Naval Fleet/Force Technology Innovation Office (NFFTIO)

Naval-Industry R&D Partnership Conference 2003

Pre-Conference Workshop – Science Advisors

4 August 2003

http://www.onr.navy.mil/nfftio
http://www.techsolutions.navy.mil
http://164.198.121.36/QuickPlace/onr_st_action_team/main.nsf (SIPRNET)

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Agenda

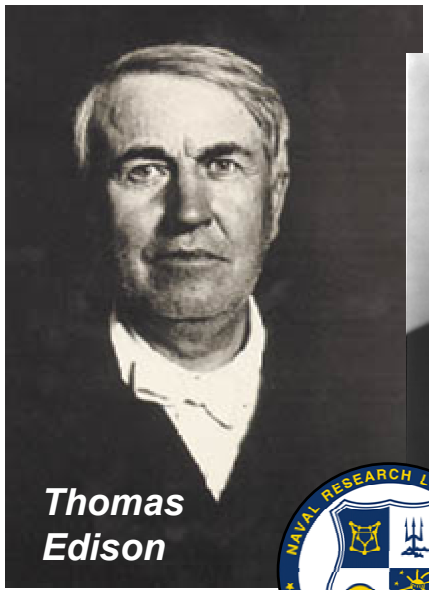
- David R. Starkston, NFFTIO Director
  - ONR Overview
  - NFFTIO Science Advisors – Basic Overview
- Greg Hays, Tech Solutions
  - Tech Solutions –Industry and the NRE
- Dr. Estrella Forster, COMTHIRDFLT Science Advisor
  - Science Advisor Poster Sessions

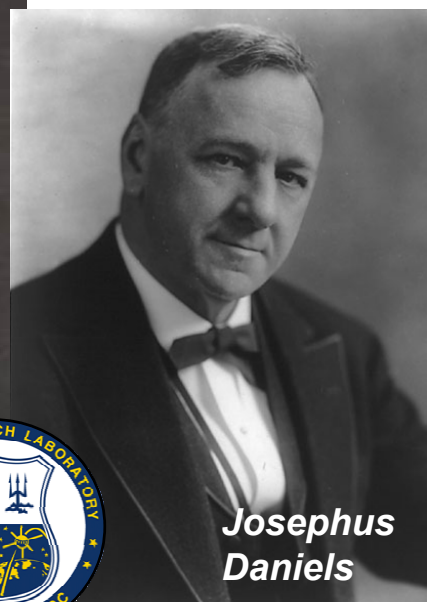
Naval Research Mission

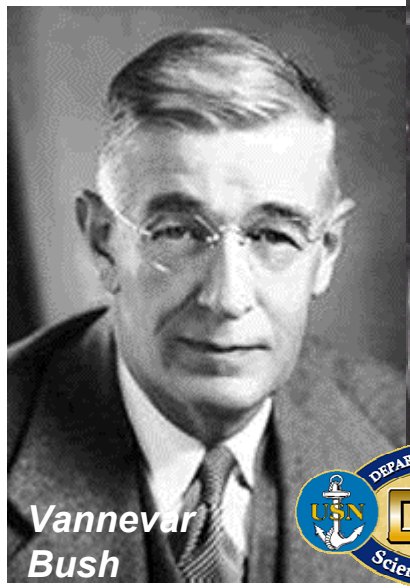
Who we are

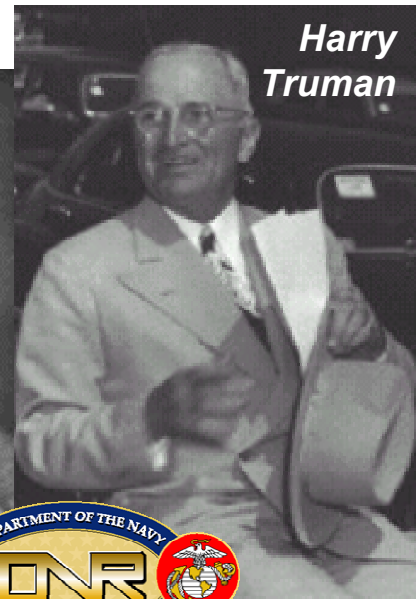
We

"To plan, foster and encourage scientific research in recognition of its paramount importance as related to the maintenance of future naval power and the preservation of national security." -Public Law 588 (1946)









