

TEKNOFEST
AEROSPACE AND TECHNOLOGY FESTIVAL

**ROBOTAXI-FULL SCALE AUTONOMOUS VEHICLE
COMPETITION**

(UNIQUE VEHICLE CATEGORY)

PRELIMINARY DESIGN AND SIMULATION REPORT

APPLICATION ID

CONTEST

| | |
|----------------------------------|------------------------------|
| 1. Summary | Error! Bookmark not defined. |
| 2. Team Organization | Error! Bookmark not defined. |
| 3. Vehicle Features | Error! Bookmark not defined. |
| 4. Originality | Error! Bookmark not defined. |
| 5. Sensors | Error! Bookmark not defined. |
| 6. Vehicle Control Unit | Error! Bookmark not defined. |
| 7. Autonomous Driving Algorithms | 4 |
| 8. Security Precautions | 4 |
| 9. Simulation | 4 |
| 10. References | Error! Bookmark not defined. |



1. Summary

In this section, general introductory information about the software system to be prepared for the competition should be given. Emphasis should be placed on the design process, acquired skills, and unique aspects of design. The task to be performed by the autonomous vehicle should be briefly explained and general information about the performance of the vehicle that will perform this task should be conveyed.

2. Team Organization

This section should provide general introductory information about team organization and capabilities. An organizational chart showing the work sharing during the Robotaksi Autonomous Vehicle design process and who is working should be shown. At this stage, brief information about the team members should be conveyed. The work packages to be used in the vehicle design process should be shown with a "timeline graphic". Also, the main work packages should be briefly described with their requirements and objectives.

3. Vehicle Features

Within the scope of the competition, a vehicle with autonomous driving interfaces will be used. Most importantly, this vehicle must support electronic steering (steer-by-wire), electronic accelerator (pedal-by-wire) and electronic brake (brake-by-wire) functionality. In this section of the report, detailed information should be given about the vehicle to be used, focusing on autonomous driving interfaces.

4. Originality

In the works to be carried out within the scope of the competition, those with unique features in terms of design and/or software should be targeted. Whether these targets have been achieved or not will be evaluated in the detailed design report.

5. Sensors

In this section, information will be given about the sensors (lidar, radar, camera, etc.) to be used in the vehicle. Information should be given about the number of sensors, their location on the vehicle, how much volume the sensors can cover around the vehicle for autonomy purposes, and the sensor fusion algorithms used.

6. Vehicle Control Unit

Information about the control unit intended to be used in the vehicle should be conveyed. Wireless communication system should be explained. Control software features must be transferred.

7. Autonomous Driving Algorithms

In this section, information should be given about the autonomous driving algorithms used in the vehicle, such as the recognition of traffic signs and lane tracking.

8. Security Precautions

During the test phase and during the competition, the precautions to be taken for possible dangerous situations will be determined and information about the vehicle systems planned for this will be conveyed.

9. Simulation

The preliminary design should include a simulation of autonomous vehicle operation according to the competition specifications. We plan to share the model in the simulation environment of the vehicle, which will be given by the TEKNOFEST committee, with our teams in the future. The video of the realized simulation will be uploaded to Youtube before the date specified in the specification and its name/link will be included in this section of the report. Team information should be included in the video to be uploaded. No changes will be made on the video after the date specified in the specification. This video is considered as proof of concept of the simulation. The scores for the simulation will be calculated according to Table 3 in the competition specification.

10. References

You should specify the resources, websites, trainings, books, articles, etc. you have used in this section.

Additional Notes:

- Each report should begin with a cover page and include a “Contents” page.
- Reports pages should be numbered consecutively.
- Font should be selected as “Times New Roman”, “Point: 12”.
- Compliance with academic report standards is sought.

Preliminary Design Report scoring will be done according to the template below.

| Section | | Scoring |
|---------|-------------------------------|---------------------------|
| 1 | Summary | 5 |
| 2 | Team Organization | 5 |
| 3 | Vehicle Features | 10 |
| 4 | Originality | 15 |
| 5 | Sensors | 5 |
| 6 | Autonomous Driving Algorithms | 15 |
| 7 | Vehicle Control Unit | 15 |
| 8 | Security Precautions | 5 |
| 9 | Simulation | $(P - 1500) \cdot 0.02$ * |
| 10 | References | 5 |

* P , represents the scores from the simulation according to Table 3 in the competition specification.

