HyLab – Alaska's In-State Capability for Airborne Imaging Spectroscopy

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Though the impacts of climate change are being felt world-wide, they are far more significant in the Arctic region. The longer summer season and depleting sea ice along the Arctic coasts is posing new opportunities for access and for economic exploitation of the rich natural resources in the Arctic. For Alaska, the only US Arctic State, the need for mapping and monitoring its vastly unexplored terrain is heightened. Therefore, imaging spectroscopy provides a powerful tool to support resource exploration and ecological studies. Over the last decades, the University of Alaska Fairbanks (UAF) has become the research hub for high-latitude research. UAF's Hyperspectral Imaging Laboratory (HyLab), established in 2014 with a Major Research Instrumentation grant from NSF, provides this much needed local airborne hyperspectral imaging capability using the HySpex sensor. The HySpex sensor consists of a VNIR-1800 camera (0.4 – 1.0 µm) and a SWIR-384 camera (1.0 – 2.5 µm) that are mounted on a versatile single-engine Aviat Husky A1-B airplane. This mobile and low-cost platform allows on–demand acquisition of high resolution hyperspectral data all over Alaska. The HySpex data processing chain was implemented by the German Space Agency (DLR) and guaranties the operational production of robust, geo-registered, surface radiance / reflectance products. Airborne hyperspectral missions have been few and far-spaced in Alaska due to high costs of aircraft mobilization and dependence on unpredictable weather conditions. In the mid-80s there was one NASA AVIRIS airborne campaign in Alaska, followed by a long hiatus. Summer 2014 saw a flurry of activities with airborne hyperspectral data acquisition by NASA and USGS. Though these missions will provide some baseline data for selected regions, the in-state hyperspectral imaging capacity provided by HyLab will be critical for extended resource exploration and for making multiple inter-annual and intra-annual observations essential to understand the rapid changes in Arctic ecosystems.