DIRECTORATE GENERAL OF VOCATIONAL AND TECNICAL EDUCATION

18th INTERNATIONAL MEB ROBOT COMPETITION

UNMANNED SURFACE VEHİCLE (USV) CATEGORY GUIDE

TÜBİTAK | TİKA

2026

CONTENTS

WATER UNMANNED SURFACE VEHİCLE(USV) CATEGORY COMPETITION RULES

1. GENERAL INFORMATION ABOUT THE COMPETITION

1.1. Objective

The Unmanned Surface Vehicle Competition aims to provide an environment where students can acquire the knowledge, skills and competencies they need, become involved in the process of producing technology, shape the future through historical awareness and science, and develop empathy and courtesy. To this end, students are expected to increase their interest in technology, develop innovative thinking skills to design robots capable of performing tasks on water, engage in technological work to plan research and development processes, access and use information, analyse potential problems to generate solutions, and acquire new knowledge.

Additionally, in collaboration with the social and economic sectors, the aim is to cultivate a skilled workforce that possesses national and international professional competence, the culture of craftsmanship, professional ethics, and professional values; one that is innovative, entrepreneurial, productive, and adds value to the economy. Furthermore, the MEB Unmanned Surface Vehicle (USV) Competition, which will encourage students to understand the real-world applications of what they learn at school, see the processes by which their work becomes a product, and understand its relationship with the production process. It focuses on the use of unmanned vehicles with the aim of bringing together the knowledge and equipment of the developing technological infrastructure with you, our valued students, to contribute to sustainable, nature-friendly solutions that meet the needs of people and natural water resources, prevent the risk to the lives of living creatures by cleaning up the environment, reduce costs in water surface operations, and improve energy efficiency.

1.2. Theme

The oceans, the heart of our planet, are of vital importance to all living things. Approximately half of the oxygen in our world is produced by marine life. In addition, the oceans play an important role in many areas such as climate regulation, maintaining temperature balance, transportation, tourism and energy production.

However, due to increasing population, consumption habits and environmental pollution, our oceans and water resources are under increasing threat every day. Considering that our country is surrounded by seas on three sides, it is our collective responsibility to be aware of this issue and to find solutions.

Today, the importance **of intelligent robots used in manned and unmanned missions** is increasing to find solutions to these problems. In this regard, **the** planned **"Unmanned Surface Vehicle (USV)" category** aims to enable our students to produce technological solutions to environmental problems and all activities that will take place on the seas.

In this category, inspired by the founding year of the Turkish Naval Forces, 1081, your robots have been given the slogan **"TCG-1081"**. Our students are expected to complete the given tasks by turning their own designed surface robots into a product.

The robots to be developed must:

- Move in a controlled manner in the desired direction on the water,
- Perform tasks representing the collection of waste in the seas,
- Be able to carry out load-carrying scenarios for assistance purposes,
- Solve real-life problems such as energy exploration and supporting offshore facilities in a simulated environment.

The 18th International MEB Robot Competition – Unmanned Surface Vehicle Category will be an important competition aimed at raising awareness in the field of surface robots in our country, encouraging the development of original designs, and providing our students with the experience of producing a robot that can move on water.

1.3. Participation Conditions and Team Structure

The category covers secondary school students (Years 5, 6, 7, and 8). Teams must consist of two students and one supervising teacher. Only students may enter the competition area, and the presence of at least one student from the team in the competition area is sufficient to start the competition tasks (see Sections 3.4).

1.4. The Critical Importance of Reading the Guidelines

Competition applications and general rules for the Unmanned Surface Vehicle category are outlined in the Application Guidelines. The Application Guidelines must be read before submitting an application.

The Application and Category Guides are not merely technical guides but an integral part of the competition itself. Careful reading should be considered a fundamental skill of vital importance in modern engineering projects. The scoring systems outlined in the guides detail the order and precision with which tasks must be performed. Teams that read the guides thoroughly can optimise their robots according to a task strategy that maximises points and gain an advantage over their competitors. As the competition process is dynamic, last-minute changes to the rules or applications may occur. Therefore, it is critical that competitors do not settle for just a first reading but regularly follow the announcements on the International MEB Robot Competition website and the content in the Unmanned Surface Vehicle (USV) category. All teams applying to the Unmanned Surface Vehicle (USV) category of the 18th International MEB Robot Competition must read the Application Guide (accessible from the "Organisation" menu at https://robot.meb.gov.tr), which contains the competition applications and general rules related to the category.

Understanding the guidelines is as challenging and important an engineering task as designing the robot. Diligence in this task is the first step towards success.

You may submit any questions regarding the category via the contact form under the information menu after logging in to robot.meb.gov.tr. Questions unrelated to the category will remain unanswered.

2. TECHNICAL SPECIFICATIONS AND CONSTRAINTS OF THE ROBOT

2.1. Dimension and Weight Constraints

The largest dimension of the Unmanned Surface Vehicle shall not exceed **25 cm**. This **will be checked by the referees** upon entering the competition area using a box measuring **20 cm** wide, **25 cm** long, and **20 cm** high. Robots that do not fit into this box will not be allowed into the competition area.

Mechanisms/pieces that will be opened during the competition will be exempt from this restriction, and robots will be admitted to the competition area without any additions/removals being allowed after "referee inspection".

There is no restriction on the weight of the robot. It should be noted that in the event of a tie, the weight of the robots will also be evaluated, and it should not be forgotten that lighter robots will have an advantage over others.

