Maritime Domain Awareness: The Missing Piece of the Security Puzzle

NDIA/HIS Port Security

Mr. D.A. Goward, Director USCG MDA

30 March 2006
Willing to strike …

Vessels as:

• Direct Weapons
• Delivery of WMD
• Delivery of Terrorists
• Targets

US Maritime interests:

• High economic impact
• Much critical infrastructure
• Near large, dense population centers
The New Competitive Landscape

- **Easy**
  - Global War On Terror
  - 9-11
  - Identify
  - Kill
- **Hard**
  - Cold War
  - Identify
  - Kill

**UNCLASSIFIED**
“...the effective understanding of anything associated with the global Maritime Domain that could impact the security, safety, economy, or environment of the United States.”

- NSPD 41 / HSPD 13, 21 Dec 04

MDA Defined

Homeland Security

Maritime Homeland Security
(DHS-led: USCG)

Commercial Interests,
Environmental Protection,
Maritime Safety

Homeland Defense

Maritime Homeland Defense
(DoD-led: USNORTHCOM)
**Maritime Domain Awareness**

<table>
<thead>
<tr>
<th>Observables</th>
<th>Collect</th>
<th>Fuse</th>
<th>Analyze</th>
<th>Disseminate</th>
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<tbody>
<tr>
<td>Vessels</td>
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<td>Tracks w/ tracks</td>
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<td>Networks</td>
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<td>People</td>
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**Situational Awareness**

Current & Predictive Intelligence
### Maritime Domain Awareness

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**Situational Awareness**

Current & Predictive Intelligence
Collect – Vessel Tracks

<table>
<thead>
<tr>
<th></th>
<th>LARGE (&gt; 65')</th>
<th>MEDIUM (25' - 65')</th>
<th>SMALL (&lt; 25')</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>COOP</td>
<td>EMIT</td>
<td>DARK</td>
</tr>
<tr>
<td><strong>Shore (12 nm)</strong></td>
<td>In Place</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Approaches</strong></td>
<td>In Place</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>(12 - 90 nm)</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Off Shore</strong></td>
<td>In Place</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>(300 nm)</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Global Maritime</strong></td>
<td>In Place</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td><strong>Domain</strong></td>
<td>Available</td>
<td></td>
<td></td>
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<tr>
<td></td>
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1. Coastal / National land based AIS receivers and data fusion
2. No extensive coastal radar systems deployed except around VTS and Hawkeye / JHOC ports
3. No AIS or other beacon requirement for smaller than SOLAS - technology is readily available
7. No persistent sector surveillance capability today
9. National Technical Means
Collect

Short Range

Nationwide AIS

Secure Ports Initiative/Command 2010

Rescue 21

TARS

Customs

AREA

200 NM

24 NM

voluntary reporting

direct sensing

Long Range Tracking
Beyond - 24 NM

Short Range Tracking
24 - 0 NM
Collect – Data Sources

• **Vessel** – Lloyds, photos, historical movement, SANS, MISLE, Pathfinder, VIS, Seawatch

• **Cargo** – CBP, e-manifests, Tradebytes, Global Trader

• **People** – NTTC, MISLE, TECS, APIS (CPB)

• **Infrastructure/Facilities** – PISRAT, ESRI GIS, CEU

• Intelligence Community data/info

• Multiple classification domains (HAGs)
Maritime Domain Awareness

Observables
- Vessels
- People
- Facilities
- Cargo
- Infrastructure
- Sea lanes
- Threats
- Friendly forces
- Weather

Collect
- Sensors
- Operators & field personnel
- Intel. agencies
- Open source
- Private sector data
- Law Enf
- Intl Sources

Fuse
- Tracks w/ tracks
- Data w/ data
- Tracks w/ Data

Analyze
- Anomaly Detection
- Pattern Recog & analysis
- Compare w/ rules
- Research tools

Disseminate
- Networks
- Displays (COP/UDOP)
- Command Centers

Decide/Act
- Strategic
- Operational
- Tactical

Situational Awareness
Current & Predictive Intelligence
Fuse

“The process of combining data or information to estimate or predict entity states.”
Revision to the JDL Data Fusion Model, 1998 NATO/IRIS Conference

- Detect and track maritime objects
  - Data Discovery
  - Separate the noise from the signals
- Combine data sources
  - Public
  - Commercial
  - Government
- Identify Threats
  - Fusion
  - Anomaly detection
  - Alerts

Data Sources
(GS/SCI, Private, Public Secret, Unclass)

Data/Track Fusion
Track correlation
Anomaly detection
Data/track matching

National Maritime COP

Vessel Tracks

Vessels, Cargo, People, Infrastructure
**Fusion - Operational to System Functionality Matrix**

