Naval Studies Board 40th Anniversary: 1974-2014

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NAVAL STUDIES BOARD

40TH ANNIVERSARY

1974—2014

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

The Keck Center of the National Academies in Washington, DC, where the Naval Studies Board maintains its office.

NAVAL STUDIES BOARD

40TH ANNIVERSARY

[1974—2014]

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Naval Studies Board and Navy staff at the 2014 summer meeting hosted by VADM Nora W. Tyson, USN, Deputy Commander, U.S. Fleet Forces Command (front center) in Norfolk, Virginia.

REMARKS FROM THE CHAIR AND THE DIRECTOR

Forty years ago the Naval Studies Board was created at the request of then Chief of Naval Operations Admiral Elmo R. Zumwalt, Jr. As stated in his request to the National Academy of Sciences, he thought it important for the Navy to have an outside resource to which it could turn "for independent and outside counsel on any area of its responsibilities involving the interplay of scientific and technical matters with other national issues." Admiral Zumwalt, together with Under Secretary of the Navy Honorable David S. Potter and President of the National Academy of Sciences Dr. Philip Handler, recognized the importance of not only continuing but also focusing and strengthening the relationship that had existed between the National Academy of Sciences and the Department of the Navy since the Academy's creation in 1863.

The relationship between the National Academies—National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council—and the Navy has a long and distinguished history. The mutual trust and respect that has existed between the National Academies' naval advisory activities and committees—including the Committee on Undersea Warfare (1946 to 1974), the Mine Advisory Committee (1951 to 1974), and the Naval Studies Board (1974 to the present)—and the Navy has reaped benefits for the nation and its naval forces.

In its first year of existence in 1863, the National Academy of Sciences responded to a Navy request to investigate magnetic deviations in iron ships and means for better correction of their compasses. The study committee recommended removing one of two binnacles in the pilot house and further went on to accurately determine the degree of local attraction from adjacent engines, boilers, iron rigging, and other metal items. In the 1950s, the Committee on Undersea Warfare, at the request of Admiral Arleigh Burke, concluded that technology (warhead size reduction, solid rocket fuel, and such) was indeed now in hand to produce a strategic nuclear-powered submarine. The first of the Polaris submarines went to sea 18 months later.

Since its inception in 1974, the Board has been instrumental in advising the naval forces on means for using space-based systems to meet operational objectives, on identifying future technology options for designing next-generation carriers and supporting naval aviation, on countering mine threats, on enhancing power projection

capabilities, and on using information systems (communications, radar, computers) to meet operational needs. The Board also has conducted significant long-range forecasting studies designed to anticipate new technology-based capabilities and serve as a source of guidance for the Navy's research efforts.

In recent years, the Board has taken an active role in addressing the needs of the combined naval forces—the Navy, Marine Corps, and Coast Guard team—as it has examined technological opportunities for supporting, meeting, and enhancing operational strategies and concepts laid out in the U.S. maritime cooperative strategy *A Cooperative Strategy for 21st Century Seapower.* Indeed, recent National Research Council studies conducted under the Board's auspices have yielded reports—*U.S. Naval Forces' Capabilities for Responding to Small Vessel Threats, Maritime Security Partnerships*, and *The Role of Naval Forces in the Global War on Terror*—aimed at strengthening the U.S. maritime cooperative strategy.

Today's naval forces face a rapidly changing security environment and a changing and equally uncertain fiscal environment. The future will demand that the nation's naval forces deter and counter threats different from those defined at the Board's inception in 1974. Terrorism, cyberwarfare, weapons of mass destruction, and other threats will need to be anticipated and addressed. The science, engineering, and technical community working together with the naval forces can provide the technologies and concepts needed to bolster operational capabilities to address these threats.

In the coming years, the Naval Studies Board will continue to serve as a source of independent, long-range, scientific and technical planning advice for the nation's naval forces. It will also work to ensure that the relationships between the operational, science, engineering, and technical communities remain as strong and productive as ever to ensure that progress continues in areas most critical to meeting future naval forces' needs.

