DRONE FORENSICS:

FRAMEWORK FOR PAYLOAD DETECTION THROUGH FLIGHT LOG ANALYSIS OF DJI MAVIC 2 ZOOM

by

JUSTIN RYAN

B.A., University of Colorado Denver, 2015

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This thesis for the Master of Science degree by

Justin Ryan

has been approved for the

Media Forensics Program

by

Catalin Grigoras, Chair

Cole Whitecotton

Steve Watson

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Ryan, Justin (M.S., Media Forensics Program)

Drone Forensics: Framework for Payload Detection Through Flight Log Analysis of DJI Mavic 2 Zoom

Thesis directed by Associate Professor Catalin Grigoras

ABSTRACT

This thesis's goal is to lay the groundwork for a method of analyzing flight records of consumer DJI drones to detect the presence of external payload, specifically by comparing motor RPM and motor amperage of payload vs. non-payload flights (wet vs dry).

Current research in Drone flight data analysis is limited, and generally concerns itself with the controller-drone relationship, GPS, and geofencing data. This research is, to our knowledge, the first hands-on test of what has only been a theory in the Drone Forensic community. A base understanding of aerodynamics and electrical engineering allows for the hypothesis that if a drone is laden with an external payload, then the data fields that record such events as motor rpm and motor amperage will show an increased output as the airfoils are required to generate more lift. This research is intended to be a framework for future research showing proof of concept. In a controlled environment with a DJI Mavic 2 Zoom at hover, base measurements are taken for the drone in natural unloaded flight (dry) and then compared to the same flight performed with a payload attached (wet). The results are clear; with a significant payload attached to the drone, the automated systems will be forced to generate more lift by increasing motor RPM and Battery Current; this information is recorded in the Flight Records .DAT file that is stored in the controller application. Side by side analysis of the dry-wet data shows a clear picture of which drone was carrying the payload. Future research must look to advance this procedure for real-life events where a drone is not held at a simple hover but is maneuvering in different directions in outdoor conditions where variability in atmosphere, wind, and pilot input are not controlled.

The form and content of this abstract are approved. I recommend its publication.

Approved: Catalin Grigoras

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LIST OF ABBREVIATIONS

FAA – Federal Aviation Administration

(s)UAV – (Small) Unmanned Aerial Aircraft

GPS – Global Positioning System

RC – Remote Controlled

RPM – Revolutions Per Minute

AGL – Above Ground Level

CHAPTER I

INTRODUCTION

Drones come in many shapes and sizes, and definitions. For this paper we are focused on consumer grade drones flying recreationally used under the Federal Aviation Administration (FAA) part 107 regulations (appendix - 2). Technically a drone is any aerial vehicle controlled by a pilot not on board the aircraft. For this paper, the word Drone specifically refers to remote controlled (RC) Quadcopters and not fixed wing RC aircraft.

These Drones, also known as Small Unmanned Aerial Vehicles (sUAV), made their consumer grade appearance in the early 2000s first with the Parrot in 2010 and then the iconic DJI Phantom 1 in 2013 (DrDrone.ca). Before these user-friendly drones hit the market there was no commercially available option. Technological limitations meant that only the dedicated Hobbyist-Professional, or Military personnel had access to such devices which were in many cases built by the user themselves. Furthermore, older drones were much more challenging to operate and prone to crashing from pilot error. With older tech, a drone which was commanded to go forward would continue forward until reverse inputs were applied, a drone in neutral position could end up coasting with the direction of wind currents, etc. However, in 2010 "The French company Parrot released their Parrot AR Drone, the first ready-to-fly drone which can be controlled entirely via Wi-Fi, using a smartphone" (Dormehl 2018). Then in 2013 DJI released the first consumer drone to fly by GPS, the Phantom 1, which was the first Drone that used onboard GPS navigation which corrected the previous problems while hovering and maintaining a tack sharp point in 3-d space. The key feature involved automatic systems that created the ability for a drone to hover in place when the control sticks were in a neutral position regardless of air currents around it. When input controls are neutral the drone defines a GPS coordinate, and it will maintain that coordinate by automatic adjustment to motor output in contrast to whatever wind currents are doing at any given time. There are limitations, but according to the manual for this model and a cursory look online these types of drones will stay put in wind speeds upwards of 20mph (Appendix – 4). The latest DJI drones have all manner of subject-tracking, point of interest orbits, and automated point to point flights like the “return to home” function. In 2023 one only needs a cell phone to operate this sophisticated piece of equipment.