2.2. Permitted Materials and Components

- If the robots are branded products (ready-made items), they will not be permitted to enter the pool by the referees.
- Robot bodies may be constructed from any materials available at the school, including wood, metal, foam, 3D printing, etc. Please note that if ready-made chassis are used, they will not be admitted to the competition area by the referees.
- Ready-made products may only be used if they are modular in design and used in the assembly of the robot (motor driver, control circuit, propeller guard, rudder, etc.).
- There should be no sharp edges or pointed tips on the robot's body, motor or propeller sections; any unsuitable parts must be blunted or rounded off.
- Motor propellers **must not be** exposed. Propellers must **be isolated** with a protective outer shell**.**

2.3. Software and Control Requirements

- For control, wireless communication methods such as RF, Wi-Fi, LoRa, Bluetooth, IR, etc., may be used.

2.4. Detailed Description of the Robot

After starting the competition with the characteristics specified in Section 2.1, the robot may extend and expand with its mobility and may have a structure that can change shape for the tasks in the competition (see Section 3.4). The limits specified in Section 2.1 for the robot are the conditions for starting the competition and will not be checked at the end of the competition.

3. COMPETITION AREA AND TASKS

3.1. Shape and Dimensions of the Competition Area/Track

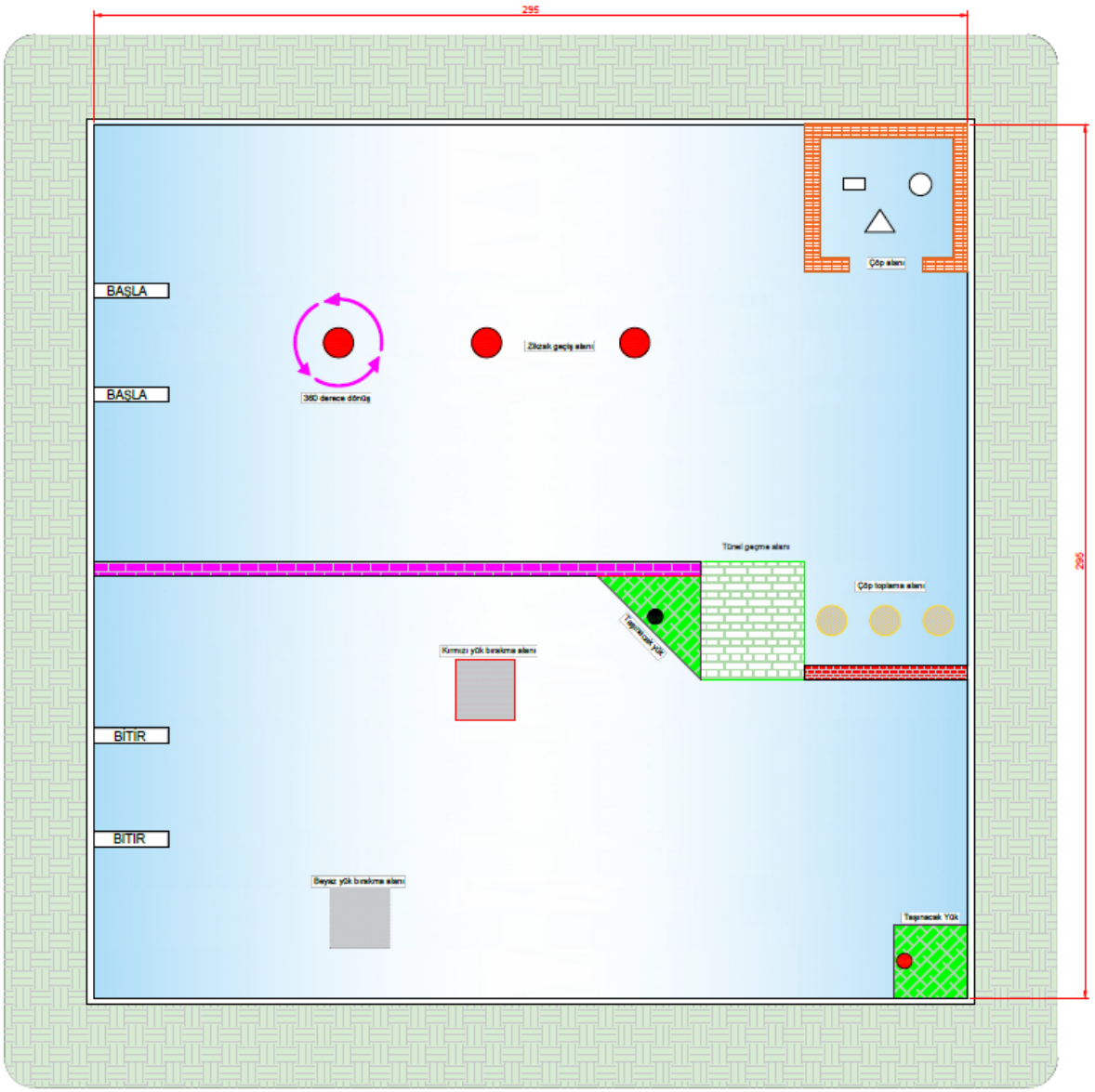

Figure 3.1. *Unmanned Surface Vehicle Competition Pool and Task View*

The competition will take place in a pool with a depth of 45 cm, a width of 295 cm, and a length of 295 cm. Platforms will be placed inside the pool to mark the start and finish areas. The competition course area where the tasks will be performed will be set up by the referees before the competition. After each team positions itself at the starting point, the referee will start the competition, and the teams will begin by passing through the starting point.

3.2. Description of Task Objects and Components

The competing teams' surface robots are expected to perform five different tasks. These tasks are not prioritised, and each task is scored individually. One of these tasks is to rotate 360 degrees around a buoy designated on the pool. Another task is to pass between two buoys, each with a diameter of 10 cm and located 50 cm apart, regardless of direction. The direction here is directly related to the previous stage, and after the 360-degree rotation task, the Unmanned Surface Vehicle must demonstrate a zigzag movement between the three buoys, including the buoy on the rotation course. The next task is to collect three geometric shapes from the waste area and transport them to the waste collection area. The subsequent task involves passing through the tunnel to the second stage of the course.

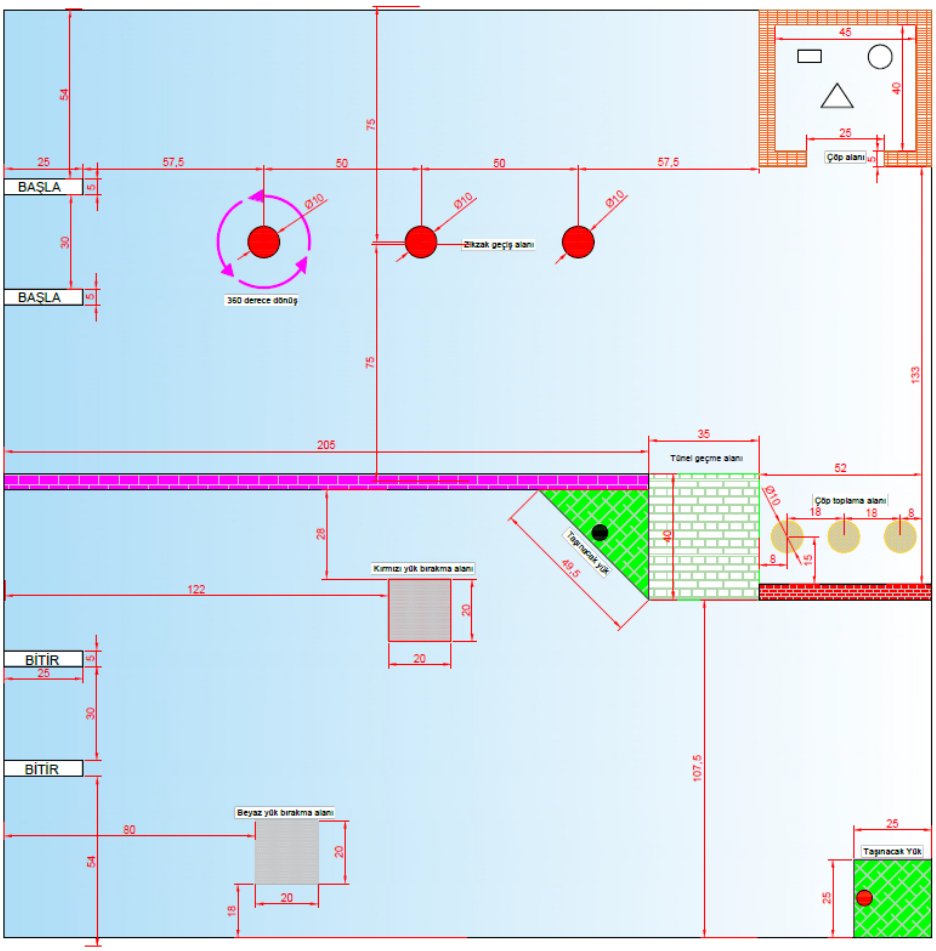

Figure 3.2. *Unmanned Surface Vehicle Competition Course*

In the second stage of the competition, the task is to deliver the spherical load, whose colour is determined by the colour of the load located on the isosceles triangular port and square

port opposite the tunnel, to the underwater search teams. Figure 3.2 shows an image of the competition course.

3.3. Object Placement Procedure and Tolerance

The robots will be placed in the starting area of the competition field, and the stopwatch will automatically start counting the time as soon as they leave the area. Again, after all courses are completed, the time will be stopped when they fully enter/approach the finish area. The start and finish will be performed automatically via sensors. The start and finish areas will be considered to be surrounded by bollards, and collisions will not negatively affect the scoring.

Geometric objects collected from the waste collection area must be placed separately in the areas of their own colour and shape in the transport area. The tolerances in these areas will be evaluated by the referees, and it will not be required that the geometric objects fit 100% into the designated areas.

Containers must be placed precisely in the areas designated according to their colour; containers not placed within the area will not be evaluated.

3.4. Task Description and Application Conditions

In the MEB Unmanned Surface Vehicle Competition, participating teams are expected to design unmanned water surface robots capable of moving on the course prepared on the water and performing various object guidance and transport tasks.

3.4.1.Task 1: 360-Degree Rotation Task

In this task, competitors are expected to complete the course by having their Unmanned Surface Vehicle make a full turn around a buoy fixed to the pool floor with a diameter of 10 cm. The task starting point is directly opposite the competition starting buoy platform. If the robot turns around this platform, 10 points will be added to the team's score. Teams that pass without completing a full turn around the platform will not receive any points. Robots that knock over or displace the platform by colliding with it while passing will have 5 points deducted from their team score. Robots not passing through the 360-degree rotation platform will only be deprived of that platform's points and will not be prevented from reaching the finish platform at the end of the course.

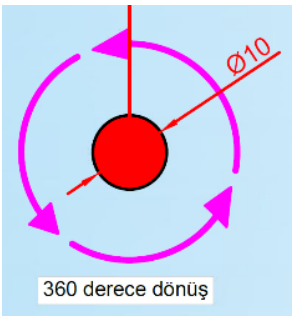

Figure 3.3. *360-Degree Rotation Platform*

This platform will be created using a buoy fixed to the pool floor as shown in Figure 3.3 and visible above the water. This platform will be referred to as the "360-Degree Platform". The height of the buoy on the 360-degree buoy platform shown in Figure 3.3 will be 10 cm above the pool floor, and the diameter of the buoy will be 10 cm.

After the preparation period, once the competition begins, the robot will pass through the 'Start Buoy Platform' and be considered to have entered the competition course. During the preparation time given to the teams, the robot must be kept ready to start the competition in front of the start buoy. After the referee starts the competition, the competing robots are expected to pass the 'Finish Buoy Platform' after completing their tasks within the competition time. Figure 3.4 shows the start buoy platform, and Figure 3.5 shows the finish buoy platform.

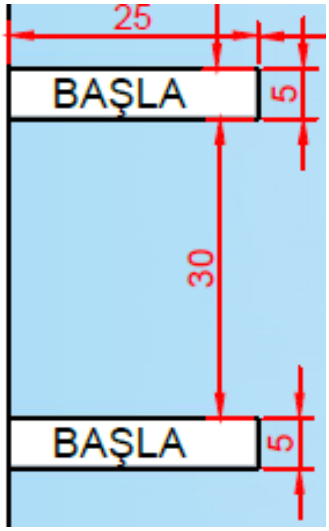

Figure 3.4. *Starting Buoy Platform*

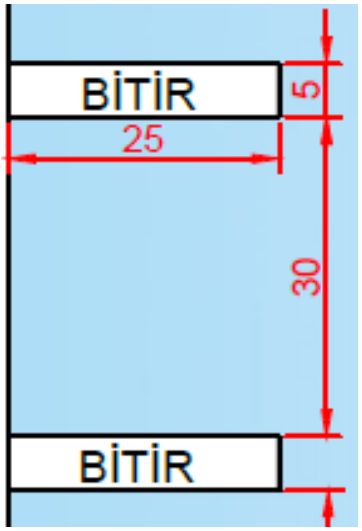

Figure 3.5. *Finish Buoy Platform*

The height of the buoys on the buoy platforms shown in Figure 3.4 and Figure 3.5 will be 10 cm above the pool floor, and the distance between the centres of the two buoys will be 30 cm. Robots passing through the start and finish buoy platforms will not be awarded points, while the finish time of robots passing through the finish buoy platform will be accepted by the referees as the time displayed on the stopwatch screen at that moment.

3.4.2.Task 2: Zigzag Crossing Task

In this task, competitors' Unmanned Surface Vehicles must pass between buoys with a diameter of 10 cm and spaced 50 cm apart on the pool surface. This task will earn the team 10 points. A visual representation of the task is shown in Figure 3.6.

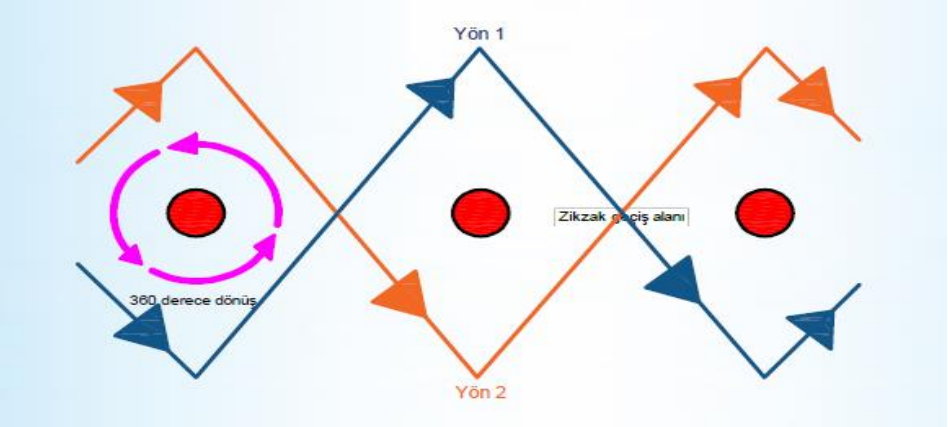

Figure 3.6. *Zigzag Crossing Task*

In this task, if the robot passes between the buoys, 10 points will be added to the team's score. If the Unmanned Surface Vehicle knocks over or displaces the buoys placed on the ground, 4 points will be deducted from the team's score. Although the start of this task is not directly related to the previous task, to complete the task, the robot must demonstrate a complete zigzag passage between a total of 3 buoys located 50 cm apart. For this reason, it is recommended that the exit from the previous stage and the start of the next stage be planned together. The task involves movement in the direction indicated by the blue line ('Direction 1') or the orange line ('Direction 2'). Departing from the competition starting area and moving directly between only the first two or last two buoys, either from top to bottom or bottom to top (which can also be thought of as left to right or right to left), will earn the team only 5 points. Each task will be scored separately, and one task will not affect the score of another task.

3.4.3.Task 3: Waste Collection Task

In this task, the competitors' Unmanned Surface Vehicle will carry three geometric shapes, representing waste materials found in the sea, from the rubbish area to the designated rubbish collection area at the edge of the pool. A visual representation of the task is shown in Figure 3.7. The geometric shapes will be placed randomly within the rubbish area designated by the referees.

