



CanSat 2019 Post Flight Review (PFR) Version 1.0

#6203 APIS ARGE TEAM



Presentation Outline

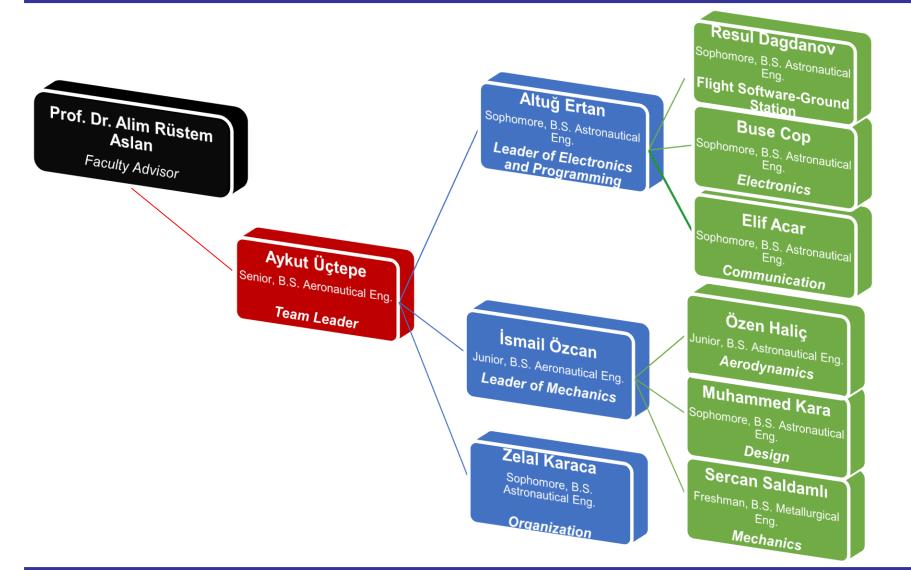


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Team Organization









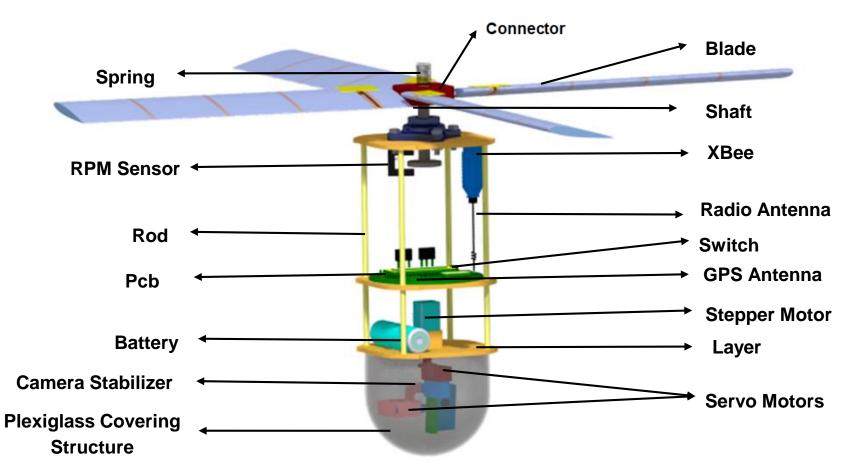
System Overview



Payload Design Overview (1/6)



PAYLOAD

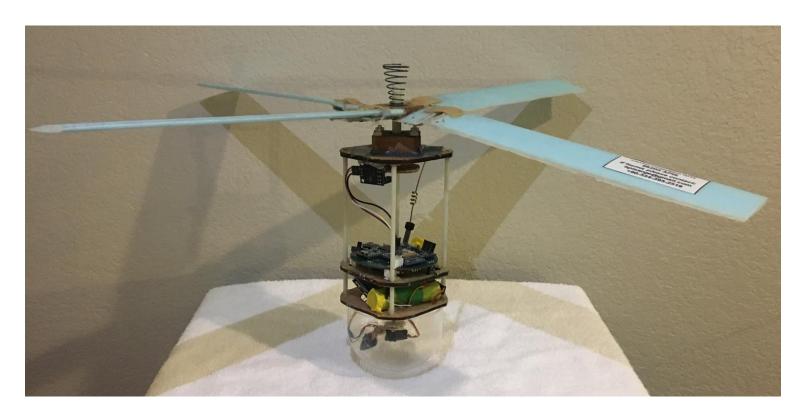




Payload Design Overview (2/6)



Real Prototype

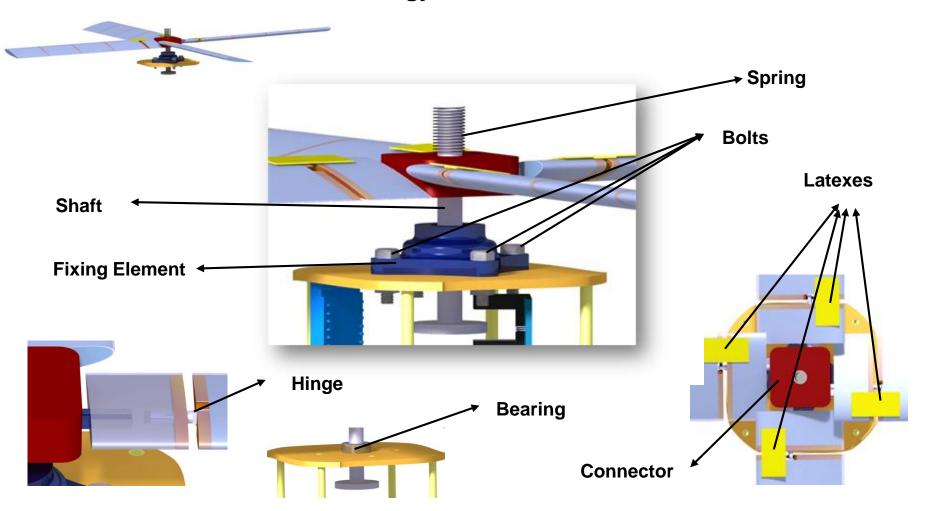




Payload Design Overview (3/6)



Auto-gyro Mechanism

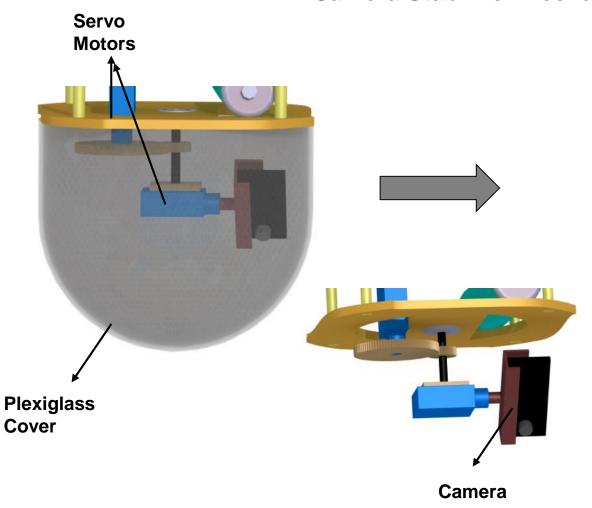


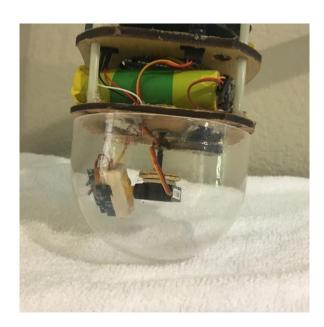


Payload Design Overview (4/6)