Some enterprise-level drones have 8 propellors or more, but we are not concerned with those aircraft for this paper. The basic element that is unique to the drone platform is that they have 4 or more rotating propellors creating lift by rotation rather than a fixed wing RC aircraft which creates lift by air movement over the wing. This allows a drone the ability to hover unlike a fixed wing aircraft. A drone is much like a Helicopter but with 4 propellors rather than 1. For more information on how aircrafts operate see “Pilot’s Handbook of Aeronautical Knowledge” (Appendix -1).

According to Grandview research the consumer drone market has swollen to a 4.1-billion-dollar industry in 2022 and estimated to hit near 12 billion USD by 2030 (3). The drone is a common piece of gear for many Photographers and videographers. They are used in water research to gather samples not easily reached by man, inspectors can fly specialized drones into hazardous locations, and even Amazon has been working on using Drones to deliver packages right to our doorstep since 2013 with their “Prime Air” program. This presents a problem for the FAA, Police, and private citizens alike. What if the motivation behind these utilities was more nefarious? Drones have been used to violate privacy, deliver drugs/paraphernalia, and even to drop bombs as described in many articles posted across the internet. Like many other topics in crime, pop culture can inspire creative uses for these devices. For instance, the video game *Call* *of Duty: Modern Warfare 2* has a special upgrade where the player can utilize a drone to spy on enemy players, and another quadcopter to carry an explosive device to eliminate enemy players. Vice News has reported on drones being used to smuggle packages into Prison where wardens use sophisticated RC trackers and disruptors to disable smuggler drones. There are many other examples that can be found with a quick YouTube search. So clearly the use of drones for these activities is in the mainstream cognition. The question for this research is how to prove the existence of a payload after a drone has been intercepted by law enforcement?

Just like any tech, the world must learn how to prevent and prosecute crimes committed by such means. Much research has been done into tying a suspect drone to a suspect controlling device, but little to no research has been done on the investigation of payloads, and if the flight data can tell the story. The scenario in question is one where a drone delivering an illegal package is captured by police after it has made the delivery of illegal contraband. Current research may be able to prove that the drone was controlled by the suspect and that it went from point A to point B, but how could one prove that the drone was carrying a payload after the fact?

The analysis of stored flight records is not new by any means, but this paper aims to lay a groundwork for detecting if a suspect drone had been carrying a payload by analyzing the recorded data of physics related measurements. In this paper we will specifically look at the motor system and show that the flight logs include data that tells a story through an increase to motor RPM and motor Amperage measurements while the drone is carrying a payload. The intent is to show a proof of concept that can be expanded on with future research. We believe that this experiment will be of value to government agencies who wish to further test different drones in real-world applications.

Previous Research

Most of the research dedicated to consumer, especially DJI, drones is concerned with GPS Geofencing and connecting a suspect drone to a suspect controller. After all the most important thing to prove in a criminal case involving drones is linking the controller with the drone. M. Yousef, F. Iqbal and M. Hussain published a paper “"Drone Forensics: A Detailed Analysis of Emerging DJI Models," that analyzed the 4 major DJI models showing, generally, how and what data can be extracted from a DJI (Yousef 2010). Another paper by J. K. W. Lan and F. K. W. Lee, "Drone Forensics: A Case Study on DJI Mavic Air 2”, discusses a case study of a real-world piece of evidence and how the methods in the beforementioned paper are utilized to attempt data extraction from the drone, the controller, and the app (Lan 2022). In "Unmanned aerial vehicles: A preliminary analysis of forensic challenges", G Horsman outlines more challenges in Drone Forensics, but again the topics of this paper revolve around data analysis as it pertains to aircraft ownership, controller identification, GPS tracking, and visual media collection (Horsman 2016). To our knowledge, research into payload detection is non-existent. A basic understanding of aerodynamics and electric engineering is the basis for the hypothesis. For an airfoil to stay aloft it must generate lift greater than the weight of the object it is attached to. For fixed wing airplanes, lift is generated by airspeed of the airfoil, but is also determined by angle of attack which can be experimented with by holding your hand out the window of a moving car on the freeway. On the other hand, Helicopters and drones can hover because lift is generated by the rotation of the propellor rather than forward motion. Unlike the helicopter, a drone has 4 propellors working in tandem to change pitch, yaw, and roll. A consumer drone is in most cases a quad copter meaning that it relies on 4 helicopter like propellers working in tandem. If all motors rotate faster the drone rises, if the 2 front motors increase and the back 2 do not then the drone will go backwards, so on and so forth in 360 of movement capabilities. These systems work together to keep the drone in the air and stable during various flight conditions. These same systems need to be able to account for the weight of the drone and the atmospheric conditions the drone itself is in, I.e., heavy drones require more power (both in motor RPM and amperage drawn for the motors) than lighter drones, but a larger drone will most likely have bigger propellers with more surface area to help create more life. If the drone has a payload attached to it, then this fundamentally changes the weight and balance of the drone and therefore will require the flight systems to compensate for these changes. When looking into the DJI spec sheet and manual there is no indication to a max payload (Appendix – 4).

CHAPTER II

MATERIALS

Table 1. Materials List

Drone System: Drone - DJI Mavic 2 Zoom v01.00.0770 Controller - DJI Smart Controller model rm500 - Android v7.1.2 - firmware v01.01.0058 Software - DJI Go4 app v4.3.38 - Android Power - 3 DJI Batteries for Mavic 2 labeled #1,2, and 3 Brand New Propellers for Mavic 2 Sandisk 124GB micro-SD Card (inserted in smart controller, not drone)
Payload System: BRDRC O'woda Mavic 2 Payload Drone Airdropper Harness Fishing line to attach payload Assorted 5/8” metal washers as payload Kitchen Aid - KQ908 - to weigh in grams
Examination Software: "CsvView/DatCon" - Available: https://datfile.net. Excel,

Primarily, this research revolves around physics and the effects it has on data rather than being based purely on digital elements. The drone used for testing was the DJI Mavic 2 Zoom and 3 accompanying batteries. The controller was the DJI Smart Controller which is an Android device that utilizes DJI’s proprietary Go4 app. The flight controlling app is the same on the smart controller as it is on any Android cell phone that may be used as a controller. We did not test with Apple iOS, and therefore it has not been confirmed by our study that all the same information is accessible on iOS devices. To attach the payload, we used the BRDRC Remote Throw system purchased from amazon. To remotely control the harness to drop a payload, the harness utilizes a sensor that goes over the drone's downward positioning light. When the light is activated the harness motor retracts and drops the payload attached via metal ring and string/wire/line. To activate the light the user must assign one of the auxiliary buttons on the controller to turn the light on and off. At default, the controller auxiliary buttons are used for camera focus. The drone and payload were weighed on a KitchenAid KQ908 scale measured in grams. The payload is made up of ¾" metal washers attached to the drop harness by thin monofilament fishing line. To collect the data a micro-SD card was inserted into the smart controller to transfer the flight log files. The desktop app CsvView/DatCon was then used to decrypt the encrypted .DAT data file into a .CSV spreadsheet format and to graph RPM data columns show as figures later in the results section.

Data

The data of interest extracted from this DJI drone is stored in 3 formats. The first is the onboard .DAT file which is encrypted and inaccessible without destroying the drone computer in the process. This file can be exceptionally large, over 1 gigabyte, and is an extremely robust data set that only DJI has access to, the utility of which is unknown, but they may request this file if the drone is sent in for warranty repairs or in the event of a "fly away". A fly away event is when a drone loses connection with the controller or is interfered with and just flies off into the sunset.

