

Real Time Forest Fire Fighting through the Integration of Infrared Video, GPS and INS Systems

Naser EL-SHEIMY and D. Bruce WRIGHT, Canada

Key words:

SUMMARY

A system that integrates imaging sensors (RGB Video and Thermal Infrared Cameras) with real-time navigation technologies (Wide Area Differential GPS (WADGPS) and an Inertial Navigation System (INS)) has been under development to help reduce the economic losses due to forest fires. The use of a thermal imager, which sense the heat emitted in the form of infrared radiation, enables early detection and location of forest fires that could not be sensed by the human eye. In addition, the cameras will provide accurate images of the fire in reduced visibility due to haze, smoke or darkness.

This paper discusses some of the issues involved in developing a true real time system for the identification and location of forest fire hot spots. An application specific real time definition is given, with a more detailed explanation of what this means from both hardware and software perspectives. Software has been developed that allowed for the collection of data over controlled burns. Specific issues encountered while developing real time software on a Windows 2000 platform, and field use of this software, are mentioned. What "Thermal Imaging" means is presented, as well as some of the specific issues related to the identification, extraction, and tracking of forest fire hot spots. What direct geo-referencing is and the need for it in this system is discussed, as well as some of the issues encountered while implementing the real time direct geo-referencing of the video. Finally a preliminary evaluation of the potential triangulation accuracy of the hot spots in real time is shown.

CONTACTS

Dr. Naser El-Sheimy and D. Bruce Wright
Department of Geomatics Engineering
The University of Calgary
2500 University Dr. N.W.
Calgary, Alberta
CANADA T2N 1N4
Tel. + 1 403 220 7587
Fax + 1 403 284-1980
Email: naser@geomatics.ucalgary.ca