EUFOFINET (European Forest Fire Network)

ONF action plan

1) The EUFOFINET programme

The EUFOFINET (European Forest Fire Network) project is part of the INTERREG IVc programme and is designed to identify and share best practices for the prevention and control of forest fires. Covering a period of 26 months (from October 2010 to December 2012) and with a budget of €2 million, it will be 75% co-financed by the European Regional Development Fund (ERDF). The French partners will also receive support from the Prefect responsible for the Southern Defence and Security Zone (Delegation for Mediterranean Forest Protection).

The principal objective of the EUFOFINET project is to share good practices in order to improve national or regional policies for the prevention and control of forest fire risk, by drawing on 5 good practices which have already been identified by the different participants in their the operational programmes.

These 5 good practices, decided upon by the participants, are divided into 3 main themes:

- Intervention strategies
  - 1-Interventions on incipient fire - techniques for intervention
- Technological innovation
  - 2-Training by means of simulation tools
  - 3-Territorial surveillance strategies including detection and prevention
  - 4-Mapping hazards and fire risks
- Restoring fire-damaged terrain
  - 5-Techniques and procedures

The two French partners involved in the programme are the Department of the National Forests Office in charge of Mediterranean Territory and the Entente for the Mediterranean Forest. The other partners involved are:

- The Regional Union Municipalities of Attica (PEDA Greece), project leader
- The Tuscany region (Italy)
- The National Forests Centre (NFC, Slovakia)
- The Centre for servicing woods and forests of Castilla y Léon (CESEFOR, Spain)
- The North Aegean Region (Greece)
- The Epirus Region (Greece)
- The Thessaly Region (Greece)
- The Galician Academy of Public Security (AGASP, Spain)
- The Frederikssund-Halsnaes Fire and Rescue Department (Denmark)
- The Forest Research Institute (FRI, Poland)
- The Northumberland Fire and Rescue Service (England)

The ONF Department for the Mediterranean Territory centralises the ONF departments and activities in the Languedoc-Roussillon and Provence Alpes Côte d'Azur regions.

The expected output and results of the project are:
* the sharing of good practices by the project partners,
* Updating and enriching of the matrix for good practices identified by the "INCENDI" project, a Regional Framework Operation co-funded by INTERREG IIIC,
* The identification and promotion of common intervention procedures for dealing with forest fires,
* The creation of a regional institutional network of expertise on the procedures to be implemented against forest fires and for controlling them,
* For each partner, the production of an operational action plan incorporating the conditions for implementation of one or more common good practices.

This document is the ONF plan for action following the EUFOFINET programme.

It has been developed and will be implemented in coordination with the 2007-2013 "regional competitiveness and employment" operational programmes of the Languedoc Roussillon and Provence Alpes Côte d'Azur regions, approved in 2007.

2) How the action plan was drawn up

The ONF is the French Institution responsible for managing state forests and for providing regional and local authorities with support for managing forests for which they are responsible.

As such, the ONF has full authority to undertake silvicultural actions in these forests, and in particular for restoring fire-damaged land (good practice 5).

This action plan therefore contains a section devoted to this theme, whose objective is to improve internal ONF procedures (both in terms of techniques and the way in which tasks are organised).

This part of the action plan is developed within the ONF, in conjunction with research organizations specialising in the area of forest fires, with a view to integrating the latest research on restoring fire-damaged land as well as the best practice of EUFOFINET project partners.

These technical exchanges have already led to the publication of several articles on the subject, which allow a wider dissemination of information to include people who are not ONF personnel.

The end products of this action plan will be made public, and made available to all potentially interested parties (State and local authority departments, forest owners, among others).

In addition to these main tasks of managing State, regional and local forests, the ONF is also responsible to the State and local authorities for carrying out activities in the public interest, one of which is to protect forests against fires.

While the ONF is responsible for implementing these missions for society as a whole, it does not have a legal mandate to modify the policies behind them.

However, the ONF intervenes as an operator but also as technical adviser to the principals involved, and in this capacity continually strives to improve its implementation techniques; when there is technical progress, the ONF reports to the principals and proposes a method of integrating it into their local or regional policies.

