EARTH OBSERVATION SYMPOSIUM (B1)
Monitoring Change in the Arctic (6)

Author: Dr. Jason Reimuller
United States, jason@integratedspaceflight.com

THE POSSUM CAMPAIGN: POLAR SUBORBITAL SCIENCE IN THE UPPER MESOSPHERE

Abstract

Project PoSSUM, an acronym for Polar Suborbital Science in the Upper Mesosphere, is a suborbital research project that uses imaging and remote sensing techniques from reusable Suborbital Launch Vehicles (rSLVs) for atmospheric science, aeronomy, and Earth observation applications. The initial POSSUM campaign will employ a manned rSLV (e.g. the XCOR Lynx) launched from a high-latitude spaceport (e.g. Eielson AFB, Alaska) during a week-long deployment scheduled for July 2016. This campaign will address critical questions concerning noctilucent clouds (NLCs) through flights that transition the cloud layer where the clouds will be under direct illumination from the sun. PoSSUM grew from the opportunity created by the Noctilucent Cloud Imagery and Tomography Experiment, selected by the NASA Flight Opportunities Program as Experiment 46-S in March 2012.

The PoSSUM Noctilucent Cloud Campaign seeks to answer several unanswered questions relating to our understanding of NLCs, such as: 1) What are the small-scale dynamics of NLCs and what does this tell us about the energy and momentum deposition from the lower atmosphere?; 2) Are fine structures observed in the OH layer coupled with NLC structures?; and 3) What is the geometry of NLC particles and how do they stratify? PoSSUM will also validate a repeatable, low-cost means to study seasonal trends of NLCs through instrumentation that will include video and still-frame visible and infrared cameras (PoSSUMCam), the MCAT mesospheric temperatures experiment, a depolarization LiDAR system (PoSSUMLiDAR), and the MASS meteoric smoke detector.