MIRIAM E. JOHN
Chair

CHARLES F. DRAPER
Director

MISSION

The mission of the Naval Studies Board (NSB), created in 1974 at the request of the Chief of Naval Operations (CNO), is to be a source of independent, long-range, scientific and technical planning advice for the Naval Forces. As mutually agreed upon between the CNO and the President of the National Academy of Sciences and with the appropriate attention to the influence of the domestic economy, national objectives, social imperatives, and anticipated military requirements, the NSB will conduct and report upon surveys and studies in the field of scientific research and development applicable to the operation and function of the Navy.

"The farther we look into the future, the more obvious it will become that without a thorough use of science and technology the Navy cannot accomplish its tremendous mission."

Dr. Edward Teller in *Science and the Future Navy: A Symposium*, hosted by the Naval Studies Board, 1977

The founders of the National Academy of Sciences portrayed with President Abraham Lincoln in this apocryphal painting by Albert Herter. Left to right: Benjamin Peirce, Alexander Dallas Bache, Joseph Henry, Louis Agassiz, President Lincoln, Senator Henry Wilson, Rear Admiral Charles H. Davis, USN, and Benjamin Apthorp Gould.

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HISTORY

The Department of the Navy has been a major sponsor of studies since the establishment of the National Academy of Sciences (NAS) in 1863. Indeed, one of the very first committees, known as the "Compass Committee," was appointed by the NAS on May 20, 1863, at the request of the Navy Department, communicated by RADM Charles H. Davis on May 8, 1863, and had a direct bearing on the operations of the Navy during the Civil War.

In 1946, following a long period of ad hoc studies (from 1863 to 1945), the newly established Office of Naval Research (ONR) requested that the NAS establish a standing committee—the Committee on Undersea Warfare (CUSW)—to advise the Navy on technical matters relating to submarine design and systems technology. In 1956, the CUSW was tasked by the CNO ADM Arleigh Burke to study the effect of advanced technology on submarine warfare. The resulting study, known as "Project Nobska," advocated an increased emphasis on deeper-diving, ultraquiet designs utilizing long-range sonar. It has been reported within the Navy that USS *Tullibee* incorporated three design changes based on the results of Project Nobska.

In 1955, the ONR again called on the NAS, requesting that it accept responsibility for the Mine Advisory Committee (MAC), which had been established in 1951 under the administration of the Catholic University of America in response to our nation's experience with the minefield that blocked the invasion of Wonson, Korea, in 1950. The MAC was responsible for advising the Navy on research for the development of mines and effective countermeasures to them.

These two proactive committees, composed initially of scientists and engineers, produced approximately 200 reports in the years between 1946 and 1973. In 1973, the CNO, ADM Elmo R. Zumwalt, Jr., asked the president of the NAS to extend the charter of its naval advisory committees beyond the two existing warfare areas and form an advisory organization "to which [the] Navy could turn for advice on any area of its responsibility involving the interplay of science and technology with other national issues." In response, the NSB, assuming the purview of both the CUSW and MAC, was established in 1974 and continues to operate today. Over the years, the activities of the NSB have reflected the language of the original request; to wit, its studies have dealt with the basic and applied science associated with virtually every area of the Navy's overall mission.

At the request of Rear Admiral Charles H. Davis, USN, in 1863, the Compass Committee studied the magnetic deviation in iron ships and the means for better correction of their compasses, one of the first studies of the National Academy of Sciences.

CHAIRS

Dr. Miriam E. John
(2008-2014)

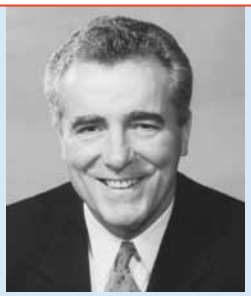
Dr. John F. Egan
(2005-2007)

"The Navy must take steps to reduce the development and acquisition cycle time in the combat information network and related areas, because there is a mismatch between the rapid time of technological advance…and the growing acquisition cycle time…"

Navy 21: Implications of Advancing Technology for Naval Operations in the Twenty-First Century, 1988