Camera Stabilizer Mechanism

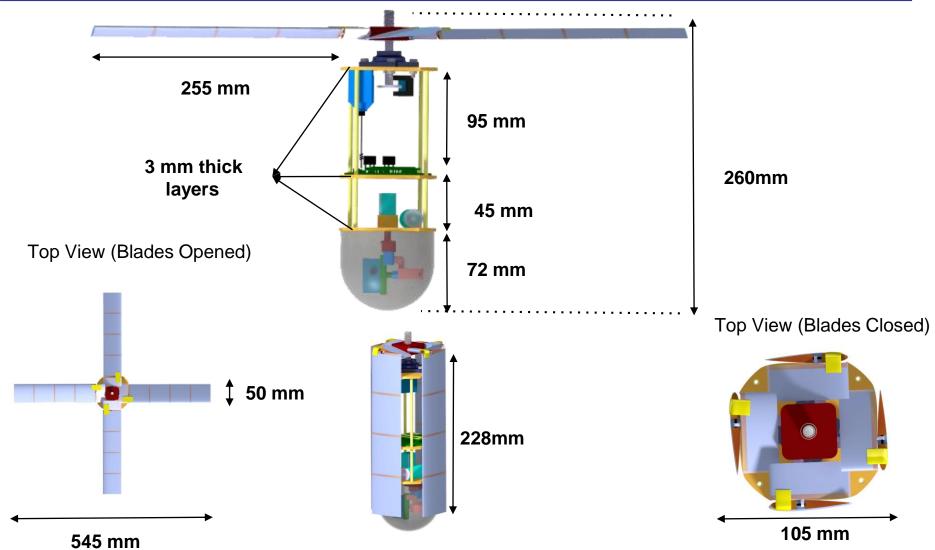






Payload Design Overview (5/6)





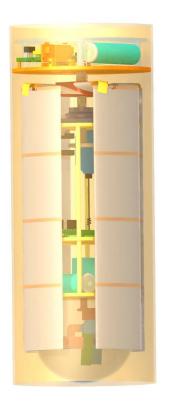


Payload Design Overview (6/6)

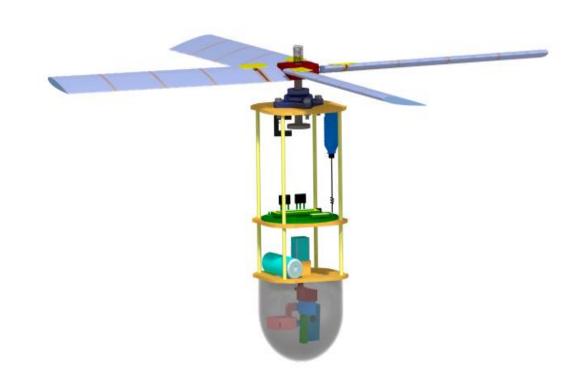


CANSAT

Launch Configuration



Deployed Configuration

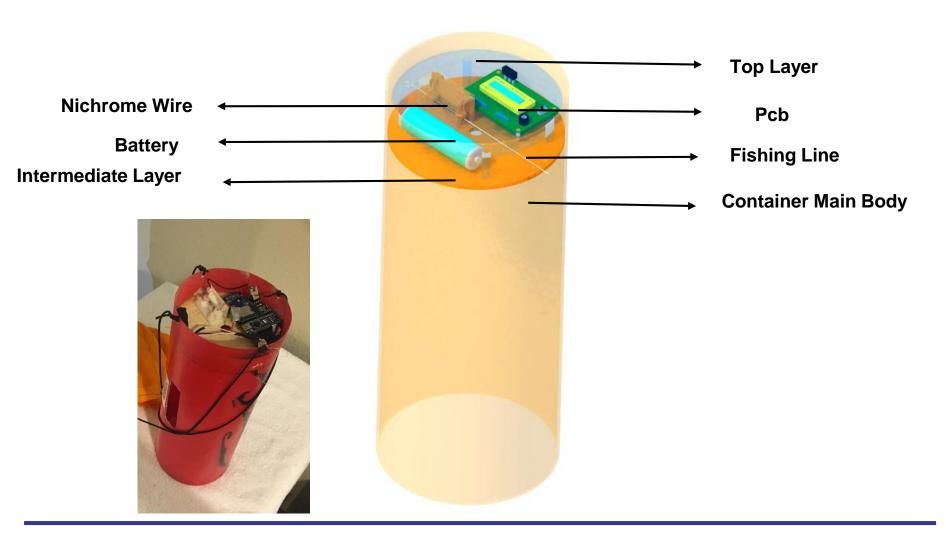




Container Design Overview (1/2)



CONTAINER

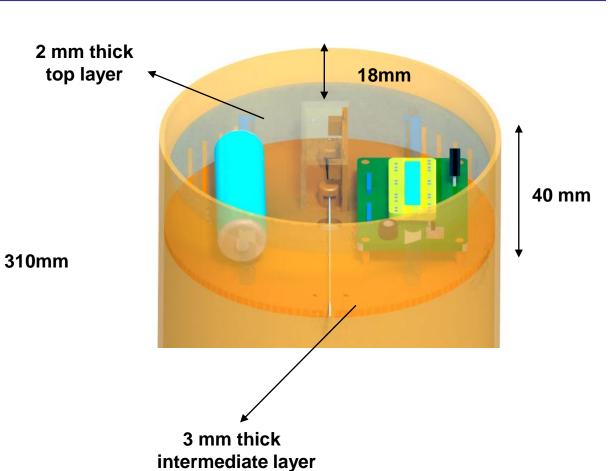




Container Design Overview (2/2)









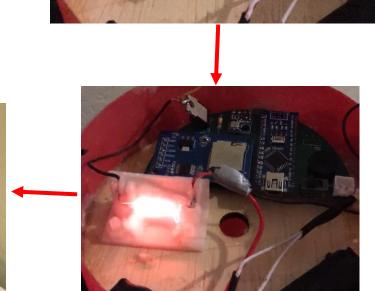
Safety Precautions of Release Mechanism

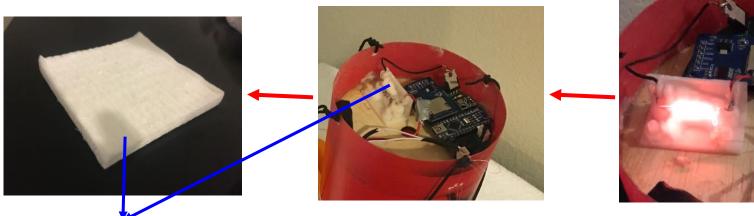


 It is shown that the effect of heat, produced by nichrome wire, to environment.

Aluminium silicate

 Aluminium silicate cover the nichrome wire to minimize the heat transfer between container and release mechanism.









