Naval Information Warfare Center PACIFIC

SEAVISION

SeaVision Introduction

Lesson 1.1

09/24/2020

Lesson 1.1 Learning Objectives

Upon successful completion of this lesson, the student will be able to:

- Identify the capabilities and functionality of the SeaVision (SV) application
- Identify SV development and support
- Identify SV data sources

SeaVision Overview

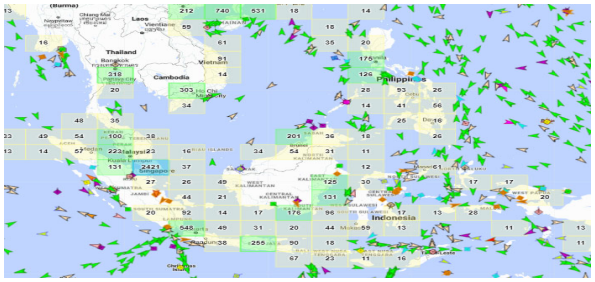
- Web-based, unclassified maritime situational awareness tool:
  - View and share a broad array of maritime information
  - Enhance maritime safety and security
  - Build partnerships with participating countries

3

- SeaVision (SV) is a web-based, maritime situational awareness tool that enables users to view and share a broad array of maritime information to improve maritime operations
- SV provides user-defined, rules-based analytics to evaluate and notify the user of maritime activities or events
- SV is a low-cost visualization and management tool that can quickly correlate multiple data sources to meet various mission needs

SeaVision Capabilities

- View and track tens of thousands of ships around the world
- Share searches, rules, alerts, shapes, and vessel lists with other SeaVision users
- Monitor Exclusive Economic Zone (EEZ) transits and port visits



4

- View/track position and movement information for tens of thousands of ships around the world with advanced filtering and search capabilities
- Utilize correlated data for conducting risk assessments, highlighting anomalies, and generating alerts and warnings that automatically notify users

SeaVision Development and Support

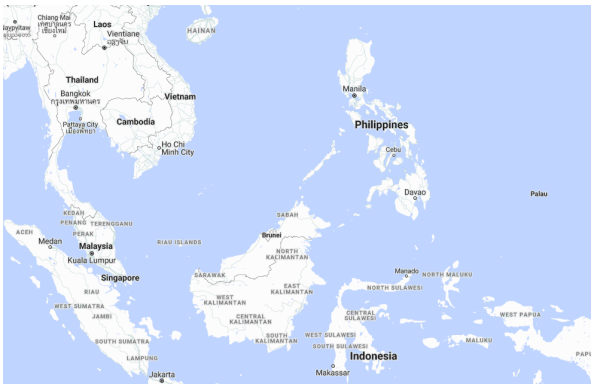
- Co-developed and managed by both U.S. Department of Transportation (DOT) Volpe and U.S. Navy Information Warfare Center (NIWC) Pacific
- Designed to take advantage of the Maritime Safety and Security Information System (MSSIS) network
- Field training and support provided by NIWC Pacific SeaVision Technical Assistance Field Team (TAFT)

5

- Volpe used its data and system engineering expertise to develop a Maritime Domain Awareness (MDA) network known as the Maritime Safety and Security Information System (MSSIS) for the U.S. Navy. Later developments expanded to partner nations in support of the Maritime Security Initiative (MSI)

NIWC Pacific Technical Assistance Field Team (TAFT)

- Improves Maritime Domain Awareness (MDA) and information sharing capabilities between partner countries
- Establishes, sustains, and integrates data for the Regional Maritime Picture (RMP)
- Provides basic to advanced SeaVision training:
  - SV Operator
  - SV Analyst
  - SV Executive
  - SV Train-the-Trainer



6

- Customizable Regional Maritime Picture (RMP) tools training for operations personnel
- Custom data source integration to RMP:
  - Long Range Identification and Tracking (LRIT)
  - Vessel Monitoring System (VMS)
  - Search and Rescue beacons, visual reports, weather data, etc.
- Assessment of current mission focus, equipment, systems, and processes with the goal of identifying areas for potential capabilities enhancement
- Every year, TAFT experts participate in major multination naval exercises and operations. TAFT is called upon to support the host nations with:
  - MDA Assessment
  - Technical support of MDA systems
  - Temporary automatic identification system (AIS) installation on vessels for tracking during exercises and/or operations
  - Mentoring
  - Exercise planning

