

## Exhibit 1. (Question 4)

### Description of Research Project

The Microwave Remote Sensing Laboratory (MIRSL) of the University of Massachusetts Amherst is supported by a grant from the Army Research Office to study clear-air scattering from the atmospheric boundary layer using a unique, vertically-pointed, 915-MHz radar called the Turbulent Eddy Profiler (TEP). MIRSL was recently awarded a grant from the Department of Energy for related work using the same instrument. Grant titles, durations and agency contacts are listed below.

### Research Grants:

1. Army Research Office: "Use of Turbulent Eddy Profiler in Making Atmospheric Boundary Layer Measurements", D.H. Schaubert, S.J. Frasier, J.R. Carswell (co-principal investigators), 9/1/98 -- 8/31/02.

ARO contact: Atmospheric Sciences, Walter Bach (919)549-4247

2. Department of Energy: "4D Radar/Acoustic Measurements of Atmospheric Turbulence in the Stable Boundary Layer", S.J. Frasier, A.L. Pazmany (co-principal investigators), 9/1/99 -- 8/31/03.

DOE contact: Environmental Sciences Division,  
Peter Lunn (301)903-4819

### About TEP

TEP is a vertically-pointed 915-MHz radar. It transmits 200-ns pulses at a rate of 40 kHz. Peak power at antenna terminals is 20 kW. Average power is 200 W. Antenna beam has a half-power beamwidth of 25 degrees.

## Exhibit 1. (Question 4)

### Description of Research Project

The Microwave Remote Sensing Laboratory (MIRSL) of the University of Massachusetts Amherst is supported by a grant from the Army Research Office to study clear-air scattering from the atmospheric boundary layer using a unique, vertically-pointed, 2.73 GHz radar called the S-band FMCW radar. MIRSL was recently awarded a grant from the Department of Energy for related work using the same instrument. Grant titles, durations and agency contacts are listed below.

### Research Grants:

1. Army Research Office: "High Resolution S-band Profiling of the Atmospheric Boundary Layer", S.J. Frasier (principal investigator), 9/1/98 -- 8/31/01.

ARO contact: Atmospheric Sciences, Walter Bach (919)549-4247

2. Department of Energy: "4D Radar/Acoustic Measurements of Atmospheric Turbulence in the Stable Boundary Layer", S.J. Frasier, A.L. Pazmany (co-principal investigators), 9/1/99 -- 8/31/03.

DOE contact: Environmental Sciences Division,  
Peter Lunn (301)903-4819

### About the S-band FMCW radar

The FMCW radar is a vertically-pointed 2.73 GHz radar. It transmits a frequency-modulated continuous-wave signal between 2.70 and 2.76 GHz. Peak (=average) power at the antenna terminals is 200 W. Antenna beam has a half-power beamwidth of 3.5 degrees.