



August 31, 2026 @ 4pm ET

PEP Office Hours

PEP is run by the American Society of Naval Engineers (ASNE) through generous support from the [Office of Naval Research](#) under grant number

N00014-25-1-2366.

**New Rules, Second Race Site
Same exciting race & community**

PEP26 National Competition



Portsmouth City Park, VA | April 14-16, 2026

What is PEP?

- The heart of PEP is an in-person race with crewed & uncrewed craft.
- This year's race will be on 4/13-16/26 at Portsmouth City Park in Portsmouth, VA.
- The craft must be electric-powered, cohesive, and safe.
- The American Society of Naval Engineers will support teams through the build, fall meet-ups, paper, and PEP presentation.



Brief Overview

PEP started in 2018 with 2 private craft.

Work continued through the pandemic. In July 2021, 6 teams met at the US Coast Guard Yard in July 2021.

In May 2022, PEP22 competed at Pohick Bay, VA with 10 schools racing 11 craft.

PEP23 & PEP26 occurred in Portsmouth, VA.

PEP24 & PEP25 occurred in VA Beach.

This year, we expect to have 68 schools building and racing boats in the national competition and are excited to start racing regionally!

navalengineers.org/PEPresearchPDF

2021 USCG Yard Baltimore



PEP27 Timeline & Process



September

Office Hours
PEP signup & rules
conversations
8/31 & 9/15

**PEP27 Sign-up
Due**
Send form to
education@
navalengineers.org
9/28 @ 2359 ET

**PEP27 Sign-
up opens!**
Sign-up form is
available
8/1

**First Checks
Sent**
ASNE sends first
checks to teams
Mid October

Second Checks Sent
ASNE sends
remaining funding
Early November

November

**Ohio Job Fair &
Testing**
Come test your
boat & find a career
in Springfield, Ohio
October 10
10am-4pm

Find Job/Internship: We will share opportunities & host hiring managers. You can search BuildSubmarines.com, local job boards, and use PEP to build your skills. PEP maintains a resume book, just send us yours if interested. Any PEP student can email education@navalengineers.org to discuss their careers.

January

PEP Alabama
Join us at the
Senior Bowl
1/29 8am-3pm

Design & Build

Hit the ground
running! Rapidly
iterate through
designs, make the
hard choices, and
order parts early

Winter Break
Ideally Hull is
done or propeller
is spinning

Test & Improve

**Race Info &
Waivers Sent**
2/17

March

**Papers/Videos
Due**
Three weeks
before
competition

Races & Celebration

PEP West: 4/2 (tentative)
Port Orchard, WA

PEP East: 4/13-16
Portsmouth, VA

PEP NC: 4/9 (tentative)
Raleigh, NC

PEP Ohio: 4/17
Springfield, OH

Demo Video
Send testing video
to secure starting
time for your race

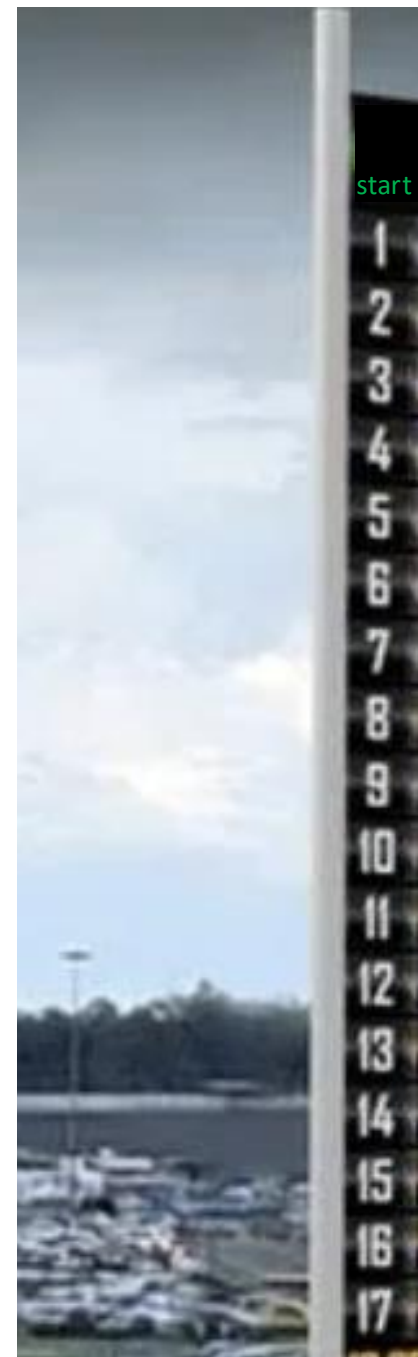
Key Changes: Safety & Race Day Requirements

