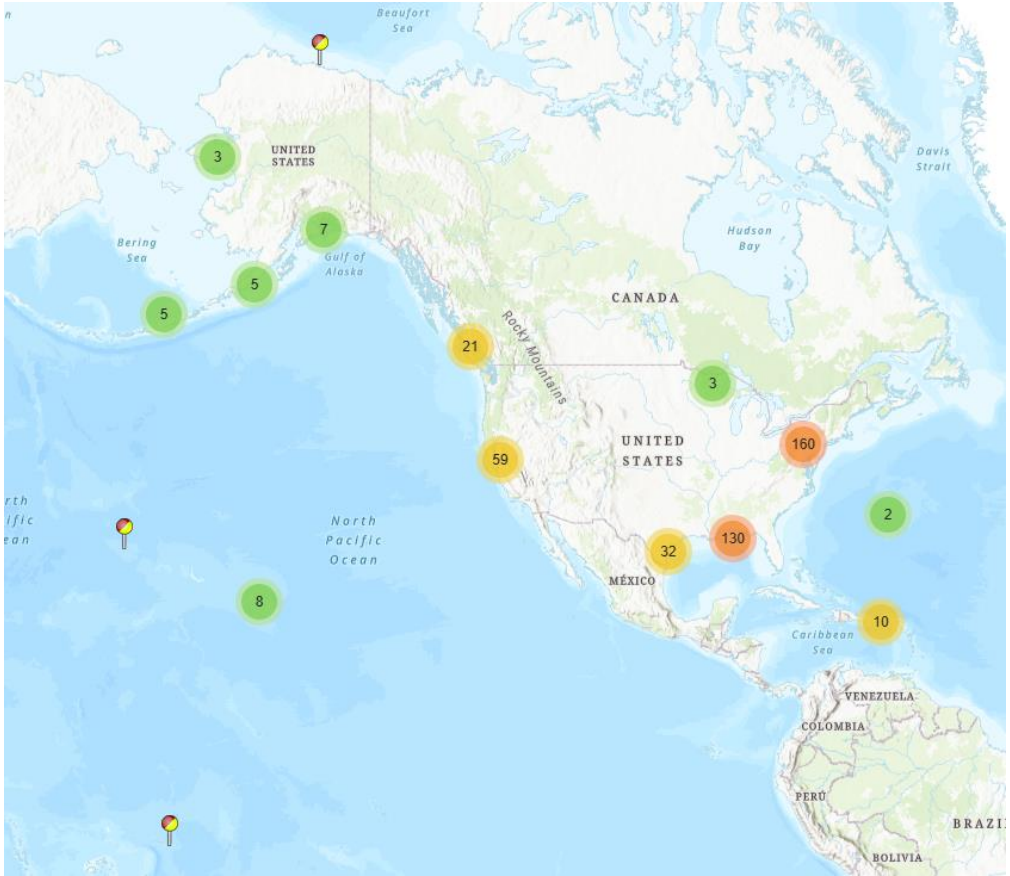
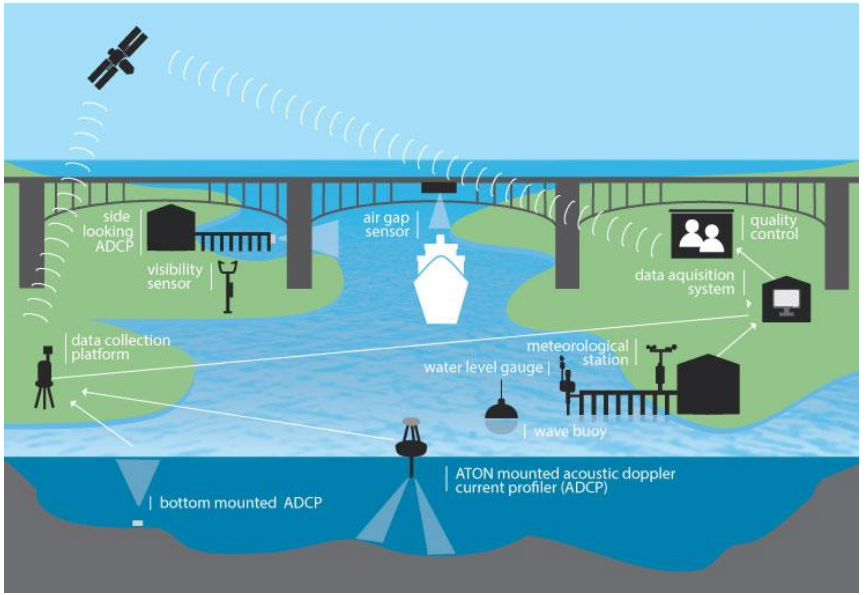
NOAA/NOS/CO-OPS Spring 2025 DCS User Report

Nathan Holcomb and David Ilogho

National Water Level Observation Network (NWLON)



Physical Oceanographic Real-Time Systems (PORTS®)



Physical Oceanographic Real Time System (PORTS®)

PORTS® is a **partnership** with responsibility shared between NOAA and the local maritime community.

