



# STRATEGIC PLAN

2018-2023





“We all have an interest in ensuring NPS endures as the postgraduate research and educational institution of choice for the Navy-Marine Corps team and our partners. But going even further, I want this institution to be the primary educational and research based enterprise that partners with the private sector and academia to provide solutions to the vexing problems facing national security across the whole of government.

We will do so by continuing to attract the best **students** through elevated admissions standards; by competing for and attracting and retaining a first-rate **faculty**; by placing an emphasis on relevant **research** that builds capabilities; and, by leveraging **partnerships** across government, industry and educational institutions.”

-The Honorable Richard V. Spencer  
Secretary of the Navy



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## OUR MISSION

The Naval Postgraduate School provides relevant and unique advanced education and research programs to increase the combat effectiveness of commissioned officers of the naval service to enhance the security of the United States. In support of the foregoing and to sustain academic excellence, NPS will foster a program of relevant and meritorious thesis and research experiences for NPS students that informs the curricula, supports the needs of Navy and Department of Defense, and builds the intellectual capital of NPS faculty. To support the core Navy mission, NPS' programs are inherently joint, inter-agency, and international.

— NPS Mission Statement



# INTRODUCTION TO STRATEGIC PLAN

## INTRODUCTION

The world around us is in great flux. The Department of the Navy must adapt and respond to an ever-evolving global context, a world swept by accelerating changes and packed with unexpected surprises. The driving forces include advances in weapons systems and warfighting techniques, from unmanned swarms to pervasive digitalization of infrastructure, communications, and control technologies. Increasing and evolving forms of political disruption from both traditional and non-state actors require new responses ranging from a renewed focus on strategic and nuclear deterrence to fighting borderless terror organizations at home and abroad.

The Naval Postgraduate School's students have changing educational needs as the United States Navy, Marine Corps, and other services continuously adapt and evolve to meet the strategic challenges facing our country. The air, land, sea, cyber and space domains are converging, requiring us to prepare our students to meet the requirements of the total force, including its joint, inter-agency and international aspects. We must adapt to changes in the nature of education, enhanced by non-traditional technologies and powered by new partnerships in teaching, learning and research. Graduate education for the military must align emerging educational methods with the needs of the U.S. military through innovative curricula and research programs.

This strategic plan positions the Naval Postgraduate School to provide world-class education and research programs to the United States Navy, Marine Corps and their partners, building on our unique capabilities and strengths in our contemporary strategic environment.

## OUR PLAN

Over the next five years, in cooperation with our curriculum and research sponsors, we will continue to provide the highest quality, defense-focused programs of education and research. Our plan organizes our actions around three main strategic themes.

### Theme 1: Excellence and innovation in emerging fields critical to national defense

The military operational environment is shaped by rapidly advancing technologies triggering avalanches of sudden and disruptive change. Technology is digitalizing everything and connecting everyone with everything. These changes set conditions for rapidly shifting political alliances, intractable insurgencies, and contests for every shared resource on the planet. We commit ourselves to stay ahead of these emerging changes with new facilities and programs.

### Theme 2: Interdisciplinary education and research programs

The Naval Postgraduate School's departments and schools reflect the main concentrations of disciplinary expertise we have assembled to support our mission. All the strategic challenges faced by the Navy and Marine Corps, as well as the rest of the Department of Defense, intersect with multiple academic disciplines. We commit ourselves to address defense challenges by expanding our collaborative work with industry and other government organizations. Our education and our research will benefit from this diversity of perspectives.

*"We will continue to provide **high-quality, defense focused** programs of education and research."*





Theme 3: Institutional innovation and effectiveness

NPS must function as a university with the highest academic standards, operating within the context of federal rules and laws. We commit ourselves to a constant search for improvement and cost-effectiveness in our business, education, and research processes. We will look internally for improvements as well as to industry and other government organizations for ideas and best practices that can improve our effectiveness.

This plan sets out ten action areas that each reflect one or more of these three themes. Visual icons for each theme link every action with the themes it supports.

Many of the trends and concerns we are following in our plan can be suddenly disrupted by external events and surprises. We need to be resilient and adaptive when the surprises happen. We are preparing ourselves and our students for futures that can be anticipated but not predicted.

This plan is not a complete description of everything we expect to do in the next five years. We will maintain the capabilities that support our core mission and that have proven valuable to our sponsors, not all of which are explicitly mentioned here. We fully recognize that over the life of this plan, we will need to adapt to new defense issues and needs. We strongly believe that the actions we propose will significantly transform NPS’s ability to fulfill our mission and increase its value to the Navy.

