

An aerial photograph of a large port area at sunset. The water is dark, and the sky is a mix of orange and blue. Numerous ships are visible in the harbor. Overlaid on the image is a complex network of glowing lines and nodes, resembling a data or communication network. The lines are primarily red and white, with some green lines visible in the lower half. The nodes are small circles or squares at the intersections of the lines. The overall effect is a sense of connectivity and technology in a maritime setting.

# The Future of MDA

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**CAPT Thom Remmers**  
**Sea Air Space - 2023**

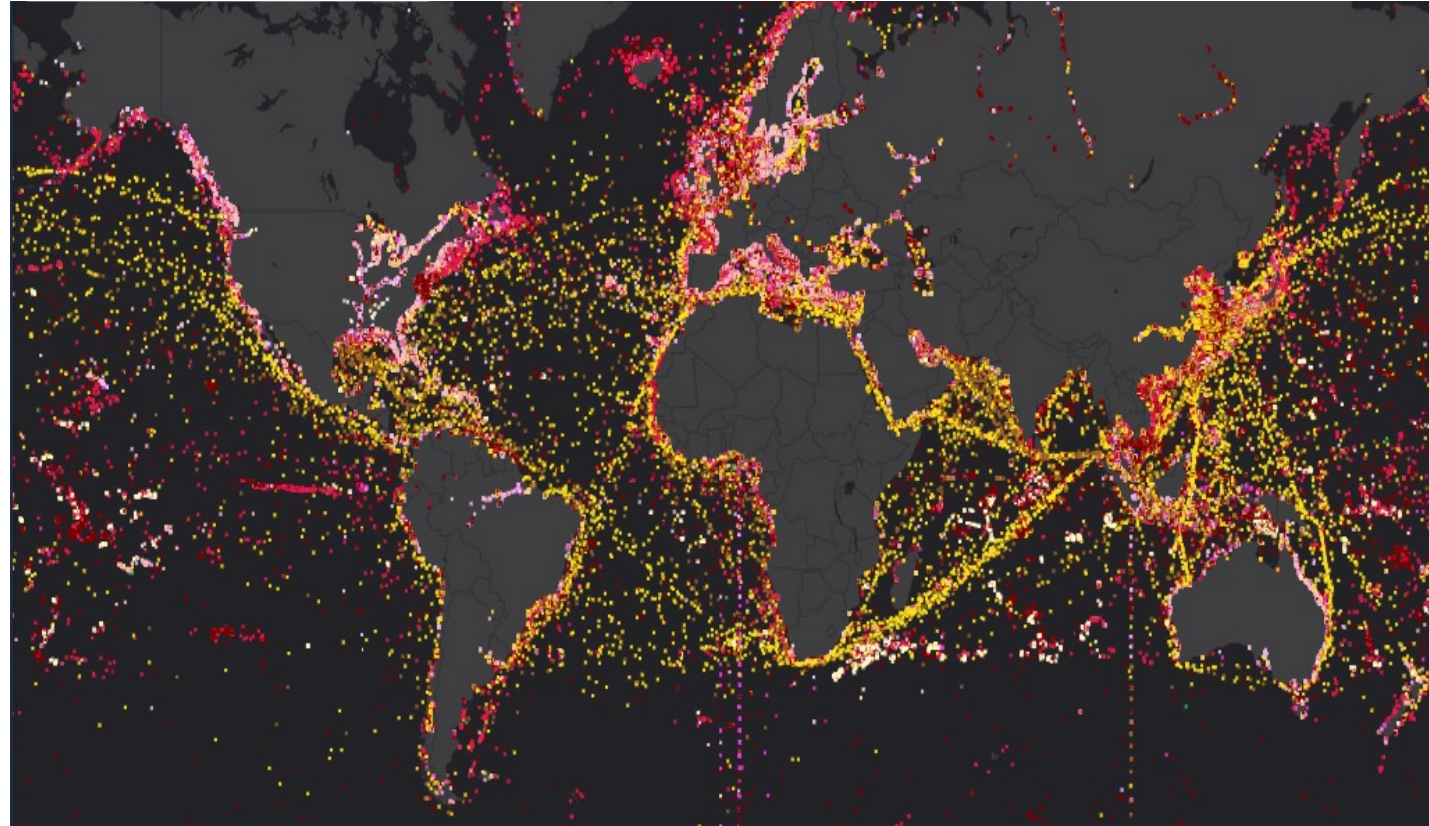


# The Future of MDA

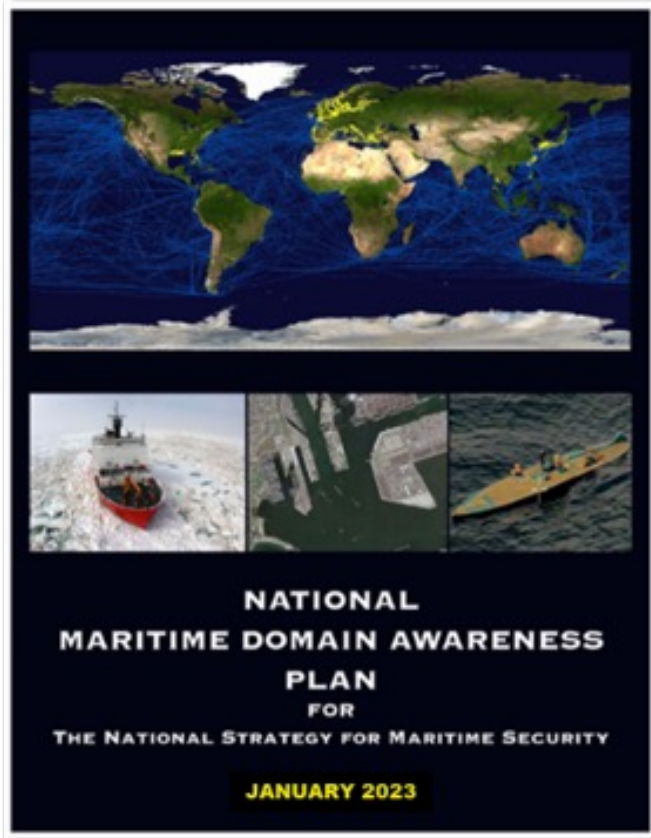
**What is MDA?**

**How can we achieve it?**

**What does the future look like?**



# National MDA Definition



**Maritime Domain Awareness (MDA)** is the effective understanding of anything associated with the maritime domain that could impact the security, safety, economy, or environment of the United States.