Note: In 1994, ONR more than tripled its scope with the addition of applied research and Advanced Technology Development (i.e., *all* of DoN S&T)

Science and Technology are Foundations of Innovation

Steam propulsion
Screw propeller
Ironclads
Steel hulls
Submarines
Aviation
Fire control
Radar
Carriers
ICBMs
Nuclear Powe
Satellite communication
Global positioning
Gas turbines
AEGIS
Tomahawk

"Innovation within the armed forces will rest on experimentation with new approaches to warfare, strengthening joint operations, exploiting U.S. intelligence advantages, and taking full advantage of science and technology."

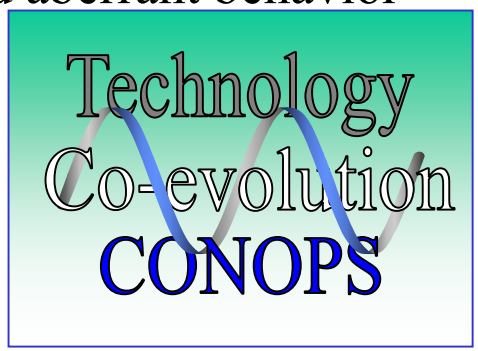
Autonomous vehicles
Integrated Electric ship
Autonomous operations
Automatic target recognition
Selectable weapons effects
Electric Drive
FORCEnet
Robotics
Networked weapons
Directed energy weapons
egrated Operational Picture
High altitude, long endurance surveillance
Hyperspectral surveillance
Self-healing machines and structures
Augmented human performance techniques
Cyberprotection/cyber attack

Excerpt from National Security Strategy of the United States, September, 2002, page 30

Context and Trends

S&T Context

- [P]rojecting dominant and decisive offensive power from the sea…"-Naval Transformation Roadmap
- "Do not fight the US without nuclear weapons"… *or WMD or asymmetry*
  - Conventional superiority leads to cyber attacks, chemicals, bio attacks, constant movement, camouflage, cloaking, deception, burial, no/short emissions and other forms of unexpected and aberrant behavior
- Fight our next enemy not the last
  - New CONOPS with legacy systems
  - New CONOPS with improved systems
  - New systems with new CONOPS



- Technology is an asymmetrical US advantage, *if and only if*, we can create a new capability, develop it fully, integrate it with legacy systems, and simultaneously learn to use it.

S&T works "Discovery to Deployment"

(i.e., both near-term objectives and long-term challenges)

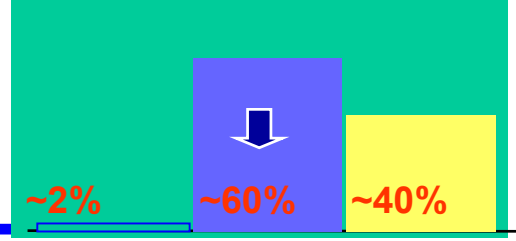
How we work

DON S&T portfolio has two parts spanning three navies

Exploitation &Deployment (E&D)		Discovery & Invention (D&I)
Present	***5 Years . . . .***	***5 ⇨ 20 Years . . .***
Today's Navy and Marine Corps	•12 FNCs •Fleet/Force Experimentation **The Next** Navy and Marine Corps	•Basic Research •National Naval Responsibilities •Grand Challenges Navy and Marine Corps **After Next**
CNR Initiatives ~2%	~60%	~40%

Note: percentages indicate approximate division of total DoN S&T annual investment in each area.

Exploitation and Deployment – Future Naval Capabilities for the Next Navy and Marine Corps



FNC	$M FY03	$M FY04
• Autonomous Operations	29.2	23.5
• Capable Manpower	33.9	24.5
• Advanced Electric Capability Systems	13.8	11.4
• Knowledge Superiority & Assurance	81.9	65.3
• Littoral Antisubmarine Warfare	67.6	55.1
• Littoral Combat & Power Projection*	57.1	54.6
• Missile Defense	36.8	30.4
• Organic Mine Countermeasures	70.1	52.6
• Fleet / Force Protection**	81.8	75.3
• Time Critical Strike	66.2	59.9
• Total Ownership Cost Reduction	32.2	24.3
• Warfighter Protection	25.6	20.3
Total	596.1	500.0***

