Global Maritime Awareness

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202-372-2591

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
JUN 2009		**00-00-2009 to 00-00-2009**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Global Maritime Awareness	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **National Office of Global Maritime Situational Awareness,U.S. Coast Guard Headquarters,2100 2nd St SW,Washington,DC,20593-0001**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
See also ADM202744. Presented at the European Command and African Command Science and Technology Conference held in Stuttgart, Germany on 8-12 Jun 2009

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**39**	

National Office of Global Maritime Situational Awareness

A multi-departmental/agency NATIONAL office responsible for effective access to maritime information and data critical to building situational awareness.

Mission: Act as a Maritime Awareness Coordinator "Honest Broker"

We are responsible for:

- Increasing communication and building trust
- Performing international and domestic outreach
- Making maritime information available/shareable

Forging relationships, enabling technology, effecting policy

UNCLASSIFIED

How We Got Here…

NSPD-41/HSPD-13
PRESIDENTIAL SIGNATURE 21 DEC 04

→ **Established MSPCC** (Maritime Security Policy Coordination Committee)

NATIONAL STRATEGY FOR MARITIME SECURITY
PRESIDENTIAL SIGNATURE 20 SEP 05

"The National strategy for Maritime Security has mandated an even higher level of interagency cooperation in pursuit of effective MDA."

A Cooperative Strategy for 21st Century Seapower

National Plan to Achieve Maritime Domain Awareness 10/05

Global Maritime Intelligence Integration Plan 10/05

Maritime Operational Threat Response Plan 10/06

International Outreach and Coordination Strategy 11/05

Maritime Infrastructure Recovery Plan 4/06

Maritime Transportation System Security Recommendations 10/05

Maritime Commerce Security Plan 10/05

Domestic Outreach Plan 10/05

- National CONOPS
- Interagency Investment Strategy

→ **National Maritime Awareness Technical Sub-committee (NMATS)**
July 2008

A comprehensive national effort to promote global economic stability and maritime safety and security.

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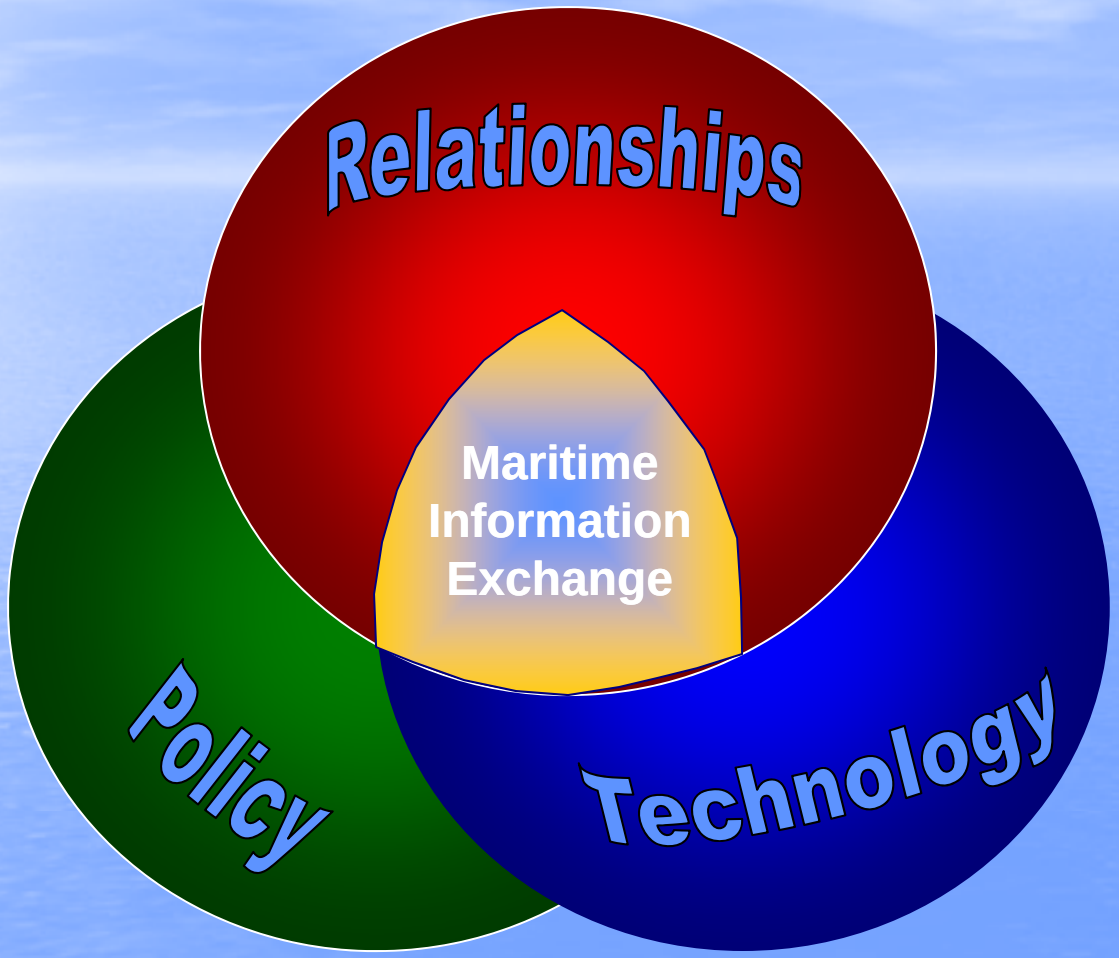
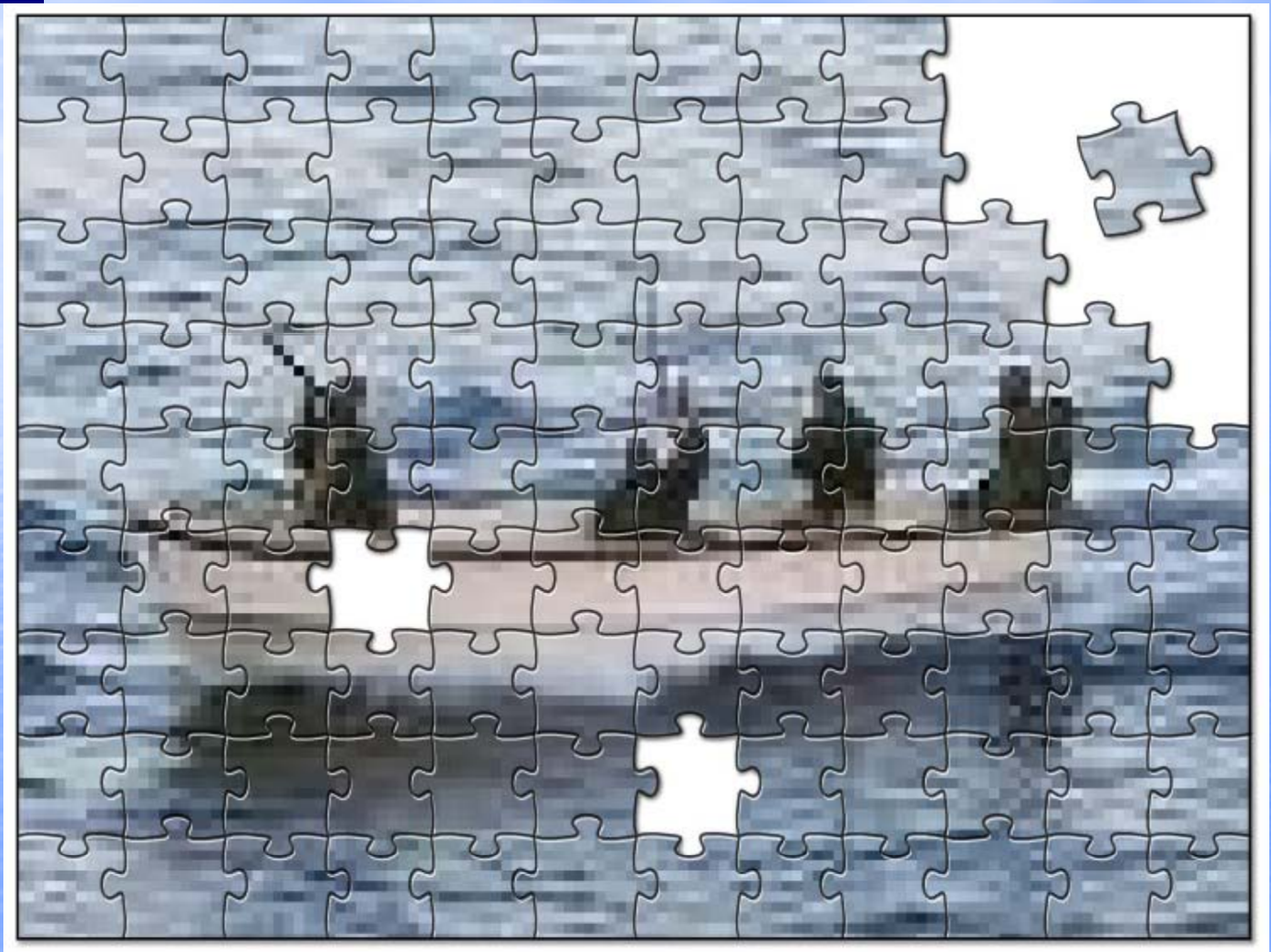
Desired Outcome