The **Maritime Domain** is all areas and things of, on, under, relating to, adjacent to, or bordering on a sea, ocean, or other navigable waterway, including all maritime-related activities, infrastructure, people, cargo, vessels, and other conveyances.

## Two Core Principles:




- Unity of Effort
- Foster Information Sharing and Safeguarding

Source:

- *National Maritime Domain Awareness Plan* [Revision 3 of 2022; original December 2013]



A collage of images related to maritime operations and intelligence. At the top is a world map showing shipping routes. Below it is a satellite image of a ship's wake. To the left is a photograph of a ship's bow. At the bottom left is a large, bold text 'MAR' and 'THE NA'. On the right is a document titled 'United States Maritime Domain Awareness and Information' with a list of tasks for the Maritime Domain Awareness (MDA) principal DHI. The document is dated April 17, 2008, and is addressed to the U.S. Department of Homeland Security. The document is signed by the Commandant of the U.S. Coast Guard.

<p>U.S. Department of Homeland Security Washington, DC 20538</p>	<p align="center">  <b>Homeland Security</b> </p>
<p align="center">April 17, 2008</p>	
<p>Memorandum for:</p>	
<p>From:</p>	
<p>Subject:</p>	
<p>I hereby designate the Executive Agent for and planning within the Commandant is policies, plans, and related activities.</p>	<p align="center"> <b>United States Coast Guard</b>  <b>Plan for</b>  <b>Maritime Domain Awareness</b>  <b>and Information Sharing</b> </p> <hr/>
<p>Specifically, the Com</p>	
<p>a. Ensure proper co Ensure effective and support of th Maritime Intellig Operations for M</p>	
<p>b. Coordinate with to execute depart Interagency Inve</p>	
<p>c. Coordinate MDA the principal DHI possible, enable forums.</p>	
<p>d. Coordinate with of MDA related</p>	
<p>e. Develop, maintai law, and other Ce</p>	
<p>f. Establish, mainta documenting the MDA Executive</p>	<div align="center">   </div>
<p></p>	<p align="center"> Version 2.0  September, 2011 </p>

- Coordinate with DHS Components on requirements, resources, and performance
- Coordinate with other Department Executive Agents including DoD, DOT

1. *Maritime Domain Awareness (MDA) Executive Agent Designation [April 2008]*



# How to achieve MDA?

## Actions:<sup>1</sup>

- Surveillance: Systematic observation of an area (Frequency or Continuous)
- Detection: Discover presence (When and Where)
- Classification: Discover differences (Type, Size, Status)
- Identification: Discover distinctness (Flag, Vessel/Persons Name, Cargo)
- Understanding: Fuse history, tendencies, intent (TOI, Threat, Hazard)

### Source:

1. Adapted from *Maritime Domain Awareness Executive Steering Group Interagency Requirements Working Group Final Report [March 2021]*





# How to improve MDA?

## Actions:

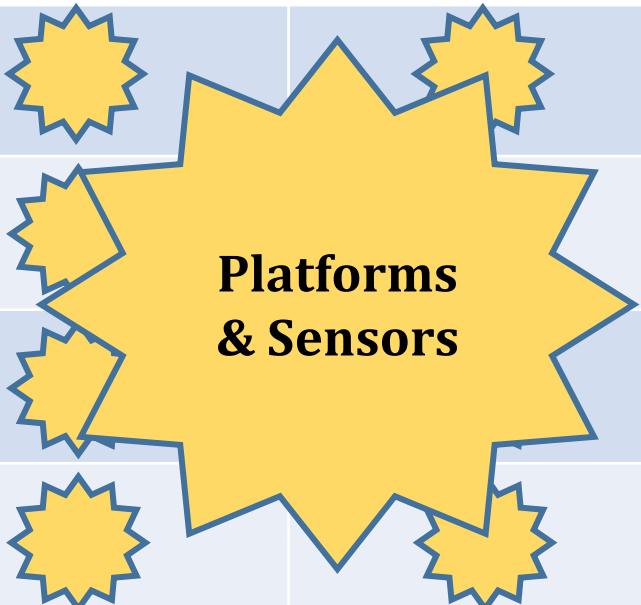

- Surveillance
- Detection
- Classification
- Identification
- Understanding

## Capabilities:

- Platforms & Sensors
- Tactical Comms & Networks
- Data Engineering & Management
- Advanced Analytics
- Visualization & Tasking



# Actions to Capabilities

	Platforms & Sensors	Tactical Comms & Networks	Data Engineering & Management	Advanced Analytics	Visualization & Tasking
Surveillance					
Detection					
Classification					
Identification					
Understanding					



# Unmanned System Strategic Plan

## VISION STATEMENT:

*The Coast Guard effectively employs, defends against, and regulates unmanned systems in a complex maritime environment advancing maritime safety, security, and prosperity for the American public.*



Read it here:



