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Ac Transmitter	ging 8	9	1	1	4 36
WFFI antenna		8	4	4	3 96
Wilf antenua	8	8	6	6	3 144
Class of Communication		8	4	4	2 64
Control Cont	6	6	1	1	7 42
Ordinary Computer & Mount Text Property Text	ntenna 6	6	111	3	3 54
Fa Flight Computer & Moont In Implication (100 and 8 nf.) (commands into live feel service (100 and 8 nf.) (commands into live feel service (100 and 8 nf.) Alispeed Sensor Measure Va Measure Va Measure Va Measure Va Measure Salume Inertial Sensor Measure acceleration, barometer data, and magnetic heading Measure salume Mea	6				7 84
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New level servic commands	se 9	9	***	3	3 81
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Hardware Failure					2 32
Measure acceleration, barometter data, and magnetic heading. Measure plane	4	4	2	2	2 16
Measure global position					7 28
Insertial series magnetic heading Insertial series Magnetic heading Floration					3 27
Hardware Failure Crash Proving Concected Electrical Joint 9 1 7 63 Extensive testing prior to: inaccurate Readings Crash Internal Code 9 3 3 10 7 65 Extensive testing prior to: inaccurate Readings Crash Internal Code 9 3 3 10 7 65 Extensive testing prior to: inaccurate Readings Crash Internal Code 9 3 3 10 7 65 Extensive testing prior to: inaccurate Readings Crash Internal Code 9 3 3 10 7 65 Extensive testing prior to: inaccurate Readings Crash Internal Code 9 3 3 10 7 65 Extensive testing prior to: Crash Charged Correctly 9 3 5 10 7 42 FECU. Battery Nor-Commenced Electrical Joint 6 1 7 4 7 4 FECU. ESCS 8EC and convert digital logic PWM to high voltage Current motor Imputs October 10 Crash Charged Correctly 9 1 5 3 10 50 Assign battery safety office Crash Charged Correctly 9 1 5 1 7 65 Extensive testing prior to: Crash Charged Correctly 9 1 5 1 7 65 Extensive testing prior to: Crash Charged Correctly 9 1 5 1 7 65 Extensive testing prior to: Crash Charged Correctly 9 1 5 1 7 65 Extensive testing prior to: Crash Charged Correctly 9 1 1 7 65 Extensive testing prior to: Crash Charged Correctly 9 1 1 1 1 9 FFCL. For and Crash Charged Correctly 9 1 1 1 1 9 FFCL. For and Crash Charged Correctly 9 1 1 1 1 9 FFCL. For and Crash Charged Correctly 9 1 1 1 1 9 FFCL. For and Crash Charged Correctly 9 1 1 1 1 9 FFCL. For and Crash Charged Correctly 9 1 1 1 1 1 9 FFCL. For and Crash Charged Correctly 9 1 1 1 1 1 9 FFCL. For and Crash Charged Correctly 9 1 1 1 1 1 9 FFCL. For and Crash Charged Correctly 9 1 1 1 1 1 9 FFCL. For and Crash Charged Correctly 9 1 1 1 1 1 9 FFCL. For and Crash Charged Correctly 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					3 81
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Battery Provide current to all systems in the air Battery Provide current to all systems in the air ESCs BEC and convert digital logic PWM to high voltage/current motor inputs BEC and convert digital logic PWM to high voltage/current motor inputs Overheat Crash Poorly Connected Electrical Joint 9 1 7 6 3 Extensive testing prior to a voltage/current motor inputs Overheat Filtre Crash Poorly Connected Electrical Joint 9 1 7 6 3 Extensive testing prior to a voltage/current motor inputs Overheat Filtre Crash Poorly Connected Electrical Joint 9 1 7 6 3 Extensive testing prior to a voltage/current motor inputs Overheat Filtre Crash Poorly Connected Electrical Joint 9 1 7 6 3 Extensive testing prior to a voltage/current motor inputs Props Provide Thrust Does Not Transmit Tourque Mission Failure Glide to Safe Landing Props Unsecured 7 8 8 3 165 FFCL Props Provide Thrust Does Not Provide Thrust Mission Failure Glide to Safe Landing Prophy Connected Electrical Joint 7 1 7 49 Provides Electricity to Incorrect Location Crash Wission Failure Glide to Safe Landing Onlypophyloriden prop 7 5 3 3 105 FFCL Provides