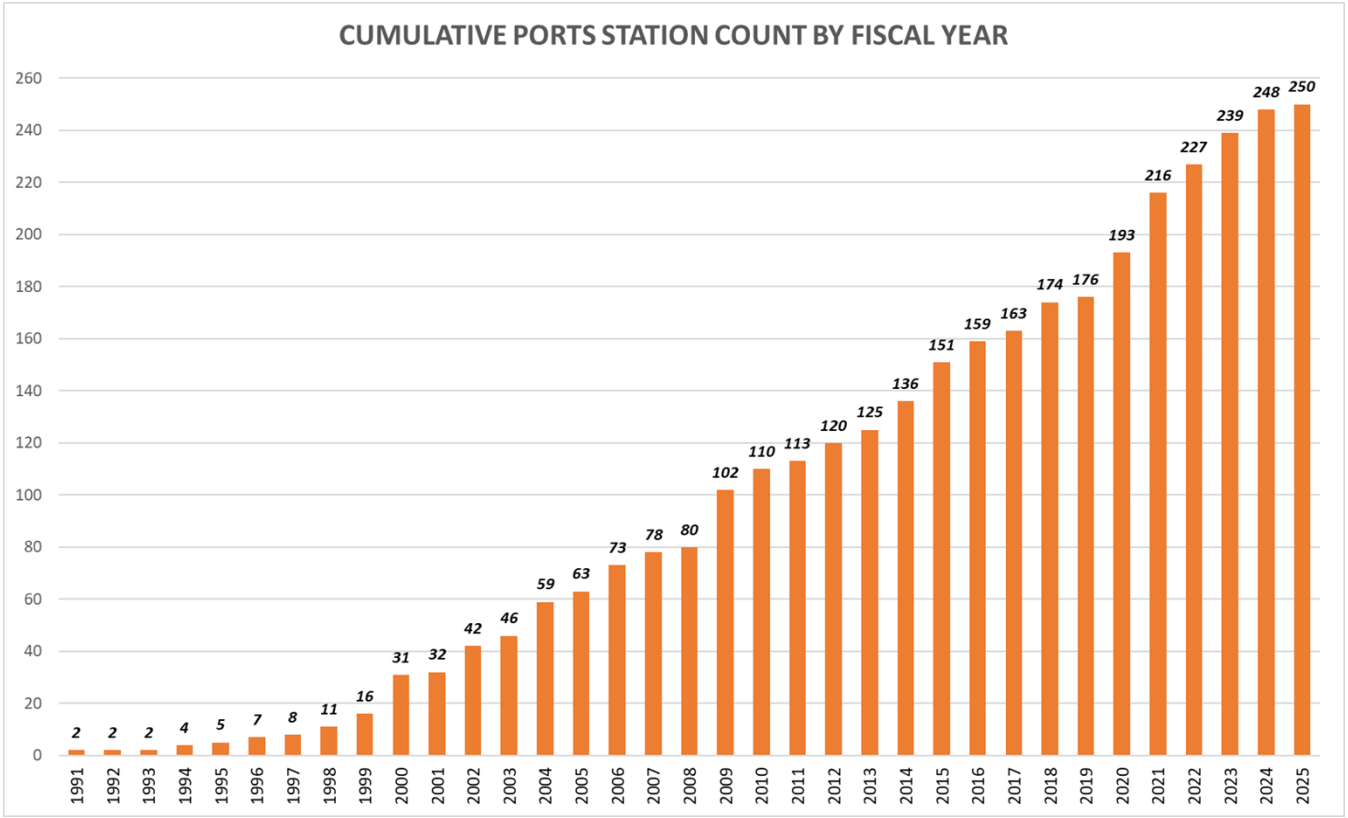
NOAA

- **Program management**
- **Data collection and infrastructure**
- **Data dissemination**
- **24/7 quality control**
- **National standards**
- **Development for future enhancements**

Partner

- **Site selection for a user-defined system**
- **Funding for local:**
  - **Equipment**
  - **Installation**
  - **Annual operation**
  - **Maintenance**

Physical Oceanographic Real Time System (PORTS®)
38 Systems Nationwide Supporting 87 top U.S. Seaports

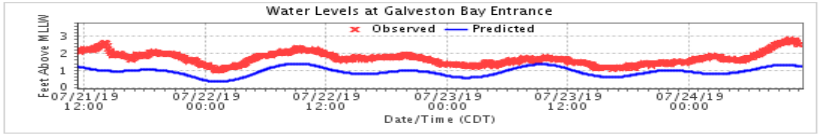


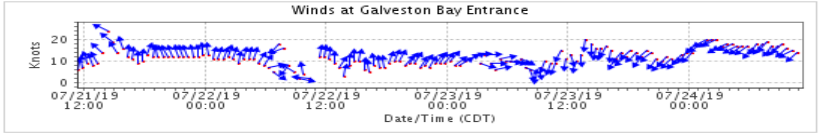
PORTS incorporates over 250 real time *stations* + use of 59 NWLONs