Vision: Global maritime information exchange to improve decision making

The information is there…



Information sharing is difficult…….

Recent GAO Report

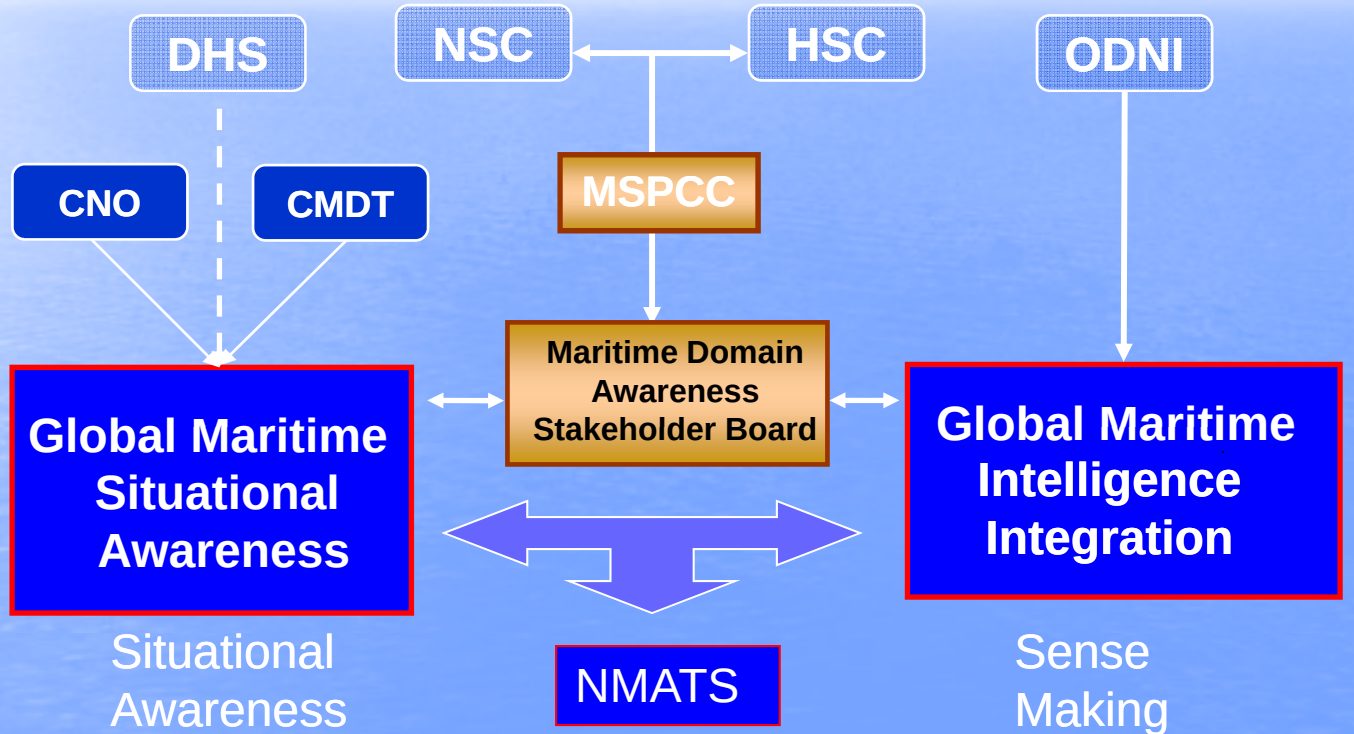
Agencies are using 56 different sensitive but unclassified designations (16 of which belong to one agency) to protect information.

"Office cubicles, the beltway, the budget, and stovepipes."