We take seriously the mission statement’s need for “jointness” and its implications for total force education. NPS is a Naval institution, meeting the graduate educational needs of Naval students. Our mission asks us to engage with the other U.S. military services and those of our partners and allies. Every Chief of Naval Operations for the last 30 years has emphasized that Naval officers must operate and fight in a joint environment. Officers from the different services must understand each other’s mindsets and capabilities. Learning together and sharing classroom experiences at NPS is a key element of building that understanding. The same need for mutual understanding also applies to our coalition partners and allies. NPS hosts officers from over 50 countries who work closely together with their U.S. counterparts, sharing experiences and perspectives on issues of common concern. The professional relationships developed at NPS have averted, and will continue to avert, numerous crises because of the shared understanding and mutual respect between our U.S. and international students.



STRATEGIC ACTIONS

The matrix below lists the ten action areas and shows which themes each area supports.

Ten action sections, each organized in two parts, follow the matrix. Each section begins with a strategic direction with a horizon of 5-10 years in the future, set in italics, followed by a more tactical set of specific actions with a horizon of 2-5 years set in regular font. For ease of cross reference between themes and actions, colored icons mark each action.

We conclude with a section that outlines the resources we expect to need to complete these actions.

DOMAIN	Action Areas	Theme 1: Emerging Fields	Theme 2: Interdisciplinary Programs	Theme 3: Institutional Effectiveness
EDUCATION DOMAIN (E)	Educational Improvement			
	Operations Effectiveness			
HUMAN DOMAIN (H)	Innovation			
	Talent Management			
	Ethics			
	Global Strategy			
SCIENCE & TECHNOLOGY DOMAIN (S)	Emerging Technologies			
	Data Science			
	Environment			
	Cyber Operations			

“This increasingly complex security environment is defined by rapid technological change, challenges from adversaries in every operating domain, and the impact on current readiness from the longest continuous stretch of armed conflict in our Nation’s history. In this environment, there can be no complacency—we must make difficult choices and prioritize what is most important to field a lethal, resilient, and rapidly adapting Joint Force. America’s military has no preordained right to victory on the battlefield.”

– National Defense Strategy 2018





# Education Domain

Educational Improvement  
Operations Effectiveness



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*In our graduate-level education, we will instill the specific skills necessary for our graduates' subsequent assignments, and we aim to cultivate competencies that will make them effective leaders and decision-makers over their entire careers. We will constantly attend to the strength of our academic programs and expertise of our faculty. We will leverage varied pedagogies and educational technologies to engage students in meaningful instructional contexts that enhance their learning and skill development.*

*We are pursuing four strategies to achieve these goals. First, rebalance our curricula to maintain appropriate breadth and depth while also creating opportunities for students to learn a wider range of subjects outside their specializations. Second, make our curricula accessible to the highly-varied backgrounds of our students. Third, adapt our curricula to the shifting needs of the Navy, the other armed services, and the civilians we serve. Fourth, constantly upgrade our faculty's skills at teaching and leading research.*

## Action E1.1—Create more flexibility in residential degree curricula.

NPS develops curricula based on the stated needs of our sponsors, who usually have subspecialty code requirements that go well beyond the actual degree requirements. Students' academic programs are fully booked, with little flexibility to study anything else. Students required to complete Joint Professional Military Education in parallel with their degree programs feel this most acutely. We believe our students' education would in many cases be more valuable if, in consultations with our curricular sponsors, we created more space in students' programs to accommodate more electives and other courses that broaden students' exposure outside their professional fields. Examples include the newly-developed "all hands cyber" course and various special-topics courses on emerging technologies. We also seek the flexibility to incorporate experience-based learning such as short stays at private sector companies and non-profit organizations in the Silicon Valley area.

## Action E1.2—Explore expansion of new programs and modes of delivery.

Many students who would benefit enormously from coming to NPS find it difficult to spend 15 -24 months in residence to complete our master's degree programs. We also receive many requests to make some of our courses available more widely throughout the Department of Defense.

We will proactively explore how more of our programs might be offered in an economical hybrid of residential and distance-learning formats. We will examine how some of our degree programs can be organized as a series of "stackable certificates" that accumulate in stages to meet the requirements of a degree program. We will expand use of self-paced, online courses for students who need refreshing of knowledge or who are missing prerequisite undergraduate courses. We will offer trials of Massively Online Open Courses (MOOCs) in selected areas where there is strong external demand including delivering courses on the .mil networks; these MOOCs will also make the educational services of NPS more visible to Naval and other officers. We will work with sponsors to create a form of continuing education to maintain the currency and relevance of the subspecialty code students earn from NPS.