Fleet / Force Protection

Littoral Combat & Power Projection

Notes: No priority expressed by order
* Includes both EXLOG and power projection
** Formerly Platform Protection; changed 24 June 02
*** Includes $2.7M FNC / Ops Analysis support

DoN Policy: FNCs are funded at 30% of the S&T topline or, $500M, whichever is larger

Pre-Conference Workshop

Science Advisors

NFFTIO Science Advisors – Basic Overview

David Starkston, NFFTIO Director

NFFTIO Mission Statement

To Serve As The Bridge Between S&T And The Warfighter

Key Goals:

I. **S&T Investment Shaping**
II. **Warfighter Pull**
III. **RDT&E and Acquisition Influence**
IV. **Competent Technological Advice**
V. **Surge Support**
VI. **Innovative Technology Push**
VII. **Knowledgeable RDT&E Community**

Making S&T Relevant to Today's Naval Forces

Goals

I — S&T Investment Shaping
Ensure the Fleet/Force has a voice in shaping DON S&T investment

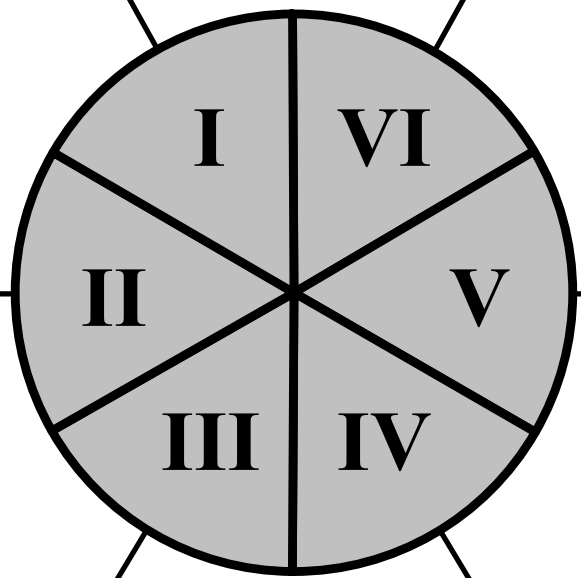
II — Warfighter Pull
Facilitate Fleet Pull of technology to meet Fleet needs

III — RDT&E and Acquisition Influence
Influence RDT&E and acquisition programs to address Fleet/Force needs and aid in transition of technology

IV — Competent Technological Advice
Provide competent technological advice to Joint, Navy and Marine Corps commands

V — Surge Support
Surge to support real world contingencies

VI — Innovative Technology Push
Push new technology and innovative uses of existing technology to the Fleet/Force



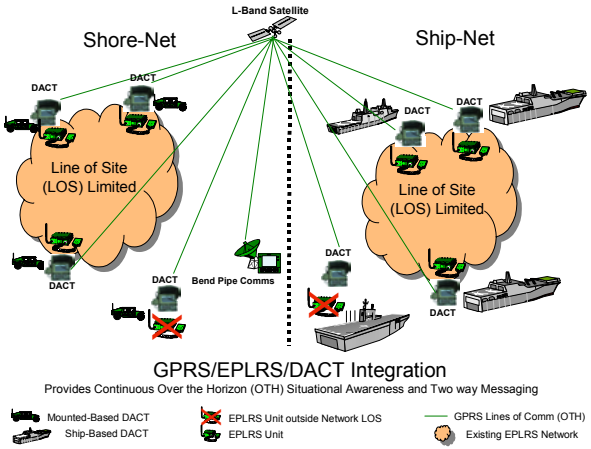
VII	**Knowledgeable RDT&E Community** Develop scientists and engineers in the Naval RTD&E community with first hand knowledge of the Fleet/Force, warfighting issues and strategic decision making.

