



Focus Area Forum:

Warfighter Performance

5 November 2014

Welcome!

Admin overview by CAPT Rob Palisin
Assistant Chief of Naval Research
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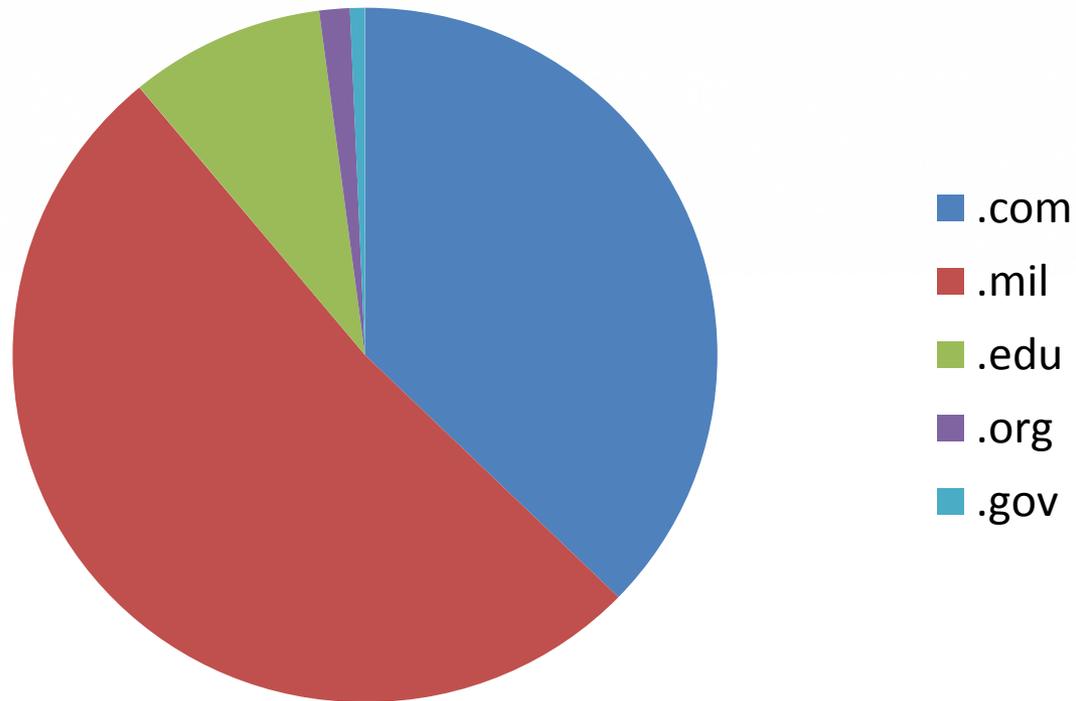
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Thank You For Coming!

Half of participants are from outside DoD

External Attendee Analysis





Warfighter Performance Focus Area Review

5 November 2014

RADM Matthew L. Klunder
Chief of Naval Research

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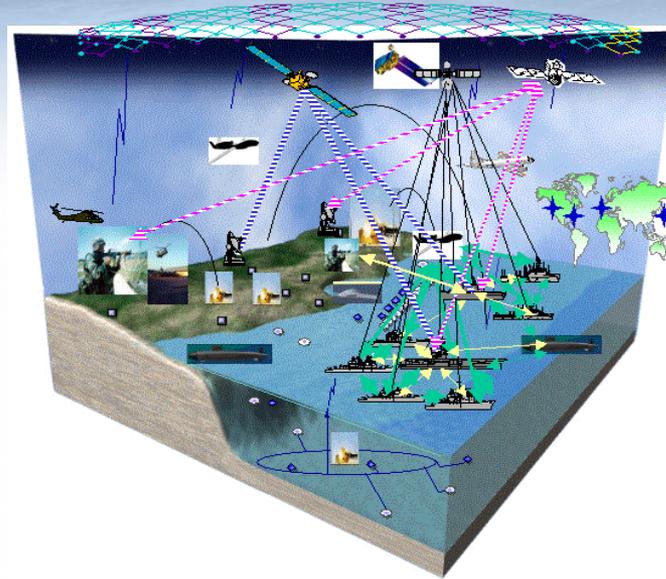