The second section of the ONF action plan focuses on the experimentation of some technological innovations used by the partners in the EUFOFINET project as part of their good practices (technological-innovation theme).

This section was drawn up in conjunction with the partners and regional executives who are likely to integrate results into their own policies or action plans.

Finally, the course of this EUFOFINET project has again demonstrated, thanks to the wide range of exchanges with partners using very different techniques and also having very different political responsibilities in a wide variety of human and geographical contexts, the advantages of cooperative projects and the improvements in techniques and modes of organisation which they enable.

One of the main aims of this project was the establishment of a regional institutional network of expertise on the procedures to be implemented to prevent and control forest fires.

The third and final section of the ONF action plan therefore deals with the creation of this network and the involvement of the ONF in it.

While waiting for this network to be established effectively, participation in new of scientific and territorial cooperation projects is being envisaged (7th PCRD).

3) Synergy with the regional operational programmes

The 2007-2013 "regional competitiveness and employment" operational programmes of the Languedoc Roussillon and Provence Alpes Côte d'Azur regions were approved in 2007.

The programme in the Languedoc-Roussillon area has among its strategic priorities a second objective, namely: "To reduce the vulnerability of the territories, ensure their attractiveness and environmental quality and reduce greenhouse gas emissions."

As part of this objective, measure 1, which aims to prevent risks to exposed persons and populations, primarily aims to prevent the risk of flooding. It comprises four initiatives, which may also relate partially to the risk of forest fire:

- to develop knowledge and reinforce risk education
- to improve monitoring and alerts and plan crisis management and mitigation
- to reduce the vulnerability of populations and economic activities at risk
- to complete the work and changes in practice necessary for effective and sustainable risk reduction
- to continue training and organisation of prevention personnel and developing comprehensive action to reduce the risk at the relevant scale ('risk basin' or area at risk).

The programme of the Provence-Alpes-Côte d'Azur region has a third objective concerning the sustainable management of resources and risk prevention, of which group 3.5 covers prevention and risk management and mitigation.

Group 3.5 contains two points:

- Experimenting with forest surveillance using cameras
- Establishment of a regional platform for hydro-climatic information

These two operational programmes primarily aim to prevent the risk of flooding, but it nevertheless appears that the improved monitoring and warning of fires and in particular, experimenting with camera surveillance, is one of the key points of these measures for reducing the vulnerability of the territories (EUR 13 million for this purpose has been listed in the budget of the operational programme of the Provence-Alpes-Côte d'Azur region).

4) Presentation of good practices to be transferred

4.1) How we determined the good practices to be transferred

In the course of the EUFOFINET programme six technical seminars were held, dedicated to each of the good practices identified.

In these seminars, each partner that implements the good practice being studied (called a donor partner) writes a short description about it, based on a standard form, and then delivers a presentation.

A synthesis of all the good practices was made to determine which good practice could be used by all partners and which would likely be adopted by a partner who does not yet have it (called the receiving partner).

Each good practice could include several elements and the transfer of a good practice might only focus on one of these components.

The partner interested in all or part of a good practice can ask one or more partners who are using it in their territory for technical, financial or organisational details, or even for help integrating this good practice into his/her own action plan (a standard form is available to partners for these exchanges).

In the light of the responses and details obtained, if required, the receiving partner then evaluated the transferability of all or part of this good practice.

A common evaluation framework was defined during the programme, to enable each partner to ensure that all the basic steps for transferring the good practice and incorporating it into an action plan could be carried out.

If one of the key points could not be met, the good practice could not be transferred.

