

Marine

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ARGUS: Enviably Technology, Unlimited Potential

System is designed to universally interface with a vessel's existing navigation equipment and autonomously deliver water depths seen by the vessel to a central server. Almost four years and 100 million soundings later, the concept is a reality.

By Joseph Keefe

Almost two years after we first reported (December 2011 edition of *MarineNews*) on an innovative, depth sounding recorder device that made wide swaths of data available to perhaps anyone who wants it, the concept envisioned by ARGUS has developed into a viable tool that could change the way that government agencies schedule surveys and dredging. Beyond that, the resource represents a valuable asset for commercial and pleasure mariners alike who, if they so choose, can “take advantage of the depth sounder on the boat in front of them.”

HOW IT WORKS

Today, about 40 boats have voluntarily placed on board their vessels the ARGUS (Autonomous Remote Global Underwater Surveillance) system transmitters. ARGUS is designed to universally interface with a vessel's existing navigation equipment and autonomously deliver water depths seen by the vessel to a central server. In April, SURVICE and the ARGUS inventors, John and William Hersey, received from the U.S. Patent and Trademark Office a patent for the ARGUS system. SURVICE, the parent company of the ARGUS effort, provides service to the Department of Defense, among others, performing survivability testing, simulation, and modeling. According to John Hersey, the ARGUS service is a natural outgrowth of that business.

ARGUS, in operation and field testing since 2010, automates the acquisition and processing of depth, environmental, and meteorological data from coastal and inland waterways and provide the data to Government, commercial, academic, and other interested organizations. The autonomous onboard system (without the need for any crew intervention) continuously processes and transmits GPS position and single-beam sonar data from a growing network of commercial and recreational mobile marine platforms to supplement nautical charts, many of which have become outdated and inaccurate.

SURVICE characterizes the patented system as “crowd-sourced” bathymetry (CSB), perhaps akin to the efforts being put forward by disaster first responders who hope to better harness the power of social media outlets. This innovative approach to data collection, however, leverages existing infrastructure and a potentially unlimited workforce. The cost-sharing of data products results in low-cost bathymetry and other data and utilities that are valuable to many different interests. Since 2010, ARGUS has acquired more than 100 million soundings from a distributed fleet of vessels navigating U.S. and international waters.

Signals can be transmitted via WiFi or SATCOM and can be viewed in “real time,” if desired. Each dot on a typical ARGUS solution depiction represents at least 140 soundings. Those soundings, initially reported without input for the state of the tide or other variables, are corrected automatically after transmission and before posting.

UNLIMITED POTENTIAL

Backend processing of the data from all participating vessels is used to provide the latest condition reports back to the vessels to optimize route planning and navigation safety, and in the case of the inland waterways, could be used to optimize barge loading based on the current depth conditions. The system can contribute to the Corps' mission at a minimum as a reconnaissance tool, highlighting for them areas that require expenditure of their resources vs. those that do not. ARGUS is a self-enabling technology for the inland waterways industry, providing condition reports at a fraction of the cost and at a speed many times faster than what it takes the Corps to provide updates to the waterway charts.

In early June of 2013, a demonstration was conducted in coordination with the Port of Pittsburgh Commission's (PPC) Wireless Waterways program. As reported in the October 2012 edition of *MarineNews*, the \$1.3 million wireless project was funded by a \$975,000 federal port se-

curity grant and \$325,000 from the nonprofit port commission, an organization that supports the region's river transportation system. The event provided an opportunity for companies with technologies that could fit into the Wireless Waterways framework, and also contribute to needs of the Port to demonstrate those technologies. SURVICE participated with its patented ARGUS platform, deployed on the RiverQuest Explorer, on Campbell Transportation and Consol Energy vessels, and on the Platypus unmanned surface vessel. ARGUS solutions were displayed on the Maritime Situational Awareness Portal (MSAP) and refreshed every two minutes based on incoming data, providing real-time display of bathymetry updates through the wireless Portal. The solution sets, received from active vessels, truly represented a first in the application of crowd source bathymetry and went right to the heart of its purpose: *providing users with current information.*

