8TH YEAR

NATIONAL TECHNOLOGY INITIATIVE

TEKNOFEST

AEROSPACE AND TECHNOLOGY FESTIVAL

TECHNICAL SPECIFICATIONS FOR ARTIFICIAL INTELLIGENCE IN AVITATION COMPETITION

2025

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1. INTRODUCTION

This document contains the situations that should be within the knowledge of the competitors before and during the Artificial Intelligence in Aviation Competition.

2. MISSIONS

Within the scope of TEKNOFEST 2025 Artificial Intelligence in Aviation competition, competitors must develop algorithms that will fulfil two different missions. These missions are object detection and position estimation. By processing the images taken from the aircraft's ground faced camera with the algorithms they have developed, the competitors must detect certain objects in the image frame for the first task, and for the second mission, they must estimate the position information of the aircraft depending on time. Detailed information about the tasks is given below.

2.1. First Mission: Object Detection

Within the scope of the Artificial Intelligence in Aviation Competition, the types of objects expected to be detected by the competitors are vehicles, people, Flying Car Parking (FCP) and Flying Ambulance Landing (FAL) areas. Technical information about the video frames which will be given to the competitors is as follows:

- Unlike the competitions held in previous years, the videos to be given to the competitors may include the take-off, landing and navigation of the aircraft. For this reason, competitors should prepare for situations where the aircraft's height above the ground may change in their flight videos.
- In a session, the duration of the video that will be given to the competitors for processing is 5 minutes and the frames per second (FPS) will be 7.5. Therefore, a total of 2250 video frames will be given to the competitors in each session and a total of 2250 results are expected from the teams.
- The videos are shot in Full HD (1920x1080) resolution and will be given to the competitors without any modification.
- Video frames will be in JPG format.
- The videos will be separated into individual frames and presented to the contestants in order.
- The 5-minute videos to be given in each session may consist of videos that do not come from a single aircraft and do not have to be continuous. Contestants should take into account the possibility of videos could be merged together. The videos to be used in the competition will be obtained from videos taken in the morning, noon or afternoon.
- Since the aircraft can fly in weather conditions such as snow, rain, etc., it should be taken into consideration that algorithms can be tested under these conditions during

the competition.

- Since the aircraft can fly over urban, forest and sea areas, it should be taken into consideration that algorithms can be tested under these conditions during the competition.
- The camera angle will vary between 70-90 degrees depending on the movement of the aircraft. In order to prevent problems in human detection due to the steep angle and the inability to detect distant objects when the camera angle is in the range of 0-70 degrees (Figure 1), the content of the data set will be prepared using specified angle values. Figure 2 shows an example of a suitable shooting angle.

Figure 1. Shooting Angle Cases (Unsuitable Shooting Angle)

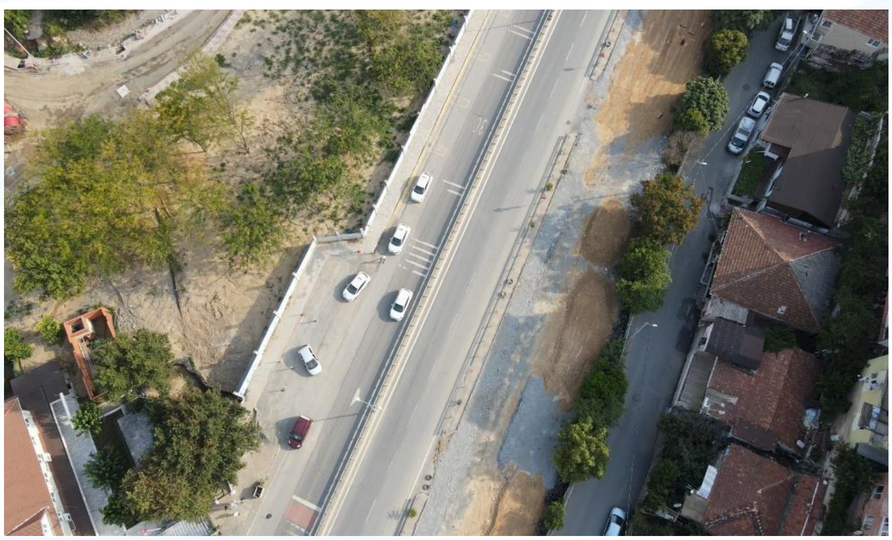

Figure 2. Shooting Angle Cases (Suitable Shooting Angle)

- There may be distortions in the given image frames due to ordinary errors that may occur in the aircraft's ground faced camera. Blurring and dead pixels can be given as examples of possible distortions. A sample distortion is shown in Figure 3.

- Due to the usual errors that may occur in the ground faced camera of the aircraft, there may be situations such as repetitions/freezes or complete loss of the image in the given frame.
- It is not obligatory that all of the images taken from the aircraft are taken from the day camera. The images taken can also consist of images taken from a thermal camera.

