A Canadian Coastal Ocean Color Imager Feasibility Study

* Martin BERGERON¹, Shen-En QIAN¹, Paul BRIAND¹, Jamie SEVIGNY¹, Bernard GRIFFITH¹, Michael FURLONG², George FOURNIER³, Jean-Pierre ARDOUIN³

1. Canadian Space Agency, 6767 route de l’aéroport, Longueuil, Canada, J3Y 8Y9
2. Fisheries and Oceans Canada, 200 Kent Street, Ottawa, Ontario, Canada
3. Defence Research and Development Canada, 2459 route de la Bravoure, Québec, Québec

* martin.bergeron@canada.ca

ABSTRACT

The Canadian Space Agency (CSA), in partnership with the U.S. Naval Research Laboratory (NRL), the National Aeronautics and Space Administration (NASA), Canadian Government Departments such as the Department of Fisheries and Oceans (DFO), Defense Research and Development Canada (DRDC), Environment and Climate Change Canada (ECCC), Public Health Agency Canada (PHAC), Agriculture and Agri-Food Canada (AAFC), and Natural Resource Canada (NRCan) with support from the academic community (U. Dalhousie, UQAR, U. Laval, U. Sherbrooke, others) have completed a joint study to host a hyperspectral imager for coastal and inland waters monitoring on NASA’s Phytoplankton, Aerosols, Clouds and ocean Ecosystem (PACE) spacecraft. The proposed payload, derived from the WaterSat microsatellite feasibility study initiated by the CSA in 2014, is a pushbroom hyperspectral sensor covering a spectral range from 360 to 910 nm with a 5 nm spectral sampling. A 100 m Ground Sampling Distance (GSD) would be achieved over a 240 km swath providing a revisit time of 8 days or better for targets in Canada. A peak signal-to-noise of up to 900:1 (for a nominal PACE scene resampled at 10 nm) would allow the retrieval of geophysical products with the intended accuracy.

This payload would respond to the need to improve the monitoring and better understand the quality and productivity of coastal and inland waters as these needs have an important impact on the coastal communities’ well-being and on economic activities. This payload aims to: 1) Provide ecological information for coastal waters and medium to large freshwater bodies; 2) Monitor hazards, discharges, effluents and pollution events; 3) Assess productivity of marine coastal ecosystems; 4) Characterize Harmful Algal Blooms (HABs); and 5) Monitor the water quality of medium and large freshwater bodies.

This presentation provides an overview of the feasibility study, mission requirements, expected mission benefits along with the way forward.