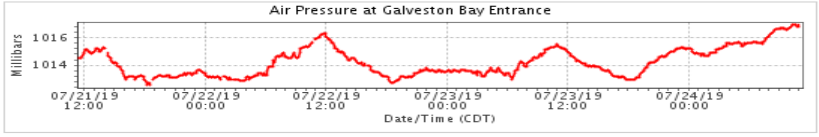
Water Levels and Meteorology

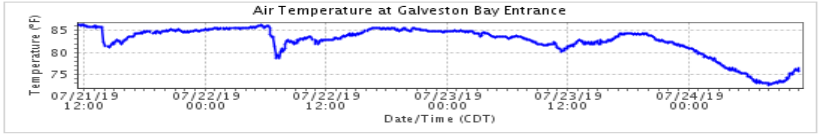
PORTS®: 8771341 Galveston Bay Entrance, North Jetty, TX

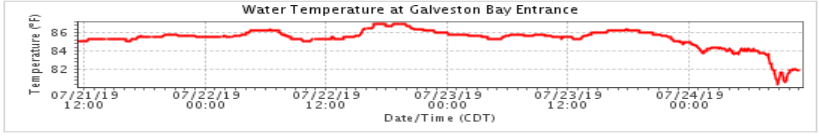
Summary | All Water Levels | 3 Days WL/Met | All Met



