



Thoughts on Increasing the Navy's Capacity for Innovation

13 March 2012

Larry Schuette
Director of Innovation
larry.schuette@navy.mil
www.onr.navy.mil

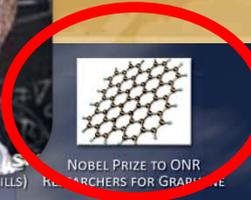
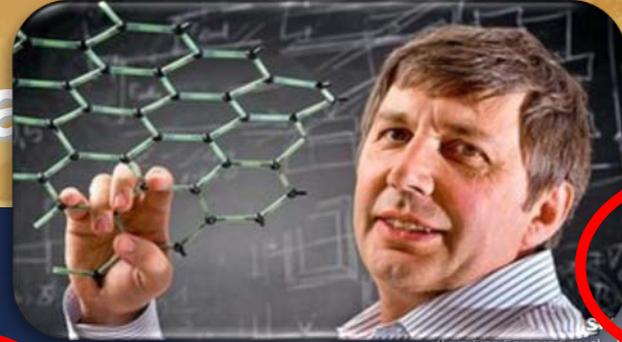


ONR

Revolutionary Research . . . Relevant Results

O F F I C E O F N A V A L R E S E A R C H

Distribution A: Approved for public release; distribution is unlimited



Keystones ACROSS ALL DOMAINS



NTS-2 SATELLITE
IN NAVSTAR GPS



TIMATION AND
NAVSTAR GPS



CORONAL MASS
EJECTION



FIRST UNMANNED
HELICOPTER



OWENS VALLEY 40M
RADIO TELESCOPE



MOBILE
ROBOTS



VANGUARD
LAUNCHED



AQUEOUS FILM
FORMING FOAMS (AFFF)



EXCIMER LASER
TECHNOLOGY



AIR-TO-AIR WEAPONRY COUNTER-CYBER COUNTER-CYBER MODEL



FREE ELECTRON
LASER



TACTICAL
MICROSATELLITE



DISPLACEMENT UNMANNED
UNDERWATER VEHICLE



INTEGRATED TOPSIDE
(INTOP)



CBR SENSORS
FOR FLEET SECURITY



FIRST UNMANNED
AERIAL VEHICLE



URANIUM 235
PRODUCTION



PRINCIPLES OF MODERN
FRACTURE MECHANICS



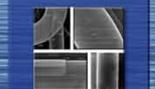
PROJECT WHIRLWIND
DIGITAL COMPUTER



FIRST U.S. INTELLIGENCE
SATELLITE



FAR ULTRAVIOLET
LUNAR CAMERA



GAMMA-RAY
RADIOGRAPHY



FIRST CONCEPT FOR A
NUCLEAR SUBMARINE



SYNTHETIC
LUBRICANTS



PARTICLE
ACCELERATORS



SEALAB I
AND II



LITHIUM
BATTERIES



CONTRIBUTED TO
AEGIS COMBAT SYSTEM



ULTRA-HIGH
STRENGTH STEEL



QUIKClot®
COMBAT GAUZE



WORLD-RECORD SETTING
33 MJ EMRG SHOT



NRL
COMMISSIONED



FIRST U.S. RADAR
PATENTS



ONR FOUNDED
1946



VERTICAL TAKE-OFF
AND LANDING



BATHYSCAPHE TRIESTE
REACHES 35,800 FT.



SOUND SURVEILLANCE
SYSTEM (SOSUS)



ACOUSTIC
MICROSCOPY



HULL ANTI-FOULING
COATINGS



REMOTE ENVIRONMENT
MONITORING UNITS

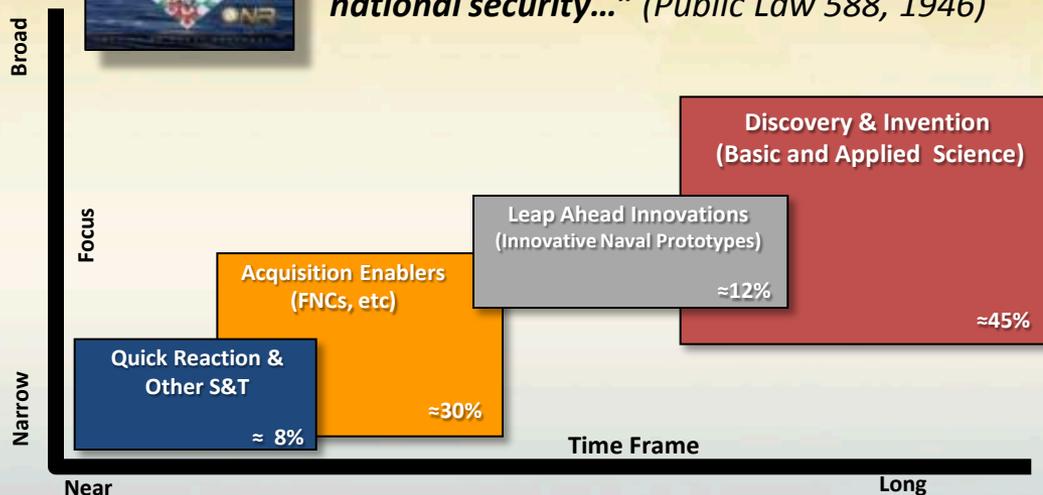


ANTI-TORPEDO
TORPEDO

Naval Science and Technology



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



Focus Areas:

- Assure Access to Maritime Battlespace
- Autonomy & Unmanned Systems
- Expeditionary & Irregular Warfare
- Information Dominance
- Platform Design & Survivability
- Power & Energy
- Strike & Integrated Defense
- Total Ownership Cost
- Warfighter Performance

Science, Technology, Engineering & Math (STEM)