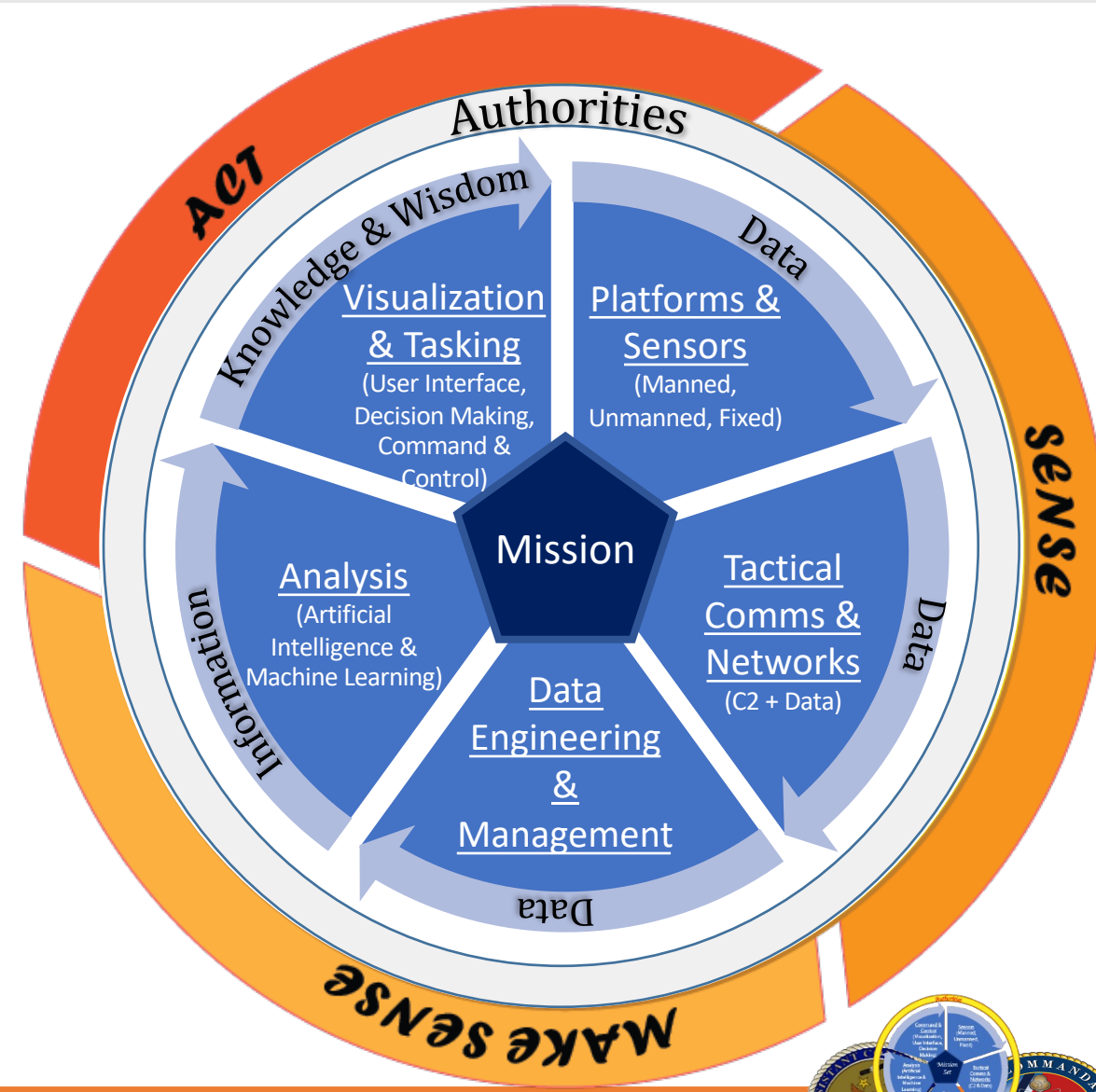


# Project Minerva: An Operational Data Ecosystem

We can unite people, assets, systems, and data in new ways to create a more agile force.

Project Minerva was chartered to "align Coast Guard efforts and... define the high-level Next Gen Operational Data Ecosystem..."

"Delivering improved maritime domain awareness and decision advantage through interconnected, enterprise wide C5I capabilities"



# Goal: Deliver The Seven “Rights”

- The right information,
- To the right user
- At the right classification,
- At the right time,
- Via the right route,
- For the right reason,
- On the right device.



# Desired End State: Coastal Maritime Domain Awareness

1. Manned platforms supplemented with new unmanned platforms and commercial LEO satellites fill capacity gaps and provide persistent, wide-area maritime surveillance.

2. Onboard sensors employ AI/ML algorithms to automatically detect targets of interest

3. Mobile Ad Hoc Networks (MANET) using mesh radios share detections and full motion video across a tactical data network

