Contributing to "A Design for Maintaining Maritime Superiority"
Four Lines of Effort

1. Strengthen Naval Power at and From Sea
2. Achieve High Velocity Learning at Every Level
3. Strengthen Our Navy Team for the Future
4. Expand and Strengthen Our Network of Partners
Strengthen Naval Power At and From Sea

1. Cyber at NPS

2. Big Ideas

3. Tactical Development Work examples: Simulation and Gaming
Cyber at NPS

RESEARCH

COMMUNITIES

EDUCATION

OPERATIONS
• Innovations emerge when someone has a game-changing insight
• NPS faculty and students constantly search for new insights into Navy’s hardest problems
• Big Ideas Exchange (BIX) communicates faculty big ideas and fosters serendipitous research and discovery
• Recent featured examples:
  – Framing cyber security
  – Secure cyber operations
  – Secure cyber infrastructure
  – Critical infrastructures
  – Healthcare simulation
  – Disrupting dark networks
  – Energy supply chains
  – UAV swarms to counter hostile swarms
  – The future of information weapons
  – Data intensive computation & analytics
  – CubeSats (small orbital satellites)
  – Design thinking and innovation
  – Innovation in uncertainty
• Many more “in the wings”
Tactical Development Work examples: Simulation and Gaming

- **PROJECT JASON (Counter-UCAV & ASCM)**
  - Single ship tactics
  - SAG tactics
  - Laser integration into DDG combat systems

- **Counter-SOF TACMEMO Validation through massive simulation**

- **Developing an NSWCDD agent based simulation to support distributed lethality and Joint War at Sea tactical development**

- **ONR sponsored Maritime Operational Planners Program**
  - Joint Defender (Theater Ballistic Missile Defense Planner)
  - Vertical Launcher Load out planner
  - Navy Campaign Mission Planner
N-96: Assess the Navy’s new Distributed Lethality Concept using Red Teaming*

Undersea Integration Program Office, PEO C4I: Assess the Undersea Constellation capabilities*

Navy Warfare Development Command: Assess capability of future US Navy distributed force structures (flotilla and air wing)*

PACOM: Assess PACOM ability to execute missions in a PNT-denied/degraded environment* [Classified results]

CTF-73: Assess the capability of CTF-73 logistics assets to support 7th Fleet operations*

SOCOM: Identify capabilities and authorities required for interdicting the flow of Foreign Fighters to the Islamic State

SOCOM: Identify capabilities required to counter a Russian threat in the Arctic

Royal Canadian Navy: Assess the use of non-lethal weapons for Visit, Board, Search and Seizure (VBSS) operations

Norwegian Armed Forces: Identify capabilities required for countering a hybrid threat in the Baltic

* - *South China Sea Anti-Access/Area Denial (A2/AD) scenario.*
Achieve High Velocity Learning at Every Level

1. High Velocity Learning at NPS

2. NPS Design Initiative

3. Summary of range/depth/reach of our graduate education programs to Naval Officers
High Velocity Learning at NPS

• Awareness of CNO Initiative
  • A Design for Maintaining Maritime Superiority
  • High Velocity Edge
  • Innovation /Adaptation / Critical Assessment

• What is NPS already doing?
  • Relevant concepts already taught in NPS programs:
    • CEE, GSBPP, GSOIS
  • NPS Education Programs are structured for flexible and tailored learning opportunities:
    • Resident, DL, Certificates, Mixed Mode, Exec & Professional Devlpmnt Ed, Professional Certifications, Mobile Education Teams, Workshops

• Partnership with NWC for JPME at NPS

• NPS adapts to developments in Education & Learning:
  • Impact of technology on learning; Teaching the millennials; Learning modalities; Flipped classrooms
• **Origin:** grassroots, campus-wide, cross-disciplinary design efforts

• **Activities:**
  – Campus-wide design courses: SE3201; DA3910; DA4500
  – Special design projects: Army 2020; Civil Affairs 2025; NORSOF 2025; SOCPAC
  – Faculty and student design research
  – Deepening faculty design “bench”
  – Design short courses, workshops and consulting

• **Future:**
  – Cross-disciplinary design track
  – Design Center at NPS
Naval/DON Students:

- 1712 average Navy enrollment in Grad Ed in 2015. (of 2800 typical total NPS enrollment)
- Total higher than either 5 or 10 years ago.
- Evolution to higher numbers in DL
- Recent increases in USMC and DON Civilians

Naval Programs/Curricula:

- 80 distinct Grad Ed curricula serving Navy
- 11 Major Areas Sponsors for Navy Curricula
- 60+ Subspecialty codes awarded

- NPS Model: Breadth & Depth of curricula maintained via enrollment of Other Service, Intl, and DOD Civilian students.