Quick Reaction

Fleet Driven Material Solutions

1-2 yrs



Acquisition Enablers

Evolutionary POR component improvements

3-5 yrs



Leap Ahead Innovations

Disruptive Technologies

5-7 yrs

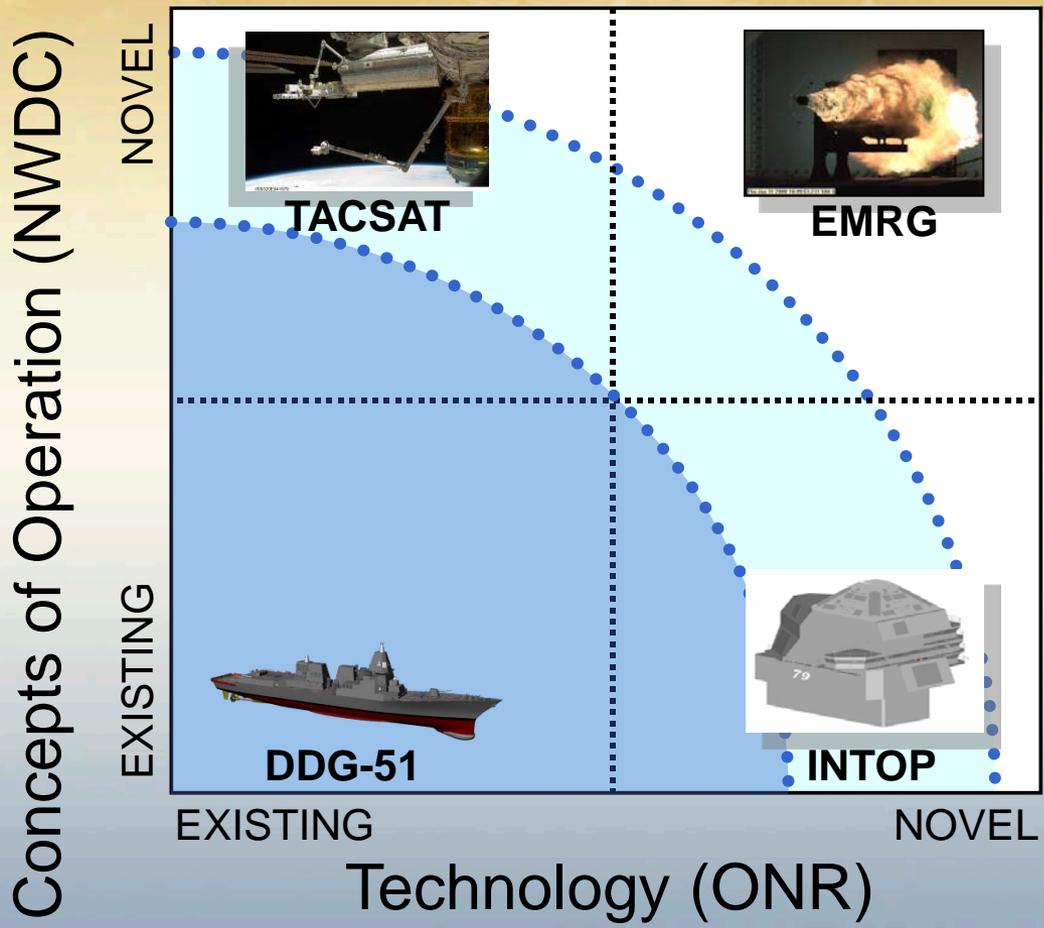


Discovery & Invention

Fundamental Science focused on naval problems

5-20 yrs

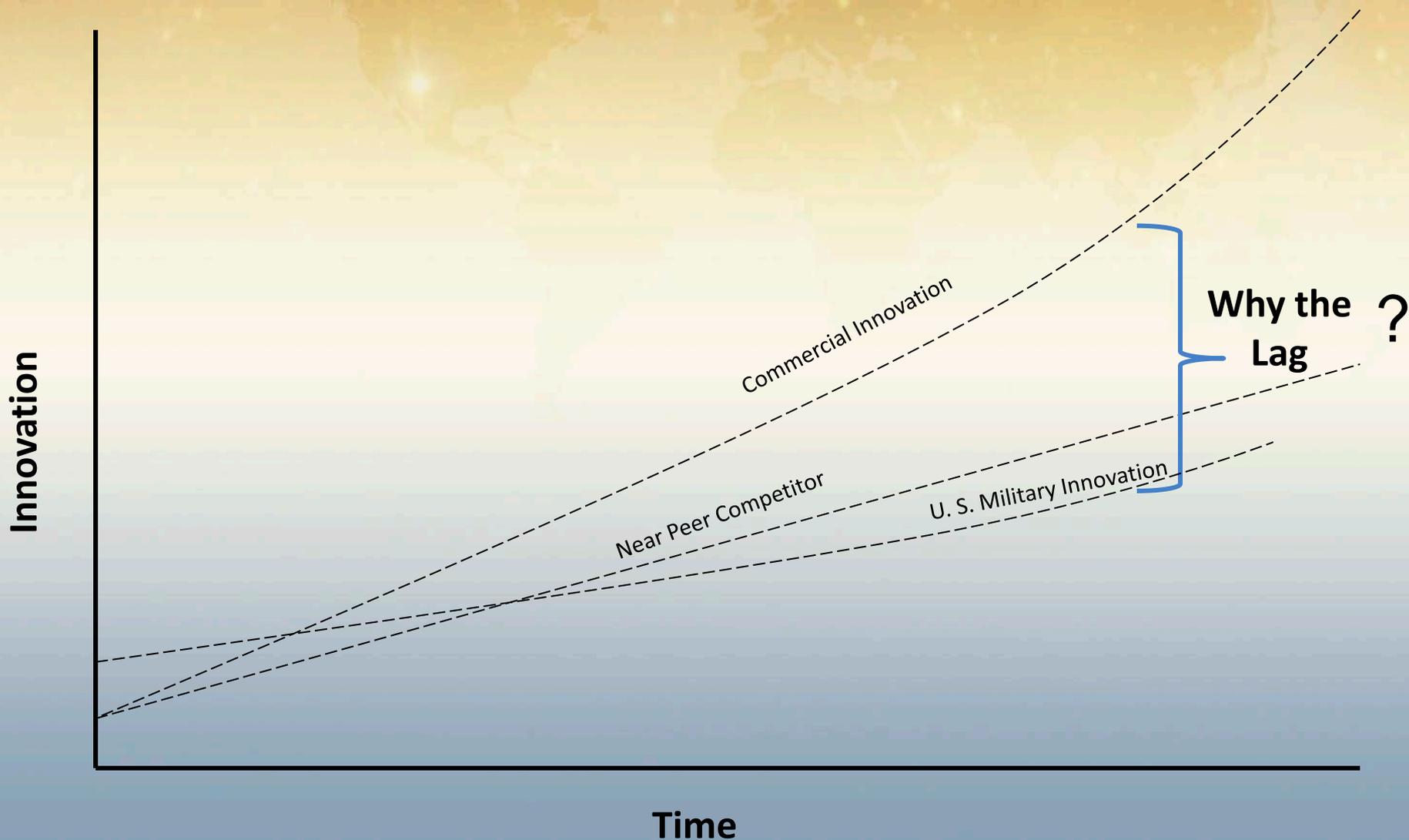
Navy Innovation Needs: Innovation Across the DOTMLPF



