Division of Engineering and Weapons

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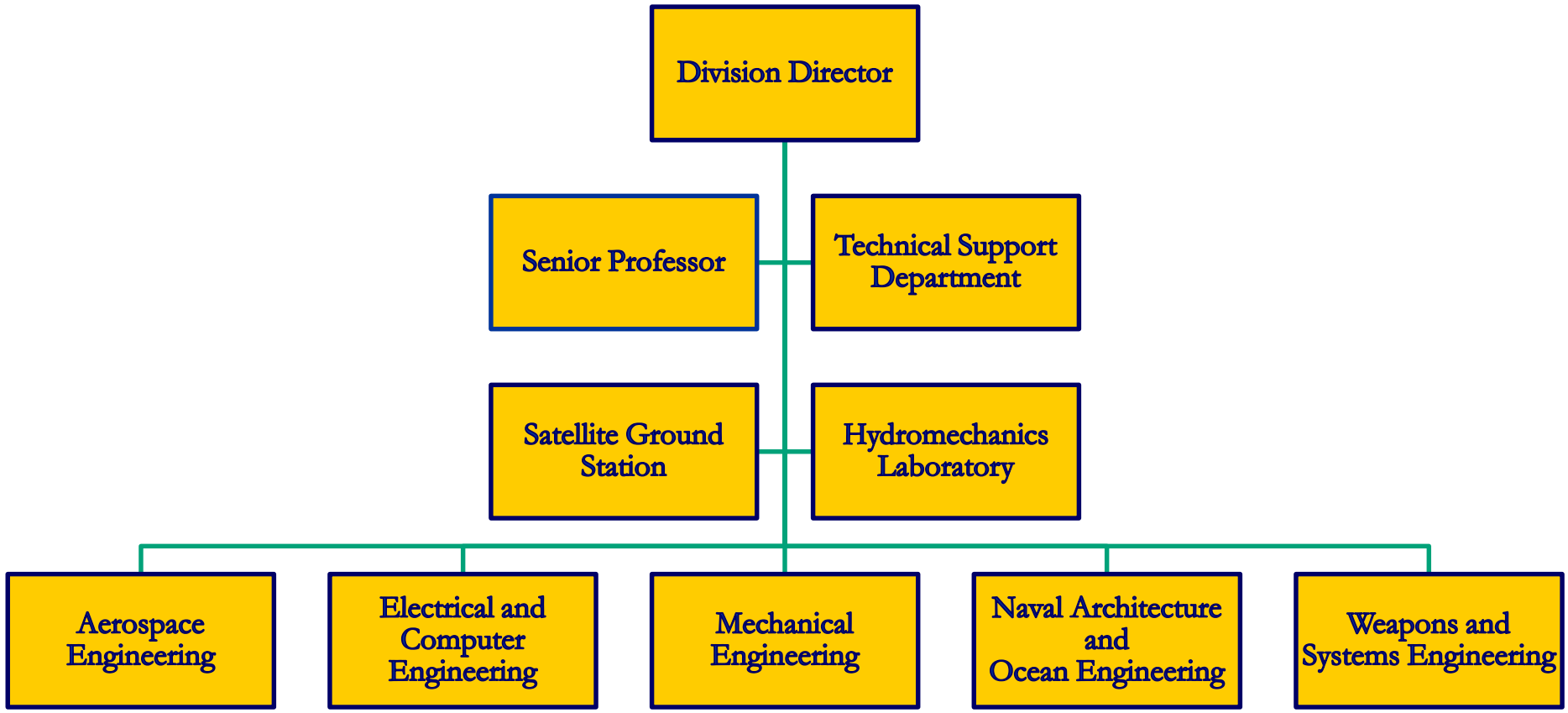
Mission Statement

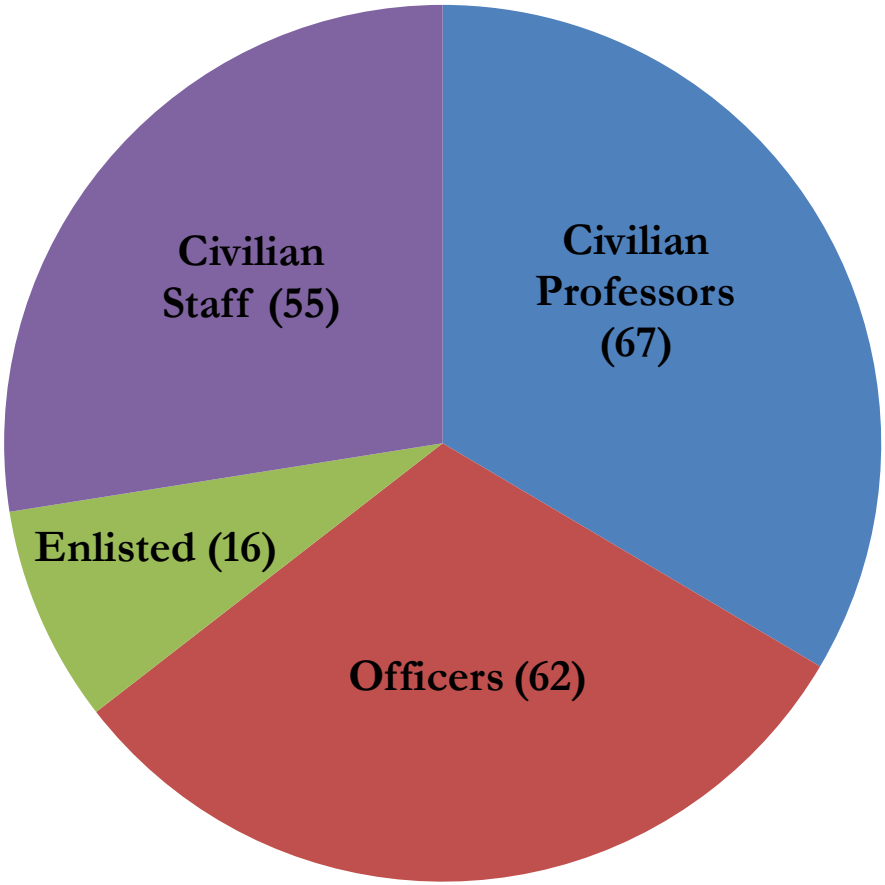
To support the mission of the United States Naval Academy by developing Midshipmen to become Officers with core technical competencies, an understanding of fundamental engineering principles, and the ability to lead a technically advanced Navy and Marine Corps.