CONOPS (Concept of Operations) & SOE (Sequence of Events)





Planned CONOPS

Pre-Launch	Launch	Post-Launch
 Competition area arrival. Team briefing. Electronic and mechanic integrity checks. GCS and antenna set up. Damage control before the flight by CanSat Crew. Double check for final CanSat integrity configuration and release mechanism by Inspection Crew. Making sure mass is between 490 g and 510 g 	 Placement of Cansat into rocket payload section by Cansat Crew. Launch, and events of CONOPS (given in previous slide). Telemetry data obtaining and .csv file creation via GCS software. 	 Recovery of payload with indicators fluorescent color, GPS telemetry and audio beacon. Recovery of container with indicators fluorescent color. Recovered CanSat is brought to GCS. Analysis of sampled data. Preparation of PFR. PFR presentation to jury.
Inspection C	Crew	Cansat Crew
Mechanics: İsmail - Özen	Electronics: Altuğ - Resul	İsmail - Sercan





1	Placement	 Power on the Cansat. Check the communication between payload and GCS. Placement to rocket payload section. 	Mission Control Officer: Aykut
2	Launch	 Rocket takes off. Parachute opens at apogee. Cansat starts to descent with parachute until 450m. 	GCS Officer: Resul
3	Seperation	 At 450m, the separation mechanism is activated and payload is released. At same altitude, camera starts to capturing the descent. During descend, CanSat continues to collect: air pressure,temperature,voltage,GPS data,tilting,software state, RPM until the landing 	
4	Recovery	 The Payload lands with auto-gyro mechanism. The payload finishes descent, stops telemetry and initiates audio beacon. The Container lands with parachute. 	Payload: Özen - Altuğ Container: İsmail - Buse
5	Data Analysis	 Analyzing the data retrieved from descent control devices. Delivering requested data to jury. Getting ready for PFR. 	PFR: İsmail - Altuğ - Resul - Aykut





Planned CONOPS are same with the real CONOPS.

Pre-Launch	Launch	Post-Launch
 Competition area arrival. Team briefing. Electronic and mechanic integrity checks. GCS and antenna set up. Damage control before the flight by CanSat Crew. Double check for final CanSat integrity configuration and release mechanism by Inspection Crew. Making sure mass is between 490 g and 510 g 	 Placement of Cansat into rocket payload section by Cansat Crew. Launch, and events of CONOPS (given in previous slide). Telemetry data obtaining and .csv file creation via GCS software. 	 Recovery of payload with indicators fluorescent color, GPS telemetry and audio beacon. Recovery of container with indicators fluorescent color. Recovered CanSat is brought to GCS. Analysis of sampled data. Preparation of PFR. PFR presentation to jury.
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3	Seperation	 At 450m, the separation mechanism is activated and payload is released. At same altitude, camera starts to capturing the descent. During descend, CanSat continues to collect: air pressure, temperature, voltage, GPS data, tilting, software state, RPM until the landing. 	Recovery Crew
4	Recovery	 The Payload lands with auto-gyro mechanism. The payload finishes descent, stops telemetry and initiates audio beacon. The Container lands with parachute. 	Payload: Özen - Altuğ Container: İsmail - Buse
5	Data Analysis	 Analyzing the data retrieved from descent control devices. Delivering requested data to jury. Getting ready for PFR. 	PFR: İsmail - Altuğ - Resul - Aykut





PLANNED	ACT	UAL
	Succesful	Unsuccesful
Put the CanSat inside the rocket properly.	Accomplished	
Starting telemetry before launch.	Accomplished	
Send calibration command from ground station to Payload.	Accomplished	
Deployment from rocket.	Accomplished	
Parachute open after deployment from the rocket.	Accomplished	
Payload separation and blades deployment at 450 meters.	Accomplished	
Continuous telemetry transfer during flight.	Accomplished	
Capturing the descent after Payload Separation.	Accomplished	
Buzzers worked when payload and container landed in order to ensure easier recovery.	Accomplished	
Recovery.	Accomplished	
Protecting the integrity of payload and container after landing.	Accomplished	
Descent rates of container and payload meet mission req.	Partial	



