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NDIA Fall Symposium

Captain Kurt Rothenhaus
Commanding Officer
SSC Pacific

25 October 2016

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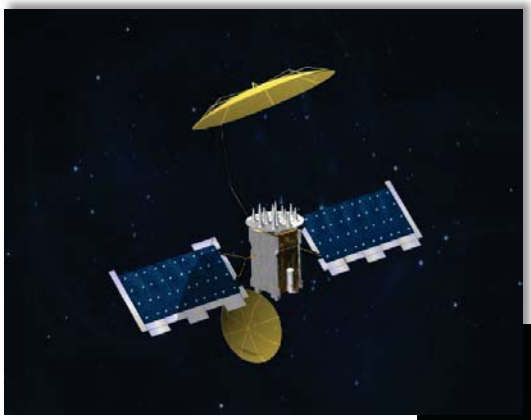
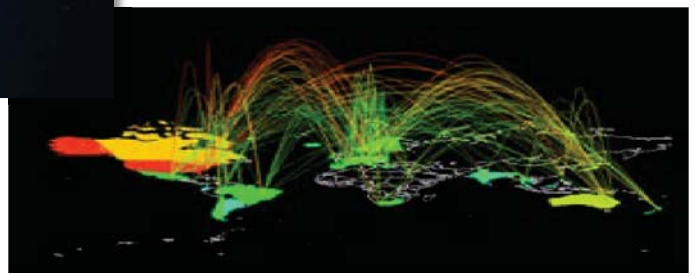
SSC Pacific Mission

DISCOVER DEVELOP NR&DE NAVAL RESEARCH AND DEVELOPMENT ESTABLISHMENT TRANSITION

Concept to Capability…





…via research, development, delivery, and support of integrated C4ISR, cyber, and space systems across all warfighting domains

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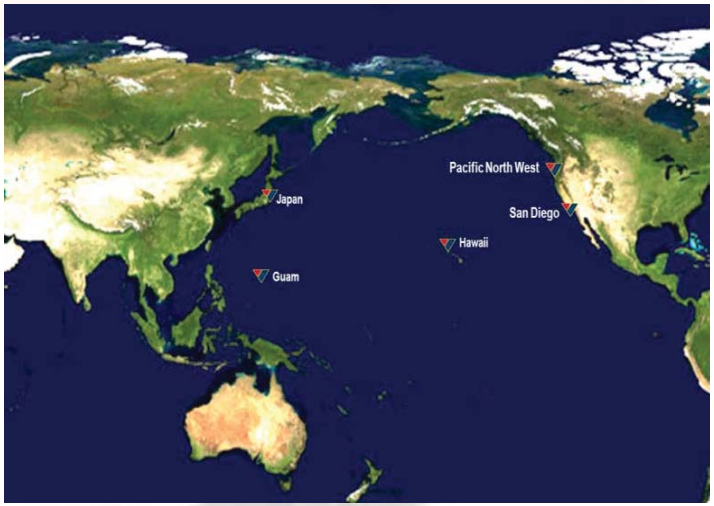
Legacy of innovation…strategic location

Underwater Acoustics

Laser Research

Personalized Assistant that Learns (PAL)



Satellite Communications

Navy Tactical Data System

Radar / EW

ARPANET

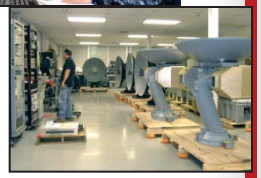
Capabilities – Across the Full Life Cycle

Today — Installation and Support

Tomorrow — Engineering, Development, Test and Evaluation

Future — Science and Technology

Production, Installation In-Service Support



Marine Mammals

3D Printing/ AM

Restoration and Repair

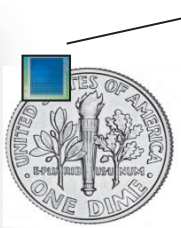
C4ISR for Unmanned Vehicles

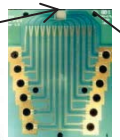
Ballistic Missile Defense System

Enhanced Polar Systems Gateway

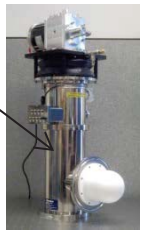
Cyber

C4I MILCON





Cryogenic Exploitation of RF (CERF)



