



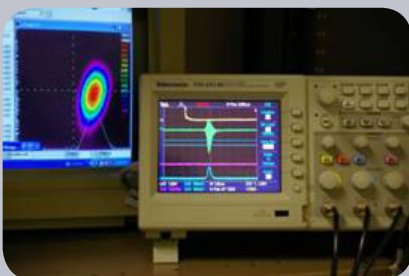
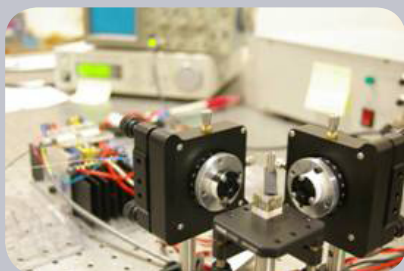
Coherent laser radar

For remote sensing of atmospheric wind fields

Description of Technology

The coherent laser radar (CLR) project is developing an eye-safe laser radar, or lidar, for coherent remote sensing of atmospheric wind fields. This system will be able to predict and monitor dispersion of pollutants in the planetary boundary layer, and detect clear-air turbulence and wind-shear in front of aircraft. This research is funded by an industry partner and an ARC Linkage research grant.

In a CLR, the frequency of the light in the transmitted laser pulse and that in the reflected pulse are measured by heterodyning the light with a continuous laser beam from a stable reference laser that was used to injection seed the pulsed laser. The velocity of the aerosol from which the light reflected is then calculated using the Doppler formula, and the distance to that aerosol is determined using the time of flight of the pulse.



Currently, we are developing

- » An injection seeded, diode pumped Er:Yb:glass laser with a single-shot velocity resolution of about 1 m/s, a pulse repetition frequency of 10 Hz and an expected range of about 3 km.
- » An integrated lidar receiver and analysis system.
- » Diode-pumped Er:YAG lasers at 1645nm for the next generation lidar, which will have a pulse energy of at least 10 mJ and a 1 kHz repetition rate, with a similar single-shot velocity resolution. In addition to enabling a larger range, the high pulse energy will significantly increase the signal to noise at short ranges in atmospheres with low aerosol concentrations.

Commercial Applications

The technology has application in a number of different industry sectors, including:

- » Defence
- » Security
- » Transport

Summary

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This system will be able to predict and monitor dispersion of pollutants in the planetary boundary layer, and detect clear-air turbulence and wind-shear in front of aircraft.

The Optics and Photonics research group is one of the leading groups in advanced solid state laser research and precision laser sensing in Australasia.

Key People

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Website

www.chemphys.adelaide.edu.au/physics/research/optics/projects/clr_for_rs.html



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