MANET Mesh Radios

Unmanned & Autonomous Vessels

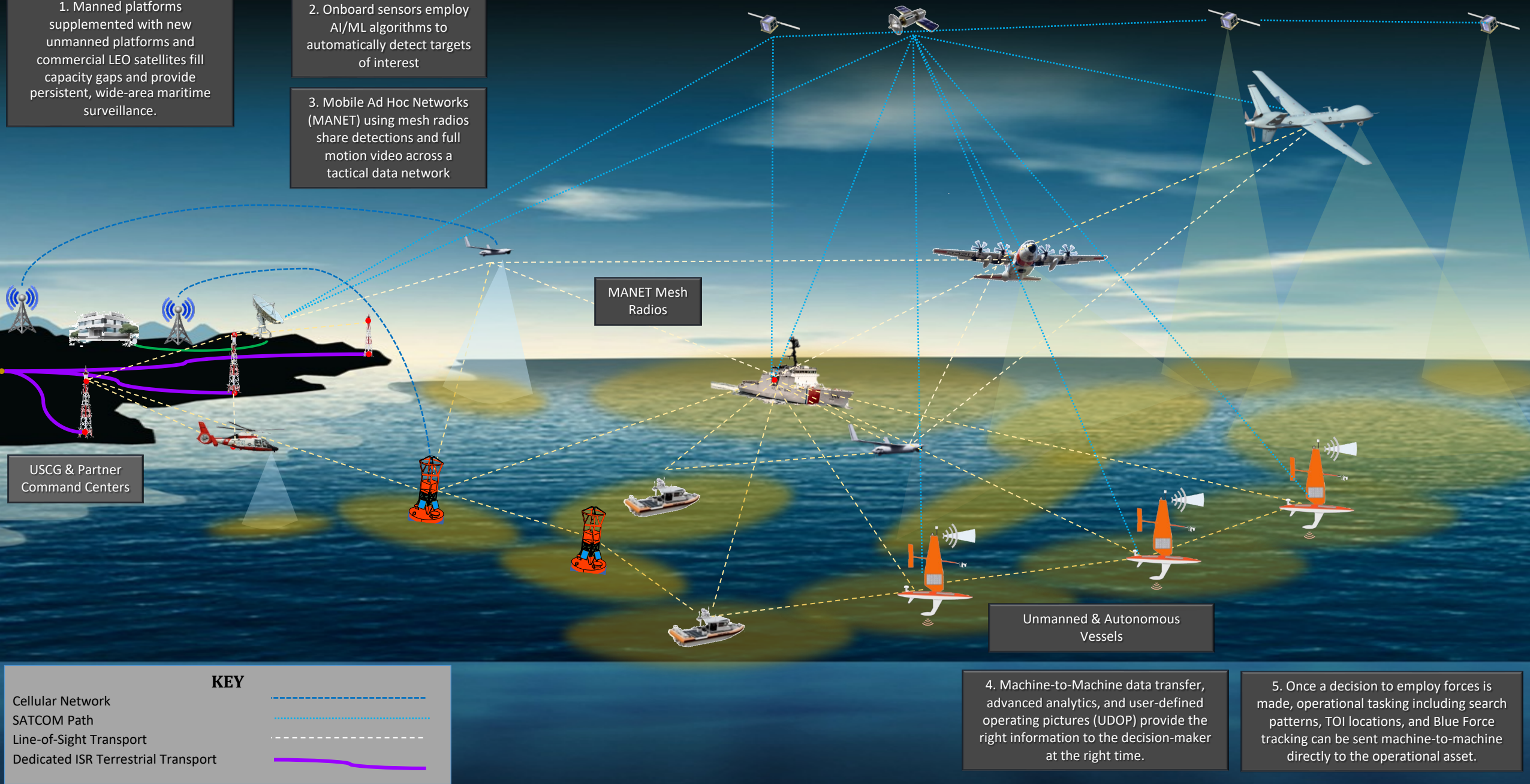
USCG & Partner Command Centers

4. Machine-to-Machine data transfer, advanced analytics, and user-defined operating pictures (UDOP) provide the right information to the decision-maker at the right time.

5. Once a decision to employ forces is made, operational tasking including search patterns, TOI locations, and Blue Force tracking can be sent machine-to-machine directly to the operational asset.

## KEY

Cellular Network  
SATCOM Path  
Line-of-Sight Transport  
Dedicated ISR Terrestrial Transport





# Questions?

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Unmanned Systems Strategic Team Lead  
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Read it here:

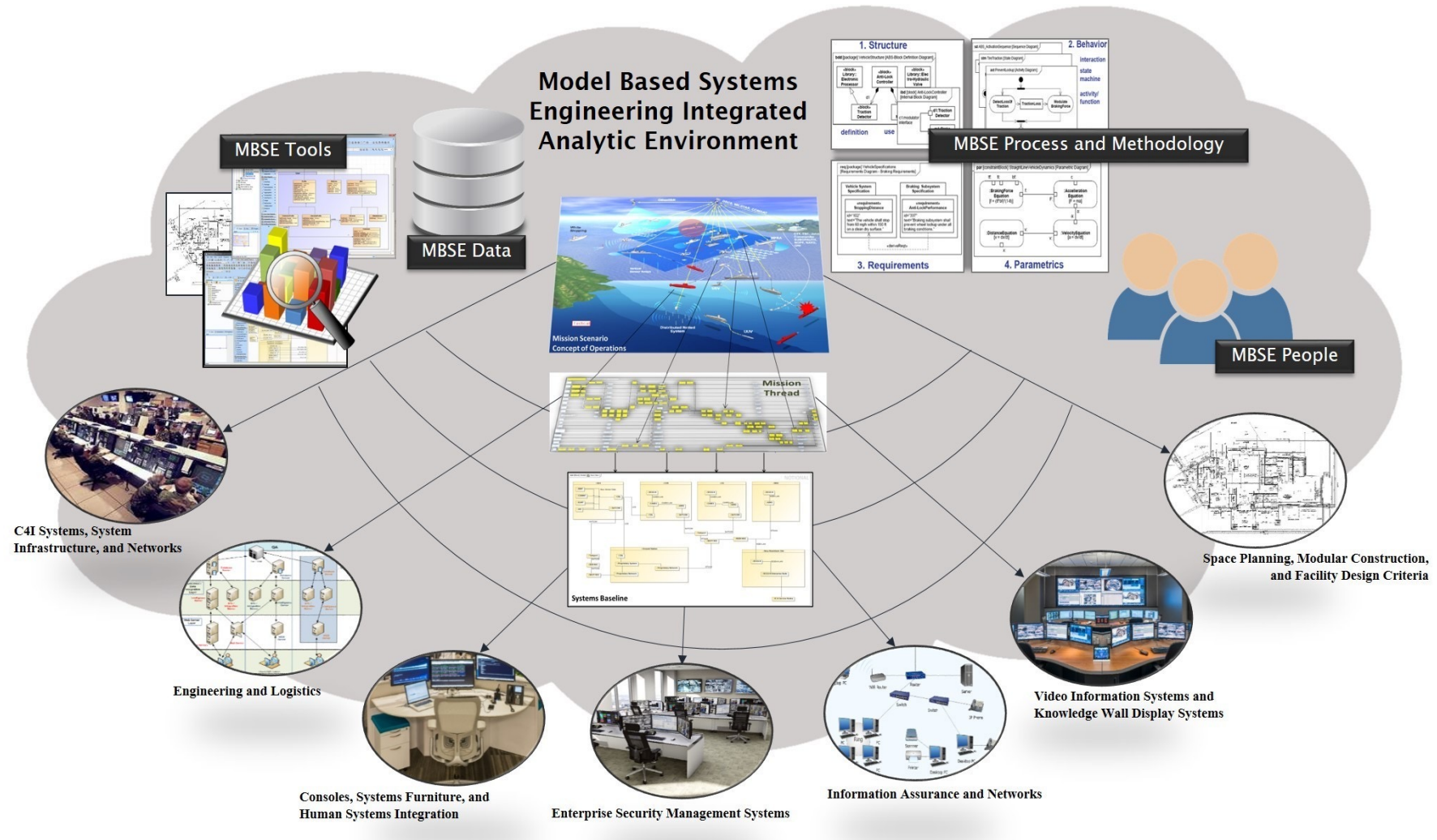


<https://www.dvidshub.net/video/878483/coast-guards-unmanned-systems-strategic-plan>



# Model Based System Engineering Approach to EA

- Multiple Interfaces:
  - Internal to the “Slices of the Pie”
  - Between “Slices of the Pie”
  - Between the EcoSystem and Legacy Systems
  - Complex Cybersecurity interactions
- Start Small, Learn, and Scale Smart
  - Segment Architecture
  - Build to Enterprise Architecture
- Deliver at the speed of need; remain agile for obsolescence

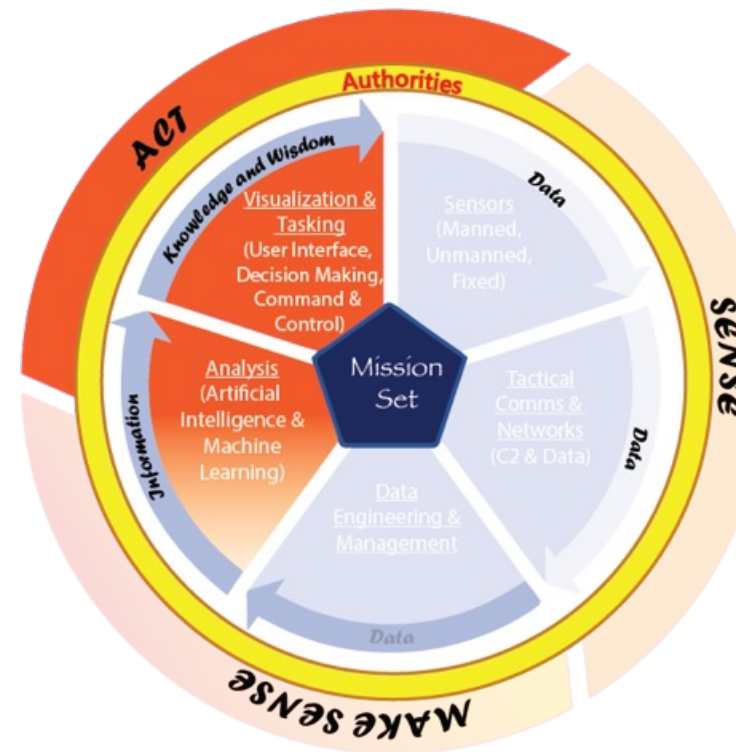
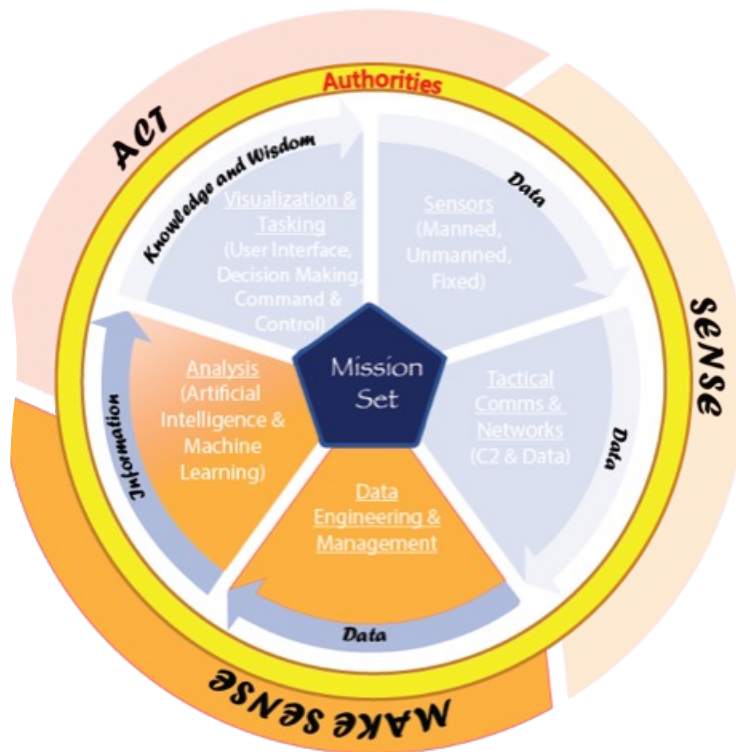
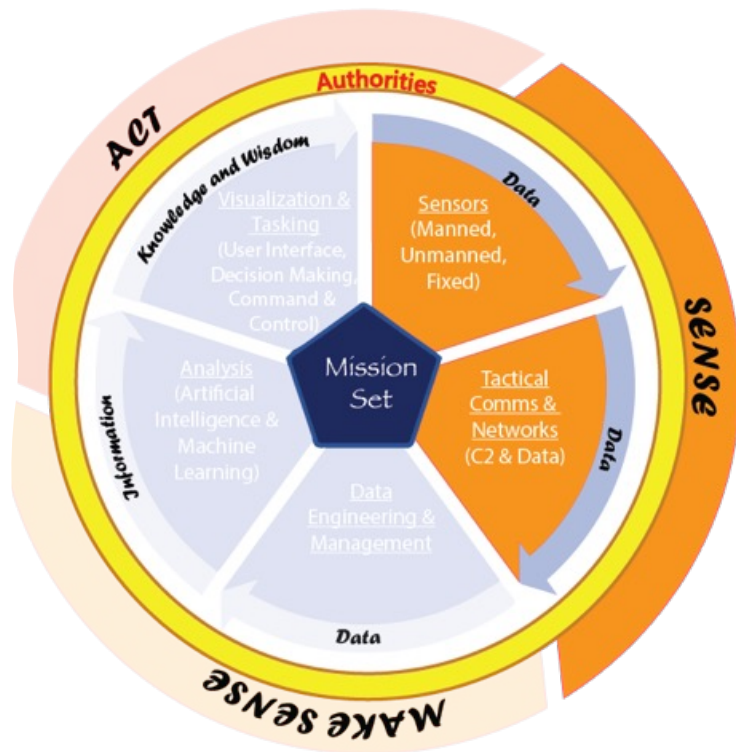