- Continued program development & evolution to meet Navy needs, including (in past 5 years):
  - Cyber Systems & Operations
  - Defense Energy (4 curricula)
  - Strategic Studies
  - Partnership with Navy TPS
  - Mixed-Mode for URLs
Naval/DON Students:
- 10,916 Naval students enrolled in EE/PD in 2015.
- Significant increase in Naval/DON enrollment over the last three years.
- Highlight:
  - RSEP: Regional Security Education Program

Naval Programs/Curricula:
- 131 Exec & Professional Education courses offered to Naval students in 2015
- At Monterey, across the Nation (11 states), across the World (5 countries), at Sea, and Online.
- Within all four NPS Graduate Schools.
  - Security & Regional Studies
  - Leadership & Management
  - Operations/Analysis/Technical
- Highlight:
  - CEE: Center for Executive Education
NPS Civilian Institutions Programs

CIVINS Students: 155
CIVINS Schools: 51
CIVINS Cost FY15: ~$6.0 million at 80% execution

FY15 Cost by Curriculum

- NPS is Navy’s Exec Agent for CIVINS
- Principally serves Staff & Restricted Line
  - Most programs are 10-12 months
  - Selected (e.g., MIT, MBAs, CEC) longer up to 36 months
- New: FSEP: Fleet Scholars Education Plan (Talent Management)
  - FY15 Start = 3 initial students
  - FY16 = 30 new students
  - FY17-18 Steady State = 60 enrolled
Strengthen Our Navy Team for the Future

1. The NPS Naval Research Program

2. Talent Management Research at NPS

3. Long-Term Investment
The NPS Naval Research Program

Background:
SECNAV has allocated $12.5M annually for NPS to conduct relevant Naval research and analyses (FY16-FY20). The NPS Naval Research Program aligns these research requirements with NPS interdisciplinary research faculty and student teams by leveraging their expertise, providing the fleet with innovative, executable solutions to real-world issues.

Status FY16 and FY17 Plans:
- Currently executing 95 Navy & Marine FY16 projects.
- Includes over 100 different NPS faculty and their students involving 17 different NPS organizations/disciplines.
- Received over 500 Navy & Marine potential research topic requests for FY16 from Naval sponsors.
- Met over 250 initial research requirements of the US Navy & USMC since 2014.

Example: Graduate School of Business and Public Policy (GSBPP) continues to research elements of Sailor 2015 with OPNAV N1, which feeds into Strengthening our Navy Team for the Future as part of A Design for Maintaining Maritime Superiority.

NRP Strategic Goals:
- Provide an annual process, based in Title X, for NPS faculty and students to conduct research in areas directly relevant to Naval challenges.
- Develop NPS faculty area expertise for long-term Naval research interests.
- Launch new research initiatives that posture the Navy to meet future challenges.

NRP Milestones:
- Chief of Naval Research signed NRP Charter, Aug 2015
- Participate in ONR FNC and N8 Analytics Programs for matching OPNAV, Fleet, and USMC issues with NPS faculty expertise
## NPS Capabilities

<table>
<thead>
<tr>
<th>Systems design</th>
<th>Data management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data analytics</td>
<td>Operations research</td>
</tr>
<tr>
<td>Statistical analysis</td>
<td>Simulation modeling</td>
</tr>
<tr>
<td>Game theory/mechanism design</td>
<td>Behavioral economics</td>
</tr>
<tr>
<td>Operations research</td>
<td>Strategic communications</td>
</tr>
<tr>
<td>Statistical analysis</td>
<td>Survey design and analysis</td>
</tr>
<tr>
<td>Etc.</td>
<td>Systems design</td>
</tr>
</tbody>
</table>

## NPS Organizations Involved

- Student operational/institutional knowledge
- Center for Defense Management Research
- Graduate School of Business and Public Policy
- Operations Research
- Information Sciences
- Computer Science
- Defense Analysis
- Defense Resources Management Institute
- Human Systems Integration
- Cebrowski Institute
- Moves Institute
- Interest Growing

## Current Research Sponsors

- Navy Recruiting Command
- N00P/N01P
- N1/N1Z
- N12
- N13
- N17
- NETC
- ASN (M&RA)
- PACFLT
- Fleet Forces Command
- Production Management Office

## Way Ahead: Engaging Navy OSD Leadership

- Mr. Lutterloh (N1B/ASN MR&A)
- RDML Steindl (Deputy CNP, MOU with CDMR)
- RDML Burke (N13)
- RDML Burkhardt (N17)
- RDML Whitesell (PERS-4)
- RDML Hughes (CNRC)
- RDML Beal (CNRC)
- RADM Kurta (Retired) (OSD P&R)
- Mr. Durham (PMO – Navy Total Force)
- Reaching out to others (N1b, N12)
With over 50,000 graduates, alumni range from admirals to astronauts, service chiefs to chief executives.

