# High Resolution Optical Filters for Space-borne Lidar Receivers

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Lidar techniques are now very well established as a means for probing the physical, chemical and dynamical properties of the atmosphere from ground-based observatories. Recently, NASA (e.g. LITE, GLAS) and ESA, in particular, have undertaken the development of a series of Space-borne Lidar Missions to measure atmospheric dynamics (e.g. AEOLUS) Atmospheric Aerosol and Cloud Properties (e.g. ATLID – EarthCARE), Carbon Dioxide (FACTS) and Water Vapour (WALES). These future Missions promise major advances in data quality and in global coverage, with a significant impact in Meteorological Prediction and in the study of Climate and Climate Change. Future missions, exploiting powerful and robust laser transmitter / receiver systems none-the-less have the challenge of detecting and recording weak back-scattered lidar signals against the background of the sunlit earth, including snow and cloud scenes. We report on the development of "High Resolution Optical Filters" intended to assure that the full performance of these Space Lidar systems can be exploited on the dayside of the earth, as well as the night-side. The filters exploit stable and robust Capacitance-Stabilised Fabry-Perot etalons of very high finesse. Additionally, the high resolution optical filters are fully programmable to meet all the complex requirements of the space missions, including calibration, the tracking of variations of laser wavelength and the Doppler shifts induced by atmospheric winds and orbital variations.