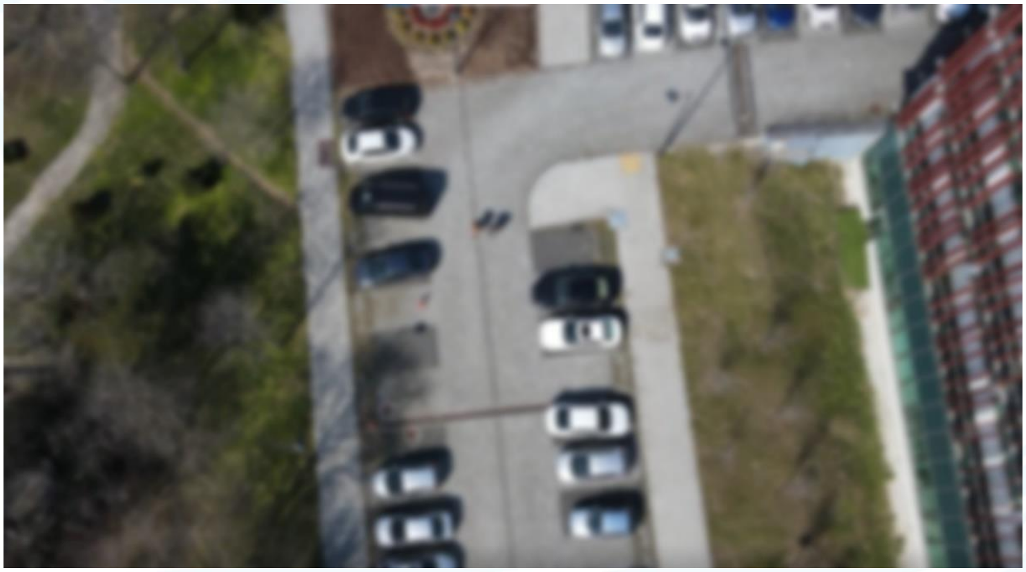

Figure 3. Sample Image Distortion

2.1.0. Vehicle and People Detection

- When identifying vehicles and people, all vehicles and people in the entire image frame should be taken into account.
- The vehicle list is shown in Table 1 as specified in the competition specifications.

Table 1. Table containing Vehicle and Human Classes

Class	Class ID	Values that the Landing State can take	Details
Vehicle	0	-1	All types of objects listed below should be considered as vehicles. 1. Motorised road vehicles a. Automobiles b. Motorbikes c. Buses d. Trucks e. Tractor, atv etc. Land vehicles 2. Rail vehicles a. Trains i. Locomotives ii. Wagons b. Trams c. Monorails d. Funicular 3. All motorised watercraft
Humans	1	-1	All people should be assessed, whether standing or sitting.

- If there is a train in the image frame, each locomotive and carriage should be identified as a separate object.
- Vehicles and human objects that are not fully visible are also expected to be detected. For example, as in Figure 4, all objects in the frames should be detected, including vehicles, some of which are out of the image.

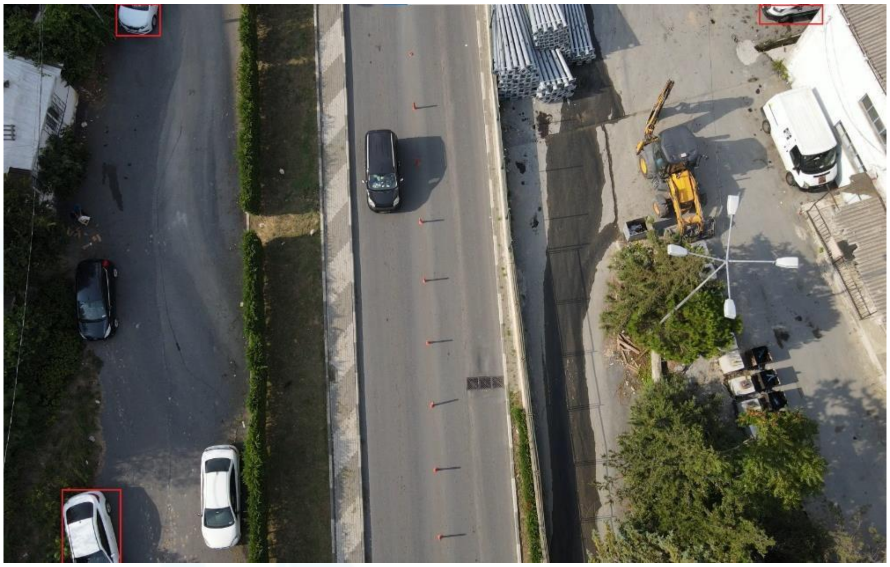

Figure 4. Labelling Instruction When Not All Objects Are Within the Image Frame

- As exemplified in Figure 5, it is expected that people and vehicles, some of which are visible due to being behind another object, should also be detected.

Figure 5. Presence of Objects in the Image Frame

- Bicycle and motorcycle riders should not be labelled as "people". The vehicle and its driver as a whole should only be labelled with the "vehicle" label.
- Scooters should be labelled as a vehicle when there is no rider and as a person when there is a rider.

