FLYING CAR COMPETITION SPECIFICATIONS

2025

VERSIONS

Version	Date	Description
V1.0		
V1.1	15.01.2025	Competition Schedule
V1.2.	03.03.2025	FDR Deadline

TABLE OF CONTENTS

1. SCOPE

The scope of the Flying Car Simulation Competition includes giving participants autonomous flight algorithms, strategic control systems and tasks to produce solutions in various air transportation scenarios. Competitors will demonstrate their performance by developing effective flight systems in areas such as cargo transportation, civil aviation and emergency services.

In this context, the competition includes critical system designs such as autonomous air traffic management, route planning, inter-vehicle communication, battery management and response to environmental factors. The competition aims to safely integrate cargo drones, passenger-carrying flying cars and emergency vehicles (such as ambulances, fire trucks, police) at different altitudes and air corridors. Participants will be responsible for producing solutions against environmental factors, sensor failures and other unexpected situations that they will encounter during the competition.

2. AIM

The use of personal aircraft and cargo drones has an important place in the transportation systems of the future. These technologies, which can be used in areas such as civil aviation, logistics, health and security, have the potential to make transportation faster, safer and more environmentally friendly. Thanks to the developments in aviation technologies in the 21st century, the idea of vehicles flying in the air for public use has become increasingly applicable. However, more research and simulation studies are needed to accelerate developments in this field and to offer innovative solutions that appeal to the masses.

The Flying Car Simulation Competition focuses on developing autonomous flight systems and strategic control mechanisms that will shape the future of modern air transportation. This competition encourages participants to present innovative solutions through critical scenarios such as cargo transportation, emergency services and passenger transportation. Participants aim to contribute to the transportation ecosystem of the future by pioneering the design of sustainable, safe and effective air transportation systems.

3. AUTONOMOUS FLIGHT SYSTEM AND SCENARIOS

The virtual platform that forms the basis of the competition will present participants with a city environment that includes various scenarios. Participants will aim to successfully complete the tasks in the determined scenarios with the autonomous flight systems they have prepared. Applicants will create user accounts over the internet to access the virtual platform and will have the opportunity to work on the determined scenarios. In addition, training will be organized on the effective use of the simulation environment during the competition process.

In the PDR phase of the competition, participants are asked to complete various route planning, inter-vehicle communication, battery management, air traffic management system tasks on the simulation environment and to shoot a proof video. Along with these proof videos, they are also asked to prepare and explain the code developments made in their reports and the working flows of the algorithms used.

The simulation environment is designed on a modern city structure. In this city, cargo drones, passenger-carrying flying cars and aircraft designed for emergency services will fly at different altitudes and lanes. The simulation will evaluate the performance of aircraft in various missions and will include randomly assigned environmental factors (heavy fog, wind, precipitation), GNSS failures, sensor errors, battery problems and other emergency scenarios.

Some of the scenarios that will be considered during the competition include:

- Cargo drones deliver from designated point A to point B.
- Transporting passengers from the airport to the city center.
- Intervention of emergency vehicles (fire, ambulance, police, etc.) to specified situations.

Participants are expected to develop algorithms that comply with the principles of safety, efficiency and sustainability while performing these tasks. During the competition, training will be organized to ensure effective use of the virtual simulation environment and participants will be given the opportunity to test their vehicle designs in an urban environment.

3.1. Air Traffic Management System Design

In the Flying Car Simulation Competition, a safe air traffic management system is an essential requirement when multiple flying vehicles operate in a city at the same time. This system must include a comprehensive design to ensure that the vehicles interact safely with each other and their environment.

The air traffic management system includes a traffic control system that monitors and manages air traffic over the city. This system must meet the following criteria:

- Rules of Movement of Aircraft
- Features That Vehicles Must Have to Comply with the Rules
- Sanctions to be Applied in Case of Non-Compliance with the Rules
- Trajectory Prioritization
- Getting in and out of the vehicle
- Central Stops
- Individual Use
- Features That Vehicles Must Have
- Hardware and Software Criteria
- Communication Systems
- Perception Abilities

When introducing the Air Traffic Management System, an example routine of any vehicle operating within the system should be explained with visuals and flow charts.

