

Utilization of Satellite Surveillance System for Natural (Steppe) Wildfires in the Province of Qaraghandy

Kazakhstan III

In 2004, the Republic of Kazakhstan Emergency Response Agency sent a letter to the provincial government of Qaraghandy urging the province to study the feasibility of applying a flood/fire conditions satellite surveillance system within the province. The Qaraghandy Emergency Response Bureau drew up a plan in response to the letter and signed a contract with the Space Research Institute of the Kazakhstan Ministry of Education, Culture, Sports, Science and Technology to monitor trends in flood conditions, high-temperature fire sources, and total area destroyed by fire. Under this contract, the total budget of 21 million tange is scheduled to grow each year (including 2007).

This fire satellite surveillance system was designed to discover fires and pinpoint their source at an early stage, predict the fire development route, evaluate the latent dangers of fire, specify the area affected by fire, and evaluate the extent of injury and damage. Based on NOAA AVHRR nighttime infrared photos (resolution of 1.1km) and EOS-AM Terra MODIS nighttime photos (resolution of 250 - 1000m), this system contains a fire source early detection GIS (Ground Information System) based on remote detection data (Figure 1).

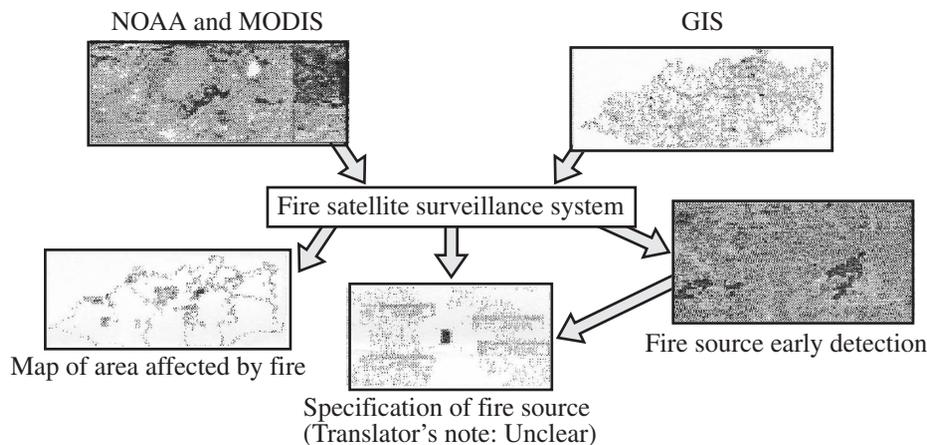


Figure 1 Block Diagram of Fire Satellite Surveillance System

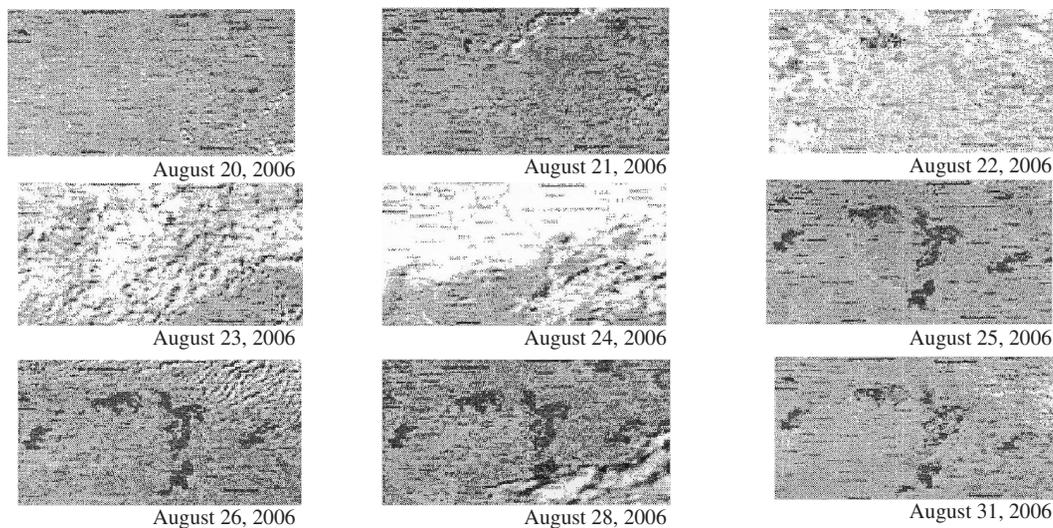
The features of the province of Qaraghandy are not only its large size (428,000 square kilometers) and large rice cultivation area, but also its numerous coniferous forest zones, which are unique, environmentally protected areas. As a result, measures will have to be devised to combat steppe fires as well as emergency measures that will provide maximum reduction of risk to forests and agricultural fields from steppe fires.