2.1.1. FCP and FAL Detection

- The Flying Car Parking ("FCP") and Flying Ambulance Landing ("FAL") areas visualised in Figures 6 and 7 are indicated by a circle with a diameter of 4.5 metres.
- Colours with hex code #89cff0 and #ffffff were used in the FLP area.
- In the FAL area, colours with hex code #ff0000 and #ffffff are used.

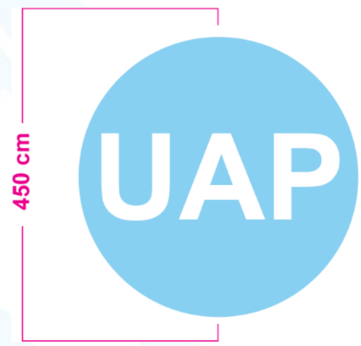

Figure 6. FCP Area Information

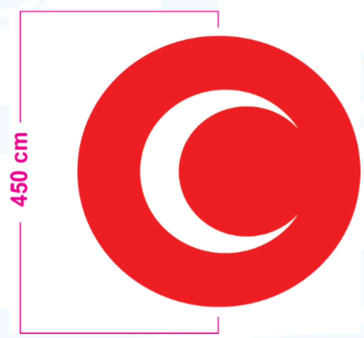

Figure 7. FAL Area Information

- Following the detection of FCP and FAL, the landing status must also be reported. Whether the landing status of FCP and FAL areas are suitable or not is related to whether there are any objects on these areas or not. If there are any objects such as vehicles and people on these areas that can be detected or cannot be detected, this area is not suitable for landing (Figure 9).
- FCP and FAL class numbering and landing status information are given in Table 2. Landing condition ID information is shown in Table 3.

Table 2. Table Containing FCP and FAL Class Information

Class	Class ID	Values that the Landing State can take	Details
Flying Car Parking (FCP) Area	2	0,1	It is the area where there is a sign indicating that the flying car can park. Figure 6 shows a sample figure for the flying car parking area.
Flying Ambulance Landing (FAL) Area	3	0,1	It is the area where there is a sign indicating that the flying ambulance can land. Figure 7 shows an example figure for the flying ambulance landing area.

Table 3. Landing State Values

Landing State ID	Landing State
0	Unsuitable
1	Suitable
-1	Not a landing area.

- While FCP and FAL areas are detected just like vehicles and human objects, the presence of some of the areas in the image frame is sufficient for detection. However, in order for the landing situation to be "suitable", all of the FCP and FAL areas must be in the frame. In the image given as an example in Figure 8, the UAI area should be detected as an object and the landing status should be indicated as unsuitable.

Figure 8. When the entire object is not in the image frame

Figure 9. Any Objects on the FCP and FAL Areas (In this example, there are two people on the area and a coat lying on the ground).

- If there are human and vehicle objects above the FCP and FAL areas, these objects should also be detected.
- Depending on the angle of the shooting, objects close to the field may appear to be on the field even if they are not (Figure 10). In this misleading situation, the landing status should be "not suitable for landing".

Figure 10. Presence of Objects Next to the Area

2.1.2. Algorithm Operating Conditions

- Contestants will receive one image frame when they connect to the server and send a request.
- They will send the information of the objects detected in each image frame to the server in the requested format.
- Contestants will not be able to send a request for the next frame without sending a result to any of the image frames sent in turn. For this reason, it is not possible to download all image frames in bulk.
- One result must be sent for each image frame, if more than one result is sent for the same frame, the first result that is sent will be evaluated.
- Teams that send result more than the threshold value for an image frame may be prevented from sending results within the current session for a certain period of time. Contestants are required to keep track of the number of predictions sent for each image frame.

2.2. Second Mission: Position Detection

In the second task, situations where the positioning system of the aircraft becomes unusable or unreliable will be simulated and position estimation is expected to be made only from image data. In this way, the ability of the aircraft to perform the mission will be increased in case of any adverse situation that may occur. The conditions under which this task will be performed and at which stages of the competition will be explained in the following sections of this document.

2.2.0. Position Determination

- The competitors will estimate the position of the aircraft in the reference coordinate system by using the camera images given with the position estimation algorithms they have developed.
- Competitiors will determine the directions of movement in x, y and z axes from displacement information of given image frames in each session.
- The first position information in the reference coordinate system will be x0=0.00 [m], y0=0.00 [m], z0=0.00 [m].
- In sessions where position estimation will be performed, the camera angle will be 90 degrees to see the earth vertically.
- The camera parameter information of the aircraft will be shared with the competitors.

- There is no restriction on the system to be developed by the competitors. The algorithms they develop can use learning models as well as systems based on mathematical foundations.
- Figure 11 shows an example of the reference and estimated position information plotted in the reference coordinate system. The error of the competitors will be calculated by using the reference and estimated position information. The magnitude of this error will be related to the score of the competitors in this task. Section 9.2 describes the scoring.

