



**POWER
— AND —
ENERGY**

OFFICE OF NAVAL RESEARCH
FOCUS AREA FORUM

10.29.2015
BOBBY JUNKER EXECUTIVE
CONFERENCE CENTER
OLC, ARLINGTON, VA

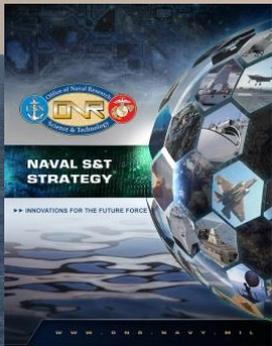


The Office of Naval Research

The S&T Provider for the Navy and Marine Corps



- 4,000+ People
- 23 Locations
- \$2.1B / year
- >1,000 Partners



Discover

→ **Develop**

→ **Deliver**

**Technological
Advantage**





Naval S&T Strategy Focus Areas

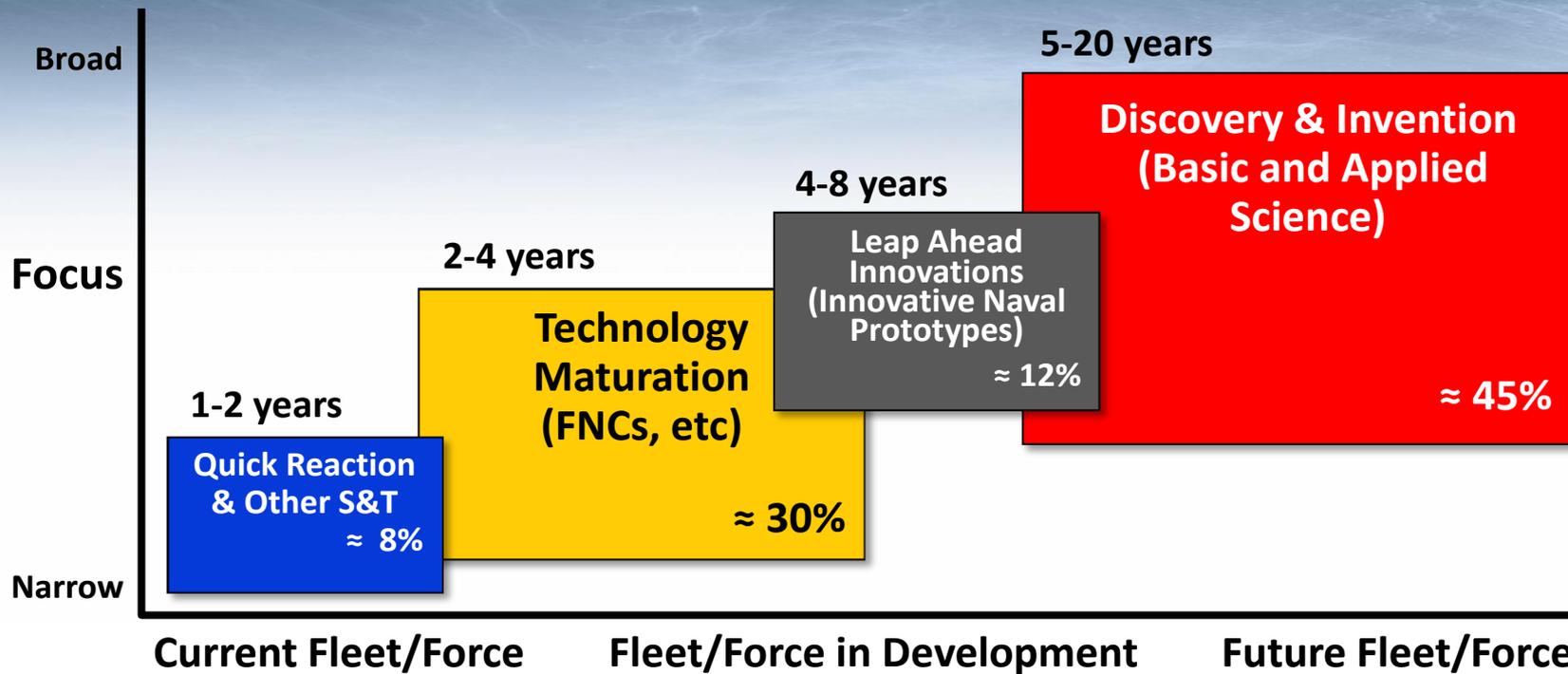
10 March 2016

- Assure Access to Maritime Battlespace
- ✓ Autonomy & Unmanned Systems
- Electromagnetic Maneuver Warfare
- ✓ Expeditionary & Irregular Warfare
- ✓ Information Dominance - Cyber
- Platform Design & Survivability
- Power & Energy
- Power Projection & Integrated Defense
- ✓ Warfighter Performance





Warfighting Capabilities Enabled by S&T Investments





ONR is part of the NR&DE, Providing Full-Spectrum RDT&E

RDT&E Budget (6.1-6.7)

S&T Budget (6.1-6.3)

6.1 Basic Research	6.2 Applied Research	6.3 Advanced Technology Development	6.4 Adv. Comp. Development & Prototypes	6.5 System Development & Demonstration	6.6 RDT&E Management Support	6.7 Operational System Development
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Naval R&D Establishment

(ONR, SYSCOMs and their Warfare Centers, PEOs)