- Specific guidance on ease of accessing main power disconnect
- Must identify the lowest point on the boat where water can intrude.
- Race-day regulations require us to treat the boat ramp like a testing lab (because it is).
- Rubrics emphasize **testing** in Risk.
- Updated rules for each division available online.



Key Changes: PEP East Racing Order

- Race times will be **randomly drawn the morning** of the heats.
- Teams will be expected to be ready to get in line at 8:30.
- Qualification is strict. Teams not qualified by the end of the session will not have a launch number for race day.
- #1-#7 must line up at the boat ramp to start racing at 0845. The queue must always have 4 boats. If you are not in the queue when the Dock Manager is ready for you, your launch number will go to the end of the line.
- If each boat has 2 opportunities to launch and there is time remaining in the race day, then second chance runs may be given to teams that had extenuating conditions during their first run.



Key Changes: PEP West Racing Order

- Teams can submit a testing video starting March 1.
- When you submit the video, you will get a launch number for your race day. #1 races first, #2 races second, etc.
- If you do not submit a testing video, a launch number will be assigned on race day.
- Qualifying starts at 9am. If you do not qualify, you cannot race. You can have as many chances as possible to qualify.
- Racing will start at noon and we will be out of the water by 3pm. Trophy presentation at 3:15pm and you can leave immediately afterwards.

Qualifying
0900-1100

Racing 1200-
1500

Key Build Features

Batteries are limited to 55V nominal

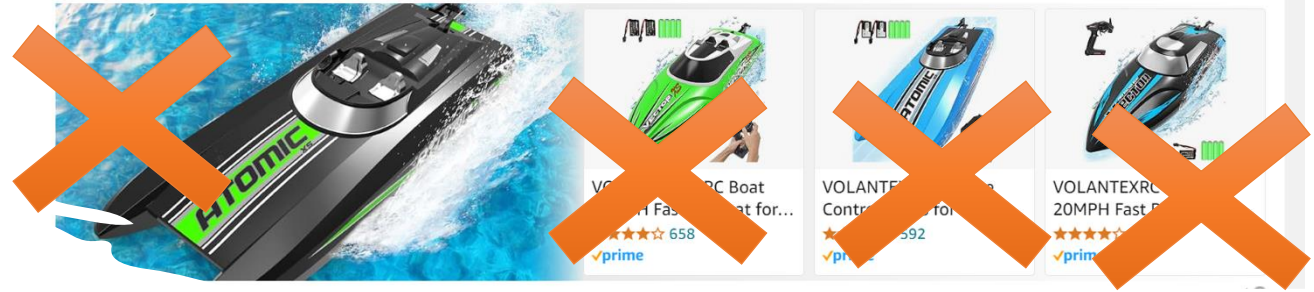
Documentation matters

No kits! No preform hulls, prebuilt battery, motor connections, etc.

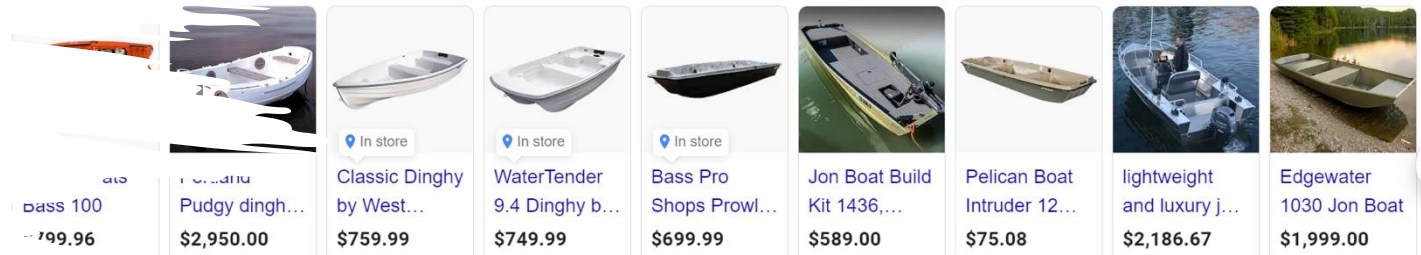
Uncrewed boats have to carry at least 30-60 pounds of non-functioning, easily-removable payload.

