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2026/27 Ottonel Popesco Student Challenge by PEMA

2026/27 Topic:

How can AI support operational decision-making in ports and terminals, increasing productivity while improving safety and reducing environmental impact?

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1. Challenge and Project

Artificial Intelligence (AI) utilising advanced data analytics has become a key focus of ports and terminal operators worldwide. It has the potential to play a key role in optimising operational efficiency on both the vessel and yard sides.

Despite continuous improvements in equipment, infrastructure and automation, terminal operations remain constrained by multiple variables. These include unpredictable vessel arrival times, landside equipment synchronisation, weather, safety hazards, and the requirement to reduce the environmental footprint of heavy terminal machinery.

This year's **PEMA Student Challenge** invites participants to explore innovative ways to deploy **AI technologies to support operational decision-making in ports and terminals.** The objective is to identify and explore AI-related concepts that **increase operational productivity, improve site safety, and reduce environmental impact.**

Teams are encouraged to look beyond conventional solutions and consider new applications in machine learning, predictive analytics, computer vision, autonomous system coordination, power-use optimisation, and human-AI collaboration. Proposals may include AI applications for existing terminals, entirely new smart terminal layouts, or intelligent digital platforms that optimise resource allocation, improve safety, and reduce the environmental impact.

The project study should consider the following approach

1. **Analysis of current port and terminal operations**, identifying specific areas where traditional decision-making creates inefficiencies, safety risks, or avoidable emissions.
2. **Identification of bottlenecks and constraints** that limit terminal throughput.
3. **Assessment of existing software, digital tools, and automation systems** currently utilised in ports to evaluate their limitations in smart decision-making.
4. **Development of innovative AI concepts** to support operational decision-making. These may include, but are not limited to:
   - Predictive AI models for overall terminal logistics planning
   - Computer vision or sensor-fusion systems to enhance on-site safety
   - AI-driven optimisation algorithms to optimise equipment utilisation and minimise fuel/power consumption
   - AI-based human-machine interfaces (HMIs) for terminal operations personnel.
5. **Evaluation of the operational impact** of the proposed AI solution, including estimated productivity gains or throughput increases.
6. **Assessment of the economic implications**, considering software deployment costs, training costs, infrastructure requirements, and potential return on investment (ROI).
7. **Assessment of safety and sustainability impacts**, including projections on accident reduction, energy savings, and carbon footprint reduction.

2. How To Enter

1. Form a team of students from your university - MSc, BSc or diploma students. You as a team formulate an answer to address the challenge given above. You do the work on the challenge as a team. You can invite one university staff member to provide you with advice. Ensure that you have submitted your team sheet before the initial deadline.
2. **By Friday 5th February 2027, 17:00 CET:** Submit a PDF copy – A4 and no more than 8 pages – on your proposed solution and completed team sheet.
3. **By Monday 15th February 2027: Finalists will be notified** and provided with a full briefing and allocated a date – week commencing **22nd February** – to make a detailed presentation to the judging panel via Teams or equivalent media. 30 minutes will be reserved for each presentation (including 5 minutes for questions).
4. A panel of experts will judge your solution based on the following criteria:
   - Innovation potential of the ideas presented.
   - The practicability of the solution – could your ideas be implemented in the real world?
   - Academic value of the ideas presented.

   The adjudication period will take place week commencing 1st March, and the winning team will be announced to all finalists in due course following this period.

3. Winner Information

The winning team will be announced in due course following the presentation from all finalists. The winning team prize is €2,000 shared between teammates, plus certificates for the winning team and finalists. There will also be publicity via PEMA website and social media channels, plus other media coverage. Where suitable, we will arrange for a representative of PEMA to present the winning team with a cheque for a photo opportunity. This will be coordinated with the winning team to select a date that suits all members of the team to attend.

We look forward to your participation in the 2026/27 PEMA Student Challenge.

For questions please contact the PEMA Student Challenge Coordinator - Karen Cloke - on **info@pema.org**

4. Rules Of Participation

1. The PEMA Student Challenge competition is open to teams from any university globally.
2. Teams must consist of 3 - 4 participants.
3. All participating students must be aged 18 or over.
4. All participating students must be studying towards an undergraduate or postgraduate degree.
5. All team members must attend the same university but can be studying different subjects.
6. Multiple teams from the same university can enter if they compete as independent teams and there is no overlap of work.
7. Each team is required to nominate their team captain who will act as the primary delegate for PEMA Student Challenge communications.
8. Teams are permitted to have a sponsored lecturer who can act as a consultant but are not allowed to contribute to the production of the report and presentation.
9. All presentations must be written in English.
10. By signing up, students confirm their participation in the competition and agreement of the Rules of Participation.
11. By submitting a proposal teams agree to their work being published under the Student Challenge page on the PEMA website.
12. All presentations must be in Microsoft Powerpoint format, slide ratio (16:9).
13. The teams who qualify for the final stage of the competition agree to the use of their names and images in any PEMA publicity material.
14. The team captain of the winning team will need to provide bank details to transfer the prize money.
15. It is the responsibility of the team captain of the winning team to disseminate the prize money equally among teammates.

The prize is as follows:

16. €2,000 (split between team members, exposure on PEMA website and social media channels and the possibility of their solution being published in a relevant publication.

Questions on plagiarism, or any other queries must be directed to the PEMA Student Challenge Coordinator – Karen Cloke – on **info@pema.org**

5. Frequently Asked Questions

1. What is the Ottonel Popesco Student Challenge by PEMA?

The Ottonel Popesco Student Challenge by PEMA is an annual competition run by the Port Equipment Manufacturers Association and is open to students studying any relevant degree from universities globally. In the first stage of the competition, teams (comprised of 3 - 4 students) are invited to submit a proposal, providing their solution to the Student Challenge Question. The question itself constructs a fictional scenario within which there is a real-world operational issue that the students must solve. The theme of the challenge is always topical focusing on current challenges facing the industry today.

The winning team receives a prize of €2,000 to be shared between team members, the possibility of their solution being published in a relevant publication.

2. Who can participate?

Participation in the Ottonel Popesco Student Challenge by PEMA is open to any team of students currently studying towards an Undergraduate or Postgraduate degree. The competition is open to universities globally and students must be aged 18 or over.

3. How many students can be in a team?

Teams must comprise 3 - 4 students, one of whom must be a nominated team captain who will act as the main contact for the Student Challenge communications.

4. Can more than one team from the same university participate?

Multiple teams from the same university can participate, so long as they compete independently of each other and there is no overlap of work. Team mates can be studying different degrees but must attend the same university to compete.

5. How can I participate?

To submit a team for the Student Challenge 2026/27, please click here to fill out our online submission form or visit the Student Challenge page on **pema.org**

6. Who do I contact if I have additional questions?

For any questions or queries relating to the Ottonel Popesco Student Challenge by PEMA, please contact PEMA Student Challenge Coordinator - Karen Cloke - on **info@pema.org**

7. What is PEMA?

Founded in 2004, the Port Equipment Manufacturers Association, PEMA, provides a forum and public voice for the global port equipment and technology sectors. The Association has seen strong growth in recent years, and now has 130 member companies representing all facets of the industry, including crane, equipment and component manufacturers, automation, software and technology providers, consultants and other experts.