

**POTENTIAL FAILURE MODE AND EFFECTS ANALYSIS
(DESIGN FMEA)**

Function / Requirements	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s) / Mechanism(s) of Failure	O c c u r	Current Design Controls - Prevention	Current Design Controls - Detection	D e t e c	R P N	Recommended Action(s)	Responsibility & Target Completion Date
Availability of deliverables	Hard drive failure	Complete loss of deliverables	10	Isolated to complete system failure	Power surges	1	Fuses, power strips, redundant backups	None	1	10		Group -
			10	Isolated to complete system failure	Age	2	Redundant backups	None	1	20		Group -

	CMap failure	Documents not available upon demand	3	Isolated system failure	Internet down	3	Documents backed up on laptops	None	1	9		Group -
			3	Isolated system failure	CMap server down	3	CMap posted on multiple servers	None	1	9		Eun Young -
Communication between the components	Communication failure from module	Module not responding	10	Isolated System Failure	Mechanical component failure	2	Overbuilt for durability	Software logic that determines faulty components	1	20	Indicator light that activates when sensor is triggered.	Andrew - 1/12/12
			10	Isolated System Failure	Electronic component failure	2	Overbuilt for durability/use of simple electronic components less likely to fail	Software logic that determines faulty components	1	20	Add fuses to prevent surges	Andrew - 1/12/12

Hardware acting in communication from sensor module to software	Failure in hardware system	Communication line failure	10	Isolated up to complete system failure	Communication lines damaged, degraded	1	Cables housed in conduit	Software logic to determine if communication segment is not responding	1	10		-
		Sensor failure	10	Isolated System Failure	Mechanical device not working	1	None	None	7	70	Indicator light that activates when sensor is triggered.	Andrew - 1/12/12
			10	Isolated System Failure	Module damaged	1	Module housed in protective container	Software logic determines if module is not responding	1	10		-
Alert State	Visual and Audio Alert Fail	Egg Jam Propogates until found by manual and or traditional means	9	System Failure	Sensor failure	3	None	System logic detects malfunctioning sensors/modules	2	54	Add fuses to prevent sensor failure due to surges	Andrew - 1/12/12
			9	System Failure	System logic issue	5	None	Validation	5	225	Research and incorporate improved jam logic algorithm (RANSAC)	Andrew - 4/9/12

		Eggs clog up for the day	8	System	User unaware of alert	4	None	None	2	64	Install volume settings	Andrew - 2/1/12
											Make alarm loud/ louder	Andrew - 2/1/12
			8	System Failure	User error	1	None	None	4	32	Warn that proper setup of sound system and software required for operation	User - 4/9/12
GUI Failure	Draw rate too slow	User annoyance	6	Credibility issue	Development language	6		Validation on target system	1	36	Develop entirely in fast compiled language	Andrew - 2/12
Parameter validation	illegal parameter entry	Program crash	8	Total system failure	Values out of range or nonnumeric	3	Enforce proper valuation	None	1	24		-
Hardware acting in communication from sensor module to software	Failure in hardware system	Communication line failure	10	Isolated up to complete system failure	Impedance from RS-285 converters	10	None	None	2	200	Use RS-422 instead of RS-485	Andrew - 2/12/12

			10	Isolated up to complete system failure	Noise	7	None	None	10	700	Incorporate error detection/correction	Andrew - 12/5/12
			10	Isolated up to complete system failure	Communication lines damaged, degraded	1	Cables housed in conduit	Software logic, to determine if communication segment is not responding	1	10		-

Action Results					Node Info.	Linked Action
Actions Taken	S e v	O c c	D e t	R P N		
				####	Engineering	DPO
				####	Operational Procedures	

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Incorporated logic for indicator	10	1	1	10	Engineering	DP0	
Installed 0.5A fuses	10	1	1	10	Engineering		

				###		DPO	
Incorporated logic for indicator	10	1	1	10	Engineering		
				###			
Installed 0.5A fuses	9	2	2	36	Engineering	DPO	
Incorporated RANSAC	9	3	5	135			

Added volume slider	4	2	2	16	Engineering		
Choice of loud sound files	4	2	2	16	Engineering		
Addition to help files/legal notes.	2	1	4	8	Operational Procedures		
Changed development language from C# to C++/Qt	1	2	1	2	Engineering	DP1.1	
				####		DP1.1.1	
Installed new converters	10	1	2	20	Engineering	DP2.1.3	

Added Hamming Code	10	1	3	30	Engineering	
			###			