Craft have to get in and out of the boat dock in 5 minutes or less. We have extra staff available to time how long it takes you to get from the ramp into the water.

No kits. You need the opportunity to prove you designed it.



OK but make it your own. Adaptations matter to ONR judges.



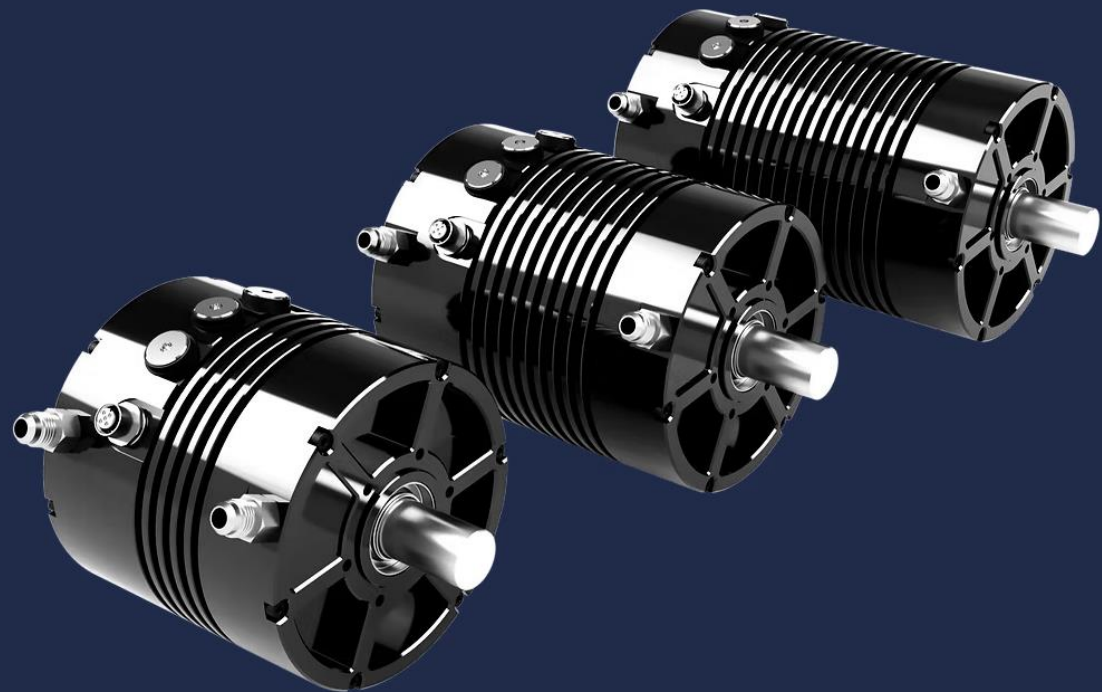
True innovation is not required but encouraged.





PEREGRINE

SPECS



The Peregrine 48-96V motor series and the Kestrel 300-600V motor series features a compact, light-weighted design with high torque performance. The P40 72V motor has proven extremely effective for boating applications, winning races since 2019. Request the most up-to-date CAD, and pricing at info@dhxelectric.com.



Not acceptable for
PEP teams.
(You need motors,
not fully built
propulsors)



EP-5 Electric Outboard

\$3,150.00

Comparable HP:

5HP

Voltage:

24 Volts

Suggested Battery Package Options:

AGM - Victron - 12V / 110Ah (2 batteries)

Lithium Iron Phosphate - 24V / 100Ah (1 battery)



EP-9.9 Electric Outboard

\$3,450.00

Comparable HP:

9.9HP

Voltage:

48 Volts

Suggested Battery Package Options:

AGM - Victron - 12V / 110Ah (4 batteries)

Solid State - 48V / 120Ah (6.0kWh) (1 battery)



EP-14 Electric Outboard

\$4,950.00

Comparable HP:

14HP

Voltage:

48 Volts

Suggested Battery Package Options:

AGM - Victron - 12V / 130Ah (4 pack)

Solid State - 48V / 120Ah (6.0kWh) (1 pack)



Email education@navalengineers.org
if you plan to buy Blue Robotics
Thrusters by October 10.