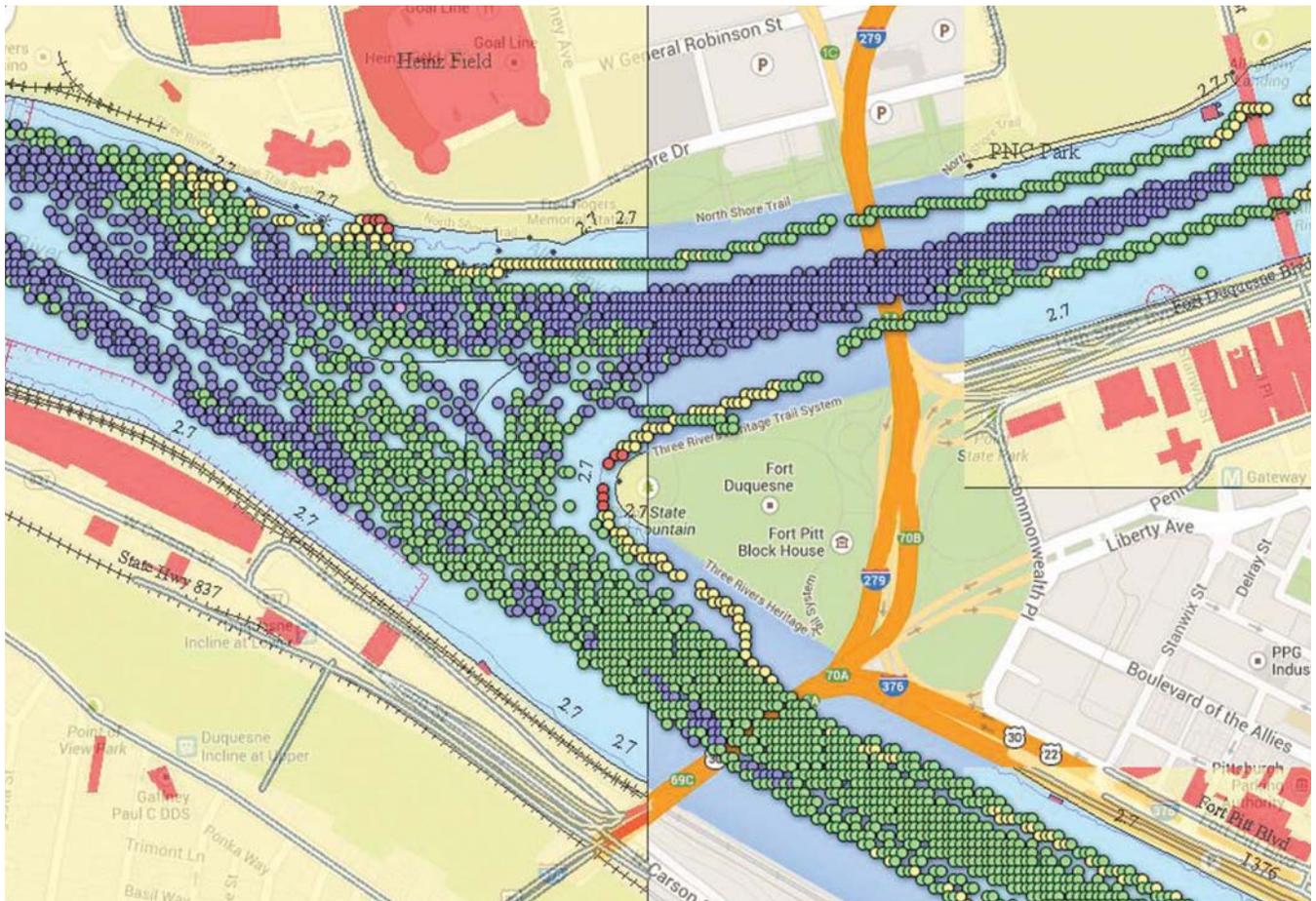
PARTICIPANTS & PARTNERS

Over time, many commercial, private and pleasure operators have participated in the ARGUS effort. Commercial firms such as McAllister towing, at least one Cruise

Line operator (who did not want to be identified), Rivercrest (classroom), Campbell Transportation, Consol Energy, and the Platypus unmanned surface vessel have all at one time or another had ARGUS equipment deployed on board. Beyond this, ARGUS has collaborated on one level or another with the port of Pittsburgh, NOAA, the University of New Hampshire and many others.