## Action E1.3—Improve the transition for incoming students.

Our incoming students face significant challenges. Up to 70% of them have bachelor's degrees in fields quite different from the ones they are entering for graduate study. Moreover, nearly all our incoming students have been out of the classroom environment for 6-10 years. These adult learners are military experts but are out of practice with writing academically, thinking critically, and researching questions. We will foster their intellectual development through applied learning, guided practice, coaching, workshops, and discussion forums. We will continue to provide enhanced refresher courses, including through distance learning, to provide incoming students with the opportunity to refresh basic pre-requisites such as math skills and be fully prepared for our technical and strategic curricula.



Action E1.4—Establish a Teaching and Learning Studio.

The studio will enable various existing campus centers for teaching and learning to function as an integrated team and community of practice. Its goals will include:

- help students develop effective communication skills for writing, presenting, researching, and publishing);
- promote generative learning and student engagement through consistent application of research-based instructional methods;
- support learning through the application of best practices to integrate technology and pedagogy;
- support Actions E1.3 and E1.5 as well as other NPS and Navy educational initiatives.

Action E1.5—Hybrid formats of Distance Learning (DL).

Expand distance learning enrollment to reach a greater Department of Defense audience and make best use of NPS’s teaching capacity. Steps to this end include:

- make more international partners aware of NPS programs;
- expand the programs bringing new United States Naval Academy (USNA) graduates to NPS to Reserve Officer Training Corps graduates;
- communicate the benefits of an NPS education to junior and mid-level officers as well as detailers;
- examine possibilities for increasing the number of enlisted military in our programs;
- expand how we deliver programs, particularly seeking opportunities to deliver programs in hybrid formats that combine intermittent residence-based education with distance learning for mixed cohorts;
- explore how we serve the defense contractor community, particularly in classes and programs with unused capacity; and
- improve internal support services so that DL students can take full advantage of the Library, the Teaching and Learning Studio, and technical help 24 hours a day.

E2 – OPERATIONS EFFECTIVENESS



Action E2.1—Undertake initiatives to increase diversity at NPS.

It is crucial that NPS recruit and retain the best possible faculty and staff. The U.S. workforce has become increasingly diverse. We aim to make NPS a place where the most-talented individuals, regardless of gender, race, religion, political beliefs, or ethnicity, want to join and stay with. Our primary objective is to create an atmosphere that is welcoming, fair, and inclusive, in which all are committed to listening to each other with respect and appreciation for the value that our differences bring to our work.

To accomplish these goals, we will create an Inclusion and Diversity Council reporting to the President and Provost that is charged to make recommendations concerning practices that we can adopt, and other actions we can take, to make our university a magnet for the most talented individuals we want to attract and retain. The council will include faculty and staff from across NPS.

Action E2.2—Become more effective at institutional advancement.

Many people within Department of Defense are unaware of the depth and breadth of NPS education and research activities, due to our limited capacity to communicate the range of NPS’s activities and accomplishments. Effective institutional advancement involves significant attention to our public affairs, protocol, outreach, marketing and communications. NPS is understaffed in these areas. As a result, potential students are often unaware of opportunities we offer, news of our research accomplishments does not reach all potential audiences, and defense leaders do not know how to tap the full

Every organization has opportunities to become more effective and efficient; NPS is no exception. As part of the Department of the Navy, we must continually adapt to ever-changing legal and regulatory requirements while maintaining sharp focus on our over-arching mission of education and research. While individual improvements in operations may not seem strategic, maintaining an efficient and supportive operational environment is.

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capabilities of NPS to address Naval and other defense issues. We have already appointed a Director of Institutional Advancement, reporting to the president and provost. This person will coordinate NPS offices and stakeholders to promote NPS’s education and research programs to potential students and sponsors and to make our accomplishments more broadly known.

Action E2.3—Review and improve key processes and practices.

To improve our key processes and practices, we will:

- Review policies for attracting, retaining, and developing faculty.
- Review policies for attracting, admitting, and providing students who are missing prerequisite knowledge or need ways to refresh their skills.
- Develop new incentives for faculty to engage in interdisciplinary activities. Opportunities for new incentives include criteria for promotion and tenure, merit step increases, special act awards, and fellowships.
- Improve the methods by which NPS collects and distributes funds to cover indirect costs associated with sponsored research. The current model is too inflexible for our high-flux environment; it costs us work and raises the costs of the work we do have. In collaboration with the Office of the Chief of Naval Operations, we will develop improved models for collecting and distributing indirect funds and for paying personnel working part time to support sponsored research.
- Seek efficiencies in our core business processes. Key areas include travel, purchasing, contracting, property management, class scheduling, IT support, library services, thesis processing, comptroller functions, safety compliance, records management and training. We will look at both industry and other government organizations for best practices that can be adopted within NPS.
- Improve our succession planning for leadership in key administrative and academic areas.

“The essence of Capt. Alfred Mahan’s late 19th century vision still pertains: America’s interests lie beyond our own shores.”

