

..... ArcFIRE™ ?

Architecture

- Spatial & non-spatial data from readily available sources
- Mathematical models & estimation methods
- Geo-processing & spatial technologies
- Mapping & automated reporting
- Navigation & field guidance
- Information & Communication technologies
- Training & technical assistance guidance



Tools

- Daily forecasting and assessment of meteorological and wildfire situations
- Weekly fire risk analysis and identification of the worst expected day
- Assessment on the initiation and progression of a forest fire
- Fire fighting resources allocation planning and support for dispatching
- Analysis and fighting operation planning in large and risky forest fires
- Operational training and education based on forest fire simulations
- Forensic analyses of factors and fire behaviour from past forest fires

ArcFIRE™ has its origin in year 1998, and the development of the FOMFIS European Commission Forest Fires System & Management Project. Since then, numerous EC, national & international interlinked projects lead to the development & packaging of ArcFIRE™; it offers a cumulative multinational knowledge of European & international experience, and a state-of-the art s/w webGIS technology applied, tested and validated in many countries.

Some of the ArcFIRE™ modules, scripts and procedures are incorporated into the SCIER technology (EC/2009, www.scier.eu) whilst operational on GRID computational geo-technology. ArcFIRE™ is a user friendly, yet sophisticated, technology platform under constant evolution, weekly updated via current contracts (e.g., Seix-Sou forest management, GR) and by the partners target for the release in 2010 of the ultimate wildland & forest fires management portal developed under ESRI™ technology.

ArcFIRE™ capitalises on webGIS & information technologies as linked to: sensor, satellite, forestry & ecology, wild & forest fire, meteorology, economics & administrative forestry policies, navigational technologies, EU regulations, and related sciences & technologies, that are organised and packaged into a single platform that delivers forecasts & services for all four life-cycle (LC) phases of a fire: Awareness (prior), Emergency (during), Impacts (after), and Dissemination (fate/lessons).

ArcFIRE™ follows the fire LC in a seamless mode, and provides services as: stand-alone platform operation, tailored s/w solutions incorporating customers needs an endeavours via additional modules, integration of other third-party applications an services, training on the platform for operational and visualisation use, consultancy services for thematic mapping and geo-referencing, delivery custom made wildland & forestry management modules as part of a civil protection platform, as in the SCIER case (fires & floods).

The ArcFIRE™ Team is permanently identifying and adapting new upcoming technologies to improve and extend the system capabilities and functionality giving response to end-users in the operational arena. The Team is in constant involvement in research and development projects identifying and participatin in the transfer of research outcome while pushing the envelope to the frontline of research activity on forest fires.

Thus, the ArcFIRE™ Team can transfer technology and can assume co-ordination of various types of actors as administrations & civil protection bodies or fire fighting and civil protection resources utilising the ArcFIRE™ platform. For information please contact:

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ArcFIRE™

Forest Fire
Life-Cycle Simulation
& Management
Geo-Platform

A user friendly, state-of-the-technology
Geo-Platform for practitioners,
decision-makers & scientists
It delivers technology & services to
analyse Wildland & Forest Fires
and respond to crises



www.ArcFIRE.eu

What is

Service

ArcFIRE™ is a complete, scalable & modular information technology geo-platform, that provides risk management information & solutions for the entire "spectrum" of wildland fire events & crises; It is based on webGIS and info-technologies, and can support planning & management of fire "defence" operations. ArcFIRE™ considers, simulates and provides info-technology support for all four dominant phases of a fire life-cycle; Thus it is structured in four Phases/Modules: A, E, I, D



Life Cycle

- A** Awareness phase/module: it provides data, statistics, means & tools, aimed to analysing regional and local situations, and to forecast short-term crucial conditions "prior to a fire".
- E** Emergency phase/module: it provides dynamic integrated communication, surveillance, modelling and information tools, and can assist planners, decision makers, and fire fighters in their mission "during the fire".
- I** Impacts phase/module: it provides environmental, economic, social, and administrative quantitative impact assessment tools & frameworks, for planners, analysts, scientists, interested to assess impacts "after the fire".
- D** Dissemination phase/module: it provides statistics, information, tools & dissemination material, based on international practices and on the lessons learned from the fire; As such it feeds back the Awareness module of the fire Life-Cycle.