3.2. Trajectory Planning

Trajectory planning is a critical element in the Flying Car Simulation Competition. At this stage, competitors are expected to aim to increase the comfort of the passengers in the flying car, as well as ensuring that users reach their destinations in the fastest and safest way. The strategy of going towards the head of the flying car is another important feature during trajectory planning in order to maximize user comfort during the journey.

After determining the destination, the created autonomy systems must determine the most efficient route using navigation and map systems. At the same time, there must be the ability to create a constantly updated trajectory that adapts to variables that arise during the journey, such as traffic density or weather conditions. Users are expected to have flexible options such as changing destinations or manually adjusting the trajectory in order to customize their travel plans.

3.3. Vehicle Communication

Vehicle communication includes the ability of flying vehicles to communicate with each other. This includes the ability to cooperate in important tasks such as adapting to environmental variables, managing traffic and anticipating potential hazards. Communication between vehicles and the central system is intended to coordinate air traffic management. The central system must be in constant communication with the vehicles to ensure safe air traffic management by tracking the location, route and other important information of the aircraft. Communication between vehicles and 'Take-off-Landing Points' includes the ability of flying cars to interact with designated take-off and landing points. This is important in coordinating take-off and landing operations, ensuring the safety of landing zones and the safe landing of passengers. Competitors are expected to develop these communication features so that flying vehicles can work together and ensure safe air traffic management.

3.4. Battery Management

Participants are expected to develop the ability to effectively manage the flying car's battery by using the battery or fuel capacity in a balanced manner. This is crucial for ensuring continuous access to energy during scenarios such as long-distance flights and emergencies. The intervals at which charging/refueling operations are carried out also emerge as an important aspect of battery management.

Participants are expected to develop a strategic approach regarding how often they will perform charging or refueling operations on a specific route, taking into account the flying car's energy levels. Additionally, where charging/refueling will take place is also a critical detail. Identifying appropriate charging or refueling points along the flying car’s route is necessary for safe and efficient battery management. Participants are expected to plan safe and suitable points along the designated route where charging or refueling operations will be carried out. These criteria are essential for the effective use of energy sources in flying vehicles and for their safe integration into air traffic during long-distance flights. Participants are expected to present successful and innovative solutions for battery management while meeting the specified criteria.

3.5. Reaction to Non-Ideal Situations

Variable weather conditions, unexpected traffic congestion, and emergencies (such as childbirth, heart attacks, etc.) can cause flying vehicles to deviate from their normal course. Variable weather conditions can affect flight planning and may require additional precautions for safe travel. Unexpected traffic congestion can lead to changes in routes due to sudden increases in air traffic or a high concentration of vehicles on the same path. Emergencies can cause sudden changes in air traffic and necessitate emergency landings.

Participants are expected to develop effective response strategies to cope with these non-ideal conditions. These strategies should include the ability to adapt to variable weather conditions, show flexibility in the face of unexpected traffic congestion, and provide rapid and safe responses in emergency scenarios. The route planning should consider these situations and adopt an adaptive approach, updating routes when necessary.

3.6. Scenario

To provide participants with an opportunity to practice, independent exercise scenarios will be made available within the simulation environment. During the final stage of the competition, participants are expected to autonomously complete the tasks in the competition scenarios using the software they have developed. These competition scenarios will be a combination of events from the exercise scenarios but will not be identical. They will not be shared with the participants or published on any platform until the final day of the competition. The goal for participants is to develop resilient software that can handle an entirely new scenario they have not encountered before. Therefore, it is essential that the competition scenarios remain confidential.

Although the scenario work is still ongoing, the following are examples of possible scenarios that may be applied. Throughout the scenarios, environmental factors and malfunctions may vary. Participants are expected to find solutions to the challenges presented and complete the scenarios according to the required conditions.

Malfunctions within the scenarios will be defined at random times.

The scoring of the competition scenarios will be announced by the competition committee on the final day.

3.6.1. Sample Scenarios

Sample Scenario 1

The flying car is required to travel from point A to point B. There is a no-fly zone, an airport, located between A and B. While following the route, the flying car must not violate the no-fly zone.

Sample Scenario 2

The flying car is required to travel from point A to point B. During the descent at point B, the vehicle experiences a loss of GNSS, radar, and barometer data. The flying car is expected to complete the descent under these conditions.

