Maritime Situational Awareness

ENHANCING SAFETY AND STABILITY ON THE WORLD'S SEAS

The U.S. DOT Volpe National Transportation Systems Center has been in the vanguard of developing and deploying state-of-the-art, easy-to-use, cost-effective vessel tracking networks that enhance maritime situational awareness in waterways around the world.

Renowned for its major technological advances in communications, traffic management, and marine navigation systems, Volpe's expert team provides invaluable technical leadership to organizations in the U.S. and abroad.

The team was awarded the prestigious Innovations in American Government Award from Harvard's Kennedy School of Government for enhancing levels of safety and economic stability in the global seas.





PARTICIPATING NATIONS

Angola Madagascar Albania Malta Mauritania Argentina Australia Mauritius Bahrain Mexico Belgium Moldova Benin Montenegro Bermuda Morocco Brazil Mozambique Netherlands Bulgaria Cameroon New Zealand Canada Nigeria Cape Verde Norway Chile Oman Colombia Pakistan Comoros Palau Croatia Panama Denmark Peru Djibouti Poland Dominican Portugal Republic Philippines Estonia Republic of Finland Congo France Romania Gabon São Tomé & Príncipe Gambia Georgia Senegal Seychelles Germany Singapore Ghana Sierra Leone Greece Guinea Slovenia South Africa Iceland Spain Iraq India Sweden Togo Ireland Israel Tanzania

A NEW TOOL FOR INTERNATIONAL DIPLOMACY
 Fosters greater trust and collaboration among nations.
 Promotes greater willingness among nations to jointly address regional and global maritime security issues.
 Contributes to efforts to combat piracy, terrorism, illegal fishing, and the smuggling of humans, drugs, and weapons.
 Fosters global economic stability by enhancing the secure global transfer of goods.

INNOVATION AND THE EVOLUTION OF AN IDEA

1 ST. LAWRENCE SEAWAY: A GIANT STEP FORWARD 1990 - PRESENT

The movement of cargo through the St. Lawrence Seaway supports more than 329,000 jobs and \$46 billion in economic activity. In 2002, **Volpe designed and deployed an Automatic Identification System** (AIS)-based data network, dramatically improving navigation safety and traffic management on the St. Lawrence

 Improved coordination of ship inspections.

Using the Seaway's Draft Information System and transmitting accurate and real-time depth information through the AIS network, ships **may travel at a draft 3" beyond the Seaway's published maximum**, which could

Italy Thailand Jamaica Tunisia Japan Turkey Jordan Ukraine Kenya United Kingdom Liberia United States Lithuania Uruguay

+3"

Seaway. Ship owners and Seaway management benefit from:

- Enhanced safety through real-time vessel locations and water measurements.
- Reduced transit time and fuel consumption.
- Faster response times to accidents.
- The ability to monitor vessels and
- enforce speed limits.

result in an additional 350–400 metric tons of cargo per trip.

Recently, Volpe experts developed a tool to forecast vessel traffic demand at locks and other key infrastructure within the Great Lakes-St. Lawrence Seaway System to improve predictability of vessel transit times and increase operational efficiencies and situational awareness among traffic controllers and Seaway users.

2 CENTRAL AMERICAN PORTS: BUILDING IN RESILIENCY 1998

The ports in Honduras and Nicaragua were ravaged by Hurricane Mitch in November 1998. In support of the U.S. DOT and the U.S. Agency for International Development, **Volpe helped both nations** achieve a marked enhancement in the safety and efficiency of port operations. Specifically, Volpe:

- Supported the U.S. response a humanitarian program to "build it back better."
- Designed, created, and deployed a Differential Global Positioning System (DGPS) installation to support 24-hour navigation.

PANAMA CANAL: A MILESTONE IN NAVIGATION HISTORY 1989 - 1999

A real-time Communications, Traffic-Management and Navigation (CTaN) system **developed and installed by Volpe engineers** in the Panama Canal had a major impact on safety and efficiency. Volpe's contributions:

- Enabled pilots to safely guide 50,000-ton vessels through the narrow channels under any weather conditions.
- Dramatically enhanced situational awareness, resulting in improved safety and vessel transit efficiency.

Also, in a rare gesture, the Panama Canal Pilots Association awarded honorary membership to three Volpe engineers in recognition of their outstanding contributions.



MARITIME SAFETY AND SECURITY INFORMATION SYSTEM (MSSIS) 2005 - PRESENT

When the U.S. Naval Forces Europe Commander brooded over the state of worldwide maritime domain awareness (MDA), Volpe stepped up. Only a handful of commercial vessels were being tracked in 2005. Working closely with the North Atlantic Treaty Organization and the U.S. Navy, **Volpe quickly built and deployed a multinational, freely shared, unclassified, and low-cost vessel tracking system** based on AIS technology.

The MSSIS network provides users with streaming and real-time information on global vessel traffic movement. Volpe's work disproved industry experts who predicted that the project would take years and cost tens of millions of dollars.

GLOBAL DISASTER RELIEF EFFORTS IN HAITI AND JAPAN 2010

In the aftermath of the devastating earthquakes that struck Haiti and Japan, the arrival details of supply ships were critical to relief organizations. **Volpe's support**

to DoD:

- Ensured that Navy personnel and relief workers had continuous access to real-time ship arrival data.
- Hastened distribution of desperately needed supplies.





In Mexico, the **Volpe-developed AIS network** was key to:

- Rescuing stranded workers from an oil platform forced adrift by Hurricane Nate.
- Helping authorities find and capture offshore drug smugglers.

BUILDING AN AFRICAN MARITIME SAFETY AND SECURITY CAPABILITY 2011 - PRESENT

In support of U.S. Naval Forces Africa's (NAVAF) international security cooperation initiative, **Volpe developed SeaVision**, a webenabled vessel tracking display system for enhancing MDA.

SeaVision is an extension of the MSSIS MDA software toolkit. Using an internet browser, users can observe the location of commercial vessels, track the history of ship movements, and conduct search queries. Today, SeaVision is a cornerstone of MDA outreach and is used by NAVAF and its African

SAVING THE WHALES IN THE NORTH ATLANTIC 2012 – PRESENT

Collisions with vessels are a leading cause of death for the endangered North Atlantic right whale. **A unique application developed by Volpe** has:

- Enabled the National Oceanic and Atmospheric Administration's National Marine Fisheries Service to better monitor vessel speed compliance.
- Assisted in speeding violation enforcement in seasonal right whale migration zones along the U.S. Atlantic seaboard.



A Volpe team developed and installed solar-powered AIS units on remote lighthouses

and beacons that vastly improved the situational awareness and MDA capabilities of the Philippine Coast Guard. partners to:

- Assist developing nations in combating piracy, illegal fishing activities, and the smuggling of humans, drugs, and weapons.
- Support joint military exercises.
 Help build and strengthen maritime partnerships among countries on the western coast of Africa.

10 COMBATING DRUG TRAFFICKING ON THE HIGH SEAS

In the first six months of 2023, the Servicio Nacional Aeronaval de Panamá (SENAN) utilized data provided by the MSSIS Network and the Volpe-developed SeaVision tracking and visualization tool to conduct

119 drug interdiction missions, resulting in the

seizure of **over 27 tons** of drugs. Transnational criminal

organizations use Panama's waters, lengthy coastlines, and densely forested border with Colombia to traffic people and illegal drugs from South America to Central America, and ultimately to the United States.



4.10.2024