

AN AIRBORNE LIDAR

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NASA has developed the Lidar in Space Technology Experiment (LITE) instrument, a shuttle borne Mie Lidar-system, designed to observe clouds, tropospheric and stratospheric aerosols, characterize the planetary boundary layer and characterize properties of the terrestrial surface. The system will be operating at the fundamental, doubled and tripled wavelength of a Nd:YAG laser. There will be a total of 45 h, where measurements can be taken, equivalent to 30 orbits. The launch of the shuttle is presently scheduled for September 9, 1994. The planned orbit inclination is 57°.

DLR, Institute of Atmospheric Physics will be participating in a coordinated LITE validation program using airborne and ground based sensors along the orbit ground track. The DLR-Lidar like the LITE instrument consists of a three wavelength Nd:YAG laser, a 35 cm Cassegranian telescope and a detector assembly to measure at 355 nm, 355 nm and 1064 nm. Wavelength separation is provided by dielectric beamsplitters. For reducing background and background noise interference filters are used. The repetition rate of the laser is 10 Hz corresponding to a horizontal spacing of 20 m of the single profiles at a speed of the aircraft of 200

m/s at high flight levels. For data reduction 5 consecutive shots will be horizontally integrated, which also is more in accordance with the LITE spotsize in the troposphere. Online dataevaluation will allow for color coded quicklook plots during flights.

The system will be mounted vertically downward pointing on board a Falcon 20. Ceiling altitude is 41 000 feet and the typical range about 2000 km. Due to the inclination orbit of 57° a measurement field within latitude 50° and 57° and longitude 5° W and 15° E gives a reasonable probability of getting active LITE tracks within this area.

Data will be made accessible to all participants. Data format and archiving facilities are still being discussed. For European participants, ESA has taken care of coordinating European groups and is setting up the link to NASA.

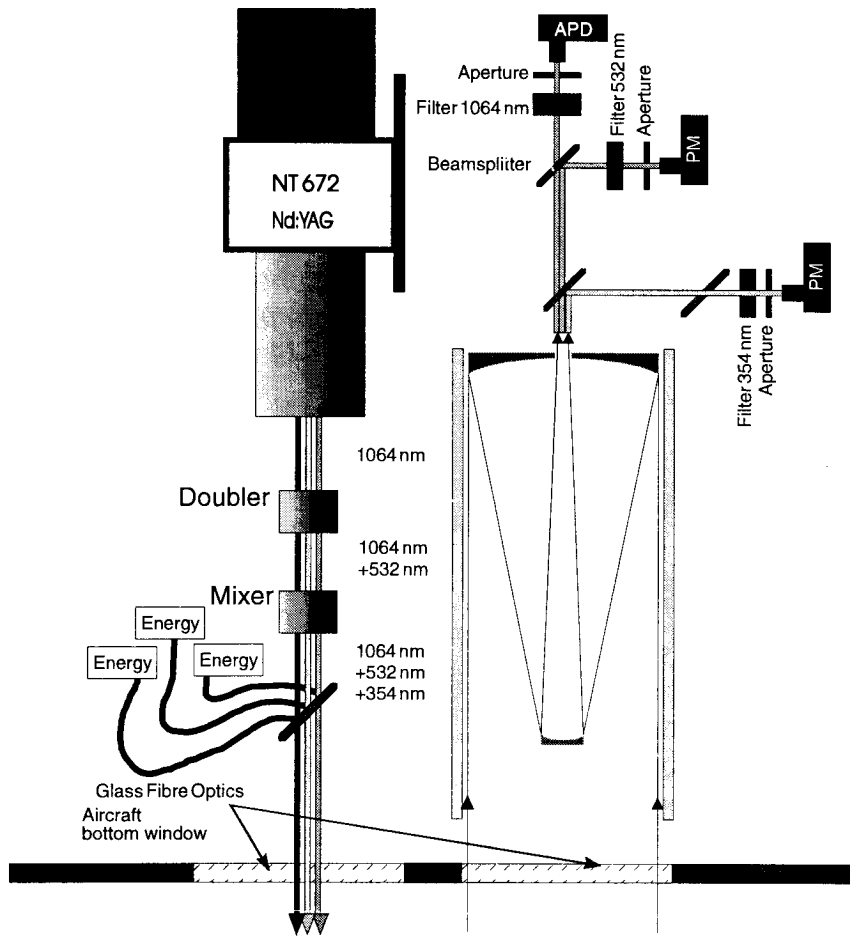


Fig. 1 LIDAR setup for LITE campaign