"The light was blinking red". *911 Commission Report*

National MDA Structure

A federal, interdepartmental and interagency leadership structure



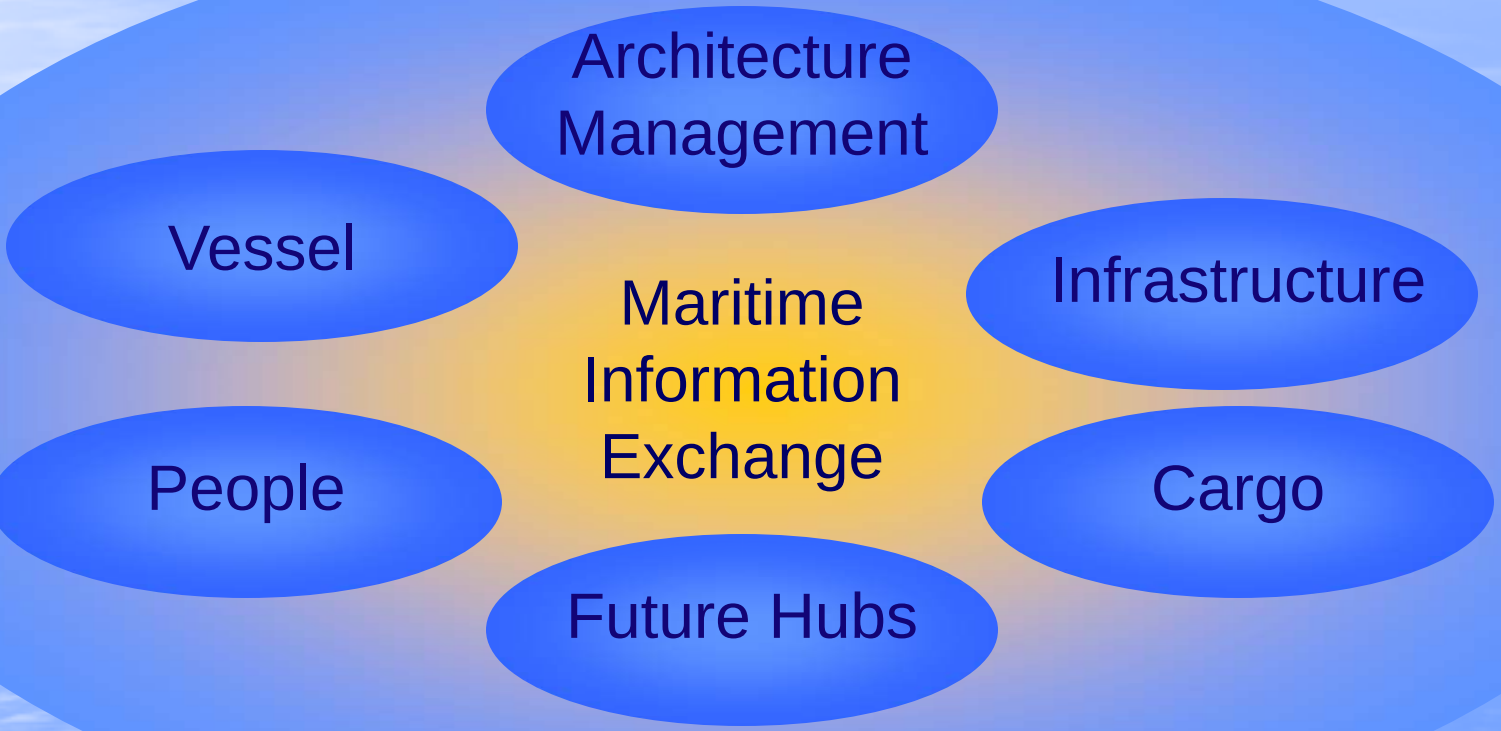
Situational Awareness + Sense Making = Maritime Domain Awareness

Office of Global Maritime Situational Awareness

Initiatives:

1. Information Hubs
2. MSSIS (Maritime Safety & Security Information Systems)- Expansion
3. GMISS (Global Maritime Information Sharing Symposium)
4. TEXAS 3 (TEchnical eXchange on Ais via Satellite)
5. C-SIGMA (Global Maritime Awareness from Space)

Increasing & Coordinating Data Sharing



*… coordinate information flow for subject areas domestically and internationally and facilitate information and data sharing.**

** US National Concept of Operations for Maritime Domain Awareness*

MDA Information Enterprise Hubs

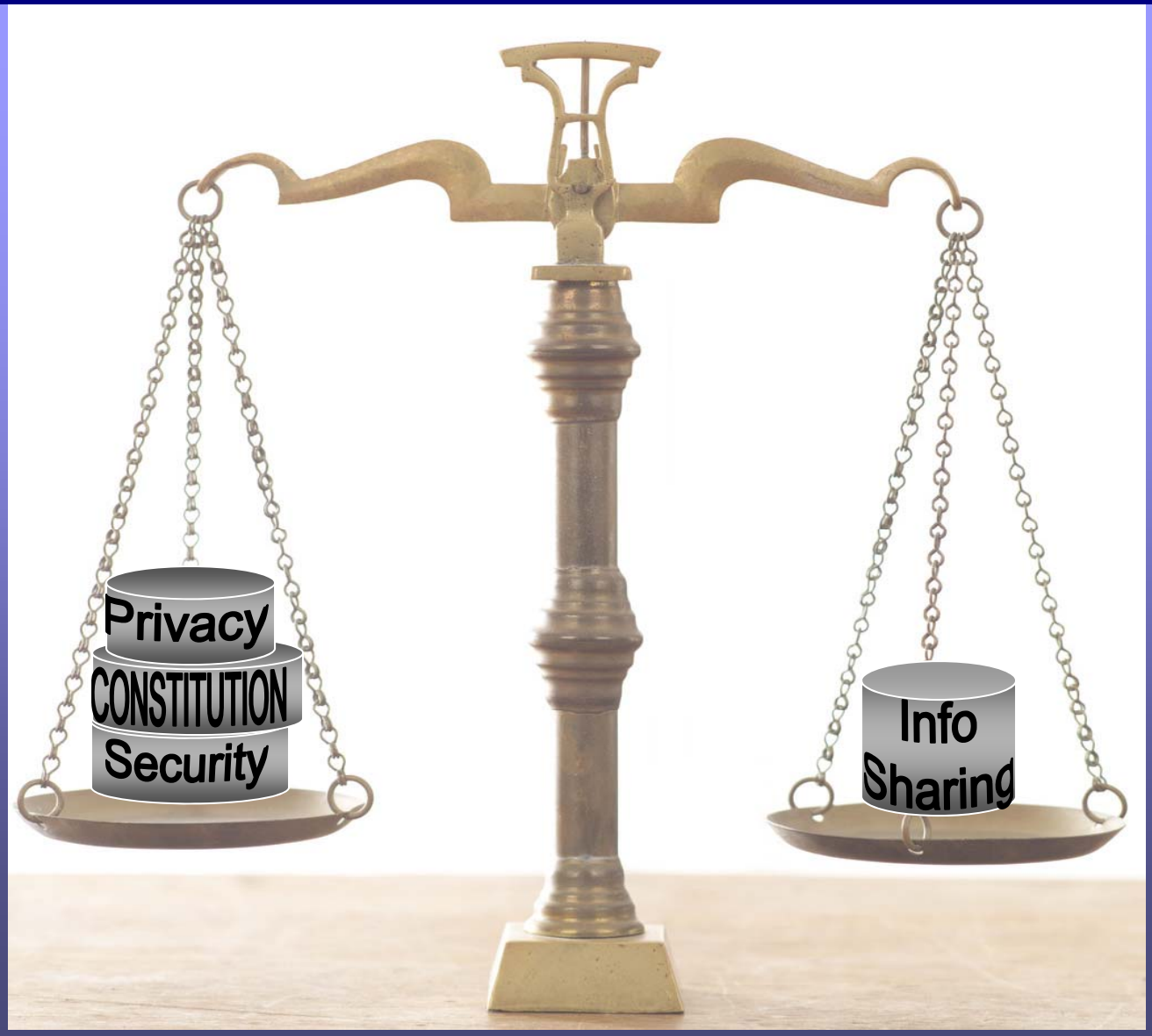
What are Hubs? Information Enterprise Hubs are the lead coordinators and subject matter experts for their specific areas of MDA information*

*Cargo, vessel, people, infrastructure

Why develop Hubs? The hubs support information sharing efforts to bridge the gap until policies, relationships and technology are in place

“They are not systems, they are people.”

