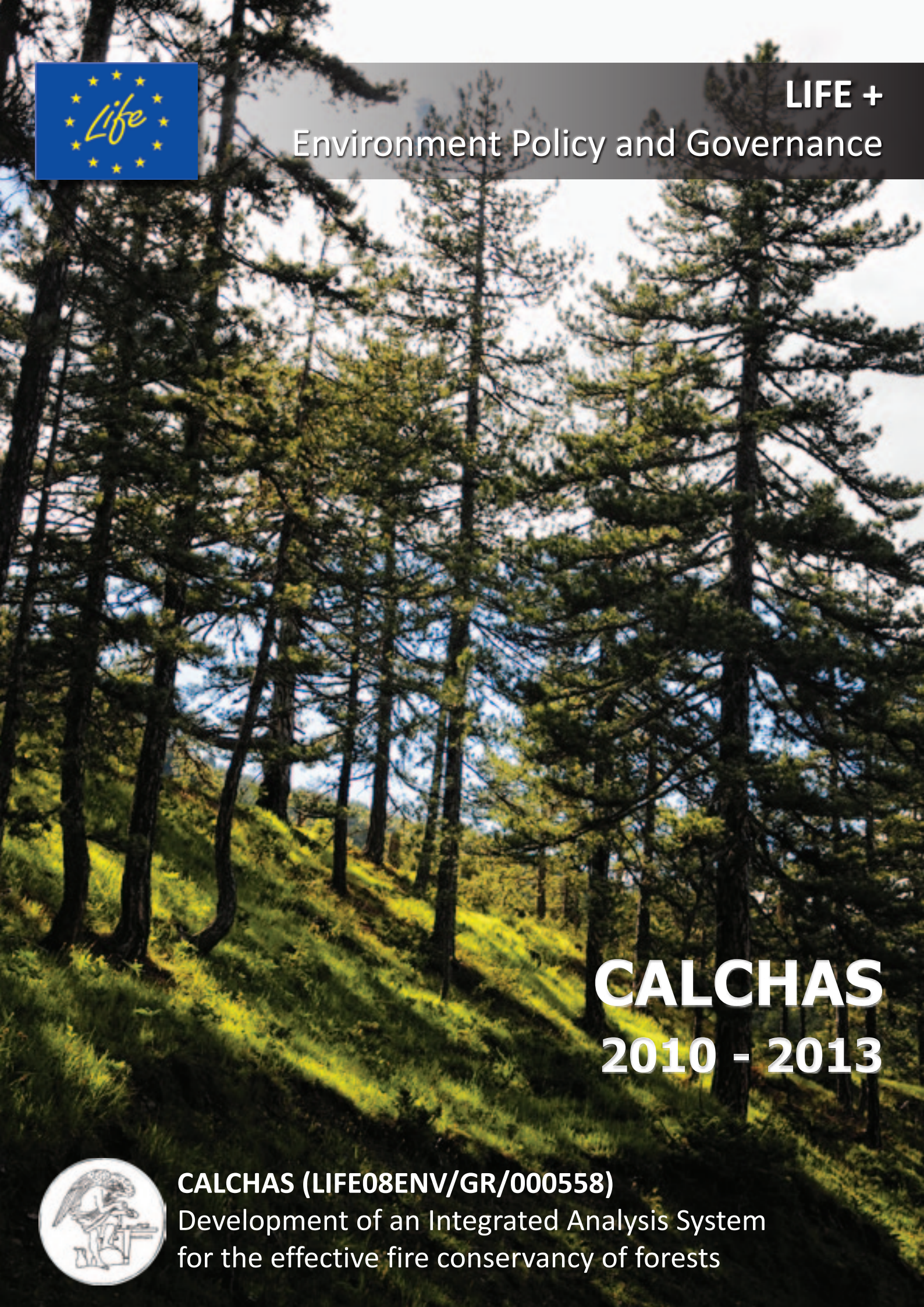

LIFE +
Environment Policy and Governance

CALCHAS
2010 - 2013

CALCHAS (LIFE08ENV/GR/000558)
Development of an Integrated Analysis System
for the effective fire conservancy of forests

The CALCHAS Project (LIFE08ENV/GR/000558) is co-financed by the European Programme

LIFE+ (Environment Policy and Governance)

Project duration: 1/3/2010 - 31/8/2013

Total Project Budget:	2,340,839 €
EU Contribution:	1,158,803 €

Participating Beneficiaries:

AGRICULTURAL UNIVERSITY OF ATHENS

TERRA NOVA Ltd.