Nano Satellites

Mixed Reality

User Center Design

Advanced Antenna Research

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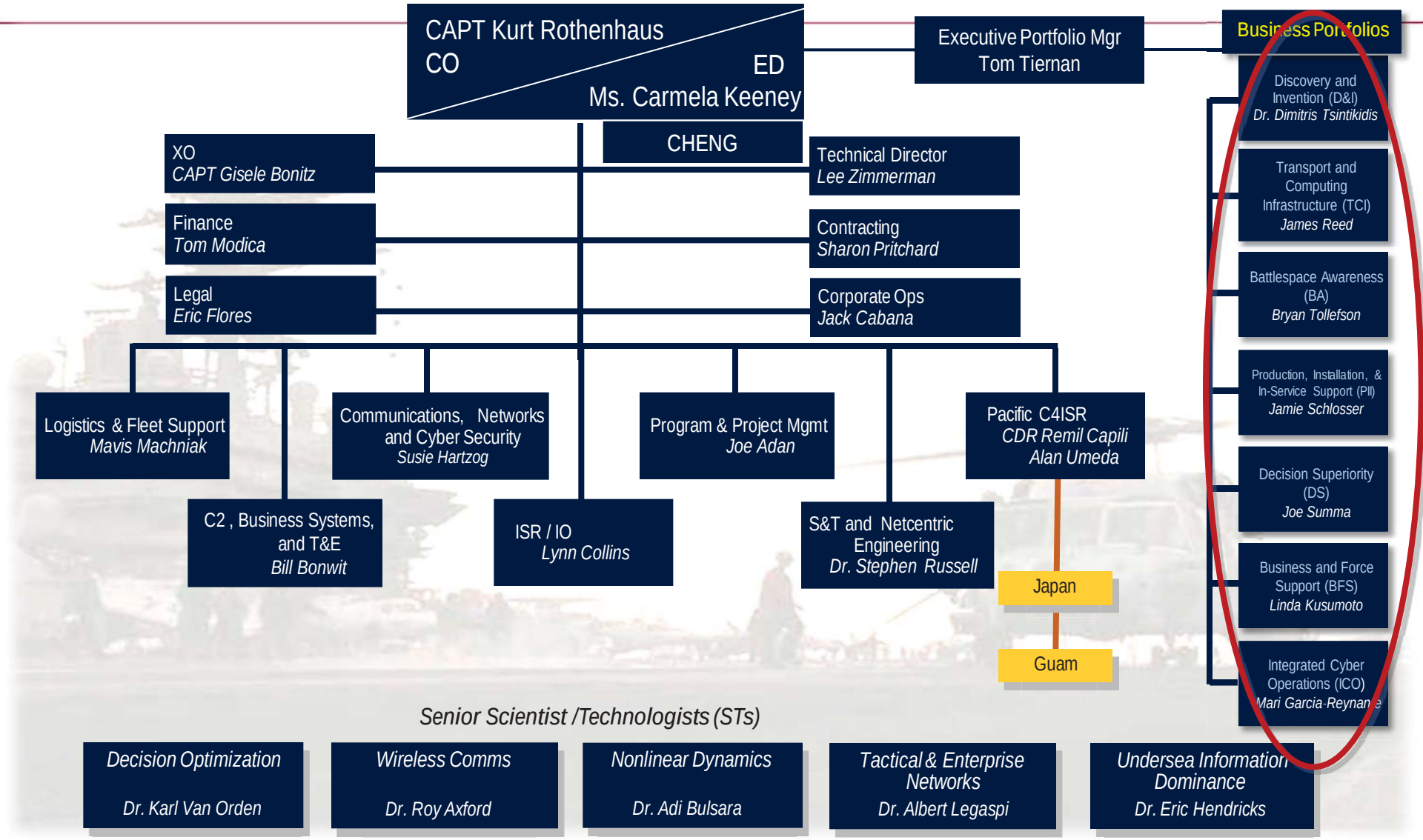
SSC Pacific Organization



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Business Portfolio Managers

- Executive Portfolio Manager… **Tom Tiernan**
- Discovery & Innovation… **Dr. Dimitris Tsintikidis**
- Battlespace Awareness… **Bryan Tollefson**
- Transport and Computing Infrastructure… **James Reed**
- Integrated Cyber Operations… **Mari Garcia-Reynante**
- Decision Superiority… **Joe Summa**
- Business and Force Support… **Linda Kusumoto**
- Production, Installation, and In-Service… **Jamie Schlosser**

Concepts to Capabilities

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Portfolio Management Overview

Presented To:
NDIA Fall 2016

Presented By:
Tom Tiernan, Executive Portfolio Manager

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Portfolio Management

- Provide demand signal to the Competencies to ensure the workforce is shaped, enabled, and empowered to deliver and sustain our mission
  - Provide responsive, best value products and services to existing and new customers
  - The coordinated management of portfolio components (IPTs) to achieve specific organizational and customer objectives
- Ensure the organization is "*doing the right work*", rather than focus only on "*doing the work right*"
  - Structure common processes to deliver effective and efficient outcomes
- Serve as an Industry and Academia Point of Entry to support program and capability development efforts at the Center

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Selected Focus Areas for Today

- Unmanned Systems - Mike Tall
- USMC - Nick Roussel
- Fleet Experimentation - Tracy Conroy

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C4ISR for Unmanned Systems at SSC Pacific

Mike Tall
UxS Capability Portfolio Manager
October 25th, 2016

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SSC Pacific UxS History

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Unmanned Systems at SSC Pacific

