Appendix A1: Updated Gantt Chart

Appendix A2: Requirements and Measurements Matrix

Subsystem: Pump (1st Prototype)

Target design requirements	< Imp	1	2	3	4	5	6	7	8	9	10	11	12
	Units	PSI	lbm/s	PSI	seconds	seconds	lbm-in		y/n	USD	USD	min	min
	Subsystem performance measures	*Static pressure created at outlet*	*Mass flow rate*	*Pressure rating of housing and fittings*	*Seal life at RPM & pressure*	*Bearing life at load and RPM*	*Rotational imbalance of assembly*	*Number of impeller variants*	*Components can be fabricated with 3 axis CNC mill*	*Cost of fabricating entire assembly*	*Cost of fabricating additional impeller and housing*	*Time to change test impellers and housing*	*Time to assemble/dissassemble*
Outlet pressure of 350 psi	8	•		•									
Mass flow rate of 1.7 lbm/s	8		•										
Operational life of 60s	10			•	•	•	•						
Includes variety of test impeller & housing options	12							•		•	•		
Assembly can be fabricated quickly	8								•				
Fabrication of assembly is affordable	6								•	•	•		
Test impellers can be changed in 5 minutes	5											•	
Assembly/dissassembly in under 1 hour	2												•
	Imp ->	8	8	18	10	10	10	12	14	18	18	5	2
	Lower Acceptable	260	1.3	500			-	5	-	-	-	30	-
	Ideal	350	1.7	600			unknown	7	yes	50	50	5	60
	Upper Acceptable	440	2.1	-			-	9	-	500	100	-	120

Figure A.1: Requirements/measurements matrix for the first prototype EFS

Subsystem: Pump (2nd Prototype)

Target design requirements	< Imp	1	2	3	4	5	6	7	8	9
	Subsystem performance measures	*Static pressure created at outlet*	*Mass flow rate*	*Pressure rating of housing and fittings*	*Seal pressure limit*	*Seal life at temp, RPM & pressure*	*Bearing life at temp, load and RPM*	*Rotational imbalance of assembly*	*Mass of system*	*Time to assemble/disassemble*
	Units	PSI	lbm/s	PSI	PSI	min	min	lbm-in	kg	min
Outlet pressure of 350 psi	7	•		•	•					
Mass flow rate of 1.7 lbm/s	7		•							
Sustained operation for 20s	9				•	•	•	•		
Mass approximates flight ready system (~10kg)	3			•					•	
Assembly/disassembly in under 1 hour	2									•
	Imp ->	7	7	10	16	9	9	9	3	2
	Lower Acceptable	315	1.6	450	450	0.33	20	-	-	-
	Ideal	350	1.7	500	500	20	200	unknow	10	60
	Upper Acceptable	385	1.8	-	-	-	-	-	15	120

Figure A.2: Requirements/measurements matrix for the second prototype EFS