Key

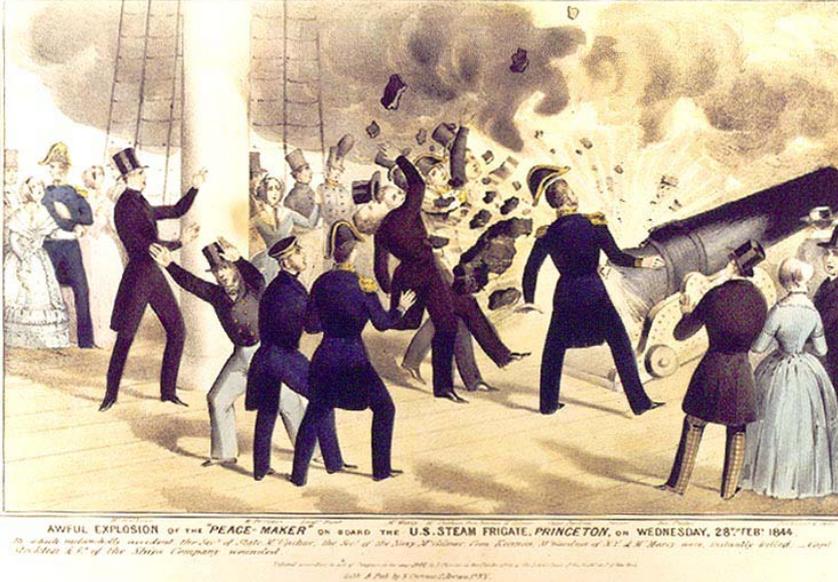
RADICAL NBT
DISRUPTIVE
SUSTAINING

What is the Imperative for Naval Innovation?



The Challenge of Naval Innovation Need to Chose Risk Wisely

Photo # NH 58906-KN "Awful Explosion of the 'Peace-Maker' on board the ... Princeton"



The Catastrophe at Washington 1844

“the beginning of US ordinance research”

Impact in 1862? USS Monitor only fired 15lb charges instead of the (CSS Virginia terminating) 30lb charges



“Share the Risk, Share the Glory”
Neil Armstrong at the 1957 AIAA meeting

Flight 191: 15 November, 1967
MH-96 FCS fails, causing aircraft to
be destroyed by aerodynamic forces

A look at Innovation Metrics

How do we measure innovation?

AND

How do we know who is being innovative?

One theory suggests we examine:

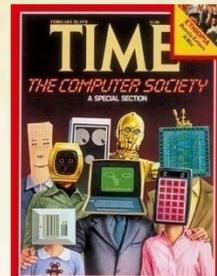
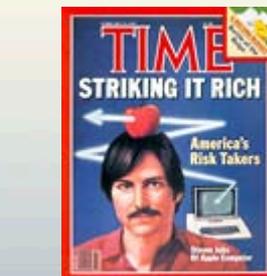
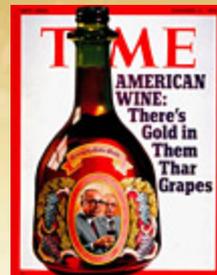
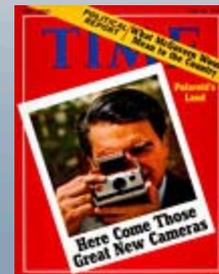
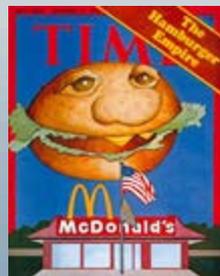
- “Connective Tissue”
- People who create connections
- Invention concentrations
- Productivity of collaboration
- Maven vs Connector

Why do we care?