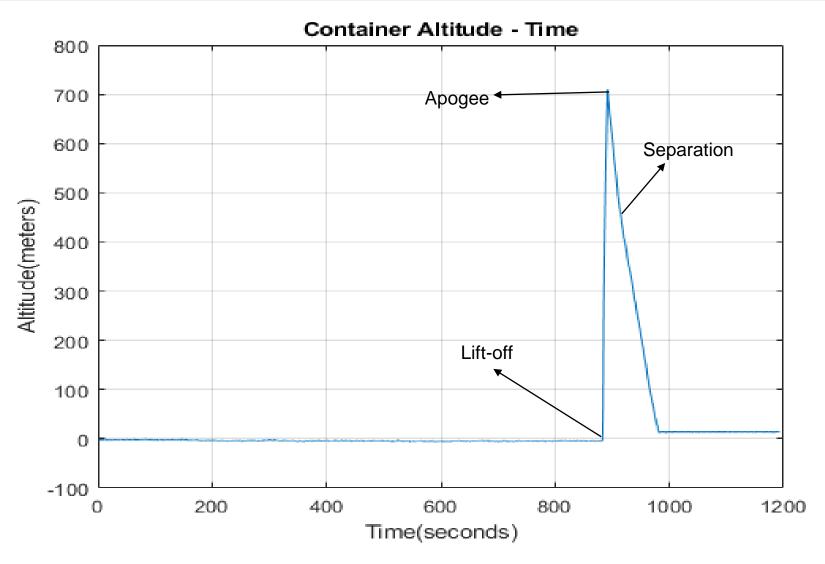


Flight Data Analysis



Container Separation Altitude Plot

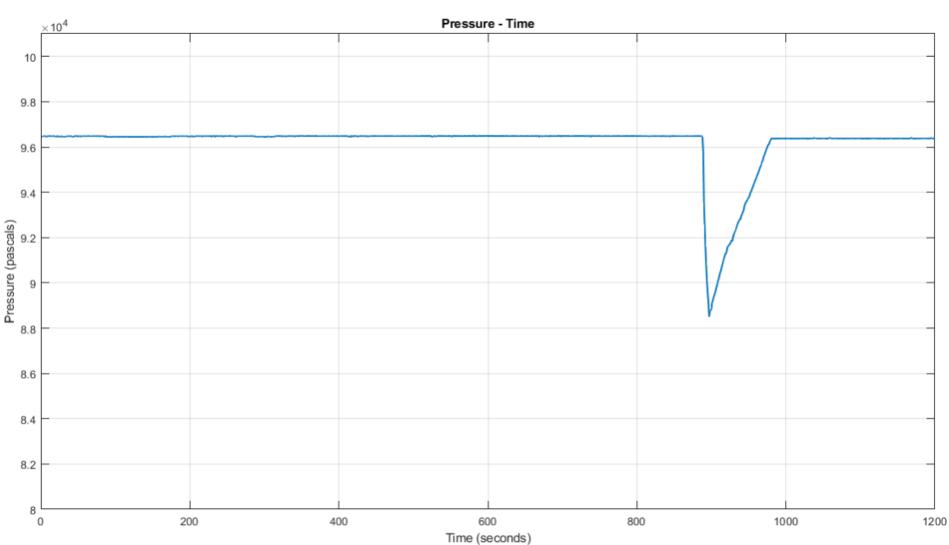






Payload Pressure Sensor Data Plot

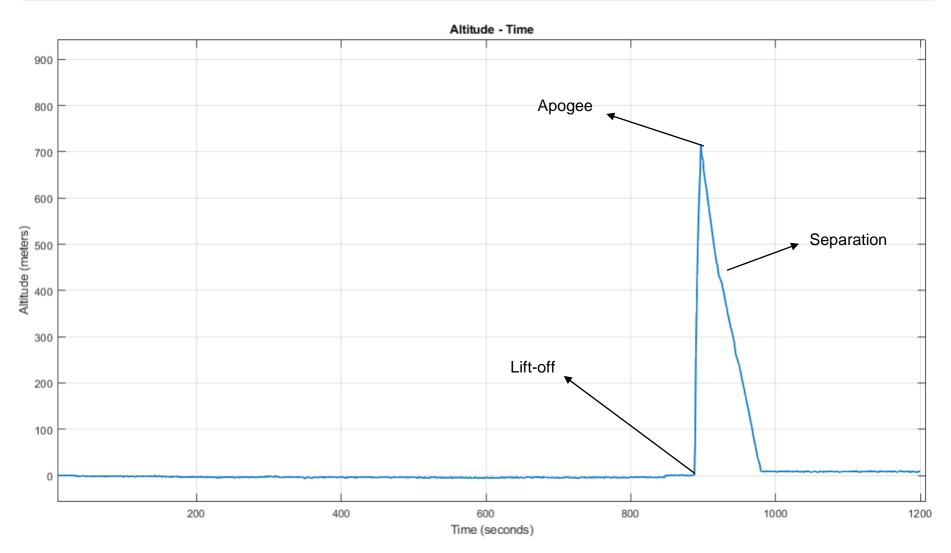






Payload Altitude Plot







Payload Separation Altitude



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62 6203 919 919 458.3 91287 34.3 4.42 18 1 23 32.242 -98.2 422.5 11 49 -65 0 5 10 63 6203 920 920 455.3 91327 34.1 4.44 18 1 25 32.242 -98.199 424.5 11 -66 -155 180 8 13 66 6203 921 921 439.4 91500 33.5 4.45 18 1 26 32.242 -98.199 424.5 11 -66 -155 180 8 13 66 6203 922 922 431.3 91597 33.1 4.33 18 1 28 32.243 -98.199 423.5 11 16 -1 480 5 19 66 6203 923 923 427.4 91643 33.2 4.44 18 1 28 32.243 -98.199 423.5 11 6 0 780 5 3 67 6203 924 924 423.5 91685 33.1 4.44 18 1 30 32.243 -98.199 425 11 -38 -22 720 5 11 66 66 6203 925 925 419.6 91729 33.1 4.44 18 1 31 32.243 -98.199 425 11 -34 -15 600 5 9 9 6 6203 926 926 416.5 91789 32.8 4.35 18 1 31 32.243 -98.199 425 11 -34 -15 600 5 9 9 70 6203 927 927 406.9 91885 32.5 4.44 18 1 33 32.243 -98.199 425 11 -40 3 480 5 0 70 6203 928 928 399.8 9183 31.5 4.44 18 1 33 32.243 -98.199 425 11 -40 3 480 5 0 70 6203 929 929 393.2 92029 31.9 4.4 18 1 33 32.243 -98.199 425 11 -40 3 480 5 0 70 6203 929 929 393.2 92029 31.9 4.4 18 1 33 32.244 -98.199 425 11 -40 3 480 5 0 70 70 6203 928 928 399.8 91833 31.5 4.44 18 1 33 32.243 -98.199 425 11 -40 3 480 5 0 70 70 6203 929 929 393.2 92029 31.9 4.4 18 1 33 32.244 -98.199 425 11 35 -25 420 5 9 9 70 6203 930 930 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 74 6203 931 931 375.4 92222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 76 6203 932 932 367 92294 31.3 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 76 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 415.4 11 -29 -42 480 5 6 76 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 415.4 11 34 -6 420 6 3 3 8 8 67 6 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0 78 78 78 78 78 78 78 78 78 78 78 78 78	760	6203	917	917	477.4	91093	34.4	4.46	18	1	21	32.242	-98.2	421.3	11	13	17	0	4	137		
63 6203 920 920 455.3 91327 34.1 4.44 18 1 25 32.242 -98.199 424.5 11 -66 -155 180 8 13 64 6203 921 921 439.4 91500 33.5 4.45 18 1 26 32.242 -98.199 424.9 10 -35 36 120 5 7 65 6203 922 922 431.3 91597 33.1 4.33 18 1 28 32.243 -98.199 423.5 11 16 -1 480 5 19 66 6203 923 923 427.4 91643 33.2 4.44 18 1 28 32.243 -98.199 423.5 11 6 0 780 5 3 67 6203 924 924 423.5 91685 33.1 4.44 18 1 30 32.243 -98.199 424.6 10 14 10 720 5 11 68 6203 925 925 419.6 91729 33.1 4.44 18 1 31 32.243 -98.199 425 11 -38 -22 720 5 9 69 6203 926 926 416.5 91789 32.8 4.35 18 1 31 32.243 -98.199 425 11 -34 -15 600 5 9 70 6203 927 927 406.9 91885 32.5 4.44 18 1 33 32.243 -98.199 423 11 -40 3 480 5 0 71 6203 928 928 399.8 91833 31.5 4.44 18 1 33 32.243 -98.199 423 11 -40 3 480 5 15 72 6203 929 929 393.2 92029 31.9 4.4 18 1 33 32.243 -98.199 418.7 11 35 -25 420 5 9 73 6203 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 75 6203 932 932 367 92294 31.3 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 76 6203 933 933 361.1 92378 31.1 4.41 18 1 38 32.244 -98.199 410.1 11 6 76 480 6 0	761	6203	918	918	467.4	91196	34.4	4.45	18	1	23	32.242	-98.2	422.5	11	13	-40	0	5	10		
64 6203 921 921 439.4 91500 33.5 4.45 18 1 26 32.242 -98.199 424.9 10 -35 36 120 5 7 65 6203 922 922 431.3 91597 33.1 4.33 18 1 28 32.243 -98.199 423.5 11 16 -1 480 5 19 66 6203 923 923 427.4 91643 33.2 4.44 18 1 28 32.243 -98.199 423.5 11 6 0 780 5 3 67 6203 924 924 423.5 91685 33.1 4.44 18 1 30 32.243 -98.199 424.6 10 14 10 720 5 11 68 6203 925 925 419.6 91729 33.1 4.44 18 1 31 32.243 -98.199 425 11 -38 -22 720 5 9 69 6203 926 926 416.5 91789 32.8 4.35 18 1 31 32.243 -98.199 425 11 -34 -15 600 5 9 70 6203 927 927 406.9 91885 32.5 4.44 18 1 33 32.243 -98.199 423 11 -40 3 480 5 0 71 6203 928 928 399.8 91833 31.5 4.44 18 1 33 32.243 -98.199 423 11 41 -35 540 5 15 72 6203 929 929 393.2 92029 31.9 4.4 18 1 35 32.244 -98.199 418.7 11 35 -25 420 5 9 73 6203 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 74 6203 931 931 375.4 9222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 75 6203 932 932 367 92294 31.3 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 76 6203 933 933 361.1 92378 31.1 4.44 18 1 38 32.244 -98.199 410.1 11 6 76 480 6 0	762	6203	919	919	458.3	91287	34.3	4.42	18	1	23	32.242	-98.2	422.5	11	49	-65	0	5	10		
65 6203 922 922 431.3 91597 33.1 4.33 18 1 28 32.243 -98.199 423.5 11 16 -1 480 5 19 66 6203 923 923 427.4 91643 33.2 4.44 18 1 28 32.243 -98.199 423.5 11 6 0 780 5 3 6 76 6203 924 924 423.5 91685 33.1 4.44 18 1 30 32.243 -98.199 424.6 10 14 10 720 5 11 6 6 6 6203 925 925 419.6 91729 33.1 4.44 18 1 31 32.243 -98.199 425 11 -38 -22 720 5 9 70 6203 926 926 416.5 91789 32.8 4.35 18 1 31 32.243 -98.199 425 11 -34 -15 600 5 9 70 6203 927 927 406.9 91885 32.5 4.44 18 1 33 32.243 -98.199 425 11 -40 3 480 5 0 71 6203 928 928 399.8 91833 31.5 4.44 18 1 33 32.243 -98.199 423 11 -40 3 480 5 0 71 6203 929 929 339.2 92029 31.9 4.4 18 1 33 32.244 -98.199 418.7 11 35 -25 420 5 9 71 6203 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 418.7 11 35 -25 420 5 9 71 6203 931 931 375.4 9222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 75 6203 932 932 367 92294 31.3 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 75 6203 933 933 361.1 92378 31.1 4.44 18 1 38 32.244 -98.199 415.8 11 34 -6 420 6 3 75 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0	763	6203	920	920	455.3	91327	34.1	4.44	18	1	25	32.242	-98.199	424.5	11	-66	-155	180	8	13		