ONR's Mission

DISCOVER

DEVELOP

DELIVER

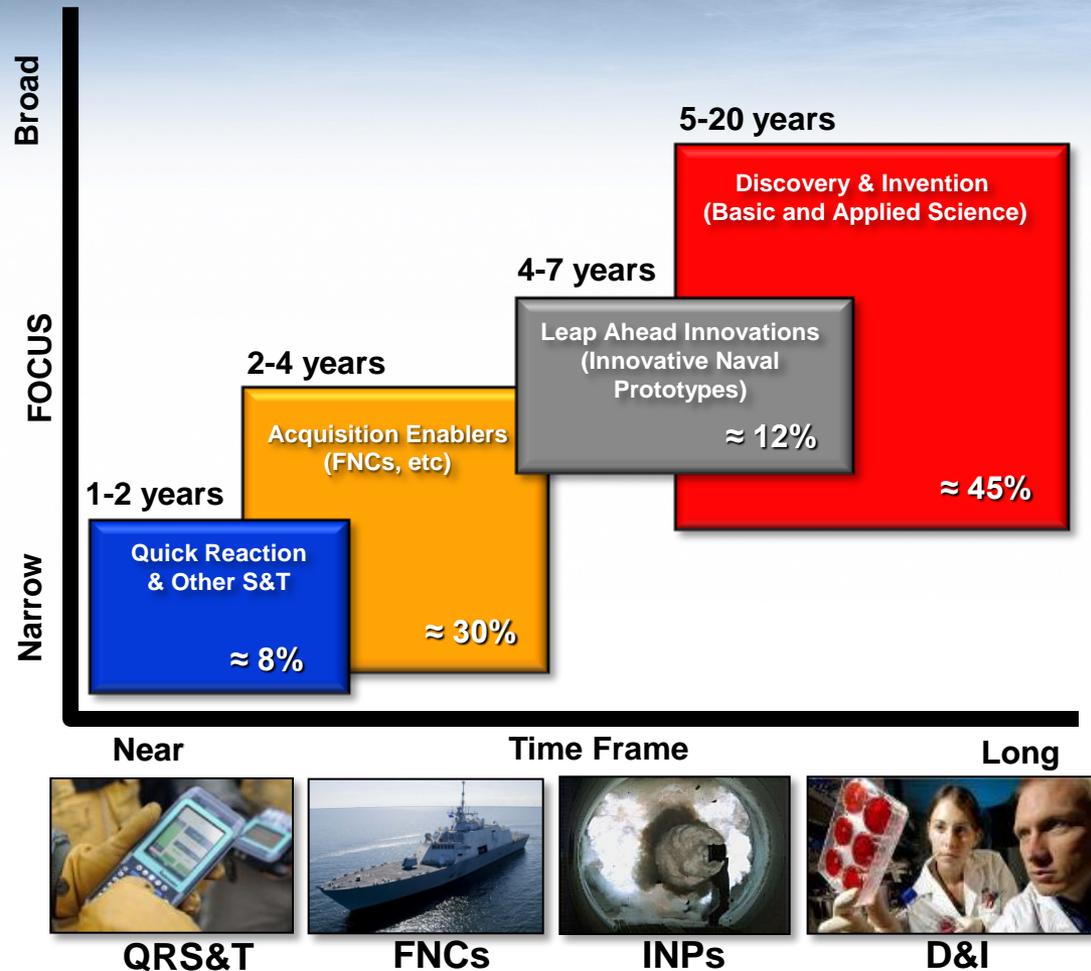


**Innovative science and technology (S&T)
to meet the needs of Naval forces today...
and for tomorrow ...**





ONR Investment Strategy



S&T Focus Areas:

- Warfighter Performance
 - Autonomy & Unmanned Systems
 - Assure Access to Maritime Battlespace
 - Information Dominance - Cyber
 - Expeditionary & Irregular Warfare
 - Power Projection & Integrated Defense
 - Platform Design & Survivability
 - Power & Energy
 - Electromagnetic Maneuver Warfare
-
- STEM
 - CNO's Quick Reaction Efforts (S2F/CRIC)

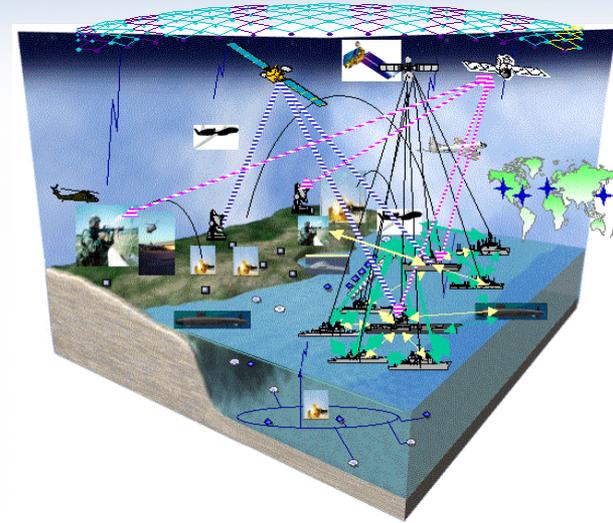
- Approved by UNSECNAV, ASN(RDA), VCNO, ACMC
- Revised every two years





Today's Objectives

- Engage Stakeholders
- Assess Current Investment Strategy
- Develop Common Vision of the Future



Warfighter Performance Focus Area

- People are the Critical Elements of Operational Systems
- Enhance Warfighting and Warfighter capability

- **Warrior Resilience**
- **Fleet Integrated Training, Experimentation, and Planning**



Strategic Overview of Warfighter Performance S&T Portfolio

5 November 2014

Terry Allard, PhD, SES
Head, ONR34 Warfighter Performance Department

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Naval S&T Strategic Plan Focus Area



