

# ATMOSPHERIC LIDAR

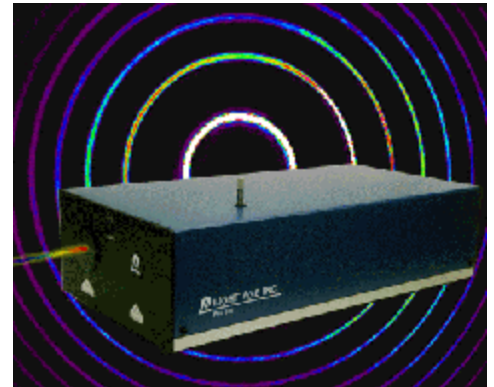
## APPLICATION NOTE #11



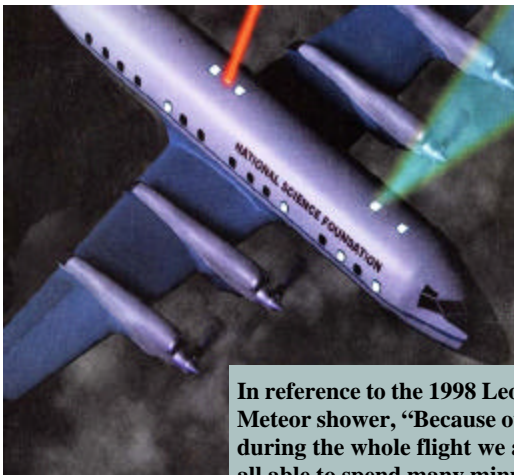
### THE APPLICATION

There is a significant and growing interest in determining the temperature, wind speed, and concentrations of certain trace elements such as iron and ice particles in the Earth's upper atmosphere. Among other things, these data allow us to better understand weather patterns, global climate changes, atmospheric disturbances, cyclic phenomena and the factors that drive or influence them. The mesosphere – 90-155 km above the earth's surface has been particularly difficult to characterize. It is too high for conventional aircraft and balloons. Currently only test rockets and satellites can provide this data.

Because all of the layers of the atmosphere; troposphere, stratosphere and ionosphere, are coupled, mesospheric changes are important to an understanding. The data is very important for environmental impacts, advance weather modeling and atmospheric re-entry. In the past decade certain Light Age's PAL based high performance lasers have been deployed on airplanes, ships and in land-based containers to address some of the needs.



The PAL/PRO is broadly tunable, relatively rugged, and can provide high-powered unltanarrow band light at any wavelength of interest. LIDAR currently offers both Doppler and Boltzmann technology as well as DIAL and balloon data technology. Light Age's PAL/PRO laser technology leverages the inherent properties of alexandrite to make the ideal LIDAR source. The key performance specifications of the PAL/PRO (pulsed alexandrite laser/pulse ring oscillator) that make it so well suited for this application are listed in the laser characteristics section on the continuation of this application note.



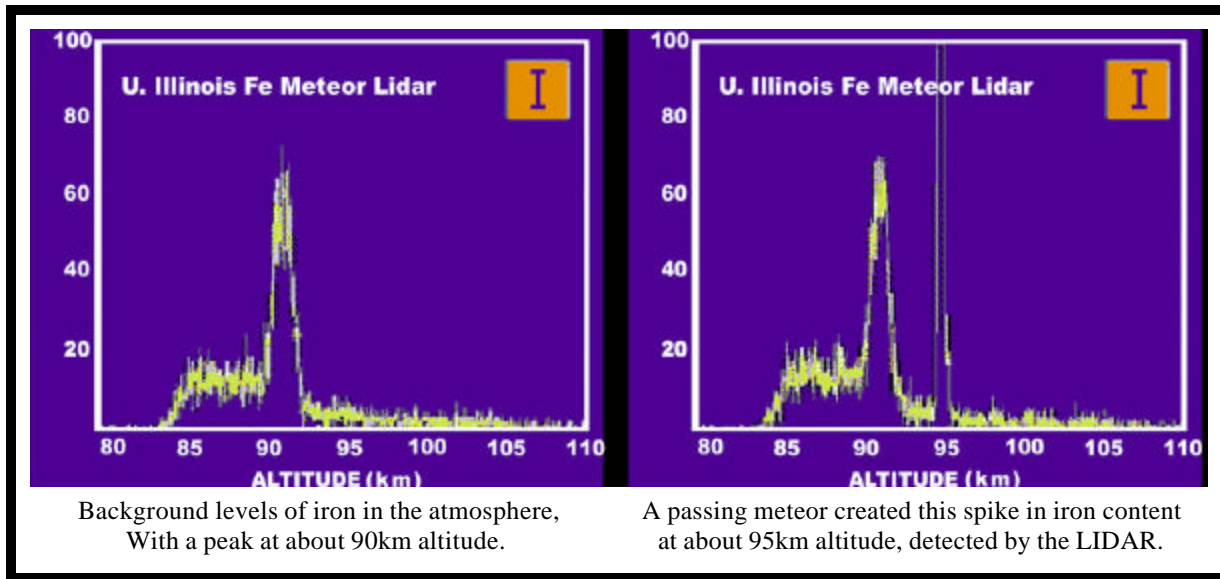
In reference to the 1998 Leonid Meteor shower, "Because our during the whole flight we are all able to spend many minutes gazing out of the aircraft windows at the beautiful display of 'shooting stars'". Chet Gardner, Univ. of Illinois.



## ATMOSPHERIC LIDAR CONTINUED

### LASER CHARACTERISTICS

Narrow Linewidth: < 10 MHz optimally; , 80 MHz typically  
High Pulse Energies: 200 mJ and > 500 mJ with an amplifier  
Wavelength Agility: Iron: 372,374 nm; Sodium: 589 nm; Potassium: 769 nm;  
Water vapor: 727 nm;  
Oxygen: 760 nm and Many others in UV vis



### Related References

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