66 6203 923 923 427.4 91643 33.2 4.44 18 1 28 32.243 -98.199 423.5 11 6 0 780 5 3 67 6203 924 924 423.5 91685 33.1 4.44 18 1 30 32.243 -98.199 424.6 10 14 10 720 5 11 68 6203 925 925 419.6 91729 33.1 4.44 18 1 31 32.243 -98.199 425 11 -38 -22 720 5 9 70 6203 926 926 416.5 91789 32.8 4.35 18 1 31 32.243 -98.199 425 11 -34 -15 600 5 9 70 6203 927 927 406.9 91885 32.5 4.44 18 1 33 32.243 -98.199 423 11 -40 3 480 5 0 71 6203 928 928 399.8 91833 31.5 4.44 18 1 33 32.243 -98.199 423 11 -40 3 480 5 0 71 6203 929 929 393.2 92029 31.9 4.4 18 1 33 32.244 -98.199 418.7 11 35 -25 420 5 9 73 6203 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 418.7 11 35 -25 420 5 9 74 6203 931 931 375.4 9222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 75 6203 932 932 367 92294 31.3 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 415.4 11 44 7 480 5 6 6 75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 415.4 11 34 -6 420 6 3 75 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0	764	6203	921	921	439.4	91500	33.5	4.45	18	1	26	32.242	-98.199	424.9	10	-35	36	120	5	7		
67 6203 924 924 423.5 91685 33.1 4.44 18 1 30 32.243 -98.199 424.6 10 14 10 720 5 11 68 6203 925 925 419.6 91729 33.1 4.44 18 1 31 32.243 -98.199 425 11 -38 -22 720 5 9 69 6203 926 926 416.5 91789 32.8 4.35 18 1 31 32.243 -98.199 425 11 -34 -15 600 5 9 70 6203 927 927 406.9 91885 32.5 4.44 18 1 33 32.243 -98.199 425 11 -40 3 480 5 0 71 6203 928 928 399.8 91833 31.5 4.44 18 1 33 32.243 -98.199 423 11 -40 3 480 5 15 72 6203 929 929 393.2 92029 31.9 4.4 18 1 35 32.244 -98.199 418.7 11 35 -25 420 5 9 73 6203 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 74 6203 931 931 375.4 9222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 415.4 11 -29 -42 480 5 6 6 75 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0	765	6203	922	922	431.3	91597	33.1	4.33	18	1	28	32.243	-98.199	423.5	11	16	-1	480	5	19		
68 6203 925 925 419.6 91729 33.1 4.44 18 1 31 32.243 -98.199 425 11 -38 -22 720 5 9 69 6203 926 926 416.5 91789 32.8 4.35 18 1 31 32.243 -98.199 425 11 -34 -15 600 5 9 70 6203 927 927 406.9 91885 32.5 4.44 18 1 33 32.243 -98.199 423 11 -40 3 480 5 0 71 6203 928 928 399.8 91833 31.5 4.44 18 1 33 32.243 -98.199 423 11 41 -35 540 5 15 72 6203 929 929 393.2 92029 31.9 4.4 18 1 35 32.244 -98.199 418.7 11 35 -25 420 5 9 73 6203 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 74 6203 931 931 375.4 9222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 932 932 367 92294 31.3 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0	766	6203	923	923	427.4	91643	33.2	4.44	18	1	28	32.243	-98.199	423.5	11	6	0	780	5	3		
69 6203 926 926 416.5 91789 32.8 4.35 18 1 31 32.243 -98.199 425 11 -34 -15 600 5 9 70 6203 927 927 406.9 91885 32.5 4.44 18 1 33 32.243 -98.199 423 11 -40 3 480 5 0 71 6203 928 928 399.8 91833 31.5 4.44 18 1 33 32.243 -98.199 423 11 41 -35 540 5 15 72 6203 929 929 393.2 92029 31.9 4.4 18 1 35 32.244 -98.199 418.7 11 35 -25 420 5 9 73 6203 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 74 6203 931 931 375.4 9222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0	767	6203	924	924	423.5	91685	33.1	4.44	18	1	30	32.243	-98.199	424.6	10	14	10	720	5	11		
70 6203 927 927 406.9 91885 32.5 4.44 18 1 33 32.243 -98.199 423 11 -40 3 480 5 0 71 6203 928 928 399.8 91833 31.5 4.44 18 1 33 32.243 -98.199 423 11 41 -35 540 5 15 72 6203 929 929 339.2 92029 31.9 4.4 18 1 35 32.244 -98.199 418.7 11 35 -25 420 5 9 73 6203 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 74 6203 931 931 375.4 9222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 412.8 11 34 -6 420 6 3 76 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0	768	6203	925	925	419.6	91729	33.1	4.44	18	1	31	32.243	-98.199	425	11	-38	-22	720	5	9		
71 6203 928 928 399.8 91833 31.5 4.44 18 1 33 32.243 -98.199 423 11 41 -35 540 5 15 72 6203 929 929 393.2 92029 31.9 4.4 18 1 35 32.244 -98.199 418.7 11 35 -25 420 5 9 73 6203 930 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 74 6203 931 931 375.4 92222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 412.8 11 34 -6 420 6 3 76 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0	769	6203	926	926	416.5	91789	32.8	4.35	18	1	31	32.243	-98.199	425	11	-34	-15	600	5	9		
72 6203 929 929 393.2 92029 31.9 4.4 18 1 35 32.244 -98.199 418.7 11 35 -25 420 5 9 73 6203 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 74 6203 931 931 375.4 92222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 412.8 11 34 -6 420 6 3 76 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0	770	6203	927	927	406.9	91885	32.5	4.44	18	1	33	32.243	-98.199	423	11	-40	3	480	5	0		
73 6203 930 930 383.3 92110 31.7 4.44 18 1 36 32.244 -98.199 415.4 11 44 7 480 5 16 74 6203 931 931 375.4 9222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 412.8 11 34 -6 420 6 3 76 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0	771	6203	928	928	399.8	91833	31.5	4.44	18	1	33	32.243	-98.199	423	11	41	-35	540	5	15		
74 6203 931 931 375.4 92222 31.5 4.44 18 1 36 32.244 -98.199 415.4 11 -29 -42 480 5 6 75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 412.8 11 34 -6 420 6 3 76 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0 Flight 6203 Flight 6203	772	6203	929	929	393.2	92029	31.9	4.4	18	1	35	32.244	-98.199	418.7	11	35	-25	420	5	9		
75 6203 932 932 367 92294 31.3 4.44 18 1 38 32.244 -98.199 412.8 11 34 -6 420 6 3 76 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0 Flight 6203 Flight 6203	773	6203	930	930	383.3	92110	31.7	4.44	18	1	36	32.244	-98.199	415.4	11	44	7	480	5	16		
76 6203 933 933 361.1 92378 31.1 4.41 18 1 39 32.244 -98.199 410.1 11 6 76 480 6 0	774	6203	931	931	375.4	92222	31.5	4.44	18	1	36	32.244	-98.199	415.4	11	-29	-42	480	5	6		
→ Flight_6203 ⊕ : ◀ ▶	775	6203	932	932	367	92294	31.3	4.44	18	1	38	32.244	-98.199	412.8	11	34	-6	420	6	3		
	776	6203	933	933	361.1	92378	31.1	4.41	18	1	39	32.244	-98.199	410.1	11	6	76	480	6	0]
	4	>	Flight_6203	3	+									1 4								I
	Ready																	===				

- Column D shown the "Altitude".
- Column R shown the "Software State".