T200 Thruster

The world's most popular thruster for ROVs, AUVs, and more

FROM: \$230.00



T500 Thruster

More thrust, more possibilities! 3x the thrust of the T200

FROM: \$790.00



The PEP Community

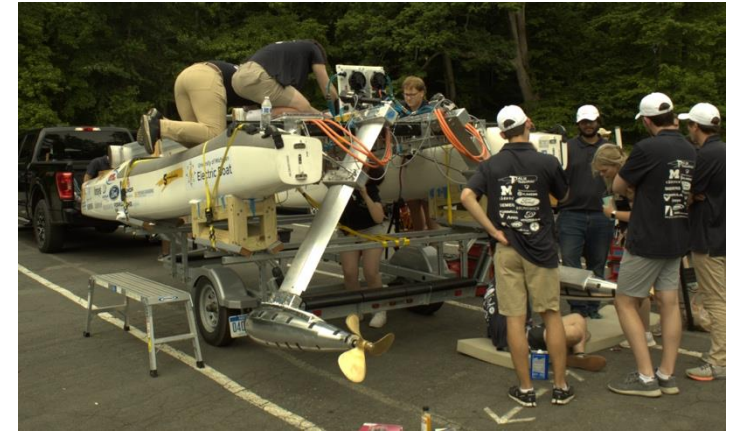
Let's get loud together!

- Our Discord is open to all interested in Promoting Electric Propulsion.
 - <https://discord.gg/ZsXtgw6SDT>
 - [linkedin.com/showcase/pep-workforce-development/](https://www.linkedin.com/showcase/pep-workforce-development/)
- ASNE hosts internships/job talks, professional symposia, and professional-development free for students.
- The entire PEP community works together, and relations students start now can help strengthen your future career.
- We invite you to the many fall events; please try to attend one so we can give you free components and discuss careers. If an event at your school is better, please just let me know.

Yes, that's allowed!

The wide-range of designs possible could be paralyzing, but we encourage teams to explore the possible. Successful teams choose a design within the first month and spend months fabricating and testing.

It just has to be safe!



Crewed Competition has 2
Divisions:
Planing & Displacement
- Very similar to PEP26



Planing Division
Champion



PEP27 Crewed - Planing
Same as PEP26 (<55V)



Displacement
Champion



PEP27 Crewed - Displacement
Same as PEP27 (<55V)



- Note that all craft are limited to 55V nominal rating.
- 5-mile race rewards endurance.
- We can always discuss whether your craft is a better fit for Planing or Displacement Division.

PEP27 Unmanned Divisions



Uncrewed
Champion

PEP27 Uncrewed - Open

Similar to PEP26 (<55V, Remote Control from chase boat)
Must carry 60 pounds of payload



- You can ride in a chase boat and use a Remote Control to operate your craft.
- Boat must carry a 60-lb payload that is easily removed for us to weight it and cannot be subdivided into more than 15-lb sections. Teams must provide their own payload.
- Race is for 2 miles and teams will have their distance recorded at 45 minutes if they are still on the course.

- First, set up a boat that can go 2 miles using 2 waypoints that are $\frac{1}{4}$ mile apart (4 laps)
- Craft must carry a 30-lb payload this is easily removed for us to weight it and cannot be subdivided into more than 15-lb sections.
- Then, explore autonomy more deeply after the platform is reliable.
- You will be able to be in a chase boat to operate a kill switch

Autonomous Champion



2 Miles: 7 min, 15 sec

PEP27 Autonomous

Same as PEP27 (<55V, 30-lb. payload)
May use GPS waypoints or more advanced levels of autonomy



PEP27 Over The Horizon

(<55V, 30 pound payload)
Big Challenge!
Remote control from shore



- Very challenging division.
- If you pursue this competition, let's test the system early and often.
- Craft must carry a 30-lb payload this is easily removed for us to weight it and cannot be subdivided into more than 15-lb sections.

Budget Warriors & Regional Competitions



PEP27 Budget Warriors

Same as PEP27 (<55V, 30-lb. payload)
Spend \$1,500 or less
National & Regional Competitions!