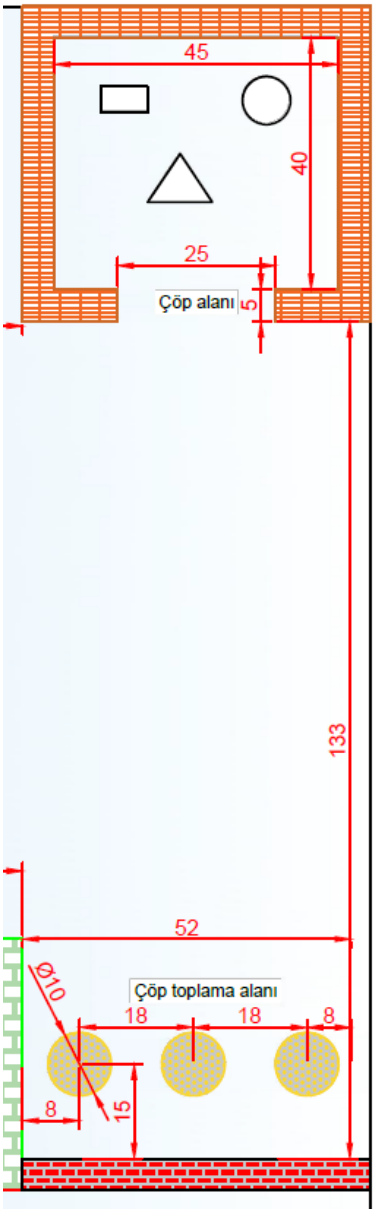

Figure 3.7. *Waste Collection Task*

The task objects are a Rectangular Prism (5x4x3, approximate weight 25 grams), a Pyramid (5x5x6, approximate weight 25 grams), and a Cylinder (Diameter 3 cm, Height 5 cm,

approximate weight 20 grams), all created using a 3D printer. These weights and dimensions have been calculated approximately using the 3D printer programme and may not match the weights and dimensions in the competition exactly. A tolerance of ±15 grams can be considered. The waste area is a rectangular space with internal wall dimensions of 40cm depth and 45cm width, featuring a 25cm door opening. The task involves collecting the geometric shapes designated as waste from the waste area and transporting them to the waste collection area located approximately 130cm away, directly opposite the wall. The waste collection area consists of three basketball hoop-like areas, each created in different colours and shapes for the relevant geometric shape. The hoops have a diameter of 10 cm, and their centres are 15 cm from the wall. The height of the hoops above the water surface is approximately 5 cm, with a tolerance of ±2 cm. Waste is expected to be deposited in the designated area for the relevant geometric shape in the waste collection area. During the removal of the balls, no penalty points will be applied if the walls are touched while within the designated area (waste area); this condition applies only within this area. The technical measurements of the platform's top view are shown in Figure 3.8.

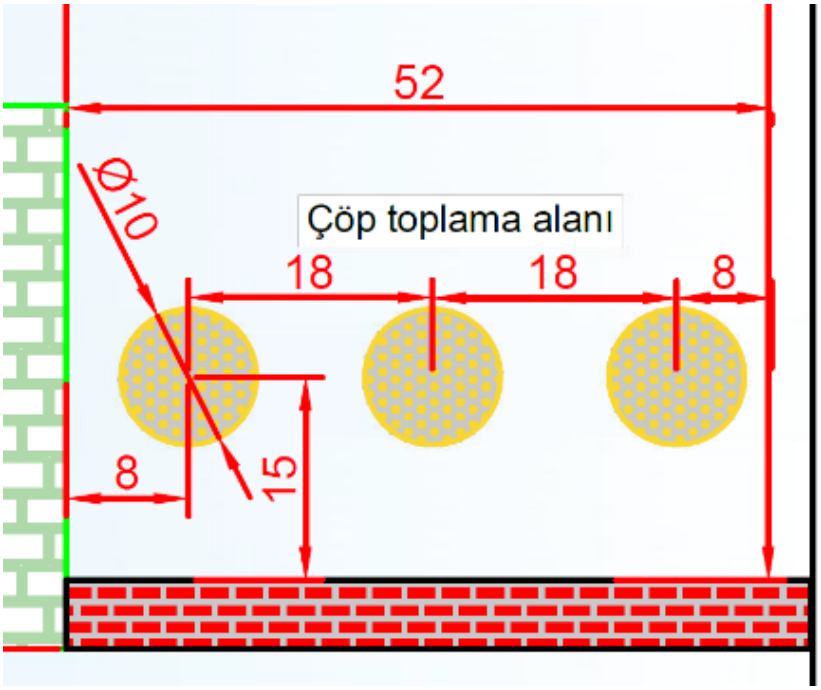

Figure 3.8. *Technical Dimensions of the Platform's Top View (centimetres)*

In this task, placing each object in the appropriate location in the waste collection area will add 10 points to the team score. If all objects are collected, 10 x 3 = 30 full points will be

awarded. Competitors will act with attention to the total time and may proceed to the next task without completing the waste collection task if they deem it necessary. In this task, each piece of waste (geometric shape) will be scored individually. There is no limit to the number of geometric shapes that can be transported. In this case, the geometric shapes placed in the designated areas of the waste collection area will be taken into account.

3.4.4.Task 4: Tunnel Crossing Task

In this task, the competitors' Unmanned Surface Vehicle must pass through a semi-circular tunnel with an internal width of 35 cm, a height of 35 cm, and a length of 40 cm placed on the pool floor to proceed to the second stage of the competition. Figure 3.9 shows a visual representation of the task.