GEN Tommy Franks: Areas Requiring Additional Work

- **Fratricide prevention**
  - **Suffered from lack of standardized combat ID (7 systems)**
  - **Commanders overcame shortcomings "on the fly"**
- **Deployment planning & execution cumbersome**
  - **Need to improved to meet 21st C operational demands**
- **Coalition information sharing: must improve at all levels**
- **Human intelligence: requires continuing focus**
- **Comms bandwidth: requires continuing focus**
- **Global Hawk:** hi-alt, long loiter, beyond line-of-sight multi-sensor UAV will be further developed
  - **Need to include laser designation & precision weaponry delivery**
- **Integrated common operating picture** (COP): very powerful but need further development
  - Tracking systems were previously Service-unique
  - Workarounds developed, but need integrated, user-friendly, C4I architecture for blue & red air, ground & maritime forces
- **Strategic lift & tanker aircraft** availability **were stretched**

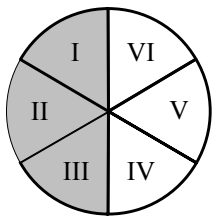
Examples

Blue Force Tracking



Impact:

- Leveraged GPRS technology from PRESS ACTD to integrate OTH capability in M-DACT.
- Working with AMC-FAST to make USMC and USA interoperable!

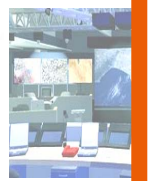


CORTEX

Command Center and Research Facility

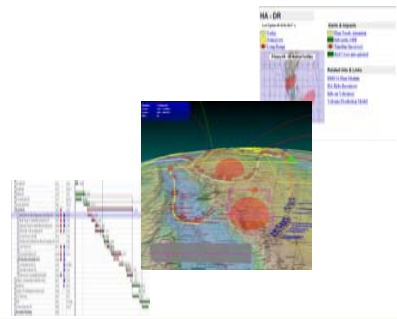
Reconfigurable Display Surfaces Views

FY'04



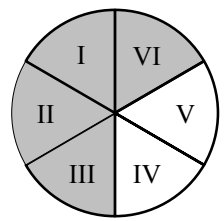
FY'03

Knowledge Views (Geospatial, Functional, Temporal)



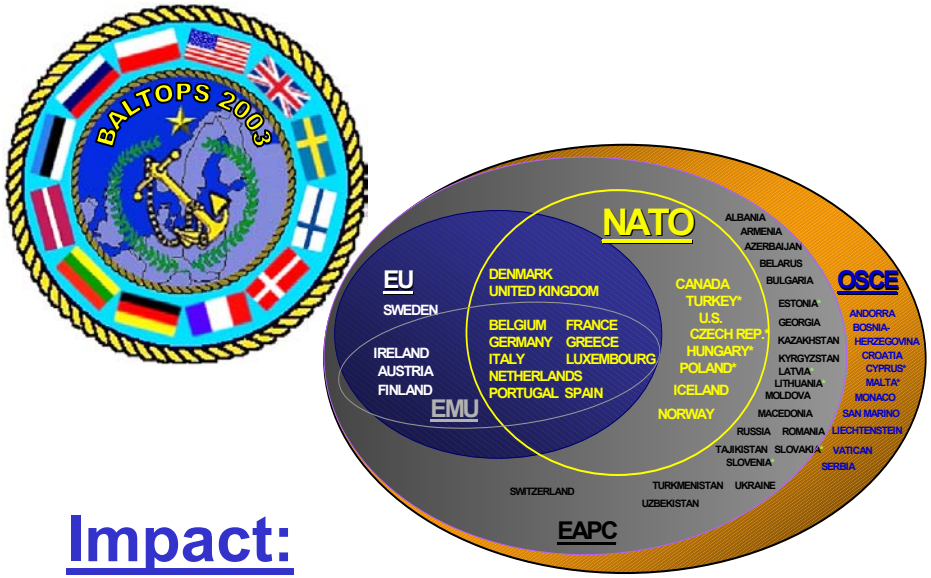
Impact:

- Shaping Code 31 investment ($6M) to create an environment for experimenting with SA to move towards USA.



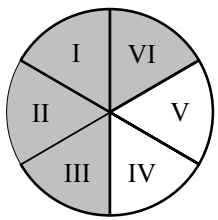
Examples

Coalition Chat Line



Impact:

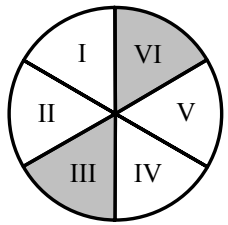
- Shaping Code 31 investment to accelerate LASER ACTD
- Expands on the success of online chat to provide this capability to a multi-lingual coalition!