The Balance



MSSIS PARTICIPATING NATIONS

(as of 20 APR 09 – 56 Nations)

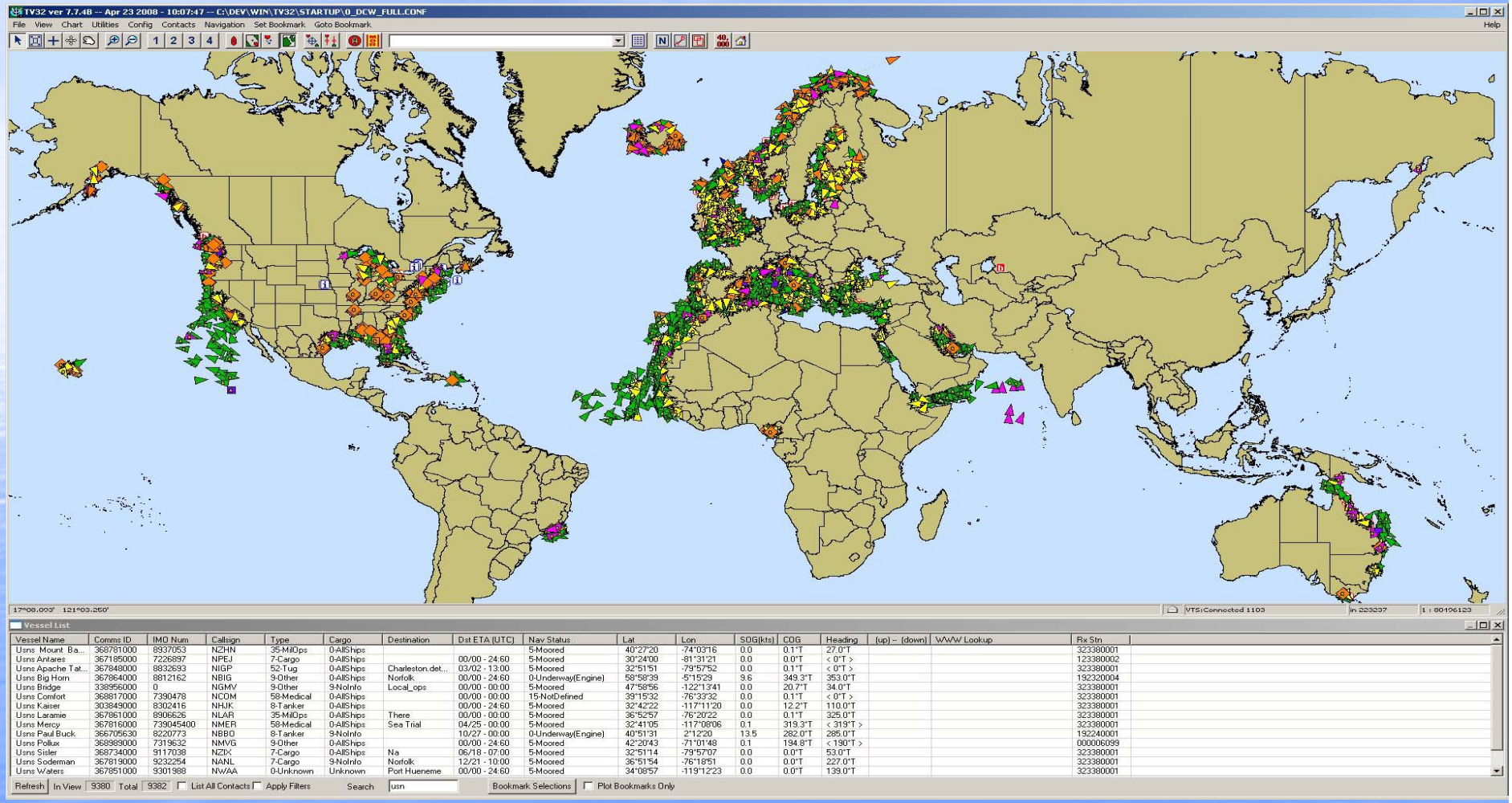
Active Participants

ALBANIA	FINLAND	ITALY	PORTUGAL
AUSTRALIA	FRANCE	IRAQ	ROMANIA
BAHRAIN	GABON	JAMAICA	SAO TOME & PRINCIPE
BENIN	GAMBIA	JORDAN	SENEGAL
BULGARIA	GEORGIA	LIBERIA	SIERRA LEONE
CAMEROON	GERMANY	LITHUANIA	SINGAPORE
CANADA	GHANA	MALTA	SLOVENIA
CAPE VERDE	GIBRALTAR (UK)	MAURITANIA	SPAIN
CHILE	GREECE	MONTENEGRO	TOGO
CROATIA	GUINEA	MOROCCO	TUNISIA
DENMARK	ICELAND	MOZAMBIQUE	TURKEY
DJIBOUTI	INDIA	NETHERLANDS	UKRANE
DOMINICAN REPUBLIC	IRELAND	NORWAY	UNITED KINGDOM
ESTONIA	ISRAEL	POLAND	UNITED STATES

Pending and / or Under Constructions

ARGENTINA		PHILLIPPINES	TIMOR LESTE
BRAZIL	JAPAN	SERBIA	URUGUAY
COLOMBIA	LATVIA	SWEDEN	YEMEN
ECUADOR	NEW ZEALAND	SOUTH AFRICA	

GLOBAL PICTURE OF AIS RECEIVERS & MSSIS SOFTWARE



Way Ahead

- The National Maritime CONOPS has set up *short term*, *mid term*, and *long term* goals to improve *transparency* in the maritime domain.
  - Short term (0-5 years): "[I] *intensify the acquisition of data for small ocean-going craft (*vessels < 300 tons) with an emphasis on the vessels of greatest concern regarding illegal maritime *activity—dhows and fishing vessels".*
  - Mid-term (6-10 years): "Implement technologies which detect vessels as small as 65' on the *open ocean*."
  - Long-term (11-20 years): "reduce the size of the non-emitting objects that can be detected and monitored on the ocean towards the ultimate goal of 25 feet".

National Maritime Awareness Technology Sub-committee

NMATS

- The principal goals of the NMATS include:
  - In coordination with the OGMSA and the GMAII,
- **<u>Provide an effective methodology</u>** for the federal leadership to identify, participate in, and influence the technology-related processes in the development of the nation's maritime security.

DODTECHIPEDIA - Effective Tool to assist Goals!

Basic objectives are:

1. Assist all users to understand MDA capabilities
   - Fielded
   - Under Acquisition
   - Under Development (6.1 to 6.5)
2. It will include:
   - Systems
   - Sub-systems
   - Enabling Technologies
3. Enable developers to identify sources of capabilities
4. Enable government R&D and acquisition managers to identify sources
5. Enable sub-systems/Technology developers to advertise their capabilities (data base becomes an MDA Toolbox)
6. Provide the potential for fielding capabilities more rapidly for both government and non-government.