– CNO’s Design for Maintaining Maritime Superiority







# Human Domain

Innovation  
Talent Management  
Ethics  
Global Strategy

## HI – INNOVATION

### Action H1.1—Streamline the processes for working with industry and other academic institutions.

The current process for establishing cooperative research programs with industry and other academic institutions is slow and cumbersome, mostly because of Intellectual Property rules. We will focus on establishing common written rules for government and private intellectual property and other process improvements that enable Co-operative Research and Development Agreements (CRADAs) to be enacted within reasonable times. We will also seek authority for entering into other types of agreements with industry that might be more efficient or broader than permitted under CRADAs. We will investigate ways to create joint institutes or other entities through which NPS can partner with industry on key defense-related areas including cyber operations and data sciences.

### Action H1.2—Upgrade education programs that cultivate innovation leaders.

Innovation leaders find new ideas and see them through to adoption as practice in their communities, coping skillfully with resistance and unexpected contingencies along the way. We will promote and advance existing courses and workshops that support the full spectrum from design thinking (focus on ideation) to innovation leadership (focus on adoption). We will make new offers in design and leadership through our resident, distance learning, and short-course programs. Cultivating innovation leaders does not end after a student graduates; the Center for Executive Education already offers short courses on innovation, which will be complemented by short courses offered off-site.

### Action H1.3—Establish an Innovation Fellows Program.

This will involve a close partnership with organizations such as the Navy Innovation Advisory Council and the Defense Innovation Unit Experimental. Informal efforts to create such partnerships have already succeeded in generating new opportunities for students and faculty. Innovation Fellows would leverage the geographic proximity of NPS to Silicon Valley and facilitate student-faculty participation with potential governmental and industry partners in projects, internships, and field experimentation. The Innovation Fellows Program will enhance NPS's ability to take students out of the classroom to see how they can use emerging technologies to solve real problems with together with partners.

### Action H1.4—Institutionalize the Big Ideas Exchange (BIX).

The BIX spotlights big, transformative ideas faculty and students are developing for the military and defense community. We will host two BIX events annually and leverage our Public Affairs Office, the Institutional Advancement Office, and external partners to connect the work at NPS to our broader Navy, Marine Corps and Department of Defense stakeholders. We will organize an annual “Discover NPS” day that includes lab tours, presentations of big ideas, youth tournaments, hackathons, and a major public presentation by a national innovation leader. We will promote the Naval Research Working Group, which annually brings together topic sponsors from across the Navy, Marine Corps, and Department of Defense. Using the Human Systems Integration research group as a model, we will reach out to Navy and Marine Corps organizations and promote innovative technologies and practices for their adoption.

*The Secretary of Defense and all of the Service Chiefs have identified military innovation as a critical requirement in the face of increasingly innovative state and non-state adversaries. Military innovation is the adoption of new technologies and practices in all aspects of the military including manning, training, equipping the force, and combat operations. Military innovation emerges from the actions of individuals at all ranks responding to opportunities and contingencies and is rarely driven by top-down initiatives. We aim to evaluate innovative emerging technologies through research and student theses. We aim to teach our students how to be innovation leaders who can support the rapidly changing requirements of the Navy-Marine Corps team, the Joint Force, and the broader Department of Defense.*





*The capabilities of our people have been, and will always be, a critical element of warfighting. The growing complexity of the technologies our warfighters use, the diverse locations in which we conduct military operations, the emergence of non-state adversaries, and the expansion of joint military operations all make increasing demands on the education we deliver. We need to anticipate the specialties that will be essential in the years ahead and prepare the workforce. We need to enable our graduates to think, navigate, and lead in a world of accelerating technologies, contingencies, and surprises. We need to design how we work to enable efficient performance.*

*NPS has critical expertise in talent management and performance that needs to be expanded and coordinated to meet these goals. Towards that end, we propose the following specific actions.*

**Action H2.1—Build more coherent programs in talent management.**

NPS has a long history of conducting studies in the field of defense talent management. For the most part, these studies have focused on answering specific, relatively narrow questions for individual sponsors, but have not addressed longer-range strategic concerns in talent development. We will transition our current capabilities into a sustained education and research program that creates a broadly useful forecasting and analytic capability for recruitment, workforce maintenance, and retention. To do this, we will expand our working partnerships with holders of critical data, develop more general models of the talent management “pipeline” for military personnel in various roles, and, in concert with current and potential sponsors in Department of Defense, identify the most critical problems to which models should be applied.