Bandwidth Optimization

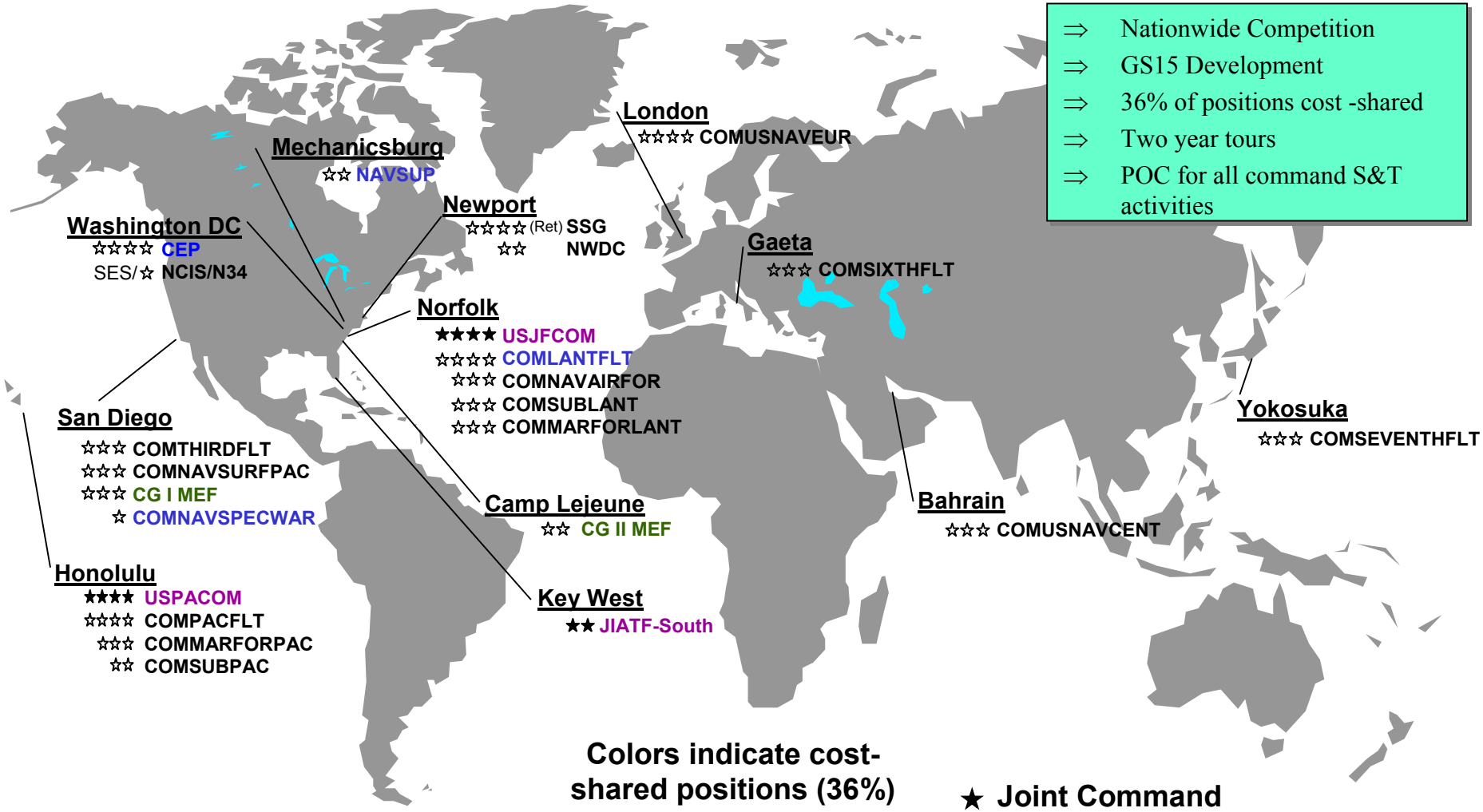
Impact:

- Provides a 4 fold increase through today's limited bandwidth satellite communications.