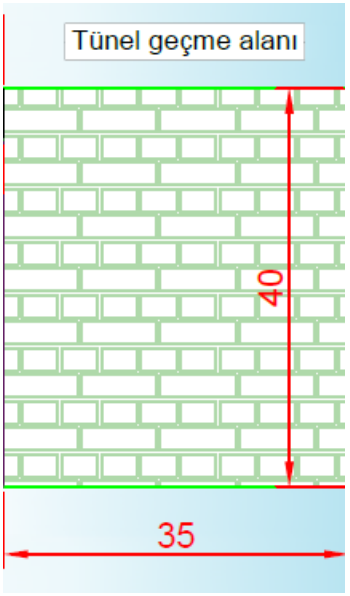

Figure 3.9. *Tunnel Passage Task*

Passing through the tunnel in this task earns the robot 10 points. If the Unmanned Surface Vehicle collides with or displaces the tunnel, 5 points will be deducted from the team's score. Competitors will receive the specified points separately for each task they complete. It is not necessary to complete the entire task. However, as the tunnel passage task allows progression to the second stage of the competition, it must be completed in order to access the courses in the second stage and reach the finish line.

3.4.5.Task 5: Aid Material Delivery Task

In this task, competitors are required to drop (sink) a perforated spherical aid material, weighing approximately 50 grams and made of white PLA material with a diameter of 5cm, located in an isosceles triangle with a side length of 35cm, approximately 5cm above the pool surface, into a white area approximately 130cm away, immediately after the tunnel crossing task in the second stage of the competition. The designated area under the pool is a white square area 10 cm above the ground with a side length of 20 cm. Similarly, the robots are expected to load the aid material, which is a perforated sphere made of red PLA material weighing approximately 50 grams and with a diameter of 5 cm, located in a square area with a side length of 25 cm, approximately 5 cm above the pool surface, and drop it into the red square area with a side length of 20 cm, located approximately 180 cm away, below the pool located 10 cm above the pool floor and measuring 20 cm on each side. The aid material will be created using a 3D printer and may have a tolerance of ±15 grams. During this task, collection and release can be performed individually or simultaneously. A visual representation of the task is shown in Figure 3.10.

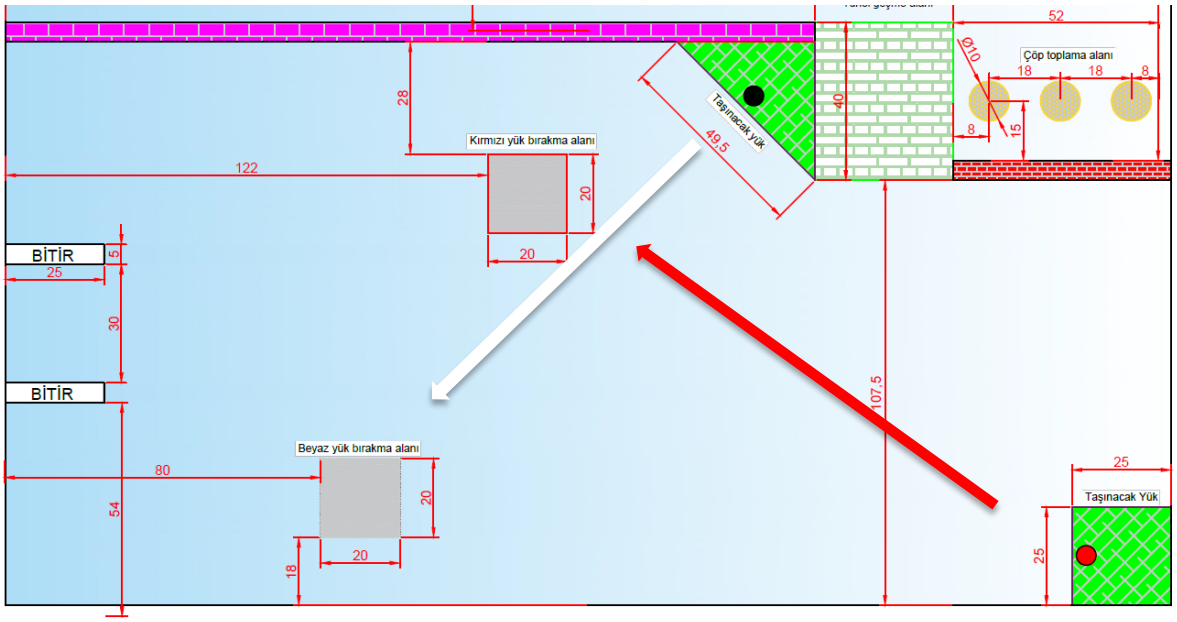

Figure 3.10. *Assistance Material Transport Task*

In this task, 10 points will be added separately to the team score for each task of the robot picking up and dropping the aid material. Picking up and dropping the red and white aid materials will add 40 points to the team score. To complete the task of picking up the aid

material, the load must be loaded onto the robot. If the aid material falls into the pool during pickup, no task points will be awarded. When approaching the port areas, it will be assumed that the areas approached are surrounded by buoys, and contact during approach will not be considered a collision. However, teams that knock over containers other than the load to be transported as a result of violent collisions will have 4 points deducted.

4. COMPETITION FORMAT AND EVALUATION CRITERIA

4.1. Application and Reporting Process

It is important for those applying to compete in the International MEB Robot Competition Unmanned Surface Vehicle (USV) category to complete their reports on the robot production processes.

4.1.1.Robot Production/Design Report

Sixty teams will be invited to compete in the Unmanned Surface Vehicle (USV) category of the International MEB Robot Competition. In determining the competitors, technical information such as "Materials used in robot construction", "Robot construction process", "Language used in robot programming", and "Budget used for robot construction", which form the subheadings of the "Robot Production/Design Report", will be considered. subheadings, such as "Materials used in robot construction," "Robot construction process," "Language used in robot programming," and "Budget used for robot construction," as well as videos demonstrating the movement capabilities of Surface Water Robots and photographs taken from different angles showing the construction stages of the robot will be decisive. The "Robot Production/Design Reports" will be uploaded to the Production Report attachment page and evaluated as specified in the 18th International MEB Robot Competition General Application Guide. The team score will be determined based on the Robot Production Report. The top 60 teams will qualify to compete in the Unmanned Surface Vehicle (USV) category of the 18th International MEB Robot Competition.