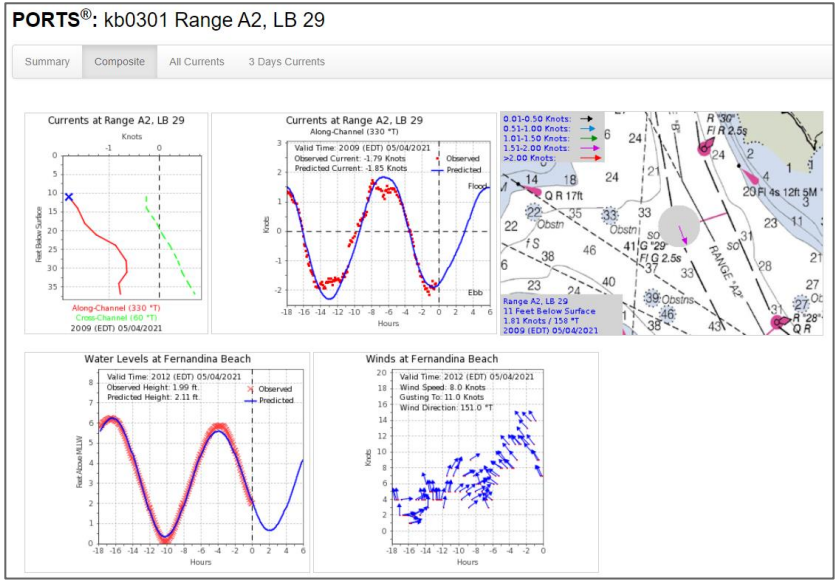


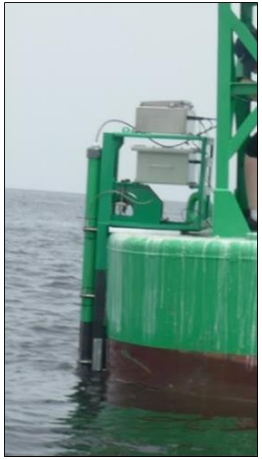


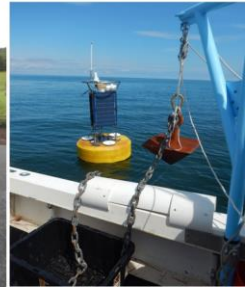




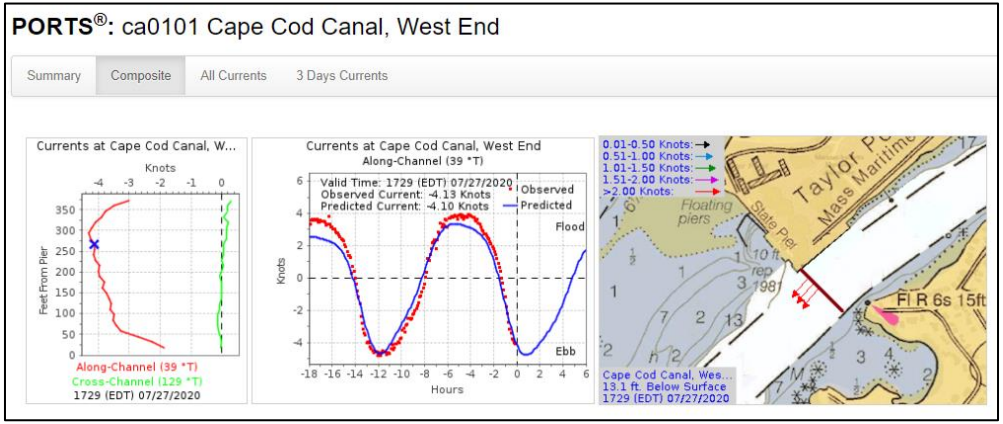
Buoy Mounted Current Meters



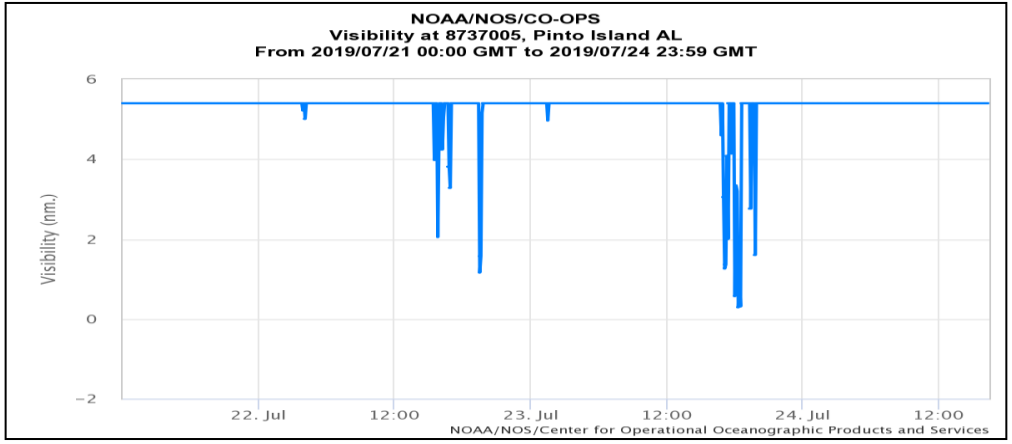




Horizontally Mounted Current Meters



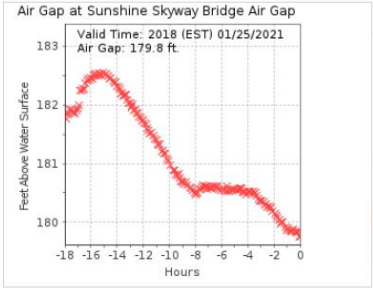
Visibility (Fog)

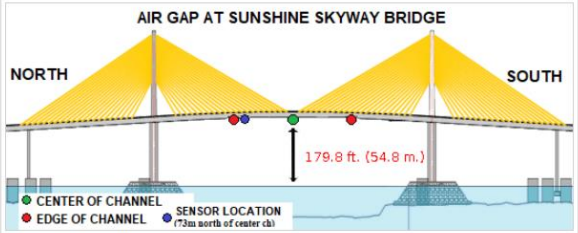


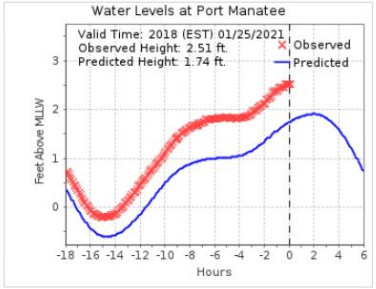
Bridge Air Gap

PORTS®: 8726371 Sunshine Skyway Bridge Air Gap, FL

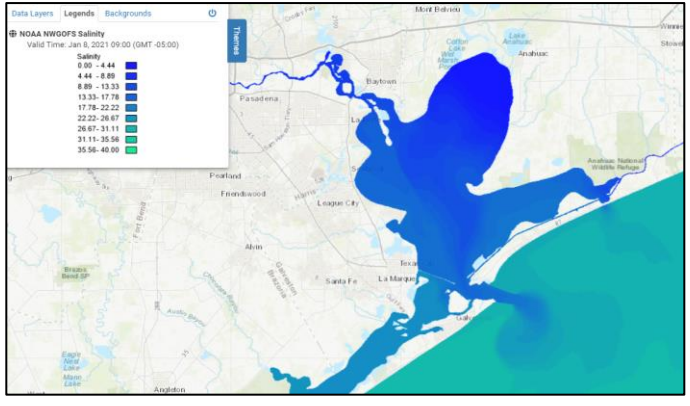
Summary | Composite | Air Gap | 3 Days Air Gap