Engineering and Weapons



Human Capital

Engineering Students (~1200)



Majors

- Aerospace Engineering
  - (Aeronautics, Astronautics, Rotorcraft)
- Electrical Engineering
  - (Digital Design, Communications, Power Systems, Signal Processing, Biometrics, Electromagnetics, Micro Electronics)
- Computer Engineering
  - (Computer Architecture, Networking, Digital Logic, Embedded Systems, Algorithms and Coding)
- Mechanical Engineering
  - (Energy and Propulsion, Structures and Materials)

Majors

- Nuclear Engineering
- Naval Architecture & Marine Engineering
- Ocean Engineering
  - (Offshore Civil Engineering, Underwater Technology, Environmental Engineering, Coastal Engineering)
- Weapons and Systems Engineering
- General Engineering

Engineering in the Core

- 6 Core Courses reside within E&W (19 total hours)
  - EE301 or EE331 – Electrical Engineering (4)
  - EC310 – Cyber II (3)
  - ES300 – Weapons (3)
  - ES360 – Control Systems Lab (1)
  - EA400/EN400/401 – Planes/Boats/Dirt (4)
  - EM300 – Steam (4)

Recent Changes

- Gained ABET Accreditation for Computer and General Engineering in 2013
- Added Nuclear Engineering Major (Accreditation in 2018 retroactive)
- Added Rotary Track for Aero Majors
- New joint Energy Security Forum
  - Mechanical Engineering, Oceanography, Chemistry, Economics, and Political Science

Statistics

- Trident Scholars
  - 8 of 13 for Class of ‘15
  - 6 of 11 for Class of ‘16
- Bowman Scholars
  - 19 of 20 for Class of ‘15
  - 20 of 25 for Class of ‘16

Statistics

- Majors:
  - 2015: 419 (39%)
  - 2016: 399 (37%)
  - 2017: 409 (36%)
  - 2018: 400 (35%)
- Class of 2015 Average CQPR: 3.22 (Brigade average was a 3.09)

Project Based Learning

Project Based Learning

- A comprehensive instructional approach that engages students in practical cooperative learning.
- Teaching approach using labs and projects where student learn by solving complex, multidisciplinary problems.
- Hands on opportunities for investigation, analysis, and project development. Includes opportunities for travel, collaboration, and internships.

Project Based Learning

- All Engineering Core and majority of Majors courses include a Lab/PBL component.
- "Margin of Excellence" program, largely supported through private donations
- Culminates is Senior Design "Capstone" Project for engineering majors

PBL & Capstone Funding

- Public
  - DARPA
  - NAVSEA 05
  - PEO IWS
  - NRO
  - NASA
  - NAVAIR
  - ONR
  - AFRL
- Private (through Foundation)
  - Boeing
  - Lockheed Martin
  - Sikorsky
  - Synexxus
  - Northrop Grumman
  - Johns Hopkins APL
  - Polaris
  - Vexos
  - Booz Allen Hamilton

Capstone Projects

- Spring of 2013 we founded Capstone Day
  - Consolidated all 5 Departments into one event
  - Over 50 external public and private VIPs in attendance
- Third year grown to ~150 VIPs
  - Expect growth to continue
- 15-20 minute presentations in morning running concurrently; poster session in afternoon
- Common Design Course
  - Focus on multi-disciplinary projects
  - Greater flexibility in scheduling

Capstone Committee

- Formed in Fall 2014 – Prof Len Hamilton Chair
- Capstone Sub-Committees
  - Capstone Day planning committee
  - Interdepartmental collaboration committee
  - Outreach liaison (with Foundation)
  - Financial
  - Project proposal review

Capstone Future

- Coordinate with Research Poster Session
  - Already have a poster session on Capstone Day in afternoon
  - Coordinate with Research from other Divs for their poster presentations on same day
  - Lab Decks full of posters from Chauvenet to Sampson
- Expand to include M&S and Hum/SS Capstone experiences
- Academy Wide Capstone Project Day
  - Significant external interest
  - Match scale of Project Day at West Point

Facilities

- Rickover undergoing major upgrades
- Window replacement continues for approx the next 12 months
- HVAC Replacement should follow through FY17
- Cyber Building coming
- Rickover Lab reconfigure

Cyber (Engineering) Building

- New building will house:
  - Electrical and Computer Engineering
  - Systems Engineering
- Synergy in Cyber domain (ECE and SE teach several of the Cyber Ops Courses)
- Lab Deck completely engineering
  - Center for Autonomous Vehicle Research
  - Improved Project Lab space for Midshipmen
  - Newly designed waterfront access

Rickover Redesign

- Expanded and new lab facilities for Nuclear Engineering
- Re-design and expand Mechanical spaces
- Additional space for Aeronautical
  - Upgraded Rotor Lab facility
- Project Spaces expanded for Midshipmen
- “Designing for the next 40 years”

"Ex Scientia Tridens"