- Infrastructure for all 4 domains of UxS
  - 51+ active robotic projects
    - Advanced Autonomy
    - Human Machine Teaming
    - Sensor Fusion
    - Communications
    - Payloads
    - Operational T&E
    - S&T Research
- Expert Personnel
  - 400+ government scientists and engineers
  - 40+ years in unmanned systems

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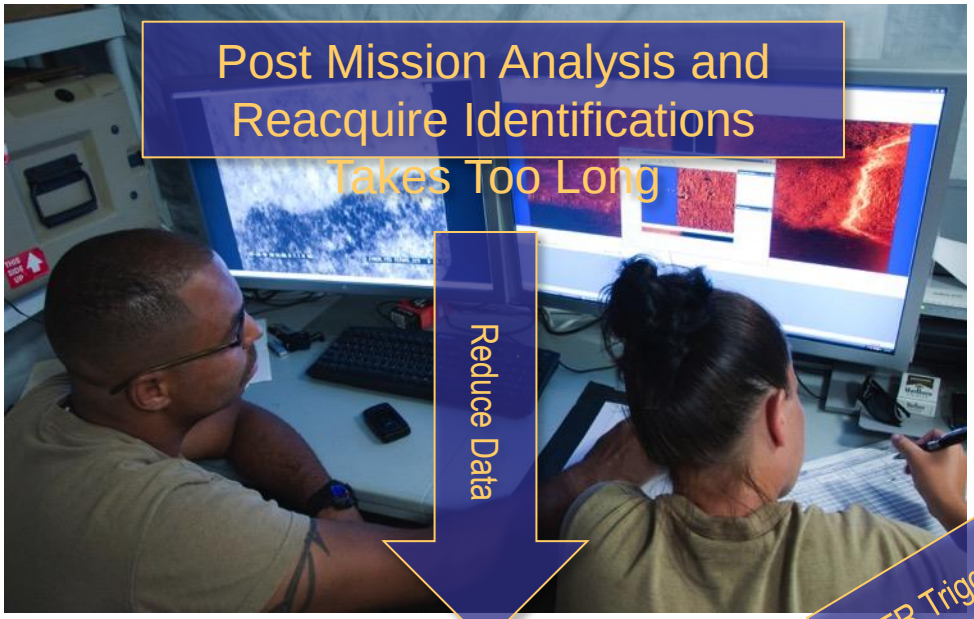
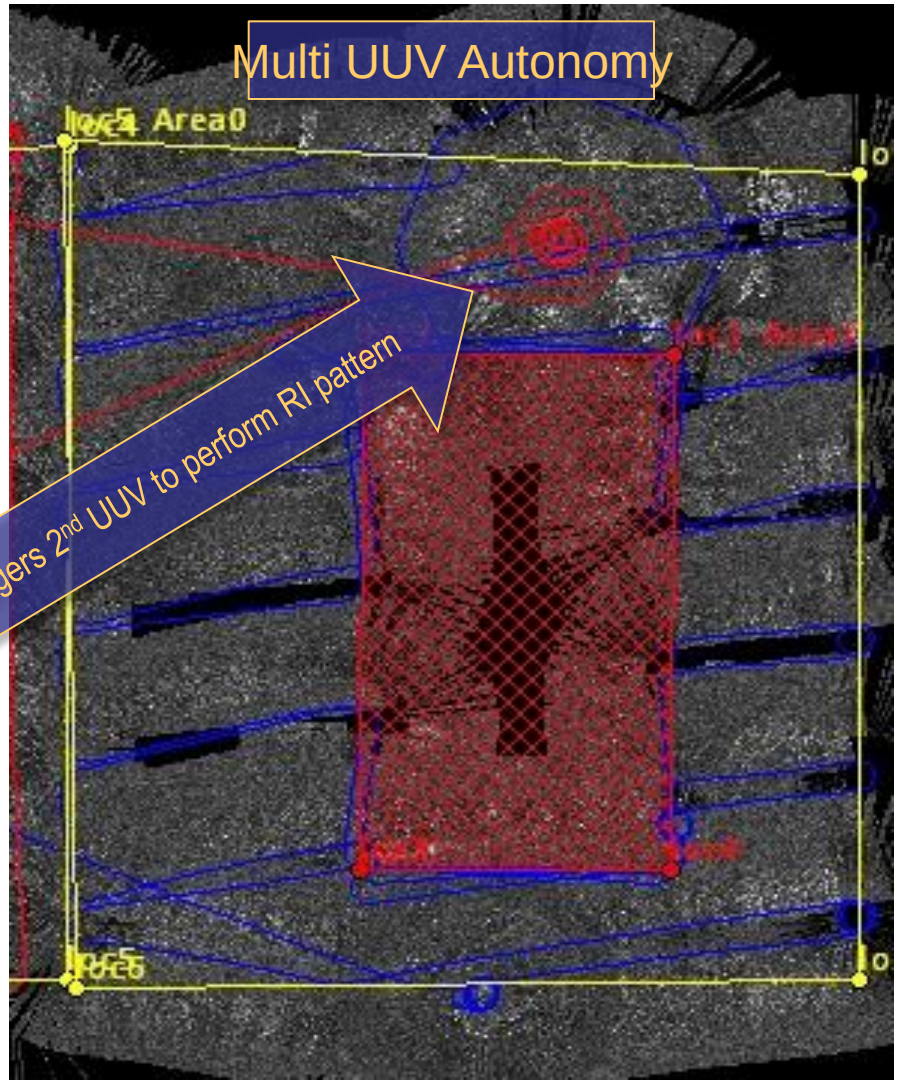
Autonomy





