INTERNET OF THINGS (IOT) INITIATIVE IN MALAYSIA FOR FOREST FIRE MONITORING

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In the support of:

▶ INTRODUCTION

IoT has a great potential to be implemented in Malaysia as many researchers apply this technology in their research. One of the biggest potentials of IoT implementation is in the peat fire management in Southeast Asia countries such as Malaysia, Indonesia and Brunei. INTROP, Faculty of Engineering and MIMOS Berhad research team has proposed an IoT system to be implemented in Raja Musa Forest Reserve (RMFR), Bestari Jaya, Selangor. The proposal entitled "NAPC: Networked ASEAN Peat Swamp Forest Communities" was proposed to National Institute of Information and Communication Technology (NICT) Japan. In 2018, approval letter was received by ASEAN IVO Steering Committee and this project was listed under ASEAN IVO 2018 program. The fund was granted in January 2018 and initiated on 1st July in the same year. The duration given to the project is 24 months. The first face-to-face (F2F) meeting was successfully conducted on 13 to 14 Aug 2018 at La Apparenti, UPM followed by 2 days of pre-visit to RMFR (Figure 1).

Figure 1.0 A field visits to Raja Musa Forest Reserve (Education Centre) was conducted in August 2018 with NICT research team.

▶ NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY (NICT)

NICT or National Institute of Information and Communications Technology (NICT) is one of Japan's sole National Research and Development Agency specializing in the field of information and communications technology. The institute is charged with promoting ICT sector as well as research and development in ICT, which drives economic growth and creates an affluent, safe and secure society. Further details of the project can be found in NICT website.

▶ STUDY SITE

The project is a jointly conducted with other ASEAN countries as described in the table below. Each of the countries chosen suitable area to test this system within their forest fire issue. Overview of Raja Musa Forest Reserve, Selangor located in Peninsular Malaysia was chosen as a tested site for Malaysia team (Figure 2.0).

Table 1.0 ASEAN Countries involve in this project and location of the research areas.

Country	Study Site	Location/District
Malaysia	Raja Musa Forest Reserve	Selangor
Brunei	Badas Peat Dome	Brunei
Vietnam	Ca Mau Peat Swamp	U Minh Ha
Indonesia	Sebagau Park	Central Kalimantan

Figure 2.0 Overview of the study site for the IOT implementation.

▶ **IOT SYSTEMS**

The study employed climatological sensors for acquiring climatic condition of the peat lands for forest fire monitoring activity. The tower mounted with several sensors namely, relative humidity, air temperature, light intensity, and camera. At the same time water level, soil moisture, temperature and other related to peat swamp environmental characteristics sensors were also included and installed at the peat land. As we know, during January to April every year ASEAN countries were triggered by forest fire event. This type of data is very important for this area particularly during drying period.

Data is collected by the sensors, stored and transfers to server to be utilized by users which will be identified later. For this study the user can be Forestry Department, BOMBA

and villagers. Based on identified cloud server data will be received and stored by the manager, which then waiting for downloading for analytical usage. The proposed systems is showed in Figure 3.0.

▶ **EXPECTED OUT**

The project enables connectivity for IoT-based monitoring system in peat swamp forest areas in all the ASEAN countries involved. The benefits are namely:

1) To enable the forest management community and researchers to understand more about the peat management issues and ecosystem;

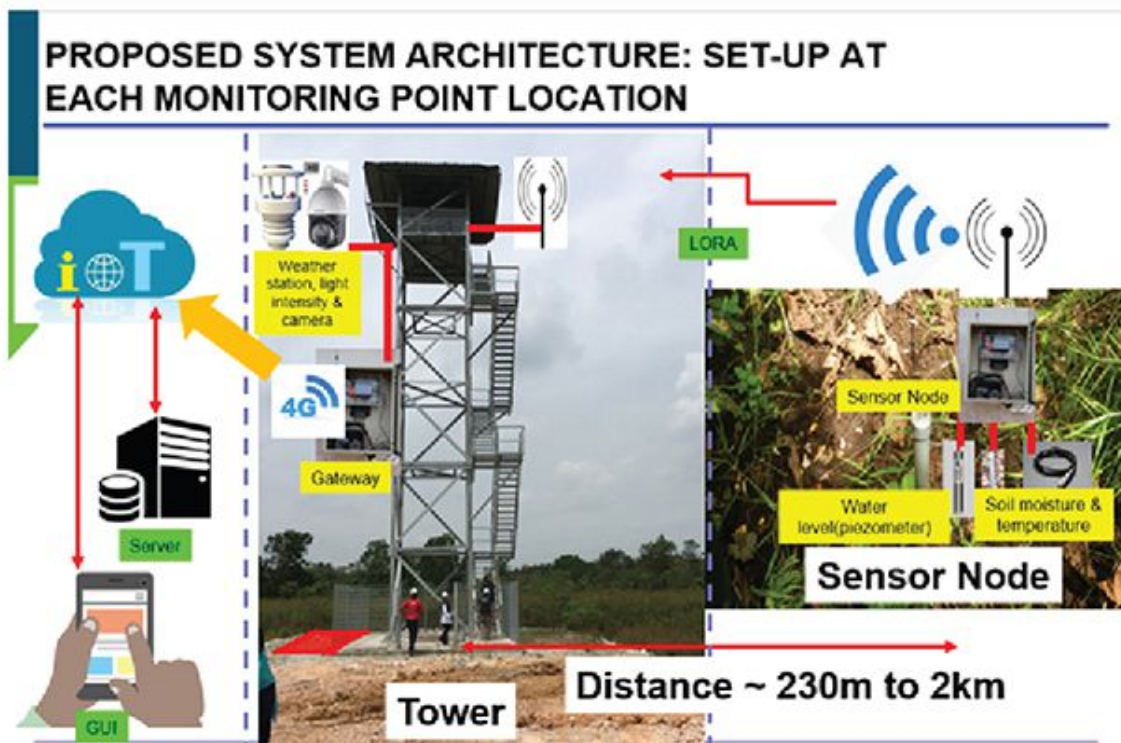2) To serve as pilot projects for IoT-based monitoring systems for Malaysia and other ASEAN countries participated.

Figure 3.0 Proposed systems at the peat land