4.2) Selection of the good practices by the ONF

At the end of the process described in section 4.1, the following good practices were selected by the ONF:

- restoration of fire-damaged land, with statutory powers,
- technological innovation, with its own technical resources, but through State and local authorities having the requisite statutory authority; as part of this objective, the elements selected are as follows:
  - strategies for monitoring the territories, automatic detection of fires by camera
  - risk mapping
    - ✓ use of devices for measuring the moisture content of forest litter to improve daily risk forecasts
    - ✓ geolocation of the surveillance and intervention resources using operational GIS

4.3) Description of the good practices adopted by the ONF

4.3.1) Restoration of fire-damaged land

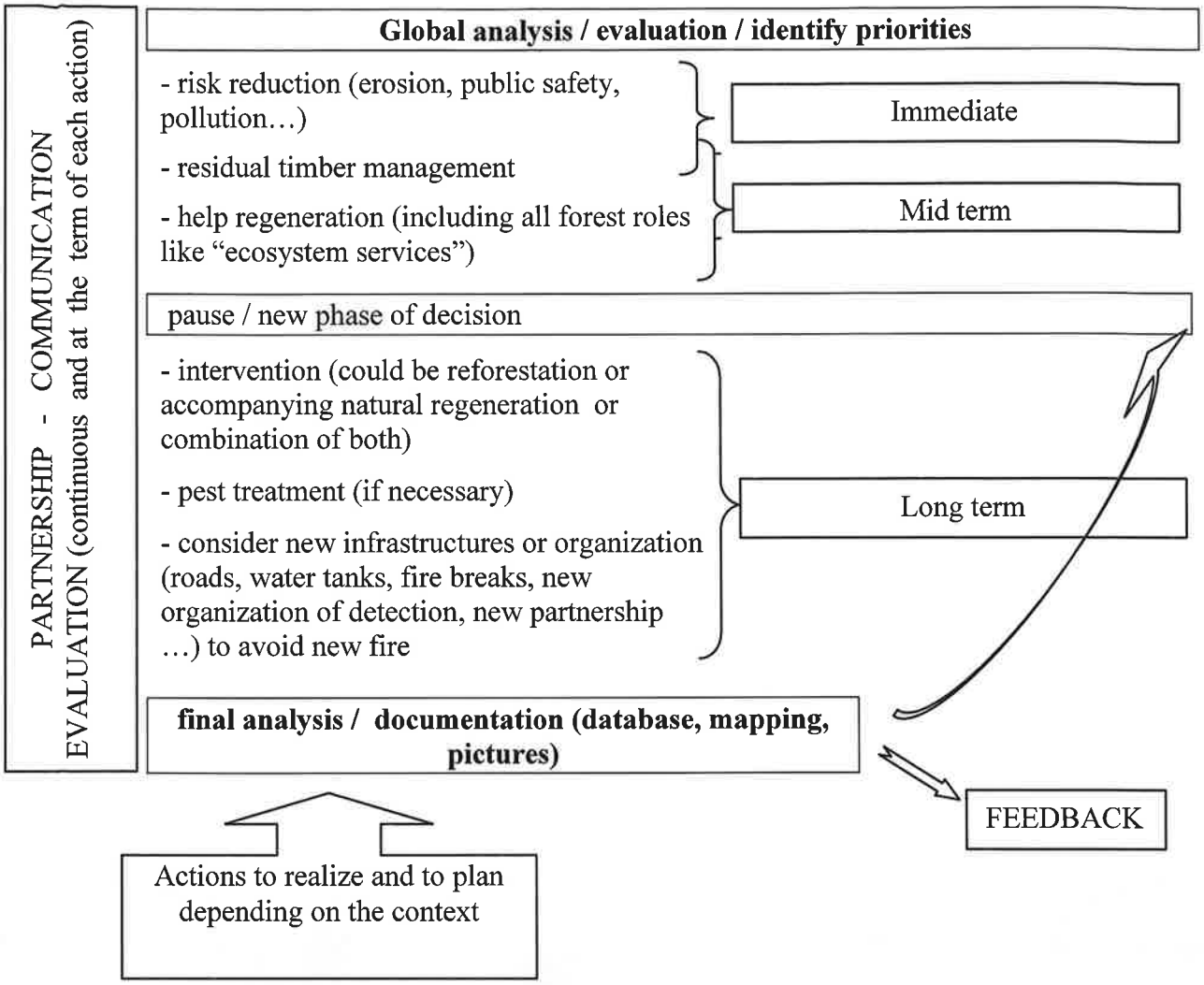
The good practice identified is the result of pooling the practices implemented by the partners. This synthesis emphasizes the overall progress of restoration operations (see diagram on the following page). This ideal process involves a number of steps implemented more or less fully by the partners, while formalising them to make them reproducible. Intervention techniques can vary depending on the environment (climatic, natural and human), the constraints and the objectives laid down for the forest, but the identified common key points are applicable whatever the context.

