



One of Six Boeing Wind Stations for Aviation Support

Coastal recently delivered six wind stations to The Boeing Company. These are rugged mobile weather monitoring systems that can be deployed at an airport runway anywhere in the world to support flight test operations. The wind stations digitally record time synchronized weather data, including wind speed and direction, temperature, absolute pressure, solar radiation, and relative humidity, which is then output to an external display system in real time.

### Unique System Requirements

There were several unique requirements these stations had to meet.

- ✓ Each station must be powered from a portable battery for up to 10 hours, or operated continuously using an external 12VDC power source.
- ✓ They must be able to be set up without any tools in under 20 minutes.
- ✓ There is no user interface, keyboard or mouse.
- ✓ All stations must have an operating range of -40° to 120° F, and a non-operating range of -55° to 150° F. Each must be capable of operating at an altitude range from -200 ft up to 15,000 ft (-61 m to 4572 m) with an operating humidity range of 5 to 95% relative humidity. Each station must be able to operate in blowing rain.
- ✓ All components must be able to be transported on an aircraft without any special FAA handling requirements. The maximum shipping case weight must be under 50 lbs, and all sensors and electronic components are to be secured in foam inserts and stored in ruggedized shipping containers.

### Making it Rugged

Coastal selected Campbell Scientific's heavy-duty stainless steel tripod tower to support the sensors. The tower is adjustable from a minimum of 7 feet high, to a maximum of 20 feet high, using the mast inserts and guy wires. This allows stability in rough terrain and the ability to be taller than possible obstructions. It also allows the wind sensor to be closer to the 30 feet standard specification for fixed system aviation winds.

In addition to professional-grade sensors and heavy-duty battery, Coastal also

uses rugged military standard connectors for the fiberglass enclosure which houses each station's datalogger, barometer, and other electronics.

### Fine Tuning

Shortly before shipping, eight Boeing representatives came to Coastal for a day of testing, operations and maintenance training, and acceptance review. At that time final modifications were made to streamline setup. These included moving the GPS sensor inside the electronics enclosure, and slipping sensor u-bolts over the top of the tower, eliminating the need to completely unscrew them.

### The End Result

Boeing has six new high-performance portable wind stations to support flight test operations that will withstand many years of exposure in any location.

### About the Newsletter

Published quarterly by Coastal Environmental Systems, the Coastal Update provides new product information, case studies, company news, and other information relating to our weather monitoring systems.

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## Ulanhot Airport, Inner Mongolia, China AWOS Installation – Phase 2

Located at Ulanhot Airport, Inner Mongolia, China, Coastal's latest Automated Weather Observing System (AWOS) installation is an update to the Primary Sensor Group installed there in December, 2015. That installation was key for testing and securing Civil Aviation Administration of China (CAAC) certification for Coastal AWOS, which was granted in 2017. CAAC certification enables us to provide our AWOS to China's fast growing aviation market.

In this update, Coastal's Steve Clark, Field Service Manager, installed 10 meter frangible towers and sensors at both Runway 14 (roll-out) and Midfield points of the runway.

The Runway 14 sensor group is an exact duplicate of the primary station minus the ambient light sensor. It



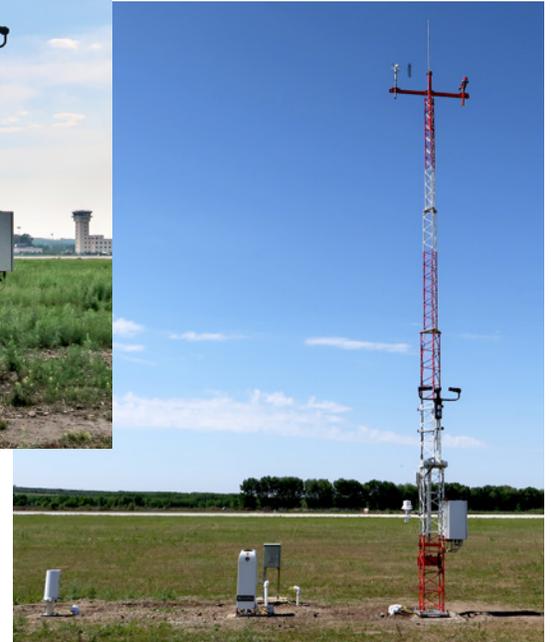
*Ulanhot – Primary Sensor Group*

measures wind speed and direction, cloud height, pressure, air temperature, relative humidity, precipitation accumulation, as well as visibility and present weather.

