



"Calibration" system for spectral measurements and its experimental results

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"Calibration" system has been developed at A. N. Sevchenko Research Institute of Applied Physical Problems of the Belarusian State University. It was designed for measuring the characteristics of spectral reflectance of all types of natural surfaces (test sites) in ground conditions or on board of aircraft carriers and has the following components:

- Photospectroradiometer (PhSR) of high resolution with a range of 400-900 nm, equipped with a digital time-lapse video system;
- Two-channel modular spectroradiometer (TMS) with a range of 400-900 nm, designed for simultaneous measurements of reflected light brightness of the underlying surface and the incident radiation from the upper hemisphere;
- Two portable spectroradiometers (PSR-700 and PSR-1300) with a spectral range 800-1500 nm; 1200-2500 nm;
- Scanning solar spectropolarimeter (SSP-600) with a range of 350-950 nm for measurements of direct sunlight and scattered by the atmosphere at different angles;

"Calibration" system provides spectral resolution of 5.2 nm in a range of 400-900 nm, 10 nm in a range of 800-1500 nm and 15 nm in a range of 1200-2500 nm. Measurements of the optical characteristics of solar radiation (for determining parameters of the atmosphere) and that of underlying surface are synchronous. There is also a set of special nozzles for measurements of spectral brightness coefficients, polarization characteristics and spectral albedo. Spectra and images are geotagged to the navigation data (time, GPS).

For the measurements of spectral reflection dependencies within "Monitoring-SG" framework expeditions to the Kuril Islands, Kursk aerospace test site and Kamchatka Peninsula were conducted in 2015 and 2016. The spectra of different underlying surfaces have been obtained: soils, plants and water objects, sedimentary and volcanic rocks. These surveys are a valuable material for further researches and selection of test facilities for flight calibration of space imaging systems. Information obtained will be also included in a database of spectral samples created in the Institute of Geography of Russian Academy of Sciences.