# How to achieve MDA?







# Questions

# Transformational Pillars

- Collaboration is Key.
  - The Ecosystem rules all. We must ask: Is this the best for the service?
- All data is enterprise data.
  - Data is paramount to yield information, generate knowledge, and support decision making.
- Stovepipes are the enemy.
  - Each piece of the system performs its function and the entirety of the ecosystem delivers capability beyond the sum of the individual parts. Obsolescence will be managed in stride.
- Focus on the User.
  - Concentrate on designing the human-machine interface to create an intuitive, easy to use ecosystem.
- Live the Agile Manifesto.
  - Building the ecosystem is a marathon. Think big, test small, fail fast, learn a lot, and scale smart. Each step of development will be deliberately made toward the end state.
- Have a Bias for Action.
  - Look for opportunities to innovate, compress timelines, and take risks.



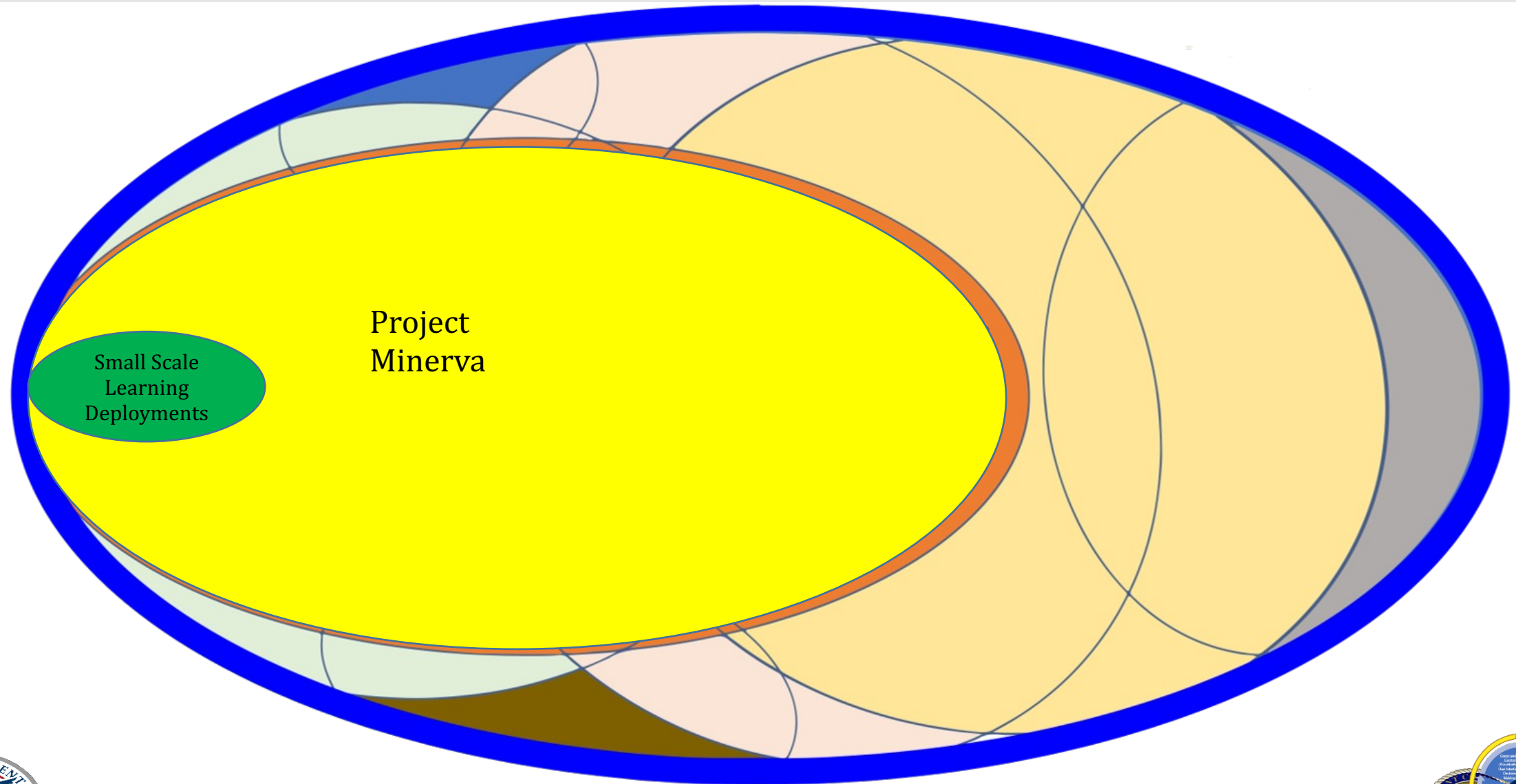
# Four Lines of Effort

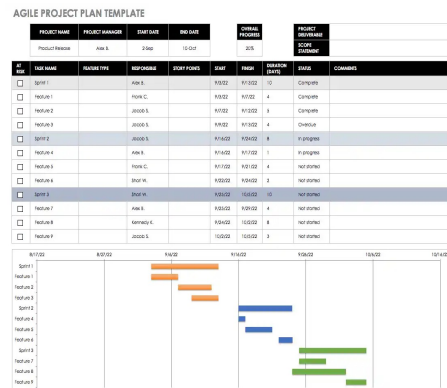
- LOE 1-Establish the Operational C2 Data and AI Enterprise
  - Effective Operational C2 Data and AI Enterprise is essential for accurate, valid, and authoritative data and AI models.