At software state 5 - Separation - the release mechanism is activated.

At the altitude **455.3** meters, the separation occurs and the auto-gyro mechanism starts to operate.



Payload Calibration Command



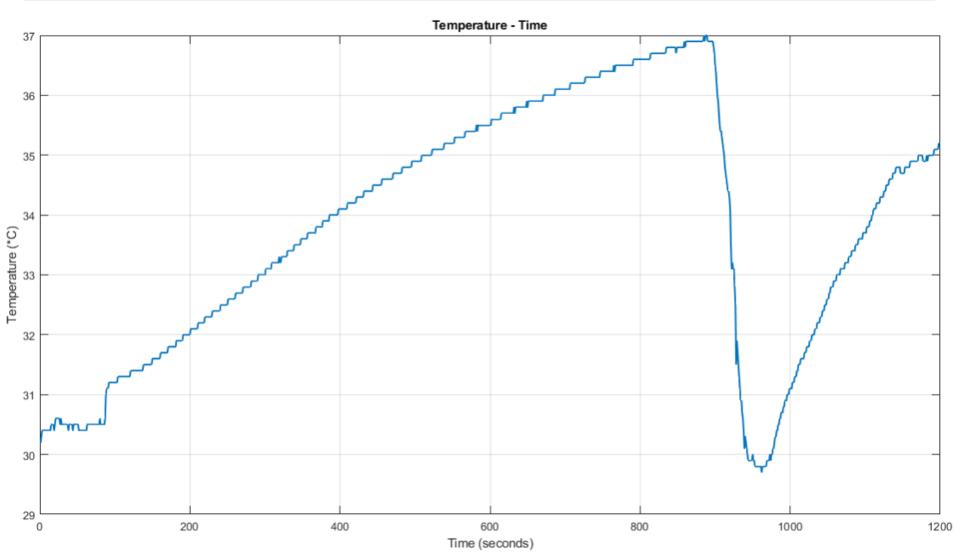
H	€ 1 €									Flight_6	203 - Excel								雨 -	- 0	×
File	Hom	ne Insert	Page I	ayout	Formulas	Data	Review	View (Tell me wh	at you wan	t to do								Sig	gnin 24	Share
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T706	, -	: ×	~ J	Se																	
	Α	В	С	D	E	F	G	н	1 1	J	K	L	М	N	0	Р	Q	R	s	Т	U
32	6203	838	838	-3.8	96473	36.8	4.46	17	59	58	32.241	-98.2	366.1	10	-1	178	0	1	231		
33	6203	839	839	-3.6	96473	36.8	4.46	17	59	58	32.241	-98.2	366.1	10	-1	178	0	1	232		
1	6203	840	840	-3.7	96468	36.8	4.46	18	0	1	32.241	-98.2	366.1	10	0	178	0	1	232		
5	6203	841	841	-4.3	96478	36.8	4.46	18	0	2	32.241	-98.2	366.1	10	0	178	0	1	231		
6	6203	842	842	-3.7	96471	36.8	4.46	18	0	2	32.241	-98.2	366.1	10	0	178	0	1	231		
7	6203	843	843	-4.3	96475	36.8	4.46	18	0	4	32.241	-98.2	366.1	10	-1	178	0	1	231		
В	6203	844	844	-3.5	96465	36.8	4.46	18	0	5	32.241	-98.2	366.1	10	-1	178	0	1	232		
9	6203	845	845	-3.8	96474	36.8	4.46	18	0	6	32.241	-98.2	366.1	10	0	178	0	1	231		
О	6203	846	846	-4.8	96477	36.8	4.46	18	0	8	32.241	-98.2	366.1	10	0	178	0	1	231		
1	6203	847	847	-4.2	96476	36.8	4.46	18	0	9	32.241	-98.2	366.1	10	0	178	0	1	232		
2	6203	848	848	0.3	96483	36.7	4.46	18	0	9	32.241	-98.2	366.1	10	0	0	0	8	0		
3	6203	849	849	0.5	96477	36.8	4.46	18	0	11	32.241	-98.2	366.1	10	0	178	0	1	166		
4	6203	850	850	0	96486	36.8	4.46	18	0	11	32.241	-98.2	366.1	10	0	178	0	1	166		
5	6203	851	851	0.3	96480	36.8	4.46	18	0	13	32.241	-98.2	366.1	10	-1	178	0	1	196		
5	6203	852	852	0.3	96468	36.8	4.46	18	0	14	32.241	-98.2	366.1	10	-1	178	0	1	197		
7	6203	853	853	0.4	96479	36.8	4.46	18	0	15	32.241	-98.2	366.2	10	-1	178	0	1	196		
8	6203	854	854	0.7	96475	36.8	4.46	18	0	16	32.241	-98.2	366.2	10	-1	178	0	1	196		
9	6203	855	855	0.6	96478	36.8	4.46	18	0	17	32.241	-98.2	366.2	10	-1	178	0	1	196		
0	6203	856	856	1	96474	36.8	4.46	18	0	17	32.241	-98.2	366.2	10	-1	178	0	1	196		
1	6203	857	857	0.3	96483	36.8	4.46	18	0	19	32.241	-98.2	366.2	10	-1	178	0	1	196		
2	6203	858	858	0.3	96470	36.8	4.46	18	0	20	32.241	-98.2	366.2	10	-1	178	0	1	196		
3	6203	859	859	0.3	96472	36.9	4.46	18	0	21	32.241	-98.2	366.2	10	-1	178	0	1	197		
4	6203	860	860	0.9	96475	36.8	4.46	18	0	22	32.241	-98.2	366.2	10	-1	178	0	1	196		
5	6203	861	861	0.6	96472	36.9	4.46	18	0	22	32.241	-98.2	366.2	10	-1	178	0	1	197		
16	6203	862	862	1	96469	36.9	4.46	18	0	24	32.241	-98.2	366.2	10	-1	178	0	1	197		
4	-	Flight_6203	3 (+									1 4								
ady																					+ 10

- Before the flight the calibration command from the ground control station is send to the payload.
- Calibration command calibrated payload to the true the magnetic north direction. (Column "S")
- Altitude data of the payload is calibrated to 0 meters. (Column "D")
- Roll and Pitch data are calibrated with respect to the payload. (Roll: Column "O"; Pitch: Column "P")



