

## Collaborative Lower Atmospheric Mobile Profiling System (CLAMPS) hardware information



*The CLAMPSI facility is shown with the three main instruments annotated. Instrument specific information is included at the end of this document.*

### **Trailer:**

22ft, approx. 1200 lbs.

### **Siting considerations:**

We require a clear view of the sky from approx. 70 deg. above the horizon and up. For multi-day deployments, we prefer a solid surface such as concrete or gravel to prevent sinking (impacts instrument alignment). Longer term deployments also require security considerations. Fenced/private areas are preferable.

### **Power:**

CLAMPS includes a diesel generator for short-term deployments and providing power in transit. For multi-day deployments, we prefer to use shore/pole power. We have a 100ft extension cable

allowing some flexibility in deployment location with respect to the power drop. Power requirements follow:

- Voltage: 240V
- Frequency: 60 Hz
- Amperage: 50A
- Phase: split phase
- Plug: NEMA 14-50P

### **Network:**

CLAMPS includes an onboard mobile wireless network point.

### **Sound considerations:**

When running on shore/pole power, the only sounds CLAMPS emits are those associated with the cycling of the climate control system (keeps the interior of the trailer at a safe operating temperature for the instruments) and an occasional motorized hum associated with an instrument scanner. CLAMPS does not use any acoustic instruments, which are sometimes considered a nuisance to the surrounding environment. In the event CLAMPS is relying on generator power, the diesel generator also makes sound while running.

### **Instrument specific information:**

*Doppler Lidar (DL):* The Doppler lidar is the only **active** sensor onboard CLAMPS. It employs a non-visible Class 1M eye-safe solid-state laser transmitter operating at 1.5 $\mu$ m wavelength with low pulse energy (~100  $\mu$ J), and high pulse repetition frequency (15 kHz). A Class 1M laser is safe for unaided eye exposure. The laser is safe for all conditions of use except when passed through magnifying optics such as microscopes and telescopes. The lidar has full upper hemispherical scanning capability and provide range-resolved measurements of attenuated aerosol backscatter and radial velocity, i.e., the velocity component parallel to the beam.

*Microwave radiometer (MWR):* The microwave radiometer is a **passive** sensor. It is essentially a sensitive microwave receiver. That is, it is tuned to measure the microwave emissions of the vapor and liquid water molecules in the atmosphere at specific frequencies (temperature measurements: 52-28 GHz, water vapor measurements: 22-31GHz).

*Atmospheric Emitted Radiance Interferometer (AERI):* The AERI is a ground-based instrument that measures the downwelling infrared radiance from the Earth's atmosphere. The AERI is a **passive** remote sounding instrument, employing a Fourier transform spectrometer operating in the spectral range 3.3-19.2  $\mu$ m (520-3020  $\text{cm}^{-1}$ ) at an unapodized resolution of 0.5  $\text{cm}^{-1}$  (max optical path difference of 1 cm).