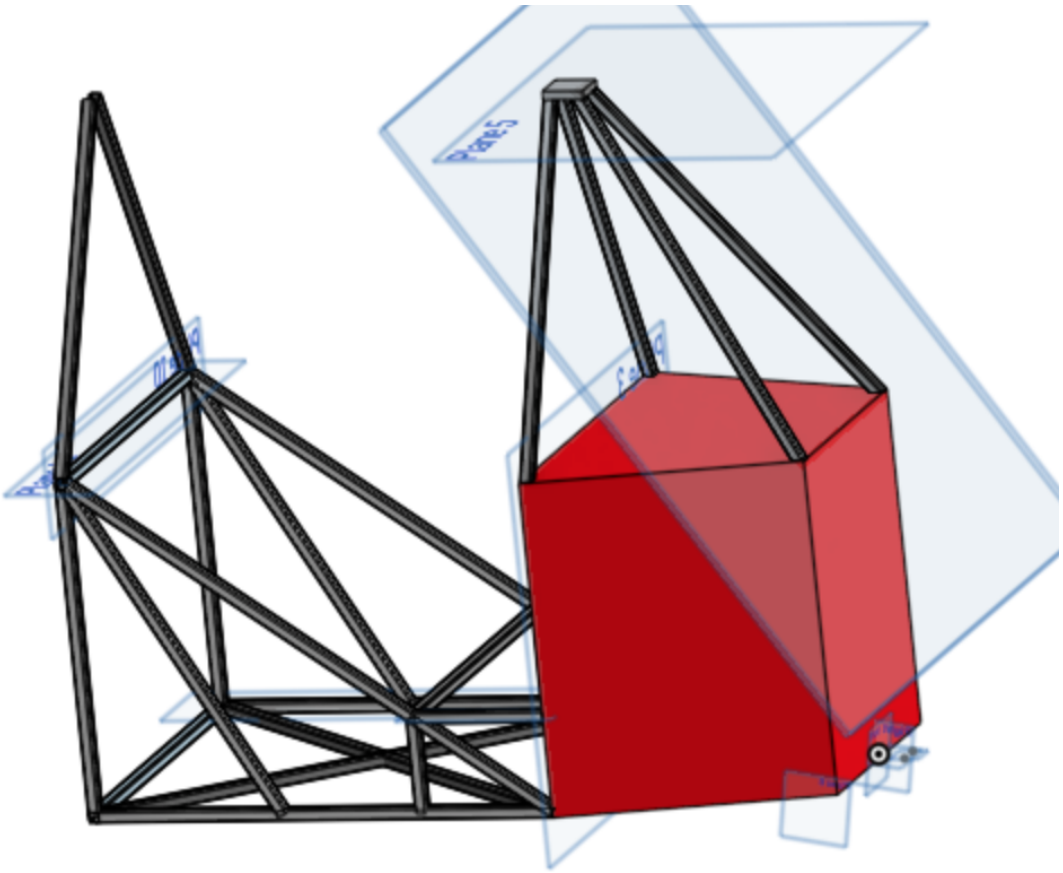
# Fuselage Design Process

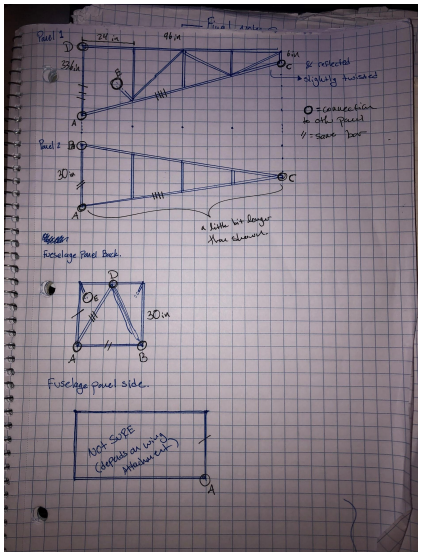
## Day 1 (3/21)