Science Advisors

Geographic Locations



15 July 03

Characteristics of a Good Science Advisor

- A self-starter
- Impeccably honest
- Speaks with authority
- Receptive to change
- Articulates Vision
- Entrepreneurial
- Proactive
- Innovator

Pre-Conference Workshop

Science Advisors

Tech Solutions – Industry and the NRE

Greg Hays, Tech Solutions

Tech Solutions

Why Tech Solutions

- Brings **Naval Research** directly to the warfighter
- **Positive impact** on current readiness
- Leverage FNCs
- Demonstrate new technologies
- Bridge from Naval Research to Acquisition

- Web-based (Internet and SIPRnet)
- Targets E-4 to O-4's
- Acquire needs from the deck-plates.
- Deliver **50–70% solutions** addressing immediate requirements
- **Not a substitute for the acquisition process.**
- Transition "hook points" are built into the solution
- 12 month or less delivery time-line.

Major Capabilities:

- Technology **search** and analysis
- Rapid **prototyping** of technologies
- **Demonstrations** of available technologies and conceptual systems.

Tech Solutions Answer the Mail

Got an Idea? We Want to Hear!

The Tech Solutions process

Sailor or Marine submits an S&T need request via the Tech Solutions Website

Tech Solution team & Science Advisors Validate request

Request is vetted to the NRE (Naval Research Enterprise) in search of solutions

Short white papers (Solution Ideas) are Submitted to Tech Solutions from NRE

Solution Ideas are evaluated and down selected for proposals

Evaluation team is generally made up of TS team members, applicable ONR Codes, subject matter experts, and the submitter

Proposals are evaluated and a winning proposal is selected

Winning proposal is funded with Techsolutions dollars

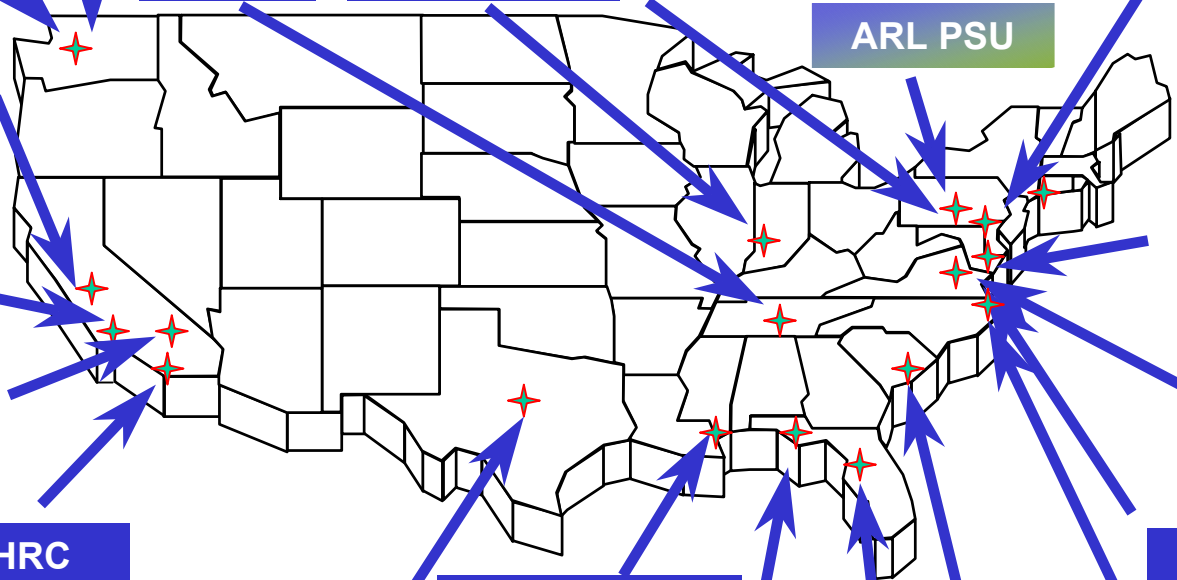
Projects are expected to complete within a 12 month period, produce a deliverable, and a demonstration on the originators command

Submitter's request answered!

