Memorandum

DATE:       28 March 2016
TO:         Penn State EDSGN 100
FROM:       Lockheed Martin Customer Team
SUBJECT:    Updated Design Goals & Updated USB Hub Details

**Item 1: Updated Design Goals**
It is the desire of the customer team that the design teams quantify the precision of their 3D printed parts using 3D scanning technologies. The design teams should compare the 3D scanned results to the expected results from their 3D models to determine the accuracy of the 3D printed prototype parts. This should be considered a stretch goal for all projects, and highly desirable by the customer team as they evaluate the feasibility of fielding additively manufactured items. Analysis between the 3D scanned prototype and the 3D model will be considered by the customer team during the design competition.

**Item 2: Updated USB Hub Details**
Due to a change in priority by our end users, the LM customer team will be modifying the goals of the USB Hub design project. There is a requirement from our customer to field new mission systems under the current, dual-stacked, 7-port USB Hub configuration by July 1, 2016. In order to meet this deadline, the LM customer team will be putting a stronger emphasis on reduction in parts versus the added USB capability and vertical installation. While the added USB hub and vertical configuration will remain stretch goals for use in later production lots, it will be imperative for the design teams to reduce the overall parts required for this assembly in order to meet production deadlines in July.

The modified project description is as follows:

**Project #4: USB Hub Mounting Bracket**

The purpose of this project is to redesign a USB Hub Mounting Bracket used as a debug and auxiliary mounting device for a custom avionics mission system. The primary goal of this project is to reduce the total number of parts for this assembly. As a stretch goal, design teams should consider methods for increasing the capacity of USB connections as well as a vertical installation. Prototype designs may be for use with any COTS USB hub that meets the overall total port requirement.

Your work will involve the following:
1. Re-design the existing bracket for quantity 2, 7-port USB Hubs with cable retention for USB and Power cables and minimal part count
2. Maintain 4-point, screw mounting for base bracket
3. Minimize any additional screw / mounting holes required in platform structure
4. Bonus: Design a bracket for vertical hub mounting
5. Bonus: Design a bracket for stacking three Hubs together (horizontal and vertical)
Design Data for USB Hub Mounting Bracket:

Original Concept:

Total Unique Part Count: 6
Total Part Count: 27
- Base Hub Enclosure: Qty 1
- Power Retention Bar: Qty 1
- USB Retention Bar: Qty 1
- Screw: Qty 8
- Washer: Qty 8
- Lock Washer: Qty 8

Notional Prototype for dual-stacked, 4-port Hub:

Total Unique Part Count: 7
Total Part Count: 38
- Base Hub Enclosure: Qty 1
- Power/USB Up-link Retention Bar: Qty 2
- USB Retention Bar: Qty 1
- Screw: Qty 10
- Washer: Qty 10
- Lock Washer: Qty 10
- Nuts: Qty 4