In particular, the three phases of analysis (preliminary, intermediary after the actions in the short and medium term, and final) are essential for successfully undertaking direct consistent and useful actions, without wasting resources, and for attempting to revert to a situation which is as good as, or even better than before. The phasing of the types of action, closely related to these phases of analysis, allows one to concentrate on the important aspects at the most appropriate time, without excessive haste or omissions.

Throughout this process, it is essential to combine the concepts of partnership (to allow for consensus and synergy beneficial to the success of these actions), communication (to explain and convince partners of the value of the phasing and the choice of these actions) and on-going evaluation (to ensure the best possible outcome and prepare the resulting analyses and feedback reports).

Finally, documentation and feedback are also important for making it possible to improve the technical aspects and provide material for the different phases of analysis, and can also be very useful for training new experts.

Diagram showing the global progression of restoration operations:



4.3.2) Automatic detection of fires by camera

The pooling of experiments carried out by each of the donor partners helps to better define which tools are best adapted to each situation, what organisation is necessary to implement automatic detection devices, what the costs of the available materials are and what the technological advances, what mistakes to avoid and which key elements should be taken into account when planning (power supply, data transmission, etc..).

It appears that two types of camera are used: infra-red, which detects heat (main advantage: can be used at night; main disadvantage: must have a direct visual of the flames thus spots some fires at a late stage, when they show above the crest in the case of terrain with contrasting relief , or when they reach the top of the canopy in the case of running fires), or video in visible light based on smoke detection, which has the advantage of identifying fires more quickly by their smoke, but which is more prone to false alarms (dust, cloud cover etc...).

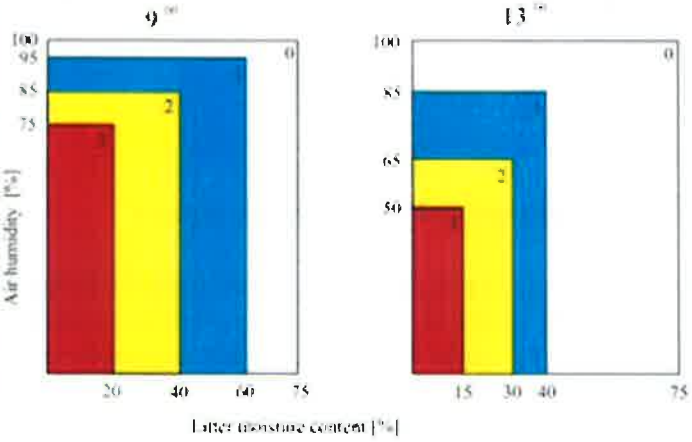
In all cases, the presence of an operator who is able to analyse and confirm the alert seems to be essential. It appeared that, in addition to the alarm, the camera offers the possibility of following an event remotely at an operational centre which is often blind without it.

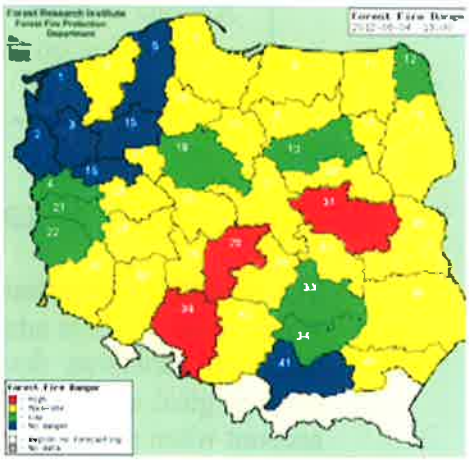
4.3.3) Measuring the moisture content of forest litter

In Poland, the forecast level of fire danger is based, among other more conventional parameters, on a cross between the relative humidity of the air and the moisture content of pine litter (the major species in Poland and the most vulnerable). These parameters are measured twice a day from April to September in 42 forecasting zones.