N M A T S WIKI

- https://www.dodtechipedia.mil/dodwiki/display/techipedia/Interest+Areas

- NO CAC CARD NEEDED
- REGISTER TO GET A PASSWORD
- CLICK ON LINK ABOVE & FOLLOW DIRECTIONS
- SITE IS LIMITED TO US national with contracts with the federal government.
- 2 ND SITE FOR THE GENERAL PUBLIC SOON.

NMATS Data Base (Planned)

1. Collection
   a. Sensors
   b. Platforms
2. Processing
3. Fusion
4. Analysis
5. Display/Decision Aids
6. Dissemination

7. SMEs/POCs
   a. System
   b. Attribute

GLOBAL SPACE PARTNERSHIP

GSP

Collaboration in Space for International Global Maritime Awareness

C-SIGMA

Photo Courtesy of MDA

Guy Thomas george.g.thomas@uscg.mil

Office of Global Maritime Situational Awareness

Accordingly, the prospect of ***open ocean*** situational awareness from space via a ***global space partnership*** could fill the gap as mandated by the CONOP.

Office of Global Maritime Situational Awareness

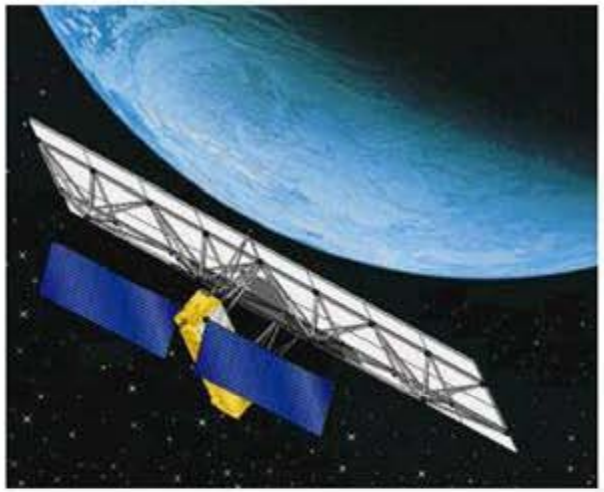
Commercially available, existing technology, and open source information from satellites.

The concept: An International Collaboration of 4 Types of Satellites:

1. Synthetic Aperture Radar Satellite-- SARSAT
2. Electro Optical/Infra-Red—EO/IR
3. Automatic Identification System—AIS
4. Transponders—equivalent to IFF

C-SIGMA Concept

- **Use today's commercial satellite technology**
  - Inexpensive
  - Readily available
  - Worldwide coverage
  - Choice of optical and radar sensors
- **Automate all processing**
  - Get results fast
  - Keep it simple and easy-to-use
  - Minimize manpower and user intervention
- **Be able to monitor large ocean areas**
  - Increase areas of surveillance
- **Be able to re-survey areas quickly**
  - Increase revisit times
  - Speed of re-surveillance
- **Accurately detect ships**
  - Minimize false hits
  - Increase ship detection probability

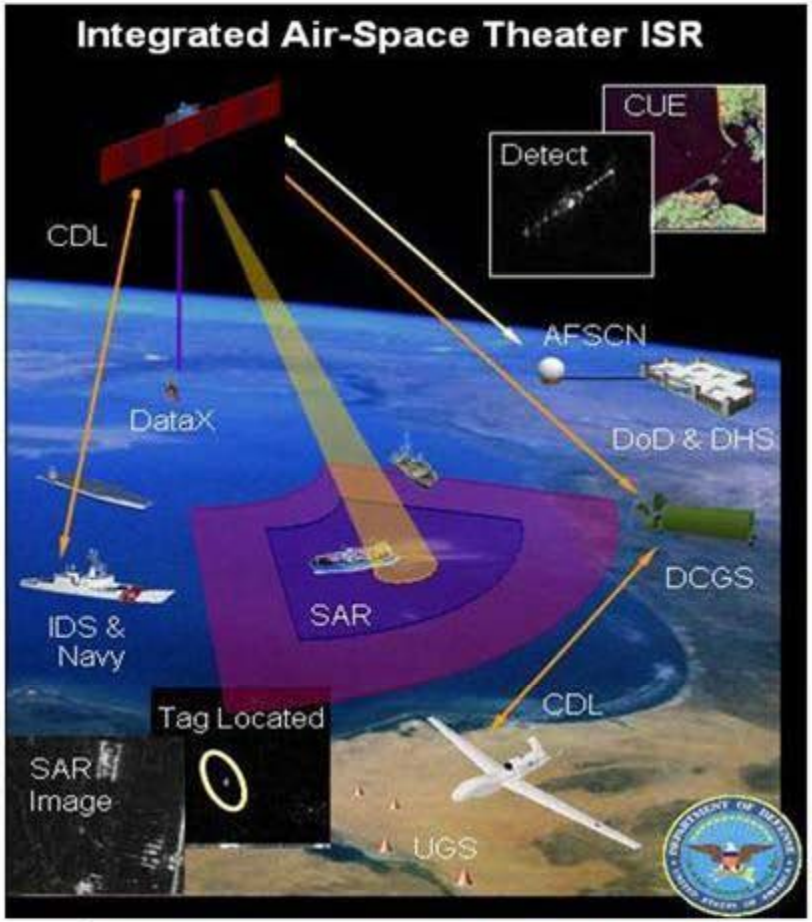


1st Part of the
C-SIGMA Equation

SARSATS

Space-Based SAR Provides Global Access

- **All-Weather, Day-Night, Dynamically-Tasked, Tactical-Resolution SAR**
  - Optimized for large area collections Cues higher-resolution systems - Tipping & Cueing
- Augments NTM
- **Repeat Orbit**
  - Nominal 24 Hour Repeat
  - Optimal CCD over wide area
  - Maritime Domain Awareness
  - Non-SAR Mode for Vessel Detection
  - SAR mode for wake detection
- **Simultaneous SAR Imaging & Tagging**
- **TPED using existing ISR Infrastructure**
  - Theater tasking/downlink
  - Automated CCD Processing (projected capability)

