

# Development and Installation of Network Connected Meteorological Sensors in the Shiretoko World Natural Heritage region

Kazutaka Tateyama<sup>1</sup> and Hiroshi Ohno<sup>1</sup>

<sup>1</sup>*School of Earth, and Environmental Engineering, Kitami Institute of Technology*

A new network device which can be connected to multiple communication has been developed in collaboration research among Kitami Institute of Technology, Koken Engineering Co., Ltd. And Syscon Inc. This device has a router for LTE (4G) line of mobile phone and communication unit for LPWA (Low Power Wide Area). The resistance ability against low temperature and maximum communication distance of this network device were verified in the Shari area..

Figure 1 indicates the location map of network connected AWS (Automatic Weather Station) and thermometers at the Cape of Shiretoko and Shiretoko mountain range. VAISALA WXT536 and Onset HOBO MX2301A were used as AWS and thermometer, respectively. LPWA has an advantage that one master unit can communicate with multiple slave units and send data to the server via LTE line. Figure 2 shows picture of WXT536 installed at the Cape Shiretoko. WXT536 can measure atmospheric pressure, air temperature, humidity, precipitation, wind speed and direction. Observation data is recorded once every 10 minutes and send from the slave unit to the master unit via LPWA and transmitted to server via LTE line once an hour.

We use "mobile SINET" which provided by the National Institute of Informatics as LTE line. Observation Data is collected at the server in Kitami Institute of Technology and sent to Data Integration and Analysis System (DIAS) which funded by the Ministry of Education, Culture, Sports, Science and Technology. Observation data can be viewed and obtained on the "Shiretoko Portal" of the DIAS application.

Since this technology developed in this study enables connections between observation equipments to the network using LPWA even outside the communication area of mobile phones, it can be expected to be used in areas where networks are not established, such as polar regions.



Figure 2. Picture of AWS (WXT536) installed at the Cape Shiretoko

Figure 1. Location map of network connected AWS and thermometers in the Shiretoko World Natural Heritage region. Background image is provided from Google Earth (Landsat/Copernicus image).