Welcome to the Challenge!

We are very excited to have you join us for this portion of **HACKtheMACHINE: "Data Science and the Seven Seas."**

The U.S. Navy has big datasets on maritime traffic. When our data is combined with increasingly sophisticated constellations of commercial sensors it may create new opportunities to understand maritime traffic patterns. This weekend you will compete to design and solve a real-world data fusion and anomaly detection problem in maritime data.
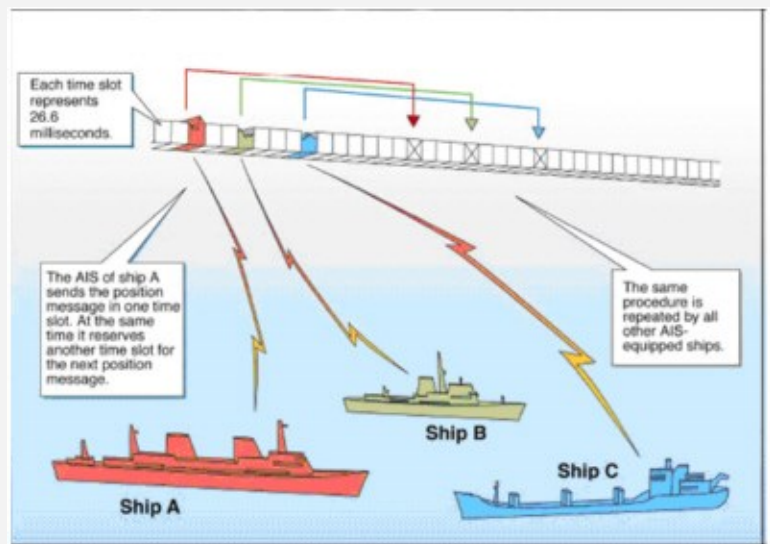
The Data….

For this challenge, your primary data set will be from the Automatic Identification System (AIS).

AIS is an international system/protocol for vessel tracking using automated radio signals and the global positioning system (GPS). Under U.S. law and International Maritime Organization statute, most ships greater than 65 feet in length are required to have AIS transponders installed. AIS data (i.e., vessel location, course, speed, and other static information) forms a holistic view of maritime vessel traffic around the world.

You will be able (and encouraged!) to leverage other data sources as well, but the main focus of effort should be on analyzing the AIS data in support of the overall challenge statement:

"Develop analytic techniques and apply to AIS data and other physical measurements data in a way that detects change, helps identify and understand anomalous movement in maritime vessel traffic, or uncovers analytical insights gained through fusion of multiple data sets."

AIS Resources:

AIS Overview from the U.S. Coast Guard Navigation Center of Excellence: https://www.navcen.uscg.gov/?pageName=AISmain

For a chart describing the different AIS message types, see the PDF here: https://www.navcen.uscg.gov/pdf/AIS/AISMessages.pdf

For a breakdown of the AIS message data (Data Dictionary) see the PDF here: https://www.navcen.uscg.gov/pdf/AIS/ais_data_by_station.pdf

A sample of the final data format will be provided via email in the days prior to the event, but you can ingest and format the data in any way that you choose to analyze it.

Tools and Resources

Data and Resource Access

We will be providing access to many resources such as public open source data sets, visualization tools, and useful information on the AIS data you will be analyzing. All of the resources will be made available at the event via Sailfish Exchange, a data curation social network commonly referred to as "Pinterest for data."

If you would like to become familiar with Sailfish Exchange before the event, you are invited to watch an introductory video here: http://bit.do/SailfishOverview

For more information on the Sailfish family of data products, visit the main Sailfish page here: http://boozallen.com/sailfish
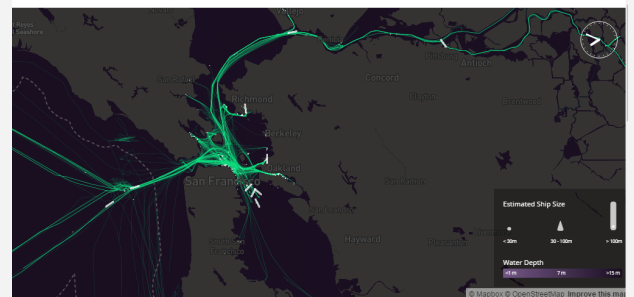
Visualization

You are free to be creative and present your findings any way you like, but we will have some new and exciting technologies on-hand for you to explore: Mapbox and OceanLens.
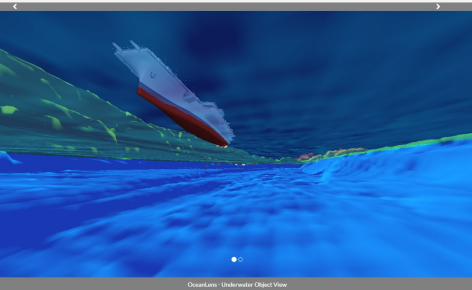
Mapbox

Our partners at Mapbox will be on-hand to provide expertise and insights into how you can use the data and your analysis to create meaningful visual products

One great example of using AIS data combined with bathymetric data from NOAA can be found at their blog post here: https://www.mapbox.com/blog/ships-in-the-bay/

OceanLens

Booz Allen Hamilton has developed an innovative, data-layering visualization solution that gives defense organizations a technological edge. OceanLens provides interactive 3D geospatial rendering software with virtual reality and mixed reality capabilities to create an immersive understanding of our world based on high resolution bathymetry and topography data. As we explore, exploit, and protect our waters, OceanLens can support the full spectrum of planning and operations from undersea sensor placement, intelligence data fusion, common operating picture applications, unmanned underwater vehicles (UUV) mission planning, training, and more.

Package your HACKtheMACHINE data and deliver it to OceanLens, where you can explore it live in virtual reality. We'll help you craft an impressive visualization and provide a 360 degree immersive video of the result (with a Google Cardboard VR headset).

You can access a short introductory video introducing OceanLens here: http://bit.do/OceanLens