

# Department of the Navy Test and Evaluation



Mr. Rick Quade, SES  
Deputy T&E Executive



# DOD 3OS Strategy

- Quest for next generation technologies
- Reevaluation of existing programs
- Dramatically improve capability
- Focus on cost and technology transition

Not This....



*Death Star*

But This....

Six Targeted Technologies

<b>Anti –Access</b>	<b>Area Denial</b>
<b>Guided Munitions</b>	<b>Undersea Warfare</b>
<b>Cyber</b>	<b>Electronic Warfare</b>

DON Already Doing 3OS Planning and Execution



# Future Naval Capabilities (FNCs) Aligned to 3OS

## Intelligence Data Analytics

- Naval Tactical Cloud
- Adaptive TCPED for ASW Services
- Detection and Fusion for Remote Sensors

## Undersea Warfare

- Advanced Undersea Weapons System
- Full Sector Torpedo Defense
- High Altitude ASW from the P-8

## Directed Energy

- Ground Based Air Defense (GBAD)
- Compact High Density Tactical Energy Storage
- High Power Solid State Circuit Protection for Power Distribution

## Autonomous Systems

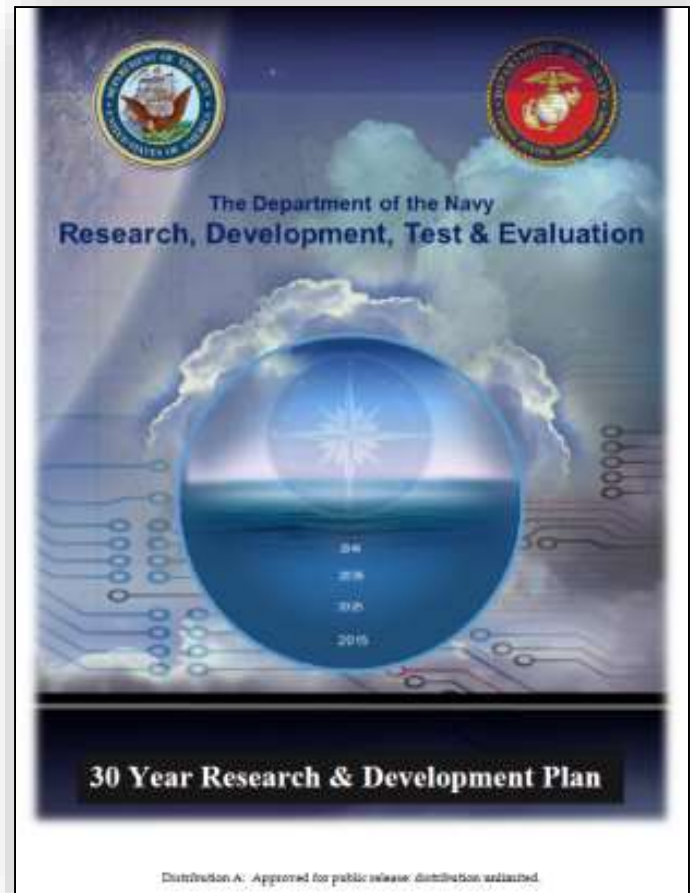
- Autonomous USV for Mine Warfare
- Autonomous UAV Collision Avoidance System
- Extended Range Modular Undersea Heavyweight Vehicle

## Cyber Technology / EMW

- Fast Magic
- Silk Thread
- Radar Electronic Attack Protection (REAP)
- Reactive Electronic Attack Measures (REAM)