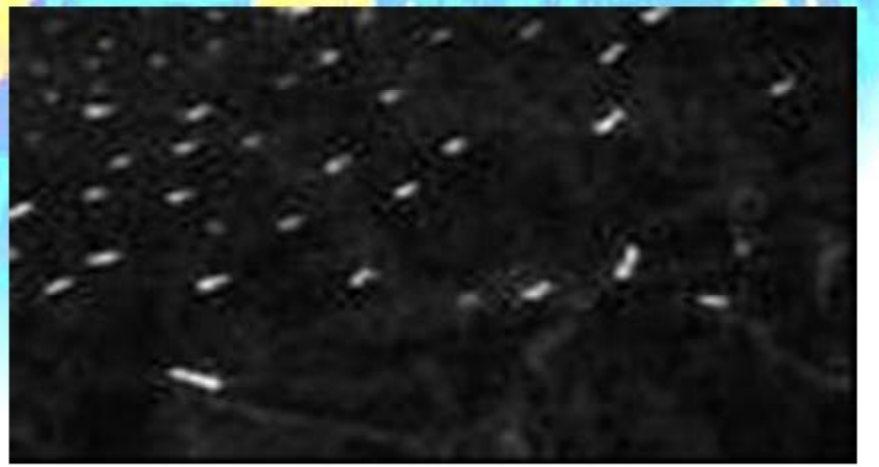


Analysis of Change Indicates Potential Activities of Interest

Courtesy Ball Aerospace

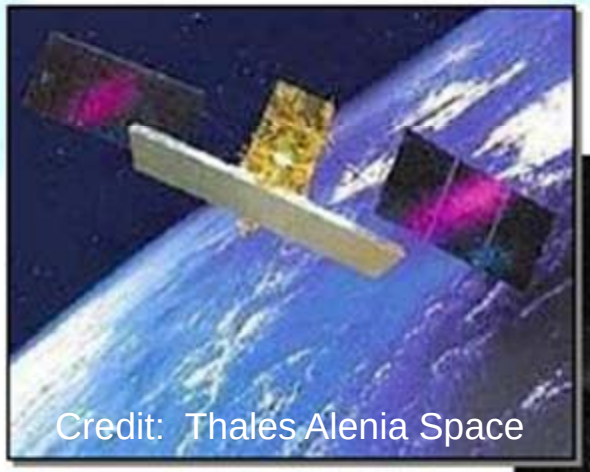
L-Band SARSat

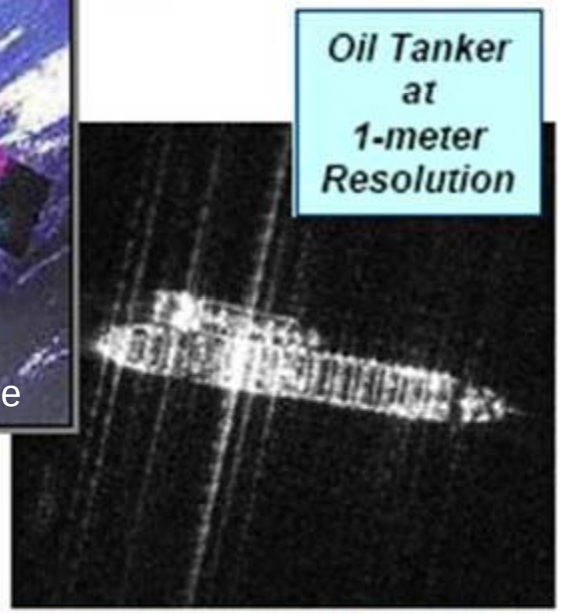
Wake and Ship Detection



Courtesy of
Ball Aerospace

Cosmos Sky Med





Technology

- Constellation of four X-band SAR imaging satellites with multi-polarization

The So What

- Resolutions from sub-meter in spot-light mode through several tens of meters
- Rapid revisit, improved persistence, 24-hr, global coverage
- The only commercial imagery satellite constellation with this capability
- Dual-use system for defense and civil applications

Optical Systems

High Res Optical Satellites: e. g. EROS-A1, EROS-B, OrbView, QuickBird, WorldView, IKONOS, Spot Image GEOEYE

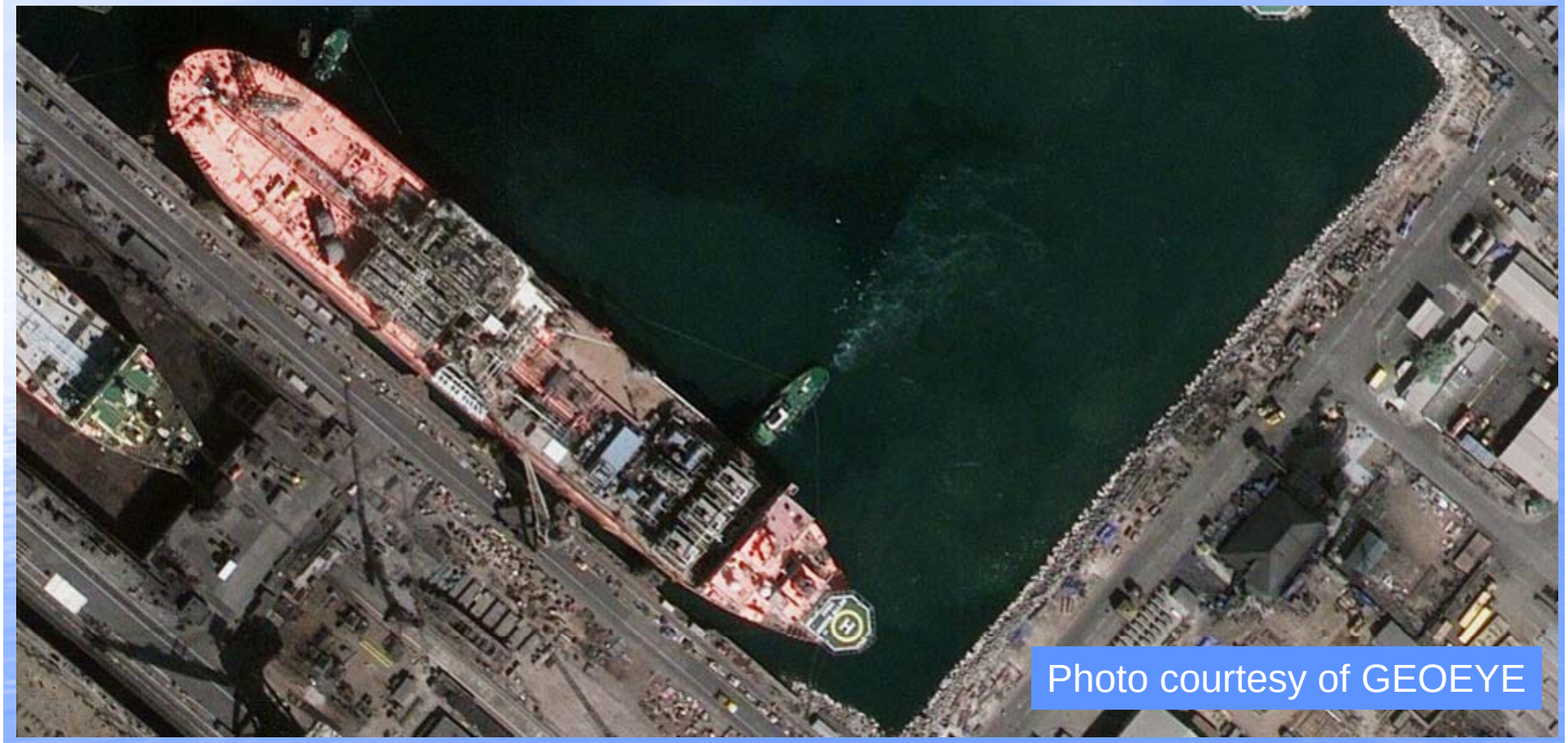
- Suitable for ship classification:
  - Coverage from 8km to 16.5km
  - Resolutions from 0.61m to 1.80m panchromatic
- Agile satellites that provide 12 hour to 2 day revisit times depending on number of satellites
- Some include direct tasking to support Tactical Surveillance applications

GEOEYE's & its First Pictures

This 1-meter resolution image was collected November 20, 2008 by the IKONOS satellite. The image shows the SIRIUS Star, the Saudi-owned crude oil carrier Hijacked by Somali pirates, anchored approximately 5 miles off the Somali coast.