DOWNSTREAM APPLICATIONS

Eventually, it is hoped that ARGUS will be a primary tool in helping to prioritize dredging areas, surveys and could also substitute for a dredging schedule that may not reflect real needs. In a world where cruise lines increasingly go to places not considered mainstream ports that lack reliable soundings, the participation of local boaters in the ARGUS scheme could provide real commercial value in that regard. Yachts and others cruising on intercoastal waterways could benefit immediately by using improved, community generated chart products at a fraction of the cost of current methods, and in places that haven't been surveyed in decades. And the Wave WiFi, integrated into the ARGUS onboard units for data offload, provides mul-



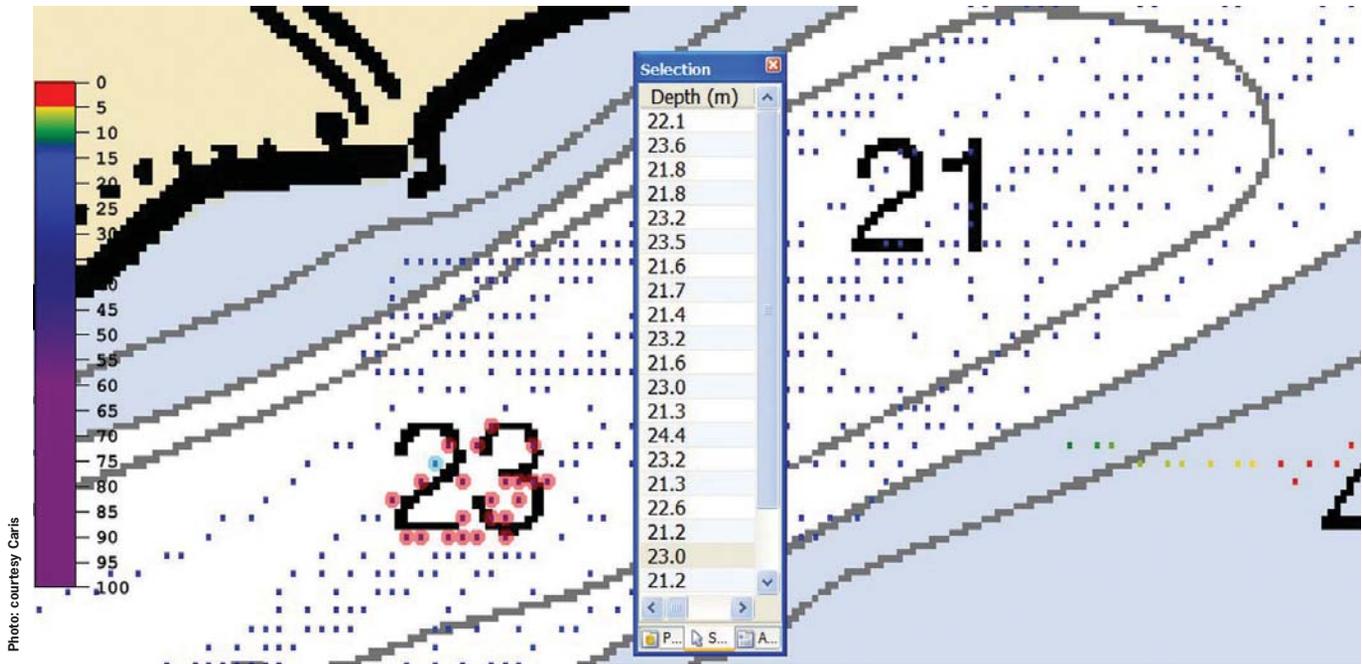


Photo: courtesy Caris

Screenshot of individual soundings around a particular datum point give mariners a clear view of actual conditions.

ICW Study Area					% of Soundings		
Start Location	Mile Marker	End Location	Mile Marker	Distance (mi.)	Total No. Soundings	Depths < 12'	Depths < 6'
Atlantic ICW (Norfolk, VA)	0	Fort Pierce, FL	965	965	277,078	9.1	0.1
VA/NC Border	35	Winn Bay	105	70	12,207	31.7	0.0
Bogue Sound	215	Carolina Beach	295	80	15,197	5.9	0.0
North Myrtle Beach	345	International Drive	360	15	7,390	13.3	0.0
Georgetown	400	Charleston	460	60	23,520	29.9	0.2
Edisto Island	500	Beaufort	535	35	11,517	14.7	0.2
Hilton Head Island	560	Savannah	585	25	12,163	6.1	0.0
Saint Catherine's Sound	625	Jekyll Sound	685	60	23,755	9.6	0.1
Fernandina Beach	720	Jacksonville Beach	745	25	10,748	10.6	0.4
Flagler Beach	810	Fort Pierce	965	155	34,528	14.9	0.3
Gulf ICW (Sand Ridge)	185	New Orleans	0	185	16,489	6.7	0.1
Sand Ridge	185	Gum Island	155	30	1,996	29.0	0.1
Cypremort	135	Mud Lake	120	15	587	19.6	0.0
Larose	35	New Orleans	0	35	3967	5.2	0.0