Metrics

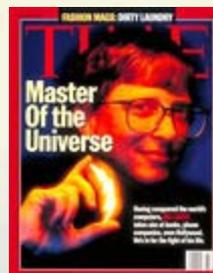
1970s-1980s

- Patents
- Publications
- *Products*



Metrics 1990s

- Surveys
- Indexing
- **Benchmarks**



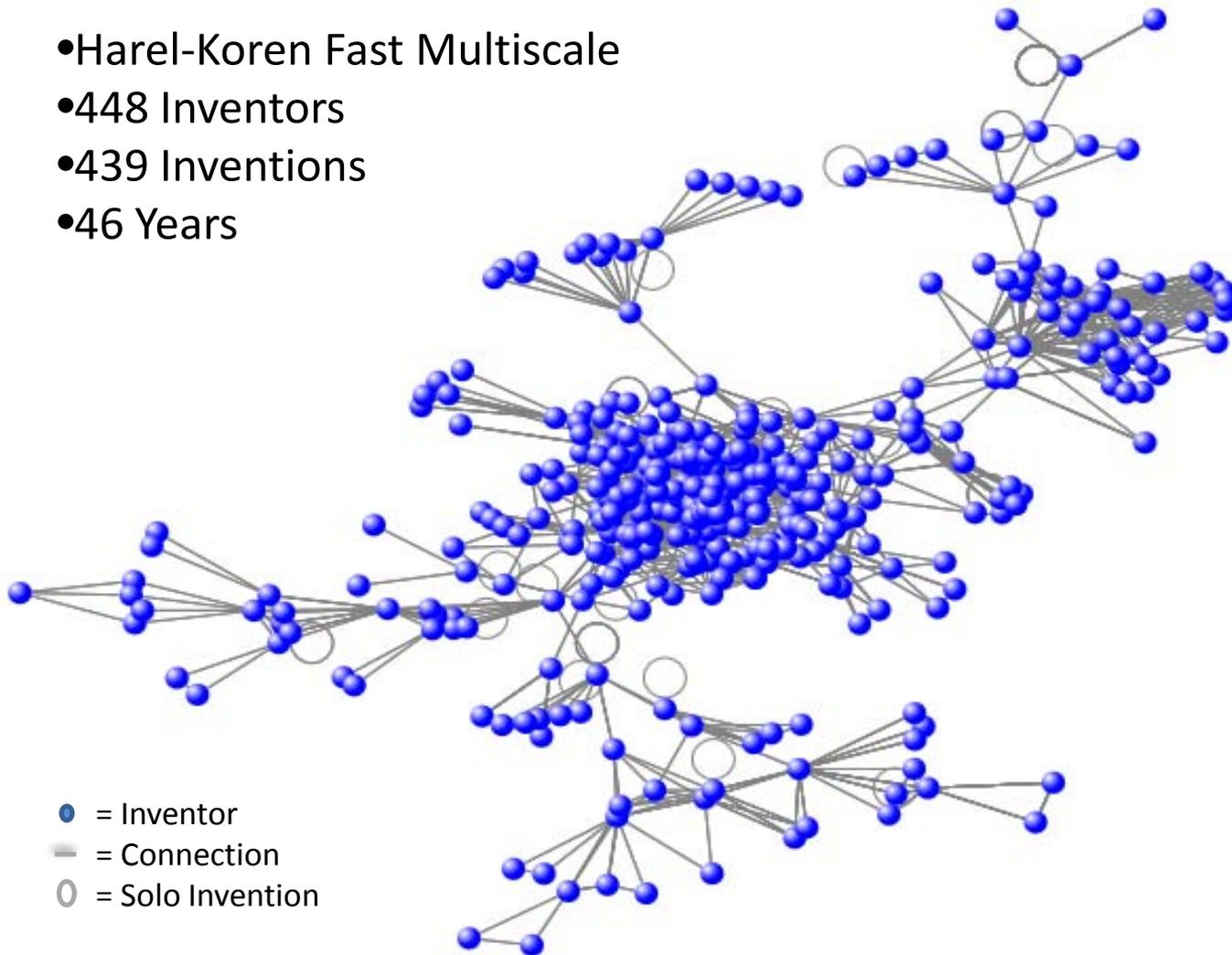
Modern Metrics 2000+

- **Networks**
- **Intangibles**
- **System Dynamics**

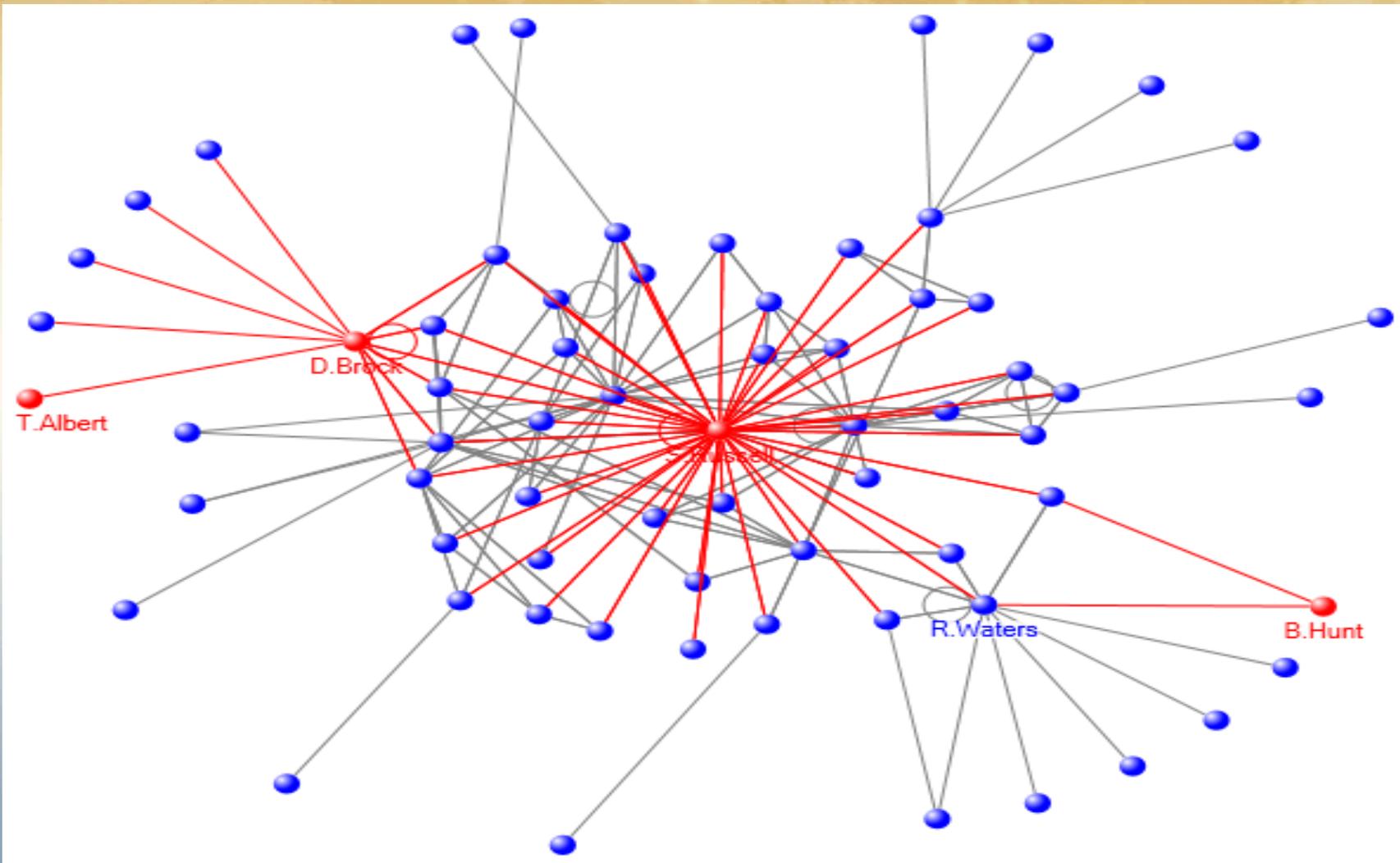


Invention as a Surrogate for Innovation (SPAWAR Co-Inventor Network 1964-2010)