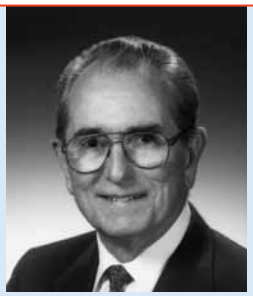
During Dr. John's term as chair of the NSB, she co-chaired the study *A Review of U.S. Navy Cyber Defense Capabilities*. Earlier she chaired the studies *Naval Forces' Defense Capabilities Against Chemical and Biological Warfare Threats, The Role of Naval Forces in the Global War on Terror,* and *An Assessment of Non-Lethal Weapons Science and Technology.* The following reports were also produced under her tenure: *Responding to Capability Surprise: A Strategy for U.S. Naval Forces; Improving the Decision Making Abilities of Small Unit Leaders; U.S. Naval Forces' Capabilities for Responding to Small Vessel Threats; National Security Implications of Climate Change for U.S. Naval Forces; Information Assurance for Network-Centric Naval Forces;* and *Maritime Security Partnerships.*

During Dr. Egan's term as chair of the NSB, the following reports were produced: *Manpower and Personnel Needs for a Transformed Naval Force; The Role of Naval Forces in the Global War on Terror; Identification of Promising Naval Aviation Science and Technology Opportunities; FORCEnet Implementation Strategy; C4ISR for Future Naval Strike Groups; Distributed Remote Sensing for Naval Undersea Warfare; Sea Basing: Ensuring Joint Force Access From the Sea; Navy's Needs in Space for Providing Future Capabilities; Naval Analytical Capabilities: Improving Capabilities-Based Planning;* and *Autonomous Vehicles in Support of Naval Operations.* Earlier Dr. Egan co-chaired *Recapitalizing the Navy: A Strategy for Managing the Infrastructure* and *Information Warfare.*



Mr. Vincent Vitto
(1999-2004)

During Mr. Vitto's term as chair of the NSB, he chaired the study *Network-Centric Naval Forces*. Earlier, he chaired the studies *Technology for the United States Navy and Marine Corps, 2000-2035: Becoming a 21st-Century Force (Volume 3: Information in Warfare); Naval Communications Architecture; Space Support to Naval Tactical Operations; Opportunities in Radar and Radar-Related Science and Technology;* and *Over the Horizon Targeting*. The following reports were also produced under his tenure: *Naval Forces' Defense Capabilities Against Chemical and Biological Warfare Threats; An Assessment of Non-Lethal Weapons Science and Technology; Naval Mine Warfare: Operational and Technical Challenges; The Role of Experimentation in Building Future Naval Forces*; and *Naval Forces' Capability for Theater Missile Defense.* More recently, Mr. Vitto served as a member of the study producing *Responding to Capability Surprise: A Strategy for U.S. Naval Forces.*



Mr. David R. Heebner
(1993-1998)

During Mr. Heebner's term as chair of the NSB, he chaired the studies *Technology for the United States Navy and Marine Corps, 2000-2035: Becoming a 21st-Century Force* (nine volumes) and *The Navy and Marine Corps in Regional Conflict in the 21st Century*. Earlier he chaired the *Mine Countermeasures Technology* (four volumes) and the *Report of the Mine Warfare Study Group* (11 volumes). The following reports were also produced under his tenure: *Naval Expeditionary Logistics: Enabling Operational Maneuver From the Sea; Recapitalizing the Navy: A Strategy for Managing the Infrastructure; Navy-21 Update: Implications of Advancing Technology for Naval Operations in the Twenty-First Century; Fire Suppression Substitutes and Alternatives to Halon for U.S. Navy Applications; Shipboard Pollution Control: U.S. Navy Compliance with MARPOL Annex V;* and *Post-Cold War Conflict Deterrence*. Mr. Heebner was a member of the National Academy of Engineering.

Dr. Robert J. Hermann
(1986-1992)

During Dr. Hermann's term as chair of the NSB, the following reports were produced: *Navy-21 Update; Space Support to Naval Tactical Operations; Integration of Hard-Kill and Soft-Kill Systems for More Effective Fleet Air Defense; Carrier-21; NATO Mine Warfare Trip Report; Opportunities in Radar and Radar-Related Science and Technology; Over the Horizon Targeting; Satellite-Submarine Connectivity; Navy-21; Implications of Future Space Systems for the U.S. Navy; Combat Networks for Distributed Naval Forces;* and *Surface Ship Countermeasures Against Wake Homing Torpedoes.* Dr. Hermann is a member of the National Academy of Engineering.

