

XPECTO

Tech Fest 1.0

GaLacTic EyE - The Observatory Design Challenge

Max Points: 400

Astronomical observation needs both public and private functions: Stargazing & night sky can give a new public function & value to the fortress appealing the highest number of visitors. Building an observatory that is accessible to all would increase the interest of the commons in the field of astronomy and astrophysics. Because of this the observatory would include multiple features to make it easier for the public to stargaze and learn astronomy and astrophysics by making things completely autonomous, a common lounge, books, discussion rooms, computers for better visualization of multiple things etc.

PROBLEM STATEMENT

The problem statement is to design an Observatory that is accessible to the public for stargazing, astronomical study and research. This requires the participants to design an observatory, along with a telescope which is able to locate

and track any star autonomously by only its name and should plot its trajectory as well.

1. The teams will have to design an observatory that is to be built on a hilly topographical region.
2. The main components would be an observatory, telescope, telescope mount for autonomous mapping and tracking and mirrors/lenses. All these should be included in the 3D design (except mirror/lenses).
3. The Telescope should be able to track the celestial bodies that are visible in the night sky at that particular time and location. So the teams should also provide the Star Map of that location.
4. The telescope should be equipped with the right mirror or lenses or both for appropriate and accurate focusing on the entered celestial body. The teams will have to give a detailed calculation and analysis of the same in the report.

SOFTWARE SPECIFICATIONS

1. Participants can use any of the following 3D design software : Solidworks, AutoCAD or Fusion360.
2. Any Application can be used for figuring out the starmap at that location.
3. Any circuit design software for Electrical schematic. Example: Proteus, Fritzing etc

GUIDELINES

1. A brief topographical analysis should be done before designing the observatory based on the location where the observatory would be located.

2. Terrain information for observatory location would be provided.
3. Plagiarism upto 10% is tolerable. 10-30% plagiarism will fetch a penalty of 20% of points obtained. Above that would result in disqualification of the team.
4. Max Team Size - 6 Members
5. Only team leaders will have to register and would be the point of contact for the rest of the event.
6. Each team would be provided with a unique ID and all the submissions should be named using it. College names should be present in any of the submissions. If found it would fetch a penalty of 30 points.
7. A description of the components used and justification of the particular component.
8. The limit of pages for the report and slides should not be exceeded. In case done so it would attract a penalty of 30 points.

EVALUATION CRITERIA

Final Evaluation 300:

The final submission of the teams would be evaluated on the following basis:

1. Innovation and feasibility in design: 100
2. Materials, optical analysis and telescope specifications: 40
3. Accessibility, StarMap: 20
4. Basic automation Idea for the telescope: 40
5. Real time performance analysis: 40
6. Code Complexity: 60

Presentation and Q&A: 100

1. Presentation: 50
2. Q&A: 50

SUBMISSION

FINAL-EVALUATION (300 Points)- To be submitted **before 1 day of final presentation**

Following files are to be submitted in report:

1. CAD Model - It should be an STL file.
2. Design Report - It should contain all the specifications and description of the design. The materials for the observatory, topographical information should also be included. Design Specifications of the telescope along with proper optical calculations for the lenses and mirrors being used in the telescope should be present. Everything in design should have a proper reasoning behind it. The design report should be of max 7 pages.
3. Detailed pseudo code or algorithm should be given which explains autonomous working of the telescope. Any libraries or APIs should be clearly mentioned.

FINAL PRESENTATION (100 Points)

Following files need to be provided for final submission:

PPT - Should include design highlights and all the various analyses. Innovation, ease of use should also be included. Should not exceed 10 Slides.

The time limit for presentation is 5mins, which will be followed by a Q&A session by the judges. The Q&A session would be 5mins long.

*** Kindly don't exceed the time limit for presentation.

CONTACT DETAILS

In case of any Queries contact:

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Or reach out through our discord channel: