UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Center for Operational Oceanographic Products and Services
Silver Spring, Maryland 20910

MEMORANDUM

TO: The Record

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FROM: Dr. Marian Westley, Director
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SUBJECT: Policy for Dual Air Gap Systems, Air Gap Reference Point Location, and Bridge Infrastructure Requirements for the NOAA Physical Oceanographic Real-Time System (PORTS®) Program

DATE: September 25, 2024

The NOAA PORTS® program provides local mariners with real-time oceanographic and meteorological information needed to safely and efficiently navigate local waterways. In operation since 1991, PORTS® is a highly trusted source for real-time information among the nation's maritime community, and NOAA has documented a 50 percent reduction in accidents in seaports where PORTS® data are available.

PORTS® operates as a domestic cost shared partnership program between NOAA and at least one local partner from the local maritime community who serves as the system's financial sponsor. Working closely with the local maritime community, the partner defines how many and what type of real-time sensors need to go where; provides funding for the purchase and installation of these stations; provides funding for the ongoing operation and maintenance of these stations; and pays to repair and recapitalize these stations, as needed. CO-OPS and its local partner work collaboratively under a Memorandum of Agreement (MOA) to install, operate, and maintain these real-time oceanographic and meteorological sensors. The Federal appropriations that NOAA receives to administer the PORTS® program are used to establish MOAs and manage partner reimbursable financial accounts; manage the installation and ongoing operations of the PORTS® using the local partner's funding; manage, QA/QC, and publicly disseminate real-time PORTS® data; maintain national program standards; and infuse new sensor technologies into the program.

Air gap measurement systems were researched, tested, and adopted by CO-OPS in the early 2000s to provide precise, real-time observations of the vertical distance from an agreed-upon "air gap reference point" on a bridge structure to the water level surface below. These observations provide vessel pilots and other mariners with decision support information that can decrease the likelihood of vessel allisions with bridges.

Air gap data are transmitted via Geostationary Operational Environmental Satellite (GOES) and/or cellular IP modem and ingested into the CO-OPS database. After passing QA/QC validation, real-time air gap data are then displayed both graphically and in text format through PORTS® product pages, and made available through robust Data APIs, which are regularly used by third-party navigation support vendors. All real-time PORTS® data - including air gap data - are quality controlled by CO-OPS 24 hours a day, 365 days a year, to ensure that suspect data are not disseminated.

Every bridge and associated navigation channel configuration is unique. As such, NOAA, the local PORTS® partner(s), the bridge owner, and other marine navigation stakeholders work collaboratively to determine the specific location on the bridge where the air gap systems will be installed, and designate a point on the bridge

that will serve as the “air gap reference point”. The final parameters of each air gap system installation are documented in a standing letter that is widely distributed among the local marine navigation community and also publicly available on the CO-OPS website.

Dual Air Gap Systems Requirement

In accordance with an analysis of NOAA PORTS® program air gap system performance since the early 2000s, CO-OPS recommended a change to the standard configuration for all new air gap installations. This policy adopts that recommended change as a requirement for all new PORTS® air gap systems installed starting in 2022.

1. The standard configuration for all new air gap system installations will be two independent air gap systems. The two systems will have separate air gap sensors, data collection platforms (DCPs), and data telemetry/communications systems. The two systems will be co-located as close as practicable. The second air gap system will serve as a highly-reliable backup for the primary station to help ensure continuous data dissemination, as well as a highly-reliable QC check to the primary station.
2. For any new PORTS® air gap installations, all associated costs for this new standard configuration will be represented in the cost estimate provided to the partner and paid for by the PORTS® partner. These costs will include air gap station equipment acquisition, equipment installation, ongoing data telemetry costs, ongoing maintenance costs, station recapitalization, and station removal. The associated MOA will reflect this new standard configuration.
3. CO-OPS has determined that this change to the standard configuration will help mitigate overall downtime in real-time air gap observations. However, due to the cost impact on the local partner, CO-OPS highly recommends, but does not require this upgrade for existing air gap stations installed prior to 2022.
4. It is the intent of this policy to continue phasing out and removing outdated laser backup sensors at existing air gap systems.
5. CO-OPS shall coordinate and determine the best suitable air gap sensor technology to be utilized at a given location. The list of currently accepted air gap sensor technologies can be found in the air gap sensor section of the CO-OPS Environmental Measurement Systems Sensor Specifications and Measurement Algorithms.

Air Gap Reference Point Location Requirements

This policy adopts the following requirements related to the “air gap reference point” for all PORTS® air gap systems. The air gap reference point is defined as the point on the bridge from which the distance to the water’s surface will be displayed as the air gap measurement on the PORTS® webpage.

1. For all new PORTS® air gap system installations, the designated air gap reference point shall be in close proximity to the air gap system, as determined on a case-by-case basis. The ideal setup is that the dual air gap sensors are located directly above the desired air gap reference point; for example, at a center channel navigation light. The intent of this requirement is to ensure the real-time air gap measurement is not adversely affected by bridge deflection and/or vibration caused by environmental factors such as wind, temperature changes, and varying vehicular load on the bridge. These sources of air gap measurement error normally increase as the horizontal distance between the air gap system and the air gap reference point increases.
2. CO-OPS will work to update all existing air gap system installations where there is a significant horizontal distance between the existing air gap system and the designated air gap reference point. This will be accomplished by either moving the air gap system within close proximity of the desired air gap reference point, or by moving the air gap reference point to the location of the air gap system (and then collecting and documenting updated vertical offset measurements). In either case, the associated costs will be covered by the local partner. The final parameters of the air gap system installation will be updated accordingly in the standing letter that is widely distributed among the local marine navigation community.

Bridge Infrastructure Requirements for Air Gap Systems

This policy adopts the following bridge infrastructure requirements for PORTS® air gap systems.

1. Where a new air gap system is requested by the marine navigation community and is supported by a local financial sponsor, CO-OPS shall coordinate a site reconnaissance on the bridge to determine if there is an adequate existing platform or other infrastructure at the desired air gap reference point, and if this is not the case, determine if there are alternate locations to install the dual air gap systems that meet both CO-OPS standards and local user needs.
2. In cases where adequate bridge platform/infrastructure does not exist, as determined by the CO-OPS-coordinated site reconnaissance, the air gap reference point can be moved to a location with an appropriate platform/infrastructure, or the local partner and/or bridge owner can lead an effort to have appropriate platform/infrastructure added to the bridge at the desired air gap reference point. Ideally, the local partner will work directly with the bridge owner, if different from the local partner, to add appropriate infrastructure to the bridge at the desired air gap reference point. CO-OPS will be available for consultation during this process, but note that CO-OPS does not provide (1) engineering design work for bridge platforms (besides past conceptual designs used at other bridges), (2) project management services for the installation of a bridge platform/infrastructure, nor (3) accept funding for third party contract execution of related design, fabrication, or construction work for a bridge platform/infrastructure. It is the responsibility of the local partner, working closely with the bridge owner to provide an acceptable platform (or other bridge infrastructure) upon which to install the air gap systems.
3. CO-OPS can provide existing conceptual designs of platform infrastructure that have (1) adequate room for the installation and ongoing maintenance of the air gap systems and (2) address safety considerations for maintenance crews. Safety considerations are related to crew access to the air gap systems and collaboration on any necessary lane closure procedures or traffic pattern adjustments during maintenance visits.