Input Technologies

Administrative

Event notification forms (Authority Desk)
Historic forest fires records & emergency input

Info sources

Sensor, data fusion, and fire alerting & monitoring technologies
Linkage to monitoring & surveillance cameras
Optimal sensors allocation & visibility modelling
Field telecom GPS, GPRS, Global Star™ input technologies
Spatial analyses and statistics generation
Access to national, international, and proprietary data & info sources

Meteorology

Meteo auto-integration, forecasting and interpolation (standard 5x5 km)
Meteo grid technology down-scaling to 0,5x0,5km
Auto linkage to international forecast weather service
1HR, 10HR, 100HR calculations (up to H+36, D+1-D+6)

Geo-morphology

Satellite, aerial photography, Google Earth™, ArcGlobe™ info processing
Satellite automated input from MODIS & other
DTM/DSM/DEM and 3D-terrain modelling
Digital Greece™ and POIs geodata for 100% Greece & Cyprus
Geodata production technology

Land/soils/forestry

Corine LC™ and satellite data automation
Forest fuel mapping estimation
Incorporate vegetation (forest fuels) and topography effects
Wildland Urban (WUI) interface structure mapping
Broad fire indexing FMC, FWI, Behave+ values, etc.

Field technologies (bi-directional)

WiFi and regional network automated linkage
GPS/AVL Service for tracking & guidance
SatCom/GlobalStar™ AVL Service for tracking & guidance
Aircraft, terrestrial vehicles, vessels tracking & guidance
Mobile users' & services technology
Operable in PDA hand-held portable devices
Spatial & temporal navigation via web
Multiple origins of fires
Dynamic modelling of barriers

A Awareness Modules

A1 Meteo indexing & risks
A2 Meteo response & patrolling
A3 Fire probability & operational forecasting
A4 Fire risk out-breaking & response indexing
A5 Vulnerability & other indices
A6 Difficulty-of-extinction & indexing
A7 Wildland Urban Interface indexing
A8 Danger indexing: CA, USA, ES, PT, Crown-Fire, other
A9 Electronic events cataloguing & forwarding
A10 Regional planning & notification
A11 Statistics modules
A12 Cumulative risk modelling (inc: social)
A13 Preparedness Plan

E Emergency Modules

Fire evolution (behaviour, spreading, progression, cessation) E1
Fire danger including crowning probability E2
Fire risk dynamics E3
Fire fate monitoring (bi-directional via mobile users) E4
Interoperable access to geodatabases for risk management E5
Alarming to third parties E6
Evacuation plan & population/other evacuation assistance E7
Communication and networking for resources coordination E8
Resources operation management (air, land, sea) E9
Patrolling routes planning (bi-directional) E10
Support for dispatching decisions (bi-directional) E11
Monitoring of aerial and ground resources E12
Emergency notification, GSM broadcasting E13
Interfacing with media and public actors E14
On the fly generation of reports & graphs (bi-directional) E15

Output & Technologies

Standardised “Use Cases” for the Fire-Man’s Daily Login:

US1. Daily assessment on the meteo & fire situation (region)
US2. Weekly assessment on the meteo & fire situation, subcase for weekend
US3. Meteo & fire situation (forecast) in case of fire (local) reporting
US4. Simulation of the first moment of a fire & assessment on fire behaviour
US5. Training & education on fire behaviour, using the fire simulator
US6. Forensic analysis of a real fire, explanation of fire behaviour

Output features & alternatives

Search and discovery tools by date, type, size
Automated comparison and analysis of common situations
Cross-analysis with historical climatic and meteorological data
Multiple fire modelling (e.g., multiple origins of fire)
User-defined forest fuel characterisation
Burned and non-burned areas cataloguing
On-the-fly fire mapping (from air, ground, sea; bi-directional)
Non-deterministic simulations
Dynamic modelling with boundary conditions (e.g., barriers)
Comparison of observed and forecasted ArcFIRE meteo data
Reporting on of “what-if” cases
Burned / non-burned area analyses
2-D and 3-D visualisations reporting
Seamless ArcExplorer or Google Earth viewing on the move

WebGIS technology

ArcGlobe™, ArcExplorer™, Google Earth™, MS-VE™, NASA, Client's
Seamless integration in WebGIS geo-platforms
Comparative modelling analyses to SCIER™, FarSite™, Behave+™, FlamMap™, FireFamily+™, WFAS™, other
Advanced, custom, animated, Mosaic mapping & visualisation
Neural network training modules
Multiple origins of fires simulations
ArcFIRE™ database visualisation & linkage to other
Values and graphs of specific points on ArcExplorer™ and Google Earth™
Data export & results to other systems (XML, SHP, ASCII, KML, other)
Integration of thematic maps from WMS servers
Map catalogue & search retrieve tools
Advanced 3D viewing
Comprehensive, operational symbology

D Dissemination Module

D1 Statistical analyses & extremes of fires
D2 Critical analyses of past fires
D3 Lectures, seminars, workshops, conferences (entire LC)
D4 Virtual simulator training for fighting operations
D5 International linkage for cross-experience accumulation
D6 Feedback to the Awareness of the Life-Cycle (LC)

I Impact Modules

Impact in soil and vegetation I1
Impacts on surface runoff I2
Impact on economic environment I3
Impact on social environment I4
Impact on administrative environment I5
Mitigation measures I6