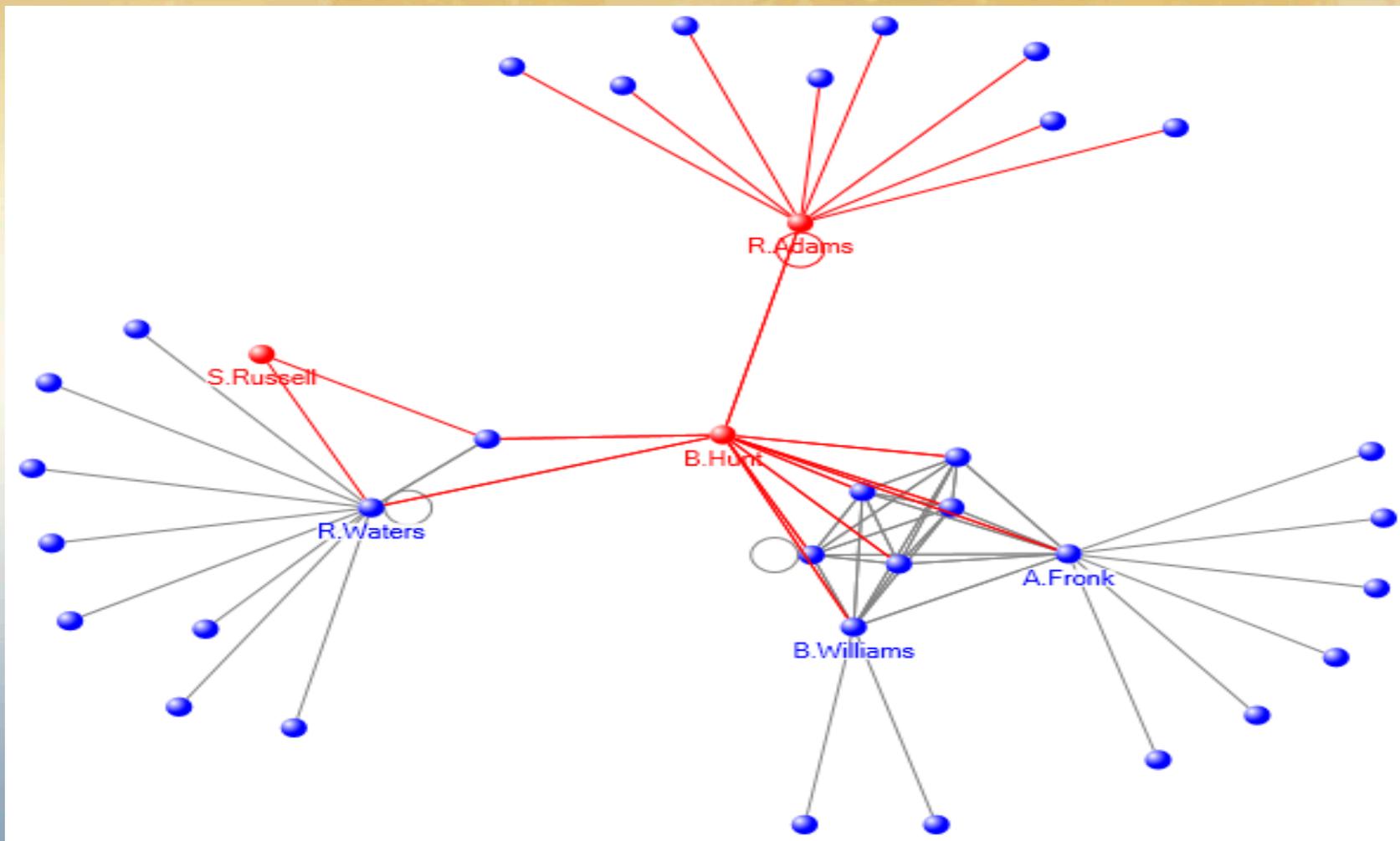
- Harel-Koren Fast Multiscale
- 448 Inventors
- 439 Inventions
- 46 Years



SPAWAR Russell +2 Co-Inventor Network



SPAWAR Hunt +2 Co-Inventor Network



Initial Findings

- Innovation networks are complex
- Collaboration is the general rule for invention
- In general the larger the collaboration network the greater the intellectual property output
- Not all collaborators are created equal
- There are “connector” and “maven” networks
- Collaboration networks have a finite lifetime
- Geography tends to bound collaboration networks
- Opportunities for innovations at the intersections

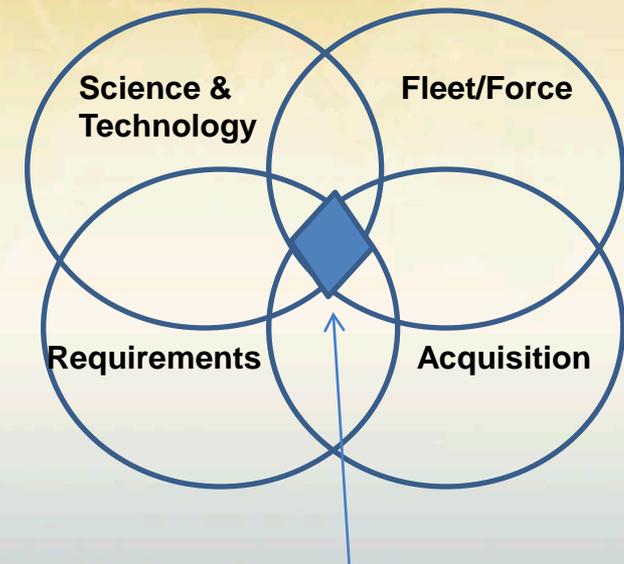
So What?