(IKONOS is 10 years old….)

Freighter off-loading at Casablanca, Morocco



½ meter resolution photo of Collected on October 25, 2008 by GEOEYE

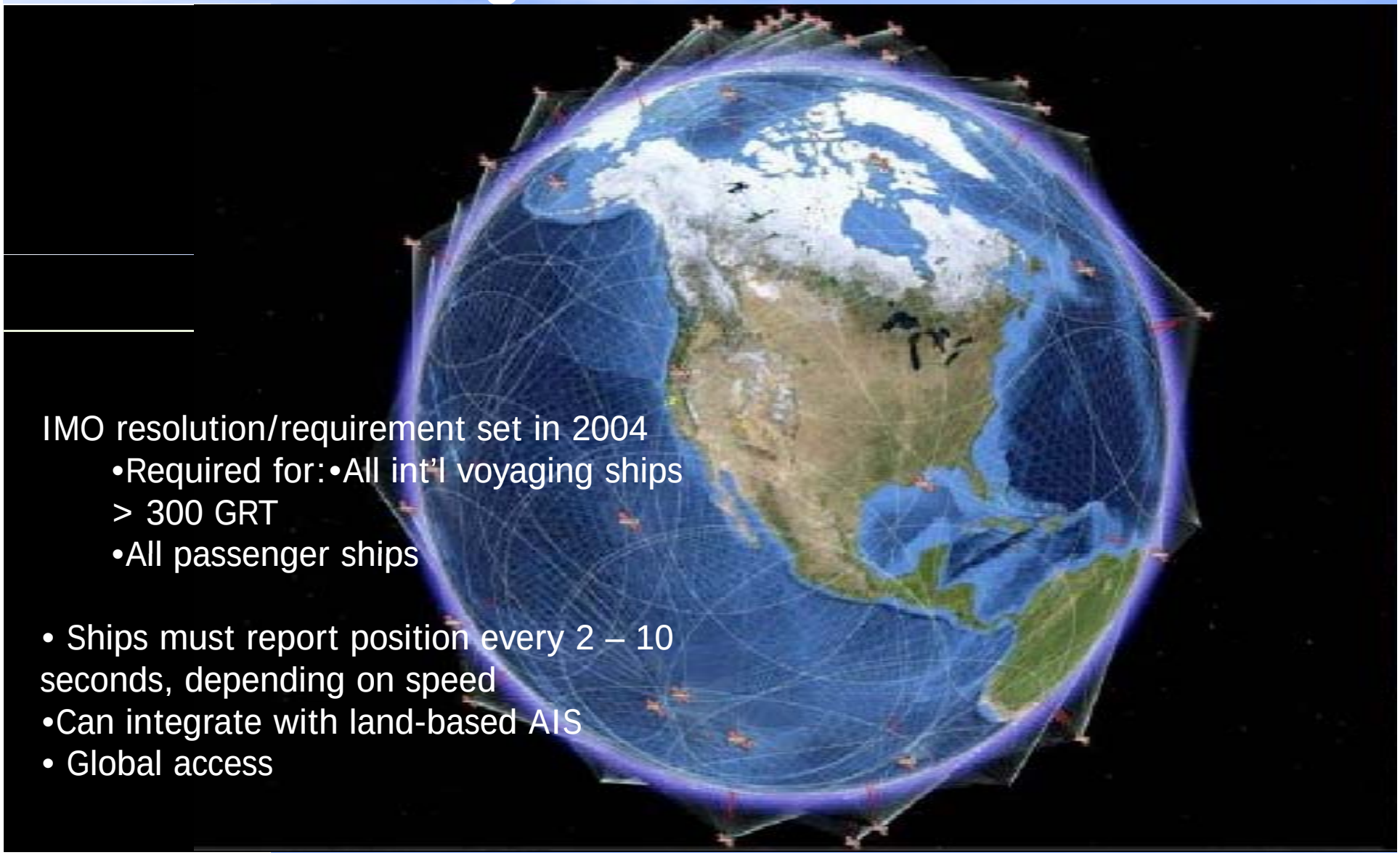
3rd Part of the C-SIGMA Equation

AIS

CRUCIAL NEW COMPONENT

LETS YOU KNOW WHO THE ***GOOD*** GUYS ARE

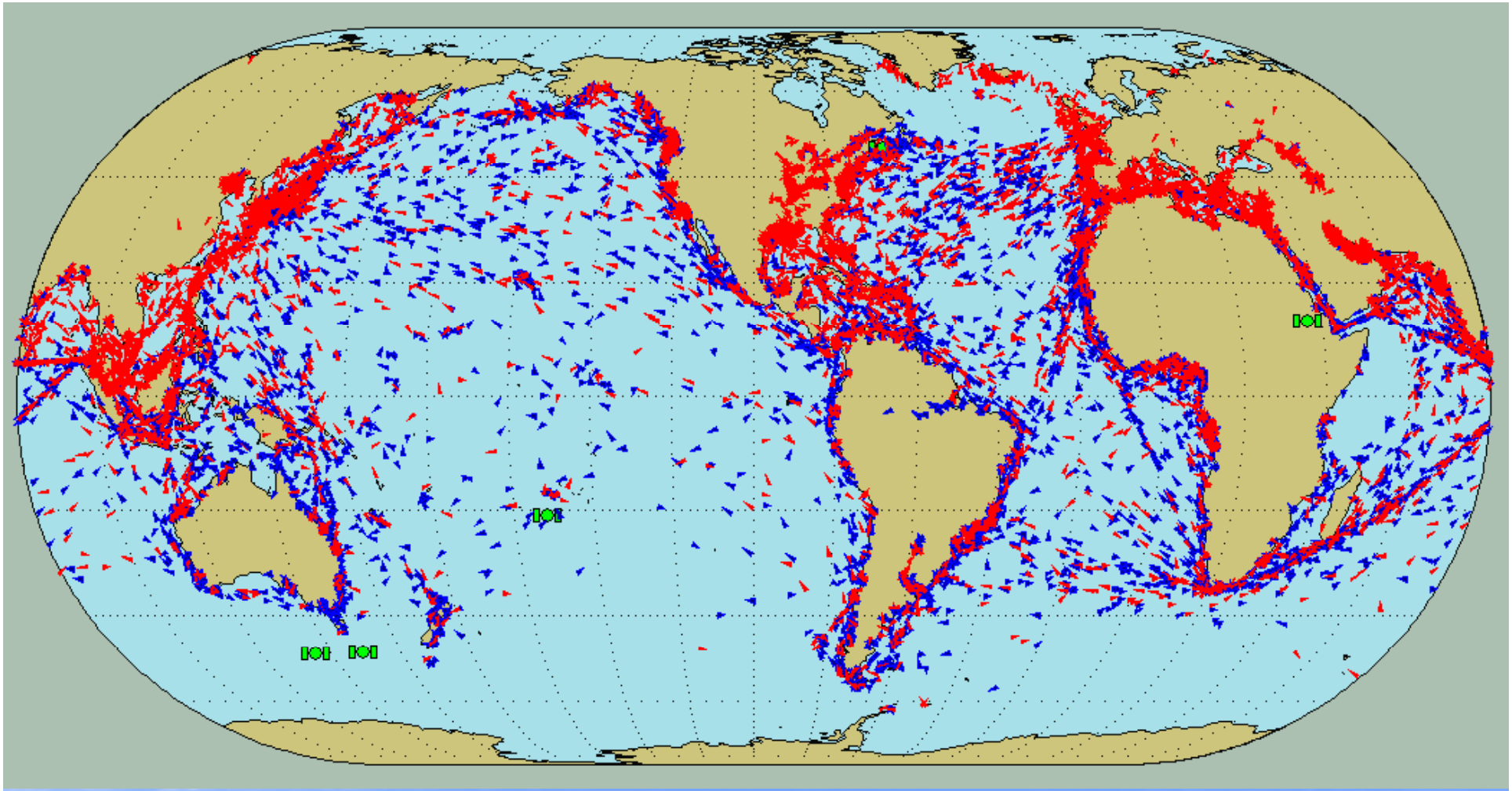
AIS from Space is a Paradigm Changer - ADM Thad Allen