Naval Research Enterprise

Solution/Knowledge Providers

CNR coordinates a consortium of S&T elements in System Commands, Warfare Centers, Naval Laboratories, UARCs, FFRDCs, other Naval organizations



ONR
APL JHU
NAVFAC
NAVSEA HQ
NRL
NSWC HQ
NSWC IH
NAVAIR HQ
NAWC PAX
MCWL
MARCORSYS
NSWC DAHL
OPTEVFOR
NSWC DAHL DN
SPAWAR SSC CHAS
NWDC
NAWC LKH
NAVSEALOGCEN
NUWC NPT
SSG
NUWC KPT
NAVSUP
NSWC CARD PH
MIT
APL UW
NPRST
NSWC Crane
NSWC CARD
NMRC
ARL PSU
NPS
NSWC PHD
NFESC PHD
NAWC PT MG
NAWC CH LK
NHRC
SPAWAR HQ
SPAWAR SSC SD
NSWC Corona
ARL UT
NAVOCEANO
NSWC DAHL CSS
NAWC TSD ORL

How can industry play in Tech Solutions?

1. By partnering with the Naval Research Enterprise

- **Over 85% of our projects have an industry partner**

2. By ONR's Long Range BAA for S&T

Tell us who you are and what you do:

- Go to www.techsolutions.navy.mil
- Request an account
- Register your company

New Feature Appearing Aug 4th

Pre-Conference Workshop

Science Advisors

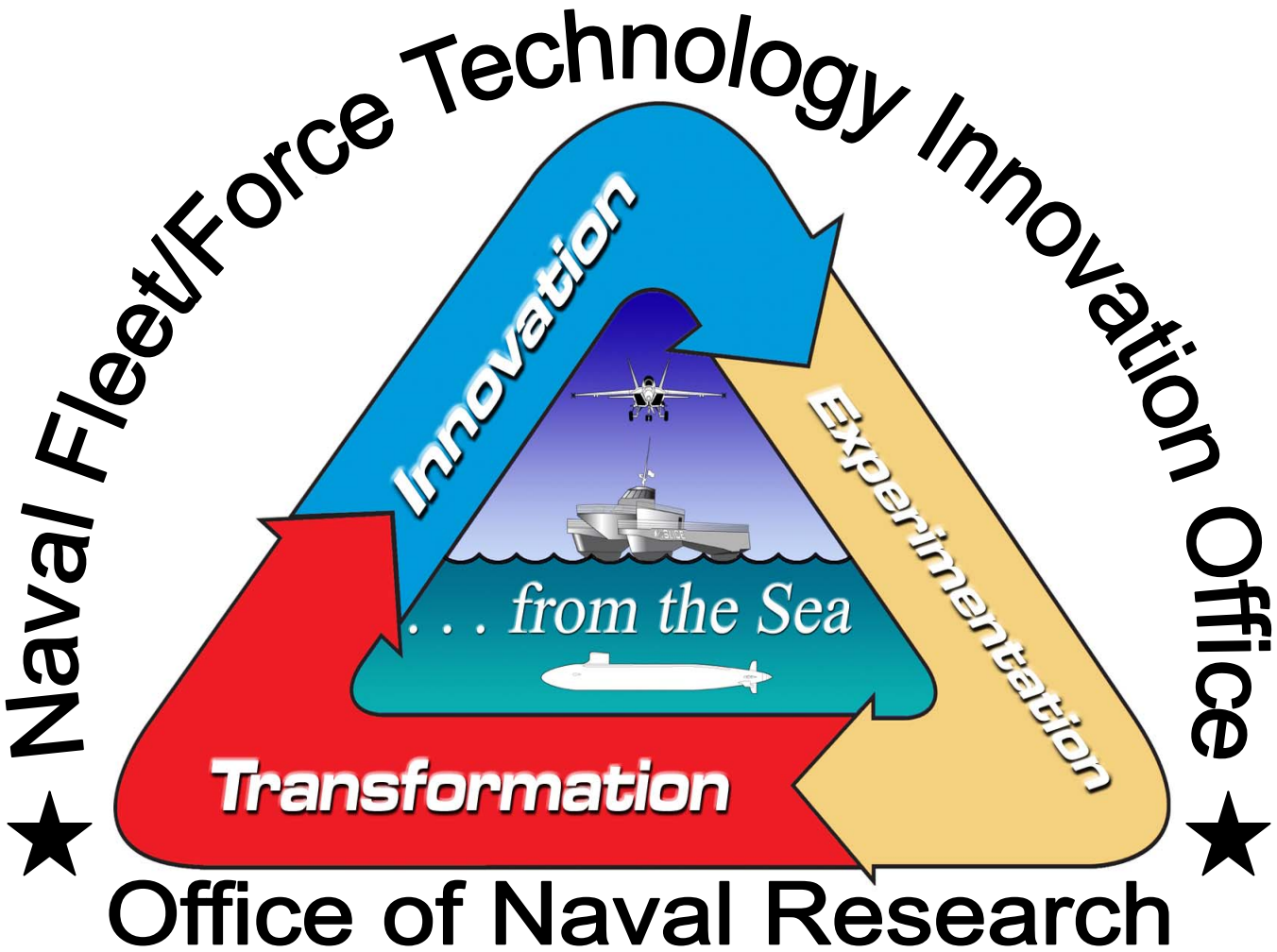
Science Advisor Poster Sessions

Dr. Estrella Forster

COMTHIRDFLT Science Advisor

Representative Technical Issues from the Fleet/Forces

- **US Numbered Fleets**
  - Organic Battle Group (BG) mine detection and defense capabilities
  - Network supported Common Operational Picture (COP)
- **NCIS/N34: AT/FP**
  - Stand-off Explosives detection and imaging
  - Unambiguous Warning Devices
- **US Marines**
  - Joint/Multinational Integrated Intel, Fires, Maneuver, and Logistics with data fusion capability
  - Expeditionary Command and Control
- **Naval Surface Forces**
  - Asymmetric Anti-Surface Warfare (ASUW)
  - Shallow Water Anti-Submarine Warfare (ASW)
- **Naval Air Forces**
  - Airwing/Aviation Simulation & Training Systems
  - Advanced Precision And Stand-off Weapons
- **Submarine Forces**