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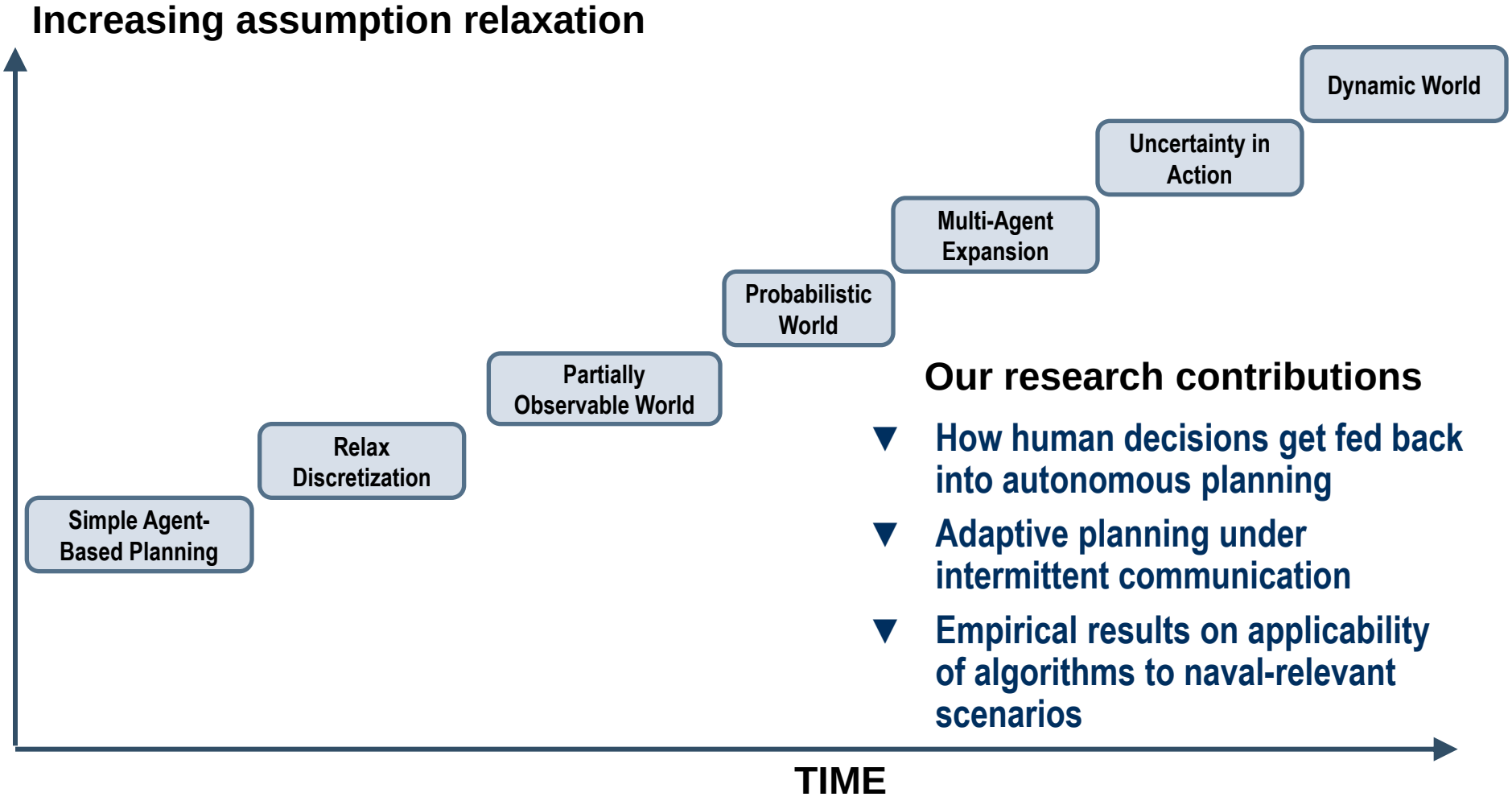
Agent-Based Planning Algorithm Maturation

Assumption Relaxation in Agent-Based Planning



Our research contributions

- How human decisions get fed back into autonomous planning
- Adaptive planning under intermittent communication
- Empirical results on applicability of algorithms to naval-relevant scenarios

