scale Demonstration in alpine forests in Bulgaria (BG)
- Large Scale Demonstration in Poland/German border region (DE/PL)
- Large Scale Demonstration in Rafina-Pikermi (GR)
- Large Scale Demonstration of enhanced Common Operational Picture in firefighting scenarios (PT)

Thank you for your attention!

Questions?