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X650F Power Solution

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Problem Statement: The problem that has been found is how that students coming out of the UAV minor and major are not getting enough flight time in the starting courses such as AT 209 and AT 219. Due to this, they are not as prepared as they should be for the higher level courses such as AT 309 and AT 319. Our end goal is to somehow increase the level of flight time in the earlier courses so that they can be prepared and ready for the next level courses.

Procedures: The procedures taken in the development of the X650F Power Solution involved a complicated process, and thus was broken into different sections. The first section describes the concept design analysis, in which several concept designs were conceived and evaluated. After each concept was evaluated, a concept was inserted into a decision matrix and ranked against the other concepts. The highest ranking concept, which resulted in concept 1, was then used to address the issue. A set of procedures in the form of either DMAIC or DMEDI improvement process were generated to develop the product. The second section serves for as summary of procedures taken to complete the project in a table format. This section uses the DMEDI style of Lean Six Sigma improvement process for the development of the new product. The third section reviews the measured data and experiments conducted by team on the prototype of concept design one.

Needs	Drivers	Critical to Quality
• Increase drone flight time • Lower time needed to recharge battery • Operation in an enclosed environment • Allow users more hands on experience	• Ease of use • Efficiency of lab time • Cost to student	• System is durable for up to 300 cycles • System directions are concise and easily understood • Compatible with all student operated drones • System does not hinder lab time

Table 1.1 Voice of Customer

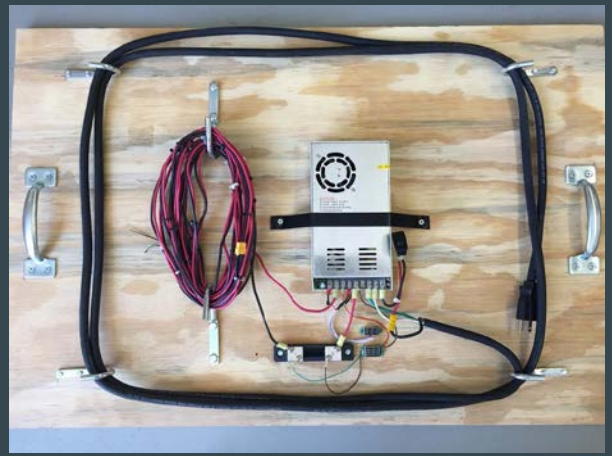

Figure 1.1 Final Mock up Board

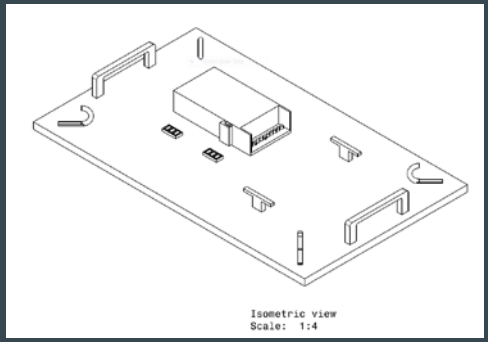

Figure 1.2 Engineering Drawing of Mock-Up Board

	Payload Capacity (in pounds)			Duration of Flight (rounded to nearest minute)	
Test	Battery Powered	Powered Tethering Unit	Test	Battery Powered	Powered Tethering Unit
1	0	0	1	13	10
2	1	1	2	15	15
3	2	2	3	12	20
4	3	3	4	10	30
5	0	4	5	13	30
Totals	6	10	6	11	30
Average	1.2	2	Totals	74	135
Improvement	60.00%		Average	12.33333333	22.5
			Improvement	54.81%	

Table 1.3 T Test Results

		DATUM					
		Concept 1: Tethered System		Concept 2: Additional Batteries and Charging Units		Concept 3: Charge Battery via Tether	
Criteria	Weight	Rating	Score	Rating	Score	Rating	Score
Increase drone flight time	5	0	0	-1	-5	-1	-5
Lower time needed to recharge battery	3	0	0	-2	-6	-1	-3
Operation in an exclosed environment	1	0	0	1	1	-2	-2
Allow users more hand-ons experience	4	0	0	0	0	0	0
Safe operations	5	0	0	0	0	-3	-15
Reliability of system	3	0	0	-1	-3	-1	-3
Cost	4	0	0	-3	-12	0	0
Total		0	0	-6	-25	-8	-28

Table 1.2 Conceptual Design Decision Matrix