IMO resolution/requirement set in 2004

- Required for:
  - All int'l voyaging ships > 300 GRT
  - All passenger ships

- Ships must report position every 2 – 10 seconds, depending on speed
- Can integrate with land-based AIS
- Global access



ORBCOMM Worldwide plot, 24 hours data, 15,073 vessels tracked

OrbComm Future Plans: Full AIS Enabled Constellation

- **Up to 25 AIS enabled satellites projected for constellation**
  - Four planes (45 - 48.5 degrees) of six satellites each One polar satellite (current spare available for polar launch)675 - 750 km altitude
- **Advantages of multiple AIS satellite constellation**
  - Increases probability of message reception
    - Multiple "views" of individual vessels
    - Minimizes effects of co-channel interference
  - Network redundancy minimizes risks
    - Redundant space and terrestrial assets

4nd Part of the
C-SIGMA Equation

Transponder Systems

- IMARSAT
- ORBCOM
- Iridium
- Global Star
- Etc.

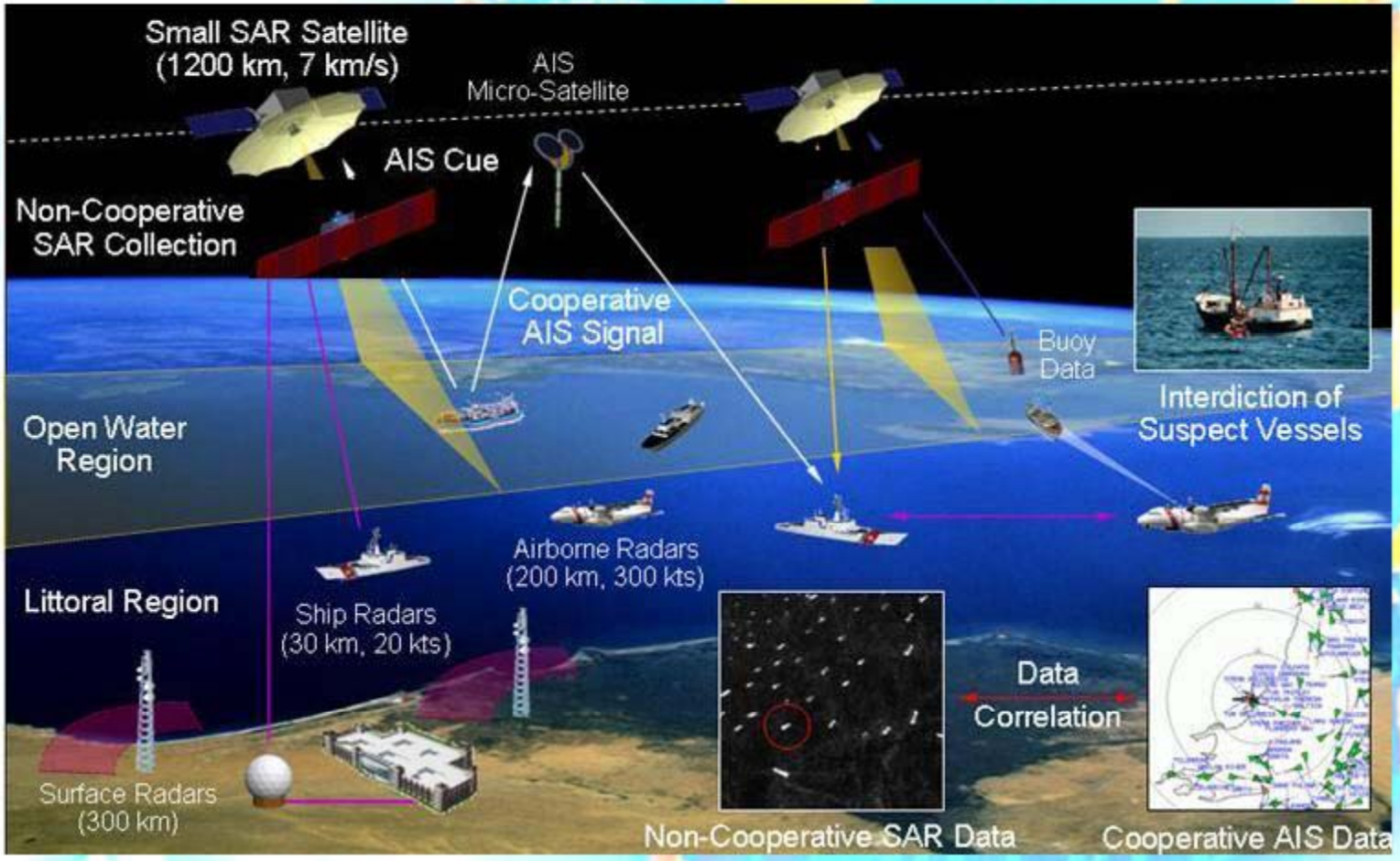
Often overlooked, not very sexy?

The Real Maritime IFF System?

AKA
Self Reporting Systems

- Tracking , (fishers +), trucks, status change,
- Formatted Message
- Can be programmed to report
  - On a time schedule (every hour, every 30 minutes, etc.)
  - By geographic limit (cross a boundary)
  - Upon event (door open, temperature out of limits, etc.)
  - Combination of rules (e. g. LRIT)
  - Upon demand from shore

Global Maritime Awareness



Collaboration is THE Silver Bullet

GLOBAL MARITIME INFORMATION SHARING SYMPOSIUM 2009
SEPTEMBER 15-18
NATIONAL DEFENSE UNIVERSITY
FORT LESLIE J. MCNAIR
WASHINGTON, D.C.

Bringing the maritime industry perspective into government maritime awareness policy

U.S. Navy photo

OFFICE OF GLOBAL MARITIME SITUATIONAL AWARENESS

www.gmsa.gov/gmiss

Call for Presentations

TEchnical eXchange on Ais via Satellite

TEXAS 3

UNCLAS- Open to All
August 18-19
Washington, DC

SCI
August 20
NSSO
Chantilly, VA

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