Network Theory could be used to optimally populate teams:
Those who already collaborate are likely to be the right people to engage

What is the Lesson for Naval Innovation?

- Connective Tissue
- People creating connections
- Invention concentrations
- Productivity of collaboration
- Maven vs Connector
- Collaboration Opportunities
- “Three cups of tea” required

DOTMLPF Universe



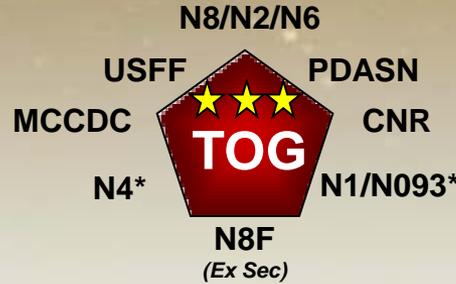
Innovation Opportunity.
How do we make this bigger?
What is the right size?

ONR: Increasing Global Innovation Opportunities



Technology Oversight Group

Ensuring Technical, Resource, Acquisition and Fleet Alignment



TOG Working Group

- 0-6/GS-15 reps

Sea Shield



N86
MCCDC
USFF N803
PEO LMW
ONR 32

Sea Basing



N85B
Dep. CG
MCCDC
USFF N804
PEO Ships
ONR 33

FORCENet



N6F
Dir HQMC C4
NETWARCOM
SPAWAR 05
ONR 31

Sea Strike



N87
HQMC
Aviation
USFF N8
PEO U&W
ONR 35

Naval Expeditionary Maneuver Warfare



N85B
HQMC
PP&O
USFF N8
MCSC
ONR 30

Enterprise & Platform Enablers



N8F
HQMC I&L
USFF N433
NAVSEA 05
ONR 03T

Force Health Protection



N0931
TMO, USMC
FFC N02H
NMSC
ONR 34

Capable Manpower



N15
USMC
Training/Ed
USFF N1D
NAVAIR TSD
ONR 34

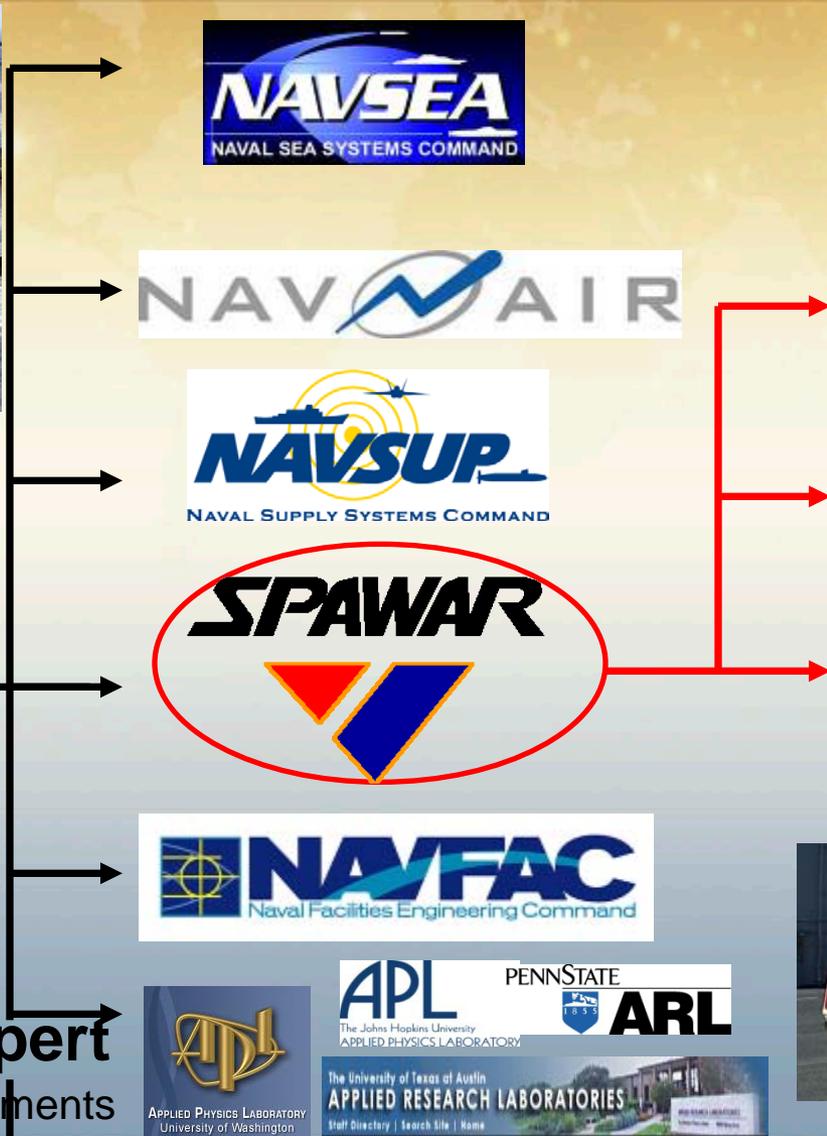
TECHSOLUTIONS: Increasing Collaboration & Innovation at the Deckplate