Electricity to Incorrect Location Crash Electrical Short Circuit 9 9 3 8 2 105 Shrink wrap all exposed with Electrical Short Circuit 9 9 3 8 2 105 Shrink wrap all exposed with Electrical Short Circuit 9 9 3 8 2 105 Shrink wrap all exposed with Electrical Short Circuit 9 9 8 5 306 FFCL Provides Electricity to Incorrect Location Crash Electrical Short Circuit 9 9 8 5 306 FFCL Crash Electrical Short Circuit 9 9 8 5 306 FFCL Crash Electrical Short Circuit 9 9 8 5 3 506 FFCL Electrical Short Circuit 9 9 7 7 126 Extensive testing prior to unit to the provide Short Circuit Short C					3 81
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Battery Provide current to all systems in the air Loss of Power Crash Crash Crash Battery Degridation 9 1 1 9 FFC.		6			7 42
Battery Degridation				5	2 90
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Notage Variety Varie	se 9				3 27
Motors Rotate Props Rotate Props Rotate Props Rotate Props Rotate Props Mission Fallure (lide to Safe Landing Props Unsecured 7, 8, 3 168, FEC.	e 9	9	1	1	3 27
Rotates the Wrong Way	10	10) 2	2	5 100
Rotates the Wrong Way					2 70
Hardware Failure		6			2 12
Props Provide Thrust Does Not Provide Thrust Mission Failure Gilde to Safe Landing Chipped/broken prop 7 5 3 30 50 FCL					7 49
Wiring Transmit power and signals Provides Electricity to Incorrect Location Crash Electricity Grash Electricity Grash		7			3 105
Wirring Transmit power and signals Does Not Transmit Electricity Crash Electrical Short Circuit 9 3 8 216 Shrink wrap all exposed w.					3 81
Does Not Transmit Electricity		9			8 72
Servos Move control surfaces Linkage Breaks Crash Deorly Assembled Large Control Inputs at High Velocity 9 2 7 126 Extensive testing prior to Large Control Inputs Large Control Inputs		9			1 72
Servos Move control surfaces Move control control inputs See Control Documentation for UGV FME A See Control Documentation for Control FMEA See Communication powe control inputs Move control inputs Move control inputs and report ground targets See Control Documentation for Control FMEA See Control Documentation for Control FMEA Contain components See Control Documentation for Control FMEA Contain components, provide lift, provide stability, & respond to control inputs Move control inputs and report gove to the surface and report gov				2	5 90
Servos Move control surfaces Move control control loud internal code Move control control Move control control in Jud Surfaces See Control Software See Control Documentation for UGV FMEA See Communication Documentation for Communication FMEA Flight Characteristics Change Crash Move control internal Code See		9	1		3 27
Servos Move control surfaces Moveruse Moveru					4 36
Software Failure Crash Internal Code 9 1 10 90 Extensive testing prior to to the Tardware Failure Crash Poorly Connected Electrical Joint 9 1 7 63 Extensive testing prior to to the Tardware Failure Crash Poorly Connected Electrical Joint 9 1 7 63 Extensive testing prior to to the Tardware Failure Crash Poorly Connected Electrical Joint 9 2 5 90 Bullow water bottle to both ground locations Form Burns Out Crash Poorly Connected Electrical Joint 9 2 5 90 Bullow water bottle to both ground locations See URS Documentation for UGV FMEA See Imaging Documentation for UGV FMEA See URS Documentation for Control FMEA See Cantrol Documentation for Control FMEA Communication Software Allow communication of all components See Control Documentation for Communication FMEA Communication Software Allow communication of all components Flight Characteristics Change Crash Crash Crash Poorly Manual Landing 9 2 1 18 Only fly in good weather Contain components, provide lift, provide stability, & respond to control inputs Flight Characteristics Change Crash Poorly Manual Landing 9 2 7 126 FECL Unidentified Flying Object (UFO) Impact 9 