Dr. Robert A. Frosch
(1983-1985)

During Dr. Frosch's term as chair of the NSB, the following reports were produced: *Report of the Panel on the Implications of Future Space Systems for the U.S. Navy; Report of the Mine Warfare Study Group; An Assessment of Computer Science Activities of the Office of Naval Research; Report of the Advanced Space Systems and Technology Study Group; Implications of Existing and Future Space Systems for the U.S. Navy Submarine Force; National Security Implications of U.S. Exclusive Economic Zone Survey Data; Sensor Panel Report; Space-Based Infrared Technology Assessment; Superconductive Electronics; An Assessment of the U.S. Naval Observatory;* and *Perspectives on Reference Literature for Underwater Acoustics.* Dr. Frosch is a member of the National Academy of Engineering.

Dr. Eberhardt Rechtin
(1977-1982)

During Dr. Rechtin's term as chair of the NSB, the following reports were produced: *The Implications of Advancing Technology for Naval Aviation; Report of the Workshop on Navy Technical Intelligence; Report on Risk Assessment of Space Based Radar; Report of the Panel on SSBN Technology; A Review of Magnetometer Technology; Some Possible Contributions of Cryogenic Technology to Inertial Navigation; Ad Hoc Panel on the Military Implications and Use of Directed Energy Weapons;* and *Some Naval Issues and Options in Crisis Management*. Dr. Rechtin was a member of the National Academy of Engineering.

Dr. William H. Pickering
(1974-1977)

Dr. Pickering guided the NSB in its transition from the work of the Committee on Undersea Warfare and the Mine Advisory Committee to the broader effort needed for the range of its studies for the Navy today. During his tenure, he helped to produce the report *Some Naval Issues and Options in Crisis Management.* Dr. Pickering was a member of the National Academy of Sciences and the National Academy of Engineering.

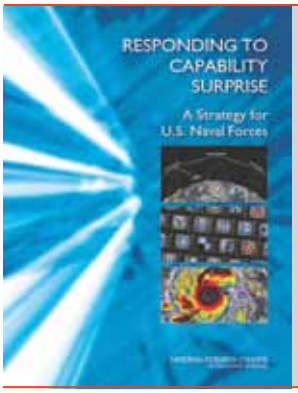
DIRECTORS

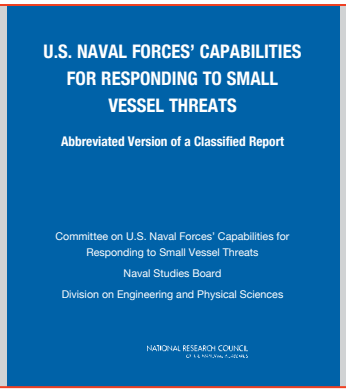
Dr. Charles F. Draper
(2003-PRESENT)

Dr. Ronald D. Taylor
(1995-2003)

Mr. Lee M. Hunt
(1974-1995)

RECENT REPORTS





"The goal of naval forces must be to always find the best reaction to a surprise, using the fullest measure of knowledge, intelligence, experience, and talent that can be brought to bear."

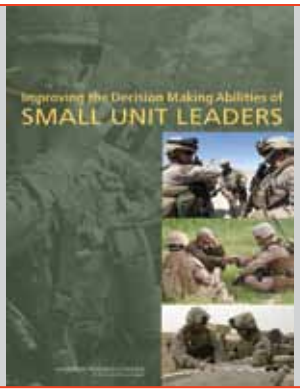
Responding to Capability Surprise: A Strategy for U.S. Naval Forces, 2013

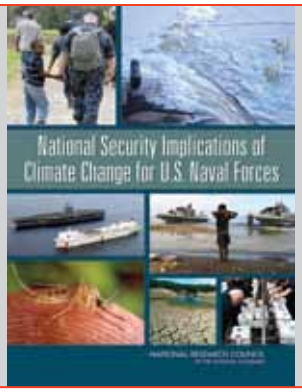
Responding to Capability Surprise: A Strategy for U.S. Naval Forces (2013)

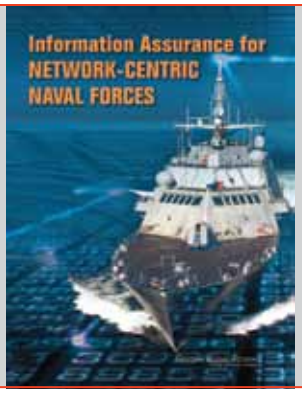
This report, conducted at the request of the Chief of Naval Operations, examines the issues surrounding capability surprise, both operational and technical, facing the U.S. Navy, Marine Corps, and Coast Guard. The report selects a few surprises from across a continuum of surprises, from disruptive technologies, to intelligence-inferred capability developments, to operational deployments, and assesses what the Naval Forces are doing (and could do) about them while being mindful of future budgetary declines. The report then examines which processes are in place or could be in place in the Navy, the Marine Corps, and the Coast Guard to address such surprises.