**Human-System Design
& Decision Support**

**Bio-Engineered
Systems**

**Warfighter Health
and Survivability**

**Manpower, Personnel,
Training & Education**

Naval Warfighter Performance

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Warfighter Performance S&T

Human-Systems Integration

Personnel Selection & Assignment

Training

User-Centered Design

Manpower Models

Cognitive Science

Social-Cultural



Noise-Induced Hearing Loss

Artificial Intelligence



Fatigue / Resilience

Human-Autonomy Interaction



Undersea Medicine

Automated Medical Care

Human Physiology Models

Blast & PTSD

Marine Mammal Health

Robots & Unmanned Vehicles

Hemorrhage Control & Treatment

Systems Biology / Synthetic Biology

Microbial Fuel Cells



Shipboard, Expeditionary & Undersea Medicine

Bio-Inspired Systems



FITEP

Fleet Integrated Training, Experimentation, Planning

***Multi-Mission, Multi-Platform, Multi-Echelon
Simulation-Based Training / Scenario-Based Planning***

ONR Focus

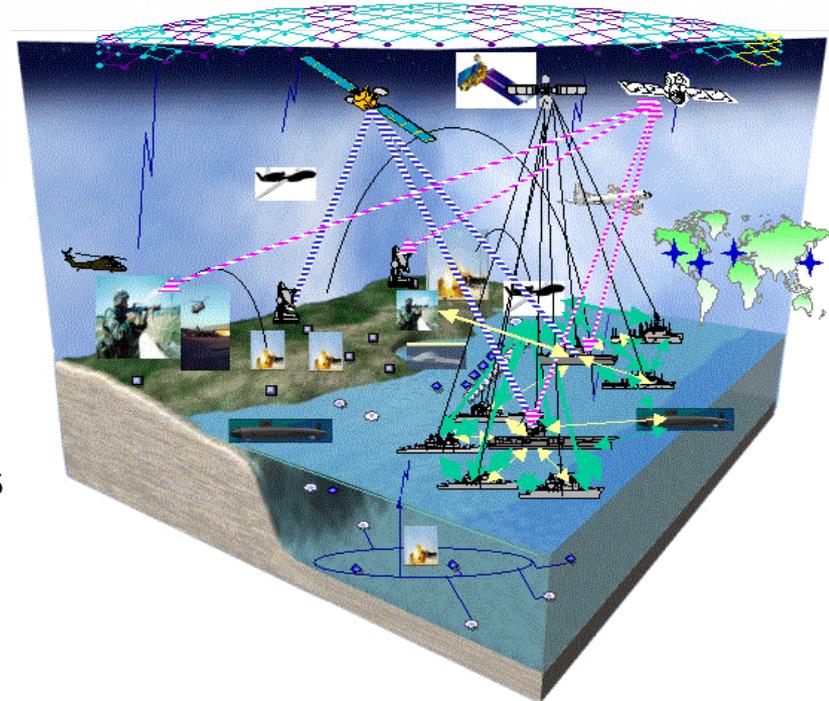
- Fleet Integrated Synthetic Training and Testing Facility: FIST2FAC
- Live, Virtual, Constructive Aviation Training – Cooperative Engagement, EMW
- Near Real Time Mission Planning

Forum Outcomes

- Increased awareness of scope
- Showcase Current S&T
- Dialogue on Future Directions

Format

- ONR FITEP vision
- Panel: S&T and Acquisition Perspectives
- Posters and Demonstrations





Warrior Resilience

The ability to withstand, recover, and grow in the face of stressors and changing demands¹

ONR Focus

- Mind & Body: Physical, Cognitive, Medical
- Training, Protection, Treatment
- Fleet and Force

Forum Outcomes

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Format

- Overview of ONR Warrior Resilience
- Panels: Practitioner and Program view
- Posters and Demonstrations



Total Force Fitness Framework

Chairman's Total Force Fitness Framework,
 J-7 Distribution: A, B, C, S. CJCSI 3405.01
 1 September 2011, Directive Current as of 23 Sep 2013



Warrior Resilience: Programs, Challenges, Opportunities

5 November 2014

Peter N. Squire, PhD – ONR30
Expeditionary Maneuver Warfare and Combating Terrorism Department
Program Officer, HPT&E Thrust Area

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Definition of “Resilience”

The ability to withstand, recover, and grow in the face of stressors and changing demands.^{1, 2}

¹ Chairman’s Total Force Fitness Framework, J-7 Distribution: A, B, C, S. CJCSI 3405.01, 1 September 2011, Directive Current as of 23 Sep 2013

² Uniform Definition of Resilience and Programmatic Definition of Resilience For Department of Defense, Memorandum for National Guard / Army / Navy / Air Force / JCS, 11 Jun 2014.

Resilience Framework

Total Force Fitness Framework

Service Level Initiatives



- **Marine Total Fitness**



- **Navy Operational Stress Control**



- **Air Force Resilience Initiatives**



- **Army's Comprehensive Soldier Fitness**



¹ Chairman's Total Force Fitness Framework, J-7 Distribution: A, B, C, S. CJCSI 3405.01
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ONR S&T Opportunities for Warrior Resilience

Stress Response and Mitigation

Musculoskeletal Injury Prevention

Automated Medical Care

Heat Strain

Hemorrhage Control & Resuscitation

Altitude Exposure

Circadian Disruption, Sleep Loss & Fatigue Mitigation

Human Physiology Models

Noise-Induced Hearing Loss

Undersea Medicine

Blast / TBI

Gut Microbiome

Performance

Health Protection

Treatment



ONR: A Unique Research Hub

Resilience Gov't Communities

- ASD(R&E) Armed Services Biomedical Research Evaluation and Management
- ASD(R&E) Human Systems
- Human Performance Optimization Working Group
- Defense Medical R&D Joint Planning Committees
- Military Communities, e.g. Research Physiologists



Performers

- Academia
- Industry
- Government Labs

Stakeholders

USMC: e.g., Training and Education Command, Manpower and Reserve Affairs



Navy: e.g., Navy Bureau of Medicine and Surgery, Navy Expeditionary Combat Command

SOCOM: e.g., Marine Corps Forces Special Operations Command, Naval Special Warfare



The Practitioner Level Perspective on Resilience S&T

5 November 2014

Peter Squire, PhD – ONR30
Tim Bentley, PhD – ONR34

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Panel Questions

- 1. What is/are your vision(s) for Warrior Resilience?
What are the challenges ahead?
Can you provide specific examples/anecdotes?**
- 2. How are ONR S&T investments fitting into your vision(s)?
What is the value of S&T in that vision?
What are we doing well?
What are some opportunities for improvement?**
- 3. What places / activities are good common grounds for
examining the challenges and opportunities in resilience;
e.g. training, education, boot camp, etc.?**



The Program Level Perspective on Resilience S&T

5 November 2014

Peter Squire, PhD – ONR30
LCDR Chris Steele, PhD - ONR34

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Strategic Overview of Warfighter Performance S&T Portfolio

Afternoon Session:

Fleet Integrated Training, Experimentation and Planning

5 November 2014

Terry Allard, Ph.D., SES
Head, ONR34 Warfighter Performance Department

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- Training, Protection, Treatment
- Fleet and Force

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Total Force Fitness Framework