SeaVision Data Sources

- SeaVision integrates multiple government and commercial data sources to aid in developing an RMP
  - Automatic Identification System (AIS)
  - Fairplay by IHS Markit
  - Visible Infrared Imaging Radiometer Suite (VIIRS)
  - Satellite Synthetic Aperture Radar (SAT-SAR)
  - Coastal Radar (Future Integration)

Automatic Identification System (AIS)

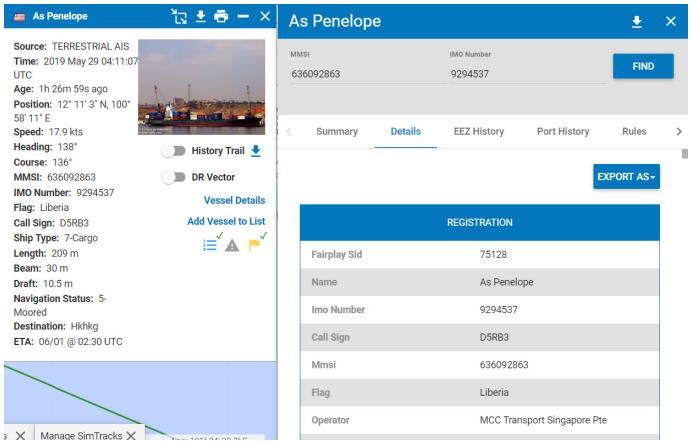
- AIS is a maritime navigation safety communication system that automatically provides:
  - Vessel identity
  - Type
  - Position
  - Course/Speed
  - Other safety-related information
- AIS data is provided to SeaVision from the following sources:
  - Maritime Safety and Security Information System (MSSIS) network
  - ORBCOMM – Satellite AIS
  - ORBCOMM_T – Terrestrial AIS
  - ORBCOMM_LR – Long-Range AIS

8

- AIS is a maritime navigation safety communications system standardized by the International Telecommunication Union (ITU) and adopted by the International Maritime Organization (IMO) that provides vessel information, including the vessel's identity, type, position, course, speed, navigational status, and other safety-related information automatically to appropriately equipped shore stations
- The Maritime Safety and Security Information System (MSSIS) is a freely shared, unclassified, near-real-time data collection and distribution network. Its member countries share data from AIS
- ORBCOMM is a commercial company that both provides terrestrial AIS information and operates a fully populated, AIS-enabled satellite constellation

Fairplay by IHS Markit

- Fairplay is a repository for International Maritime Organization (IMO) ship registry data
  - Vessel Details
  - Crew
  - Inspections
  - Port History



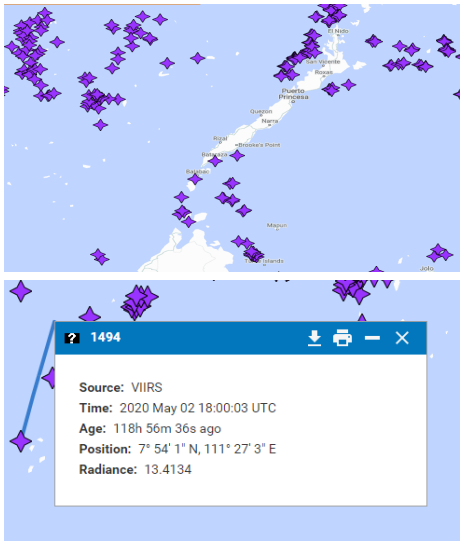
9

DISTRIBUTION STATEMENT A. Approved for public release: distribution unlimited.