**Action H2.2—Optimize Human Performance.**

NPS will expand its activities focused on optimizing human performance. Currently, NPS is a leader in understanding how sleep schedules affect performance. However, this work is just the beginning. NPS will develop

further education and research in the field of human performance by investing in studies of how machine and humans interact; how physical performance can be advanced through wearable technology such as head-mounted displays and exoskeletons; and how biological, chemical and other technologies, such as implanted chips, might enhance military effectiveness.

*“The future requires Marines to embrace change to leverage the rapid advancements in technology at the pace of the 21st Century in order to gain an operational advantage over any potential adversary we may face in the future ... The character of the 21st Century is rapid evolution. Our potential adversaries have not stood still, and it is imperative that we keep pace with change.”*

*– Commandant, U.S. Marine Corps  
Posture Statement to Congress*



**Action H3.1—Create a Center on the Ethics of War.**

*We propose to create a Center on the Ethics of War to:*

- significantly increase our capacity to provide ethics education to our students as well as extend that opportunity to the broader Department of Defense community;
- produce top-tier academic research on the ethics of war;
- propose policy changes, conduct ethical analyses and advise the Navy and Department of Defense; and
- engage the broader society on military ethics issues, including ethical issues in acquisition and program management.

Once established, the Center on the Ethics of War will recruit a full-time ethics of war Research Professor and additional post-docs who will work to meet the demands for both in-house teaching at NPS and ethics education across the Navy and other military services. Additionally, a team will develop a program of ethics research, analysis and policy advisement needs for the Department of Defense.

*There is a strong demand for increased education, research and training capacity around the ethics of war across NPS curricula as well as for the broader Navy and Department of Defense communities. A number of accelerating factors have changed the role of technology in warfare, including information technology, interconnectivity, and environment. For example, automated fire control systems appear essential to counter enemy threats, yet they must be sufficiently trustworthy for leaders to have confidence that no bug or glitch will start an unwanted war. Connectivity increases the range of coordination and awareness, but also increases the risk of mob behavior when enticing but false stories circulate. Grabbing resources from the global commons creates new risks of conflict in contested environments.*





### Action H4.1—Establish a strategy-related experience tour program.

Competitively selected faculty will work closely on-site with such partners as Combatant Commands, private sector companies and government agencies. The program will more closely link our faculty and students with operational, technological and policy concerns that might affect future U.S. strategies.

### Action H4.2—Establish a Research Fellowship in Deterrence & Diplomacy.

One or two fellowship(s) will be offered annually for faculty and student teams to visit relevant bodies within the U.S. military and government dealing with deterrence and diplomacy issues. These tours and discussions would support faculty research and student theses. Organizations to be visited will include U.S. Strategic Command, Office of the Secretary of Defense for Policy, and individual commands dealing with single-domain deterrence (Cyber Command, USAF Space Command, or others). The fellowship program would fund one trip per team and would support new proposals as well as ongoing projects.

### Action H4.3—Foster cross-domain research.

NPS will introduce a cross-domain research program that invites teams of faculty from different departments to jointly propose research studies or short courses on some cross-domain issue such as space and cyber, maritime and space, or autonomous systems and warfighting. We will support this with an annual “Monterey Strategy Symposium” organized with regional partners.

*The strategic environment facing the United States comprises traditional military threats; evolving challenges on issues such as nuclear proliferation and global terrorism; and newer problems in areas such as cyber, climate, energy and space. These concerns collectively raise demands on existing alliances and increase the need for coalition building and combined operations across the globe. Addressing them effectively requires contextualized understanding of the unique challenges in specific regions of the world. We will expand our portfolio of interdisciplinary research and teaching to strengthen U.S. defense strategy, systems, and technology. We have been and will remain at the forefront of teaching and research in international security, with expertise spanning across regional operational theaters as well as specific functional security threats.*