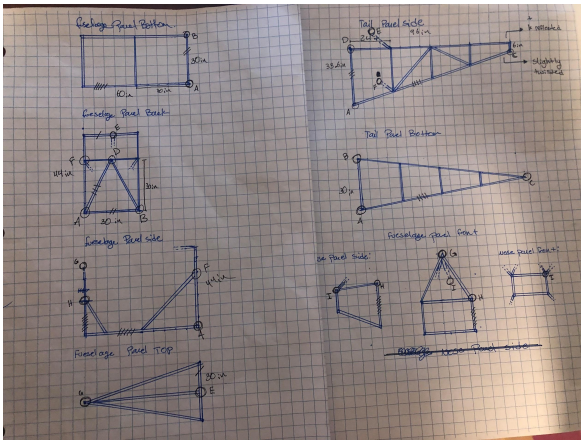
The Design Team ultimately decided on a top wing design for improved visibility during landing as well as roll stability. As none of us are experienced pilots, any stability improvements are crucial. After this decision on March 21st, we immediately started CADing the fuselage using the Onshape beams feature. The initial concept was based on the Milholland Legal Eagle, but quickly deviated in future revisions. Through this process, we kept it in mind that the design would have to soon be changed to accommodate various differences between our design constraints and those of the Legal Eagle, such as that we do not have fuel stored in the wings.

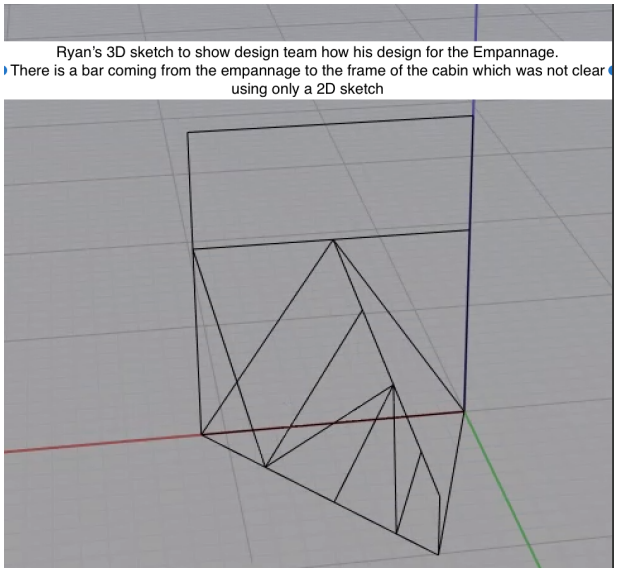


# Day 2 (3/22):

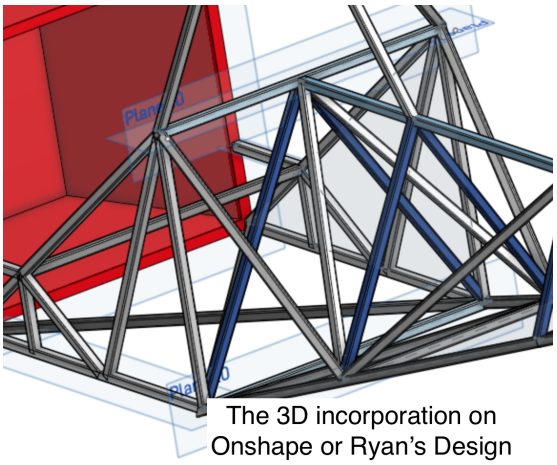
Ryan sketched out a slightly different beam layout as to strengthen the connection between the empennage and cabin. Ryan sketched the updated empennage by hand and in Rhino before Maya implemented the changes into Onshape.