The Midfield sensor group measures winds and visibility/ present weather.

The main challenge Steve faced was switching the communications, scheduled to be fiber optic, to point-to-point radio. This was a last minute change made after the system was built and shipped. On-site, Steve configured the ZENO® 6800 dataloggers inside each tower's Field Data Collection Unit (FDCU) to use the available Power over Ethernet connections. This enabled the radios inside the FDCUs to send the weather data via radio link back to the server.

For data display, the system uses a custom version of Coastal's Aviation INTERCEPT® (AI) software. To meet CAAC Part 7 specification, the system creates automatic monthly and yearly climate reports, which can then be edited by on-site weather technicians. These are stored in an internal database.



*Ulanhot – Phase 2 – Runway 14 Sensor Group*

Installing the two new stations also required corresponding changes to the software. A new primary screen was added that displays weather data from all three stations on one screen. Other changes included adding additional fields, such as rainfall, along with 24 custom tabs and formatting changes.

AI offers user customized displays, report generation functionality, display of all the meteorological data, including Runway Visual Range (RVR), data outputs for ATIS, AFTN, PSTN, maintenance functionality, and a customizable XML data feed for integration into third-party systems. AI is compliant with ICAO/WMO/FMH-1 reporting standards.

During the 8-day installation, Steve also provided on-site installation, operation, and maintenance training to technicians from Campbell Scientific's Beijing office. They took care of the site preparation, including arranging the Power over Ethernet connections.



*Ulanhot – Phase 2 – Midfield Sensor Group*

## Article shows a Coastal PTAC in Panama

In 2016, we supplied the US Air Force with a Portable/Tactical Aviation (PTAC) System for the American Embassy in Panama. Back in July, Paul Garner, Coastal's Service Department Manager, provided email support for the PTAC to Darlene Byers. The system hadn't been used in over a year, but Paul helped Ms. Byers get it up and running. Paul recently received the following email from her. At the end, the email contains a link to the article titled "571st MSAS provides aviation weather capability to Panama."

*"Dear Sir: My name is Darlene Byers and we spoke numerous times during the month of July. I truly wanted to thank you from the bottom of my heart. Due to your assistance, we were able to complete a mission detailed in the link provided below. While I speak on my behalf and do not mean to show an endorsement on the part of the Department of Defense or Air Force, I wanted to express my eternal gratitude. Please feel free to send this to your boss or have them contact me so I can tell them how lucky they are to have you on their team!"*

<https://www.expeditionarycenter.af.mil/News/Article-Display/Article/1936442/571st-msas-provides-aviation-weather-capability-to-panama/>

Thank you, Ms. Byers! We appreciate your taking the time to let us know of your experience and are glad to be of assistance.



Coastal's PTAC for Panama

## CR6 Datalogger Training for Coastal Employees

In August, Campbell Scientific (CSI) held a three day course on its CR6 datalogger at Coastal for our employees in the engineering, production, and service departments.

Holding the course was very beneficial because many Coastal employees had no previous experience with the CR6, which recently replaced Coastal's ZENO® datalogger in WEATHERPAK®s and other weather stations.

The CR6 is programming-based—you have to tell it what to do—while Coastal's ZENO requires configuration.

Participants learned the basic programming structure and received hands-on experience hooking up different sensors.

The CR6 is user-friendly, so programming no longer has to be done exclusively by software engineers. Now production and service can take existing programs and configure them

for applications, then test, diagnose and troubleshoot. For any unusual application questions, Coastal also has access to the CR6 developers at CSI.

The CR6 is reliable and flexible, able to connect with many different kinds of sensors. One welcome new feature is the on-board charging capability. This eliminates the need to add an external low-voltage disconnect (LVD) module to some stations.

CR6 also has the capability to store 76MB of data internally. Adding a micro SD card adds even more data storage, up to 8GB.

The first CR6 based WEATHERPAKs were sold to Biral and BNSF earlier this year. The CR6 is part of the LAWS project, and the Boeing Wind Stations (page 1).