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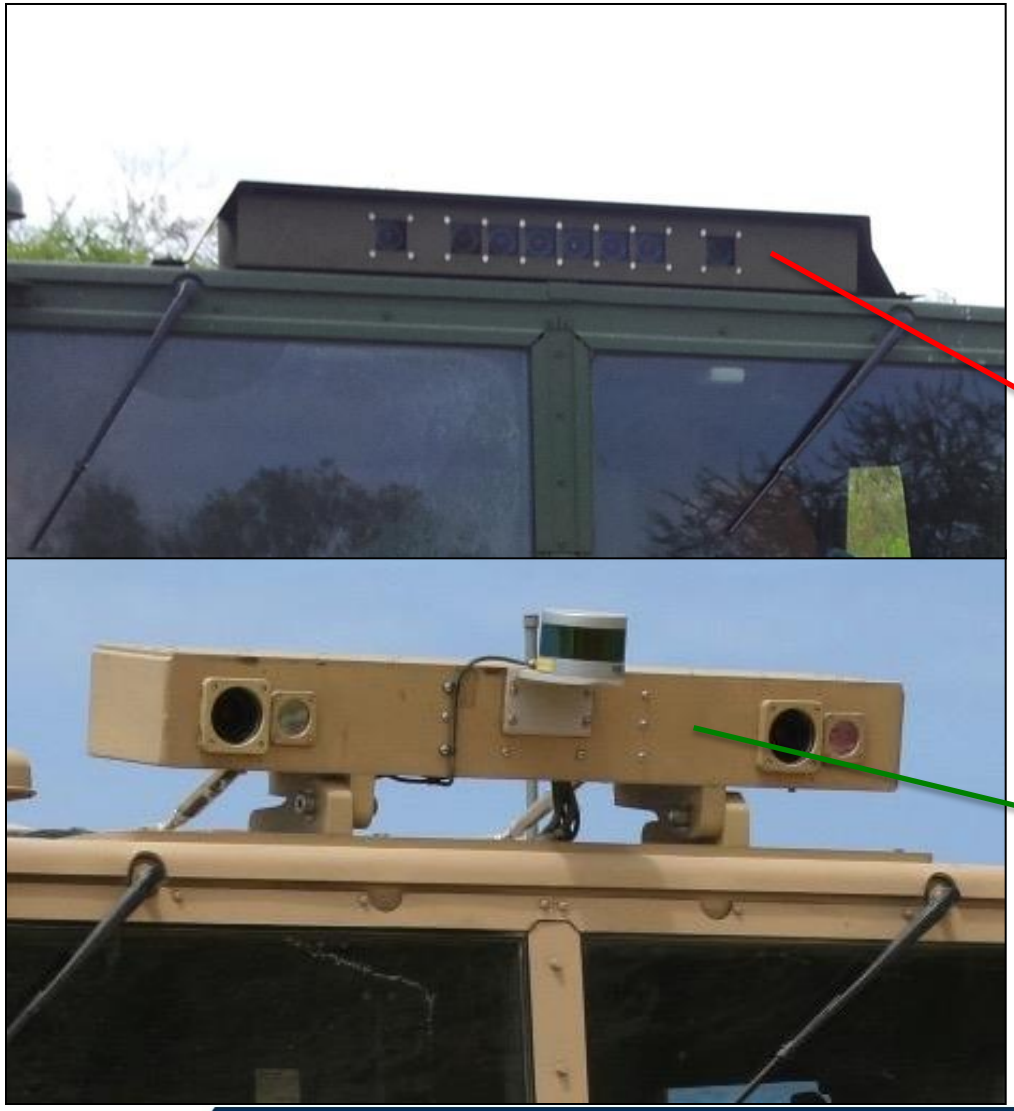
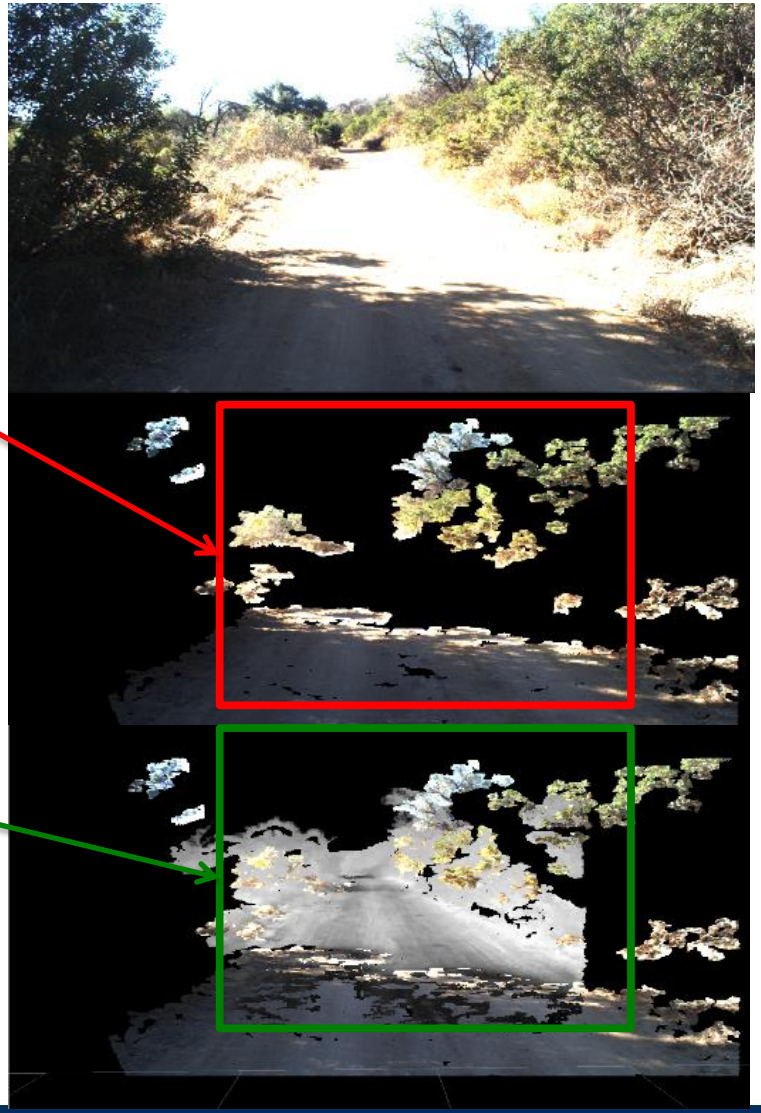
Integration, Test, and Experimentation