Pine litter samples are collected according to a very specific protocol and their water content is measured with a humidity indicator, a device which is available from any supplier of laboratory equipment, which makes it possible to obtain a result that is fast enough for this type of sample.

The charts make it possible to define a level of risk based on these two settings and are valid for the Polish context, but the protocol is very interesting and makes it possible to take into account two factors that are known to influence both the risk of outbreak of fire and the risk of it spreading. The adaptation of this protocol to the French context would certainly make it possible to better predict the risk on certain days of summer without wind when sometimes the risk may nevertheless be very high, as well as of many winter fires, the spread of which is closely linked to the state of the forest litter.





4.3.4) Geolocation of patrol vehicles

The Junta de Castilla y Leon has an integrated information system, "EMERCARTO", which combines risk mapping, operational maps, and also monitoring of all vehicles and intervention personnel. This unique system is implemented by the public company TRAGSA. It enables the monitoring of all vehicles and personnel of the various intervention groups (TRAGSA ground teams, Junta teams, private subcontractors) thanks to a unique data format

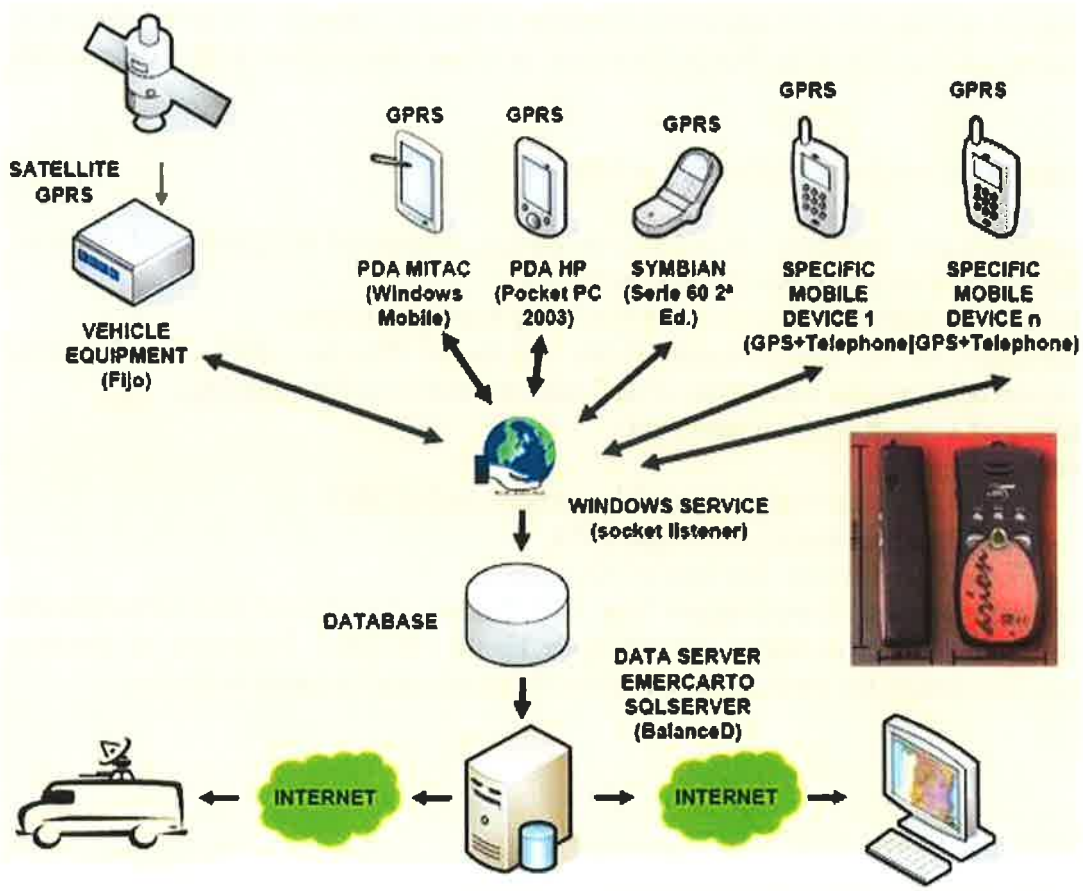
that can be sent from TRAGSA modules or other modules available on the market, this data being centralized by TRAGSA and made available in real time by the software.

