

OCEAN OPTICS XXIV

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<https://oceanopticsconference.org>

Monday, October 8

Poster Session 1

16:00–18:00

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WATERSAT IMAGING SPECTROMETER EXPERIMENT (WISE) FOR CANADIAN MICROSATELLITE MISSION

The Canadian Space Agency (CSA) undertook a pre-Phase A concept study for a near-UV-visible-near-IR hyperspectral microsatellite mission, referred to as the WaterSat, for monitoring coastal oceans, estuaries and inland water bodies. To help advance the WaterSat mission study and elevate its technology readiness level, CSA awarded a contract to ITRES to design and build an airborne WaterSat Imaging Spectrometer Experiment (WISE) instrument. The WISE instrument was built and commissioned in early-2018. Comprehensive lab and airborne tests validated WISE's instrument design, robustness and suitability for science applications in coastal oceans, estuaries and inland water bodies. The WISE instrument consists of three key subsystems: 1. fore-optics; 2. imaging spectrometer; 3. CCD with its readout, control electronics and software. WISE's fore-optics is a novel wide-angle, diffraction-limited two-mirror telecentric system. WISE's imaging spectrometer is an innovative compact modified-Dyson design based on an ITRES' patent technology. WISE also incorporates a custom-designed high-speed low-noise CCD with superb sensitivity and dynamic range. This combination yields a high-performance hyperspectral imaging system with excellent SNR. Both spatial and spectral distortions are less than 0.1 pixel. The WISE instrument acquires 1500 spatial pixels spanning a 39.46 degree-FOV, up to 288 spectral bands covering a spectral range of 358nm to 992nm with a 2.20nm/pixel average dispersion. It occupies a volume of less than 0.06m³, weighs less than 10kg and consumes less than 70W. In addition to supporting CSA's WaterSat mission study, WISE's technological innovations will also support CSA's Coastal Ocean Color Imager (COCI) joint feasibility study with NASA and NRL.

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