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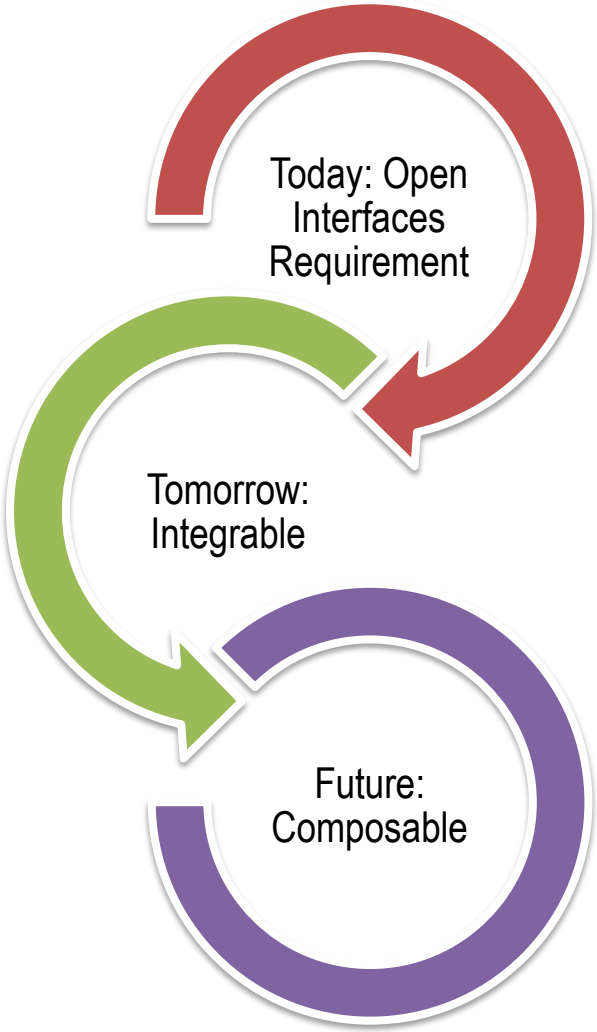
Increase UxS Interoperability



- IP is protected, but all interfaces are clearly defined
  - Allows for government to perform integration
- Facilitates the future of rapid development and integration
- Allows easier exploration of commonality between UxVs
- Ultimately results in composable UxS