4.1.2.Unmanned Surface Vehicle Movement Video

When determining the competitors, the applying teams should take into account the criteria in the Production/Design Report Guide when adding videos and images. The video showing

the movement capability of their robots, requested as a URL, should be at least 1 minute and at most 3 minutes long.

4.2. Competition Stages

- The first 60 candidates determined based on the Robot Production Report will be invited to the competition.
- After the competition registration and the draw for ranking, candidates who wish to take a test drive will be given the opportunity to do so in 3-minute test drives.
- Competitors will be ranked according to the draw before starting the competition.
- The total competition time is 8 minutes. At the end of this time, teams **must** remove their robots from the pool.
- Each team is given 5 minutes to prepare. The competition time starts after 5 minutes. The competition starts with the start command given by the referee to **the robot driver** of **the team who declares** to the referee that they are ready before the preparation time expires.
- Competing teams may withdraw from the competition at any time. The decision to withdraw must be communicated to the referee at the pool by the driver. Tasks performed after the decision to withdraw will not be added to the team's score, and tasks completed before the decision will be added to the team's score.
- Teams that reach the finish line before the expected task completion time (8 minutes) **will not receive** any points**.**
- Competing teams will be **ranked from highest to lowest** based on the team points they have earned at the end of the competition. The positions of teams with the same points in the ranking will be determined by **the time it took** them **to cross the finish line**. The team with the shortest completion time will be placed one rank higher in the ranking. Furthermore, if one of two teams with the same team points decides to withdraw, the team that decided to withdraw will be placed lower in the ranking. In the ranking between teams with the same completion time, the team with fewer penalty points will be prioritised in the higher position. If the rankings are the same in the evaluation, the teams' rankings will be determined according to the robot weights. Lighter robots will be placed higher in the ranking.

- Based on the ranking results, the top three candidates will be announced as the 1st, 2nd, and 3rd place winners of the competition.
- A maximum of two people, including the team captain and a team member, may be present at the poolside.

4.2.1.Preliminary round

The ranking will be determined based on the scoring to be made according to the robot production report. The scoring shows the probable distribution ratios. Detailed evaluation criteria for each evaluation criterion may be applied by the Executive Committee when necessary.

Requirements in the Robot Production Report	Score
Materials used in robot construction	20 Points
Robot construction process	15 Points
Controller and language used in robot programming	20 Points
Budget used for robot construction	10 Points
At least 5 photographs taken from different angles showing the construction stages of the robot	10 Points
Video demonstrating the robot's mobility	25 Points
Evaluation Score	100 Points

4.2.2.Test Runs

Based on the draw results in the competition, the competition day will be determined with a schedule allowing participants to test the robot's mobility in water in 3-minute intervals.

4.1. Scoring System and Evaluation

Tasks	Competition Score
360-Degree Rotation Around an Obstacle	10 Points
Trash Collection Task	10 x 3 Points
Tunnel Crossing Task	10 Points
Delivery of Aid Materials Task	2 x 20 Points
Zigzag Crossing Mission	10 Points
Maximum Task Points Available	100 Points

Penalty points:

1. Robots that knock over or dislodge the 360-degree rotating buoy platforms as a result of collision **will have 5 points deducted** from their team score**.**
2. In the Zigzag Crossing Task, if the robot collides with the buoys, **4 points will be deducted** from the team's score**.**
3. If the Unmanned Surface Vehicle collides with the outer edges of the pool area during the waste collection stage, **5 points will be deducted** from the team's score**.** No penalty points will be applied if the robot collides with the inner edges of the pool.
4. In the Tunnel Crossing Task, if the robot collides with the platforms, the tunnel, or the edges of the pool area**, 5 points will be deducted** from the team's score**.**
5. If the team collides with the outer boundaries of the pool area, **2 points will be deducted from** the team's score**.**

Note: *Penalty points will* ***only*** *be applied* ***once per task****; no penalty points will be applied for repeated offences requiring penalties in the same task.*

Total team score = Task Score – Penalty Points

4.2. Competition Duration and Break Usage

The total competition time is 8 minutes. At the end of this time, teams **must** remove their robots from the pool.

Interference with the robots during the competition time is strictly prohibited.

No separate time will be allocated for breaks.

5. ETHICAL AND OTHER RULES

5.1. Disqualification and Penalty Situations

- Competitors participating in the competition with more than one robot declare that the robots are different from each other. This difference can be listed as the main design element, mechanisms, drive units, microcontroller, control method, etc. All robots that do not show significant differences in these features will be eliminated in the preliminary round. If the required differences are present in the

reports but similar robots are entered into the competition, all robots will be disqualified by the referees.

- Robots that overturn during **the competition will be disqualified**. However, the points they have earned up to that point will determine their competition score**.**
- After the competition has started, student advisors will not be permitted to provide one-on-one guidance to students. This situation may result in **a penalty** of **10 points** at the discretion of the referees.
- Competitors who communicate with the Competition Organising Committee and other competitors outside of the "Ethical Rules" will be evaluated by the referees and may be disqualified if necessary.

5.2. Appeal Procedure

Appeals that could alter the course of the ranking during the competition will be resolved immediately by the table judge(referee).

Appeals regarding other matters will be made via the meb.gov.tr portal, and responses will be provided through the same platform.

Objections/appeals made during the competition regarding issues arising from light and sound **will be deemed invalid**.