  - ASW: Improved detection, classification, and localization sensors and technologies for the littoral and blue water against all submerged threats
  - Battlespace Connectivity and Situational Awareness


Naval Fleet/Force Technology Innovation Office
Innovation
Experimentation
. . . from the Sea
Transformation
Office of Naval Research

BACKUP

NR STAT Medical Triage

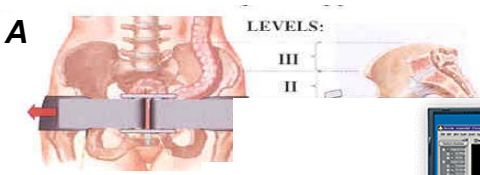
MISSION: Maritime Interception Operations
THREAT: Casualties during boarding
REQUEST: Lightweight, portable, advanced triage support

IMPACT:
- **Provided C6F with advanced portable medical technology in 22 days.**
- **C6F evaluating for Force Protection FNC**

SOLUTION: Portable diagnostics; Hemostatic Agents; Noninvasive Methods for Internal Injuries

SOLUTION:

A



Pelvic Sling
(Pelvic Ring Stabilizer)

B
Terason® Portable Ultrasound

C **QuikClot**
Hemostatic Agent

Request received from C6F 10 FEB 02.

Classified VTC with C6F and ONR Code 34 conducted on 19 FEB 02.

C6F received items on 4 MAR 02.

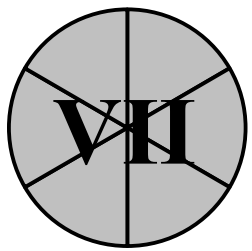
Day 1 ... 11 ... **Day** 22

Marine Mammals

- ALSIXTHFLT guidance
- Implement CINCLANTFLT procedures
  - Trained lookouts on ships and aircraft
  - Inspect range before dropping ordnance or using sonar
  - Whales, dolphins, other mammals, turtles
  - Secure sonar if whale spotted
  - Report whale strikes
- Identify marine protected areas
- Pre-exercise planning

Impact:

- Changed the way SIXTH Fleet operates and trains.
- Being briefed to all NATO nations with a navy by direction of ADM Johnson.

Knowledgeable RDT&E Community

- Develop scientists and engineers in the Naval RTD&E community with first hand knowledge of the Fleet/Force, warfighting issues and strategic decision making.
  - Several have moved on to SES
  - ONR Program Officers
  - Departmental directors at Labs, Warfare Centers, and Universities
  - SOCOM
- Scientist to Sea
- Face the Fleets