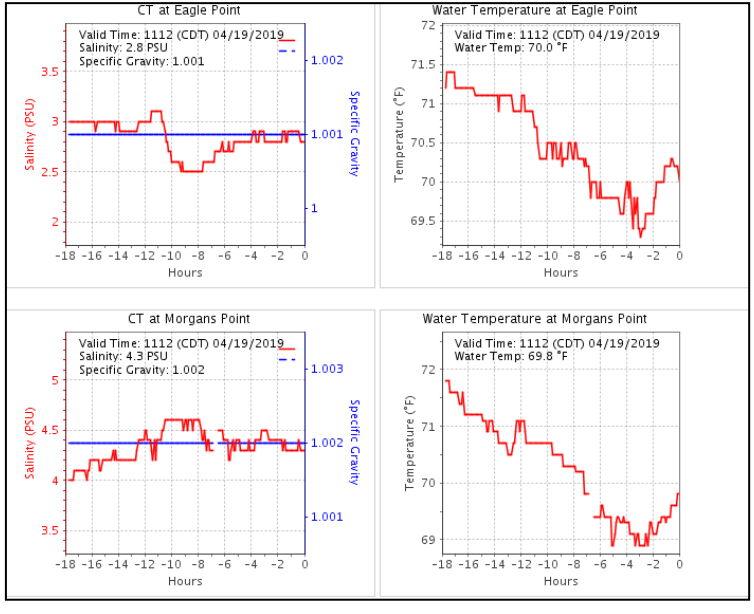






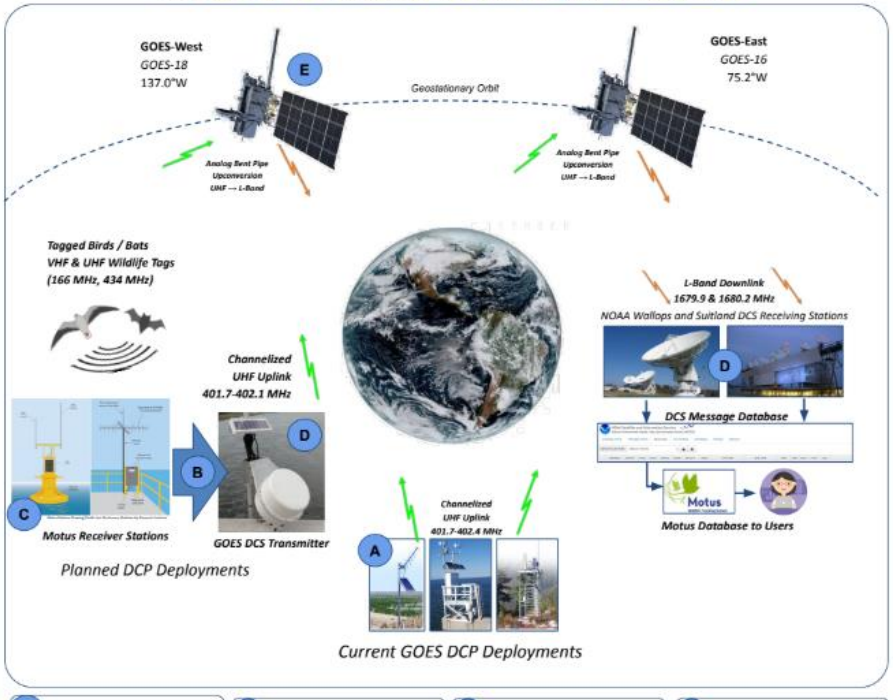
Salinity

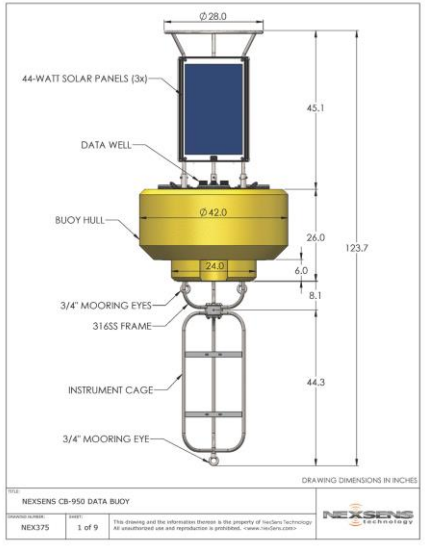

Data Layers | Legends | Backgrounds
NOAA NWGOFS Salinity
Valid Time: Jan 8, 2021 09:00 (GMT -05:00)
Salinity
0.00 - 4.44
4.44 - 8.89
8.89 - 13.33
13.33 - 17.78
17.78 - 22.22
22.22 - 26.67
26.67 - 31.11
31.11 - 35.56
35.56 - 40.00
Themes
Mont Belvieu
Baytown
Pasadena
Anahuac
Pearland
Friendswood
League City
Alvin
Santa Fe
La Marque
Texas City
Anahuac National Wildlife Refuge
Angleton