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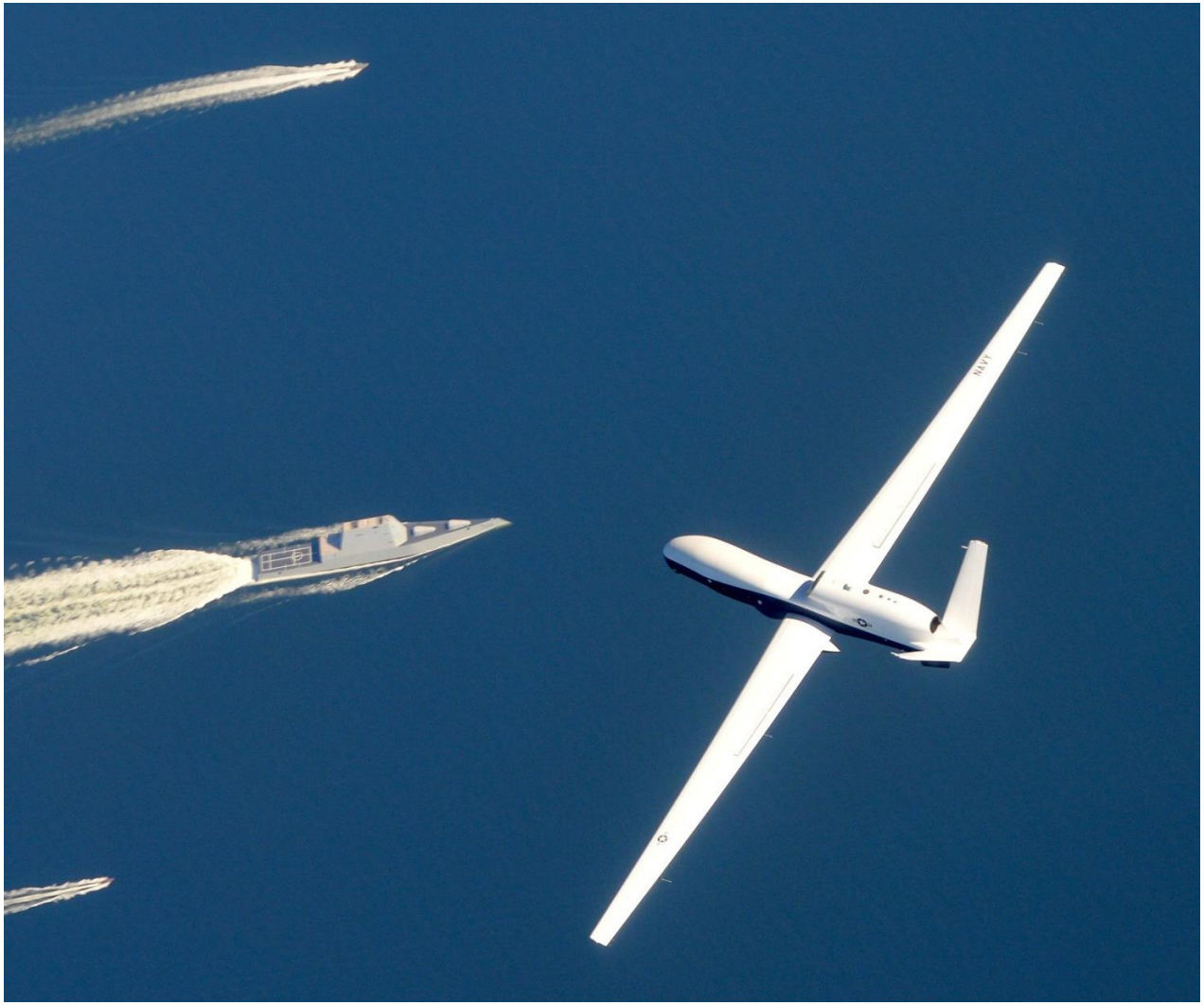
UAV Interoperability

- Triton will provide 24/7 intelligence, surveillance and reconnaissance for the U.S. Navy's surface ships
- Since 2001, SSC Pacific has been a key C4ISR resource on the NAVAIR's Triton team
  - Triton Interoperability IPT Lead – NR KPP, ISP, CDD, CPD
  - Triton communications construct.



Taken from NAVAIR's Facebook page

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How Industry Can Help

- Software developers
  - Folks who know open software architectures (e.g. ROS, MOAA, or CARACaS & interface standards (e.g. UAS or JAUS)
- New sensors / payloads
  - We're constantly looking for new payloads that SSC Pacific can integrate onto our vehicles.
- Machine learning
  - New algorithms
  - Better implementations
- In-the-loop ISR processing
  - Embedded
  - Limit amount of data transferred
- Communications
  - Adaptable Mesh

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We Make Unmanned Vehicles Smarter

Questions?

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Marine Corps Customer Portfolio

Presented to:

NDIA

25 Oct 2016

Presented by:

Nick Roussel

USMC Customer Portfolio Team

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Mission

On order, USMC Customer Portfolio Team engages with Marine Corps stakeholders to understand their C4ISR requirements, foster a collaborative environment, and then advocate for solutions within the SSC Pacific community, the Naval Research and Development Establishment, and industry partners.

Final Result Desired: Leverage Naval and Joint Service investments in laboratory infrastructure, workforce development, industry relationships, and deep technical knowledge to help meet Marine Corps operational needs.

