

## mart remote-sensing by super constellation with micro-satellites

Yukihiro Takahashi<sup>1\*</sup>

<sup>1</sup>Space Mission Center, Hokkaido University

Micro-satellite with a weight of 50-100 kg has various merits compared to middle and large sized satellite, that is, 1) low cost fabrication compared to middle or large sized satellite, namely, few M EUR including BUS and mission payloads. The launch cost will be 1-2 M EUR as piggyback, 2) quick fabrication: about one or two years for flight model would be sufficient, enabling application of the latest technologies, 3) on-demand operation, taking detail information at a point of interest, and 4) the low cost and quick fabrication make us possible to launch not a small number of satellites, which is called as constellation flight.

The constellation realizes a frequent monitoring from the low earth orbit. If we inserted 48 satellites into proper orbits, we can watch any location in the world every 7-8 min, which could be dedicated efficiently to time-variable phenomena, such as flood, thunderstorm, forest fire and Tsunami. Another important aspect of micro-satellite is the advanced technology of payload sensors. LCTF (liquid crystal tunable filter) enables the super multi-color imaging at several hundreds of wavelengths without image distortion due to the unstable attitude of spacecraft. Bolometer array sensor make it possible to take image in mid-infrared band range around 10 um without cooling system, meaning light weight and less power consumption.

We would suggest the establishment of the Smart Remote-Sensing with super micro-satellite constellation, making use of advanced sensors, under collaboration among Asian countries in the near future.

Keywords: smart remote-sensing, super constellation, micro-satellite

## Airborne LiDAR bathymetry survey in Japanese Pacific coast in 2012

Tsuneo Matsunaga<sup>1\*</sup>, Satoshi Ishiguro<sup>1</sup>, YAMANO, Hiroya<sup>1</sup>, OGUMA, Hiroyuki<sup>1</sup>

<sup>1</sup>National Institute for Environmental Studies

In 2012, Airborne lidar bathymetry survey in Japanese Pacific coast was planned and partially conducted at several selected sites.

The objective of this survey is to acquire detailed bathymetry data in Japanese Pacific coast which are important for Tsunami simulation as well as monitoring of coastal environment and ecosystem heavily damaged by the Great East Japan Earthquake occurred in March 2011.

An airborne lidar bathymetry system, Fugro LADS Mk. III, was brought to Japan for the first time in October 2012. Data acquisition flights over several coastal areas in Hokkaido, Tohoku, Mie, and Tokushima were conducted in November and December, 2012. Obtained data are currently being calibrated and evaluated.

In this presentation, the outline of the survey including instrument specifications, mapping areas, and the survey schedule as well as lidar data acquired in 2012 will be presented.

Keywords: Airborne LiDAR

## Application and possibility to the disaster prevention of the water level sensor IC tags

Osamu Saitou<sup>1\*</sup>, Yuji Kuwabara<sup>2</sup>

<sup>1</sup>Center for Disaster Prevention and Security, IBARAKI University, <sup>2</sup>Center for Water Environment Studies, IBARAKI University

The visualization of the environmental information is important from the viewpoint of disaster prevention to keep the security of inhabitants. By using small and cheap sensor IC tags, if we located a water level sensor at many points, they were effective for monitoring of the rainfall flood and the swollen river, and official announcement of the refuge information. Ibaraki University department of engineering has attached a water level sensor in Hitachi City, Ibaraki prefecture from July, 2012. In addition, we build the real time rainfall flooding monitoring system experimentally and watch water level in the case of rain. Water level monitoring of the sea level of Pacific coastal of Tohoku area is possible by applying this system where we had damaged by earthquake disaster from the Great East Japan Earthquake.

Keywords: sensor IC tag, sensor network, water level sensor

## Research on the accuracy control of DSM estimated from PALSAR-data

Sohei Yuki<sup>1\*</sup>, Yuji Kuwahara<sup>2</sup>

<sup>1</sup>Major in Urban and Civil Engineering Graduate School of Science Engineering, Ibaraki University, <sup>2</sup>Department of Urban and Civil engineering, school of Engineering, Ibaraki University

Affected by global warming, it is estimated that the sea level is rising up to 59cm by the end of this century. For this reason, it is necessary to create especially the elevation data of lowlands along the sea. In this research, elevation data was created in accordance with two or more DSM creation methods. And, we examined the comparison method of DEM and DSM accuracy generated by each method and compared the accuracy in the same field of the DEM and DSM generated by GSI-10m, LP, ALOS/PRISIM, and ALOS/PALSAR. In addition, we examined the comparison method of PALSAR-data targeted the Marshall Islands.

Keywords: DEM, DSM, precision criterion

## Generation of Vulnerability Assessment data about Water-related Disaster using ALOS/AVNIR-2 and PRISM

Toshifumi Nakagori<sup>1\*</sup>, TABAYASHI, Yu<sup>2</sup>, Yuji Kuwahara<sup>3</sup>, SAITO, Osamu<sup>4</sup>, YASUHARA, Kazuya<sup>5</sup>

<sup>1</sup>Graduate School of Science and Engineering, Ibaraki University, <sup>2</sup>Terrestrial Environment Research Center, Tsukuba University, <sup>3</sup>Center for Water Environment Studies, Ibaraki University, <sup>4</sup>Center for Intellectual Disaster Prevention Studies, Ibaraki University, <sup>5</sup>Institute for Global Change Adaptation Science, Ibaraki University

According to the Fourth Assessment Report of the IPCC, due to the climate change, it is assumed that the flood damages such as typhoon will be increased at lowland area. In order to decrease storm and flood damages, it is important to unify the measures over land use, environmental plan, and traffic environment. In this research, we focused on the Hai Hau coast that is a downstream of Red-River, Vietnam. Around the Hai Hau coast, vast lowland areas are distributed. Therefore, in this research, we mapped the vulnerability assessment to the river flood for Hai Hau coast and its vicinity. Then, we mapped a salt farm, a shrimp farm and cultivated land using ALOS/AVNIR-2 and ALOS/PRISM in order to grasp the vulnerability assessment of the cultivated land received from overtopping waves of the coast. The result of this study, we generated the geographic information for water-related disaster, and considered the relation with present condition of land-use.

Keywords: climate change, satellite image, flood simulation, remote sensing