COASTAL SECURITY

DOMAIN AWARENESS

The New Normalcy

USCG RESEARCH & DEVELOPMENT CENTER

September 2004
CG Mission

-Safeguard lives, property and the environment from intentional and accidental maritime threats. Protect maritime mobility by eliminating interruptions and impediments to the economical movement of goods and people while maximizing the recreational use of the Nation's waterways. Secure maritime routes by halting the flow of illegal drugs, aliens and other harmful/toxic contraband while preventing illegal incursions of our Economic Exclusion Zone thereby enforcing federal law. Defend the nation as one of the five US Armed Services and enhance regional stability in support of the National Security Strategy.
Strategic Objectives

– Maritime Domain Awareness
  • Identify Maritime Threats
  • Scene/Situational Awareness
  • Common Operational Picture

– Operational Presence & Response
  • Prevent the Unauthorized Entry of Illegal Aliens and Contraband, including WMD, over Maritime Borders
  • Enforce Maritime Laws including Fisheries & Environmental
  • Enhance Maritime Safety and Mobility

– Conventional Mission Areas
  • Reduce Critical Maritime Infrastructure Vulnerability
  • Prevent and Mitigate Accidental and Intentional Maritime Environmental Incidents
Threats & Challenges

Homeland Security

- Weapons of Mass Destruction
- Smuggling Aliens/Drugs
- Mobilization & Key Asset Protection
- Arms Trafficking
- Sanctions Violations
- Trade Access
- Multinationals/Multiflags
- Disaster Relief
- Maritime Transportation
- Maritime Food Supply
- Environmental Degradation
- Crime & Violence
- Mass Migration
Threats & Challenges

• Vessels carrying contraband
  – WMDs, Explosives, Weapons, Drugs

• Vessels as weapons
  – Threat to other vessels and infrastructure

• Vessels used to smuggle illegal aliens
  – Go-fast boats, “put-puts” and containers

• Vessel crews and passengers contain terrorists
  – Ship jumpers

• Underwater threats
  – Swimmers, mines, explosives
Boarding Officer Bill

Hi,
Prepare to be boarded

Attain accurate accounts of material, personnel, etc
Maritime Domain Awareness
CG Maritime Security Strategy

DHS Strategic Goals

Awareness  Prevention  Protection  Response  Recovery

Maritime Security Strategy

Enhance Maritime Domain Awareness (MDA)

Increase operational presence

Improve response and recovery posture

MISSIONS

Maritime Safety
- Search and Rescue
- Marine Safety
- Recreational Boating Safety
- International Ice Patrol
- Port Security

Maritime Mobility
- Aids to Navigation
- Icebreaking Services
- Vessel Traffic / Waterways Management
- Bridge Administration
- Rules of the Road

Maritime Security
- Drug Interdiction
- Alien Migrant Interdiction
- EEZ and Living Marine Resource
- General Maritime Law Enforcement
- Law / Treaty Enforcement

National Defense
- General Defense Duties
- Homeland Security
- Port and Waterways Security
- Polar Icebreaking

Protection of Natural Resources
- Marine Pollution Education, Prevention, Response & Enforcement
- Foreign Vessel Inspections
- Living Marine Resources Protection
- Marine and Environmental Science
Traffic Density

Thousands of vessel “trips” in the AOR per week
# Detection & ID Zones

<table>
<thead>
<tr>
<th>Internal or Inland waters</th>
<th>Baseline</th>
<th>12 nm</th>
<th>24 nm</th>
<th>200 nm</th>
<th>300 nm</th>
<th>2000 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Range Tracking &amp; Sensors</strong></td>
<td>Usually line-of-sight networked thru Sectors or Districts</td>
<td></td>
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<tr>
<td>Territorial Seas</td>
<td>12 nm</td>
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<tr>
<td>Contiguous Zone</td>
<td>12-24 nm</td>
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<tr>
<td><strong>Exclusive Economic Zone</strong></td>
<td>12-200 nm</td>
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<tr>
<td><strong>Long Range Tracking &amp; Sensors</strong></td>
<td>Usually over the horizon networked nationally</td>
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<tr>
<td>High Seas</td>
<td>200 nm+</td>
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</tbody>
</table>