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Simulation-Based Training

Multi-Mission, Multi-Platform, Multi-Echelon Simulation-Based Training

Overall Benefits

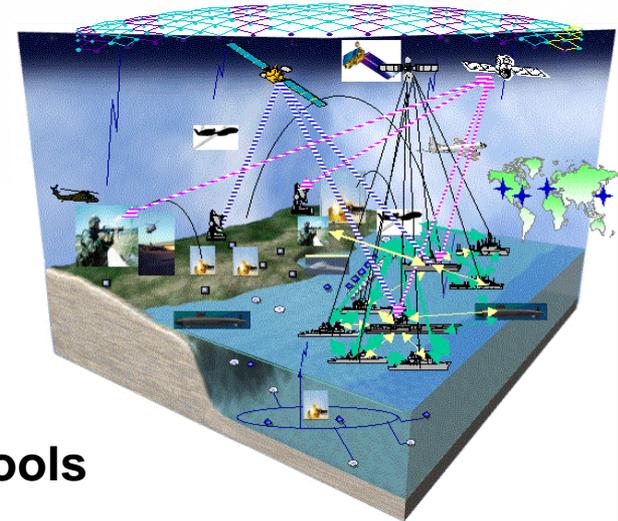
- Maintain hard-won Operational Skills with realistic scenario simulation
- Enable Risk-Taking in Training and Mission Rehearsal
 - Explore the edges of operational performance
- Extend Training Ranges virtually
- Reduce Costs of Live Assets in training

Skill Assessment

- Scale training to individual, team, battle group
- Enable individualized, self-paced learning
- Automated performance / readiness assessment

Scenario Simulation

- Explore problem space with scenario authoring tools
- Agile representation of evolving threats
- Artificially Intelligent Blue, Red and White Force entities
- Explore new Concepts of Operation / Experimentation





FITEP

Fleet Integrated Training, Experimentation, Planning

***Multi-Mission, Multi-Platform, Multi-Echelon
Simulation-Based Training / Scenario-Based Planning***

ONR Focus

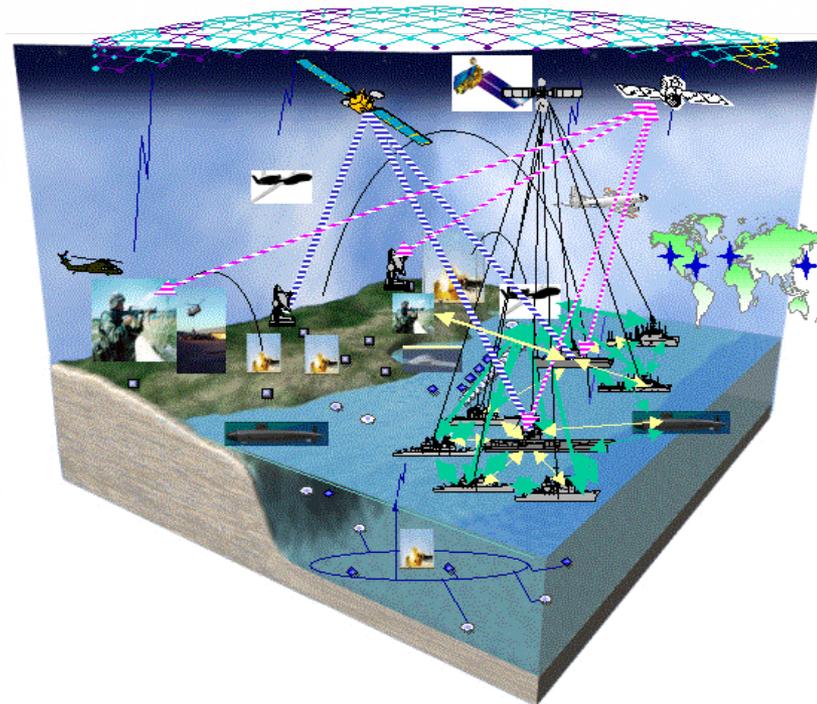
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- Demonstration and discussion