  - Must be able to discover and access any data and information from all domains and leverage responsible AI models to accelerate exploitation of the data
- LOE 2- Establish the MINERVA Human Enterprise
  - Designing the human machine interface to allow for an intuitive, easy to use ecosystem
  - Prevent leaving data on the floor because the user doesn't know how to access it
  - Combines the human elements of decision-making with the technical means to perceive, understand, and predict the actions and take action.
- LOE 3 - Establish the MINERVA Technical Enterprise
  - Cull thru existing Acquisition Documents to collect requirements applicable to Project Minerva
  - Concentrate on delivering the MVP first
- LOE 4 - Modernize Mission Partner Information Sharing
  - Implement Project Overmatch technologies where it makes sense
  - Ensure Technical Enterprise solution allow for real-time sharing w/ USN / DoD on all 3 classification domains
  - Leverage IMDE to share info with FSLTP





# Coast Guard Contribution to National MDA Picture (7-10 Year Outlook)

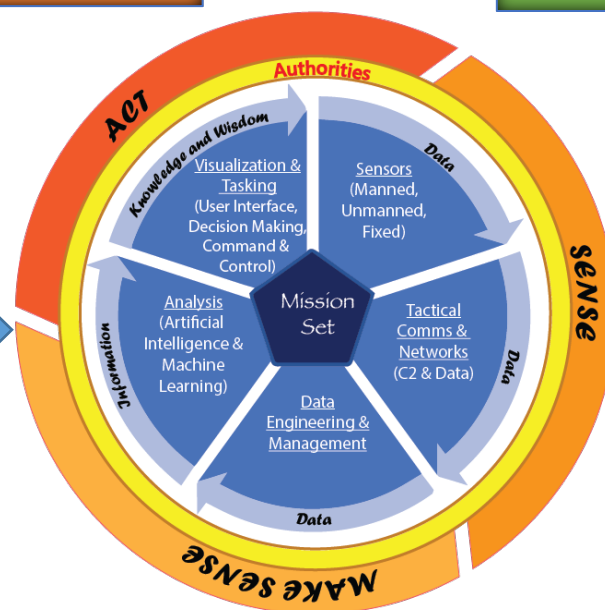




Validated CROP Requests

## District/Area Specific Requirements

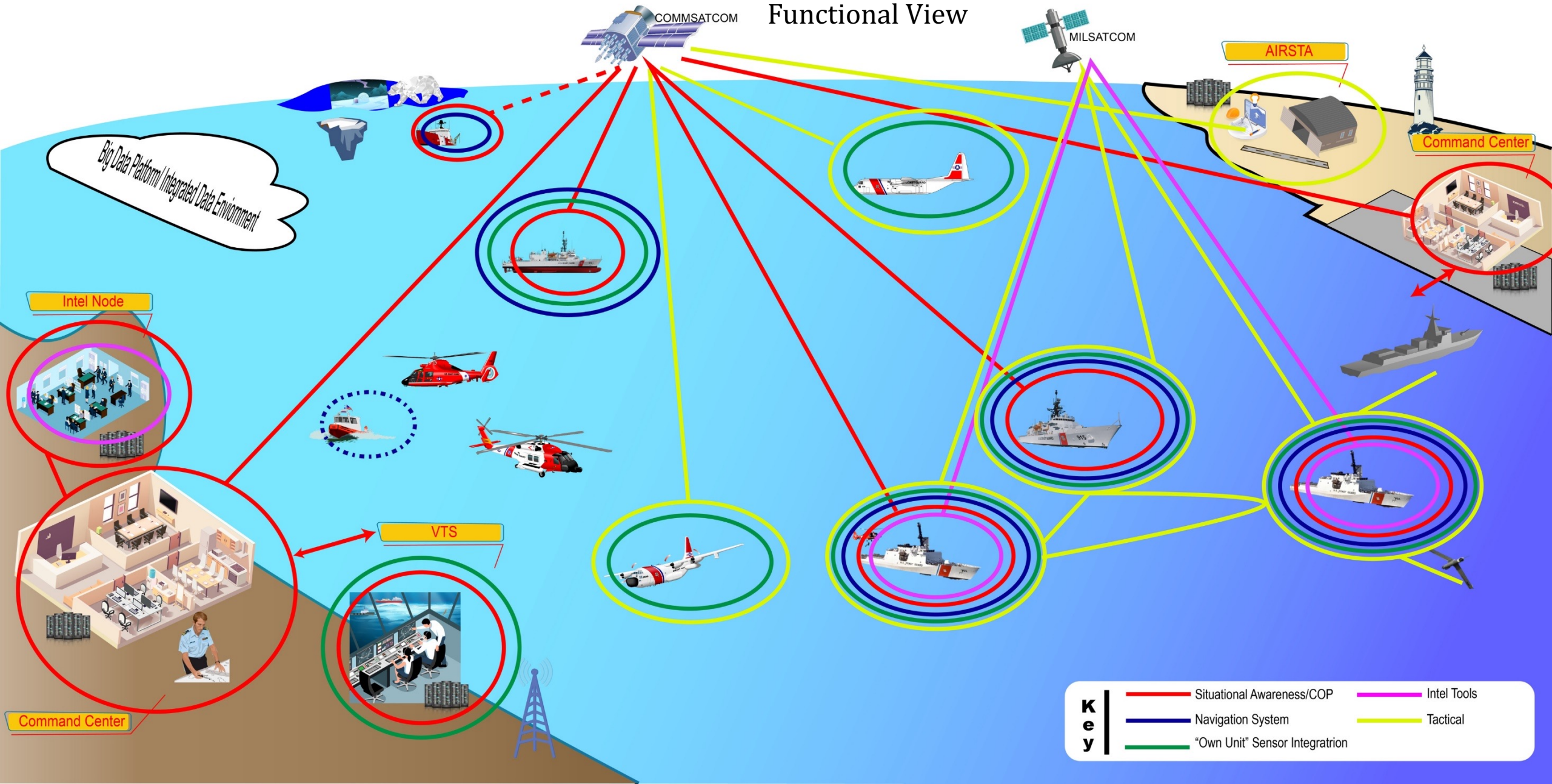
Existing MNS/CONOPS/ORDS  
Pull existing requirements from across platform and system to define Initial Project Minerva Capabilities