2 7 126 FECL Unidentified Flying Object (UFO) Impact 9 1 1 3 27 Tains saftey pilot to the Manual Landing Charger Not Connected Part poorly attached 9 2 7 126 FECL Unidentified Flying Object (UFO) Impact 9 7 10 30 Extensive testing prior to the Manual Landing Crash Poorly Connected Electrical Joint 6 1 7 42 Battery Dies Allary Solven Failure Poorly Connected Electrical Joint 6 1 7 42 Battery Dies Allary Solven Failure Poorly Connected Electrical Joint 6 1 7 42 Battery Dies Allary Solven Failure Poorly Connected Electrical Joint 6 1 7 42 Battery Dies Allary Solven Failure Poorly Connected Electrical Joint 6 1 7 42 Battery Dies Allary Solven Failure Poorl					4 72
Hardware Failure Crash Poorly Connected Electrical Joint 9 1 1 7 63 Extensive testing prior to to Internal Mechanics Broken Crash Overuse 9 2 5 5 90 Servo Burns Out Crash Overuse 9 2 5 5 90 Servo Burns Out Crash Overuse 9 2 5 5 90 Servo Burns Out Crash Overuse 9 2 5 5 90 Servo Burns Out Crash Overuse 9 2 5 5 90 Servo Burns Out Crash Overuse 9 1 2 5 5 90 Servo Burns Out Crash Overuse 9 1 2 5 5 90 Servo Burns Out Crash Overuse 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		9	1	1	3 27
Internal Mechanics Broken Crash Overuse 9 2 2 5 9 90		9			3 27
UGV System Deliver water bottle to both ground locations Imaging System Control Software Communication Software Airframe Body Airframe Body Airframe Body Airframe Body Transmit high level commands between operators and WIF1 router Sero Burns Out Crash Oversuse See Control Documentation for UGV FMEA See Imaging Documentation for Integring FMEA See Control Documentation for Control FMEA See Control Documentation for Control FMEA See Communication Software Allow communication of all components Flight Characteristics Change Crash Crash Crash Fight Envelop Exceeded 9 2 1 18 Only fly in good weather Crash Fight Envelop Exceeded 9 2 1 18 Only fly in good weather Flight Envelop Exceeded 9 2 2 3 54 Train saftey pilot Parts Break Off Crash Fright Envelop Exceeded 9 2 2 7 7 226 FFCL Unidentified Flying Diglect (UFC) Impact Part poorly attached Obarger Not Connected Obarger Not Connected Obarger Not Connected Obarger Not Connected Flore Connected Software Failure Flore Manual Landing Obarger Not Connected Software Failure Flore Manual Landing Obarger Not Connected Software Failure Flore Manual Landing Flore Manual	9	9	2	2	5 90
Imaging System Capture, interperate, and report ground targets See Imaging Documentation for Imaging FMEA	9	9	2	2	5 90
Communication Software Pilot aircraft autonomusly See Control Documentation for Control PMEA Communication Software Allow communication of all components Airframe Body Airframe Body Contain components, provide lift, provide stability, & respond to control inputs Fight Characteristics Change Crash Components Move 9 2 3 3 54 Train saftey pilot Parts Break Off Crash Poor Manufacturing 9 6 7 378 Extensive testing prior to u. Part poorly attached 9 1 2 7 126 FFCL Foround stations Transmit high level commands between operators and WiFi router Battery Dies Mission Failure Manual Landing Poorly Connected Electrical Joint 6 1 7 42 Software Failure Crash Ungested 9 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 7 10 630 Extensive testing prior to u. Software Failure Crash Ungested 9 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			•		
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Airframe Body Ai					
Airframe Body Contain components, provide lift, provide stability, & respond to control inputs Fight Live logs Exceeded Components Move Flight Envelop Exceeded Poor Manufacturing P	9	9	1	1	1 9