In connection with this, a Qaraghandy provincial government ordinance entitled “Measures for Securing Safety and Fighting Natural Wildfires in the Province of Qaraghandy” has recently moved into the implementation stage, with the aim of preventing steppe fires within the province. What is more, the province has implemented the provincial emergency response committee chairman’s message for the introduction of various action organizations that will operate the province’s emergency situation prevention/response system during the high-risk fire season. According to this system, the Space Research Institute of the Kazakhstan Ministry of Education, Culture, Sports, Science and Technology will send out data regarding high-temperature fire sources twice a day, and the Emergency Response Bureau will analyze these data and advise rural government offices and fire departments regarding its findings. The rural government office will then notify the nearest farming community in the pertinent region, and the fire information will be confirmed regarding whether it is correct or not. If fire is confirmed, a volunteer firefighting team will be immediately dispatched and the source of the fire pinpointed, and if

the community does not have the means to fight a fire, the help of the nearest Kazakhstan Emergency Response Ministry Fire Department will be enlisted.

Actual cases have demonstrated that steppe fires have many sources. Fire sources can be in either mountainous regions or plains. The main cause of fires during the satellite surveillance period is the hot, dry weather of August and September (a long period without rain). The number of fires during this period increases dramatically. And the terrain, which is a complex topography of mountains and hills, makes it even more difficult to fight fires. Even extinguished fires often flare up again. This is due not only to the burning of dry vegetation on the ground but also to long periods of scorching heat and strong winds, which stoke the latent heat in roots and composted material. And because the locations are far from villages and have no early reporting systems, they lack the ability to suitably monitor fire conditions and respond quickly. As shown by many past occurrences, steppe fires grow very quickly in a short time, and they jump into forested areas and inflict irreparable harm on natural parks. Thanks to the satellite surveillance system, however, at present the source of fires is detected early, the required data are reported to the related control agencies, decisions to mobilize personnel and equipment are handed down in a timely manner, developments are observed around the clock, data from satellites are constantly studied and compared, and a complete picture of the state of fires and response measures can be obtained.

Trends in Steppe Fires (Grass Fires) in Rural Areas



Analysis results of natural wildfires based on satellite surveillance data of fire sources show that in 2006, at the start of the high-risk fire season, there were about 1,000 fires blazing in the steppes (1,200 fires in 2004 and 1,100 fires in 2005), and that the total area damaged by fire dropped to 2,436,600 hectares (from 4,500,000 hectares in 2004 and 4,334,900 hectares in 2005).

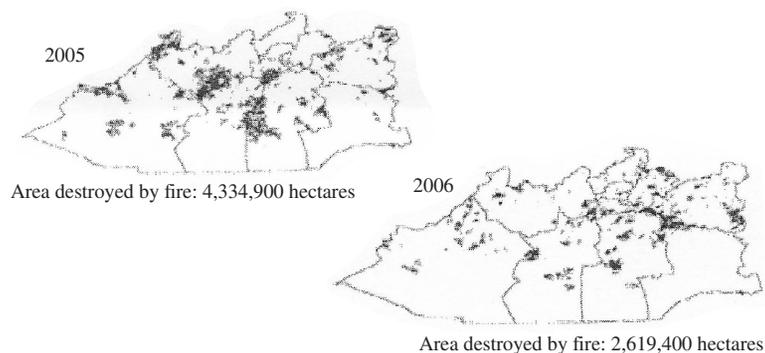


Figure 2 Trends in Area Damaged by Fire in the Province of Qaraghandy from 2005 to 2006

As shown by analysis results of area destroyed by fire in the province of Qaraghandy, utilization of the satellite surveillance system played a large role in reducing the total area of damage due to fire in the province of Qaraghandy, and this lead to other benefits, such as the preservation of pastureland and corn crops and reduced soil erosion.

In addition, certain fire occurrence principles emerged from analyses of areas that were not damaged by fire last year; namely, the main area not damaged by fire was in central Kazakhstan, where new plant growth had a high water content, so fewer fires flared up in withered grass.

Contact: Republic of Kazakhstan Emergency Response Ministry, Qaraghandy Provincial Emergency Response Bureau, 100027

4 Mustafin Street, Qaraghandy City

Phone: 8 (3212) 511240

Fax: 512107

E-mail: dchs_krg@mail.ru