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Execution – Lines of Operation

- Inform the Center of USMC Stakeholders Needs
- Leverage Science and Technology Efforts to Meet USMC Needs
- Understand and React to Urgent Operational Needs
- Collaboration with Government Labs and Industry Partners

Key Tasks

Educate the Center on USMC operational policy and needs, and advocate for the delivery of new capabilities

Synchronize with USMC S&T efforts, from COCOM need to technology transition

Identify USMC Urgent Needs in our swim lane, and present potential solutions

Create cross-org teams that are cost effective and technically appropriate

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Execution – Area of Operation

Relevant Strategic Guidance:

- *FragO 01-16:*
  - Achieve rapid prototyping of technologies to send "shovel ready" projects to the warfighter
  - Ensure freedom of action in cyberspace and the electromagnetic spectrum
  - Utilize big data analytics to transform how we obtain sensor data
  - Enable 3-D printing for forward deployed logistics operations
- *Marine Corps Operating Concept:*
  - Design and protect C2 and ISR networks as a multi-source information sharing architecture
  - Integrate Information Warfare as a combination of creative thinking and advanced technology
  - Master the man-machine interface

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Execution – Focus of Effort

Cyber & the Electromagnetic Spectrum

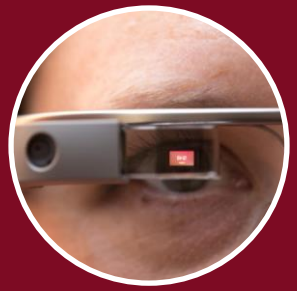
- Build cyber tools; offensive & defensive
- Construct architectures to enhance combined arms; kinetic and non-kinetic fires

Space Systems

- Develop space capabilities and partnerships
- Create test environments
- Increase communications performance

Unmanned Systems & Autonomy

- Create C4ISR payloads for unmanned systems
- Develop algorithms for autonomous operations



Augmented Reality

- Enable man-machine teaming with interfaces that inform, not overwhelm
- Enhance decision-making, reduce risk, and speed training

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Command and Signal

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FLEET EXPERIMENTATION

Presented By:
Tracy Conroy, Experimentation Director
Science & Technology, Code 7.2
tracy.conroy@navy.mil, 619-553-5666
Tues & Wed, October 25-26, 2016

UNCLASSIFIED

FLEET EXPERIMENTATION

- Technical Solutions to Existing Technology
- Material and Non-Material Experimentation
- Problem: “IT IS HARD TO DO INSTALLS”

- Official initiative submission requires detailed entry into the FLEX Information Management System (FIMS)

- Once selected for possible inclusion in the Campaign plan the originator and venue lead are notified so in-depth planning can begin.

What's In It For Me (Industry)?

- **Can Industry Play??**
  - **YES**
- CAA for FY17 Trident Warrior Experimentation
- "The purpose of this Commercial Area Announcement (CAA) is to elicit industry input for Experimental Initiatives that may be considered for the Fiscal Year 17 (FY17) Trident Warrior Experiment. As used in this CAA, an Initiative is defined as a doctrinal, organizational, or technological solution providing needed operational capabilities to the warfighter. The Fleet Experimentation Execution Plan (FLEX), which includes Trident Warrior (TW), addresses the Fleet's highest priority issues and matches potential solutions to appropriate experimentation events."

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… More Industry Play – S2ME2

- Ship to Shore Maneuver Exploration and Experimentation Task Force (S2ME2 TF) is soliciting mature, fieldable prototypes from **industry**, academia, and government research and development (R&D) organizations to participate in the S2ME2 17 exercises. The S2ME2 17 exercises will be a progressive series of exercises conducted between April and October 2017. The first exercise will be held April 15-27, 2017 at Marine Corps Base Camp Pendleton, San Diego, California.

- Pay-to-Play
- Ends October 31, 2017 – SUBMISSIONS (S2ME2@navy.mil)

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Industry & UARC Participants in TW-17

Blue Wasp ---	NGC
Dataminr ---	Dataminr
iCommand ---	Textron Systems
Long Distance H/B Laser Comms ---	JHU / APL

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LESSONS LEARNED

- Risk Management Framework
- Limited Purpose Cooperative Research and Development Agreement (*LP-CRADA*) & Bailment Agreements
- SIPR Access – CLEARANCE
- OPSEC
- Documentation - Tracking

Risk Management Framework, RMF - What Now

Risk Management Framework

- To improve information security
- To strengthen risk management processes
- To encourage **reciprocity** among federal agencies

- Eliminated **redundant** processes around obtaining an ATO.
- Simplified control testing.
- Increased focus on **risk** vs. compliance.
- More **thorough** guidelines.

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Lending Stuff / Receiving Stuff
Bailments and Limited Purpose CRADAs

- The Navy borrowed an Unmanned System from a vendor.
- The exchange was a gentleman's agreement / handshake.
- The Experiment went off without a hitch
- *** BUT ***

SIPR Access – Clearance & OPSEC

- SIPR - FIMS – Fleet Experimentation Information Management System
- Information Assurance & Accreditation Issues

- THEY ARE ALWAYS WATCHING
- Scouring your White Papers, Briefs, Facebook, & Twitter

Documentation - Tracking

- Manpower
- Dollars Expended
- Folks Traveling and Supporting the Exercise
- Other Associated Costs
  - C&A
  - Test Equipment

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The Valley of Death

Permission of Wisconsin Historical Society
10/14/2015