TOWARDS REMOTE SENSING DATA CLOUD

KUMAGAI, H., MURATA T.K.

National Institute of Information and Communications Technology

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ABSTRACT:

Remote sensing technology to monitor the global environment has been developed well in these two decades. Earth observation by satellites is being made by means of electromagnetic waves over wide wavelength spectra, continuously. This means that the monitoring networks of the entire globe have been achieved in some sense. This situation enables us to use multi-sensor and multi-satellite data under regular basis, which helps provide us of new tools to obtain more complete view of the earth and to study more complicated processes in earth environment issues than ever did.

Examples of successful multi-sensory analysis are the combined sensor monitoring with radiowave and optical sensors on the earth surface with vegetation and urban land use or sea/ice signature, combined passive and active sensor data both with radiowaves and optical lights for cloud/aerosol and precipitation in the atmosphere, and combined optical and radiowave sensor data analysis of atmospheric trace gases.

NICT (National Institute of Information and Communications Technology) has been working actively to develop new remote sensing technology and their data processing algorithms mostly in collaboration with other institutions. NICT developed airborne SAR (synthetic aperture radar) nicknamed as PiSAR and PiSAR2. Latest upgraded system of PiSAR2 has excellent performance in spatial resolution of less than 1 m. NICT has also been working with satellite borne precipitation radars; NICT was involved in the first spaceborne rain radar projects of TRMM, in which the design study, instrument development, and data algorithms study for the PR (Precipitation Radar) were conducted. TRMM was launched in 1997 and surprisingly PR is still working healthy. Subsequently, Ka-band engineering model of DPR for GMP mission and subsystems of CPR (Cloud Profiling Radar) for EarthCARE (Japan-Europe joint mission to be launched in 2013) has been conducted. SMILES (Super conducting sub-Millimeter Limb Emission Sounder) is ongoing mission in operation being attached to the JEM Exposed Facility of ISS, which was developed jointly with JAXA. The super conducting SIS mixer on SMILES is working well with the first onboard mechanical refrigerator. SMILES is operated with highest sensitivity than ever attained and to detect various trace gases in the stratosphere relating the ozone chemistry.

Enhancement in the multi-sensor data fusion capability and also fusion of satellite data with ground based sensor data will be realized through broadband data networks and visualization techniques. Remote sensing data Cloud concept is a proposed platform to realize the data fusion as well as data visualization. A testbed equipped with broadband networks such as JGN2 upgraded system and virtual networking function is needed to demonstrate and evaluate the Cloud capability. On demand sensor data exchange and data visualization tool as TDW (tiled display wall) of great precision will be one of the system goals. The data Cloud will help accelerate integrated study between observation data and simulation/modeling data. An approach towards the remote sensing data Cloud will be introduced in the presentation.