Sample Scenario 3

A cargo transport flying car is required to travel from point A to points B, C, D, and E (the order is not important). For the task to be considered successful, the entire route must be completed within a maximum of 4 hours. There are speed limit restrictions between points B and C and between points D and E. The distance between points D and E and the other points is too long to be covered with a single charge.

Sample Scenario 4

A civil flying car is required to follow a given route from point A through points B, C, D, and E, while navigating through existing traffic. The civil flying car can travel at an altitude of 2000 feet in the city and must remain at this altitude. However, emergencies may occur along the route. For example, the flying car must prioritize a flying fire truck passing by to assist with fire extinguishing or adjust its path to allow a cargo aircraft descending to pass through. The flying car is expected to navigate considering the movements of different vehicle types and complete the descent under these conditions.hesaba katarak bu koşullar altında inişi tamamlanması beklenmektedir.

3.6.2. Environmental Situations

The conditions outlined below will be randomly assigned at the start of each scenario but will not change during the scenario:

Rain

There are areas of the city with rain. This reduces the reliability of some of the sensors on the vehicle, which may affect its performance and decision-making.

Wind

Certain regions of the city experience variable winds. These winds may cause deviations in the vehicle's position, potentially affecting its path and accuracy.

Fog

Certain areas of the city are affected by fog. This reduces the reliability of optical sensors on the vehicle and imposes speed limitations to ensure safety.

No-Fly Zone

There is a designated no-fly zone in certain areas of the city. Vehicles must avoid these regions and cannot pass through them.

3.6.3. Emergencies and Malfunctions

During the competition scenarios, various emergency situations and malfunctions are updated as the scenario progresses. Solutions to these issues must be handled within the autonomy system. Below are the potential malfunctions and emergency situations that participants must address in their system designs:

GNSS Malfunction

The GNSS receiver on the vehicle has malfunctioned, and the reliability of the data coming from this sensor has decreased.

GNSS Jamming

The vehicle has entered an area containing a jammer, causing the GNSS system to deliver faulty results.

Motor Malfunction

One of the motors on the vehicle has failed.

Batarya Malfunction

There could be a sudden drop in the battery voltage or an overheating of the battery. Appropriate solutions should be devised to handle these situations.

Communication Failure

The flying car loses communication with the central system. As a result, it cannot receive information about environmental factors, no-fly zones, and other air vehicles.

Health Emergencies

Passengers may experience sudden health problems during the flight. In such cases, the flying car system must quickly route to the nearest healthcare facility using the shortest path.

3.7. Simulation Environment

The simulation system where the given scenarios will be executed will be shared with the participants, and each participant will work in the same simulation environment. While simulating the scenarios, it is expected that certain air traffic management rules will be defined, and participants will specify how to comply with these rules.

When multiple flying cars are operating in a city simultaneously, the vehicles must move safely with each other and their environment. Therefore, designing a system to manage this traffic is inevitable. While the aircraft travel through the city according to the rules set by the participants, they must deal with environmental factors and overcome potential issues.

The final competition will be held through a specially designed simulation environment. This platform provides the necessary sensors and coding resources to initiate the development of air traffic system management for flying cars. The coding will be done using Python. Participants will have access to training courses on coding and the use of the simulation environment through the platform, which will support their development.

In addition, a trial simulation environment will be provided on this platform, allowing participants to evaluate their algorithms before the final competition. Access to this trial environment will be granted during the preparation phase of the Preliminary Design Report (PDR) and will allow participants to develop their algorithms in a controlled environment. While using this simulation environment, participants can ask their questions to the designated communication platform's authorized personnel.

3.7.1. City Data

The central information system will provide various data to the flying cars via the communication network. This data will include environmental conditions (rain, fog, wind, etc.), city layout (hospitals, charging stations, etc.), and maps (city elevation maps, no-fly zone information, air traffic maps, etc.). These datasets will be made available to the participants.

Figure: representative city image, the city dimensions will be enlarged and detailed to match the flying car dimensions.

The city data will be provided to the participants in matrix format. Each data set will be presented as a separate matrix in MxN form, and the simulation system will update these matrices periodically.