Warfighter Need



Subject Matter Expert
Interpret Technology Requirements



Technology Solutions

Academia

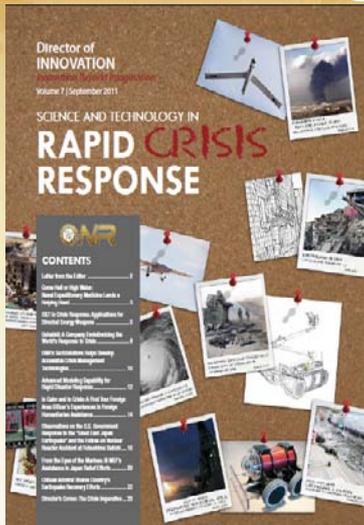
Industry

In-house



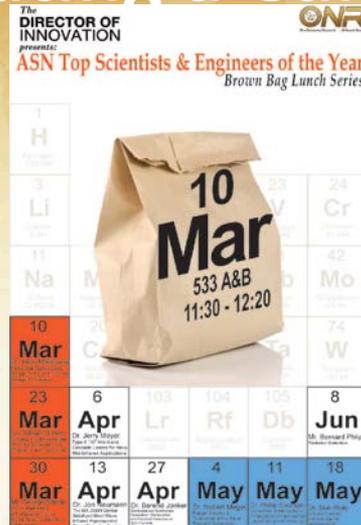
Innovation Opportunities

Creating a Culture of Innovation



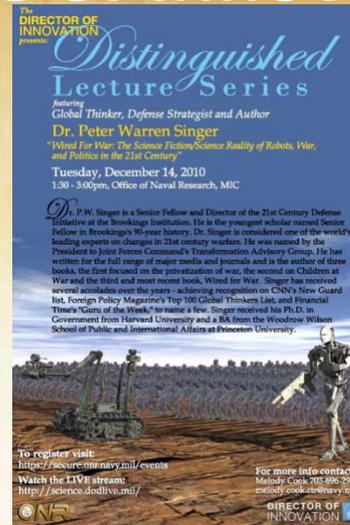
Innovation Newsletter

- Explores technologies and capabilities from first hand Warfighters or S&T professionals
- Themes are relevant and timely
- A new and different way to visualize the Navy S&T message
- Always looking for new input and perspectives from NRE family



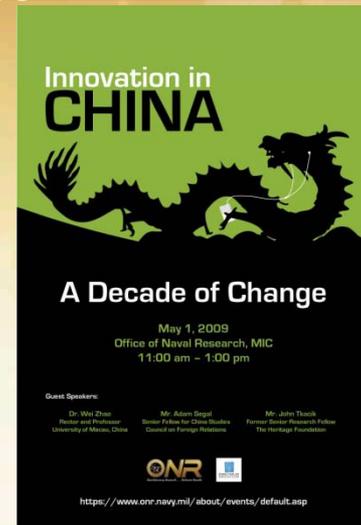
Brown Bag Lecture Series

- Highlighting Innovative Naval S&T
- Showcasing research efforts and capabilities within NRL
- Allowing ONR personnel to understand the resident expertise at NRL
- Improving communication between ONR and NRL



Distinguished Lecture Series

- Promoting collaboration and highlighting frontier science and thought
- Enhancing communication across disciplines and organizational boundaries
- Gaining insight into the present and future areas of S&T that are in technological demand



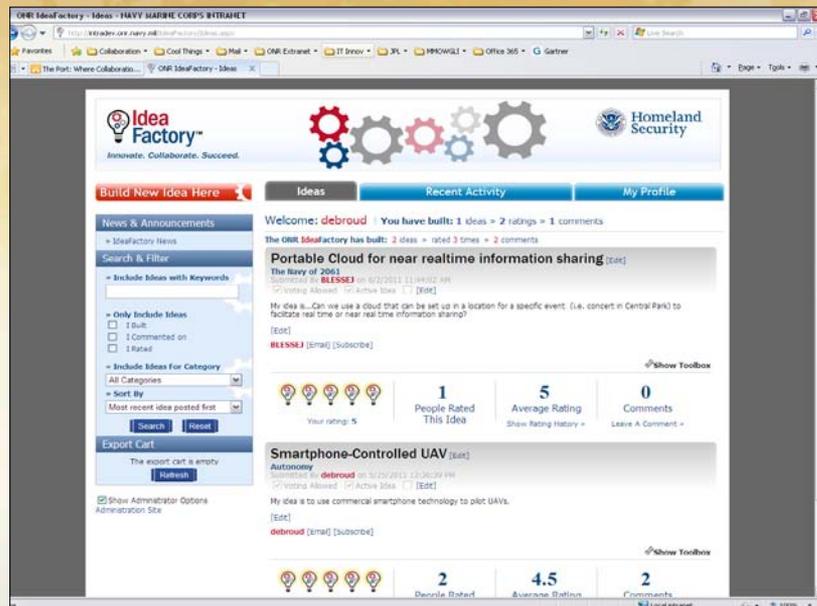
International Lecture Series

- Drawing together a panel of experts from S&T backgrounds to discuss innovation in different regions of the world
- Providing insights on trends and issues that affect S&T to the participants
- Seeking to improve our international presence through S&T relationships across the globe

