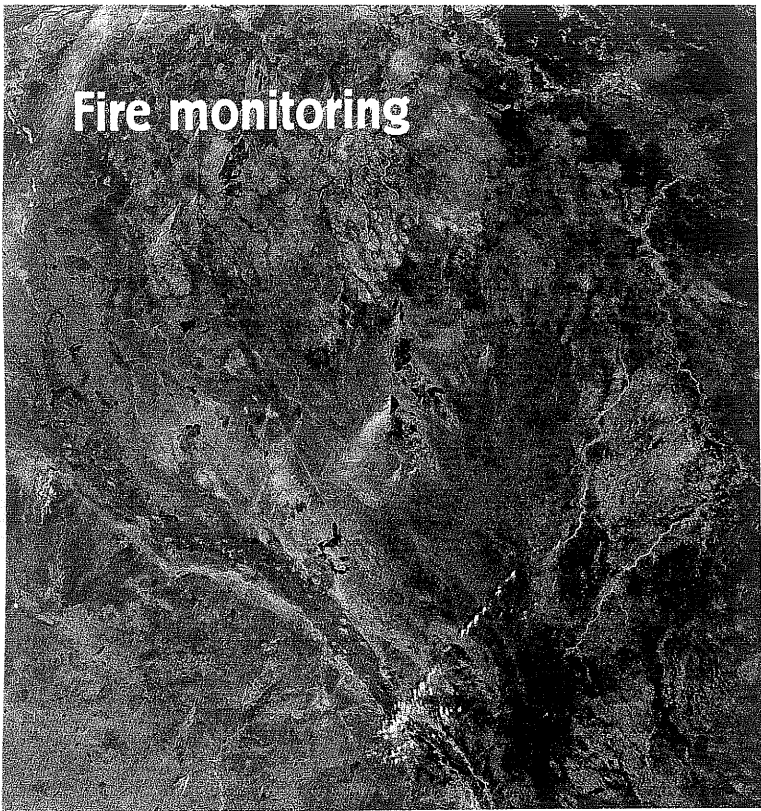


Fire monitoring



▲ Smoke plumes from burning fires over South Sudan. Agricultural fires in the region are common during the dry season beginning in November. The lush green area running from the top left to the bottom center of the image is the Sudd, one of Africa's largest floodplains, providing watering and feeding grounds for migratory fauna. Envisat/MERIS image © ESA 2006

Approximately 600 people die and over 4 000 are injured annually in South Africa as a result of fire, and these blazes cause more than 50 million Euros' worth of damage to property every year. Fire is responsible for many diseases related to constant smoke, like asthma. It also has an impact on climate change, land cover, the productivity of the vegetation and it opens up the landscape. When you fly a plane or you look at satellite images you can see a river of smoke coming from Angola, flowing over Zambia, Botswana and Mozambique. It stays all the year and can reach Australia. A dramatic event convinced me to devote my career to fire. In September 2001 a very big fire disaster killed 23 people in the Kruger Park. At that time we received NOAA satellite data. As I had to write the final report on this event, I mapped this data and could clearly see where the fire started, when it crossed the road, the change in wind direction that killed

people miles away from where it started. I understood that we could prevent this kind of disaster if we had a more proactive information system, integrating more data sources.

So in 2003 we started developing the Advanced Fire Information System (AFIS) as a service module of the Wide Area Monitoring Information System. WAMIS provides continuous data streams captured and processed by the South African National Space Agency (SANSA formerly CSIR — Satellite Application Centre) at Hartebeesthoek, near Pretoria, as well as by the Meraka Institute in Pretoria. It aims to deliver fire information products to researchers, Fire Protection Agencies and Disaster managers all over Southern Africa in support of decision-making in the monitoring of fires. It is the first near real time operational satellite fire monitoring system in Southern Africa. We were looking for financing and heard that Eskom, South Africa's biggest

power company, had problems with fire developing underneath their 28 000 km of transmission lines. The smoke ionises the air, creating a path through which electricity arcs to the ground. Wild land fires can then cause flashovers, which severely affect electricity supply to industries, causing important economic losses. We told Eskom: 'we can prove to you that we can do something and we will do it free for a start'.