GPS modules communicate their position by GPRS (a digital radio system was tested but abandoned). New modules are being tested with a system of automatic switchover to satellite transmission in poor-quality GPRS areas (with however a lower transmission frequency to minimise the cost)

For response teams, monitoring by staff is given preference over tracking vehicles for security reasons related to the fire-fighting technique being used (teams on foot often far away from the vehicle), knowing that when staff are in the vehicle then the position of the vehicle is known.

There are two advantages to this system:

- it integrates several departments or companies in a single information system thanks to a unique data format.
- it enables an interface adapted to the mission, with specific job-based maps and specific features, in contrast to standard market solutions



5) Actions to be taken

5.1) Restoration of fire-damaged land

Exchanges with the project partners around this theme primarily highlighted a lack of standard procedures and technical decisions taken to implement actions to restore fire-damaged land.

A methodological and technical guide will thus be prepared to standardise the steps leading up to the decision to either restore or not restore fire-damaged terrain, and the technical specification of studies and work to be implemented according to the main tree species found in the French Mediterranean region.

An internal ONF directive will then set the framework for all ONF officials using the guide.

- Completion period: 1st half of 2013
- Associate partners: research institutes

5.2) Technological innovation

5.2.1) Automatic detection of fires by camera

An experimental operation to test automatic detection of fires by camera will be conducted in the Department of the Alpes de Haute Provence in close cooperation with departmental partners.

This experiment will involve the following actions:

- Acquisition and installation of a detection camera, associated equipment and software in the South West of France (Manosque Basin)
- Effectiveness testing of detection devices using smoke simulation
- Comparison of the effectiveness of the automatic detection devices and human detection using smoke simulation (over 2 summer seasons of monitoring)
- Drafting of a report on the experiment
- Completion period:
  - acquisition and installation of the camera: end of 2012
  - effectiveness testing: 2013 and 2014
  - experiment report: first half of 2015
- Associate partners: Departmental Fire and Rescue Department and Departmental Directorate of the Territoires des Alpes de Haute Provence, Prefecture of southern zone - Delegation for Mediterranean Forest Protection and research institutes.

5.2.2) Measuring the moisture content of forest litter

An experimental measurement of the moisture content of litter and herbaceous plants will be carried out in two coastal departments normally subjected to drying winds (Var and Bouches du Rhône).

This experiment will involve the following actions:

- Acquisition and installation of two devices for measuring the moisture content of forest litter.
- Experimental measurements over two summer seasons
- Analysis of the results of measurements based on weather parameters
- Comparison of the evolution of the moisture content of litter with the behaviour of fires near the places where the measurements were taken (outbreak, velocity)
- Drafting of a report on the experiment
- Completion period:
  - acquisition of measurement devices end of 2012
  - efficiency testing and analysis of the results: summer 2013 and 2014
  - experiment report: first half of 2015
- Associate partners: Météofrance, Prefecture of southern zone - Delegation for Mediterranean Forest Protection, Head of Interdepartmental Southern Area and research institutes.

5.2.3) Geolocation of patrol vehicles

An experimental monitoring operation using GPS patrol vehicles was carried out by the ONF over 3 years, in the departments of Gard and the Alpes de Haute Provence.

The technical part of this experiment (equipment supplies, monitoring of patrol vehicles and visualisation modules on an internet server) has been contracted out to a private company.

The action to be undertaken for this plan is to test the methods and products developed by the partners of EUFOFINET in order to set up a system of technical monitoring controlled by the ONF, with limited recourse to subcontractors, allowing the use of thematic maps developed by the ONF.

