

RAM 2000™ Achievements

1.5 Kilometer Ranges Validated

Recently, significant reductions in the noise floor of the **RAM 2000™** air quality monitor, combined with software improvements, have enabled AIL Systems to extend the **RAM 2000™** range to beyond 1 kilometer.

BACKGROUND DEMONSTRATION

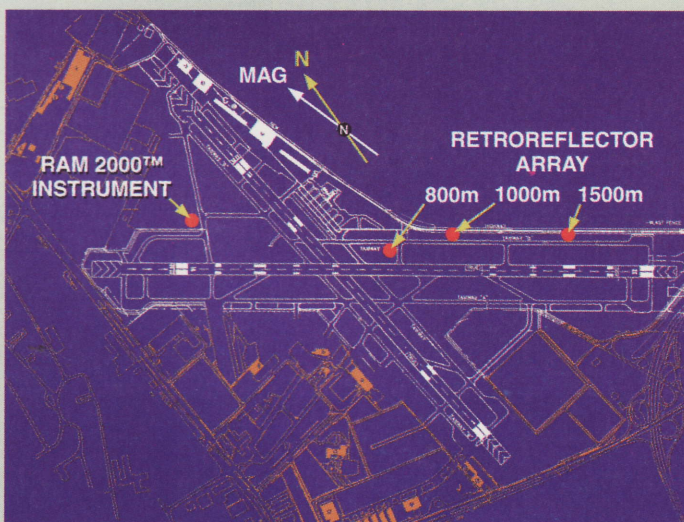
During the fall of 1998, the **RAM 2000™** team successfully demonstrated the operation of AIL's Open-Path Air Quality Monitor at pathlengths greater than 500 meters at three different sites. The FTIR instrument was maintained at a fixed position and the tripod-mounted retroreflector array was moved to successively longer ranges.

The demonstration began with the retroreflectors placed some 800 meters away from the **RAM 2000™** unit. Then the retroreflectors were moved to 1,000-meter and 1,500-meter distances from the instrument. At each range, the return signal was sufficiently strong to monitor effluent species present in the successively longer infrared beampaths.

CHEMICAL DETECTION LEVELS

The concentrations of three (3) minor atmospheric species, carbon monoxide, methane and ozone were measured as the range increased. The concentrations were in good agreement with nominal ambient values for these minor atmospheric species. The concentration of carbon monoxide ranged from 200 to 270 ppb, the methane concentration from 1,500 to 1,800 ppb and the ozone concentration from 33 to 42 ppb.

In addition to these naturally occurring species, **RAM 2000™** detected a mixture of hydrocarbons



Typical Test Site Configuration

including n-hexane, n-octane, 2-methyl butane and 2-methyl pentane.

IMPLICATIONS

The demonstrations show that atmospheric scintillation and the presence of water vapor do not prevent the **RAM 2000™** from achieving ranges of one kilometer or more. With the extension to ranges beyond one kilometer, open-path FTIR's can now be applied to much longer fence-line and perimeter applications. Entire chemical and defense facilities such as airfields can be protected using a minimum number of **RAM 2000™** instrument stations. ❖

RAM 2000™ Software Year 2000 (Y2K) Compliant

In September, AIL software and quality engineers conducted extensive tests to verify that **RAM 2000™** system software, **RMMsoft™**, along with the micro-controller software used in the autopositioner, weather station and the automatic liquid nitrogen (LN₂) refill meet year 2000 compliance.

The tests performed included data collection through date rollover, offline processing and hardware data rollover. Test results verified the following conclusions:

- **RAM 2000™** system can collect and process data through the year 2000 rollover December 31, 1999 to January 1, 2000. Additionally, this applies to system autopositioner, weather station and the automatic LN₂ refill.
- **RAM 2000™** will perform statistical analysis and data conversions through Y2K.
- **RAM 2000™** will perform automatic data summarizing across the Y2K rollover from data stored in multiple files that will contain data from both 1999 and 2000.