Technological Foundations for Fleet Synthetic Training-LVC

Innovative Research to address
Priority Fleet Training Requirements



Briefers: Harold Hawkins
Glenn White
Ami Bolton

ONR34 Warfighter Performance Department

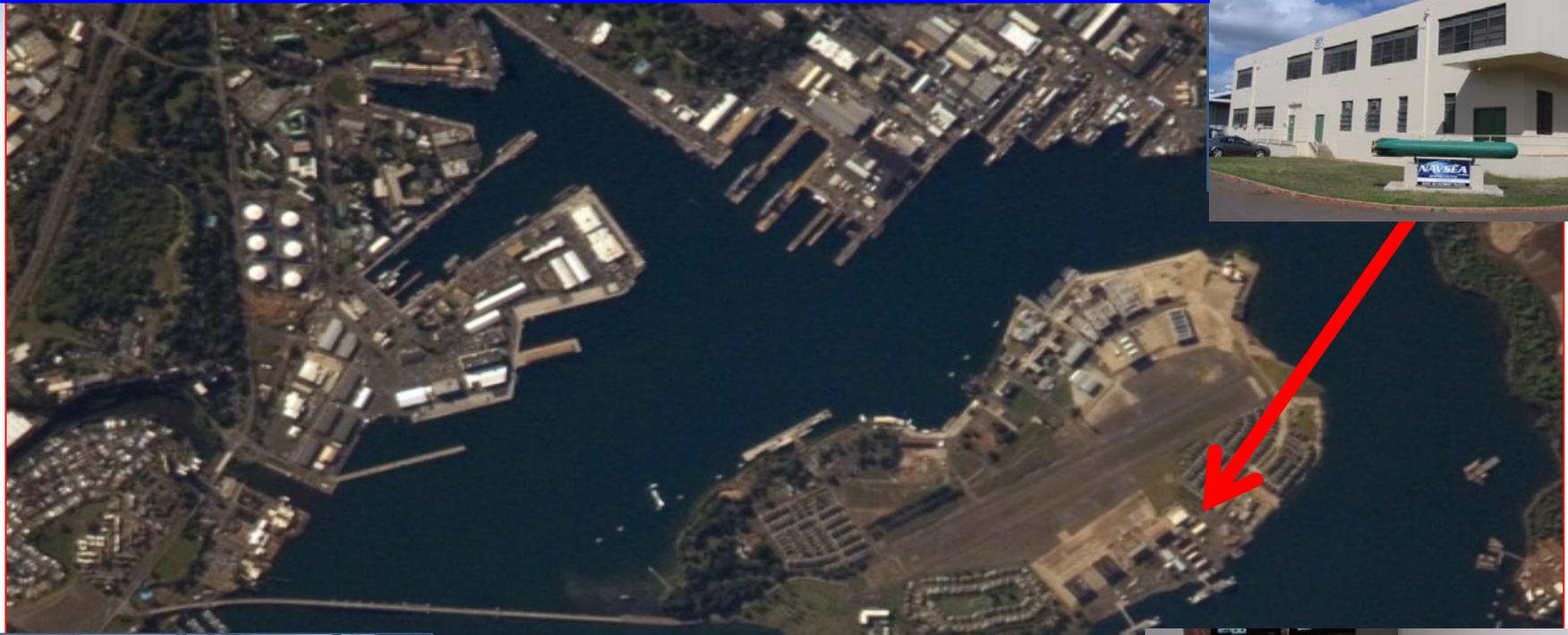
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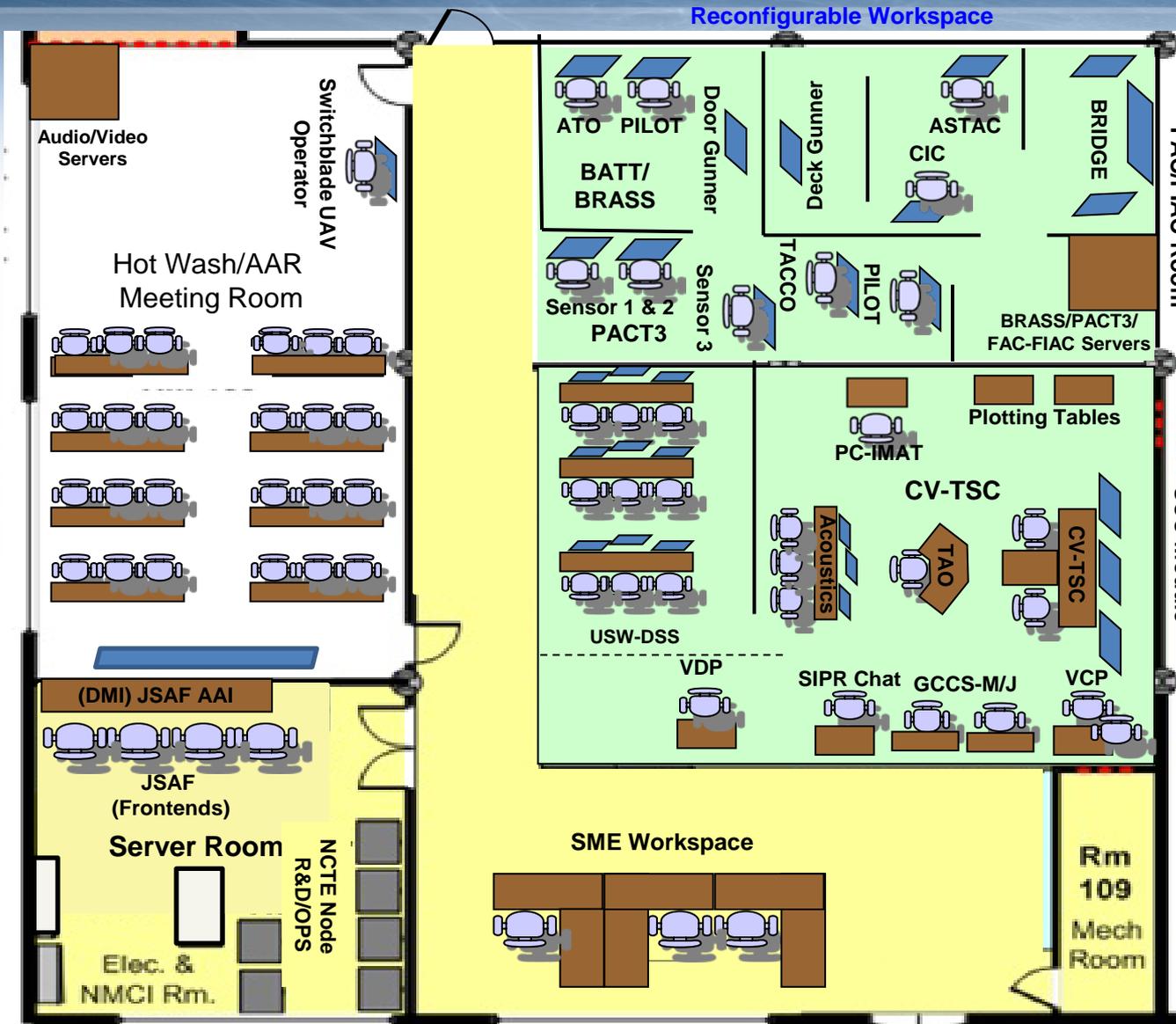
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FIST2FAC on Ford Island, Pearl Harbor

Fleet Integrated Synthetic Training & Test Facility





Training Audience

- ASTAC
- Acoustic Operators
- Tactical Action Officer
- UAV Operators
- Helo Crews
- P-3 Crews
- SCC, Staff
- CVN Support Personnel
- DDG/CG ASW Team
- ASWE
- Strike Group Staff
- Commander Theater Forces Staff
- *Foreign Military Staff*
- *COCOM Staff*
- *E2-D Crews*
- *F-18 Crews (Boeing LC simulator)*