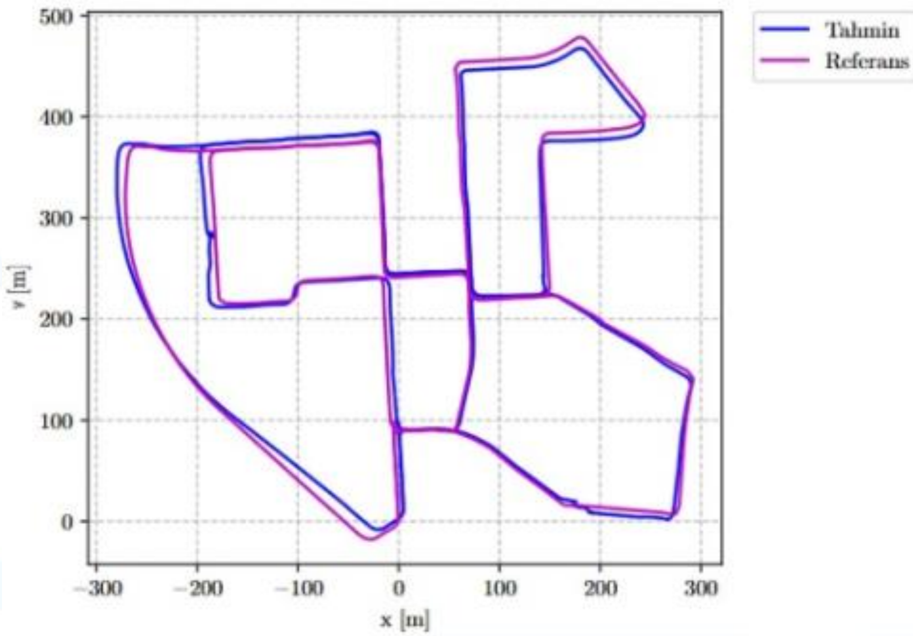

Figure 11. Reference and Estimation Position Information Example

- Figure 12 shows a visualisation of the error calculated using the reference and estimated position information. As can be seen in the figure, the error amounts in x, y and yz axes are visualised.

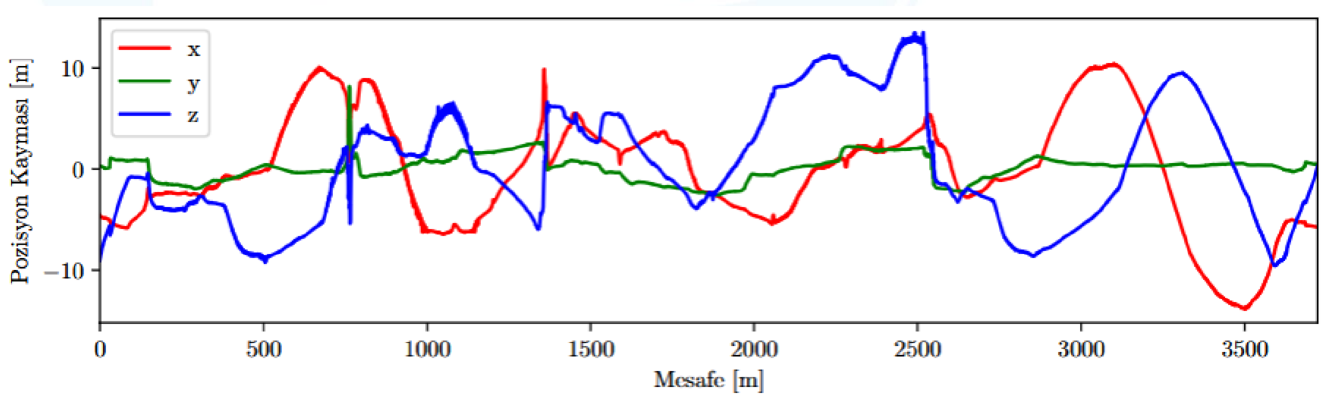

Figure 12. Error Values Calculated Using Reference and Prediction Position Information

2.2.1. Algorithm Operating Conditions

- When the contestants send a request to the server, they will receive the video frame as well as the information given in Table 4 about this frame.

Table 4. Information That Contestants Will Receive After Server Request

Title	Details
Video Frame Info	Unique name to be used when retrieving the Video Frame and sending the results
Position Info - X	Displacement of the Aircraft in meter on the X axis with respect to the first image in the reference coordinate system
Position Info - Y	Displacement of the Aircraft in meter on the Y axis with respect to the first image in the reference coordinate system
Position Info - Z	Displacement of the Aircraft in meter in the Z axis with respect to the first image in the reference coordinate system
Position Info - Health	The value indicating whether the aircraft's position detection system is functioning properly

- If the health value is 1, the competitor can send the position information estimated by their algorithm, or they can send the reference value received from the server without changing it. This is a decision to be made by the competitor.
- If the health value is 0, the competitor must send the position information estimated by competitor’s algorithm to the server.
- In the sessions, it is certain that the competitors will receive the position information of the aircraft according to the reference coordinate system in the first 1minute (450 frames) of the 5 minutes (2250 frames in total) video they receive from the server.
- In the last 4 minutes of the session (1800 frames) the position information of the flying car may go into an unhealthy state. It is not clear when this unhealthy state will start and how long it will last.
- In Figure 13, the system scheme expected to be developed by the competitors is visualised.