NATIONAL TECHNICAL UNIVERSITY OF ATHENS

ONEX S.A.

NGO ARCTUROS

UNION OF CYPRUS COMMUNITIES

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Introduction

Over the last years, there has been an increasing number of forest fires in the southern regions of Europe. Fire is the most important natural threat to forests and wooded areas of the Mediterranean basin. It destroys more trees than all other natural calamities: parasite attacks, insects, tornadoes, frost, etc. The average annual number of forest fires throughout the Mediterranean basin is close to 50,000. On average, some 400,000 hectares of forest go up in smoke each year in the region, notably in Portugal, Spain, Italy and Greece.

It has been calculated that the damaging forest fires that Greece faced during the summer of 2007 resulted in the loss of 2.700 Km^2 and were responsible for the emission of 4,5 million tones of CO_2 in the atmosphere.

A disaster risk arises when a hazard meets vulnerability. A key factor that increases vulnerability is the inadequacy of disaster management planning. The recent forest fire catastrophes have revealed serious gaps in coordination, gaps or overlaps in the chain of command, inadequate resource management and allocation. Often, information was not updated or inadequate, leading to inefficient decision making.

CALCHAS project through the developed Integrated Forest Fire Analysis System (IFFAS) intends to cover this gap, regarding the necessary data for the effective coordination and confrontation of a forest fire incident.

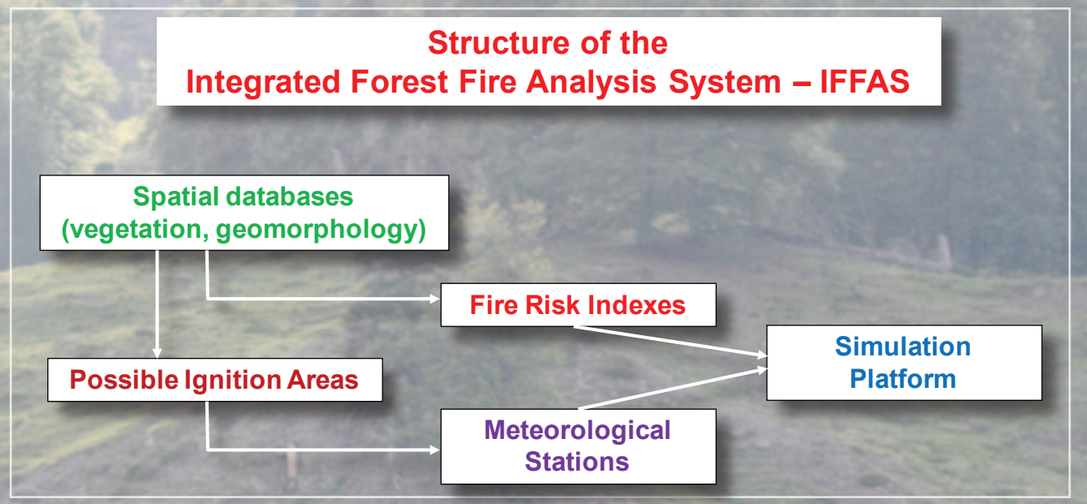
Goal

Goal of the CALCHAS project was the design, development, pilot application and optimization of an Integrated Analysis System (Integrated Forest Fire Analysis System - IFFAS), which has provided to the responsible authorities the data and information required towards the effective management and confrontation of fire incidents in forest ecosystems.

Results

With the completion of CALCHAS, the competent authorities are granted with an Integrated Forest Fire Analysis System (IFFAS) for the effective fire conservancy of Grammos and Troodos forests, which consists of the following components:

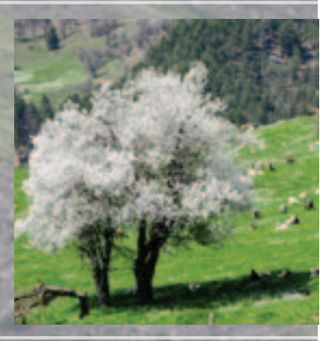
- An integrated spatial database consisting of flora and risk analysis data for each one of the pilot areas
- A network of meteorological stations appropriately installed in order to feed on-line the developed system with real-time data
- A computational platform for simulating the evolution of forest fire incidents.









CALCHAS' applications

The Integrated Forest Fire Analysis System (IFFAS) is a useful tool for the responsible authorities:

- At scenario level:
  - for personnel training purposes
  - for planning of the necessary fire conservancy infrastructures (fire monitoring stations, firebreak zones, water tanks, etc.)
- At operational level
  - for decision making and coordination during forest fire incidents.

