

## **Potential of ESA missions for fire products**

CGMS is informed about the fire related parameters provided or planned by ESA missions: ERS, Envisat and GMES Space Program.

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## Potential of ESA missions for fire products

### 1.- INTRODUCTION

Fire is one of the hazards that has been devastating many parts of the World, an in particular Europe in the last few summers. Although ESA has not embarked so far specific sensors to detect fires, both ERS and Envisat can provide useful information for fire monitoring. On the other hand, ESA has co-operated with EUMETSAT in the development of the MSG series of satellites, which embark the SEVIRI radiometer, featuring channels appropriate for fire detection. ESA is considering to include IR instruments in the future GMES missions.

### 2.- ERS DATA

The status of the ERS mission is to be found in paper CGMS-XXXIII-ESA-WP-01. The most complete information about the ERS mission, system, instruments, its products, user services and latest news can be found at <http://earth.esa.int/ers/> .

The ERS-1/2 satellites, being designed originally as an oceanographic mission, provides useful fire related information from its sensors:

- SAR Synthetic Aperture Radar: images of burned areas
- ATSR Along Track Scanner radiometer: smoke and night fire detection

### 3.- ENVISAT DATA

The status of the Envisat mission is to be found in paper CGMS-XXXIII-ESA-WP-01. The most complete information about the Envisat mission, system, instruments, its products, user services and latest news can be found at <http://envisat.esa.int/>

The Envisat satellite is dedicated to environment monitoring, including the ocean. It provides many useful fire related information from its sensors:

- ASAR: Advanced Synthetic Aperture Radar: images of burned areas
- AATSR: Advanced Along Track Scanner radiometer: smoke and night fire detection
- MERIS: Medium resolution Imaging Spectrometer: images of burned areas for fire damage estimation. See an example on:

[http://www.esa.int/esaCP/SEM25M808BE\\_index\\_0.html](http://www.esa.int/esaCP/SEM25M808BE_index_0.html)

The High Bit Rate ASAR and MERIS data are selectively acquired by ESA and National stations. They can also be relayed via the latest ESA telecommunication satellite Artemis since March 2003. There is no direct broadcast service to users. There is a dissemination service using commercial telecom satellites.

### 4.- AVAILABLE DEMONSTRATION PRODUCTS

Global burned forest mapping products, based on ATSR-2, are available from:

<http://dup.esrin.esa.int/ionia/projects/summary24.asp>

[http://www.geosuccess.net/geosuccess/relay.do?dispatch=GLOBS\\_info](http://www.geosuccess.net/geosuccess/relay.do?dispatch=GLOBS_info)

Monthly global fire maps for climatology, based on ATSR-2 and AATSR, are available from:

<http://dup.esrin.esa.int/ionia/wfa/index.asp>

Other fire related level 3 products developed under the ESA Data users programme, based on third party missions, are here

<http://dup.esrin.esa.int/ionia/projects/summary34.asp>

<http://dup.esrin.esa.int/ionia/projects/summary23.asp>

A Dragon project demonstration for forest fire monitoring in China with the combined use of the ASAR, AATSR and MERIS sensors is currently on going. See:

[http://earth.esa.int/dragon/project\\_pdfs/Forest\\_Fire\\_Monitoring.pdf](http://earth.esa.int/dragon/project_pdfs/Forest_Fire_Monitoring.pdf)

Catalogues of Envisat available data can be found at:

<http://envisat.esa.int/services/catalogues.html>

Quick planning of acquisition for emergency services can be obtained by activating the “Space and Disasters Charter”. This is an International collaboration, created by ESA and CNES in 1999, to combine international satellite resources to assist participating rescue authorities and other civil protection agencies. ESA participates with the Charter together with Argentina, Canada, France, India, Japan and the U.S.A.

<http://www.disasterscharter.org/>

## **5.- FUTURE MISSIONS DATA**

The status of the Explorers mission is to be found in paper CGMS-XXXIII-ESA-WP-02. The most complete information about the Explorers mission can be found at <http://www.estec.esa.nl/explorer/>

From the four missions under implementation the SMOS (Soil Moisture and Ocean Salinity) mission may provide information about risky areas (for planning purposes, 50 Km resolution).

ESA started in 2001 studies for an Earth Watch programme called Fuegosat dedicated to “Fire risk management”. The Fuego programme focuses mostly on crisis management, as the other risk phases (anticipation, prevention, alert, post crisis-damage assessment) are served by existing or planned space assets. Such studies included the use of the German satellite BIRD in order to define a 3-band IR sensor specially devoted to monitor fires. A demonstration project, using MSG data, is underway.

This Fuego results will be fed into the GMES (Global Monitoring or the Environment and security) Space Component Program activities. The GMES missions, called “Sentinels” are aimed to provide data for operational services to cover a number of sectors. In particular, it has been proposed to deploy the payload defined under Fuego, and further enhanced/developed under the GMES programme and called for this GMES IR-element on one or more GMES missions. The other payloads carried by the GMES missions include

- C-band SAR
- a multi-spectral optical imager at medium resolution (10-30 m),
- an optical sensor suite operating at medium (250 m) to low (1000 m) spatial resolution , ranging from VIS to thermal IR part of the spectrum. It provides continuity to MERIS, AATSR and VGT sensors.
- a radar altimeter to provide continuity to ERS-1 and ERS-2

The main aim is to support operational monitoring of the oceans, including sea ice and coastal waters, to deliver land cover information, to monitor land deformation, ice and human activities.