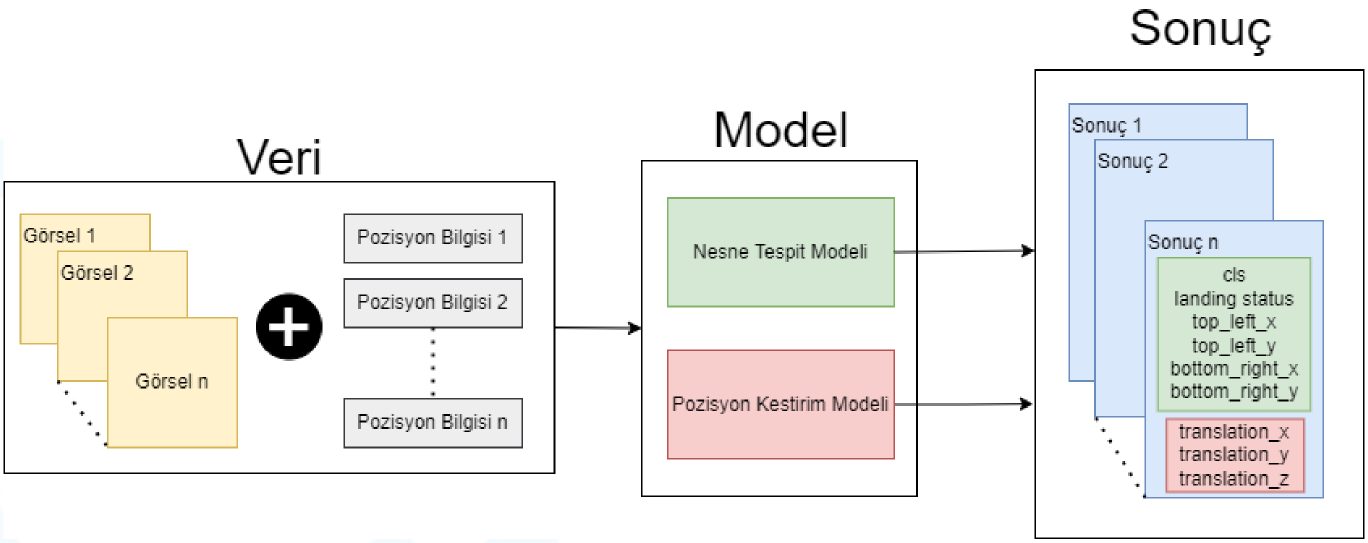

Figure 13. Diagram for Creating Result Packages

3. COMPETITION

- Teams that have submitted the Preliminary Design Report and received enough points from the Online Competition Simulation will be eligible to compete in TEKNOFEST 2025.
- A server and a local network will be set up in the competition area where the competitors will be able to receive both videos and position data for the second task by sending a request.
- Competitors will connect to this network via ethernet cable, receive the test video frames from the server and upload their results to the server.
- The specified local network will not have an internet connection and the contestants' systems will not be allowed to connect to the internet.
- Technical details regarding the connections will be specified during the competition and the competition technical team will assist the competitors in connecting to the system.
- Competitors will be responsible for the computers they will use in the competition area.
- No computer support will be provided to the competitors.
- Competitors' computers must have ethernet port and ethernet connection capability.
- In each session, 3 competitors from each team will be allowed to enter the competition area at the same time. If the team has a counsellor, 2 contestant students and 1 counsellor will be allowed in the competition area.
- It is strictly forbidden for a team to assist another team during the competition.

3.1. Test Session

- A 75-minute session will be held to make all necessary preparations before the competition.
- The purpose of this session is for the competitors to set up their hardware.
- A 2-minute (900 video frames) video will be streamed from the server in order to test the competition conditions in the best way possible.
- The competitors will be tested by the technical team to ensure that they have received this test video properly sent the results appropriately and received feedback.
- The results sent by the competitors in the test session will have no effect on the scoring.

3.2. Competition Sessions

- There will be 6 competition sessions.
- The total duration of each of these sessions will be 75 minutes.
- The first 15 minutes of the session will be given to the competitors for preparation.
- The next 60 minutes will be reserved for the competition.
- In each session, 2250 video frames will be given Competitors must send the results from processing of these frames to the server computer in the appropriate format.
- The video to be given in each session will have a theme. Examples of these themes are "Sunny", "Challenging Weather Conditions", "Evening", "Above Sea". Information about the session themes will be reserved until the day of the competition.

