TAC Challenge

Rules and Regulations

Last reviewed: March 2026

Key Differences Between TAC Challenge Rules (2024 → 2026)

Competition Theme Expanded

The 2026 rules explicitly define the technology focus areas of the competition. The theme now highlights:

- underwater docking
- inductive charging
- underwater navigation and positioning
- object/image recognition
- acoustic localization
- visual inspection
- pipeline inspection
- manipulator intervention
- launch & recovery philosophy

No rule change, but clearer expectations of what technologies teams should demonstrate.

Venue Description Expanded

The 2026 rules describe the competition area more precisely, including; 20 m × 20 m operational harbor area (exact coordinates), and pool vs ocean mission locations

The 2024 version only describes the venue more generally.

Impact is better planning for localization systems, tether length and navigation strategy.

Weight-Based Scoring

2026 explicitly includes a weight scoring table. This is more clearly defined in the 2026 rulebook.

Encourages compact vehicles and man-portable designs (industry standard).

Multiple Vehicle Support Clarified

2026 explicitly states teams may use multiple vehicles, including USVs supporting the underwater vehicle.

Teams can legally deploy:

- USV + AUV
- relay systems
- acoustic localization platforms.

Battery Voltage Limits Specified

The 2026 rules clearly define battery limits: Max open circuit voltage: 60 VDC

Electrical design must remain under 60 V battery systems with safe sealed battery packs.

Tether Voltage Limit Introduced

2026 inroduces a rule for tethered power with a maximum tether voltage: 50 V

Weather Limits Defined

Explicitly defines weather operating limits, which gives better expectations for thruster sizing and navigation robustness.

Safety Procedures Expanded

The 2026 document includes new safety clarifications, including

- Pool Safety Rule
- Charging Area Rule

TDR Requirements Updated

The Technical Design Report section was restructured. The 2024 TDR structure was less formalized.

Communication Channel

email:
challenge@tauautonomycenter.no

Discord Community form

What Did NOT Change

These major elements remain identical between 2024 and 2026:

- competition structure (static + dynamic)
- main missions
  - docking
  - pipeline inspection
  - visual inspection
  - valve intervention
- scoring structure
- autonomy bonus philosophy
- vehicle buoyancy requirement
- LARS
- ArUco marker usage

Summary

The 2026 rules do not drastically change the competition, but they:

- clarify safety
- encourage lighter vehicles
- formalize documentation
- allow more advanced system architectures

Contents

1 Introduction

Tau Autonomy Center are pleased to announce the TAC Challenge for Unmanned Underwater Vehicles 2026, which will be held at Tau Autonomy Center, just outside Stavanger, Norway. This is the official competition handbook.

The goals of this competition are to advance the state-of-the-art of Unmanned Underwater Vehicles by challenging multi-disciplinary teams of students to perform piloted and autonomous mission in the industrial underwater environment and to foster ties between young engineers and the organizations involved in piloted and autonomous underwater technologies.

Please note that although this is a competition focusing on autonomy, the tasks are designed for both autonomous and piloted drones (or a combination).

The official competition language is English.

Any questions concerning the contents of this document of other competition details can be directed to TAC Challenge via the TAC Challenge Community Forum, or via email to challenge@tauautonomucenter.no marked with “competition questions”.

The link to the TAC Community Forum, as well as other information, can also be found on the TAC Challenge website:

https://tacchallenge.com/.

2 Competition Overview

2.1 Competition Objective

TAC Challenge aims to inspire innovation and interest in autonomous robotics for underwater applications among STEM students. This competition invites teams to showcase their expertise in this advanced and dynamic field.

Student teams are tasked with conceiving, designing, building, and competing with small unmanned underwater vehicles. Creativity and unconventional solutions are strongly encouraged.

2.2 Competition Theme

The competition is designed to replicate real-world industry problems. The challenges are provided by sponsors and contributors where all of the challenges are relevant to the drone industry today.

Drone technology has evolved rapidly during the last years. The development of autonomous underwater vehicles is highly relevant today and presents a series of challenges. Some of these challenges include underwater residency and charging, communication, navigation, and positioning.

Successful implementation of the new technology is dependent on multi-disciplinary teams working together for safe integration and operation of the untethered vehicles.

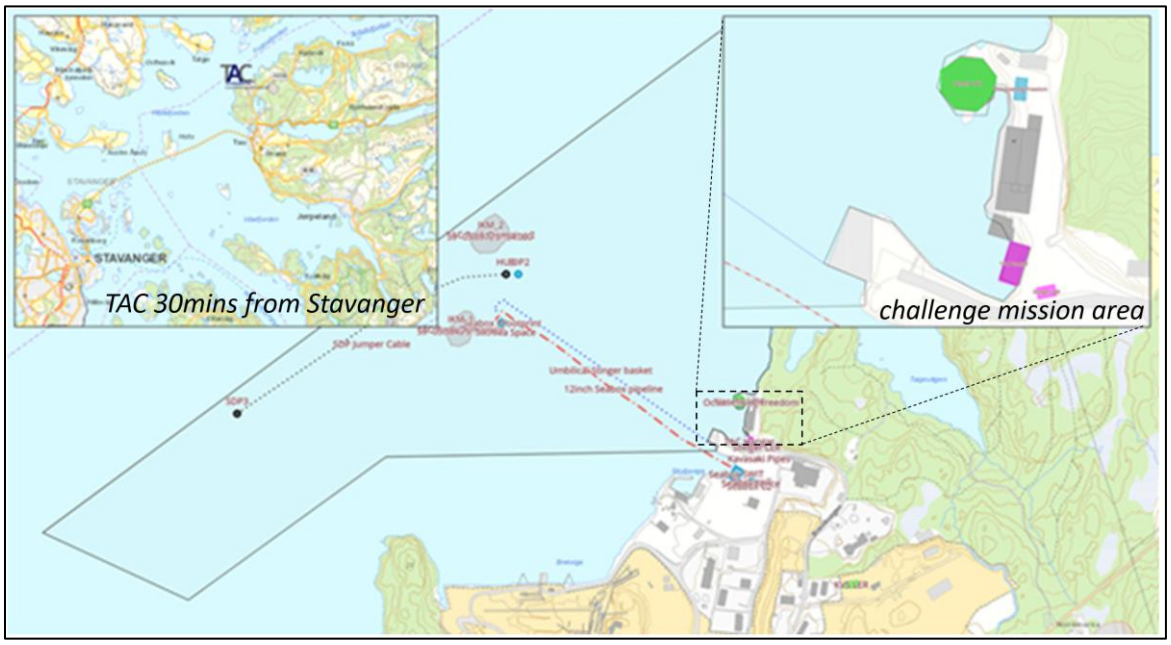
The 2026 competition focuses on the following:

1. Underwater docking to a Subsea Docking Station.
2. Underwater charging via induction connectors.
3. Underwater navigation and positioning.
4. Object and image recognition underwater.
5. Acoustic localization and navigation.
6. Visual inspections.
7. Pipeline inspection.
8. Drone intervention by operating standard subsea interfaces by use of manipulator.
9. Launch and recovery philosophy.

2.3 Dates and Venue

TAC Challenge 2026 will be held **15 – 19 June 2026** at Tau Autonomy Center outside Stavanger, Norway. The teams will have the opportunity to train on certain missions during the weekend. The competition days are Monday and Tuesday. The missions will be completed in the marked area in the top right corner and carrying the following coordinates: **59.09246°N, 5.9101°E**.

The venue consists of, but is not limited to, a drone docking station, a pipeline, a subsea structure, and launch and recovery area.



The area of operation is located in the harbor at Tau Autonomy Center (TAC) and is approximately 20 m by 20 m. One mission will be performed in the TAC training pool.


Area of operation
Tau Autonomy center
20 m
20 m

2.4 Competition Scoring

The competition is divided into *static* and *dynamic* events.

Static events include the Technical Design Report and Team Presentation, and **dynamic events** include the missions. The presentations will be held in-person during the competition, while the documentation will be submitted in advance. The static events will be evaluated and scored by a jury of professionals within the field. The static events are mandatory for all teams.

The **dynamic events** (i.e., missions) will be scored based on the *results* of the mission as well as the *execution method* (i.e., demonstration of autonomous behavior). A combination of autonomous and piloted mission strategy is allowed. To encourage creativity and innovation, the teams are free to decide how to solve a mission, as long as they stay within the rules and framework of the competition. This allows using different types of vehicles, like an ASV, UAV, etc. If your team is unsure if your planned strategy is allowed, contact TAC Challenge. Autonomous behavior will award the highest scoring, but also represent the highest risk for success. The missions are detailed in the Mission Booklet.

Competition Scoring - Maximum points			
Static Events	Standard Points	Bonus Points	Total
Technical Documentation	100	N/A	100
Team Presentation	100	N/A	100
Dynamic Events (Missions)	Standard Points	Bonus Points	Total
Docking	120	100	220
Pipeline Inspection	100 *	300 *	400 *
Visual Inspection	120 *	120 *	240 *
Valve Intervention	100	200	300

*Approximate value due to unknown number of markers to identify. See the Mission Booklet.

3 Regulations

3.1 Eligibility

3.1.1 International teams
The competition is international and welcomes teams from all over the world.

3.1.2 Team members
The majority of the team members must be full-time students at university level or lower. This does not include PhD students and candidates. A team member may only be part of one team and take part in static and dynamic events for one team only

3.1.3 Professional involvement
The vehicles are meant to be conceived, designed, and maintained by the student team members with limited involvement from professionals. The students are, in other words, expected to be a significant part of the development process.

3.1.4 Team supervisor
Each team must have one team supervisor. The team supervisor is the main contact person for the officials during the registration process and the competition.

3.1.5 Number of teams
A university can register several teams. Teams which are formed with members from two or more schools/universities are treated as a single team.

3.2 Safety

3.2.1 Responsibility of equipment
Competition organizers are not responsible for any damage or loss of the vehicles or equipment before, during, or after the competition.

3.2.2 Launch and recovery.
The teams commit themselves to use the standard launch and recovery procedure sat by TAC Challenge. Failure to use this procedure can lead to disqualification from the competition. The LARS method is further detailed in the Vehicle Requirements section.

3.2.3 Separated charging area
There will be a separated charging area on the competition site. Charging of main power batteries is only allowed inside this area. No machining is allowed in the charging area. At least one team member who has knowledge of the charging process must stay with the batteries during charging. Batteries must not be charged inside of sealed vessels at any time.

3.2.4 Grounds for disqualification

Organizers reserve the right to penalize or disqualify a team registered for their competition in case of unsafe operating behavior, especially if the reputation of the competition, sponsors and other teams is compromised.

3.2.5 Pool Safety

Due to the risk of ground fault, one is not allowed to reach inside the training pool once the docking station is powered on. The teams should also limit reaching in the water when their own vehicle is in the pool.

3.2.6 Limitations

Since the competition will be arranged outdoors and Norway has a lot of different weather, even in June, the following weather and condition limitations apply:

Weather limitations	
Precipitation	Light rain
Wind speed average	8 m/s
Maximum gust speed (10 minute)	10 m/s
Significant wave height	1.5 mS
Sea current	0.3 knots

The competition judges will notify the teams if the weather conditions are beyond these limits.

4 Rules

4.1 Rules of Conduct

4.1.1 Alteration to competition schedule

The officials reserve the right to change the schedule of the competition and/or interpret or modify the competition rules at any time and in any manner that is, in their sole judgment, required for safe and efficient operation.

4.1.2 Mannerisms

All teams are required to cooperate with and follow all instructions from the TAC Challenge organizers. This is mainly meant for the efficiency of the competition and the safety for everyone involved.

4.1.3 Punctuality

It is the responsibility of each team to be in the right place at the right time.

4.1.4 Misconducts

Misconducts or failure of a team member to follow an instruction directed specifically to that team or team member can result in penalty points being deducted from the team's overall score or, in extreme cases disqualification.

4.2 General Rules

4.2.1 Forfeit

If a team is not present and ready to compete at the scheduled time they forfeit their attempt at that event.

4.2.2 Mission Briefing

Team supervisor, pilots, and other members of the team are required to attend a team briefing related to the event they partake in.

4.2.3 Competition officials

The competition officials disassociate themselves from all activities of the teams besides their own competition and associated events.

4.2.4 Usage of common sense

All teams are advised to follow safe practices and common sense when working on the vehicle and when operating the vehicle, before, during, and after the competition.

4.2.5 Competition supervision

Stinger Technology will observe the underwater activities with their own Unmanned Underwater Vehicles. The video footage will be streamed for the judges and participants.

5 Technical Requirements

5.1 General Requirements

5.1.1 Engineering practices

The vehicle must be designed and fabricated in accordance with good engineering practices. Good environmental practices are emphasized.

5.1.2 Safety inspection

Vehicles can and will be inspected by any competition officials at any time to ensure that there is no unreasonable safety hazard to participants, staff, or the host facilities. This also includes equipment supporting the operation (e.g., power and control panels). The organizers, sponsors, partners are in no way liable for any injury or damage caused to or by any vehicle or equipment.

5.1.3 Using multiple vehicles

Multiple vehicles may be used during missions, including the use of Unmanned Surface Vessels(s) (USV) to support the underwater vehicle(s). USVs are not weight restricted.

5.2 Vehicle Requirements

5.2.1 Weight Requirements

The team will also be awarded points based on the weight of the underwater vehicle. A vehicle under 25kg will award the most points, due to this being a limit used by the offshore industry for man-portable equipment. The vehicle will be weighed before each mission. If the drone's weight varies between the missions, the highest weight will count.

Weight including batteries	Points	Comments
< 25 kg	+50p	
25 – 50 kg	+20p	
50 – 100 kg	0p	
> 100 kg	---	Disqualified

5.2.2 Vehicle emissions

Due to environmental concerns, the drone is not permitted to emit anything besides air and water during the competition.

5.2.3 Batteries

If the team decides to use batteries, all batteries must be sealed to reduce the hazard from acid or caustic electrolytes. The open circuit voltage of any battery or battery system in a vehicle may not exceed 60 VDC.

5.2.4 Launch and Recovery System (LARS)

TAC Challenge will provide a LARS for the underwater vehicles for the ocean missions. The method is based on a crane that lowers the drone from the quay to the ocean's surface. Once the drone reaches the surface, the crane is detached from the drone. For the vehicle to be

compatible with the LARS, it must have the possibility to be safely secured to carabiner hooks or a sling.

5.2.5 Tether

Since the area of operation connects to the open ocean, teams are strongly encouraged to use a tether to avoid loss of the vehicles. A **tether length of 50 m** is sufficient to maneuver freely in the area of operation (the tether should not be shorter than 30 m). If this is a problem, contact the TAC Challenge organizers.

If a team decides to have power in the tether, the voltage cannot exceed 50V. If this is a problem, contact the TAC Challenge organizers.

5.2.6 Buoyancy

All untethered vehicles must be positively buoyant.

5.2.7 Indication light

In the Docking Mission, the team can use a light to indicate power transfer between the inductive connectors (power puck). This light must illuminate when the secondary power puck receives power from the primary side (i.e., when docked). The light is only allowed to be powered by the power puck (i.e., it cannot be controlled and powered by the vehicle). This will be verified by the judges on land before the mission attempt starts. This light will be monitored pool side during the mission and must therefore be **visible from a distance under water**. The light-system will not be provided and must be developed by the team.

6 Static Events

6.1 Technical Design Report (TDR)

The Technical Design Report (TDR) is a key part of the TAC Challenge. The TDR provides teams with the opportunity to demonstrate their technical expertise, innovation, safety considerations, and competition strategy. The report should provide a concise yet comprehensive description of the team's technical design and engineering approach, outlining the system architecture, software, hardware design, and the team's competition strategy and SJA. The TDR can be awarded with a maximum of 100 points.

The TDR should include the following sections:

1. **Introduction**: This section should briefly describe the team's AUV or ROV design and objectives, as well as their overall competition strategy.
2. **Competition Strategy:** This section should provide a concise yet comprehensive description of the team's competition strategy, including how they plan to approach the different mission tasks and challenges of the competition.
3. **Safe Job Analysis (SJA):** This section identifies and mitigates risks associated with the missions during the competition. It involves breaking down the job into steps, identifying hazards, and implementing controls to ensure the job can be completed safely. A template for the SJA is given by TAC Challenge and is excluded from the 5-page limit). *If you have not received this contact challenge@tauautonomycenter.no.*
4. **System Architecture:** This section should provide a concise description of the AUV or ROV's hardware and software architecture, including its sensors, actuators, communication systems, and control mechanisms. The report should detail the software, electrical, and mechanical design. The team should explain how their system design and architecture aligns with their competition strategy.
5. **Testing and Validation:** This section should provide a description of the team's testing and validation process, including the procedures and metrics used to evaluate the system's performance.
6. **Conclusion:** This section should summarize the team's achievements and highlight how their design and strategy position them to excel in the competition.

The TDR will be evaluated by a panel of judges based on the following criteria:

- **Technical Depth and Innovation:** The report should demonstrate an understanding of the technical challenges and objectives of the competition and showcase innovative solutions to address these challenges.

- **Clarity and Organization:** The report should be well-organized, clearly written, and easy to understand.
- **Safety:** The report should demonstrate that safety considerations were incorporated into the design of the AUV or ROV. The report should also provide evidence of safety protocols that will be followed during the competition.
- **Competition Strategy:** The report should demonstrate a well-thought-out and effective competition strategy.
- **Feasibility:** The report should demonstrate that the team's design and strategy are feasible and can be implemented within the constraints of the competition.

Teams should ensure that their TDR fits within the maximum 5-page limit, while still conveying their technical expertise, innovation, and strategy. A well-written and concise report can impress the judges and highlight the team's unique approach to solving the challenges of TAC Challenge.

The TDR should be written in English and follow this format:

- 5-page limit (excluding SJA, references and appendices).
- A4 page size (ISO: 210 x 297 mm).
- Margins ≥ 0.8 in.
- Font: Times New Roman 12pt.
- Header on every page including team name and page number.
- Submitted in .pdf format.

Submit the TDR to challenge@tauautonomycenter.no marked with "*team-name* TDR."

The deadline for the TDR is 01.06.2026 (June 1. 2026) (this also includes the SJA)

6.2 Team Presentation

Each team will have a maximum of 20 minutes to present their AUV or ROV design and competition strategy to the judges. The presentation should be focused on providing a clear, concise, and engaging overview of the team's competition strategy, vehicle design and development process. The Team Presentation can be awarded with a maximum of 100 points.

The presentation can include visual aids, such as PowerPoint slides or videos, to help communicate the team's message. Teams should also be prepared to answer questions from the judges and demonstrate their AUV or ROV if requested.

The presentation should include these topics:

1. **System Overview:** The presentation should include a general overview of the technical systems for the vehicle design and address major design decisions.

2. **Competition Strategy:** The presentation should detail the team's overall competition strategy, including plans for completing the competition missions, contingency plans, and tactics for dealing with unexpected challenges. The presentation should also explain how the design of the AUV or ROV supports the team's competition strategy.
3. **Development Process:** The presentation should then describe the team's development process, including the methods used for prototyping, testing, and iteration. The presentation should demonstrate that the team followed a systematic approach to development, with documentation of their process and decisions.

7 Dynamic Events

7.1 General Overview

The dynamic events consist of missions which are all performed at the venue during the two competition days. The missions include:

- Subsea docking
- Pipeline inspection
- Visual inspection of subsea structure*
- Valve intervention*

**The Visual Inspection mission and Valve Intervention mission will be performed in the same run.*

The following subsection will present a general description of each task. Detailed mission descriptions are found in the Mission Booklet.

7.1.1 Subsea docking on docking station

A docking station is positioned in an indoor training pool in the TAC building. The vehicle will locate the docking station and then attempt to dock to this station. The docking station is equipped with an inductive 250W Subsea Power Puck, developed by Subsea USB, which can transfer data and power to the vehicle. The team will demonstrate power transfer by illuminating a light equipped on the vehicle connected to the secondary power puck; and establish communication with the docking station. The docking station will also be equipped with predefined visual indicators (ArUco Tags). Specific autonomous behavior will also reward points.

7.1.2 Pipeline inspection

A pipeline, positioned on the seabed in the operational area, needs to be inspected. The pipeline has an unknown path and position. There is an unknown number of ArUco markers along the pipeline which need to be identified. Delivering this code in the correct order will reward maximum points. Specific autonomous behavior will also reward points.

7.1.3 Visual inspection of subsea structure

An underwater structure, located on the seabed in the operational area, must be inspected. Various ArUco markers are positioned on the structure and must be recognized to achieve points. Specific autonomous behavior may also reward points.

7.1.4 Valve intervention on subsea structure

Two valves are positioned on the same underwater structure from the previous mission. The valves have a standardized subsea interface and can be turned either clockwise or anticlockwise in a 90-degree sector. Before the mission starts, a judge will inform the team on which way the valves must be turned and its final position. To achieve points, the team must operate the valves according to the information given by the judge. Specific autonomous behavior will also reward points.