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SEAHAWK; A NANOSATELLITE MISSION FOR SUSTAINED OCEAN OBSERVATION.

Abstract

Recently the National Academy of Science (NAS) highlighted the need for sustained, advanced ocean color research and operations. The report shows that ocean color satellites provide a unique vantage point for observing the changing biology of our ocean's surface. Space observations have transformed biological oceanography and are critical to advance our knowledge of how such changes affect important elemental cycles, such as the carbon and nitrogen cycles, and how the ocean's biological processes influence the climate system. Ocean color remote sensing allows scientists to assess changes in primary production, which forms the base of the marine food chain. Continuous satellite observation of ocean color is essential to monitoring the health of the marine ecosystem and its ability to sustain important fisheries, especially in a time of global change and acidification.

The authors of this paper were previously involved in delivering SeaWiFS; the most widely used orbital ocean color instrument to date.

SeaWiFS took more than 10 years and costed $14.1 M. By contrast, 2 SeaHawk 3U CubeSats with HawkEye Ocean Color Sensors will be produced in 2-years, with launch planned for early 2017, at a cost of $1.675 M. The final product will be 130 times smaller but with a ground resolution 7 - 15 times better whilst maintaining a Signal/Noise Ratio approximately 50% that of SeaWiFs.

Interestingly, whilst many people have talked of the effect of Moore's law on the space industry and nanosatellite are considered an example of the impact of technology development following the Moore's Law concept. The Seahawk project is funded by the Gordon and Betty Moore Foundation, and the Foundation has a particular interest in SeaHawk from the perspective of technology demonstration as "proof of concept" of a "game-changer".

This paper describes the technical and science objectives of the SeHawk mission, the design of the Ocean Color payload and the spacecraft platform to support the payload. This ambitious mission has particular challenges not only in the development of an advanced payload, but in terms of platform

pointing accuracy, in-situ data processing, the downlink of data sets within a fundamentally restrained, standardized spacecraft platform.