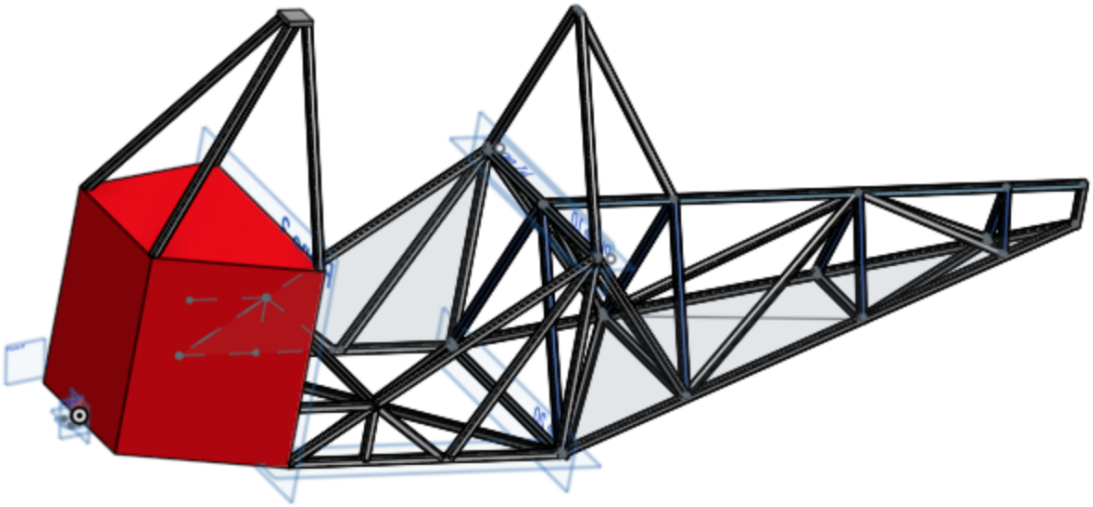




Ryan's 3D sketch to show design team how his design for the Empannage.
There is a bar coming from the empannage to the frame of the cabin which was not clear using only a 2D sketch



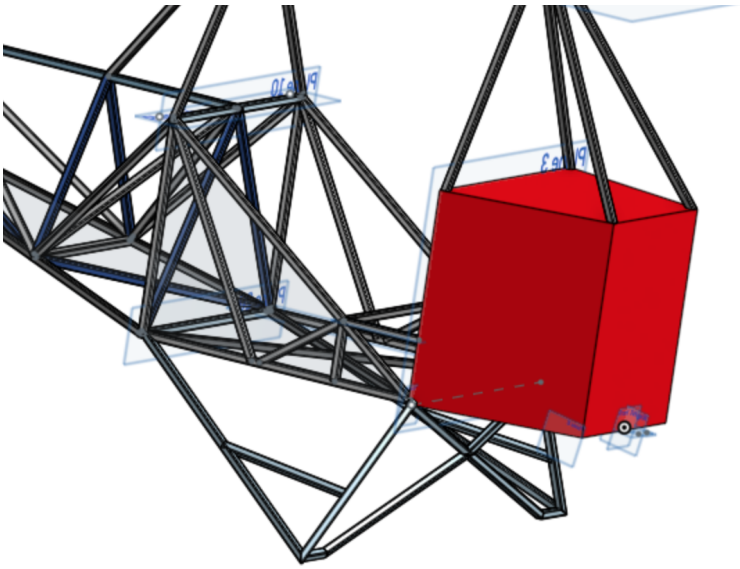
The 3D incorporation on Onshape or Ryan's Design



## Day 3 (3/24):

With the nose, cabin, and empennage drafted, Justin and Rudy researched different landing gear configurations. Design Team eventually decided on a taildragger landing gear layout, as it is inexpensive, lightweight, structurally simple, and better adapted for undeveloped runways despite its inherent difficulty to control.

Since exact landing gear location is dependent on the center of gravity which we cannot precisely determine until the entire fuselage is drafted, we variablized the landing gear dimensions so they could be easily adjusted in the future. We then modeled the wing bearing struts, which are just in the beginning stages of design as calculations for ideal placement of these struts are not completed.



## Day 4 (3/25):

We then added wing bearing struts to the side of the fuselage which will hold most of the weight of the wing. After research into ultralights and seeking help from the forum, we learned that ultralights differ from normal planes in that the struts and wiring carry most of the load. This means that the attachment to the fuselage can be simple, so as to save weight. The struts and initial wing attachment were based off the Affordaplane which also incorporates a dihedral. All wing strut dimensions are variables as placement calculations have not yet been completed.