Airframe Body Contain components, provide lift, provide stability, & respond to control inputs Farts Break Off Crash Crash Filight Envelop Exceeded Poor Manufacturing Poor Manufacturing Poor Manufacturing Part poorly attached Unidentified Flying Object (UFO) Impact Oranger Not Connected Transmit high level commands between operators and WIFI router Transmit high level commands between operators and WIFI router Battery Dies Mission Failure Manual Landing Oranger Not Connected Electrical Joint Oranger Not					3 81
Farts Break Off Crash Poor Manufacturing 9 6 7 378 Extensive testing prior to L. Parts Break Off Part poorly attached 9 2 7 7 126 FFCL Unidentified Flying Object (UFO) Impact 9 1 3 27 Train safety pilot Fround stations Transmit high level commands between operators and WIFI router Transmit high level commands between operators and WIFI router Battery Dies Mission Failure Manual Landing Poorly Connected 6 1 1 6 6 1 1 6 6 1 1 6 6 1 1 6 6 1 1 6 6 1 1 7 4 2 1 6 1 1 6 6 1 1 7 4 2 1 6 1 1 6 1 1 7 4 2 1 7 1 1 6 1 1 1 1 6 1 1 1 1 6 1 1 1 1 6 1 1 1 1 6 1 1 1 6 1 1 1 1 6 1 1 1 1 6 1 1 1 1 6 1 1 1 1 6 1 1 1 1 6 1 1 1 1 6 1 1 1 1 1 6 1					2 36
Parts Break Off Crash Part poorly attached 9 2 2 7 326 FFCL Unidentified Flying Object (UFC) Impact 9 1 3 2 7 Tain saftey pilot Unidentified Flying Object (UFC) Impact 9 1 3 2 7 Tain saftey pilot Oranger Not Connected 6 1 1 6 Hardware Failure Mission Failure Manual Landing Poorly Connected Electrical Joint 6 1 7 42 Software Failure Crash 8 up in Code 9 7 10 630 Extensive testing prior to 0.					2 108
Ground stations Transmit high level commands between operators and WIFI router Battery Dies Mission Failure Manual Landing Charger Not Connected 6 1 1 6 6 1 1 6 6 1 1 6 6 1 1 6 6 1 1 7 6 1 7 6 1 1					3 54
Ground stations Ground stations and WIFI router Battery Dies Mission Failure Manual Landing Charger Not Connected 6 1 1 6 Hardware Failure Mission Failure Manual Landing Poorly Connected Electrical Joint 6 1 7 42 Software Failure Crash					3 27
Ground stations operators and WIFI router Hardware Failure Hardware Failure Mission Failure Manual Landing Poorly Connected Electrical Joint 6 1 7 42					1 6
operators and WIFI router Software Failure Crash Bug in Code 9 7 10 630 Extensive testing prior to u					7 42
					3 108
Loss of Connection Mission Failure Manual Landing Interference 6 2 7 84					7 84
WIFI Router Trasmit data over KUS network between Hardware Failure Mission Failure Manual Landing Route Connected Electrical Joint 6 1 7 42					7 42
groundstations to light beam groundstations to light beam Software Failure Mission Failure Manual Landing Internal Code 6 1 10 60					10 60
Loss of Connection Mission Estima Manual Landing Interference 6 9 7 226 Laboratory debugging					7 210
WIFI light Ream Iransmit data over ROS network between WIFI				1	7 42
router and the WIFI antenna on the aircraft Software Failure Mission Failure Manual Landing Internal Code 6 1 10 60					10 60
Not Brought with Us Mission Door Not Start Boor Diagona 4 9 4 130 EEC					4 64
Ground Power Source Provide current to all ground systems Mechanical Failure Mission Failure Manual Landing Pow Manufacturing 6 1 7 42		6			7 42
Sick Mission Does Not Start Bacteria or Viruses 5 4 3 60		5			3 60
Give high level commands & ensure saftey of Can Not Attend Mission Does Not Start Other Plans 5 1 1 5					1 5
Human Operators flight Crack Poor Judgement 9 2 9 162 Extensive practice					9 81
Sends Incorrect Commands Crash Poor Understanding of System 9 2 5 90 Extensive practice					5 45
* In this analysis "Hardware Failure" refers only to electrical hardware (e.g. USB port breaks or soldering fails) S: Severity of failure effect			-	_	
** FFCL is the Field Flight Checklist to which we will add items to test and do before flight L: Likelihood of failure occurring					
*** Extensive testing before use refers to extensive flight tests before the competition. D: Dectability of cause before failure or	urs				
We currently perform flight tests a couple times a week. RPN: Risk Priority number (5°1°1					