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Science & Technology – Key Enablers for Naval Forces

"For 65 years ONR has fostered bold ideas and the pioneering work of brilliant innovators in science and technology. These technologies provide our naval advantage today, and help ensure our future as the world's pre-eminent maritime force."

– Rear Adm. Nevin Carr, Chief of Naval Research

The [Office of Naval Research](#) (ONR) has been delivering mission-essential and game-changing science and technology (S&T) solutions to the Department of the Navy (DoN) for 65 years. Throughout eras of conflict, the S&T community has delivered advanced capabilities for ships, aircraft, submarines, space and expeditionary forces. Often, these breakthroughs carry over to valuable public sector application such as the [Global Positioning System](#) (GPS).

Notable ONR Contributions Throughout History

- The first [Viking rocket](#) was launched in 1949 at the start of the Cold War and pioneered technology for multi-stage, liquid-propelled, steerable rocket motors.
- During the 1950s, [Project Whirlwind](#) developed the first digital computer and random-access memory, which laid the foundation for the exponential growth in computing power.
- Deep submergence research advanced submarine technology and oceanography with the [Trieste](#), a Navy-owned, deep-diving research bathyscaphe, which dove to a record-breaking depth of 35,800 ft. in 1960.
- Throughout the 1960s and 1970s, ONR-funded research at the Naval Research Laboratory on precise, all-weather, real-time, 24-hour, worldwide navigation information led to the NAVSTAR satellite and GPS.
- In the 2000s, [wide bandgap semiconductors](#) enabled solid state power amplifiers for the new E2-D radar.
- In 2010, the first successful at-sea [maritime laser demonstration](#) was conducted aboard a Navy ship, and the [Electromagnetic Railgun](#) set a new world record, firing at 33 mega joules with projectile speeds of mach seven.

Building the Future Fleet and Forces

S&T investments are developing a broad range of new technologies for the Navy and Marine Corps. From [basic research](#) that expands the boundaries of scientific knowledge, to [innovative naval prototypes](#) that are poised to revolutionize naval capabilities, DoN's scientists and engineers are developing tomorrow's technological advantages today. Some of these programs include:

- [Large Diameter Unmanned Underwater Vehicle](#), [Electromagnetic Railgun](#), Solid State and [Free Electron Laser](#), [Autonomous Aerial Cargo Utility System](#), [Tactical Microsatellites](#), [Digital Tutors](#), [Counter IED](#) and [Energy](#).

The [Future Naval Capabilities](#) (FNC) program provides solutions to DoN requirements. Recent capabilities delivered to the Navy include:

- The [Large Vessel Interface Lift-On/Lift-Off](#) crane that enables the rapid and safe transfer of International Organization for Standardization containers through sea state 4.
- Lightweight torpedo technologies with improved performance against low-doppler targets in shallow water.
- Advanced electromagnetic armor that provides protection for tactical wheeled vehicles against rocket-propelled grenades.

As part of the Secretary of the Navy's [STEM priorities](#), the Navy continues to invest in science, technology, engineering and mathematics (STEM) education aimed at inspiring youth to pursue naval careers.

Key Messages

- Naval scientists and engineers are delivering technologies that will shape the future fleet and force.
- ONR works with hundreds of academic, industry and government partners and through [ONR Global](#), an expanding network of international scientists.
- Naval STEM outreach is helping inspire, educate and attract S&T talent for DoN.

Facts & Figures

- ONR successfully delivered 153 FNC products in FY11.
- TechSolutions enables rapid prototyping and delivery of technologies to naval forces in response to requests submitted by Sailors and Marines [online](#).
- The Navy's patent portfolio was [ranked the world's best](#) among government organizations by [IEEE](#).