U.S. Naval Forces' Capabilities for Responding to Small Vessel Threats (2013)

This classified report, conducted at the request of the former Chief of Naval Operations, examines U.S. Naval Forces' capabilities for responding to the potential exploitation of small vessels by adversaries. The terms of reference of the study are to (1) characterize known and potential small vessel types that could be potentially exploited by terrorists or small groups acting as agents of hostile governments; (2) identify U.S. regions of interest, both within and outside the continental United States, that could be potentially threatened by the use of small vessels; (3) review and assess the adequacy of current and planned U.S. Naval Forces' policies, strategies, approaches, and capabilities; (4) identify promising science and technology areas for U.S. Naval Forces' capabilities for responding to these potential small vessel threats; and (5) recommend any other initiatives, excluding budgetary and organizational, that should be undertaken. An abbreviated version of this report is also available.







Improving the Decision Making Abilities of Small Unit Leaders (2012)

This report, conducted at the request of the former Commanding General of the Marine Corps Combat Development Command, recommends operational and technical approaches for improving the decision making abilities of small unit leaders, including potential acquisition and experimentation efforts that can be undertaken by the U.S. Marine Corps. Since the Marine Corps is engaged in hybrid warfare, in which all modes of warfare are employed, such as conventional weapons, terrorism, and disruptive technologies, the report examines the various complex environments, the existing abilities, and gaps in the abilities of the small unit leaders to include technology, skill sets, training, and measures of effectiveness.

National Security Implications of Climate Change for U.S. Naval Forces (2011)

This report, conducted at the request of the former Chief of Naval Operations, addresses the potential national security implications of climate change for U.S. Naval Forces. While the timing, degree, and consequences of future climate change impacts remain uncertain, many changes are already underway in different regions of the world, such as in the Arctic, and call for action by U.S. naval leadership in response. The report provides both the near- and long-term implications for U.S. Naval Forces of trends such as increases in territorial disputes in the Arctic, elevated demand for humanitarian assistance and disaster relief, and sea level rise.

Information Assurance for Network-Centric Naval Forces (2010)

This report, conducted at the request of the former Chief of Naval Operations, examines information assurance (IA) in the context of naval mission assurance. Owing to the expansion of network-centric operating concepts across the Department of Defense (DOD) and the resulting threat to information and cyber security from individuals, groups, nation states, and malicious insiders, IA has been a cause for growing importance and concern. This report presents its case for action through a discussion of the following subjects: (1) the threat to IA; (2) the technology trends that contribute to potential IA and mission threats; and (3) a review of DOD and Navy Department initiatives deployed to help mitigate these trends and threats. The report then presents arguments for additional actions that the Navy should undertake in its longer-term operational and technical response to IA-related mission threats.

CURRENT PROJECTS

A Review of U.S. Navy Cyber Defense Capabilities

At the request of the Chief of Naval Operations, an ad hoc committee of the Naval Studies Board is conducting a classified study to review the U.S. Navy's cyber defense capabilities. In addition to reviewing cyber defense-related studies conducted within and outside the U.S. government, the study will (1) review U.S. Navy information technology modernization plans and processes with respect to the evolving threat and robustness to cyber attack, and identify any shortcomings; (2) recommend any immediate operational and technical mitigation strategies needed to address any shortcomings identified above, as well as recommend any future mitigation strategies, including any architectural and procedural changes that would lead to more resilient naval systems and more robust network and communications capabilities given the evolving threat; (3) review and assess the adequacy of current Department of the Navy policies, strategies, approaches, and investments in comparison to the findings and recommendations to both (1) and (2) above; and (4) identify any other critical issue—not addressed in this study—that the U.S. Navy should consider addressing in subsequent studies.

