U.S. Coast Guard
Maritime Domain Awareness
Sensor Technologies

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Maritime Domain Awareness (MDA)

…the effective understanding of anything associated with the global maritime domain that could impact the security, safety, economy, or environment
Exclusive Economic Zone (world’s largest)
## Achieving and Maintaining MDA

<table>
<thead>
<tr>
<th>Observables</th>
<th>Collect</th>
<th>Fuse</th>
<th>Analyze</th>
<th>Disseminate</th>
<th>Decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Vessels</em></td>
<td><em>Sensors</em></td>
<td><em>Tracks w/ tracks</em></td>
<td><em>Anomaly detection</em></td>
<td><em>Networks</em></td>
<td><em>Strategic</em></td>
</tr>
<tr>
<td><em>People</em></td>
<td><em>Operators &amp; field personnel</em></td>
<td><em>Data w/ data</em></td>
<td><em>Pattern recog &amp; analysis</em></td>
<td><em>Displays (COP/UDOP)</em></td>
<td><em>Operational</em></td>
</tr>
<tr>
<td><em>Facilities</em></td>
<td><em>Intel Sources</em></td>
<td><em>Tracks w/ data</em></td>
<td><em>Compare w/ rules</em></td>
<td><em>Command centers</em></td>
<td><em>Tactical</em></td>
</tr>
<tr>
<td><em>Cargo</em></td>
<td><em>Open source</em></td>
<td></td>
<td><em>Research tools</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Infrastructure</em></td>
<td><em>Private sector data</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Sea lanes</em></td>
<td><em>Law enforcement</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Threats</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Friendly forces</em></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Weather</em></td>
<td></td>
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Layered MDA

Coastal
24 - 300 nm

Ports & Approaches
< 24 nm

High Seas
300 - 2,000 nm
Layered MDA Sensor Coverage Areas

**Long Range Identification and Tracking**

- Global position reporting per SOLAS regulations.
- 4 daily broadcasts per IMO
- 160+ contracting governments participating in LRIT efforts
- Track 40,000+ SOLAS Class vessels globally
- Satellite-based reporting.

**Nationwide Automated Identification System**

- Nationwide network of towers & transceivers
- Similar to aircraft transponders
- VHF radio-based (line of sight technology), self-generated vessel reports per IMO/SOLAS
- Provides AIS data feed to CG enterprise data stores.
- Inside 50 NM: near real time reports (seconds/minutes).
- Inside 2000NM: less frequent satellite based coverage.

**IOC**

- Command Center monitors vessel behavior with radars and cameras.
- Corroborate vessel behavior with actions advertised in LRIT/NAIS and in ship reports
- Joint planning and ops tools
- Real-time op decision support.
- Covers critical port/coastal approaches to 24NM.

**CG Enterprise**

- Nationwide network of towers & transceivers
- Similar to aircraft transponders
- VHF radio-based (line of sight technology), self-generated vessel reports per IMO/SOLAS
- Provides AIS data feed to CG enterprise data stores.
- Inside 50 NM: near real time reports (seconds/minutes).
- Inside 2000NM: less frequent satellite based coverage.

**US Port State**

- Global position reporting per SOLAS regulations.
- 4 daily broadcasts per IMO
- 160+ contracting governments participating in LRIT efforts
- Track 40,000+ SOLAS Class vessels globally
- Satellite-based reporting.

All tracking systems feed data to CG enterprise data warehouse for strategic fusion.

Image © 2006 NASA
Current AIS Capability
International AIS Information Sharing
Maritime Security and Safety Information System (MSSIS)
AIS Via Commercial LEO Satellite
Commercial AIS - 24 hour period
Combined data of 2 satellites

Time of screen capture: 13:16 UTC
5 November 2008
Vessel count: 11928
Long Range Identification & Tracking
"These polygons, or geographical areas, represent the technical and unilateral work completed by all nations to implement the International LRIT system. The United States geographical areas depicted are for technical LRIT system and access to LRIT information purposes ONLY. They do not represent maritime jurisdictional areas for any other purpose, AND MAY NOT BE USED TO SUPPORT JURISDICTIONAL CLAIMS OR BOUNDARY LINES FOR ANY OTHER PURPOSE."

Green polygons = U.S. Baseline

Blue hollow polygons = U.S. Territorial Seas

Red hollow polygons = U.S. 1000 NM Boundary
Approach Zone
- Radar tracking of vessels
- Daytime cameras
- Nighttime imaging
- Receive all AIS broadcasts
- Fuse sensor inputs into one track
- IP-enabled sensor network

Monitoring Zone
- Monitor behavior of all vessels
- Provide persistent surveillance of security zones, regulated navigation areas and port vulnerabilities
- Observe, day/night, activities and operations within the zone

Approach Distance 24 NM
In Conclusion

• The US Coast Guard is one of many agencies in a layered approach to MDA
• A variety of sensors, analysis tools, technologies, & partnerships combine to guard our waters
• Global implementation & continued international partnerships are essential
• MDA is the key to effectively implementing any maritime security strategy
Thank You

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