The architecture of the system was originally based on the MODIS Rapid Response Web. But MODIS (Moderate Resolution Imaging Spectro Radiometer) only flies over for fifteen minutes twice a day. So it may miss many. So we decided to integrate data from METEOSAT Second Generation (MSG), which provided data every 15 minutes. At first, people were sceptical. But the CSIR SAC (Satellite Application Centre) in collaboration with David Taylor developed the MSG Fire Tracker software package and it worked perfectly: over the next year, the alert system detected 65% of all fires that caused outages. So Eskom agreed to assure the main funding for the development and implementation of AFIS.

Technically, one of the problems to solve is the difficulty to give access to the data online via Internet.

EUMETCast receiving station

So we look for an alternative system using EUMETCast, the dissemination mechanism for the EUMETSAT satellite. South Africa has about 20 receiving stations. We produce data and send it through Internet to EUMETSAT in Darmstadt (Germany), they send it to the satellite which distributes it to every EUMETCast receiving station. Within a minute or two we can distribute our information to all the South African countries. All it needs is a very low cost fixed antenna and with our application the client can display and analyse the information on his desktop.

The AMESD project provides the key function of both providing EUMETCast stations to all fire-related institutions in SADC and to provide additional funding to expand on the existing AFIS field terminal concept. It also provides key training to regional users. Concerning cooperation and partnerships, SAFNET, the Southern Africa Fire Network, of which I am one of the coordinators, brings together scientists from the region as well as from abroad to work on satellite-based



▲ Top, Philip Frost, near a satellite data receiving antenna at the CSIR of Pretoria, South Africa. Bottom left, his colleagues Bruno Meyer and Daniel Matsapola in the Satellite Application center at Hartebeesthoek. © J.D Daller/Suds-Concepts.

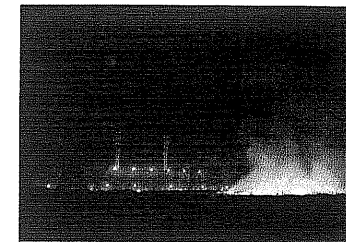
Bottom right, a fire danger billboard used to warn population. © All rights reserved

fire products that could provide a better understanding to countries governments on the importance of fire management. People cannot understand why 64% of the country burns every year in Angola, 58% in Zambia...

We are going to produce for each country 10 years of data on a DVD with vegetation time series, after fire time series, burned area and give it to fire specialists with the open source software. People will be able to analyse all that and produce maps and images they can show to politicians. This will help their country for better fire management and, globally, adopt sustainable development policies. More globally, concerning disaster management, the CSIR has promoted the data democracy initiative since 2008, under the responsibility of my colleague Daniel Matsapola. It is based on four pillars: data access, software and tools, data dissemination and capacity development. The first output of data democracy is the FUNDISA (teach in local language) disc. It is a hard disc containing data that we now receive free

from the USA, Japan, China and Brazil and software that we distribute freely to local tertiary education institutions. European participation has not yet materialised due to budget reasons. But, for the SADC region, data democracy is now supported through AMESD for dissemination of data and training. ●

Philip Frost
Senior scientist
CSIR Meraka Institute, Pretoria
South Africa



▲ South African power company conducts controlled burns at night to clear brush near the lines. © Hein Vosloo/Eskom



▲ Hot fire training at the E Centre, City of Johannesburg. © Jan Liebenberg/Firefighter N

Education training

Many of the fires in Africa are caused by as harvesting of crop, preparing fire breaks, and arson. Cultural belief that good grass rains are especially ev areas. Fires are also seen bees, killing mice and very damaging. Now, this information are the people and fire protect Companies like Eskom own fire fighting teams. fire is a government-ba the idea to empower ar without jobs, previous communities, specially fighters.

Training and fire fight of organization. South ranges from Mediter south-western corner the interior plateau, in the northeast. So w seasons: the dry sum the Western Cape, and months throughout t country. Trainers and f have to keep moving all. The biggest thing is ed danger of fires. So, fo have big billboards w and red colours for fire in the morning, someo indicating the level of th kids learn "on those da go for fire, because it's