Source: ARGUS. This data not to be used for navigational purposes.

tipurpose Internet connectivity.

Most recently, ARGUS participated in a NOAA-led discussion at the University of New Hampshire Center for Coastal and Ocean Mapping (UNH-CCOM) on crowd-sourcing of hydrographic data. Eventually, says Hersey, ARGUS hopes to address the 100-year Federal surveying backlog. And, Hersey is looking at an ongoing research effort with Towson University to develop analysis tools specific to the temporal and spatial characteristics of the continuous stream of ARGUS data.

IN USE TODAY

In a partnership with Cruisers' Net and EarthNC, a beta release of ARGUS solution sets for the ICW compatible with OpenCPN is now happening. According to Hersey, OpenCPN is a capable open source PC Navigation software application in use by a large following of recreational and commercial boaters. Eventually, ARGUS intends to further develop the integration of ARGUS solution sets, making them available through Cruisers' Net as a complement to other valuable information they provide.

There may be no more important issue to vessel operators today than the depth of the water under the keels of 40,000 commercial hulls crisscrossing the nation's waterways. Great Lakes operators put the exclamation point on that by illustrating how many tons of cargo is lost annually due to each inch of draft that is unavailable. Beyond the gray noise of complaining about the lack of maintenance dredging is the concern that depths on charts may be inaccurate. At least until now. If you plan to transit the ICW in the near future and depths less than 12 feet get your attention, then you might want to take a look at the chart.

Note that these are simple vessel observations that reflect tidal conditions, have not yet been corrected

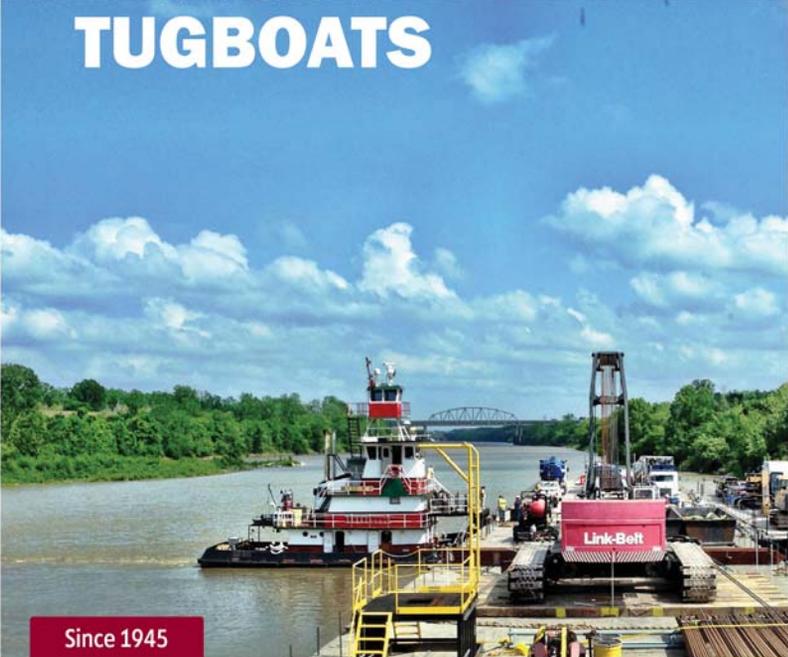
or added to the database for collective processing, and should NOT be used for navigation. Today, federal law provides for the waterway to be maintained at a minimum depth of 12 feet (4 m) for most of its length. But, as shown below – this isn't always the case. Moreover, depths on charts are typically referenced to a mean low

water datum, and since the state of the tide isn't taken into consideration below, actual depths may even be less.

ARGUS represents the way forward for many applications, but its initial value may be found in merely taking advantage of the boat's depthsounder that's just ahead of you. And, that can be done today.



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