4. TECHNICAL PRESENTATION

- Competitor teams are expected to make a presentation during the competition sessions.
- One Communication Officer from each team should be assigned to make the presentation.
- Presentation time will be no longer than 5 minutes per team.
- At the beginning of each competition session, the teams that will do their presentation during that session will be announced.
- Presentations will be presented to a panel of 3 referees.
- Questions may be directed to the team representative during or after the presentation.
- The prepared presentations must be submitted by the competitors by sending them to t3kys.com until the deadline date to be revealed by the TEKNOFEST Competitions committee.
- Sample presentation template will be shared with the participant teams until June

2025.

- There is no restriction on the content of the presentation, provided that the presentation template is kept intact.
- Examples of topics that can be presented in the presentation are "Additional Data Collection Process", "Algorithm Used", "Alternative Algorithms", "Test Results" and "Innovative Approach". Competitors are not required to use these titles in their presentations.

5. REPORTING

- Competitor teams are expected to write two separate documents.
- Since the Preliminary Design Report will be used for participation in the competition and the Final Design Report will be used in the scoring process, both reports must be submitted.

5.1. Preliminary Design Report

- The Preliminary Design Report template will be shared on the teknofest.org website on 25/04/2025 at the latest.
- As will be explained in detail in the report template, the Preliminary Design Report will include the research conducted on the subject and the solution proposals given for the solution of the problems.
- There is no restriction on the content or length of the report, provided that the report template is kept intact.
- It is mandatory to submit the Preliminary Design Report for participation in the competition.
- The Preliminary Design Report has no effect on the determination of the results of the competition and the awarding of prizes.
- The Preliminary Design Report must be submitted to t3kys.com on 25/04/2025 at the latest.

5.2. Final Design Report

- The Final Design Report template will be shared on the teknofest.org website in August 2025 at the latest.
- As will be explained in detail in the report template, in the Final Design Report, competitors are expected to report to the competition organisers the literature studies they have done during the preparation for the competition, the algorithms they used during the competition, the tests they have performed and many other technical information.
- Report content and report format will be effective in the evaluation of the report.
- Final Design Report score constitutes 5% of the overall competition score.
- It is mandatory for a competition team to submit the Final Design Report in order

to be ranked in the competition.

- There is no restriction on the content or length of the report, provided that the report template is kept intact.
- Final Design Report must be submitted to t3kys.com by September 2025 (Date to be revealed by TEKNOFEST Competitions committee) at the latest.

6. ONLINE COMPETITION SIMULATION

- After the evaluation of the Preliminary Design Report, a simulation competition will be held to determine the teams that will come to the competition area.
- In the Online Competition Simulation, the competitors are expected to detect the objects in the frames that will be shared online with the models they have developed and predict the position of the aircraft.
- The Online Competition Simulation will be held with the same rules and theme as the first competition session.
- A document containing detailed information about the Online Competition Simulation will be shared with the competitors in May.
- Teams that fall below the success criteria to be announced in the document and teams that never connect to the server will not be able to proceed to the next stage.

7. SOFTWARE AND HARDWARE CHARACTERISTICS OF THE TEAMS

- Each team is responsible for its own software and hardware system. No software or hardware (computer, mouse, etc.) support will be provided in the competition area.
- It is expected to participate in the competition by having every hardware (adapter, mouse, keyboard, etc.) and software that will be needed.
- Any operating system can be used.
- Teams can develop on any platform and programming languages they want.
- It will be sufficient for the competitors to have the hardware that can process 1 image frame per second.
- The running speed of the algorithm is not a scoring criterion. For this reason, strong or weak hardware does not affect the course of the competition.
- The competition platform will be prepared in such a way that the strong or weak hardware to be used by the competitors will not affect the course of the competition.

8. CONNECTION WITH THE SERVER DURING THE COMPETITION

- During the competition, teams will be provided with an ethernet cable to connect to the local network, that includes the competition server. Each team must connect to the competition network via this ethernet cable with only one IP address. During the competition, an IP address will be given to the competitors to connect to the system only through the specified IP addresses.
- The address of the competition server will be determined on the day of the competition. This address will be in http://127.0.0.25:5000 format for example. All communication with the server will be in JSON format with API logic.
- API address information to be used at the time of the competition will be shared with the competitors before the test session in the competition environment.
- During the competition, teams will detect the objects specified in the specification on the image frames of a video, and when the necessary conditions are met, they will make position estimation. The competitors will not be given the videos, but will be given a list of images recorded at 7.5 fps from these videos. This list is in JSON format shown in Figure 14 and the information to be included in it will be as follows:
    - **url**: Unique url of the video frame id
    - **image_url**: The url where the video frame image is located
    - **video_name**: Name or number of the video from which the video frame was taken
    - **session**: url indicating the session
    - **translation_x:** Displacement of the Aircraft in metres on the X axis relative to the first image in the reference coordinate system
    - **translation_y:** Displacement of the Aircraft in metres on the Y axis relative to the first image in the reference coordinate system
    - **translation_z:** Displacement of the Aircraft in metres on the Z axis relative to the first image in the reference coordinate system
    - **health_status:** The value indicating whether the aircraft's position detection system is working properly or not.