CT at Eagle Point
Valid Time: 1112 (CDT) 04/19/2019
Salinity: 2.8 PSU
Specific Gravity: 1.001
Salinity (PSU)
Specific Gravity
Hours
Water Temperature at Eagle Point
Valid Time: 1112 (CDT) 04/19/2019
Water Temp: 70.0 °F
Temperature (°F)
Hours
CT at Morgans Point
Valid Time: 1112 (CDT) 04/19/2019
Salinity: 4.3 PSU
Specific Gravity: 1.002
Salinity (PSU)
Specific Gravity
Hours
Water Temperature at Morgans Point
Valid Time: 1112 (CDT) 04/19/2019
Water Temp: 69.8 °F
Temperature (°F)
Hours

Motus Updates

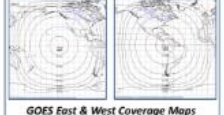
Motus+DCS Wildlife Telemetry Architecture





A GOES DCS Network

- **32,606** Active Data Collection Platforms, with coverage from:
  - Arctic to Antarctic
  - Western Pacific to West Africa
- 300 & 1200 baud rate channels
- ~**1 million** messages per day
- 8-Phase Shift Keying (8-PSK) modulation
- Periodic reporting (user defined), typically 6 min to 1hr

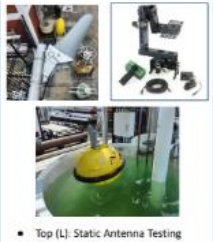


GOES East & West Coverage Maps

B Motus-DCS Integration

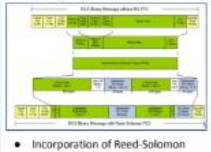
- Universal Arduino-Giga based interface board (2) between DCP (3) RS-232 & Raspberry Pi based Motus 'SensorGnome' (1)
- 434 MHz (5) & 166 MHz (4) Receivers

C Buoy Test & Integration

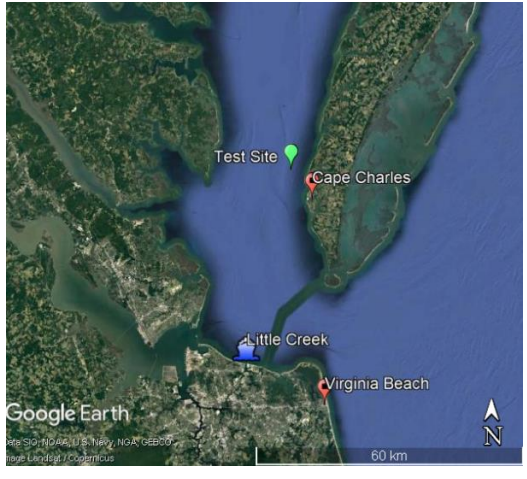


- Top (L): Static Antenna Testing
- Top (R): Dynamic Antenna Testing
- Buoy Dynamic Validation