- Boat cannot exceed \$1,500.
- This includes everything from the hull to the propulsion system to wires and 3-D printed brackets.
- Only the transmitter is omitted from the cost calculation.
- Race with a team-provided 30-lb payload (a non-functional weight)

Material (Category)	Total Cost	Quantity Used on Craft	Cost on Craft
Battery (electrical)	\$1,000 for 8 batteries	4	\$500

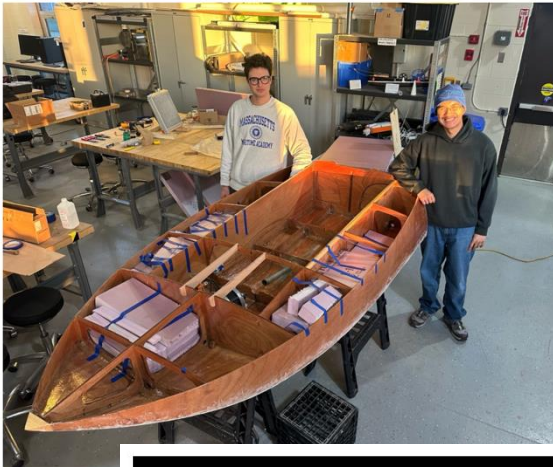
School Name: Massachusetts Maritime Academy

Team Name: Birddoggers

Division:

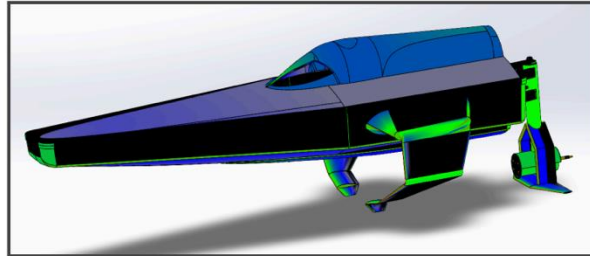
- | | |
|---|--|
| ☐ Crewed – Planing | ☐ Crewed - Displacement |
| ☐ Uncrewed – Autonomy | ☐ Uncrewed – Over-the- |
| ☒ Uncrewed – Open | ☐ Uncrewed – Budget V |

Photo of Team with Boat:



PEP26 - Uncrewed Open

DAEDALUS



Ben Linzer, Yiru Liu, Dale Rahn, Abbie Danielson, Alex Niva, Stephen Moore

- Background research utilized in design decisions.
- Review of design process demonstrating the team's entirely new electric propulsion system and why the hull and propeller are maximized to translate the stored power into speed. This section includes calculations and models used to support design choices.
- Overview of design and description of build processes for the subsystems including testing.
- Identify risks impacting the craft's competition and how they are monitored and mitigated.





Displacement
Champion

PEP27 Crewed - Displacement
Same as PEP27 (<55V)



Rules for PEP27 Displacement Division



Autonomous
Champion



Planing Division
Champion

PEP27 C
Same as P



Rules for PEP27 Planing Division



Autonomous
Champion

Highlights:

- There are three new rules (#6, #11, and #12) and tweaks to other rules.
- If you have questions about a rule, ask early and judges can provide feedback.
- Be ready for more safety requirements and a 45-minute on-water limit on race day.

#	General Rules for PEP27 Competing Craft
1	Entry is open to any vessel, crewed or uncrewed, operating with an electric propulsion system.
2	Vessels shall have appropriate fit and finish to appear seaworthy; no “Frankenstein” vessels (the hull should be cohesive, there should be no seams or joints that may come apart while on the water).
3	All vessels must comply with USCG safety regulations. (Uncrewed hulls do not need to be registered. Many states have “experimental” registration for research manned craft.)
4	Gasoline engines, recharging via an onboard generator, sails, and manual propulsion are prohibited during the competition. Solar power and other renewable systems may be onboard to recharge.
5	Competitors will not have a charging station available to them on site.
6	ASNE will allow students to ride on a Navy craft to operate a kill switch if necessary.
7	There must be a main-power disconnect through which all current to the propulsion system must travel. If the disconnect is manually moved to Off, then all high-voltage electrical systems should cease. You will need to document where this disconnect is and how someone can turn off your craft. This disconnect must be accessible in less than 5 seconds when the vehicle is on the water. (Either on the exterior on the vessel or under a simple hatch that does not need tools to be opened.)