Innovation

IFFAS' computational platform used for the simulation of the evolution of a forest fire:

√ is a forest fire evolution model

x and not a forest fire probability prediction model

IFFAS' operation is based:

√ on real-time meteorological data of the specific area

x and not on historical meteorological data of the broader area

Project areas

CALCHAS' pilot implementation was performed in two forest areas of significant ecological importance concerning the existing biodiversity:

Grammos in Greece
(GR1320002 – Koryfes Orous Grammos)

Mountain Grammos extends along the Greek-Albanian border and it is located in the northern part of the great mountain complex of Pindos. Its wealth of flora and fauna have classified it as one of the most important from an ecological standpoint areas of Europe. It is included in the important areas for birds in Greece, the «Natura 2000» network and the most important areas for bears (Ursus Arctus).

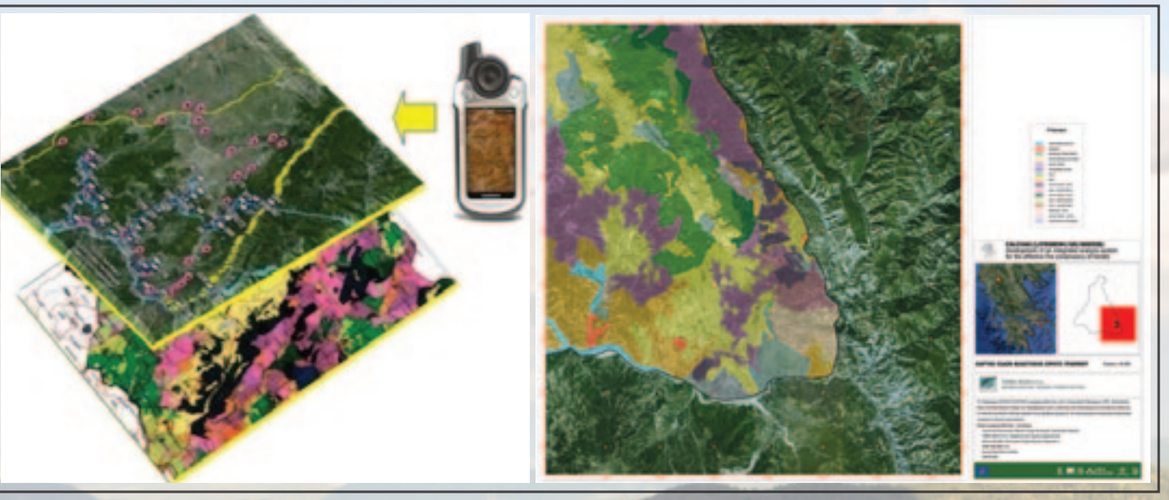
Troodos in Cyprus
(National Forest Park of Cyprus)

Mountain Troodos is the most important forest area in Cyprus. Troodos forest was declared as a National Forest Park (NFP) by the Council of Ministers in 1992 with main aim the perpetual preservation of its unique character and value. The Troodos NFP has a great ecological value, recognised as one of the most important mountainous plant biotopes in Mediterranean and Europe. The diversity of flora and fauna and the great ecological value of the park are the reasons for which it was decided to take several measures to protect and preserve the area.

Implementation Actions

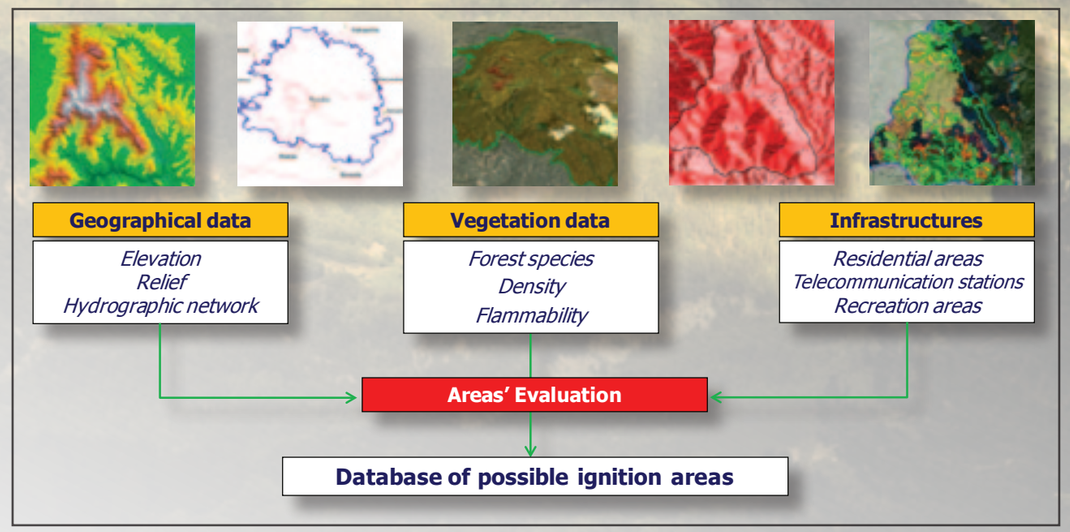
Flora mapping of target areas

Identification and spatial distribution of flora species in Grammos and Troodos and development of a GIS Database took place during this Action. Finally, flora maps for Grammos and Troodos were developed.