The competitors will receive a list similar to the following example from the competition host after the start of the competition.

```
[
{
"url": "http://localhost/frames/3598/",
"image_url": "/ljfgpemcvkmuadhxabwn_V2_1/frame_000000.jpg",
"video_name": "ljfgpemcvkmuadhxabwn_V2_1",
"session": "http://localhost/session/2/",
"translation_x": 0.02,
"translation_y": 0.01,
"translation_z": 0.03,
"health_status": 1
},
{
"url": "http://localhost/frames/4787/",
"image_url": "/ljfgpemcvkmuadhxabwn_V2_1/frame_000004.jpg",
"video_name": "ljfgpemcvkmuadhxabwn_V2_1",
"session": "http://localhost/session/2/",
"translation_x": 0.01,
"translation_y": 0.02,
"translation_z": 0.01,
"health_status": 1
},
{
"url": "http://localhost/frames/3916/",
"image_url": "/ljfgpemcvkmuadhxabwn_V2_1/frame_000008.jpg",
"video_name": "ljfgpemcvkmuadhxabwn_V2_1",
"session": "http://localhost/session/2/",
"translation_x": "NaN",
"translation_y": "NaN",
"translation_z": "NaN",
"health_status": 0
}
]
```

Figure 14. Image information

- After the team have finished processing a picture, they are required to report to the server the objects and aircraft position they found in the frame. Answers not reported to the server will be considered invalid. Results must be submitted separately for each picture.
- In order to report the detected objects to the server, the detected object positions, classes and the position of the aircraft should be sent to the address that will be specified in the competition. The information that should be included in the JSON file, the format of which is shown in Figure 15, to be sent by the competitors are as follows:
- **id**: the id of the sent prediction
- **user**: the irl containing the user's information
- **frame**: Unique url of the video frame id
    - **detected_objects**: Array containing the locations of detected objects.
        - **cls**: Class of the detected object 0", "1", "2", "3")
        - **landing_status**: Information about whether the landing status is appropriate or not
        - ("-1", "0", "1")
        - **top_left_x**: The distance in pixels from the top left corner of the smallest quadrilateral containing the detected object to the left edge of the image
        - **top_left_y**: The distance in pixels from the top left corner of the smallest quadrilateral containing the detected object to the top edge of the image
        - **bottom_right_x**: The distance in pixels from the bottom right corner of the smallest quadrilateral containing the detected object to the left edge of the image
        - **bottom_right_y**: The distance in pixels from the bottom right corner of the smallest quadrilateral containing the detected object to the top edge of the image
    - **detected_translations**: The sequence containing the detected displacement information.
        - **translation_x:** Displacement of the Aircraft in metres on the X axis relative to the first image in the reference coordinate system
        - **translation_y:** Displacement of the Aircraft in metres on the Y axis relative to the first image in the reference coordinate

system

- **translation_z:** Displacement of the Aircraft in metres on the Z axis relative to the first image in the reference coordinate system


```
[
{
"id": 22246,
"user": "http://localhost/users/4/",
"frame": "http://localhost/frames/4000/",
"detected_objects":
 [
    {
"cls": "http://localhost/classes/1/",
"landing_status": "-1",
"top_left_x": 262.87,
"top_left_y": 734.47,
"bottom_right_x": 405.2,
"bottom_right_y": 847.3
  }
],
"detected_translations":
[
  {
 "translation_x": 0.02,
 "translation_y": 0.01,
"translation_z": 0.03
  }
]
}
```


Figure 15. JSON Format

9. SCORING

Table 5. General Competition Scoring

Score Type	Score Ratio
First Mission	%45
Second Mission	%45
Final Design Report	%5
Competition Presentation	%5
Total Score	%100

9.1. Scoring Criteria for the First Mission

- The performance of the object detection will be determined according to the Mean Average Precision (mAP) value. mAP is calculated based on the Intersection Over Union (IoU) value. This ratio indicates the amount of match between the area found by the tools ($Predicted\ Quadrangle$) and the area showing the actual area of the object ($Actual\ Reference\ Quadrangle$) (Figure 16 and Formula 1).

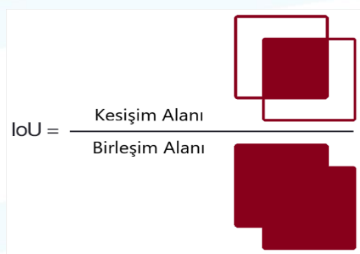

Figure 16. IoU Formula Notation

$$IoU = \frac{Actual\ Reference\ Quadrangle \cap Predicted\ Quadrangle}{Actual\ Reference\ Quadrangle \cup Predicted\ Quadrangle}$$

Formula 1. IoU Formula

The mAP metric to be used in the evaluation of the methods will be the same as that used in the evaluation of classical object detection methods. In addition, in cases where the landing state is not detected correctly, the average precision (AP) value for the relevant class will be negatively affected.

The threshold value of IoU of $Predicted\ Quadrangle$ used in the calculation of mAP metric is 0.5.

