The Cloud-Aerosol Transport System (CATS): a new lidar for aerosol and cloud profiling from the International Space Station

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Spaceborne lidar profiling of aerosol and cloud layers has been successfully implemented during a number of prior missions, including LITE, ICESat, and CALIPSO. Each successive mission has added increased capability and further expanded the role of these unique measurements in wide variety of applications ranging from climate, to air quality, to special event monitoring (ie, volcanic plumes). Many researchers have come to rely on the availability of profile data from CALIPSO, especially data coincident with measurements from other A-Train sensors. The CALIOP lidar on CALIPSO continues to operate well as it enters its fifth year of operations. However, active instruments have more limited lifetimes than their passive counterparts, and we are faced with a potential gap in lidar profiling from space if the CALIOP lidar fails before a new mission is operational. The ATLID lidar on EarthCARE is not expected to launch until 2015 or later, and the lidar component of NASA's proposed Aerosols, Clouds, and Ecosystems (ACE) mission would not be until after 2020. Here we present a new aerosol and cloud lidar that was recently selected to provide profiling data from the International Space Station (ISS) starting in 2013. The Cloud-Aerosol Transport System (CATS) is a three wavelength (1064, 532, 355 nm) elastic backscatter lidar with HSRL capability at 532 nm. Depolarization measurements will be made at all wavelengths. The primary objective of CATS is to continue the CALIPSO aerosol and cloud profile data record, ideally with overlap between both missions and EarthCARE. In addition, the near real time (NRT) data capability of the ISS will enable CATS to support operational applications such as aerosol and air quality forecasting and special event monitoring. The HSRL channel will provide a demonstration of technology and a data testbed for direct extinction retrievals in support of ACE mission development. An overview of the instrument and mission will be provided, along with a summary of the science objectives and simulated data. Input from the ICAP community is desired to help plan our NRT mission goals and interactions with ICAP forecasters.