Payload Temperature Sensor Plot



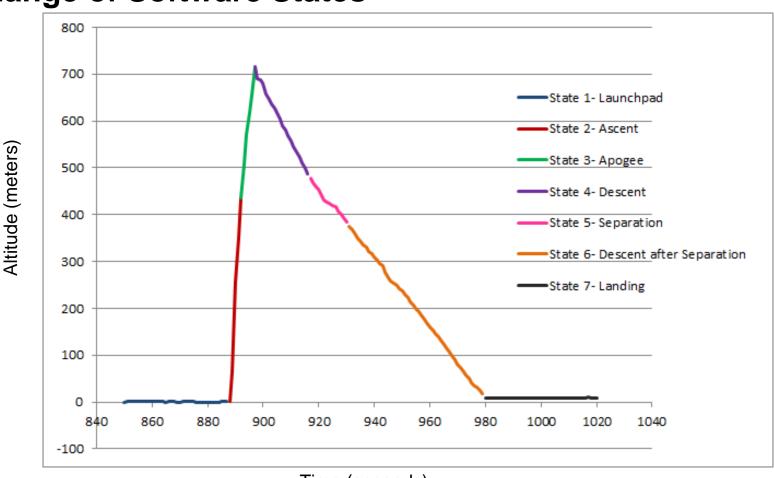




Software States



Change of Software States

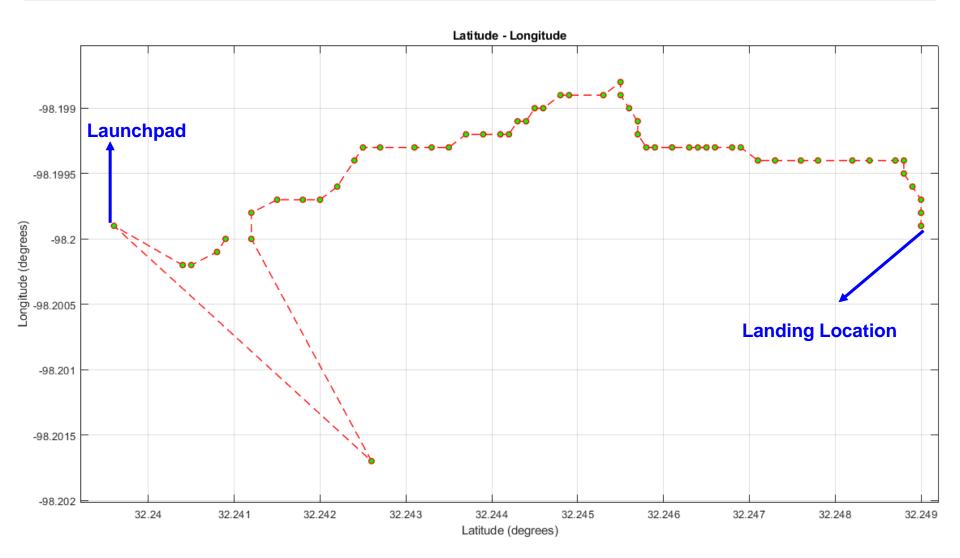


Time (seconds)



Payload 2D GPS Plot

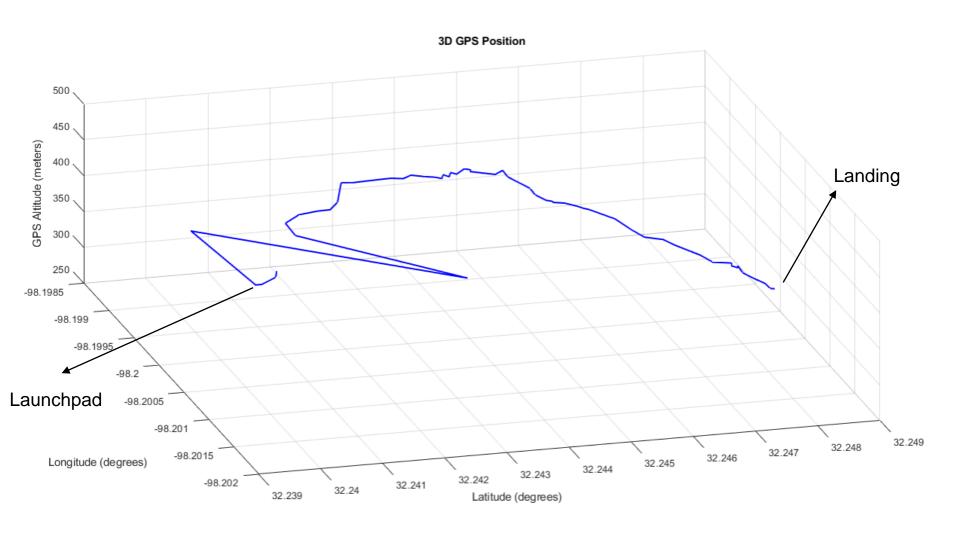






Payload 3D GPS Plot

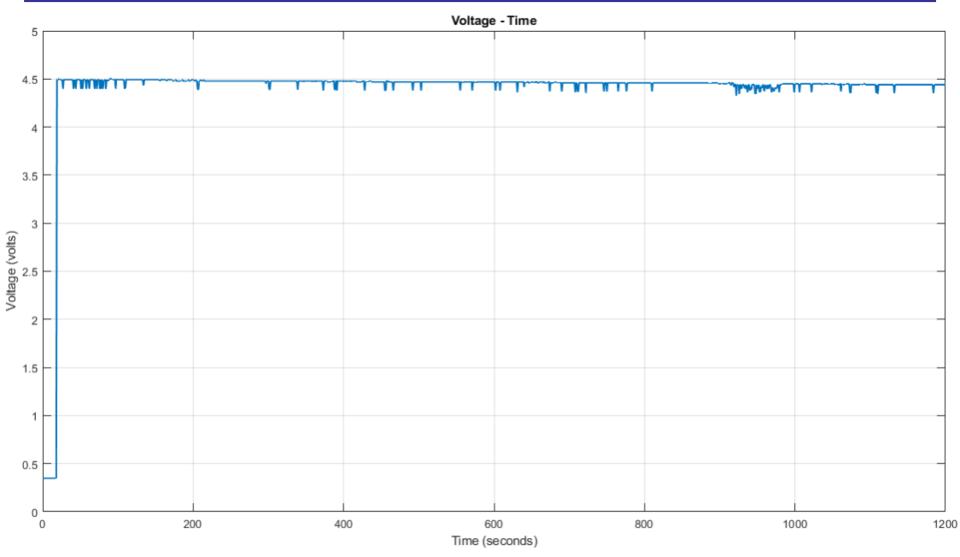






Payload Battery Power Plot

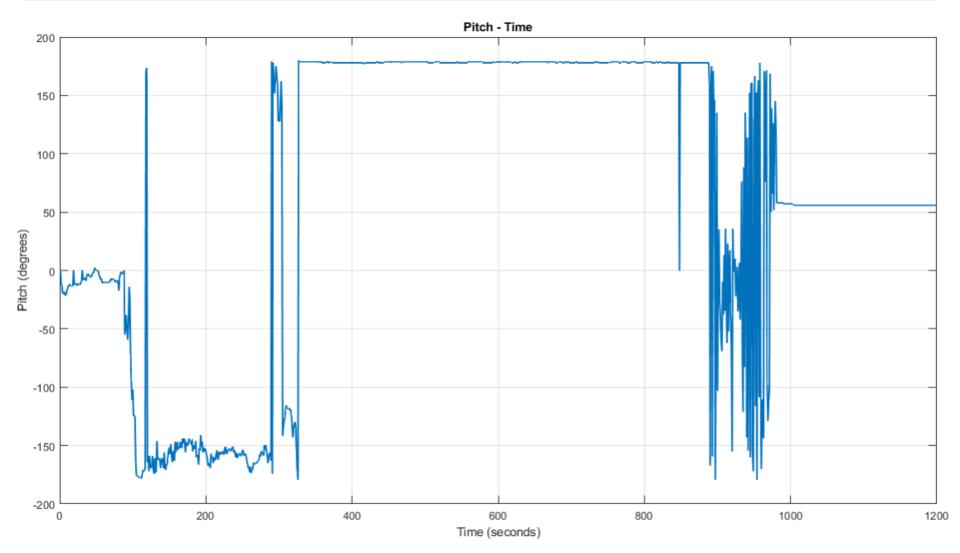






Tilt Sensor Plot (1/2)

