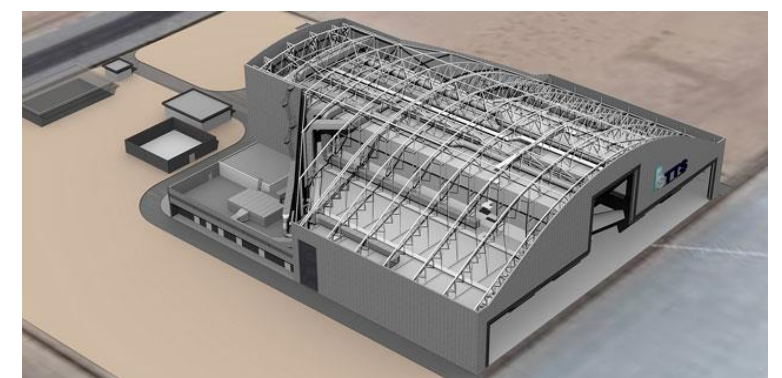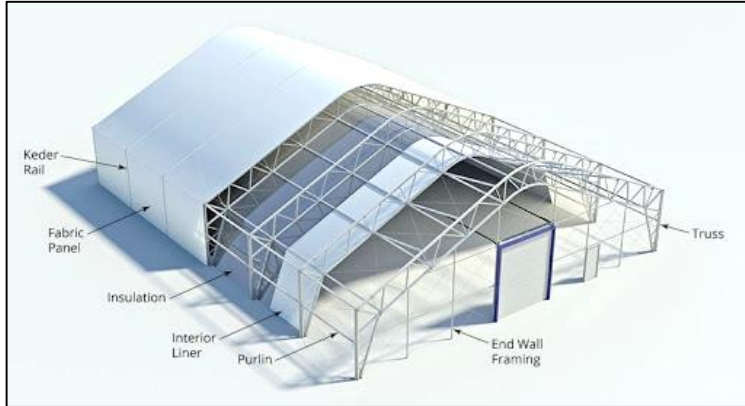# Aircraft Hangar Building Design Competition

To develop a Digital Aircraft hangar Building Model considering Architectural and Structural Aspects

Building Layout

Requirements:

Minimum requirements,

Area of the Building = 56m x 56 m2

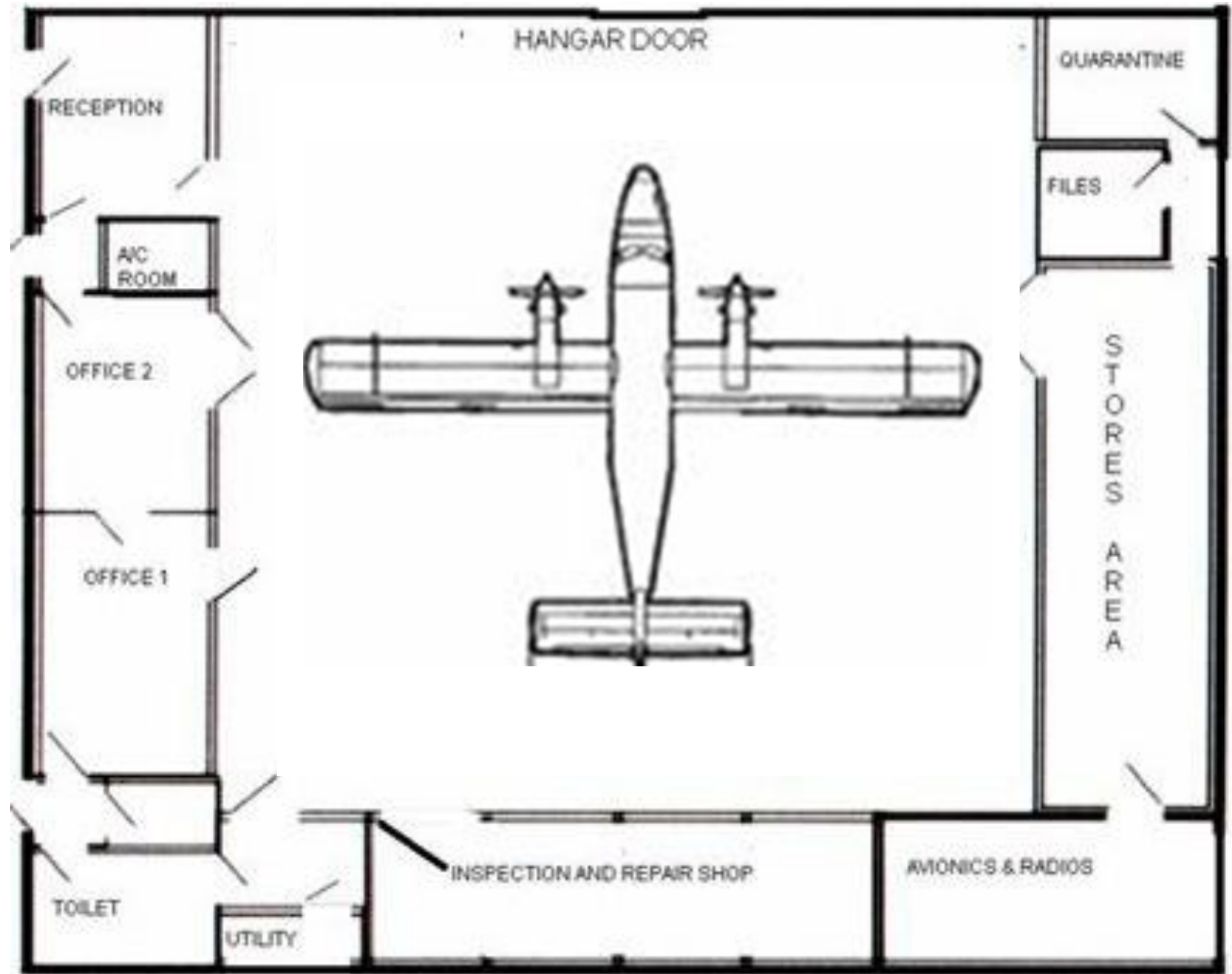Area of Hangar = 40 x 40 m2

Crane capacity of Hangar= 10Tons

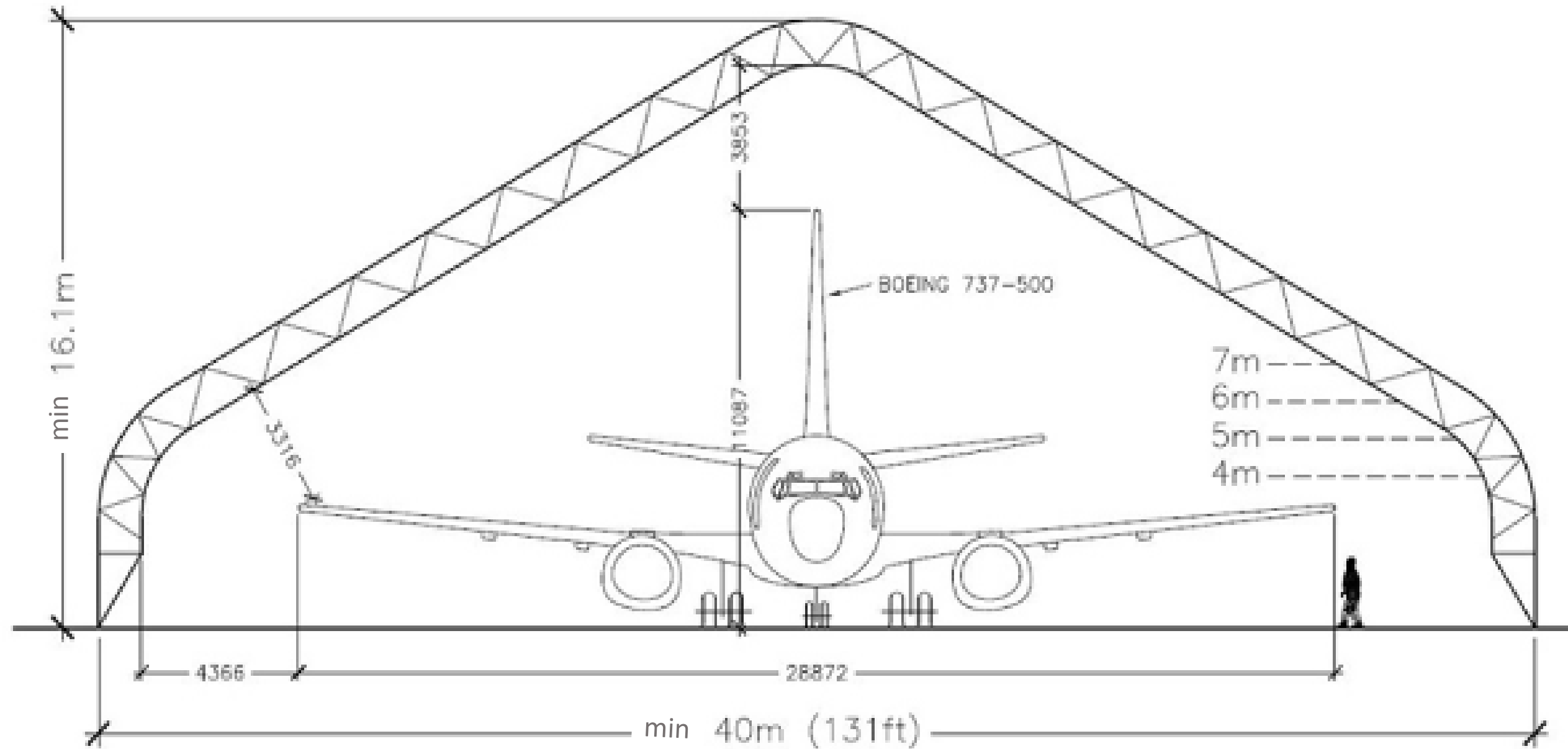# of story in office area =3

Eave Height (Hangar Height) = 16.1m

Design wind speed = 100mph

Exposure = C

Type of Terrain = Flat

Sample Hangar Buildings

BOEING 737-500

min 16.1m

3953

11087

3316

7m
6m
5m
4m

4366

28872

min 40m (131ft)

Building Requirements

Participants are bound to design the aircraft hangar building as per provided layout plan with 10tons load carrying capacity. Free to select the design material and structural configurations as an example few configurations of existing aircraft hangar are attached. The office area and store area must be three story structure with typical story height not less than 12ft, the size of the aircraft is attached. The main focus should be on structural design (skip the detail related to the mechanical equipment and platform usually required in hangar buildings)

Building Requirements

Overhead cranes and other equipment is usually suspended from the Hangar roof. For long spans this super-imposed load can be significant and must be assessed accurately at the commencement of the design. The crane lifting capacity will vary for different aircraft types but it is now common for multi-bridge 10tons cranes to be provided. So include 10tons crane load in each and every column of main hangar area in addition to the structural system loads and skip the detail or placement of crane.

Building Requirements

Understanding the high energy demand in aircraft hangar and lifecycle facility operations costs to design the structure with sustainability in mind. To explore alternative geometries that would minimize area and volume to provide energy savings during harsh weather and enhance the hangar's usability.

Structure should be sustainable considering alternative geometries/ orientations and structural system to provide energy saving during harsh weather.

Team Selection

All students are invited to participate in the design competition particularly the final year students. Multidisciplinary **teams are strongly encouraged (Maximum 06 students are allowed in a group)** with one faculty member as an advisor to that group.