5.3. Warnings and Ethical Rules for Competitors

> *"Seeking justice and patience, those who come to us are our own. Working with reason and morality, those who surpass us are our own."*
>
> *Ahi EVRAN.*

- Rude and disrespectful words and behaviour should be avoided.
- Insults, threats, and abusive language should be avoided.
- Refrain from directly targeting individuals via social media bots such as email, Facebook, Skype, Messenger, WhatsApp, Twitter, etc., to insult them.
- In your petitions and objections, attention must be paid to spelling rules and style.
- In the competition area, behaviour such as actions, words, etc., that may affect the functioning and motivation of other teams should be avoided.

5.4. Authority of the Competition Organising Committee

The Competition Organising Committee **reserves the right to amend or revise the rules or the track** as deemed necessary.

6. COMMUNICATION

6.1. Question Submission and Announcement Tracking Channel

Questions regarding the competition must be submitted via the robot.meb.gov.tr portal in accordance with the provisions of the application guide.

6.2. Competition Coordination Information

The necessary email, telephone, and responsible unit information for communication.

7. ATTACHMENTS

7.1. Competition Card

18th INTERNATIONAL MEB ROBOT COMPETITION
UNMANNED SURFACE VEHİCLE(USV) CATEGORY COMPETITION CARD

ROBOT	
NO	**|Competitor1|**

Did not arrive	0
DISQUALIFIED	0
Please state the reason in the explanation field	

COMPETITION NO
|Match Code|

ROBOT DIMENSIONS CHECK	
APPROPRIATE 0	UNSUITABLE 0

ROBOT WEIGHT

DATE TIME
…. / 05 / 2026 …… : ……

Tasks	Task Completion Status	Competition Score	Team Score
Rotating Around a 360-Degree Obstacle	0	10 Points	
Trash Collection Task	0 0 0	3x10 30 Points	
Tunnel Crossing Task	0	10 Points	
Supply Transport Mission (Red) Pick-Up/Drop-Off	0 0	2x10 20 Points	
Aid Supply Transport Mission (White) Pick-up/Drop-off	0 0	2x10 20 Points	
Zigzag Crossing Mission	0	10 Points	
	Total Task Points Earned by the Team		

Penalty Type	Penalty Status	Competition Penalty Points	Penalty Points Received
Overturning or dislodging the 360-degree buoy platform	0	-5 Points	
Colliding with buoys during the zigzag manoeuvre	0	-4 Points	
Colliding with the outer walls of the waste collection area	0	-5 Points	
Collision with the outer edges of the pool area	0	-2 Points	
Colliding with the tunnel or its edges during the tunnel passage task	0	-5 Points	
Insisting on intervention in the competition area by the advisor	0	-10 Points	
	Total Penalty Points Received by the Team		

Withdrawal Decision Taken	0

Withdrawal/Course Completion Timer Duration:	…… : ……

Total Team Points	=	**Task Points**	-	**Penalty Points**	=	
Total Team Points	=		-		=	

If there is a special situation regarding the competition, please write it below.

REFEREE (NAME SURNAME SIGNATURE)			
CHECKING JUDGE	1. MATCH REFEREE	2nd Competition Referee	TABLE REFEREE

7.2. Sample Scenario

In the MEB Unmanned Surface Vehicle Competition, participating teams are expected to design an unmanned water surface vehicle capable of moving on the course prepared on the water and performing various object guidance and transport tasks.

The tasks are listed below:

360-Degree Turn Around an **Obstacle:** After starting, the robot must be able to complete a full 360-degree turn around the obstacle without colliding with or touching the buoy in any way. There are no prerequisites for this task. Completing the task is worth 10 points, while any movement that results in colliding with the buoy will result in a 4-point penalty.

Zigzag Passing Task: To complete this task, the robot must follow one of the paths indicated by Direction1/Direction2 in Section 3.4.2. There are no prerequisites for this task. Completing the task is worth 10 points, while any movement deemed to be colliding with the cone will result in a 4-point penalty.

Rubbish Collection Task: The robot must pick up the geometric shapes representing rubbish using any method it chooses and place them in the designated area for each type of rubbish. There is no requirement to pick up/drop off each piece of rubbish individually for this task. To earn points, each piece of rubbish must be placed in the area specified for its colour and shape. Each of the 3 pieces of rubbish is worth 10 points, for a total of 30 points. Transporting the rubbish is considered a prerequisite for this task. No points will be awarded if the rubbish cannot be placed in the designated target areas. However, penalty points will be applied if behaviour requiring a penalty is encountered.

Tunnel Passing Task: With this task, the robot advances to the second stage of the competition. For this task, it is sufficient to pass to the second part without colliding. There are no prerequisites for this task. Completing the task will earn 10 points, while any movement that results in a collision with the buoy will result in a 4-point penalty.

Delivery Task: The robot must pick up red and white loads placed in square and triangular areas separately or simultaneously and drop them into the designated areas of the same colour below the pool surface. Picking up the loads onto the robot is worth 10 points and successfully dropping them into the designated area is worth 10 points. Similar scoring will

be applied for red and white loads, with a total of 2x20 = 40 points available. Dropping loads while loading them onto the robot will not be scored. The load is considered picked up if it remains on the robot for at least 10 seconds. Dropping the load after this time during transport will only result in the loss of points for the drop task. The prerequisite for this task is the completion of the tunnel crossing task. Otherwise, this task cannot be performed, and competitors will not be allowed to manually intervene to cross this area.

Success Criteria: The competitor who completes all tasks correctly and without penalties achieves the highest success score in the competition. For competitions with similar scores, evaluation will be conducted as specified in Section 4.2. The top three candidates determined by the score ranking represent the top three places in the category.