Methodology and analysis of possible ignition areas

The determination of posible ignition areas (areas with high risk of forest fire) was performed with the use of a multi-criteria analysis, based on the results oif the previous action. These results were combined with meteorological and geomorphological data of the two pilot areas as well as with data from sampling and laboratory analyses for the determination of flora's flammability.



Calculation of Forest Fire Risk Indexes (FFRI)

The calculation of FFRIs was based on the following parameters:

- Flammability of vegetation
- Density of vegetation
- Aspect of the sub-areas.

Selection of points for the installation of Meteorological stations in Grammos and Troodos

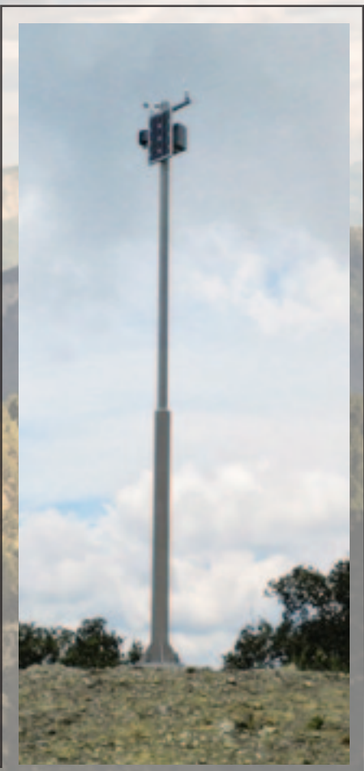
The points for the installation of the meteorological stations were selected based on the following criteria:

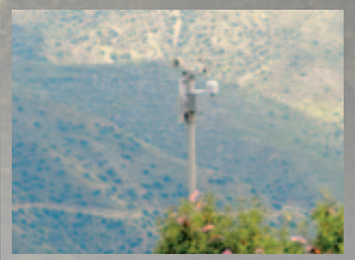
- Adequate coverage of both pilot areas
- Installation outside possible ignition areas
- Proximity to road network
- Adequate coverage of GSM network
- Proximity to residential areas.

The meteorological stations which are energy autonomous, record on a contant basis the meteorological conditions of the two pilot areas:

- Air temperature
- Relative humidity
- Velocity and direction of wind

and transmit the collected data through a GSM network.



