



DEPARTMENT OF THE AIR FORCE
AIR FORCE RESEARCH LABORATORY
KIRTLAND AIR FORCE BASE NEW MEXICO

Care Weather Technologies
Attn: Patrick Walton, CEO
144 W 400 N
Provo, UT 84601

Re: Statement of interest in Care Weather wind vector data

Mr. Walton,

Having been briefed on Care Weather efforts to develop nanosatellite radar systems to measure wind speed and direction over the ocean surface, I am optimistic that the Air Force will be interested in using the data to support atmospheric research and exploring the possibilities for it to be integrated into numerical weather prediction models.

Warfighters operating over the open ocean and in the littoral zone will increasingly need to know present weather conditions and the expected propagation of those conditions into the next few hours (nowcasting). Numerical weather predictions which are dependent on satellite data may miss the early genesis of mesoscale and macroscale wind events due to current data acquisition latency. All-weather acquisition of sea-surface wind speed and direction along with more frequent temporal coverage will become increasingly valuable for tactical operations and for safety.

Other important factors for the Air Force are high accuracy and low uncertainty for wind direction and for wind speeds up to 30 m/s and minimizing rain-contaminated measurements. Hourly acquisitions as projected by Weather Care are an improvement over currently available wind data, but temporal coverage in the 5 – 15 minute range would be desirable in the future. If the data were made available to users during or shortly after measurement via direct-satellite downlinks or a satellite relay network, this could fill critical information gaps for immediate situational awareness at sea or in the littoral zone.

Respectfully,

A handwritten signature in dark ink, appearing to read "Thomas R. Caudill", is located below the "Respectfully," text.

Dr. Thomas R. Caudill
Chief, Geospace Technologies Division
Space Vehicles Directorate
Air Force Research Laboratory



United States
Department of
Agriculture

Forest
Service

Rocky Mountain
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P.O. Box 8089
Missoula, MT 59807

Date: February 21, 2020

Care Weather Technologies
Attn: Patrick Walton, CEO
144 W 400 N
Provo, UT 84601

Patrick,

I understand Care Weather is developing systems to measure wind speed and direction, among other parameters. My organization, the Rocky Mountain Research Station of the U.S. Forest Service, is interested in this data as it becomes available from the context of possibly supporting wildland fire management. The Missoula Fire Sciences Laboratory, uses wind measurements from a variety of sources, along with national wind forecasts, to initialize surface wind simulations using the WindNinja modeling tool, our high-resolution wind simulation, which helps firefighters track and predict the wind and its impact on the forest fires they fight. Coastal wind datasets that provide wind measurements at times and places where measurements are currently unavailable allow us to select more accurate initial conditions for our simulations. The better wind data we have, the better we can inform firefighters of current wind conditions and the more accurately we can predict future conditions.

Regarding wind data attributes, to be useful for supporting fire management in coastal areas wind speed needs to be accurate to within a few meters per second. Wind direction needs to be accurate to within 20-30 degrees per second. The more dynamic range to the measurements, the better. The finer the spatial resolution, the better, but even coarser spatial resolutions will be valuable to us if they improve on existing datasets. For example, 25-50 km coastal wind measurements will be valuable if either the sampling rate is more frequent or the measurements cover gaps in currently available measurement data. We prefer measured wind data to be delivered with low latency, but older data is often helpful for researching past fire events.

Sincerely,

/Bret Butler/

Bret Butler, Ph.D.

Research Mechanical Engineer
US Forest Service, Rocky Mountain Research Station
Missoula Fire Sciences Laboratory
Fire Fuels and Smoke Program
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Department of Atmospheric Sciences

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August 20, 2020

Care Weather Technologies
Attn: Patrick Walton, CEO
144 W 400 N
Provo, UT 84601

RE: Statement of Interest in Ocean Vector Wind Data

Dear Patrick Walton,

I understand Care Weather is developing systems to measure hourly wind speed and direction over the surface of the ocean, among other weather parameters. As this data becomes available, I am excited to use it in my weather forecast and data assimilation research at the University of Utah.

I'm currently a member of the NASA CYGNSS science team. The wind measurements provided by CYGNSS have demonstrated that ocean surface winds are valuable for studying tropical cyclones and improving the weather forecast. Thus, the continuous availability of the ocean surface winds, especially the prospect of hourly ocean vector winds at the improved time and spatial resolution, can dramatically improve our ability to understand cyclones and increase the skill of the weather forecast. I am excited about the opportunity and am also interested in simulating the impact of this data on the skill of the weather forecast.

To use ocean vector wind measurements, we would like to have the following performance: speed and direction as well as the estimation of their accuracy (variances, standard deviation), dynamic range, spatial resolution, coverage, latency within several hours. I am interested in using data with improvements over existing sources of ocean vector wind measurements.

Sincerely,

Zhaoxia Pu, Ph.D.
Professor, Atmospheric Sciences