### Multi INT Data Fusion Operational Capability to System Functionality Matrix

<table>
<thead>
<tr>
<th>Data Processing/Analysis</th>
<th>Entity Analysis</th>
<th>Situation &amp; Threat Analysis</th>
<th>Contextual Analysis</th>
<th>Data Mining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate/Similar Data Types</td>
<td>Process Phonetic Data</td>
<td>Co-Process Temporal and Other Data</td>
<td>Georegion-Based Processing/Analysis</td>
<td>Spatial Analysis</td>
</tr>
<tr>
<td>Associate/Identify Data Types</td>
<td>Process Attribute and Feature Data</td>
<td>Determine and Assess Threat</td>
<td>Determine and Assess Threat Environment</td>
<td>Temporal Analysis</td>
</tr>
<tr>
<td>Automatic Data Registration</td>
<td>Generate Alternate Hypotheses</td>
<td>Generate Alternate Hypotheses</td>
<td>Generate Alert and Monitor</td>
<td>Spatial Sensing and Sensing Environment</td>
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<tr>
<td>Process Structured Textual Data</td>
<td>Automatic Identification</td>
<td>Generate Hypotheses</td>
<td>Generate Alert and Monitor</td>
<td>Spatial Sensing and Sensing Environment</td>
</tr>
<tr>
<td>Georegion Processing/Analysis</td>
<td>Automatic Track Generation</td>
<td>Track Entity</td>
<td>Track Entity</td>
<td>Multidimensional Analysis</td>
</tr>
<tr>
<td>Entity Analysis</td>
<td>Provide Track Quality</td>
<td>Research to Prove Feasibility</td>
<td>Research to Prove Feasibility</td>
<td>User Defined Requests</td>
</tr>
<tr>
<td>Process Extended Data</td>
<td>Provide Confidence Levels</td>
<td>Technology Research</td>
<td>Technology Research</td>
<td>Multidimensional Analysis</td>
</tr>
<tr>
<td>Process Vessel Data</td>
<td>Process Vessel Data</td>
<td>Basic Technology Research</td>
<td>Basic Technology Research</td>
<td>Multidimensional Analysis</td>
</tr>
<tr>
<td>Process People Data</td>
<td>Process People Data</td>
<td>Technology Concept and/or Application Formulated</td>
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**Measuring Technology Maturity**

**Technology Readiness Levels**

- **TRL 1**: Basic principles observed and reported
- **TRL 2**: Component concept and/or application formulated
- **TRL 3**: Component tested and validated in laboratory environment
- **TRL 4**: Component (or prototype) demonstrated in relevant environment
- **TRL 5**: System (or subsystem) model or prototype demonstrated in a relevant environment
- **TRL 6**: System prototype demonstration in an operational environment
- **TRL 7**: Actual system completed and “flight qualified” through testing and demonstration
- **TRL 9**: Actual system “flight proven” through successful mission operations

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- Generated for each fusion project
- Government and Industry projects
- Attributes (rows) help categorize fusion automation capabilities
Maritime Domain Awareness

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- Facilities
- Cargo
- Infrastructure
- Sea lanes
- Threats
- Friendly forces
- Weather

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- Operators & field personnel
- Intel. agencies
- Open source
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Disseminate
- Networks Displays (COP/UDOP)
- Command Centers

Decide/Act
- Strategic
- Operational
- Tactical

Situational Awareness
Current & Predictive Intelligence
Assess today’s data fusion capabilities and recommend technological improvements to maritime awareness data fusion and contact management tools.

Reduce time to process actionable information and increase the quantity of maritime information fused.
## Maritime Domain Awareness

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**Situational Awareness**

Current & Predictive Intelligence
Disseminate - Networks

- CGDN+/ DHS One Net
- SIPRNET
- JWICS
- Broadcasts
- IWN
- Internet
- MAGNet/ High Assurance Guards
Disseminate – COP/UDOP
Disseminate – Command Centers

Data -> Information -> Knowledge -> Action
Maritime Security Policy and MDA

NSPD 41 / HSPD 13

National Strategy Maritime Security
All Threats (Defense and Security)

Global Maritime Intelligence Integration

Maritime Operational Threat Response

Maritime Domain Awareness

Requires Unity of Effort

Policy Action Working Groups
- Domestic Outreach
- International Outreach and Coordination

Policy Action Working Groups
- Maritime Transportation System Security
- Maritime Infrastructure Recovery
- Maritime Commerce Security

Requires Unity of Effort
National MDA Implementation

Maritime Security Policy Coordinating Committee

MDA Implementation Team
- Req & Capabilities Workgroup
- CONOPS Workgroup
- Collection (Battle Space Awareness)
- Fusion & Analysis (Battle Space Awareness)
- Dissemination (Net-Centric)
- Data Management

COI Executive
- COI Steering Committee
- Pilot Demonstration
- Joint Implementation and Services

NSC = HD
HSC = JS/J5
DHS = USCG
DOD = JS/J5
DOD = NORTHCOM/J6
DHS = USCG
DOD = NORTHCOM/J5
DOD = NORTHCOM/J6
DHS = USCG
DOD = NORTHCOM/J5
DOD = NORTHCOM/J6
DHS = USCG
National MDA Implementation Process

Note: Various MDA capabilities being programmed independently by individual agencies for FY06–08

Appendix B

LE & Intel Community Organization(s) TBD

Prioritized Objectives

Investment Strategy

Departmental Budgeting & Programming System

UNCLASSIFIED
MDA – Connecting the Dots

Questions?
Fuse & Analyze

MAGNET Vessel Profile

- MAGNET's Vessel Profile
  - Vessel profile provides correlated, consolidated vessel information
    - Vessel Status
      - Significant MDA information
    - Arrival / Departure
    - Notes
    - Vessel
      - General features
    - Position
      - Def
    - Voyage
      - Scr

Notice of Arrival Support

- NOAD Support
  - Ability to display
    - Notice of Arrival
    - Cost of Financial Responsibility
    - Vessel Critical Profile
    - Vessel Response plan
    - Activity Tracker
  - Port map display
    - Visual representation
    - Latest position report
    - Vessel security status
    - User selectable dates

MAGNET

UNCLASSIFIED