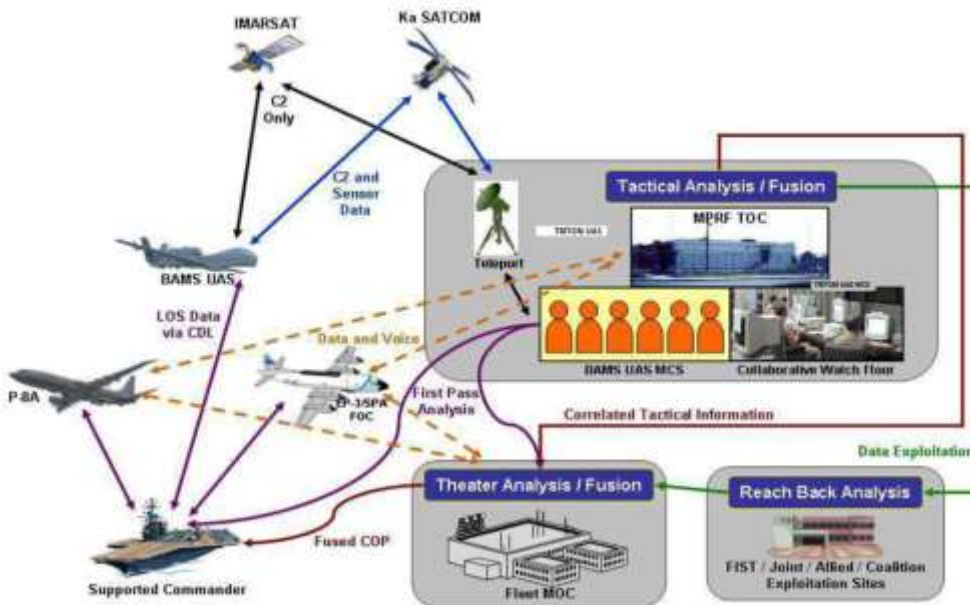
# DON RDT&E 30 Year R&D Plan

- Key Strategic Technology Investment Areas
  - *Advanced Autonomous Systems*
  - *Advanced Computing and Sensing*
  - *Advanced Materials and Manufacturing Technologies*
  - *Advanced EMW and Cyber*
  - *Advanced Weapons and Systems Technologies*
  - *Advanced Energy Technology*
  - *Other*



# Systems of Systems T&E

- Example: P-8A Program (ASuW, ASW, ISR, Weapons)



## System-of-System View

DISTRIBUTION STATEMENT A. Approved for public release

## System under Test

- Limited assets and time
- System to system testing
- Use of labs and ranges
- Identify deficiencies and repeat
- Expensive

## Live, Virtual, Constructive Test

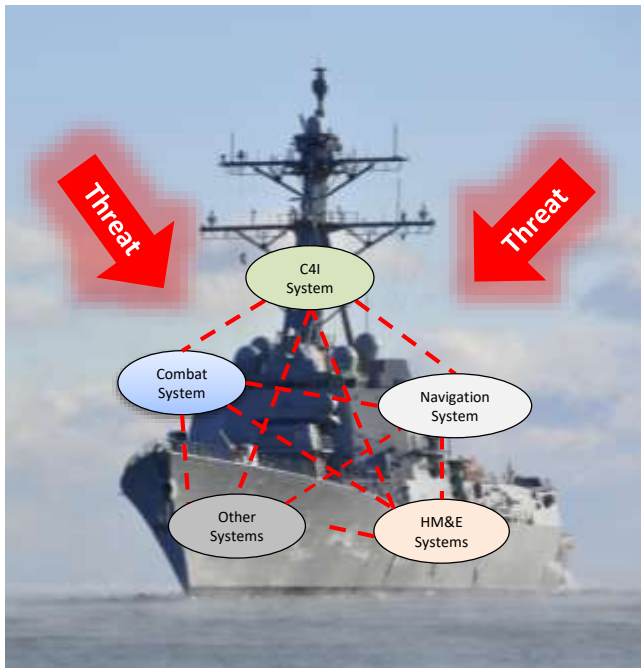
- Relevant SoS T&E environments
- Linking large # of assets
- Repeatable testing
- Relatively low cost

## Operational Test

- Fleet assets needed
- Limited number of events
- Free flowing
- Very expensive

*Requires Graduated, Test Build-up from Simple to Complex Environments*

# USS Secure Concept



## The Cyber Threat

- No boundaries, programs or SYSCOMs
- Where is the weakest link – people, process or technology

- **First across the Navy Community of Interest enterprise to provide:**
  - Functional test bed for cyber certifications and collaboration on Cybersafe test activities
  - Distributed system of system cyber test (actual and virtual) environment for multiple systems at different locations
  - Brings the NR&DE and Cyber Ranges together
  - Enables Cyber Testing not otherwise permitted on operational platforms



A Vision for Future System of System Cyber T&E

# Wrap Up

## T&E Challenges and Implications

- Workforce/Skills Development
- Enhanced M&S and LVC capabilities and access
- Streamline testing practices for minimum but adequate testing
- Flexible testing models

# Questions?

