Literature Survey

1. EARLY FOREST FIRE DETECTION USING UNMANNED AERIAL VEHICLES(

georgi hristoy department of telecommunications university of ruse “angel kanchev”use, bulgaria ghristov@uni-ruse.bg diyana kinaneva department of telecommunicationsuniversity of ruse “angel kanchev”ruse, bulgaria dkyuchukova@uni-ruse.bg)

The recent advances in the development of the unmanned aerial vehicles (UAVs) provided the possibility to use them in the fight against the forest fires as a replacement of the piloted aicrafts. Over the years different types and numbers of UAVs have been used and evaluated as solutions for early forest fire detection.

The most basic configuration of the system involves the use of a network of ground cameras, which provide constant observation of the targeted forest areas. The used cameras within the project are dual lens and provide both standard and IR images. The challenges here are the actual locations where the cameras will be installed, as the planned areas involve territories within national parks and within Natura 2000 sites.Another challenge is the fact that the camera-based systems have proven themselves to present large number of false-positive alerts.

The dimensions of the aircraft are 3000 mm wingspan, 2300 mm length and 525 mm height and its maximum take-off weight is 16 kg, which allows it to carry several different types of payload simultaneously. Its flight time is from 8 to 10 hours with average sized payload, which allows it to be used for long observations of the targeted forest areas.

Once the UAV detects increased temperature levels, it will immediately raise an alarm and will send the GPS coordinates of the area to its base station. The drone will however not stop its observation functions and will continue to patrol over the park.

The use of both rotary wing UAVs will provide the possibility for close inspection of the potential forest fire location and to perform the initial assessment of the situation.

2. EARLY FOREST FIRE DETECTION USING LORAWAN SENSOR NETWORKS AND DEVICES (

Jordan Raychev Department of Telecommunications University of Ruse “Angel Kanchev”Ruse, Bulgaria jraychev@uni-ruse.bg
Plamen Zahariev Department of Telecommunications University of Ruse “Angel Kanchev”use, Bulgaria pzahariev@uni-ruse.bg)

The Long Range (LoRa) digital wireless communication technology and the closely related LoRaWAN networks are known for their long range communication capabilities and are extremely suitable for sensor and telemetry applications. The improved range makes these network also suitable for many new applications, including forest fire detection, environmental sensing and long term air-quality analysis.

The gateways were able to receive data from more than 6000 LoRaWAN devices. Driven by the ambition to fully utilize this network, several students, under the supervision of their university professors, started the development of small-sized sensor stations equipped with sensors for temperature, humidity and atmospheric pressure . A further improvement and upgrade of these stations is underway and will provide them with sensors for analysis of different gasses and sensors for measurement of particle matter. This upgrade will make the stations suitable for both early detection of the forest fires and for post-fire damage assessment in terms of the released pollutants in the atmosphere.

3. Integrated Satellite System for Fire Detection and Prioritization

(Sunil Giuseppe MazzeoInstitute of Methodologies for Environmental Analysis (IMAA), National Research Council (CNR), Tito Scalo, 85050 Potenza, Italy)

Several studies have shown the relevance of satellite systems in detecting, monitoring, and characterizing fire events as support to fire management activities. On the other hand, upto now, only a few satellite-based platforms provide immediately and easily usable information about events in progress, in terms of both hotspots, which identify and localize active fires, and the danger conditions of the affected area. However, this kind of information is usually provided through separated layers, without any synthetic indicator which, indeed, could be helpful, if timely provided, for planning the priority of the intervention of firefighting resources in case of concurrent fires. In this study, we try to fill these gaps by presenting an Integrated Satellite System (ISS) for fire detection and prioritization, mainly based on the Robust Satellite Techniques (RST), and the Fire Danger Dynamic Index (FDDI), an original re-structuration of the Índice Combinado de Risco de Incêndio Florestal (ICRIF), for the first time presented here. The system, using Moderate Resolution Imaging Spectroradiometer (MODIS), Advanced Very High Resolution Radiometer (AVHRR), and Spinning Enhanced Visible and InfraRed Imager (SEVIRI) data, provides near real-time integrated information about both the fire presence and danger over the affected area. These satellite-based products are generated in common formats, ready to be ingested in Geographic Information System (GIS) technologies. Results shown and discussed here, on the occasion of concurrent winter and summer fires in Italy, in agreement with information from independent sources, demonstrate that the ISS system, operating at a regional/national scale, may provide an important contribution to fire prioritization. This may result in the mitigation of fire impact in populated areas, infrastructures, andthe environment.

4. Forest Fire Detection using Wireless Sensor Network

(Gomathi1, K. Vennila2, M. Sathyanantp, B. Shriaarthi4, S. Selvarasu5,1, Assistant Professor, Electronics and Communication Engineering, Knowledge Institute of Technology. 2, 3, 4, 5, Bachelor of Electronics and Communication Engineering, Knowledge Institute of Technology.Salem, Tamilnadu, India.)

we have presented forest fire detection in zigbee projects that use wireless sensor networks in their architectures to measure and transferring useful data. The role of a sensor node is to sense the environment, transferring and exchange sensory data with other nodes in the area. The industrial application of wireless sensor networks are in digital transmission to monitor temperature and humidity in the forest in a more timely and precise way, we pointed out unique advantages of safety in data transmission, flexibility in building the network, and low cost and energy requirements for a forest fire monitoring system based on a Zigbee wireless sensor technology that we designed.