**AEROSP/SPACE 583**

**Space Systems Management**

**Homework #2**

**Due: February 3 at 11:59 pm**

**Task:**

Develop a Trade Analysis Matrix (trade study) for a decision to be made on your class project, or another project of your choice.

**Notes:**

Each student must perform a unique trade study and submit independent reports.

Trade matrix should be submitted as an excel file.

Trade study report should be submitted as a PDF.

List all references used.

**Deliverables:**

**1)** Trade Matrix with the following:

a. Factors to be considered (Criteria)

b. Matrix topic and options to trade (Choices)

c. Measurement method / measuring criteria (UF Scoring and Weights)

d. Plausible alternatives – various additional options considered with respect to factors defined in (a) (Wants)

e. Make/present the final selection quantitatively (FOM)

**2)** Trade study report for the trade matrix.

**Requirements:**

**1)** Trade Matrix:

Use the Excel spreadsheet provided to compute a Figure of Merit (FOM) from a Weighted Analysis. Ignore the Cost and Risk charts at the bottom of the main spreadsheet. You may need to alter the spreadsheet to fit your needs, but the overall structure should be maintained for ease of evaluation.

a. Fill in the “must have criteria” column with the necessary parameters, e.g. cost cap, performance, etc. (Minimum four criteria should be given). These criteria must be reasonable and necessary to the success of your mission. **(10 points)**

b. Perform market availability surveys to select and fill in options (items being traded, or ‘Choices’) that meet the “Must have criteria.” (Minimum of four options). If a must-have criteria is not met, then this option should not be included in your trade study. You will need to explain why you chose these options and how they meet the must-have criteria in the Trade Report. **(10 points)**

c. Fill in the “want criteria” column with associated factors (e.g. fuel efficiency) in the “Info” column (minimum 4 criteria) of each option; and weigh each criterion based on importance to the overall mission (prioritize certain criteria by assigning higher weight to more important factors). You will need to explain the selection of this want criteria and their weights in the Trade Report **(10 points)**

d. Compute scores of each criteria using the “scores by criteria” tab (included in the provided excel sheet).

Show conformity of the “values” and “score” used in the “Trade Matrix” sheet to the “scores by criteria” sheet. For qualitative want criteria present the qualitative options for each want (eg, modern design, comfort, etc) and the corresponding numerical options. For quantitative want criteria, present the actual parameters (eg, fuel efficiency, velocity, etc) and how they can be translated into a standardized scoring scale. You should use a consistent scale for scoring each item (i.e. 0-1, 0-5, etc.), but not necessarily the same minimum, maximum, and nominal values. Clearly indicate the UF function being used for each want criteria. Assigned values must be reasonable and accurate for full points, therefore it is imperative to include any additional detail in the Trade Report.

Compute the final scores, also known as the Figure of Merit (FOM) and indicate the final decision based on your analysis. **(30 points)**

**2)** Trade Study Report

Compose a trade study report to serve as documentation for your trade matrix analysis. Your documentation should describe at least the following:

a. Reasons behind selected factors (All Criteria) **(10 points)**

b. Specific reasons behind selected options (Choices) **(10 points)**

c. Explain your measurement methods (Weight, Value, and Scoring) for *each* want criterion. **(10 points)**

d. Show and discuss the final product or configuration selected **(10 points)**

**(Each report category is subject to a 2 point deduction for lack of organization and/or clarity, please do not embed important information in long paragraphs.)**

**Optional Resources:**

Canvas -> Files -> Lectures -> Trade Study Analysis Lectures

Canvas -> Files -> Lectures -> Trade Study Analysis Lectures -> Examples