D DCS Protocol Enhancements

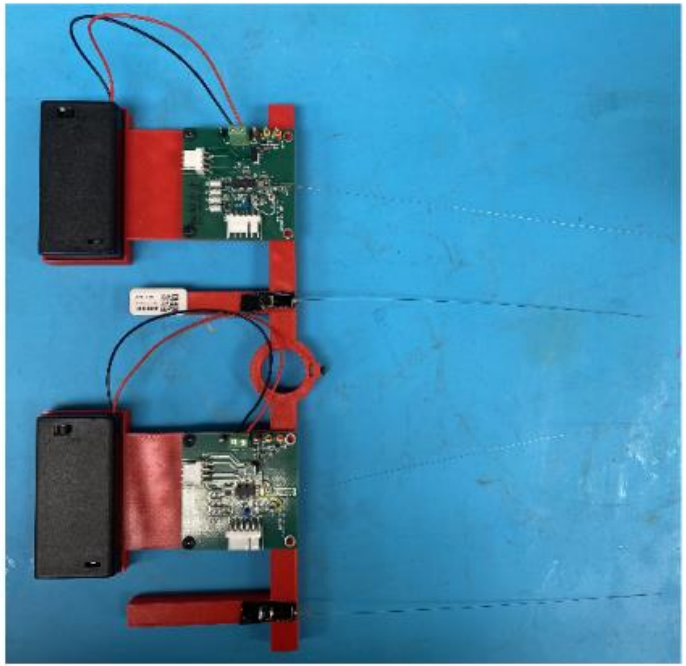


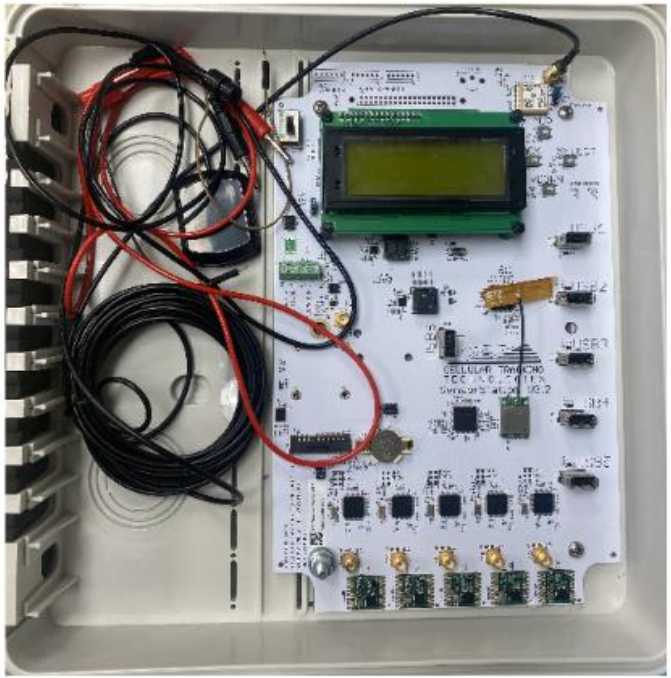
- Incorporation of Reed-Solomon Forward Error Correction
- Addition of Binary Phase Shift Keying (BPSK) & Offset Quadrature Phase Shift Keying (OQPSK) modulation @ 400 & 800 baud rate
- Bench validation using simulated buoy conditions via DCS test transmitter
- Field testing of upgraded DCP & updates to ground demodulators