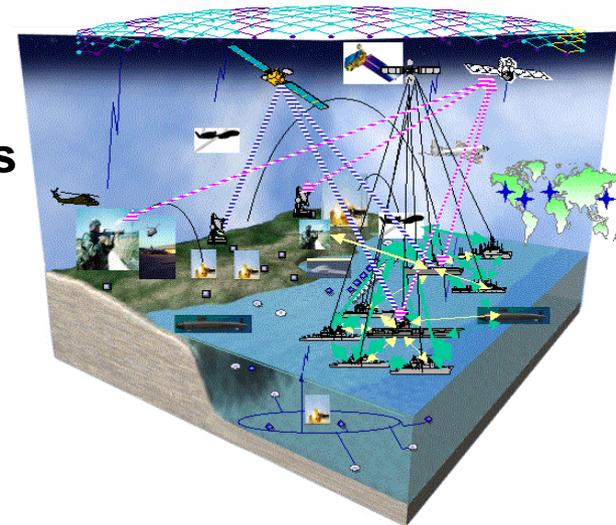
Warfare Areas

- ASW
- ASuW
- FAC/FIAC
- Strike OTH Targeting
- *MIW*
- *A2AD*
- *EMW*
- *NIFC-CA*



Recent Training System Development and Assessment Activity at FIST2FAC

- **Synthetic training system development for export**
 - FST, ATGPAC/CNSP, TACTRAGRUPAC
- **On-site integrated synthetic training for CSG Command/staff**
- **Training system demonstration to potential Fleet customers**
- **Experimentation (gain/loss/modification/what-ifs)**
- **Integration of synthetic training system components developed by industry partners**
- **Training system calibration**
 - SME-set performance standards
- **Scenario-based training effectiveness evaluation**
- **Performance metrics development and validation**





FIST2FAC



Recent Contributions to Fleet Training and Analysis

- **Multi-mission Maritime Operation Center (MOC) Commander-level training provided to COMPACFLT (CTF 519) by USFF (Pacific Reflection)**
- **Multi-mission Warfare Commander Seminar training capability developed at FIST2FAC deployed to TACTRAGRUPAC San Diego and coming soon to DESRON 15 in Yokosuka**
- **Developed Virtual Carrier Platform (VCP) enabling realistic and robust Sea Combat Commander participation from the CVN (Zulu Space(s)) in Fleet Synthetic Training (FST)**
- **Developed Virtual Ship Platform (VSP) to demonstrate capability of CRUDES unit to deploy constructive and virtual helicopters to execute ASW, ASuW, and FAC/FIAC Anti Swarm Defense in FST events**
- **Created a constructive Bravo, Romeo & Sierra Simulation (BRASS) to be used for the development of low cost platform(s) enabling helicopter participation in FST events**
- **Created Virtual Bravo tactical team trainer (BATT) to demonstrate “Integrated” CRUDES and Helicopter synthetic training capability in ASW and FAC/FIAC**
- **Afloat Training Group (ATG) is planning to use the PACT3 at FIST2FAC for FST-U training and certification instead of a MH-60R TOFT (Lack of Capacity and Capability)**
- **Supported 3rd FLT Sea Shield Experimentation (ASW) Assessment in RIMPAC 14**

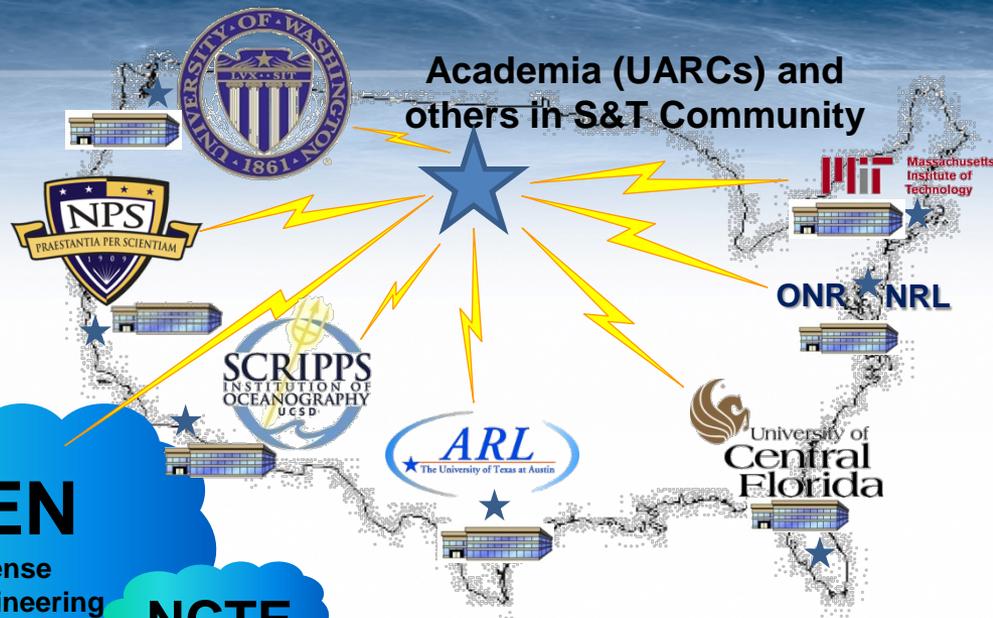


The Future: Networked FIST2FAC

FIST2FAC

Systems

- NCTE Operational Node
- NCTE RDT&E Node
- Communications Suite
- JSAF
- GCCS
- SDREN