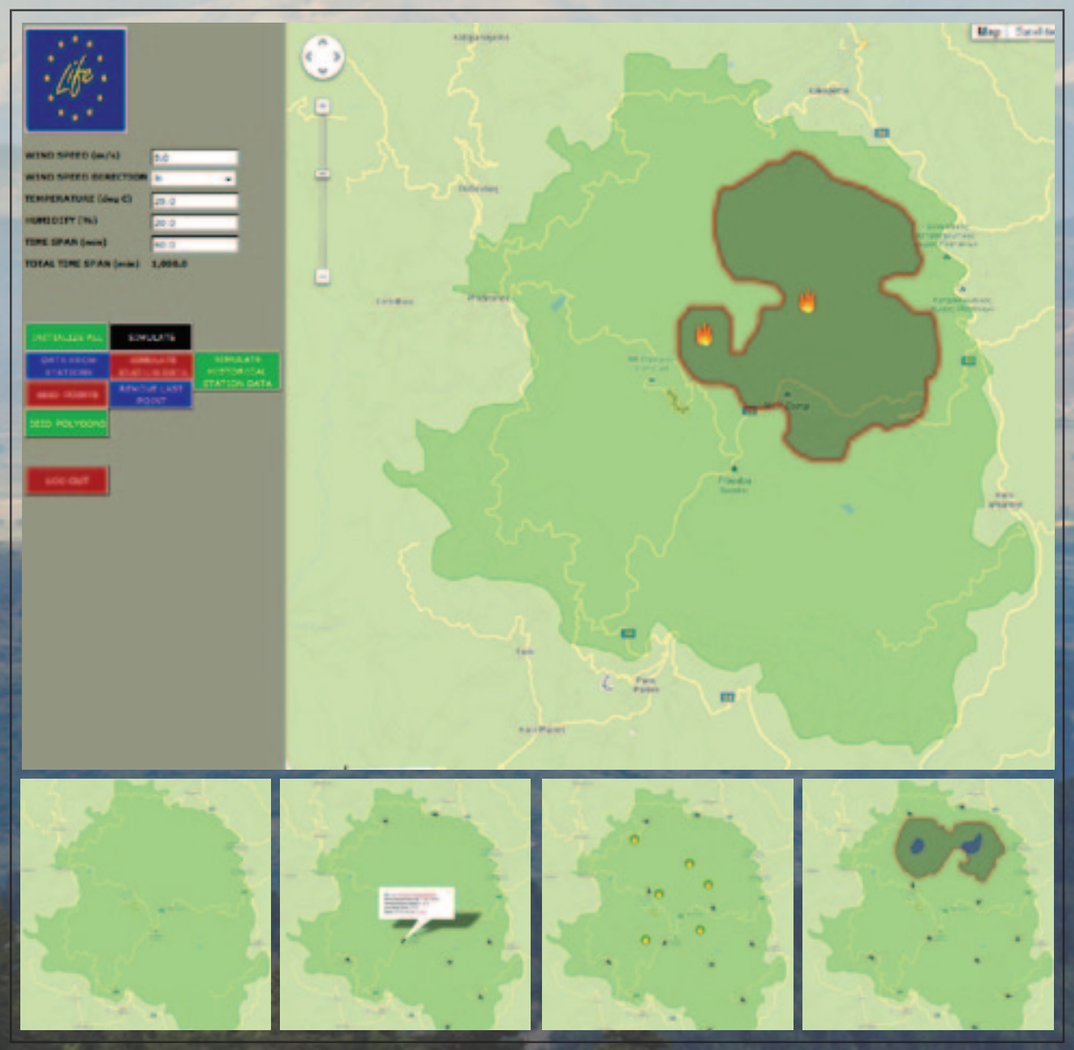


Implementation Actions

Design and development of the forest fire evolution simulator

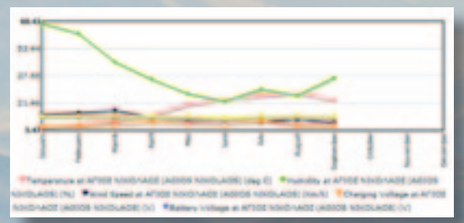
The computational platform used for the simulation of the evolution of a forest fire:

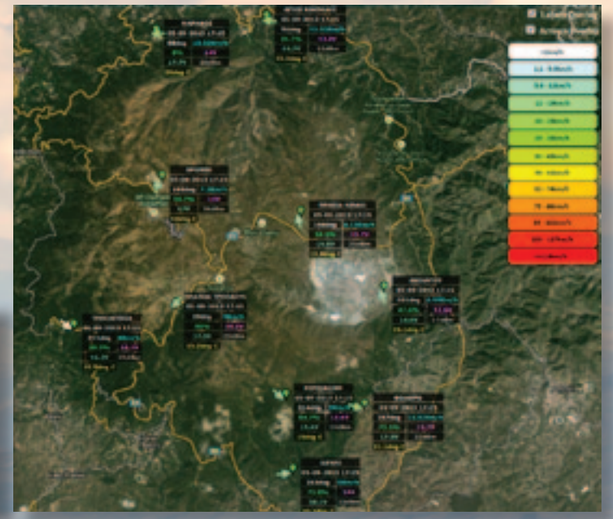
- is based on the Forest Fire Risk Index (FFRI) database of the two pilot areas
- receives on-line data from the meteorological stations. In this way it re-calculates on a constant basis the simulation of the fire's evolution
- is web-based
- is password protected.



Pilot application of IFFAS

The pilot application of the IFFAS took place in Grammos and Troodos. The operation of IFFAS as well as the operation of all it's sub-systems was tested. The computational platform used for the simulation of the evolution of a forest fire was optimized.





Training of responsible authorities on the use of IFFAS

During CALHAS' implementation period, IFFAS was presented to the responsible authorities and users of the computational platform used for the simulation of the evolution of a forest fire were trained on its use.

Dissemination

A wide dissemination campaign took place in order to inform the public about the implementation of the project. This campaign was delivered through a large number of newspaper articles, through presentations in national television programs of Greece and Cyprus as well as through a significant number of posts in web news sites and social media pages.

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