Promoting Collaboration and Interaction with the Broad S&T & Navy Community

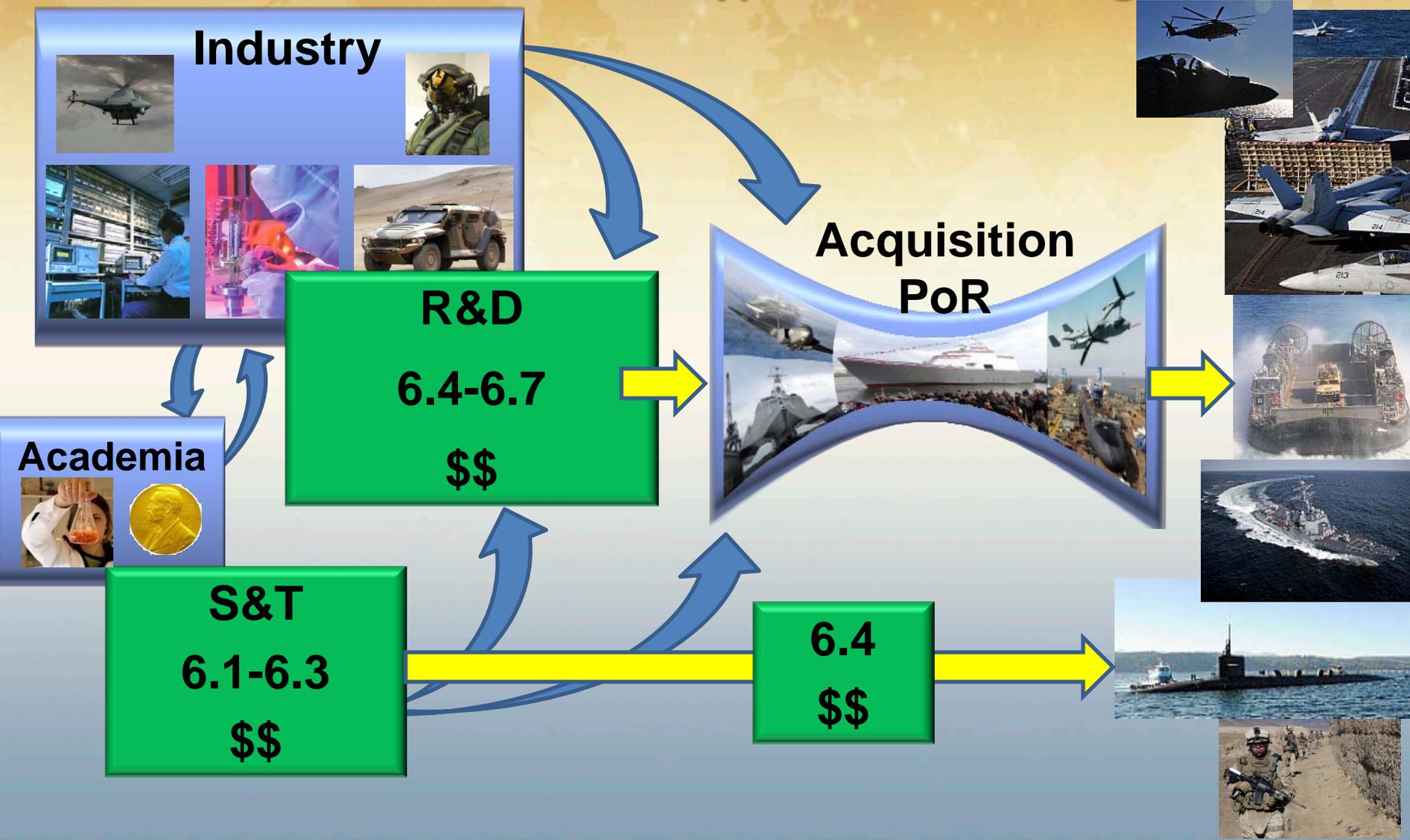
Creating Connections

Worldwide and Inside the Navy Lifelines



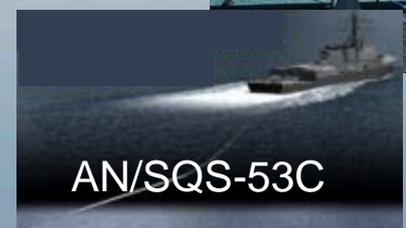
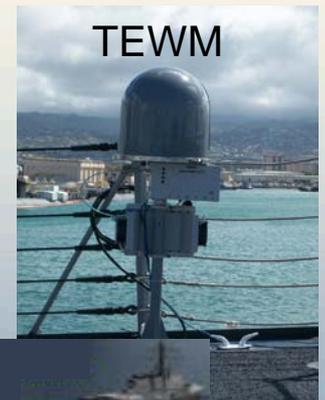
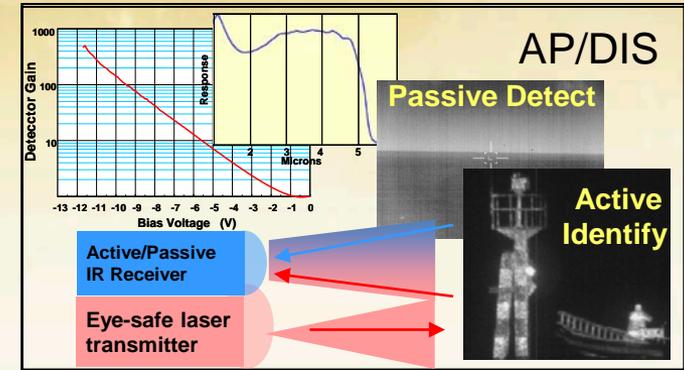
- An innovation laboratory with a repurposeable platform
- Scale and diversity of players with invisible hierarchy
- Designed with wicked problems in mind
- Introducing a game changing technology to community of users
- Task Force Energy MMOWGLI coming May, 2012
- TSA's IdeaFactory, now at ONR
- Online commentary from the community
- Online voting to promote best/most popular ideas
- Facilitated routing, SME vetting and action by leadership
- **NWDC should champion this for the CFFC & CNO**

CNO Speed to Fleet: S&T Prototypes to the Warfighter



CNO Speed to Fleet: Prototypes to the Warfighter

- AP/DIS “Super Stalker”
- AN/SQS-53C Synthetic Aperture Sonar
- Digital Rocket Launcher
- Persistent Littoral Undersea Surveillance (PLUS)
- Medusa Modification
- Graywing EW
- Transportable Electronic Warfare Module (TEWM)
- Phased Array COMSEC
- Airborne Electronic Warfare



Navy using 6.4 funds to put prototypes in the field. FY13 (Round 2) will utilize CNO R3B process. Need to balance technical opportunity with operator risk.

2012 ONR Naval S&T Partnership Conference

The 2012 S&T Partnership Conference will provide various avenues to access ONR leaders, program managers, and business operations staff. Don't miss this great opportunity!

Save the Date:

October 22-24, 2012 · Hyatt Regency Crystal City · Arlington, Va.



Naval Innovation is a “Network Sport”

Opportunities exist to increase the Network

Naval Innovation is MUCH more than just new technology

Larry.schuetter@navy.mil

- Attendees: 2,000+
- CNR Challenge papers received: 87
- Pitch-A-Principal apts: 159 of 297 requests
- IR&D appointments: 18
- Keynote speakers: 5
- Plenary room presentations: 27
- Breakout rooms: 11
- Information Exchange booths: 11
- Fact Sheets produced: 130+
- Posters designed: 121
- Exhibitors: 60
- Poster Session Participants: 40
- Doing Business with ONR workshops: 2
- Participant poster sessions: 84
- Awards presented: 5
- Press conferences: 3