Communication and Engagement Surrounding NOAA Air Gap Data

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Physical Oceanographic Real Time System (PORTS®)

- First established in 1991
- Shared responsibility partnership program. Focuses on real-time observations, collected and disseminated in a variety of ways
- Water levels, currents, winds, temperature, visibility, salinity and bridge air gap
- Systems are tailored to the needs of local mariners
- PORTS® currently operates in various bays and harbors in the U.S.
NOAA Air Gap

- A tool that measures the vertical clearance between a *defined reference point* under a bridge and the surface of the water below.
- Data are collected at a high frequency and updated for the public every six minutes to account for changes in water level, vehicular loads on the bridge, air temperature, and other factors.
- Information is critical for pilots to safely navigate a ship under a bridge, especially as U.S. seaports grow and vessels continue to increase in size.
Background

• The first air gap sensor in PORTS® became operational in 2003
• Technology for collecting air gap data has changed over the years
• As ship sizes & seaports grow, so does the need and importance of air gap
• Air gap observations must be quality-controlled and verifiable to accepted standards and follow stringent requirements
Existing Air Gap observations in PORTS®

- 19 active locations + 2 more in the works + additional areas of interest
- Part of 11 PORTS® - most have more than 1 air gap sensor
Sensors and equipment

- Combination of radar and laser technology; sensor technology has evolved quite a bit!
- Overall system costs much less than it used to
- Traditionally utilized a single data collection platform
- Now employing very similar Microwave Radar technology used for water level
- Microwave radar high accuracy readings to 70 m/230 feet distance
- Implementing changes to standard installs moving forward
How data is visualized and disseminated

• Through typical PORTS® pages -- Graphically, text, voice
• Data Application Programming Interface (API)

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<table>
<thead>
<tr>
<th>Summary</th>
<th>Air Gap</th>
<th>3 Days Air Gap</th>
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<tbody>
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Air Gap/Bridge Clearance (above water)

<table>
<thead>
<tr>
<th>Bridge</th>
<th>Clearance</th>
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<tbody>
<tr>
<td>Reedy Point Bridge</td>
<td>135.1 ft Decr.</td>
</tr>
<tr>
<td>Delaware Mem. Bridge</td>
<td>185.5 ft Decr.</td>
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<tr>
<td>Ben Franklin Bridge</td>
<td>133.8 ft Decr.</td>
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</tbody>
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Port Name: 8726371 Sunshine Skyway Bridge Air Gap, FL

Air Gap at Sunshine Skyway Bridge Air Gap

Summary | Air Gap | 3 Days Air Gap
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Port Name: 9410676 Vincent Thomas Bridge Air Gap, CA

Air Gap at Vincent Thomas Bridge Air Gap

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DISCLAIMER: The air gap systems have been created by NOAA/NOS to provide the maritime community with improved information of bridge clearances. These real-time data are accurate to within ±1 inch. They are released for limited public use as preliminary data to be used only with appropriate caution when clearing the bridge.
Challenges in conveying air gap specifics

- Every bridge design and waterway is different
- Limited widespread understanding of bridge specifics
- Definition or understanding of ‘Low Steel’ on specific bridges differs
- Charted bridge clearances are sometimes referenced to different datums from one region or waterway to another
- Often a desire in some areas to determine air gap ‘manually’ (water level vs charted clearance)
- Most cases the bridge owner is different than the air gap sponsor/users
Air Gap data considerations

- Prior to installation of an air gap sensor and dissemination, NOAA works closely with our PORTS® partner and other local users to define an ‘air gap reference point’
- The ‘air gap reference point’ on the bridge might or might not differ from low steel, as defined by the USCG
- Real-time air gap measurement on the PORTS® webpage will vary from the fixed vertical bridge clearance value displayed on the associated NOAA Nautical Chart
- The point on the bridge designated as the air gap reference point is not necessarily directly below the air gap sensor
- Other non-structural components such as navigation lights, radar beacons/RACON, etc. attached to the bridge that extend below the point designated reference point
- Pilot groups often implement their own business rules/buffers in air gap data
Air Gap Notice Letters

• Initiative that began in 2019 in order to standardize how air gap information is shared with the wider maritime community and that all users understand parameters.
• Allowed comprehensive documentation audit of all air gap installs
• Developed a very strict workflow/checklist for letter generation
• Letters now officially on file for all operational air gaps – consistent format
• Any offset changes or equipment relocation codified though updates to letters, distributed
• Each letter highlights the following:
  o Exactly where air gap equipment is located on the bridge
  o Defines each bridge's determined ‘air gap reference point’/relation to navigation channel
  o Where equipment is located in relation to ‘air gap reference point’
  o Precise leveling and measurement procedures
  o Station photos, diagrams and schematic
• Distributed broadly to wide range of maritime stakeholders: Harbor pilots, port authorities, shipping agents, USCG, USACE, Bridge owners/operators, marine exchanges
Air Gap data reliability

- Consistency in equipment, hardware, software implemented across the network
- Approved standard for new installs moving forward is Dual data collection platforms (DCP) each with their own MW radar sensors and two modes of comms
- Dual comms methods and dual DCP alleviates data down time!
- More connections to bridge AC Power
- Opportunity offered to existing partners with legacy installs to upgrade to the new standard setup. Consistent interest so far!
Summary

• Air gap data is very valuable and highly relied on
• Widespread outreach and connection with the local maritime community is key with communicating the specifics of air gap data and usage
• Conveying the importance of the ‘reference point’ and what it is and is not
• NOAA makes sure to stay out of any local development of navigation business rules
• Long standing high confidence in accuracy of air gap data being disseminated
• Any questions or confusion surrounding air gap data speaks to the wider need for consistency of referenced datums and charted clearances along U.S. waterways
Thank you!

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