Mainstreaming Unmanned Undersea Vehicles into Future U.S. Naval Operations

At the request of the Chief of Naval Operations, an ad hoc committee of the Naval Studies Board is conducting a classified study to assess the potential of unmanned undersea vehicles (UUVs) in enhancing future U.S. naval operations. Specifically, the study will (1) identify the missions and environments in which UUVs might be called upon to operate, as well as any issues or barriers (e.g., policy, operational, technical) that might inhibit mission success; (2) for each of the identified missions, assess desired UUV size, quantity, and level of coordination with other unmanned and manned counterparts; (3) review the Department of the Navy's efforts for UUVs in comparison to (1) and (2); (4) evaluate the Department of the Navy's technology activities for UUVs, including its vision documents and its science and technology roadmaps (e.g., in areas of autonomy, endurance, communications, sensor capabilities, weaponry, and launch and recovery) against criteria selected by the committee, such as the relevance for conducting future missions, cost and time scale for deployment, scientific and technical quality, and related technology activities outside of the Navy; and (5) recommend operational, technical, and acquisition approaches, excluding organizational changes, that would lead to mainstreaming UUVs into future U.S. naval operations at a faster deployment schedule—to the extent needed—than currently planned.

COMMENTARIES

"Yesterday I received a briefing from the National Academies Naval Studies Board called A Review of U.S. Navy Cyber Defense Capabilities: It's More Than the Networks! *I endorse this independent study's thoughts, concepts, and significance. . . . I recommend you [Navy Admirals and Senior Executives] take the brief, absorb its findings, and help drive the culture shift that it calls for in our Navy."*

ADM Jonathan W. Greenert, USN, December 10, 2014

"Please accept my sincere appreciation for your outstanding efforts on the report National Security Implications of Climate Change for U.S. Naval Forces. *The exceptional work of the Naval Studies Board will be invaluable in shaping our plans and strategy as we adapt to the broad effects that climate change will have on naval services in the coming decades. The findings and recommendations in this report are especially insightful."*

ADM Gary Roughead, USN, April 1, 2011

"At the request of this office, the Board initiated studies on network-centric warfare, theater missile defense, and mine warfare…These topics are of enormous importance to the naval forces and I assure you that the advice contained in those reports either has or will merit the attention of Navy leadership."

ADM Vernon E. Clark, USN, June 28, 2001

"As we approach the next millennium, science and technology advance at breathtaking speed. The studies you conducted and the symposia you sponsored have ensured that we not only kept pace, but led the way forward. With your help, we will continue to be the greatest Navy the world has ever known."

ADM Jay L. Johnson, USN, November 17, 1999

"The Navy-21 Report . . . projected the impact of evolving technologies on naval warfare out to the year 2035, and has been of significant value to naval planning over the intervening years."

ADM Jeremy M. Boorda, USN, November 28, 1995

"As I take my departure, I would like to express my appreciation for both the professional and personal relationship I have shared with the Naval Studies Board during my tenure as CNO. I am sure that, as in the past, the Navy will continue to benefit from the Board's efforts as we progress into the future."

ADM James D. Watkins, USN, June 25, 1986

40 YEARS OF CONTRIBUTIONS

REPORTS

Responding to Capability Surprise: A Strategy for U.S. Naval Forces (2013)
U.S. Naval Forces' Capabilities for Responding to Small Vessel Threats (abbreviated and classified versions, 2013)
Improving the Decision Making Abilities of Small Unit Leaders (2012)
National Security Implications of Climate Change for U.S. Naval Forces (final report, 2011)
National Security Implications of Climate Change for U.S. Naval Forces (letter report, 2010)
Information Assurance for Network-Centric Naval Forces (2010)
Maritime Security Partnerships (2008)
U.S. Conventional Prompt Global Strike: Issues for 2008 and Beyond (2008)
Manpower and Personnel Needs for a Transformed Naval Force (2008)
The Role of Naval Forces in the Global War on Terror (abbreviated and classified versions, 2007)
Distributed Remote Sensing for Naval Undersea Warfare (abbreviated and classified versions, 2007)
Conventional Prompt Global Strike Capability: Letter Report (2007)
Identification of Promising Naval Aviation Science and Technology Opportunities (2006)
C4ISR for Future Naval Strike Groups (2006)
FORCEnet Implementation Strategy (2005)
Sea Basing: Ensuring Joint Force Access from the Sea (2005)
Naval Analytical Capabilities: Improving Capabilities-Based Planning (2005)
Autonomous Vehicles in Support of Naval Operations (2005)