Architectural Requirements

1. Integration of spaces, totality of spaces, connectivity among variant facilities, sustainability.

2. Design challenges include the budget and functionality constrains in typical hangar design. The plan geometrically resolved into spaces, the office rooms must be well ventilated and enough light in the rooms during the daylight.

3. Softwares to be considered AUTOCAD 2D, SKETCHUP, REVIT and PHOTOSHOP

Structural Requirements

1. To include durable design which runs in long term ensuring safety of the structure which works in our climate and context. Readily available materials, designing of adequate beams and structures minimizing the cost and maximizing the durability.

2. Design challenges include the selection of structural system based on crane capacity, clear span and clear height requirements of Hangar.

3. Moreover, structure should be design for wind and earthquake loads considering ASCE7-16 Seismic and wind load provisions

4. Softwares to be considered SAP2000, ETABS, SAFE, AUTOCAD -2D and REVIT

Submission requirements

The **Submittal Report** shall include the cover page identifying **Team name**s, executive **Summary** for the entire project and a statement concerning the project goals and requirements, **codes & specifications**, summary narratives for each discipline may include some **graphics** (charts, graphs, renderings, models and partial plans or details). However, must include the, **statement of goals**, description of how the **design challenges** were met, description of **innovative solutions** to the design challenges, description of systems/solutions and rationale for **system selections and solutions.**

Submission requirements

Additionally, the supporting documents in each discipline such as Design criteria, methodology, assumptions, Calculations, References and Drawings (PDF format is allowed) including Plans, sections, and elevations; Typical details and/or details to highlight design elements; Rendered views of building and/or design elements and systems. Submittals should include drawing information to highlight to the jury the major design elements, integration, innovation and understanding of the systems. Moreover, a brief presentation describing your entire project aspects.

Sample Structural Systems

10 - 50 m
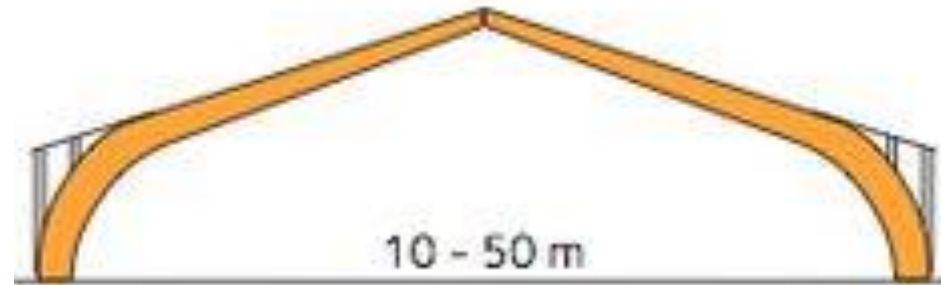
Three-pin portal frame with curved haunches

20 - 60 m
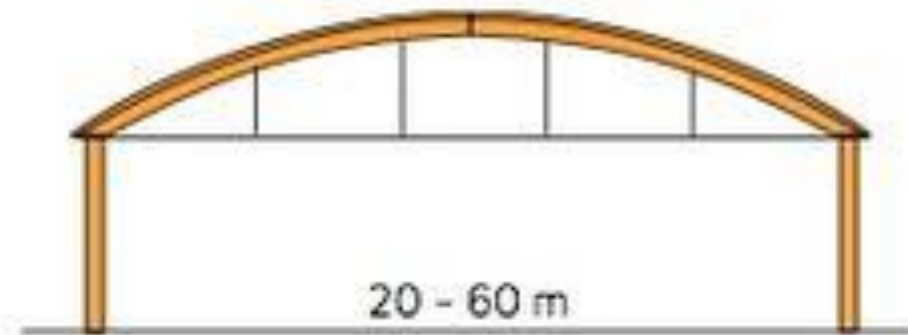
Three-pin arches with ties

Sample Structural Systems