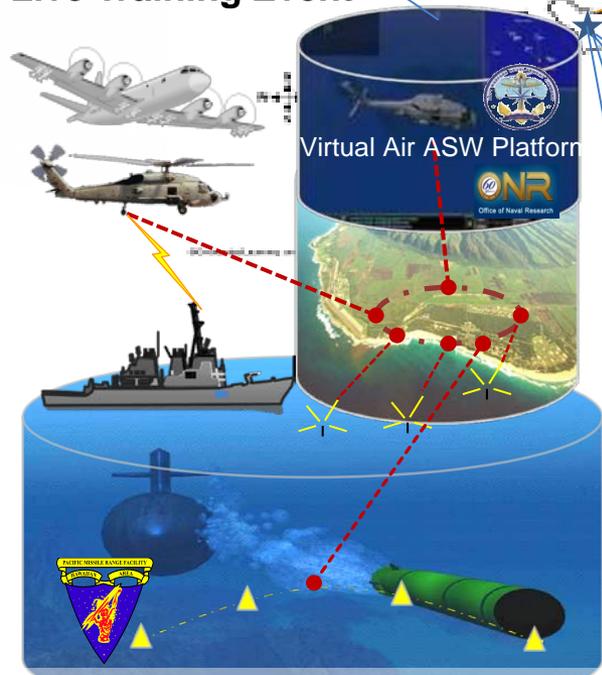


SDREN

Secure defense research & engineering Network

NCTE

Live Training Event



Instrumented Underwater Range Tracking and Acoustic Information

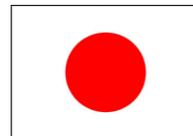


Research & Development Data Repository

Partner Nations



Japan



S. Korea



Singapore





Live, Virtual, Constructive (LVC) Training

Dr. Ami Bolton, ONR Program Officer
ONR341 Human & Bioengineered Systems Division
ONR34 Warfighter Performance Department
5NOV2014

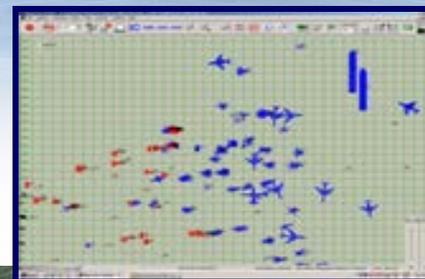
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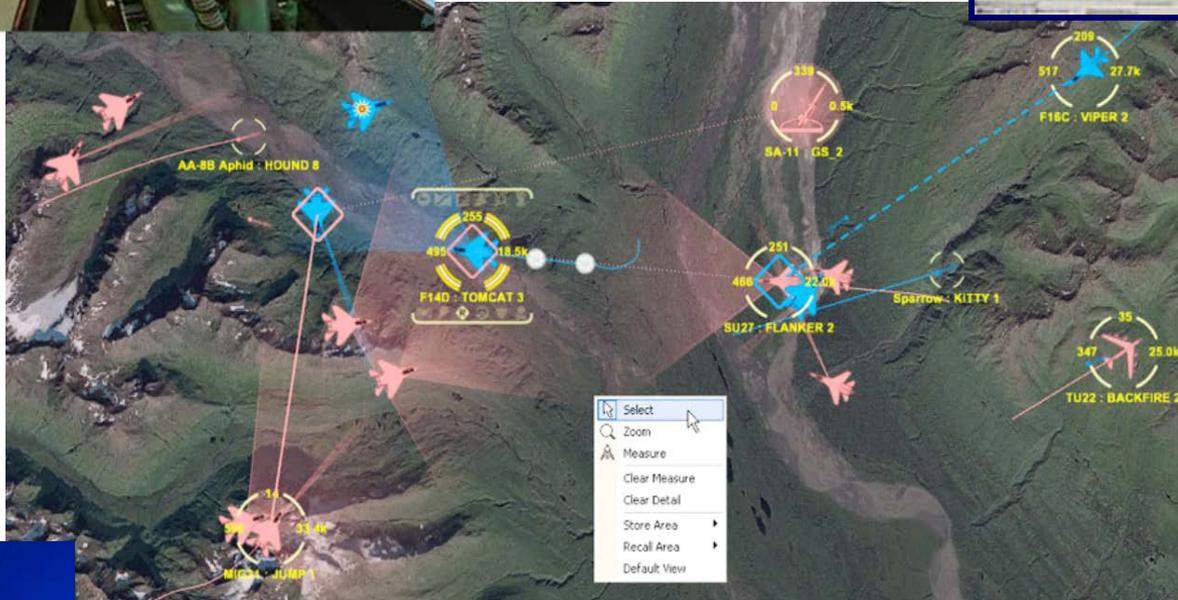
Live, Virtual, Constructive Defined