9.1.0. First Mission Sample Scoring Cases

Example 1:

Table 6. Example Table 1

Real Class	Human
Detected Class	Human
Number of Quadrangles Sent for Detection	1
Iou Values of Detected Areas	0.63
Detected Landing Values	-1
Actual Landing Value	-1

Explanation: In the example shown in the table, the competitor receives points to increase the AP value for the human class.

Example 2:

Table 7. Example Table 2

Real Class	Human
Detected Class	Vehicle
Number of Quadrangles Sent for Detection	1
Iou Values of Detected Areas	0.66
Detected Landing Values	-1
Actual Landing Value	-1

Explanation: In the example shown in the table, the competitor receives a score that reduces the AP value for the human class.

Example 3:

Table 8. Example Table 3

Real Class	Human
Detected Class	Human
Number of Quadrangles Sent for Detection	1
Iou Values of Detected Areas	0.42
Detected Landing Values	-1
Actual Landing Value	-1

Explanation: In the example shown in the table, although the competitor correctly detects the class and landing values, the IoU value of the detected area is less than 0.5, so in this example, the AP value for the human class is reduced.

Example 4:

Table 9. Example Table 4

Real Class	Vehicle
Detected Class	Vehicle
Number of Quadrangles Sent for Detection	3
Iou Values of Detected Areas	0.85, 0.61, 0.54
Detected Landing Values	-1, -1, -1
Actual Landing Value	-1

Explanation: In the example shown in the table, since the competitor sends more than one detection even though all detections are greater than the IoU threshold value, the competitor receives 1 point for the vehicle class (for a detection with an IoU value of 0.85) to increase the AP value and 2 points (for detections with IoU values of 0.61 and 0.54) to decrease the AP value. In total, the competitor's vehicle class is affected in such a way that the AP value decreases in this example.

Example 5:

Table 10. Example Table 5

Real Class	FCP
Detected Class	FCP
Number of Quadrangles Sent for Detection	1
Iou Values of Detected Areas	0.91
Detected Landing Values	1
Actual Landing Value	0

Explanation: In the example shown in the table, the competitor receives points by reducing the AP value for the FCP class because he/she detects an area that is not suitable for landing as suitable for landing.

Example 6:

Table 11. Example Table 6

Real Class	Vehicle
Detected Class	No detection
Number of Quadrangles Sent for Detection	0
Iou Values of Detected Areas	-
Detected Landing Values	-
Actual Landing Value	-1

Explanation: In the example shown in the table, the competitor fails to detect the vehicle object that he/she should have detected, so in this example he/she receives a reduced AP value for the vehicle class.

9.2. Second Mission Scoring Criteria

- Scoring will be made by using the average error between the reference position information of the aircraft and the position information estimated by the algorithms developed by the competitors.
- The error calculation formula to be used for the second task is shown in Formula 2 below.

$$Average\ Competitor\ Error\ = E = \frac{1}{N}\sum_{i=0}^{N} \sqrt{(\hat{x_i} - x_i)^2 + (\hat{y_i} - y_i)^2 + (\hat{z_i} - z_i)^2}$$

Formula 2. Average Error Calculation Formula for Mission 2

- $\hat{x_i}$ $\hat{y_i}$ and $\hat{z_i}$, denote the position estimation information sent by the competitor for the ith image. x_i , y_i and z_i are the absolute correct position information of the aircraft.
- At the end of each session, the score of the competing team is calculated with the amount of errors made by all teams in the second task. The algorithm used for calculating the team score has been shared in the Github project repository. It is recommended to review the library and use it while conducting your tests.

10. CONTEST GITHUB and GOOGLE GROUPS PAGES

Within the scope of the competition, various digital platforms have been created to enable participants to receive support throughout the process, share their questions and communicate between teams. These platforms play a critical role in sharing technical details, announcing updates and increasing interaction within the community.

Github Project Repository: Code blocks, sample data sets and other technical materials to be used throughout the competition will be shared on Github. Participants can access the necessary documents through this platform, review the code and integrate it into their own work. The Github page will be kept constantly updated to provide easy access to technical materials for the competitors.

Google Groups Platform: A Google Groups discussion platform has been created to facilitate the exchange of information between teams and to enable them to submit questions to the organising team. Through this group, important announcements about the competition will be made, frequently asked questions will be answered and competitors will be able to receive technical support.

These platforms aim to facilitate the preparation processes of the competitors and to ensure that the organisation is transparent and accessible for all participants. All participants are encouraged to use these platforms effectively.

11. ANNOUNCING THE COMPETITION RESULTS AND AWARDING

- At the start of each competition session, the ranking of the competitors according to their previous score will be announced.
- After the completion of all competition sessions, the competition score will be calculated using the ratios specified in section 8. This score value will be used to determine the ranking teams in the competition.
- The ranking teams will take the stage on the last day of TEKNOFEST and receive their awards.
- Information about TEKNOFEST and Artificial Intelligence in Aviation Competition calendars will be announced to the competitors in the general specifications and various media sources.

8TH YEAR

NATIONAL TECHNOLOGY INITIATIVE

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