

STATEMENT OF NEED FOR SUPPLY

Wind Profilers for Monitoring Fire Weather

Purchase Request #: NRMJ2000-23-00335

PURPOSE:

The purpose of this action is to purchase four (4) quarter-scale 449-MHz wind profilers to improve fire weather monitoring over the interior mountainous Western U.S. The National Oceanic and Atmospheric Administration, Physical Sciences Laboratory (NOAA/PSL) currently operates seven of these systems along the U.S. West Coast for winter storm and fire weather monitoring. NOAA/PSL also operates an additional 449-MHz wind profiler in Colorado for improving impactful weather monitoring and to support aviation weather.

SCOPE or MISSION:

The wind profilers procured under this action will support the NOAA/PSL mission to observe the vertical structure of the atmosphere and will be used specifically to monitor fire weather conditions in the interior mountainous Western U.S. The wind profile data collected will be shared with National Weather Service forecasters, fire fighters, and the general public, in near real time.

REQUIREMENT:

CLIN 0001:

449-MHz wind profiler - QTY: 4 systems

Each system includes a fully functional wind profiler, including, but not limited to all hardware, RF/power cable, an equipment rack for the vendor supplied rack-mountable radar electronics, and packaging (wooden cases) for shipping the radar antenna elements. NOAA/PSL will provide a shelter for the radar electronics and any necessary indoor cables, electrical power service to the installation site, and the radar control and data acquisition computer.

Units are not to be delivered until CLIN 0002 is exercised. In the instance CLIN 0002 is not exercised, the government will provide delivery instructions. Delivery shall not occur prior to February 1, 2024 and not later than September 30, 2024.

System and data output specifications

Transmit frequency	Nominal 449 MHz
Transmit power	2kW
Antenna type	Phased array
Antenna element type	Vendor specific

Antenna pointing	Doppler beam swinging
Number of antenna elements	Vendor specific
Antenna frame size	$\leq 8\text{m} \times 8\text{m} \times 2\text{m}$ (W x D x H)
Gain (main lobe)	> 26 dBi
Minimum sampling height	200 m; user configurable
Maximum sampling height	> 8 km; user configurable
Vertical resolution	60 m; user configurable up to 500 m
Measurement range <ul style="list-style-type: none"> • Horizontal winds • Vertical winds 	-100 m s^{-1} to 100 m s^{-1} ; user configurable -20 m s^{-1} to 20 m s^{-1} ; user configurable
Wind data accuracy	$<1 \text{ m s}^{-1}$ (speed), $<10^0$ (direction)
Receiver	16-bit fully digital receiver with high dynamic range
Signal processing	Advanced time-height continuity, multi-peak discrimination software with quality control (QC) algorithms
Data averaging period	3-60 min.; user configurable
Output data	Horizontal and vertical wind speed and direction Other user configurable quality control and wind statistic output

Software Compatibility:

The radar must be compatible with NOAA/PSL's proprietary radar operating and processing software, LapXM, which will be used to process the radar data and control radar operations. This includes starting and stopping operation and changing radar parameters. Accordingly, this will require reliable communication between the radar and NOAA/PSL's radar control and data processing computer. The proposal must specify what form of communication will be present to control the radar. Allowable communication protocols are ethernet or USB.

The raw signals recorded by wind profiling radars are usually combined in a time series format. This time series consists of contiguous samples from the I/Q matched filter outputs of the radar. These time-series data will contain all of the data points required to produce as many as 100 Doppler velocity spectra from one beam direction, one range resolution, and for all specified ranges. The time-series must be available for transfer to our radar control and data processing computer within 10 s of the completion of the time series. Documentation of the time-series format and transfer mechanisms must be specified in the proposal.

Software Compatibility Evaluation:

NOAA/PSL requires two sets of sample time series to read into LapXM. The first set is 25 hours of consecutive individual dwell files. The second set is three consecutive hourly files. All files supplied must be in NetCDF format with complete metadata. The proposal will be evaluated based partly on how easily NOAA/PSL's LapXM software can be adapted to read in the radar time series data and control the radar operations.

CLIN 0002 – Option:

Delivery and installation of 449-MHz wind profiler - QTY: 4

NOAA/PSL will coordinate with the vendor for shipping each unit to the field site somewhere in the intermountain Western U.S. (sites TBD). Vendor shall be responsible for all necessary ground preparations and installation materials, such as pylons, cement pads, leveling devices, cable conduit, and gravel or landscape materials to suppress weed growth. Installation of units will occur no earlier than February 1, 2024 and not later than September 30, 2024.

DELIVERY SCHEDULE AND LOCATIONS:

Expected delivery and acceptance of all four units by September 30, 2024. See CLIN 0001 for additional information.