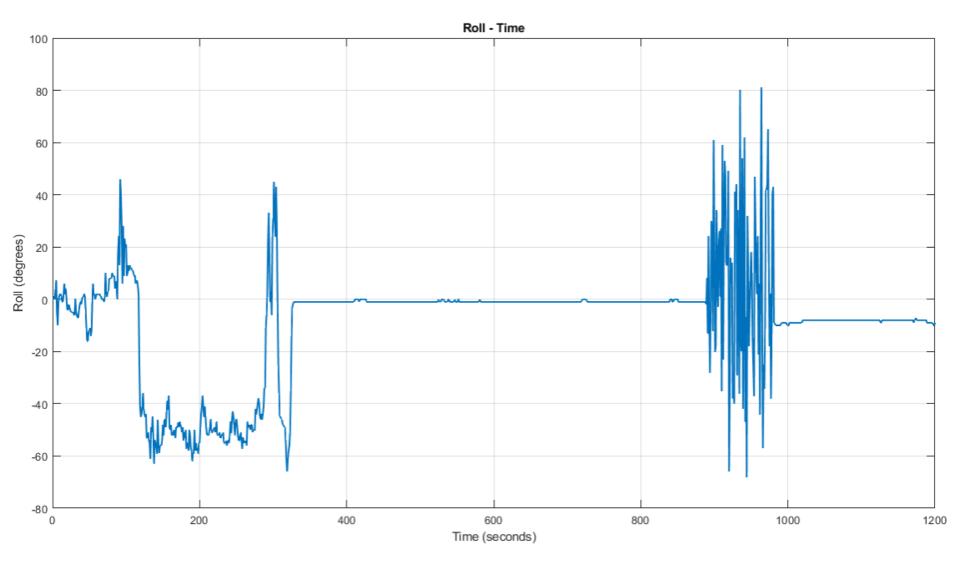






Tilt Sensor Plot (2/2)

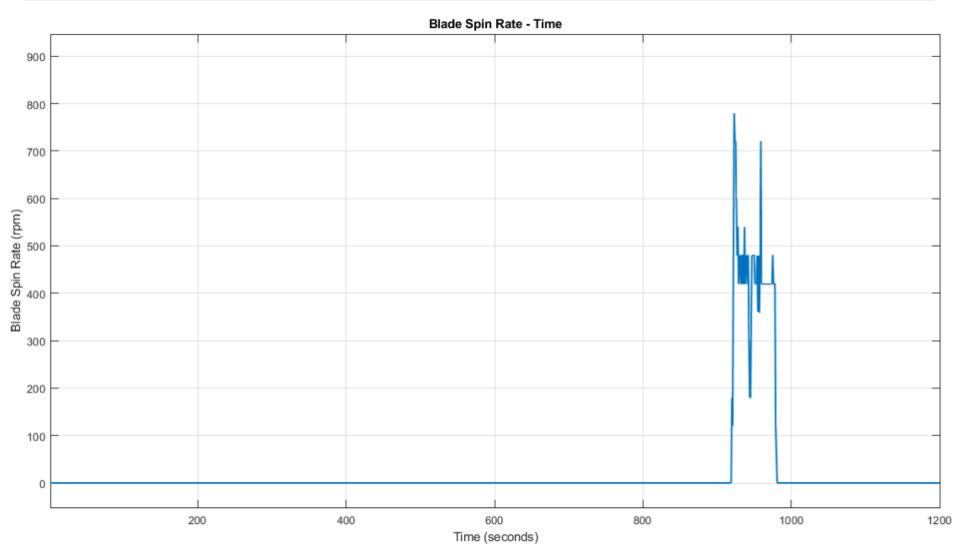






Auto-gyro Blade Spin Rate Plot







Camera Video





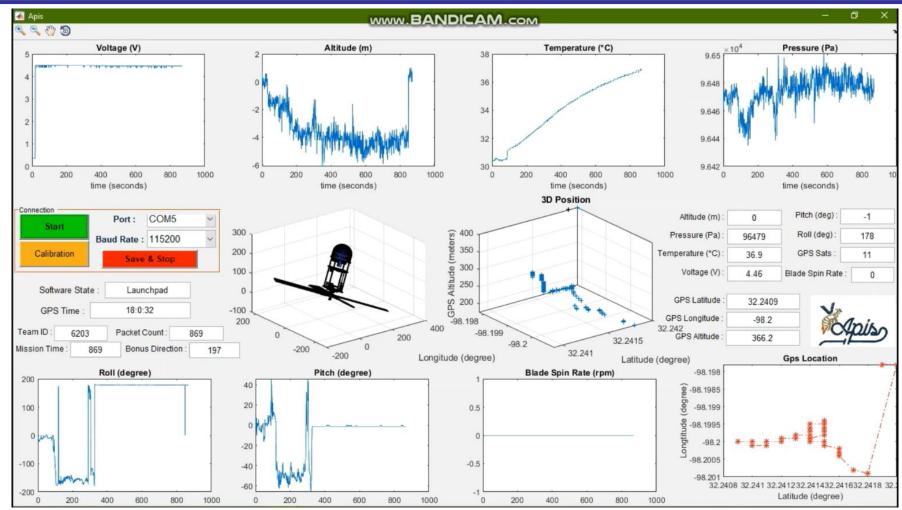
Video Link:

https://youtu.be/dA2NRpcGzOY



Ground Station Real Time Plots





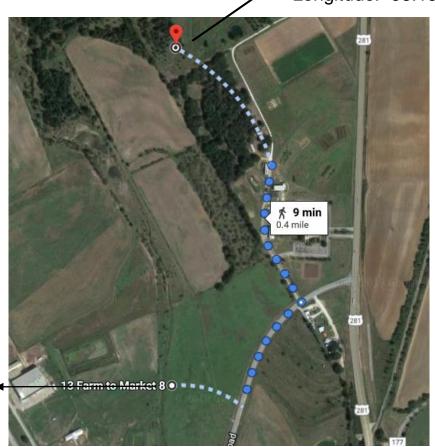
Video Link:

https://youtu.be/sswmalKrpN0





Latitude: 32.2486 Longitude: -98.1999



Latitude: 32.2409 Longitude: -98.2000





Failure Analysis



Minor Failures



Minor Failures:

→ Descent rate of the container and payload is slightly different than the mission requirements.

Descent rate of the payload is 7.44 m/s. (Mission Req. is 10-20 m/s)

Descent rate of the container+payload is 11.48 m/s.

(Mission Req. is 15-25 m/s)

Correction Methods:

- → Weather conditions should be considered more.
- → Certain mass measurement should be done earlier to produce more convenient descent systems.





Lessons Learned



Discussions of what worked and what didn't



WORKED	DIDN'T WORK
No Data Lost	
Separation Mechanism	
Auto-gyro Mechanism	
Camera	
Buzzer	
Parachute	
Deployment of Rotor Blades	
Calibration Command	



Conclusions



- •Considering the previous table, the mission was a major success.
- •Most of the components are specifically designed according to competition purposes and withstand extreme forces of lift-off. Therefore, components worked very well.
- •Electronic and mechanical requirements analyzed carefully, and the space is used efficiently with reliable and sturdy mechanism while providing flight, we managed to design and manufacture a CanSat matching all 50 requirements.