"…the panel found it impossible to think about the core of naval aviation—the carrier and its aircraft—without also thinking about the missiles that are becoming the primary warhead delivery vehicles, the platforms they are launched from, the information network

The Navy's Needs in Space for Providing Future Capabilities (2005)
The Role of Experimentation in Building Future Naval Forces (2004)
Naval Forces' Defense Capabilities Against Chemical and Biological Warfare Threats (2004)
2003 Assessment of the Office of Naval Research's Marine Corps Science and Technology Program (2004)
An Assessment of Non-Lethal Weapons Science and Technology (2003)
An Assessment of Precision Time and Time Interval Science and Technology (2002)
2002 Assessment of the Office of Naval Research's Air and Surface Weapons Technology Program (2002)
Naval Mine Warfare: Operational and Technical Challenges for Naval Forces (2001)
2001 Assessment of the Office of Naval Research's Aircraft Technology Program (2001)
Naval Forces' Capability for Theater Missile Defense (2001)
2000 Assessment of the Office of Naval Research's Marine Corps Science and Technology Program (2000)
Network-Centric Naval Forces: A Transition Strategy for Enhancing Operational Capabilities (2000)
Review of the Office of Naval Research's Uninhabited Combat Air Vehicles Program (2000)
An Assessment of Undersea Weapons Science and Technology (2000)
An Assessment of Naval Hydromechanics Science and Technology (2000)
1999 Assessment of the Office of Naval Research's Air and Surface Weapons Technology Program (1999)
Naval Expeditionary Logistics: Enabling Operational Maneuver From the Sea (1999)
Recapitalizing the Navy: A Strategy for Managing the Infrastructure (1998)
Technology for the United States Navy and Marine Corps, 2000-2035: Becoming a 21st-Century Force (nine volumes, 1997)
Post-Cold War Conflict Deterrence (1997)
Fire Suppression Substitutes and Alternatives to Halon for U.S. Navy Applications (1997)
Naval Research Laboratory Strategic Series (1995-1997)

that ties all these components into a functioning whole, and the aircraft, spacecraft, sensors, and communications links that make up the physical components of that network."

The Implications of Advancing Technology for Naval Aviation, 1982

The Navy and Marine Corps in Regional Conflict in the 21st Century (1996)
Shipboard Pollution Control: U.S. Navy Compliance with MARPOL Annex V (1996)
Office of Naval Research Opportunities Series (1986-1995)
Letter Report to The Honorable William J. Perry, Issues and Strategies Associated with Protecting the Nation's Infrastructure (1995)
Information Warfare (U) (classified, 1994)
Naval Communications Architecture (1994)
Letter Report to The Honorable John H. Dalton, Admiral Jeremy M. Boorda, USN, and General Carl E. Mundy, Jr., USMC, Future Role for the Department of the Navy in Space and Space-Related Systems (1994)
Mine Countermeasures Technology (U) (classified, 1993-1994)
Navy-21 Update: Implications of Advancing Technology for Naval Operations in the Twenty-First Century (1993)
Space Support to Naval Tactical Operations (U) (classified, 1993)
Integration of Hard-Kill and Soft-Kill Systems for More Effective Fleet Air Defense (1992)
Carrier-21: Future Aircraft Carrier Technology (U) (overview and classified versions, 1991-1992)
NATO Mine Warfare Trip Report (U) (overview and classified versions, 1991)
Opportunities in Radar and Radar-Related Science and Technology (U) (classified, 1991)
Over the Horizon Targeting (U) (classified, 1991)
Satellite-Submarine Connectivity (U) (classified, 1991)
Navy 21: Implications of Advancing Technology for Naval Operations in the Twenty-First Century (U) (eleven volumes, classified, 1988)
Implications of Future Space Systems for the U.S. Navy (U) (classified, 1988)
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The Role of Experimentation in Building Future Naval Forces, 2004

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Network-Centric Naval Forces: A Transition Strategy for Enhancing Operational Capabilities, 2000

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The Navy and Marine Corps in Regional Conflict in the 21st Century, 1996

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