- Representing all U.S. military services, government agencies, defense industry leaders, and many more
- More than 5,500 int’l officers from 100+ countries
- 32% of all U.S. Navy active-duty Flag Officers
- About 28,300 resident and non-resident, non-degree participants annually
- Notable alumni include:
  - Adm. Mark Ferguson, USN, Commander U.S. Naval Forces Europe - Africa
  - Adm. William McRaven, USN, Former Commander, U.S. Special Operations Command
  - Gen. Keith Alexander, USA, Former Director, National Security Agency
  - Adm. Mike Mullen, USN, Former Chairman, Joint Chiefs of Staff
  - Gen. Michael Hagee, USMC, Former Commandant
  - The Honorable Robert O. Work, Deputy Secretary of Defense
Expand and Strengthen our Network of Partners

1. International Degree Students (Winter Quarter 2016)

2. CCMR

3. CHDS

4. NPS – A Hub for Innovation
### International Degree Students
**Winter Quarter 2016**

**Total Graduates:**

**5929 Officers from 116 Countries**

<table>
<thead>
<tr>
<th>Region</th>
<th>Country</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Caribbean, Central &amp; South America</strong></td>
<td>Argentina</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Chile</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Colombia</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Peru</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>15</td>
</tr>
<tr>
<td><strong>Africa</strong></td>
<td>Kenya</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Mali</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>South Africa</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Tanzania</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Tunisia</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Uganda</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>13</td>
</tr>
<tr>
<td><strong>Europe</strong></td>
<td>Armenia</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Denmark</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Estonia</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Georgia</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Greece</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Hungary</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Netherlands</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Norway</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Romania</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Spain</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sweden</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Turkey</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Ukraine</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>84</td>
</tr>
<tr>
<td><strong>Central/East Asia &amp; Middle East</strong></td>
<td>Bahrain</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Israel</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Pakistan</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Saudi Arabia</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>21</td>
</tr>
<tr>
<td><strong>Far/Near East</strong></td>
<td>Indonesia</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Korea</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Malaysia</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Mongolia</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Nepal</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>New Zealand</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Philippines</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Singapore</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Sri Lanka</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Taiwan</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>63</td>
</tr>
<tr>
<td><strong>North America</strong></td>
<td>Canada</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Mexico</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>Australia</strong></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

**207 Students**

**42 Countries**
Unique reimbursable international education and research platform working with key maritime allies and partners:

- Indonesia
- Thailand
- Ghana
- Chile
- Sweden

Operates in regions critical to USN success:

- South–East Asia
- Horn of Africa
- Gulf of Guinea
- Central America

Focuses on developing partner capability and capacity in mission critical areas:

- Defense Institution Building
- Combating Terrorism
- Maritime Security
- Cyber Strategy and Policy
- Humanitarian Assistance and Disaster response

257 events with 11,991 participants from 52 countries in FY 15
There are hundreds of documented examples of CHDS graduates changing and advancing homeland, national, and defense security. CHDS graduates led the response to three recent major events:

**Washington Navy Yard**
- DC Police Chief Cathy Lanier, Master’s Graduate
- Fire Chief Kenneth Ellerbe, Executive Leaders Program
- Deputy Fire Chief Ed Pearson, Master’s Graduate
- FBI Supervisory Special Agent Stephanie Yanta, Master’s Graduate
- Battalion Chief, Rafael Sa’adah, Master’s Graduate
- NCIS Deputy Director Mark Ridley, Executive Leaders Program
- And over 50 more graduates from the DC metro area

**Boston Marathon Attack**
- State Police Superintendent Tim Alben, Master’s Graduate
- Police Commissioner Billy Evans, Executive Leaders Program
- EMS Chief Jim Hooley, Executive Leaders Program
- FEMA Deputy Administrator Rich Serino, Executive Leaders Course
- FEMA Deputy Administrator Rich Serino, Executive Leaders Course
- Search and Rescue TF Commander, Tom Richardson, Seattle FD, Master’s Graduate
- Director, Boston Intelligence Center David Carabin, Master’s Graduate
- And over 25 more graduates from the Greater Boston area

**Oso, WA Landslide**
- Emergency Management Director John Pennington, Executive Leaders Program
- FEMA Regional Director Ken Murphy, Executive Leaders Program
- Search and Rescue TF Commander, Tom Richardson, Seattle FD, Master’s Graduate
- State Adjutant General Bret Dougherty, Executive Leaders Program
- Sheriff’s Captain Tom Davis, Master’s Graduate
- Emergency Manager Jason Biermann, Master’s Graduate
- And over 46 more graduates from the Western Washington area
NPS – A Hub for Innovation

Infrastructure for Innovation
- “License to Innovate” (Contracting, Safety, Compliance)
- Support staff (Administrative, Technical, Faculty Associates)
- Direct and Reimbursable Funding
- Collaborations & Partnerships (Navy Labs, Industry, other universities)

Innovation function
- Students
- Faculty
- Postdocs

Products of Innovation
- Journal publications
- Student theses
- Presentations & briefings
- Patents

Representative GSEAS examples:

CAVR (Center for Autonomous Vehicle Research), est. 1987  > 150 publications & > 150 MS theses
ARSENL (Advanced Robotic System Engineering Laboratory), est. 2012  > 15 publications & > 30 MS theses

Recent efforts:
- AUV navigation under-ice
- NASA Extreme Environment Mission Operations (NEEMO)
- Swarm vs. swarm with 50 total UAV’s grand challenge

CMR (Center for Materials Research), est. 2010  > 100 publications, > 145 MS theses, & 10 patents

Areas of Research:
- Energy Storage/Harvesting
- Electronic/Sensor/Detector components
- Explosives
- Additive Manufacturing
- High Strength/High Temperature
- Armor
- Corrosion
- Composites

WWW.NPS.EDU