C-SIGMA

Collaboration in Space for International Global Maritime Awareness

Pathway to *Global* Maritime Cooperation for Safety, Environmental Protection, Resource Conservation, and Security
Maritime Situational Awareness (MSA)

Key to Local/Regional Maritime Security

Global Maritime Awareness (GMA)

Key to Global Maritime Security
SPACE-BASED
Global MARITIME AWARENESS
WHERE 3 GLOBAL COMMONS CONVERGE

4 GLOBAL COMMONS
1) Maritime
2) Air
3) Space
4) Cyber
Major Advancements in Last 2, Space & Cyber, Potentially HUGE Effects on Maritime

Especially GMA
Major Advancements

Tidal Wave of Earth Observation Satellites

• S-AIS
• SAR
• Video
• Imaging
• SIGINT
• IoT/M2M

• Widespread Use of AI and Machine Learning
• Blockchain being developed
COLLABORATIVE COLLECTION

S-AIS & SARSATS

A TRUE SYNERGISM
Combination of AIS Class B with ORBCOMM 2-way satellite network

Comprehensive and economic solution for small vessel tracking

Introduced March 2017
A snapshot in time: Orbiting satellites provide near continuous coverage.
Trade Show 2019
Full Sized, Ready for Launch!
Task #1

“Build C-SIGMA”

From September 2009 to June 21, 2010
Spent a day a week as a member of the US Interagency Team Drafting the NSP
and Selling the idea of C-SIGMA.

C-SIGMA Concept very well received.
Championed by CoS to President. He Left!
No accident it is Implementation Task #1. Never funded! Very Frustrating!!!
C-SIGMA Would Pay for Itself for Both Developed Countries as well as those still under Development
QUESTIONS?

Fire Away!
BACK-UPS
System Description

6 Integrated Elements  4 in Space,  
2 on the Ground

SPACE ELEMENTS

1. Synthetic aperture radar satellites (SARsats)  
2. Electro-optical (EO) imaging satellites  
3. M2M status reports via comm satellite  
4. Satellite Automatic Identification System (S-AIS)*

*(Designed for collision avoidance and traffic control in congested waters now also used globally as a primary ship identification and tracking system. It is the key component of this concept.)
Ground components:

5. The ground infrastructure, (terminals), software tools and licenses to allow users of the system to determine which spacecraft to task when to obtain the desired results.

6. The software tools to correlate, fuse and analyze the information generated by the space systems, including S-AIS track data, the basis for all analysis, along with all other pertinent data resident in all reachable data sources such as port, financial, shipping and broker records.
“(U) .... the Secretaries of Defense, Homeland Security, Transportation, State and Commerce, will develop an unclassified, international available program to foster international collaboration using civil and commercial space systems to enhance global maritime domain awareness to provide:
NSP Implementation Task #1 (continued)

- Enhanced safety of life at sea;
- Increased mutual security of all users of the maritime domain;
- Improved protection of the maritime environment
  - and the resources of the sea;
- Improved flow of commerce;
- Better monitoring of the condition and performance of the Marine Transportation System.”
INTERNATIONAL COLLABORATION

"THE" SILVER BULLET!

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