Please note that reporting physical testing is a new focus in the rules above.

	Meets	Partial Meets	Does not meet
Background 2 points	The background research into maritime autonomy is clear and creates a clear rationale for the original design utilized and proves this design is original.	The background research into maritime autonomy is not complete OR this research is comprehensive but not well connected to the design utilized.	The background research into maritime autonomy is not complete AND not well connected to the design utilized.
Design & Analysis 6 points	Design of the craft ensures the hull matches the propulsion system with autonomous controls, including code, calculations and simulations.	Design of the autonomous craft may ensure the hull will match the propulsion system for autonomous operation, but the evidence is not clearly supporting.	Design of the autonomous craft ensures the hull does not match the propulsion system for autonomous operation, nor provide calculations & simulations.
Overview of Build & Fabrication Processes 4 points	Each system (power storage, powertrain, code, controls, propulsion, propeller/jet) is clearly described and the build and testing processes are well documented to show how it is unique, safe, and well controlled.	Most of the systems (power storage, powertrain, code, controls, propulsion, propeller/jet) are clearly described and the build and testing processes are documented with some clarity.	Few of the systems (power storage, powertrain, code, controls, propulsion, propeller/jet) are clearly described and the build and testing processes are not well documented.
Risk 8 points	Clear description of the risks mitigated during the design, build, and coding, and a description of the risks that will be controlled during the race. (Half of these points will review real-world testing documentation.)	The risks are clearly described but the mitigation plans are incomplete OR some risks are described and mitigated but others are omitted.	Few risks are clearly described and/or the mitigation plans are incomplete.

Rules & Rubrics

- Rules & Rubrics for each division are online
- Please ask if you have questions.
- [PEPworkforce.com](https://www.pwpworkforce.com) & navalengineers.org/PEP

Building an electric-powered craft is hard

- Decide whether you are purchasing or building your hull immediately.
 - The hull, battery and propulsion system all inform each other.
1. The race is 2 or 5 miles; the hull and propulsion will determine your speed. This gives the total time you will be at sea.
 2. Use this time to determine the battery you need.
 3. The battery, hull and propulsion systems will give you the total weight of the craft. Simulations & Testing ensure you have necessary freeboard.
 4. Prototypes are helpful.
 5. Need to start building this semester.



Advice for
first-year
teams





PEP27 East Dates

- Send a video presentation in by 3/23.
- Send white paper in by 3/23.
- Crewed competition: 4/13-14*
- Uncrewed competition: 4/15-16*
- Heats start at 0900 April 14 & 16.
- We should conclude with the award ceremony onsite by 1600.
- We have chase boats and PFDs for both days.
- Accommodation information will be shared online and on the Discord.

* Exact competition dates may change on 10/2.



Funding is critical, but not everything

- For first-time teams, we have found that \$7,000 will get you everything you need, including travel to the event.
- The 2021 winners from University of Kentucky had half the funding.
- Figure out what your university does well (shop space, 3-d printing, etc.).
- Time is money. You will find that many things are free in February but very expensive to rush in April.

Key Resources for Teams

ASNE Website

- PEP page: navalengineers.org/PEP
 - ANSYS webinar series
 - Mandles Prize
 - Check out celebration pages and last year's research summary: navalengineers.org/PEPresearchPDF
- ASNE [Symposia](#): free for undergrads
- ASNE [Webinars](#): free for all

Other Resources

- Some vendors provide excellent service on how to integrate components/use software
- Consider a naval engineering resource like [“Naval Architecture for Non-Naval Architects”](#)
- Consider your area. Marinas, fabricators, and mechanics all have great resources that may be useful.

PEP27 Sign-up Form Now Available!

Name of your club,
senior design dept.,
or school



PEP Sign-up Form for 2026-2027 (due by Monday, September 28, 2026)



Designate 1 leader
(ideally a student but
could be faculty)

School/Club Name:

Mailing Address for Check:

Team Lead: _____

Should we follow you on social?

Exact Name to Write on Check:

☐ LinkedIn ☐ IG ☐ FB ☐ Website

Division: ☐ Crewed – Planing ☐ Uncrewed – Autonomy ☐ Uncrewed - Open
☐ Crewed – Displacement ☐ Uncrewed – Over-The-Horizon ☐ Budget Warriors

Funding: ☐ New PEP National Teams: \$7,000 ☐ Returning PEP National Teams: \$5,000
☐ Regional Budget Warrior Teams: \$1,500

We're getting
social!

**Due 9/28 at
2359 ET**

**Be sure the people
receiving mail
expect payments**

**Double check with
faculty/staff about
the name for the
check**

We can commit funding
1 team per university if
you want 2 teams, we
need to work together.

Questions? Email education@navalengineers.org

PEP27 Sign-up Form Now Available!

Cost, Schedule, & Performance. Federal contracts look for guarantees. Show us your plan.

Needed items	Expected Date of Purchase	Estimated Cost
Hull (purchase or creation)		
Energy Storage		
Motor(s)		
Control System		
Propeller(s)		
Other: Wiring, Gears, etc.		
Subtotal:		
Travel to Event		
Total (teams can raise funds in addition to PEP funding):		

* Continuing teams will need to submit a letter with this document describing 3 innovations that will ensure the craft better addresses the race requirements.

- The budget does not have to be exact, but please use it to thoughtfully plan expenses.
- Teams can raise money in addition to the PEP funding.
- Returning teams need to submit a narrative or table that describes 3 new innovations.

Questions? Email education@navalengineers.org

PEP27 Sign-up Form Now Available!

Check-in: List 3 possible times that we could meet virtually or in-person to discuss progress. (We're only looking for 1 meeting but would like some options to make a schedule.)

Date (Time) 1	Date (Time) 2	Date (Time) 3

☐ We read the PEP27 rules at PEPworkforce.com and will abide by them.

NOTE: The rubrics reward in-water testing through the Risk category which has a higher weighting this year. Please plan to extensively test your boat before competition.

Optional. Check yes (✓) if you would like a free ASNE membership on the next page.

PEP Team Member Name	Check if you want to become an ASNE member	Email Address (optional)
	☐ Yes Related society: _____ ☐ No	

- We will meet each team in person. Let us know what dates/times work for your team.
- The rules are listed at navalengineers.org/PEP & PEPworkforce.com.
- Testing data is part of the Risk scoring now.
- Sign up for free ASNE memberships.

Questions? Email education@navalengineers.org

Commitments Form

- Same form as last year, but we will collect this after January 1.
- We know disaster may strike, but if you show up with a non-working boat you will still qualify for PEP27 funding.
- The Safety and Media Releases remain largely unchanged. We will make sure all attendees are included on race day.

PEP 25 Commitments & Releases

(due by September 30, 2024)

The American Society of Naval Engineers (ASNE) will host Promoting Electric Propulsion (PEP) April 15-17, 2025 (Tuesday-Thursday). In order to receive funding, teams must commit to attending the competition.

I, _____, commit that the _____ team
team lead name team name
will attend PEP 25 in First Landing State Park Virginia in April 2025.

Signature: _____ Date: _____

Please note teams not attending PEP 25 will not be eligible for follow-on funding in 2025-2025.

Safety Requirements

Safety is our highest priority. Participants agree to obey safety instructions provided by competition organizers. Vessels that appear a hazard will not be permitted in the water. Vessels must comply with USCG safety regulations. PFDs must be worn by competitors when on the water and all vessels must carry a paddle or oar. All alcoholic beverages are banned during the competition and any evidence of alcohol or inebriation is grounds for immediate disqualification.

Please note that some states have an "Experimental" registration for manned boats, but some do not. Please consult ASNE if you are uncertain about your state's requirements.

The Department of Navy has generously agreed to provide a chase boat for the competition. If you are in need of support, please signal the nearest vessel by ASNE-provided radio, waiving to nearby chase vessel, and/or contacting your team.

Safety Release for those Attending PEP 25

The following must be signed to compete: We hereby release the American Society of Naval Engineers, its board members, directors, officers, employees, or agents, and the Department of Navy, and Office of Naval Research, its employees, agents, or organizations, from any and all claims and damages, present and future, arising from or in any way associated with this contest. Specifically, we will hold these entities harmless from any and all liabilities arising as a consequence of their actions or omissions, including but not limited to negligence of any type.

Media Release for those Attending PEP 25

Additionally, each participant consents to being filmed, photographed and recorded during and in connection with the event and consents to the use or publication of such recordings in connection with any promotional, educational or professional purposes. Each participant releases ASNE and its board members, directors, officers, employees, or agents from any and all liability arising from

Ansys Support

- There are PEP-specific trainings saved in the PEP Talks tab of the websites.
- They make software widely available to universities.
- The Ansys Resource center has 1,300+ saved webinars for anytime learning.

ansys.synopsys.com/resource-center

CFD Tips and Tricks for Student Teams - Part 1

September 15, 2026, at 10 AM EDT / 4 PM CEST / 7:30 PM IST

Discover proven strategies for handling complex geometries, refining mesh quality, and unlocking the full potential of your CFD workflows.

FEA Tips and Tricks for Student Teams

September 15, 2026, at 12 PM EDT / 6 PM CEST / 9:30 PM IST

See key aspects of FEA, including mesh generation, material properties, boundary conditions, and validation of results.

Ansys Student Team Partnership: Licensing, Software Installation, and Learning Resources

September 14, 2026, at 10 AM EDT / 4 PM CEST / 7:30 PM IST

Learn more about Ansys Student Team Partnership, understand software licensing and Shared Web Licensing access, download and install Ansys software, and explore the training and learning resources available to help teams succeed throughout their projects and competitions.

[Webinar](#) [Resource Center](#)

July 28, 2026

AI for Engineering: Explore Ansys AI Tools

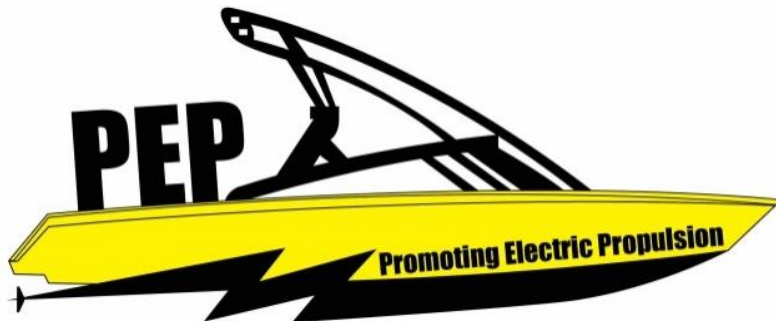


Discover how Ansys AI empowers engineers to work smarter. Join our webinar for insights into SimAI, GeomAI, TwinAI, and Agentic AI, and learn how these technologies can accelerate design, simulation, and decision-making workflows.

PEP26 National Competition



Portsmouth City Park, VA | April 14-16, 2026



Questions?



OCEAN ENGINEERING UUV OPERATOR-NB

 McLaughlin Research Corporation  Newport, RI 02840, United States

Aug 31

Job Title OCEAN ENGINEERING UUV OPERATOR-NB Location Newport, RI 02840 US
(Primary) Job Type / Status Full-Time Education Bachelor's Degree ...



Manufacturing Engineer

 VulcanForms  Newburyport, MA 01950, United States

Aug 10

About Us Arwood Machine, A VulcanForms Company, is a well-established ISO-9001:2008, AS9100C-certified high-precision job shop in Newburyport,...



** Manufacturing Engineering - Part Time

 Dwyer Instruments, Inc.  Wolcott, IN 47995, United States

Sep 01

Part Time Majors Electrical Engineering, Mechanical Engineering, Electrical Engineering Technology, Mechanical Engineering Technology, Mechatronics...

The SMART Scholarship-for-Service Program is a unique opportunity for STEM students to advance their education and jumpstart their careers. SMART provides merit-based scholarships to bachelor's, master's, and doctoral students pursuing STEM degrees. SMART scholarship recipients receive **full tuition, annual stipends, summer internships, and after graduation, civilian employment with the Department of Defense.**

Applications are due December 1.

SmartScholarship.org

SMART Scholar Benefits



Full tuition



Annual stipend between \$30,000 - \$46,000, depending on degree level



Summer internships



Book and health allowance



Experienced mentor



Guaranteed employment at a DoD facility upon degree completion



SEAP

SCIENCE AND
ENGINEERING
APPRENTICESHIP
PROGRAM

NREIP

NAVAL RESEARCH
ENTERPRISE
INTERNSHIP
PROGRAM

Paid Internships due November 1, 2025