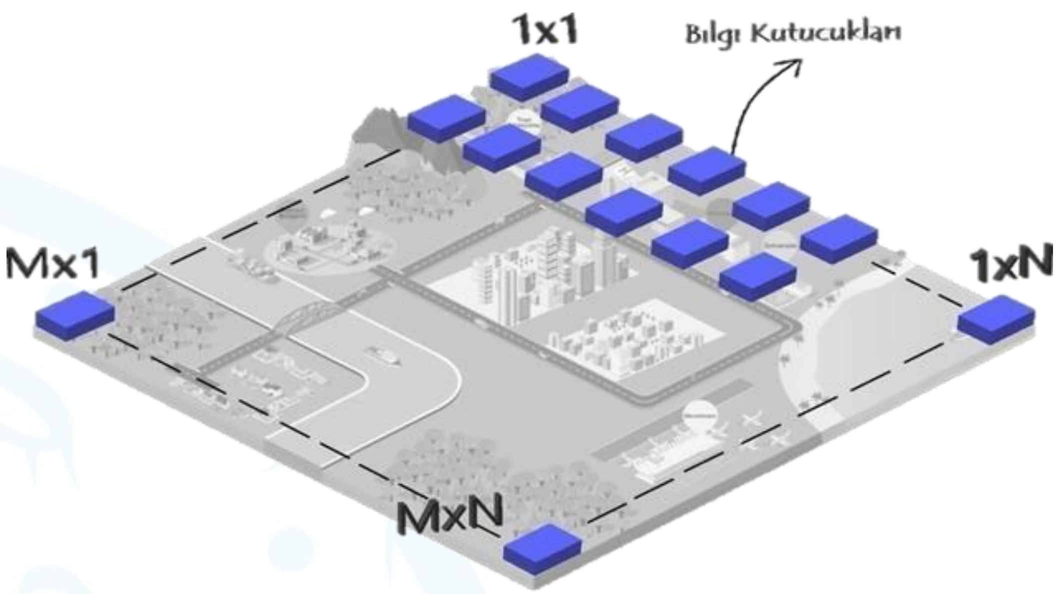

Figure: City data will be shared with the competitors in matrix form.

3.7.2. Flying Car

Çevrimiçi olarak daha önceden tasarlanmış şehir simülasyonunda her hava aracı çeşitli sensörlerle donatılmıştır. Tasarım özellikleri olarak yarışma kurulu tarafından verilecek olan Uçan Araba tasarımı ile belirlenen görevlerin icra edilmesi istenmektedir. Bu Uçan Araba üzerindeki sensörlerden veriler anlık olarak kullanıcılara simülasyon ortamında sunulacaktır.

3.7.2.1. Sensor Data

The Flying Car contains various sensors for Speed, Position, Orientation, Altitude data. Each sensor gives high accuracy data during normal operation. Each sensor is equipped with control algorithms that can detect its failure. Competitors will go from one point to another through these sensors while performing their tasks in the city.

- In the high school category, competitors are provided with processed sensor data, and they are expected to control the vehicle based on these data.
- In the university category, sensor measurements are given to the competitors as raw data (measurement and process noise, Bayes, random shifts, anomalies, etc.) and the competitors are expected to make position and attitude estimations by creating various filter algorithms with this data.

Sensor Name	Purpose	Failure Notifications
GNSS	Flying Cars can get the location, altitude and speed information on the map axis in the city.	- Working Status - Jamming Detection
Barometer	Flying Cars can receive altitude and vertical speed information.	- Working Status
Radar	The radar system gives the vertical distance to the solid objects (building, earth, etc.) under the Flying Car with radar signals.	- Working Status - Out of Limit Measurement
Inertial Measuremen t Unit (IMU)	Acceleration and velocity information on the body axis of the aircraft are provided by the inertial measurement system.	- Working Status
Lidar	The Lidar system gives the vertical distance to the solid objects (building, earth, etc.) located under the Flying Car with laser beams.	- Working Status - Out of Limit Measurement
Magnetometer	Thanks to the magnetometer, the Flying Car can detect which direction it is facing.	- Working Status
Battery Measurement Unit	It gives the voltage, current consumption, temperature and battery charge rate about the general condition of the battery	- Working Status - Overheating
Motor Measurement Unit	It gives the motor (propeller) speed.	- Working Status - Overheating

3.7.2.2. *Battery*

In the simulation environment, the battery is depleting and can be recharged at designated charging stations. The battery consumption values vary depending on the flying car's travel speed. Additionally, the rate of battery consumption influences the battery temperature, which in turn affects the reliability of the aircraft. Battery data will be provided to the participants through the battery measurement unit.