- Fairplay by IHS Markit brings the largest maritime database in the world, covering ship characteristics, movements, ownership, casualties, ports, news, and research
- Fairplay is the sole issuing and reference authority of both the Document of Compliance (DOC) company number and the Registered Owner company number on behalf of International Maritime Organization (IMO)
- The information enables SeaVision (SV) to track ship positions with Automatic Identification System (AIS) coverage and analyze the risk profiles of ships entering the user's area of operation
- Provides SV with the characteristics of 180,000 ships and over 200,000 maritime company records, including ship owners, managers, operators, and shipbuilders
- SV integrates World Registry of Ships (WROS) data with incoming positional reports to provide extensive vessel information to the user via Vessel Details
- The data is searchable and can be used as criteria in user-defined, automated search rules
- This dataset is the basis for the automatically calculated safety and security risk scores in Warnings

Visible Infrared Imaging Radiometer Suite (VIIRS)

- Joint National Aeronautics and Space Administration (NASA)/National Oceanic and Atmospheric Administration (NOAA) project with the primary mission of weather tracking
- An algorithm developed for reporting the locations of boats based on satellite sensing of light source
- Provides nighttime imagery of man-made light sources
- Cloud cover severely degrades probability of detection

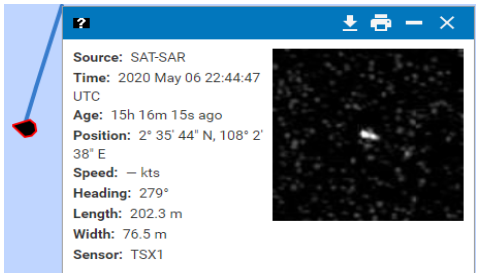


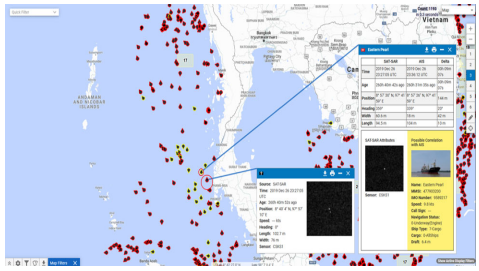
10

- Joint program between NASA and NOAA
  - First VIIRS-equipped satellite launched in 2011 – usable data 2012 to present
  - Second VIIRS-equipped satellite launched 2017 – usable data 2018 to present
  - Three more instruments planned to ensure continuity past 2030
- Polar orbit – 100 minutes, 3000 km swath, 14 orbits per day, 22 spectral channels, near 1 km pixels
- Global coverage – always turned on
- Open access data

Satellite Synthetic Aperture Radar (SAT-SAR)

- Benefits
  - Very large coverage area
  - Works in all weather, day or night
  - Well suited for ship detection
  - Able to see through clouds
- Limitations
  - Does not look like a picture
  - Ships need to have a reflective surface
  - Lower resolution than electro-optical imagery
- Results
  - Ships detected in the image are displayed as position reports in SeaVision





Coastal Radar

- Radar tracks are sourced from a SeaVision participant nation's shore-based sea radar network
- Tracks may be correlated with AIS positional reports for individual vessels
- This data source is under development for future deployment

12

- This data source is under development for future deployment

SeaVision Data Sources

Data Source		Range	Delay into SeaVision
AIS	Terrestrial	20-40 NM	Near Real-Time (NRT) 30 sec - 3min
	Satellite	Footprint of Satellite	1-3 Hours
RADAR	Coastal/Vessel	20-60 NM	Near Real-Time (NRT) 30 sec - 3min
	SAT-SAR	Footprint Of Satellite	1-3 Hours
VIIRS		Footprint of Satellite	24 Hours

13

Introduction to SeaVision Summary

- Overview/Capabilities
  - Web-based, unclassified maritime situational awareness tool
  - View and track tens of thousands of ships
- Development/Support
  - Co-developed and managed by both the U.S. Department of Transportation (DOT) Volpe and U.S. Navy Naval Information Warfare Center (NIWC) Pacific
  - Field training and support provided by NIWC Pacific SeaVision Technical Assistance Field Team (TAFT)
- Data Sources
  - Automatic Identification System (AIS)
  - Fairplay by IHS Markit
  - Visible Infrared Imaging Radiometer Suite (VIIRS)
  - Satellite Synthetic Aperture Radar (SAT-SAR)
  - Coastal Radar

Naval Information Warfare Center PACIFIC

Questions?