Live: real people operating operational systems



Virtual: real people operating simulators

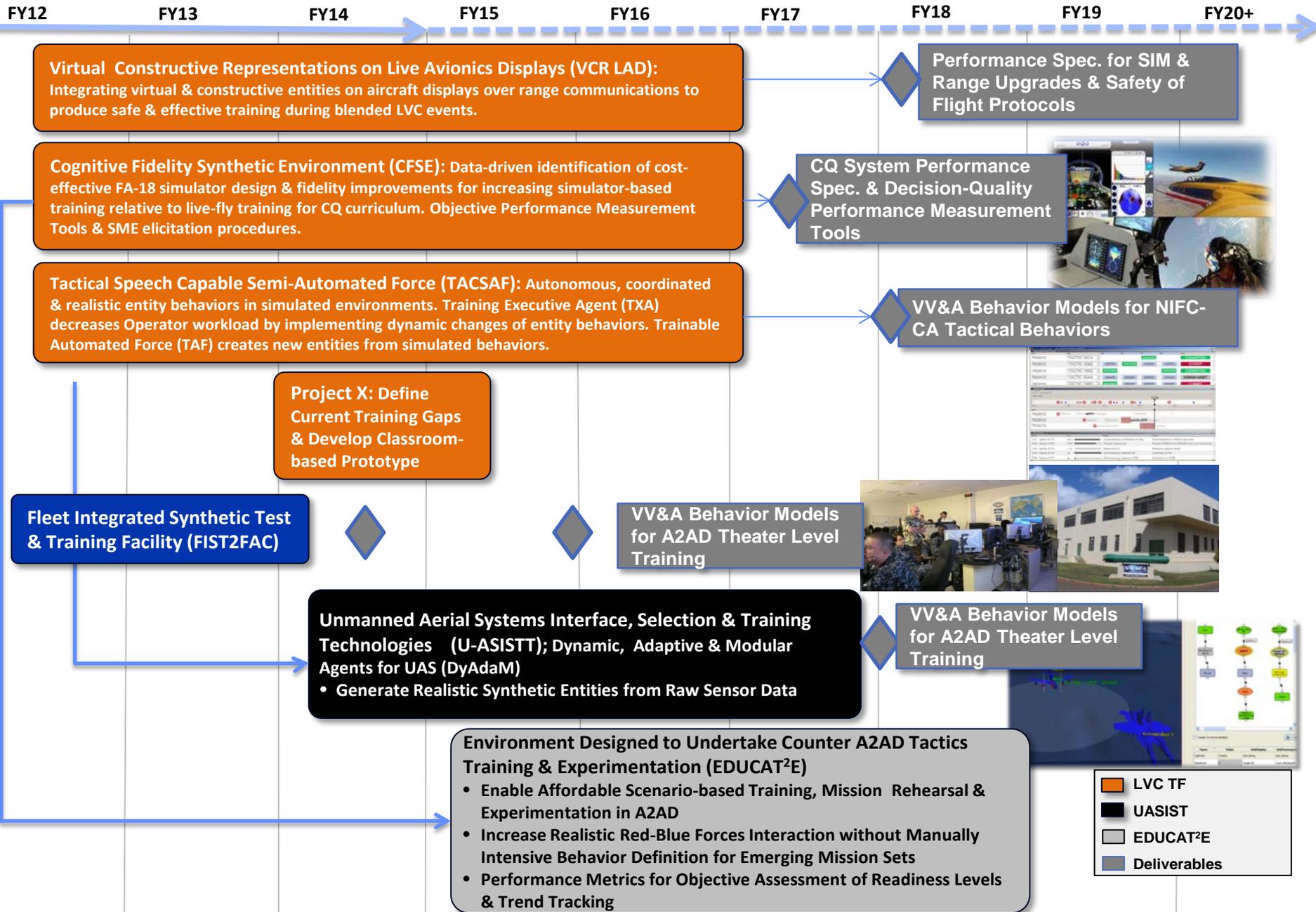


Constructive: computer generated entities



“The cost to operate present and future platforms - combined with advanced capabilities that are rapidly exceeding the capabilities of our current training ranges - demands that we innovate in combining live, virtual, and constructive training.” - The Vision of Naval Aviation 2025

Path Forward for S&T Focused on LVC Integrated Mission Level Training



NIFC-CA Operational View

From-The-Sea (FTS)



- E-2D - Advanced Hawkeye
- Cooperative Engagement Capability (CEC)
- Aegis Weapon System (ACB12)
- Standard Missile (SM-6)

From-The-Air (FTA)



- E-2D - Advanced Hawkeye
- Link 16
- F/A-18E/F
- Advanced Medium Range Air-to-Air Missile (AMRAAM)

E-2D

From The Air (FTA)

- NGTS
- Aviation LVC

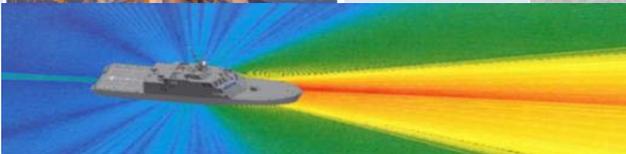
From The Sea (FTS)

- JSAF
- FIST2FAC

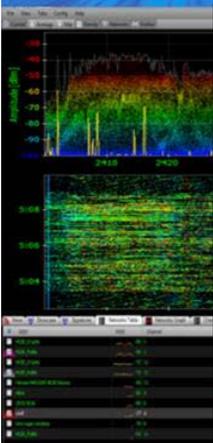
NIFC-CA is a complex Family of Systems...

- ***Urgent need for Models and Measures for training & CONOPs development!***
- ***LVC S&T development, demonstration and experimentation to occur at FIST2FAC for both FTA and FTS.***

EMW Training Capabilities Require LVC



- Directed Energy (EMP, HPM, laser)
- GPS jammers
- Digital RF Memory
- MMW
- Advanced C2 nets
- Weaponized COTS
- Proliferation



LVC EMW Training and Experimentation S&T to be conducted at FIST2FAC



“In concepts such as Air-Sea Battle, EM-cyber operations are used to attack an adversary’s whole kill chain ... we will expand the use of EM-cyber ‘training ranges’ to gain proficiency in conducting these operations ...”

- ADM Jonathan Greenert, CNO, Proceedings December 2012



Panel Questions

The organizations represented on the panel this afternoon play critical roles in providing synthetic-LVC training to the Navy and Marine Corps.

- 1. Briefly describe the role your organization plays in this enterprise?
How is your organization coordinated with others represented here?**
- 2. What is your vision for the future of Naval synthetic-LVC training? What are the challenges ahead?**
- 3. How are ONR investments fitting into your vision?
What are we doing well?
What are some opportunities for improvement?**



Mission Planning Application

5 November 2014

Dr. William “Kip” Krebs
ONR34 Warfighter Performance Department
Office of Naval Research
Capable Manpower FNC

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Mission Planning Requirement

VADM Donnelly ltr to CNR (Ser N00/00269, 22 Jul 08) ... “improve warfighter decision making abilities at every level.

Develop technologies and processes that enable rapid and effective decision making. Information display is a key component.”

Requirement



Delivered a Submarine Mission and Navigation Planning Application (MPA) to facilitate the Plan-Brief-Execute-Assess cycle outlined in Chapter 7 of the Submarine Operations Manual.



MPA Highlights

- ✓ **PMS-425 (Submarine Combat System Program Officer) transitioning MPA to production via Advanced Processor Build (APB-13 and APB-15)**
- ✓ **Used by the April 2014 Submarine Command Course**
- ✓ **PMS-425 will back fit MPA on TI-12 platforms**
- ✓ **PMS-425 installing a limited MPA version in SSBN's combat system upgrade**
- ✓ **Installing MPA on USS Mobile Bay (CG-53)**
- ✓ **Being considered as the surface Navy's path ahead for planners**



Mission Planning Application Demonstration

