# Senior Design Figure of Merit Analysis (by Eliseo Miranda)

Preface: Hey guys, I’m sorry I won’t be in class again today ☹. I’m going to the TED talks that they have on campus and it’s from 7am until 12pm. Kind of ridiculous, but, whatever. Anyways, I uploaded the senior design spreadsheets; you guys know how to use that already. But, I highly suggest that we do a FoM Analysis first in order to figure out what type of components suit the plane best. It will also be great for our report I think. (\*WARNING: THE FOM ANALYSIS IS VERY RIGID AND TRADITIONAL, THERE IS LITTLE ROOM FOR INNOVATION UNFORTUNATELY BUT IT WORKS WELL FOR THE BASIC COMPONENTS. IF YOU HAVE UNIQUE IDEAS FOR THE DESIGN, KEEP THOSE IN MIND WHEN DOING THE COMPONENT MATRICES)

The FoM Analysis wont give us details like wing aspect ratio (the spreadsheets will do that), but the FoM will give us a basic skeleton of what our design will look like based on what we determine are the most important factors for the aircraft’s performance. You can ignore the first 2 slides of the powerpoint I put in the dropbox and then you can use the format for the rest of the slides to perform the analysis.

* The first step is deciding what our primary and secondary design drivers are. These should be specific and set in stone.
* The second step is to choose our Figure of Merits. There is a bunch already included in the powerpoint but we can add more or take-away some if we feel it is necessary. One we might like to add is Glide Capability, probably.
* Then we put our figure of merits into the weights matrix and we compare them against each other with values of 1-5 with 5 being way more important and 1 being much less important. Hopefully it’s obvious from the example matrix in the powerpoint. If the FoM’s match-up, then you input a 0 and the zero’s should line up diagonally from left to right. (The FoM pairs repeat so make sure we use the same values in those repeating elements)
* Afterwards, add each row up and record it in the totals column. Then add up the total columns and calculate the percent weights based on that number for each FoM. These weights will go into the various component matrices.
* Afterwards you rank each component (after doing research on their benefits and weaknesses) from 1 to 5 and take the weighted averages using the FOM weights found previously. That should give us a numerical value for which component suits our plane the best. You can feel free to add components if you feel any are warranted (i.e. delta wing or inverted y-tail)

This will be great for the report and a good starting point for the design. Hope this helps and I’ll definitely be there on Thursday and for the rest of the semester to help. Let me know if anything important comes up in class and if you need me to work on stuff outside of class.

Eliseo