



# CO-OPS Current Sensors Data Telemetry and Formatting

NOAA/NOS

Center for Operational Oceanographic Products and Services  
User Report

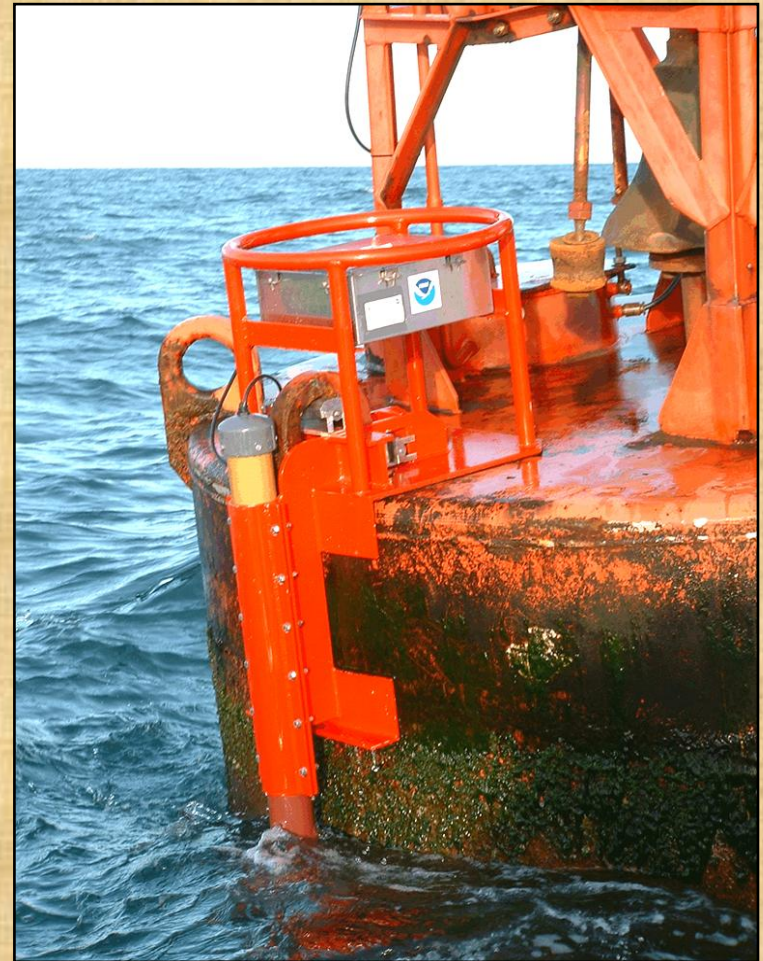
IHO Currents Working Group

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# Program Elements

## Physical Oceanographic Real-Time System (PORTS®) Aids to Navigation (ATON) mounted current sensors (ADCPs) and shore/offshore bottom mounted and sidelooking ADCPs

- PORTS® provides real-time information in support of safe and efficient maritime commerce. CO-OPS has partnered with the U.S. Coast Guard (USCG) to install current measurement systems on existing aids-to-navigation (ATON) buoys.
- The entire package weighs approximately 200 pounds and is easily deployed using a small vessel and a block and tackle.
- The ATON current profiler is a 1-megahertz (MHz) NortekUSA Aquadopp current profiler, selected for compact size and low power consumption.
- Data from each ATON system (fig. 1) are sent via radio to a data collection platform (DCP) at a shore station.
- The radios are manufactured by MaxStream and use a frequency-hopping spread-spectrum modulation technique with a maximum transmitting power of 1 watt
- The longest radio link in the Chesapeake Bay PORTS® is just over 16 kilometers (km).
- Shore/offshore bottom mounted and SL-ADCPs are setup with direct communication with the co-located datalogger and data telemetry systems.





# Program Elements



## Datalogger: Sutron 9210B (Xpert series)

- Sets the sensor's date and time at startup
- Sets the time of first ping and starts the system
- Checks and adjusts the current meter's clock to GMT daily
- Allows for added sensors such as
- winds, barometer or CT
- Ability to assign a station name that is attached to the GOES and PORTS® tag data sets



## Data Telemetry:

- Via IP modem (or landline) every six minutes data is polled
- Via GOES every six minutes



# Data Formatting

A compression technique similar to that used for NOS 6-minute water level data transmissions was developed to encode the current meter data using a Pseudo Binary Data Transmission scheme that reduces the size of the data transmission. The data is then transmitted via GOES and can be downloaded via IP modem / landline telephone

The actual GOES message looks like this:

```
ADCptestH@PM878@A@J@H@T@L@{@K@B@B@A@AH@cFPBVDIDkH_?@D??@hdAAo@A@A_?@@B@@DCo?H@@@@@
@@AfBaAfBc@Q@Q@@@@@BPCw@@Av+AAWAUAB@A@@_+B|m|QCSAa@R@P+Cyo}gC?BI@P@P+D}x@aC?Bc@P@P+E~]BLC?
BT@P@Q+F?f@EC?BY@P@P+G{GAZC?BO@P@Q+HA\?xC?BJ@P@Q+I@~~kC?BM@P@Q+J|R|{C?BP@P@P+KxtA@C?BP@P@Q+L
D??|C?BS@P@P+M@OzIC?BR@P@Q+NyuAuC?BQ@P@Q+O~_B^C?BZ@P@Q+Pzy~pC?BQ@P@Q+QxQ|pC?BU@P@Q+R@K@GC?
BQ@P@P+SyL~`C?BT@P@Q+T~G|yC?BJ@P@Q+UESBVC?BR@P@Q+Vu{DGC?BM@P@Q+W?v@KC?BU@P@Q+Xzj@eC?BU@P@Q+
Y@T?JC?BL@P@Q+ZAT~kC?BU@P@Q+[Ag@mC?BU@P@Q+\As{WC?BY@P@Q+]?FAzC?B[@P@Q+^GUA[C?BR@P@P+_xo?vC?BZ@
P@Q+`@sBkC?BM@P@Q+ayFBIC?BM@P@Q+bCN~tC?BS@P@P+cDY?{C?B\@P@Q+@@@@@@@@@@@@@@@@
```

This compression scheme reduces a Sontek 1,600 character ASCII message into 600 characters, requiring less than 5 seconds to transmit. An RDI 1,800 character hexadecimal message is reduced to 1,200 characters, requiring less than 10 seconds to transmit.





# Future Plans

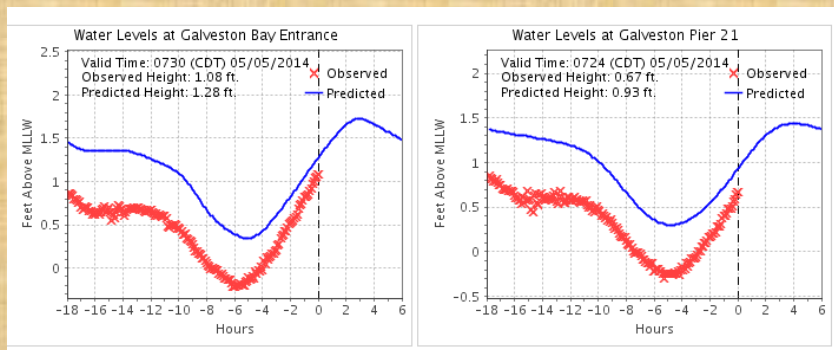
- Eliminate Radio Link system on ATON by incorporating datalogger with Iridium Short-Burst Data modems on the buoy
- Use of long-life Lithium batteries
- Wind speed sensors at current meter stations
- Use of type of advanced transducer technologies to obtain surface currents



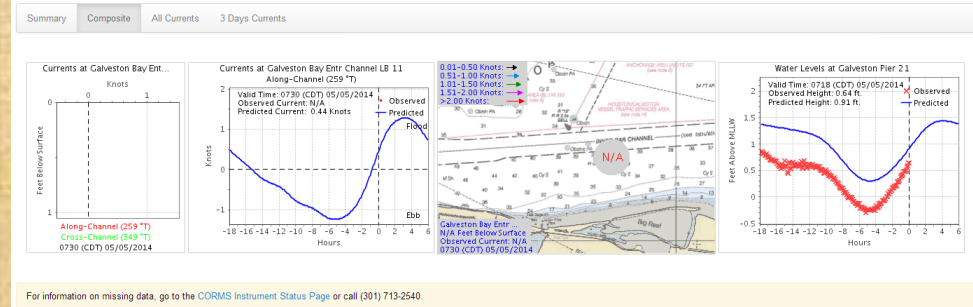
# Physical Oceanographic Real-Time System (PORTS)



- Charleston Harbor
- Cherry Point
- Chesapeake Bay North
- Chesapeake Bay South
- Delaware River and Bay
- Houston/Galveston
- Humboldt Bay
- Jacksonville
- Lake Charles
- L.A./Long Beach
- Lower Columbia River
- Lower Mississippi River
- Mobile Bay
- Narragansett Bay
- New Haven
- New London
- NY/NJ Harbor
- Pascagoula
- Port of Anchorage
- Sabine Neches
- San Francisco Bay
- Soo Locks
- Tacoma
- Tampa Bay



PORTS®: g06010 Galveston Bay Entr Channel LB 11



# Contact Info

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