3.7.2.3. *Malfunctions*

Sensor malfunction notifications, along with sensor data, will be provided to participants. Some malfunctions can be detected very quickly, while others may take more time to identify. Therefore, malfunctions may be reported to the user after some delay. In addition to sensor malfunctions, there can also be various failures in subsystems. All malfunctions will be presented to participants collectively.

3.7.2.4. *Vehicle Control*

In the Flying Car Simulation environment, participants are expected to control the aircraft. The autonomy system, which generates commands for the aircraft to perform specific tasks, will be developed by the participants based on sensor data and the city environment.

The command system will include speed commands for the aircraft. These speed commands will be selected from predefined stages and provided in real-time within the simulation environment. The commands will include MOVE FORWARD, MOVE BACKWARD, MOVE RIGHT, MOVE LEFT, CLIMB UP, DESCEND DOWN, TURN RIGHT, TURN LEFT. In addition to these commands, speed stages can be selected as SLOW, MEDIUM, and FAST.

Given that the sensors on the vehicle have complementary features and that alternative solutions are required in case of malfunctions, participants are expected to develop predictive algorithms to address such situations.

3.7.2.5. *Vehicle Dynamics*

In the Flying Car Simulation environment, participants are generally expected to focus on the scenarios and address emergencies/malfunctions. However, in order to reflect the real world, randomness and stochastic disturbances will also be present in the simulation environment. Additionally, to make the competition accessible to a wider audience, the vehicle dynamics have been simplified and integrated into the simulation environment.

3.7.2.6. *Vehicle Types*

Until the Final Design Report (FDR) stage, only Civil Flying Cars will be present in the simulation environment. From the Final Design Report (FDR) stage onwards, the simulation will include various types of flying vehicles. Each vehicle type will have specific tasks within the simulation environment. Example vehicle types that may be present in the simulation environment include:

- Flying Fire Truck
- Flying Ambulance
- Flying Police Vehicle
- Cargo Aircraft
- Civil Flying Cars

The task definitions for these vehicles will be shared with the participants during the Final Design Report (FDR) stage. While completing the given scenarios, participants are expected to take into account the statuses of these vehicles, which will be on the road, and plan their routes accordingly. An example of such a scenario, which is likely to be provided along with the Final Design Report (FDR), is given in Section 3.6.1, Example Scenario 4.

4. GENERAL INFORMATION ABOUT THE COMPETITION

4.1. Participation Conditions

- All high school and university students (including Undergraduate, Associate’s, Master's, Doctorate) studying in Turkiye and abroad can participate in the competition.
- All graduated high school and university students (including Bachelor's, Associate's, Master's, Doctorate) who studied in Turkiye and abroad can participate in the competition.
- Graduates are evaluated according to the level of education they last graduated from. While a team consisting of high school graduates and high school students will be in the "High School" category, a team consisting of university graduates and high school students will be in the "University" category as a mixed team.
- High school graduates are required to have at most 3 years since their graduation date, and people who have passed 3 years since their high school graduation cannot participate in the competition.
- You can participate in the competition individually or as a team.
- High school teams must have advisors. Detailed information about the consultant is explained under the heading "Advisor".
- The number of team members is limited to a maximum of 6 people for all categories. (The consultant is not included in this number. The total number of team members, including the consultant, is 7 people.)
- Teams can consist of a single school level or can be formed as a mixed team with one or more secondary school/higher education students coming together. The competition category that the team can participate in will be determined by the team member with the highest level of education.
- A member of a team cannot be a member of another team in the same competition.
- There must be a team captain within the team. Competitors who apply individually must choose their team role as team captain through the Corporate Management System (CMS/KYS - t3kys.com).
- The final stage of the competition will take place in Cyprus. The finalist team quota for teams participating from Turkey is limited and detailed information will be provided later by the TEKNOFEST Competitions Committee.
- All information to be made by the TEKNOFEST competitions committee throughout the competition process will be made to the person designated as the team's

member in charge of communications. For this reason, each team should designate a member in charge of communications. This can be appointed through the CMS (t3kys.com).