The experimentation will also focus on obtaining the position of the vehicle using an onboard computer mapping and guidance device, so that users of the vehicle can also benefit from the geolocation of their apparatus.

This experiment will involve the following actions:

- Definition of specifications of the geolocation device adapted to the needs of forest patrols (which might not be covered by GSM networks)
- Acquisition and installation of an experimental device to replace that currently being tested (30 vehicles distributed in the departments of Gard and the Alps de Haute Provence)
- Experimental monitoring during one summer season
- Analysis of the results, specific conditions of the season, coverage or rate of failure, and the cost of the devices

- Comparison with the device used in previous years (efficiency, ergonomics, cost)
- Drafting of a report on the experiment and, if it is positive, proposal of specifications for gradual deployment in all patrol vehicles, available to all organisations using patrols included in the arrangements being finalised by the prefects of the *Département*.
- Completion period:
  - Drafting of the specifications for the experimental device: 1st quarter of 2013
  - Purchasing or renting of the experimental device installed on the 30 vehicles used in the experiment in progress
  - efficiency testing and analysis of the results: summer 2013 and 2014
  - report on experiment and proposal of final specifications: first half of 2014
- Associate partners: Prefecture of the Southern zone - Delegation for Mediterranean Forest Protection, Inter-ministerial chiefs of staff for the Southern zone and research institutes, Departmental Fire and Rescue Departments, Departmental Directorate of the Territories of the Alps de Haute Provence.

5.3) Cooperation network

The final objective of the EUFOFINET programme was to create a regional institutional network of expertise on the procedures for preventing and fighting forest fires.

Under this action plan, the ONF will support initiatives for the creation of such a network, and, depending on the financial support for such a network, will join in as a partner or as a service provider to another French partner.

Moreover, pending the setting-up of this network, the ONF will take part as far as possible in new territorial or scientific cooperative programmes, prioritising projects which directly relate to the experiments to be undertaken in terms of this current plan of action.

- Completion period: 2012-2014
- Associate partners: partners in projects devoted to fire prevention in which the ONF has participated (OCR INCENDI, PYROSUDOE, FORCLIMADAPT, EUFOFINET) - JRC - departments of agriculture and ecology, Prefecture of southern zone - Delegation for Mediterranean Forest Protection.

6) Quantification - Indicators

6.1) Restoration of fire-damaged land

- ONF staff time:
  - 20 days for the development of the methodological and technical guide
  - 90 days of ground staff training in the use of the guide spread over 2013-2016

- External expenditure
  - €5000 for publishing the guide

- Method of financing: self-financed by the ONF

- Indicators:
  - date of publication of the guide (objective 1st half of 2013)
  - date of distribution of the ONF internal directive (objective 1st half of 2013)
  - Training: number of staff trained per year from 2013 to 2016 (goal of 30 per year)
  - Percentage of fires covering more than 50 ha. affecting public forests for which the guide was used (objective of 80% by 2016)

6.2) Technological innovation

6.2.1) Automatic detection of fires using cameras

- ONF staff time:
  - 10 days to develop the specifications for the operation and monitoring of acquisition and implementation procedures
  - 10 days per annum for smoke simulation testing in 2013 and 2104 (which can be widely developed if a collaborative project on this topic emerges)
  - 5 days to draft the report on the experiment.

- External expenditure
  - €80,000 for the acquisition and installation of the detection device

- Method of financing
  - staff days: self-financed by the ONF (and increase the number of days if funding is received from a cooperation project)
  - Acquisition of the monitoring device: sponsorship activity

- Indicators:
  - date of acquisition and installation of detection device (objective 1st quarter of 2013)
  - periods of implementation of smoke simulations and efficiency testing (objective summers 2013 and 2014)
  - date of publication of the experiment report (objective 1st semester 2015)

6.2.2) Measuring moisture content of litter

- ONF staff time:
  - 10 days per annum for tests to measure moisture content and exploitation of the results in 2013 and 2104
  - 5 days of comparative analysis of the results and the behaviour of fire (in conjunction with Météofrance)
  - 5 days to draft the report on the experiment.