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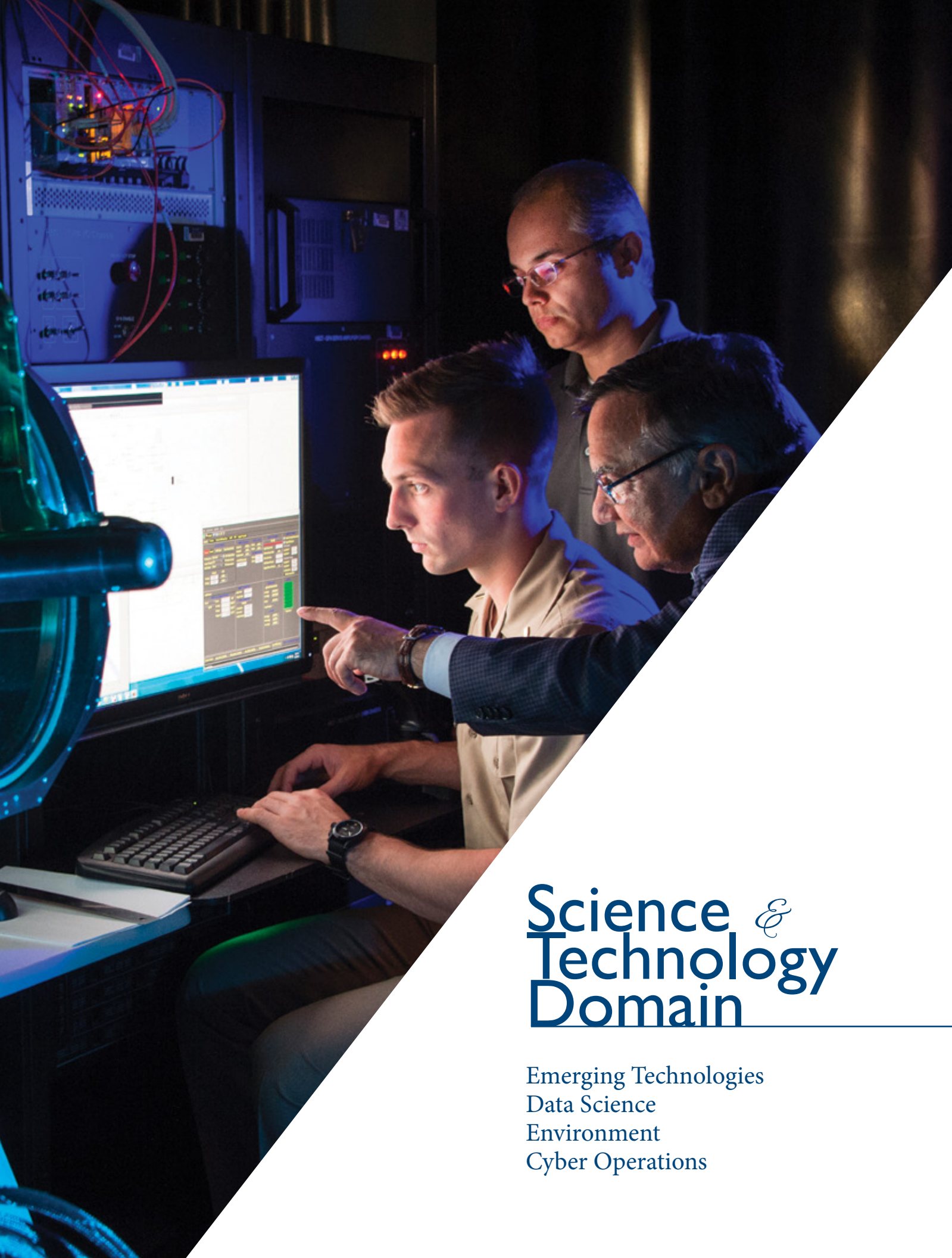
*“The program will more closely couple our **faculty** and **students** with operational, technological and policy concerns that might affect future U.S. strategies.”*



*“America’s success depends on our creativity, our entrepreneurship, and our access and relationships abroad. In an increasingly globalized world, America’s success is even more reliant on the U.S. Navy. We must do everything we can to seize the potential afforded by this environment.”*

– CNO’s Design for Maintaining Maritime Superiority





# Science & Technology Domain

Emerging Technologies  
Data Science  
Environment  
Cyber Operations

## SI – EMERGING TECHNOLOGIES

**Action S1.1—Establish emerging technology exploration laboratories and secure seed funding for new research in selected areas of great strategic importance.**

*Candidate areas include:*

- autonomous systems;
- cyber security technologies;
- additive manufacturing;
- nano-mems cleanroom for new materials;
- modelling, simulation, visualization and virtual reality;
- nano-satellites and new-band satellite-ground communications;
- military applications of blockchains; and
- quantum computing.

*We will propose other areas as the need and opportunity arises.*

**Action S1.2—Enable excellence in our faculty in these emerging technological areas.**

For the emerging technologies identified above, NPS will encourage existing faculty to form new groups to establish labs and link them to education programs and hire new junior professors to strengthen our coverage of these technologies. We will also seek support for Chaired Professorships in order to hire and retain senior faculty leaders in these areas and provide incentives for departments to collaborate.

*NPS must ensure that we are involved in developing new technologies important to the Navy and the Department of Defense and in educating students capable of understanding and leveraging whatever new technologies emerge. Technologies such as novel computing platforms, cyber security, additive manufacturing, innovative materials for energy and structures, early synthetic prototyping, and large constellations of small satellites all promise to disrupt existing capabilities. In order to support the Navy and Department of Defense in avoiding technology surprises and to educate officers to be among the first skilled users of emerging technologies, NPS must actively support laboratories exploring emerging technologies and recruit and develop faculty who can lead in these areas.*

## S2 – DATA SCIENCE

**Action S2.1—Create an interdisciplinary working group guided by a faculty coordinating committee.**

The new Data Science Working Group will bring together faculty and staff from across NPS. This group will initially be charged with implementing three main strategies:

- assist with organizing existing data resources relevant to national defense;
- provide an effective data analytic capability to answer important defense-related questions; and
- educate military officers and Department of Defense civilians so that we have the human capital that will make it possible to integrate data sciences and analytics into future decision-making.