Office of Naval Research

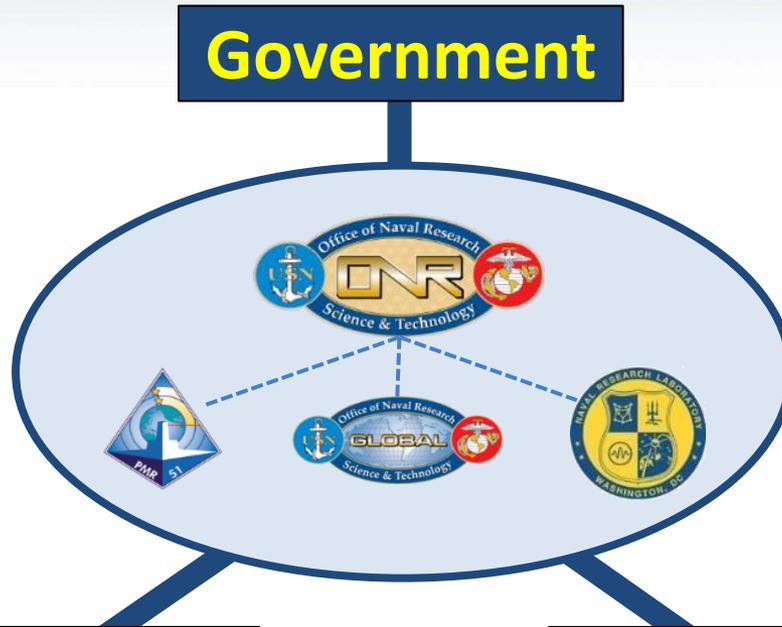




Partnering with the S&T Community



Government



Academia

1000 Universities/Colleges
Domestic/International

Industry

Small/Medium/Large
Companies

ONR Power and Energy Focus Area

Strategic Drivers:

- *Global Demand*
- *Fossil Fuel Reliance*
- *Cost*
- *Greater Energy Security/Self-Sufficiency*
- *New Weapons/Sensors/Platforms*
- *Efficient power electronics*
- *Power Conditioning*
- *Energy Storage*
- *Reduced footprint*
- *Personal Power*

Managed by ONR Code 33

Power & Energy

Objectives:

Efficient Power and Energy Systems

- Increased efficiency and power density on platforms and reduced weight for personal power through advanced materials, devices and architectures
- Efficient power conversion, switching, distribution, control and thermal management
- Efficient power generation equipment including engines, generators, motors and actuators

Energy Security

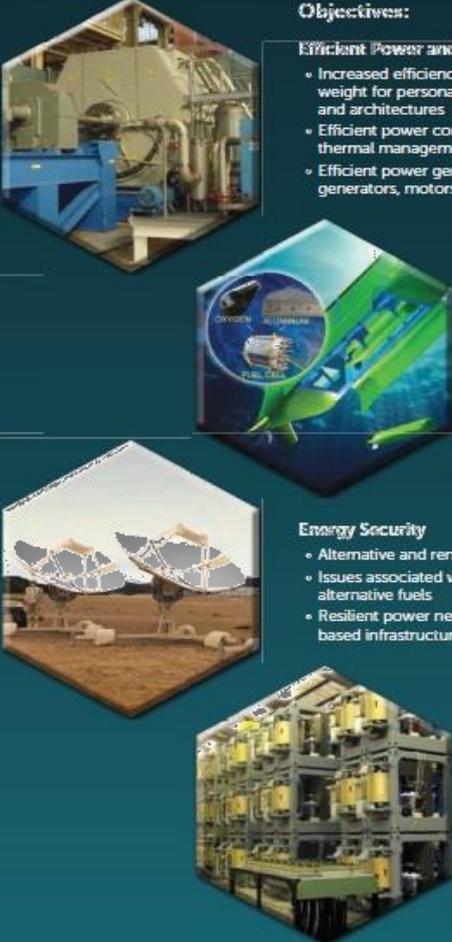
- Alternative and renewable energy sources for naval operations
- Issues associated with the logistics and compatibility of future alternative fuels
- Resilient power networks and systems for platforms and shore-based infrastructure

High Energy and Pulsed Power

- Energy storage, switching and control systems
- Pulsed power architectures
- Thermal management

Additional Objectives:

- Electrochemical, thermal, dielectric and kinetic energy storage
- Energy harvesting
- Power for distributed sensors



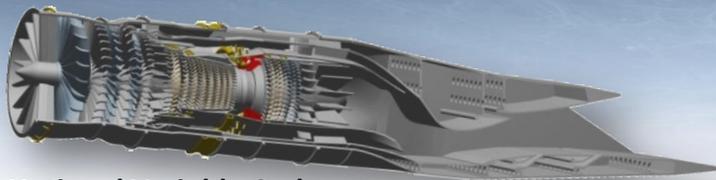
Vision:

- *Increase naval forces' freedom of action through energy security and efficient power systems*
- *Increase combat capability through high energy and pulsed power systems*
- *Provide the desired power where and when needed at the manned and unmanned platform, system and personal levels.*

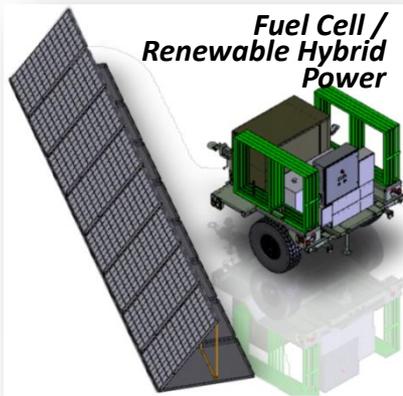


Power & Energy

An S&T Focus Area for
Current and Future Platforms & Missions



**Notional Variable Cycle
Engine for Naval Aviation**



**Fuel Cell /
Renewable Hybrid
Power**



EM Railgun



**Future Surface
Combatants**



Amphibious platforms



**Laser Weapon System
(LaWS)**



**Hawi Wind Farm
w/Energy Storage**



Unmanned Platforms