



## Forest Fire Monitoring and Carbon Emissions Reporting Using Satellite Data

TJ Lynham (1), R Landry (2), M Wooster (3), DJ McRae (1), and J Ji-Zong (1)

(1) Natural Resources Canada, Canadian Forest Service, 1219 Queen St. E., Sault Ste. Marie ON P6A 2E5 (email)  
[tlynham@nrcan.gc.ca](mailto:tlynham@nrcan.gc.ca) (fax) 1-705-541-5701, (2) Natural Resources Canada, Canada Centre for Remote Sensing, 580 Booth St., Ottawa, ON K1A 0Y7. , (3) King's College London, Environmental Monitoring & Modelling Research Group, London UK WC2R 2LS

The Canadian Space Agency (CSA) and Natural Resources Canada (NRCan) have cooperated to develop of a new national Fire Monitoring, Accounting and Reporting System (FireMARS). Primarily, it is used to report on annual carbon emissions from Canadian wildfires. FireMARS also responds to public health and safety issues and supports Canada's policy with respect to the United Nations Framework Convention on Climate Change (UNFCCC) and other international reporting obligations.

FireMARS is the result of collaboration between leading Canadian remote sensing and fire science specialists. Canada is the first nation to have a nationally consistent, internationally defensible, timely, reporting system for annual carbon emissions from forest fires. Parts of the system use satellites to detect high temperature events called "hotspots". Hotspot information allows forest managers to monitor wildfires by providing tactical information on fire locations, size, and energy of the active fire front. These hotspots are critical for the functioning of FireMARS. Meanwhile, new satellite technology may improve the functioning of FireMARS and give Canadian fire managers a strategic advantage when protecting people, managing natural resources, and reporting on carbon emissions. NRCan is collaborating with the Canadian Space Agency (CSA) and the Argentine Space Agency (CONAE) to build an experimental thermal infra-red instrument called the New Infra-Red Sensor Technology (NIRST). It will be launched in May 2010 as part of a USA/Argentine satellite mission called AQUARIUS. NIRST will be used for locating fire hotspots. Canadian wildfire information systems already use hotspot data from several thermal IR satellites; however, the data from NIRST will be the highest resolution (350 m) to date and will allow Canadian fire managers to monitor fires as small as 20 m by 20 m.

NIRST will lead to improved carbon emissions estimates from FireMARS because of the higher resolution data and the ability to point the satellite at wide areas of concern. NIRST will provide additional data for collaborative research between NRCan and King's College London, UK to find a method to use satellites to make direct estimates of wildfire fuel consumption. This is done by measuring the fire radiative energy (FRE) that is emitted from fires. In turn, FRE will provide better estimates of carbon emissions from fires. As a research instrument, NIRST paves the way for a Canadian solution to a constellation of operational, low cost satellites to be used for fire monitoring and fire carbon emissions reporting.