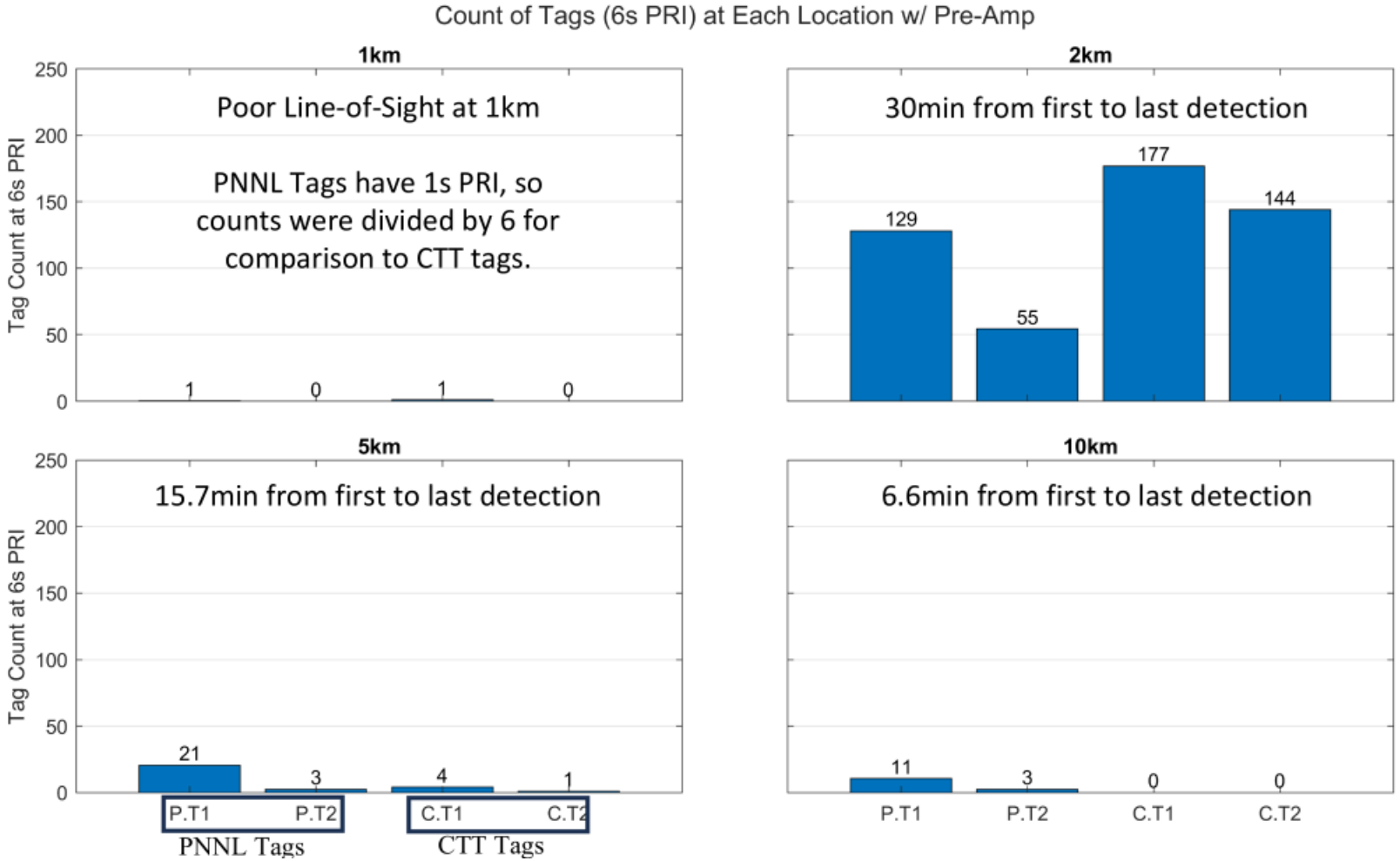
Badger Mt. Range Tests

- Two PNNL 434 MHz prototype transmitters were used and two CTT LifeTags were used.
  - The PNNL tags are P.T1 and P.T2.
  - The CTT LifeTag are C.T1 and C.T2.
- The following results are based on detections and signal strengths as recorded by the CTT Receiver with a pre-amplifier between the antenna and the receiver.

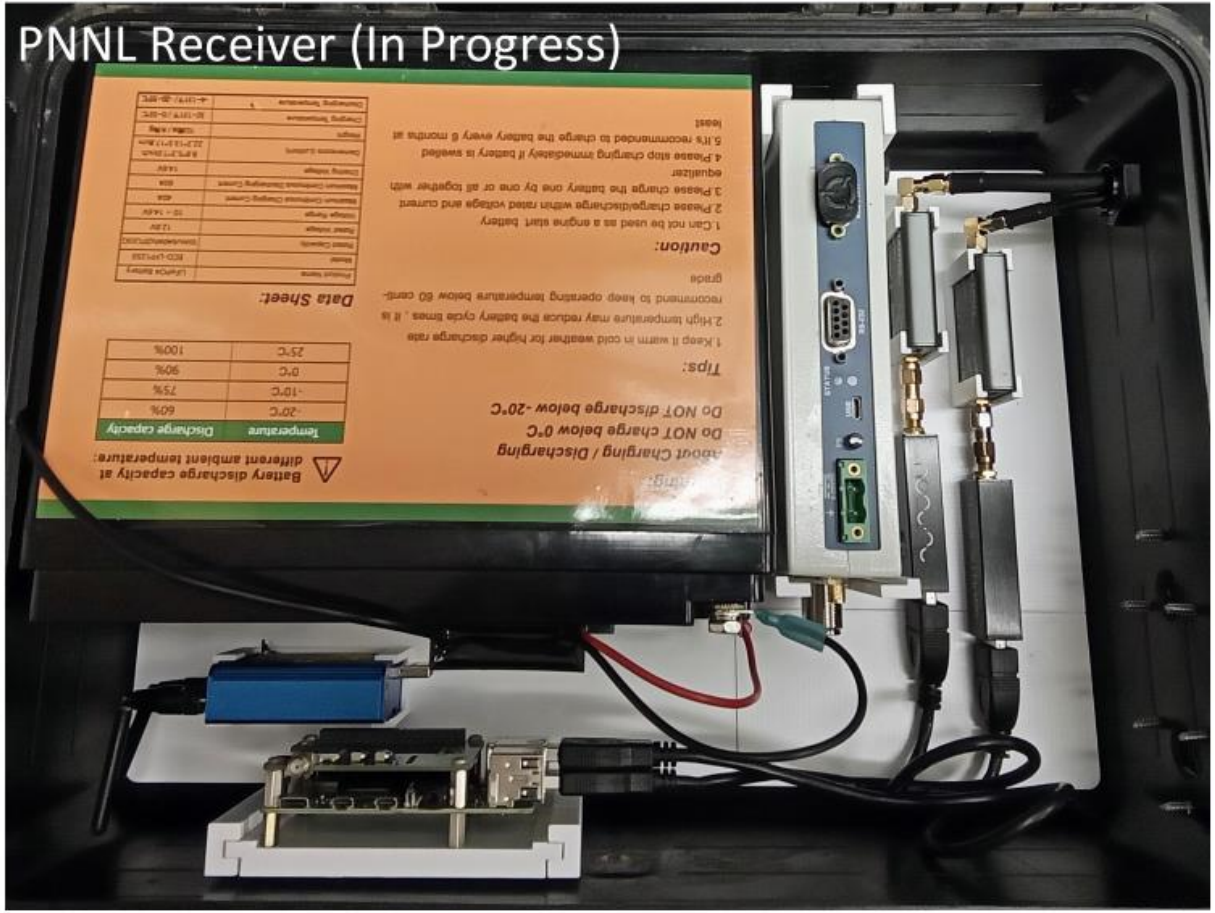




Count of tag detections at each location on CTT Receiver



Transmitting Data over GOES from PNNL RF receiver



- Successfully transmitted Arbitrary Tag Statistics over GOES via communication between PNNL receiver and the SL3 on top of Badger Mt.
- Used Random Tx Channel.
- Need to determine format of transmissions
- Will conduct a day- or week-long test using scheduled transmissions