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MAPM: A COHERENT DUAL CO₂ LASER DIAL SYSTEM¹

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The Mobile Atmospheric Pollutant Mapping System (MAPM) is a dual CO₂ laser DIAL system with heterodyne detection that is being developed for large distance range-resolved measurement of organic solvent vapors and aerosol clouds. The components have been chosen to allow measurements to be made to distances of 6-7 km in a period of 20-30 s.

The major components of MAPM are:

- 1) a 35-ft transportable semitrailer
- 2) a pair of pulsed CO₂ lasers capable of 50-150 Hz operation at pulse energies of 50-200 mJ
- 3) a pair of cw CO₂ lasers for use as local oscillators
- 4) non-coaxial transmit/receive optics and scan mirror
- 5) a 10-bit, 20-MHz transient digitizer
- 6) a computer capable of acquiring lidar data at a rate of 100-150 Hz and subsequently processing the data

MAPM is being integrated into a system and will be tested with several organic solvent gases and vapors in a remotely positioned sample chamber and with a free release of ethylene. Attention will be given to system performance and sensitivity and factors which limit it, such as spectral and spatial variations in aerosol backscatter and laser beam speckle.

The talk will describe MAPM in more detail and discuss experimental results and system performance to date.

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