The working group will develop education programs and sponsors; get research sponsorship for new technologies of gathering, storing, and analyzing data; develop a resident capability in data engineering; and coordinate data science activities across campus.

*Few organizations in the world collect and manage more data than the Department of Defense. However, the sheer quantity of these data, the large number of organizations exercising authority and control over subsets of the data, and incompatibilities in data storage severely limit decisions across all functional areas from personnel readiness, to command and control, intelligence, cybersecurity, logistics, meteorology, oceanography and acquisition.*

*The new field of data sciences and analytics makes data relevant to national defense and homeland security. NPS is uniquely positioned to make major contributions to the Navy and Department of Defense capabilities by expanding and focusing our educational programs and our research in data science. NPS will educate future leaders to think and succeed in this data-rich environment through knowledge of the fundamentals, applied research, and the ability to create institutional data science capacity.*





Many aspects of our national security require an understanding of, and an ability to predict, environmental conditions in the atmosphere, ocean, land, and space.

A number of high-profile national security systems involve technologies that are especially sensitive to environmental conditions: sensors, communications systems, and missile defense and anti-submarine warfare technologies involving lasers, radar, or sonar. Many extremely high-profile national security policies, plans, and operations such as planning for the impacts of rising sea level on military bases and operations, and humanitarian assistance and disaster relief operations, are sensitive to evolving climate conditions.

Service members must increasingly be educated about environmental effects as well as how to utilize and apply earth systems models for forecasting and decision-making. Naval officers in leadership roles will increasingly need to be well-informed about a range of environmental effects.

**Action S3.2—Expand our collaborations on environment.**

We will facilitate and improve faculty expeditions to ships, submarines, aircraft, and other platforms and experiments such as those in the Navy and University-National Oceanographic Laboratory System fleets or at Space and Naval Warfare Systems Command and the research labs. We will collaborate with other military organizations and with industry to obtain access to their experimental platforms both equipment and computational platforms such as exascale and quantum computers for hands-on education, research and experimentation to understand and explore environmental effects on operational outcomes for existing and planned systems.

“We recognize the current and future fight may not be what we experienced in the past. It will encompass not just the domains of land, air, and sea, but also space and the cyber domain. It will include information operations and operations across the electromagnetic spectrum. It will involve rapidly changing and evolving technologies and concepts, which will force us to be more agile, flexible, and adaptable. Most importantly, it will require Marines who are smart, fit, disciplined, resilient, and able to adapt to uncertainty and the unknown.”

– U.S. Marine Corps Operating Concept

**Action S3.1—Enhance our strength in defense-relevant aspects of the environment.**

We will expand our range of interdisciplinary expertise in research and graduate education on environmental conditions including the operational effects of environmental conditions, energy footprints of systems and operations, protecting energy supply chains, optimizing logistic networks, and applying models and environmental information in the operational and national security environments. In this area, we will:

- leverage NPS’s investments in expanded bandwidth to classified networks and cloud computing to enhance our collaborations with Navy, Department of Defense, National Oceanographic and Atmospheric Administration, other agencies, and universities to obtain and share access to large environmental data sets;
- improve access to real-time and archival environmental data;
- recruit post-doctoral researchers who will bring the latest techniques and scholarship into our classrooms and laboratories;
- establish seminar series and annual conferences that bring faculty, students, military and industry together to discuss pressing issues and concerns; and
- engage with our sister higher education institutions (Naval War College, USNA, Air Force Institute of Technology) to analyze environmental effects on sensors; weapons; personnel; strategic, operational & tactical planning; the operations of adversaries; and to develop policies and alternative courses of action based on environmental intelligence.



**Action S4.1—Develop new academic programs that enhance our external relationships in the cyber domain.**

We will build off of our cyberspace oriented curricula to offer enhanced DL certificate opportunities. We will continue to develop, refine, and distribute our comprehensive “Cyberspace Operations Fundamentals” course. We will work with curriculum sponsors to incorporate the course into their resident and DL students’ schedules. We will offer new cyber management and leadership courses through the Center for Executive Education, Graduate School of Business and Public Policy, and online forums. We will establish student internships at leading cyber businesses, especially in Silicon Valley, to give our students first-hand experience with industry approaches to cyber security. We will establish faculty and staff internships at numbered fleet headquarters and aboard ships, to afford first-hand experiences with the operational environments in which cyber security is critical.