4.2. Advisor

- The advisor should not be added as a team member.
- Each team can have a maximum of one advisor.
- Undergraduate, graduate students and graduated level teams may have a faculty member or research assistant as an advisor.
- There is no advisor requirement for undergraduate, graduate students and graduated level teams. High school teams must have advisors.
- The advisor must obtain the document proving that he/she is teacher/instructor/academic from the education/training institution where he/she works and upload it to the CMS together with the Final Design Report.
- In case of a change of consultant, teams must communicate this situation in writing to the relevant TEKNOFEST Committee.

4.3. Application Process

- Applications are made online until 30 January 2025 on the TEKNOFEST Aviation, Space and Technology Festival- Technology Competitions official website (www.teknofest.org).
- Between the application dates, the team captain/consultant applies through the system, registers the consultant and/or team captain/team members, if any, accurately and completely, and sends invitations to the emails of the consultant and members, if any. The invited member logs into the application system and accepts the invitation from the "My team information" section, and the competitor's registration to the system is completed. Otherwise, the registration will not be completed.
- Competitors who complete the team formation process must apply to the competition appropriate to their project.
- Member addition/removal operations are carried out until the Final Design Report Delivery date.
- During the competition process, applying through the CMS, uploading reports, filling out forms are within the authority of the Team Captain and/or consultant, and the competition processes are managed through these people.
- Between the application dates, the team captain/advisor (if any) registers through the system, the advisor (if any) and/or the team captain creates the registration of the team members correctly and completely in the system and sends invitations to

the e-mails of the members. The member to whom the invitation is sent accepts the invitation from the ‘My team information’ section by logging into the application system and the registration process is completed. In other case, the registration process is not completed.

4.4. Competition Rules and Advices

- All necessary processes related to the competition (Application, Report Submission, Report Results, Objection Procedures, Adding/Removing Team Members, etc.) will be conducted through the CMS (t3kys.com) system. Teams are required to follow their processes through the CMS system.
- It is the responsibility of the member who is in charge of communication to follow up the processes (Application, Report Upload Deadline, Form to be Filled, etc.) and TEKNOFEST competitions committee is not responsible for delays and/or disruptions caused by the communication member.
- Transportation and accommodation support provided to teams making it to the finals is limited. The number of people to be supported will be notified to the contestants by the TEKNOFEST Competitions Committee.
- Teams that have been finalists in previous years are expected to have developed their projects and the information note that they have participated in the competition before should be stated in their reports. If the contrary occurs, the relevant teams may be banned from the competition by the advisory board.
- Applications of teams that do not meet the participation conditions mentioned in Article 4.1 of the specifications will be deemed invalid.

4.5. Contact

For questions about the competition, you can join the competition group from the Flyin Car Simulation Competition page on the TEKNOFEST website. It is the responsibility of the competitors to actively follow this group and at least 1 person from each team to follow the announcements, questions and answers in this group as a member. TEKNOFEST Competitions Committee is not responsible for the inability of the teams to access up-to-date information that may arise as a result of not following the specified e-mail group.

Questions about the organizational parts of the competition should be sent via iletisim@teknofest.org e-mail address.

It is important that your questions are sent through the correct channels above in order to respond quickly to the questions asked

4.6. Competition Calendar

The competition calendar is stated below.

Date	Explanation
30.01.2025	Competition Application Deadline
05.02.2025-17:00	Project Preliminary Design Report (PDR) Deadline
19.02.2025	Announcement of the Teams That Passed the Preliminary Elimination According to the Results of the PDR
23.03.2025-17:00	Final Design Report (FDR) Deadline
07.04.2025	Announcement of Final Design Report Results and Announcement of Finalist Teams
01-04.05.2025	TEKNOFEST TRNC/Competition Finals

4.7. Competition Process

As mentioned, the Flying Car Simulation Competition is an advanced autonomy simulation competition where aircraft with autonomous decision-making software capable of responding to changing conditions and emergencies are designed. In this context, participants will simulate the algorithms they have developed in the "exercise scenarios" within the city environment provided in the "competition scenarios" during the final stage.

The simulation environment will be provided to the participants by the TEKNOFEST Flying Car Simulation Competition Committee, which also reserves the right to make updates to the simulation environment. All announcements regarding the simulation environment will be made through the channel specified by the competition committee and communicated to the teams. Participating teams must follow all announcements related to the simulation environment via this channel.

The competition process and evaluations will proceed as follows:

- In the PDR phase, a basic-level simulation environment will be opened to the participants, where they will begin their work. They are expected to test their software on the exercise scenarios shared for the PDR.
- After the PDR, an advanced-level simulation environment will be made available to the participants, and work on the shared scenarios will begin. Unlike the PDR phase, the simulation environment will be enhanced with additional elements, such as different vehicle types and various air management rules. The scenarios that are expected to be executed during the FDR phase should be achievable by the teams in this enhanced environment.
- During the final phase, a final presentation will be conducted in which all the defined scenarios will be simulated on the main screen.
- The evaluation of the final phase will be based on the success of the prepared algorithms in the competition scenarios and the assessment of the final presentation by the jury. The team with the highest score, determined by the successful simulation of the scenarios and the jury evaluation, will be the winner of the final phase.

4.8. Preliminary Design Report (PDR) and Preliminary Proof Video

- Teams are required to submit their Preliminary Design Reports (PDR) by the date specified in Table 1 of the Competition Schedule.
- PDR templates can be downloaded from the TEKNOFEST website. The reports must be prepared in accordance with the content specified in the PDR template.
- In the Preliminary Design Report, the scenarios given to the competitors will be asked to be implemented in a simulation environment. The competitors are expected to successfully implement these scenarios and shoot a proof video. In the report section, the working flows of the algorithms used during the implementation of the given scenarios are expected to be extracted.
- The Preliminary Design Report must include the simulation of the specified scenarios in the environment presented to the participants.
- The Preliminary Design Report will be a maximum of **10 pages**.
- Based on the PDR results, a preliminary selection will be made.
- Teams advancing to the Final Design Report (FDR) stage will be announced on the date specified in Table 1 of the Competition Schedule.

- Teams must present all required information in the appropriate sections of the PDR. Information not included in the relevant section of the report will not be considered in the evaluation.

- Information not requested in the report will not be considered in the evaluation.

- For the Preliminary Design Report, all requested information and evaluations must be presented in compliance with Turkish grammar rules and in a clear, understandable, and organized manner. Teams that fail to meet this requirement may have a 20% maximum score deduction applied to the relevant section of their report.

4.9. Final Design Report (FDR) and Final Proof Video

- Teams advancing to the Final Design Report stage are required to submit their Final Design Reports by the date specified in Table 1 of the Competition Schedule.

- Templates and other requirements for the Final Design Report will be disclosed after the final submission deadline for the competition.

- In the Final Design Report, the scenarios given to the competitors will be asked to be done in a simulation environment. The competitors are expected to successfully implement these scenarios and shoot a proof video. In the report section, the working flows of the algorithms used during the construction of the given scenarios are expected to be extracted.

- Each team accepted into the competition is responsible for preparing and submitting their Final Design Reports by the specified deadline in the competition schedule. Teams that fail to submit their reports by this date will be considered unsuccessful and will lose their eligibility to participate in the competition.

- The Final Design Report should explain how the solutions for the specified scenarios were achieved. Detailed information on how the solutions to the scenarios in the FDR phase were implemented and achieved must be provided.

- In the FDR phase, teams will demonstrate the success of their algorithms using a method determined by the TEKNOFEST Flying Car Simulation Competition Committee. This method will be announced alongside the FDR template.

- The Final Design Reports submitted by teams participating in the Flying Car Simulation Competition will be evaluated and scored by the Flying Car Simulation Competition Advisory Board and Judges according to the "Final Design Report Template".

- The Final Design Report will be a maximum of **15 pages**.

- Teams are expected to provide all required information in the appropriate sections of the FDR. Information placed in the wrong sections of the report will not be considered in the evaluation.