INTERCEPT® Lite Software

## New Lite Aviation Weather System (LAWS)

Coastal developed the design and installation schematics for a new simple AWOS for private and small general aviation airfields.

### AWOS for General Aviation

Known as LAWS, the complete system includes aviation grade COTS meteorological sensors, data transmission, and INTERCEPT® Lite display software.

- Simplified, single screen display of aviation weather data
- Web-based platform, accessible to authorized users via web browser
- Automatic METAR/SPECI reports
- Built-in tests and data quality checks
- ATIS output capability
- Data logs available for download or export

### New Distribution Channel

LAWS is a departure from Coastal's normal way of doing business, because we are providing the software and system documents to Campbell Scientific Aviation's international offices. Each regional office then sources the sensors and components directly and performs the installation and training. Offices are currently located in China,

Australia, and Costa Rica. The first LAWS system was shipped to Campbell Scientific's office in Beijing mid-August.



Campbell Scientific's CR6 Datalogger

## Meet Coastal's Service Department

Weather stations are sensitive, complicated pieces of engineering, requiring periodic maintenance and servicing, and sometimes just need fixing.

That's when Coastal customers rely on Paul Garner, Service Department Manager, and Jeff Cericola, Senior Support

Specialist. Paul has been serving our customers since 2005, and Jeff, since 2000.

### What can go wrong?

Together they've seen most every possible problem or accident our equipment has faced – including a buoy mounted WEATHERPAK® run over by a ship in the arctic circle. Minus its wind sensor and gps, it's other sensors were still working.

Then there was the WEATHERPAK in Montana that had been used for target practice.

Jeff also recalled the ZENO® datalogger and its enclosure hit by lightning. The datalogger exploded and knocked the enclosure off the wall. The enclosure, mounted inside a building, was not grounded properly and had no lightning protection.

### WEATHERPAKs and more WEATHERPAKs!

While they service any Coastal product, more than half of Paul and Jeff's workload is performing recommended yearly WEATHERPAK maintenance. Some of the oldest still coming in for maintenance are the 16-18 year old shipboard WEATHERPAKs purchased by the US Navy.

A more unusual WEATHERPAK system requiring service was a custom shipboard project with multiple units. Many additional sensors were added, requiring an additional Serial Sensor Expansion Module housed in a separate enclosure to collect the data. Some of the units were experiencing significant noise on the solar sensor signal lines. To mitigate the noise, Paul and Jeff worked with Scott Newell, Coastal's chief engineer, who modified the bottom Interface Board and designed a new Interface Board connection cable.

Paul and Jeff also refurbish WEATHERPAKs that were traded in. They go through each system and check sensors to make sure they are still working correctly and within tolerances, replacing O-rings, and giving them a cleaning.

### What's left?

On occasion, our service department even provides on-site repair and servicing; this is more typical with Coastal's large AWOS installations.

Is there anything they can't fix? It's rare, but there are a few old hazmat WEATHERPAKs that have ZENOCOM processors. These predate Coastal's ZENO datalogger developed in the mid-1980s. Unfortunately, we can no longer get parts to fix them.

Additionally, Paul and Jeff may be called upon to fix sensors that Coastal doesn't usually integrate. They do what they can here first—get a copy of the user manual, contact the manufacturer for information on how to communicate with the sensor, and troubleshoot. If that fails, the sensor is returned to the manufacturer.

Such a case was a WEATHERPAK mounted on a research vessel sold to the Mexican government. That system included a multi-purpose ocean sonde that had three or four chemical sensors. The sonde was connected to the WEATHERPAK through an umbilical cord that ran through the ship's hull.

### More about the guys:

Paul is also a professional voice actor, and the owner of Paul E Garner Voice Overs. You can hear Paul's rich baritone on Coastal's Aviation INTERCEPT® videos.

Jeff is known around Coastal for the many questions he asks. He designed and built his own home on Bainbridge Island all while living in a yurt with his wife and two children. He is prepping for his next adventure scheduled to start in about six months – becoming a grandpa!



Paul Garner



Jeff Cericola



**Coastal offers one- and three-year (or longer) Preventive Maintenance and Inspection (PMI) plans for all Coastal products. For more information, call +1 (206) 503-2461 or email [support@coastalenvironmental.com](mailto:support@coastalenvironmental.com).**