- External expenditure
  - €4,000 to purchase two measuring devices

- Method of financing: self-financed by the ONF

- Indicators:
  - date of purchase and installation of measuring devices (objective 1st quarter of 2013)
  - periods of implementation of measurements and analyses according to the behaviour of the fires (objective summers 2013 and 2014)
  - date of publication of the experiment report (objective 1st semester of 2015)

6.2.3) Geolocation of the patrol vehicles

- ONF staff time:
  - 20 days to develop the specifications and monitor acquisition and installation procedures of the experimental geolocation device
  - 10 days for the follow-up of the 2013 summer campaign and analysis of initial results
  - 10 days to draft the report on the experiment. (+ 10 days to draft final specifications if the experiment is a success).

- External expenditure
  - € 20,000 for the acquisition and installation (or total or partial subcontracting) of the geolocation device

- Method of financing
  - staff time: self-financed by the ONF
  - Acquisition of the monitoring device: state financed

- Indicators:
  - date of acquisition and installation of a geolocation device (objective 2nd quarter of 2013)
  - period of implementation of the device and evaluation of effectiveness (goal summer 2013)
  - date of publication of the experiment report (objective 1st semester of 2014)
  - date of possible drafting of final specifications (objective end of 2014)

6.3) Cooperation network

- ONF staff time:
  - 10 days per annum in 2013 and 2014 to participate in activities to promote the network, or in calls for participation in cooperative projects
  - approximately 20 days per annum if the network is created
  - unknown number of days, depending on the participation of the ONF in potential cooperation projects.

- External expenditure
  - €2000 for travel expenses to take part in the promotional activities of the network

- Method of financing
  - staff days:
    - ✓ self-financed by the ONF for activities to promote the network
    - ✓ partial financing by the EU in the event of participation in a programme of co-operation (and self-financed by the remaining part)
  - Travel and relocation expenses: self-financed by the ONF

- Indicators:
  - Amount of time engaged in promoting the network
  - Creation of the network, including participation by the ONF
  - Level of participation in consortia responding to calls for cooperation projects targeted at one of the topics tested in respect of this plan of action.

The financial statement is as follows:

Good Practice	External Expenditures (€)	Staff Time (days)	Staff Cost (€)	Total Cost (€)
Restoration of fire-damaged land	5 000	110	55 000	60 000
Automatic detection of fires using cameras	80 000	25	12 500	92 500
Measuring moisture content of litter	4 000	30	15 000	19 000
Geolocation of the patrol vehicles	20 000	40	20 000	40 000
Cooperation network	2 000	40	20 000	22 000
Total	**111 000**	**245**	**122 500**	**233 500**

7) Conclusion

The EUFOFINET programme has enabled the ONF to improve the technical knowledge of its staff through very constructive and fruitful exchanges, to highlight a number of points that can be improved for some procedures, but also to learn about the technological innovations used by certain partners.

This action plan aims to enhance the achievements of this programme by improving our internal procedures relative to the restoration of fire-damaged land, and by experimenting with a number of technological innovations presented in the programme in conjunction with the national, regional and local authorities responsible for fire prevention policy in the territory covered by the Mediterranean Territorial branch of the ONF.

This action plan will be spread over 2013 to 2015 to make it possible to successfully deploy our new procedures and to continue the experiments over at least two summer seasons.

As it is on a moderate financial scale, it can be conducted during this period by re-assigning existing budgets to these activities.

It will finally set aside a portion for the continuation of co-operation projects, either within a regional institutional network of experienced participants involved in the field of forest fire prevention, or in new projects of territorial or scientific cooperation, with the aim of continuing to make progress and gain immediate benefits from technological or scientific progress.

Aix-en-Provence, 06 September, 2012

The Mediterranean Territorial Director

Philippe DEMARCQ

OFFICE NATIONAL DES FORETS
Direction Territoriale d'Aix-en-Pce

Contacts
Yvon Duché / Rémi Savazzi
ONF - Mission Zonale DFCI
46 avenue Paul Cézanne CS80411
13097 Aix-en-Provence Cedex 2
yvon.duche@onf.fr / remi.savazzi@onf.fr