- For the FDR, all requested information and evaluations must be presented in compliance with Turkish grammar rules and in a clear, understandable, and organized manner. Teams that fail to meet this requirement may have a 20% score deduction applied to the relevant section of their report.
- Following the evaluation, teams accepted into the competition will be announced, and teams not accepted will be eliminated. The results of the Final Design Report evaluations will be announced to the teams on the date specified in the competition schedule.
- The Final Design Report Template will be published on the competition website.
- The TEKNOFEST Flying Car Simulation Competition Committee may request additional information or documents beyond the aforementioned details if necessary.

4.10. Final Stage

- The final simulation demonstration will be conducted in a simulation environment determined by the advisory board.
- Only one team will compete in the simulation environment at a time. Meanwhile, the competition can also be followed from the main screen.
- The order in which teams will compete will be determined by a lottery method.
- The scenarios to be simulated during the final stage will be revealed to the teams on the final day.
- After the scenarios are disclosed, teams will have the opportunity to test and adjust their algorithms on computers provided at the competition venue until the final presentation. The revised algorithms must be submitted to the referees by the final submission deadline. Any submissions received after the specified time will not be considered for evaluation.
- During the final presentation, the jury will have the right to ask teams questions regarding the algorithms they have prepared, their preparation process for the competition, as well as the PDR and FDR stages. Participants are expected to provide comprehensive answers to these questions.

5. SCORING AND EVALUATION

Scoring and evaluation will be based on the PDR, FDR, tasks to be performed on the simulation, and the simulation conducted during the final stage by the participants.

Evaluation Step	Impact Percentage
Preliminary Design Report (PDR)	**10%**
Final Design Report (FDR)	**20%**
Online Simulation Tasks	**5%**
Final Competition	**65%**
● Completion of Final Scenarios	80% of the final score
● Final Jury Evaluation	20% of the final score

Teams will be evaluated and ranked separately as High School, University, and Graduate teams. The awards will also be distributed independently within these categories.

5.1. Award

The monetary prizes specified in the table below will be awarded to the teams that qualify for ranking. These amounts represent the total prize to be distributed among eligible teams, and no individual rewards will be provided.

The prizes for first, second, and third places will be evenly divided based on the total number of team members and transferred to the bank account specified by each individual. Additionally, advisors of the teams ranked in the competition will receive a payment of 4,000 ₺. <u>However, this advisor reward will not be granted if the advisor does not attend the competition venue.</u>

	High School Category	University/Graduate Category	Advisor Award
First	100.000,00 ₺	120.000,00 ₺	5.000 ₺
Second	75.000,00 ₺	100.000,00 ₺	4.000 ₺
Third	60.000,00 ₺	90.000,00 ₺	3.000 ₺

5.2. Minimum Achievement Criteria for Award Ranking

To be eligible for an award, the competing team must meet the following conditions;

- Participation in the PDR and FDR stages
- Attendance at the final presentation

Teams meeting the specified criteria will be deemed successful. Among the teams fulfilling all criteria, the ranking will primarily be determined by points. As part of the competition, awards for "Best Team Spirit" and "Best Algorithm" will also be presented.

- **Best Team Spirit:** The evaluation will consider the team's efforts and skills demonstrated in the field, internal team communication, as well as interactions with other teams. The specified award is intended for prestige purposes and does not carry any monetary value.

- **Best Algorithm:** In the final stage of the simulation competition, the algorithms prepared by the participants will be evaluated based on their efficiency, creativity, and overall performance. The specified award is intended for prestige purposes and does not include any monetary value.

6. GENERAL RULES

Click here to access the general rules document within the scope of the competition.

7. ETHICAL RULES

Click here to access the ethics rules document within the scope of the competition.

Statement of Responsibility

T3 Foundation and TEKNOFEST are not responsible in any way for any injury or damage caused by the contestant or any product delivered by the contestants. T3 Foundation and organization officials are not responsible for any damages caused by the contestants to third parties. T3 Foundation and TEKNOFEST are not responsible for ensuring that the teams prepare and implement their own systems within the framework of the laws of the Republic of Turkey.

Turkish Technology Team Foundation reserves the right to make any changes to this specification.

8TH YEAR

NATIONAL TECHNOLOGY INITIATIVE

TEKNOFEST

AEROSPACE AND TECHNOLOGY FESTIVAL