## Vessel Size

<table>
<thead>
<tr>
<th>Vessel Size</th>
<th>MDA Surveillance and Action</th>
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</thead>
<tbody>
<tr>
<td>65’+</td>
<td>Track (AIS std: 2 sec-3 min freq)</td>
<td>Track (1 hr freq)</td>
</tr>
<tr>
<td>&lt; 65’ &gt; 25’</td>
<td>Track (AIS std: 2 sec – 3 min freq)</td>
<td>Detect, Classify/ID, Target Track (1 hr freq)</td>
</tr>
<tr>
<td>≤25’</td>
<td>Detect, Classify/ID, Target Track (AIS std: 2 sec– 3 min freq)</td>
<td></td>
</tr>
</tbody>
</table>
MDA Operations Concept

- **High Seas**
  - Track *squawking* SOLAS Vessels using variety of sensors and sensing systems
  - Use sensor correlation to detect spoofing and unusual or unexpected behavior
  - Will not cover “dark” vessels

- **Economic Exclusion Zone**
  - Distance:
    - R1: Nominal Detection Range: 200+ nm
    - R2: Nominal Decide Range*: 200 nm (4 hours)
    - R3: Nominal Intercept Range: 10 nm

*Requires near continuous track of all vessels within 200 nm

- **Coastal and Special Area Traffic**
  - Coastal areas: 12 to 24 nm from shore
  - Special Areas: Internal or Inland waters & Borders
  - Determine whether a vessel comes from within the U.S. or outside – “pop-ups”
  - Detect threat behavior
High Seas Requirements - Cueing

**Threat**
- High interest vessels and cargoes
- All vessels headed to U.S. waters

**Functional Requirements**
- Develop and maintain voyage histories for vessels of interest
- Maintain a loose track of vessels and cargoes headed to the U.S.
- Identify and track hijacked vessels

**Gap**
- Integrated tracking and cueing system
- Inputs: various sensors, other data
- Output: High Seas Common Operational Picture
Coastal Areas – Persistent Surveillance

• Vessels of Interest
  – Smuggling craft
  – Vessels as weapons
  – Near shore fishing operations
  – High interest or non-conforming vessels

• Functional Requirements
  – Detect, track, classify and identify all vessels approaching US.
  – Track, correlate and ID all SOLAS class vessels
  – Intercept all questionable vessels
  – Automated detection of threat or anomalous behavior
  – Common Operation Picture of the Sector operations area

• Gap
  – Persistent coastal surveillance out to 24 nm
  – Effective surveillance against boats with small radar cross section
Scene/Situational Awareness

DETECT      TRACK      CLASSIFY      EVALUATE      IDENTIFY      INTERCEPT

TRACK CORRELATOR

RADAR SCENE

IMAGES

CAMERA CONTROL

MPEG

NORMS

TRACKS

UNDERSTANDING

ALERT EVENTS

INTELL AIS

OTHER SENSORS

DB

FUSION ENGINE

INTEGRATED SCENE

DISTRICT, LOCAL, OTHER SCCs

REFERENCE

IMAGE UNDERSTANDING

ALERT EVENTS
Our Goals

• Invest in products that address priority needs
• Develop “best” products as quickly as possible (triage/spiral approach)
• Help CG implement our products
Program Evolution

• Spiral Development
  – Build – Test – Build evolution over multiple years
  – Incorporate new sensors, technology and improvements
  – Conduct operationally assessments (Test beds)

• First Spiral
  – Sensors at three ports
  – Sector Command Center
  – Web-Based Information Client

• Second Spiral
  – Additional Long Range Radars
  – Scene awareness
  – Common operating picture integration

• Follow-On Spirals
  – Wideband local communications
  – OTH coastal area surveillance sensors
  – Underwater object awareness
  – Swimmer and vessel defense
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