**Action S4.2—Expand classified cyberspace operations research and education.**

We will upgrade our classified networks to ensure uninterrupted, high-speed access at the Top Secret level to our sponsors and provide them with enhanced test environments. We will establish a Joint Information Operations Range node at NPS in order to support visibility and participation in classified experiments and exercises. We will commit additional staff to administer and support these networks to support faculty and student work.

**Action S4.3—Expand support of cyberspace operations research and education.**

Our students require hands-on experience with the complexities of cyber operations, the nature of threats they will face, and the improvements possible from augmenting software with security hardware. To give them this experience, we will provide cloud platforms for research and classroom lab experiences through Amazon Web Services (AWS), Microsoft Azure, or other providers. We will commit additional support services to the delivery and maintenance of these environments and set up instructional lab content in support of faculty. These upgrades will support increased depth of knowledge for successful cyber warriors and also the cyber research programs of the faculty. We will also involve more students with testing cyber technologies locally, with industry, and at the Field Experimentation Facility at Camp Roberts.

**Action S4.4—Assist SECDEF and SECNAV on designing secure networking.**

NPS will continue to explore efforts with the office of the SECDEF and SECNAV on developing design concepts for a new, highly secure, flexible world-wide Department of Defense network. This work will be conducted through research and student theses.





# RESOURCING OUR STRATEGY

Some of the actions described in the preceding section can be undertaken using resources already available to NPS. Many others will require new resources including funding, reallocation of our authorized full-time equivalent (FTE) manning level or approval to grow beyond that authorized manning level, and lab or office space.

Until we get further into the detailed planning of specific actions and have discussions with sponsors, we cannot state concretely what new resources will be required for each action. However, it is useful to consider where such resources will come from. There are five potential sources:

**Existing allocations of space, money, and FTE.** Some existing programs may have lower priority than the new opportunities described in this plan. In such cases, reallocations will be made. We will also apply our small budget for new, Navy-relevant initiatives to the highest priority elements of our strategic plan.

**The Navy itself.** We will work with Navy leadership to find ways of expanding the base budget to enable greater capability to achieve our strategic goals.

**Current and potential sponsors of reimbursable projects.** Most of our research funding and a good deal of our teaching is supported by funds from other sponsoring organizations. Many of our proposed actions will be important not just to the Navy, but to the other armed services and defense-related organizations. Our hybrid funding model using both direct Navy funding and reimbursable funding from our sponsors enables us to grow our new initiatives from both sources. We expect that several of our action areas will draw substantial external support, particularly once we initiate them and demonstrate our capabilities.

**The Program Objective Memorandum (POM) process.** We believe that many of our proposed actions are of such importance to the Navy specifically and Department of Defense more generally that they are worthy of consideration in the POM process. Starting with the FY2020 POM cycle, we expect our future POM requests to reflect our strategy and to support actions that will most significantly further NPS’s ability to serve the nation’s defense needs.

**The NPS Foundation.** In recent years, through the initiatives of the Foundation’s board and staff, the NPS Foundation has significantly expanded its support for the university. The Foundation already provides substantial seed funding for new research initiatives by our faculty through its Defense Innovation Fund. The Foundation’s leadership understands our strategic priorities and is fully supportive of them; they are prepared to seek expanded support that aligns with those priorities and make gifts to NPS (with appropriate Department of Navy approvals) to support elements of this plan.

We fully recognize that it will take time to develop the resources to do everything in our plan. Fortunately, many of the proposed actions are not “all-or-nothing” in nature and can be implemented in phases. We will start with phases that can be fully implemented by reallocating our existing resources. We will start other actions at small scale, growing as new resources are committed from reimbursable sponsors, NPS Foundation gifts, or the POM process.

# SOME FINAL THOUGHTS ON OUR STRATEGY

Wherever possible, we will partner with organizations whose capabilities and activities complement our own.

This plan is a guide for actions, not a dictum. To keep our strategies relevant, we will revisit and update this plan annually. We will be flexible and adjust our strategies for new circumstances and emerging concerns.

With Sir Winston Churchill, we appreciate that all strategies must be evaluated regularly for results. With Dwight Eisenhower, we believe that the work of fostering extensive faculty and sponsor discussions around our strategies, and making offers to do concrete actions for our sponsors, is ultimately more important than the document itself. This plan is our guide to maintaining a peerless NPS that educates officers well and engages in research that supports the national defense.

“*However beautiful the strategy, you should occasionally look at the results.*”

—Sir Winston Churchill

“*In preparing for battle I have always found that plans are useless, but planning is indispensable.*”

—Dwight D. Eisenhower





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