Note: Approach also being taken by DoD

# Current State

## Functional View

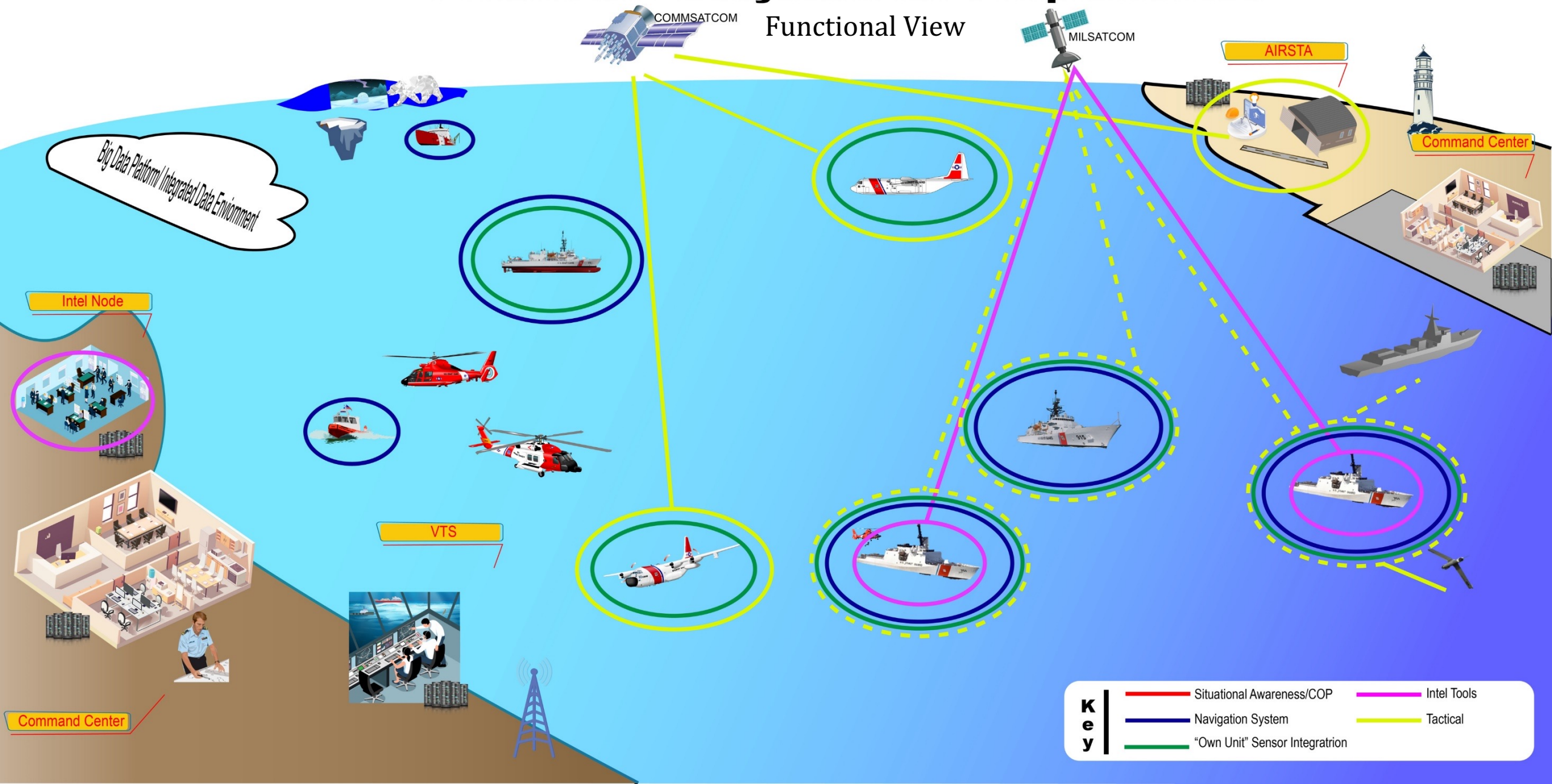




# Future State FY 25

If NextGen Ecosystem isn't implemented

Functional View



Key		Situational Awareness/COP		Intel Tools
		Navigation System		Tactical
		"Own Unit" Sensor Integration		

# To Infinity and Beyond

## Potential View of the NextGen Ecosystem