The other 2 flight log files are stored on the controller, in the app file structure. The first is a .TXT file that contains no motor or sensor data. It is useful for tracking the GPS, flight time, date-time and other basic information that is useful to investigation but not helpful for this research.

Luckily there is another more trimmed down .DAT file stored on the controller that is a simplified version of the onboard .DAT file. This file does contain the motor and sensor data needed for this research to succeed. The data on this smaller .DAT file contains 349 columns of data with variable rows based on flight time. These range from yes/no programming information to date/time, GPS satellites linked, windspeed and all manner of recordings to make automated flight possible. See appendix 5 for a complete sample of one of the test flights. What we are really interested in is Motor RPM for each motor and Motor Amperage for each motor, both will indicate how hard the motor is physically working at any given moment during a flight. Graphing and comparing these data columns for dry vs wet flight shows how a payload affects motor performance. According to Yousef, Iqbal, and Hussain "It was noted that all the DJI drone samples follow the same standards with respect to the filesystem structure and operating system, with minor differences among the data generated by each model" (Yousef 2020).

Table 2. Flight Log Files and Locations

File Name	File Location	Description
"YYYY-MM-DD_[HH-MM-SS]-(Drones' serial number).dat"	Drone Body	.DAT - Most Robust – encrypted - inaccessible
"YY-MM-DD-HH-MM-SS_FLY[Flight number].dat"	Controller – Go4 app	.DAT - Less Robust – encrypted - accessible
"DJIFlightRecord_YYYY-MM-DD_[HH-MM-SS].txt"	Controller – Go4 app	.TXT - least robust – accessible

CHAPTER III

METHODOLOGY

To lay a framework for future research for more real-life scenarios this experiment had to be conducted in a controlled indoor environment at stable flight rather than outdoors performing acrobatic maneuvers. In a broad sense The DJI drone navigates in one of two ways: It will either use satellite GPS connections or use the Downward Vision System to maintain a position lock when stick inputs are neutral.

Outdoors the drone will link with Satellites and use the GPS to maintain position. With the GPS coordinates defined the onboard computer then adjusts the motors to maintain position. As the pilot makes controller stick inputs like up or forward the drone applies power to the appropriate motors and then when the inputs are brought back to neutral the drone will make whatever automatic adjustments to the motor it needs to, to maintain the GPS coordinates specified at that time. Unfortunately, when outdoors there are many uncontrolled variables that could affect the data in unforeseen and non-documentable ways. Wind is the main concern when attempting to fly outside. As the wind speed changes. The motors will change accordingly to maintain altitude and positioning.

For that reason, this experiment was brought indoors to a high ceiling warehouse where the goal is to acquire data in the most controlled manner possible. The problem here is that GPS is unavailable indoors. To maintain position and altitude the drone utilizes the Downward vision positioning system (VPS). This feature is a failsafe if satellite connection is lost and for auto landing features. Some including the Mavic 2 can be flown in what is called Attitude mode. This can be considered as full-manual flight. Even in neutral stick position the drone may coast if buffeted by air current meaning that to maintain position a pilot must make manual stick adjustments to counter wind and other turbulence. The advent of DJI and other companies GPS and Downward Vision systems means that when the pilot removes input from the control sticks the drone will automatically hover by making micro adjustments in contrast to external forces, but there is the possibility that a pilot can override the automated system. This study is made under the conditions of automated flight adjustment. By taking advantage of this tech, we can exploit the recording of these automatic adjustments to perceive changes in external forces that are applied to the aircraft which would not be possible under attitude mode.

Methods

Table 3. Experiment Notes

Flight Number	File Name	Payload – including harness	Notes
1	(1) 23-02-17-11-53-51_FLY019.DAT	0g	Full flight
2	(2) 23-02-17-12-18-09_FLY020.DAT	0g	Full flight
3	(3) 23-02-17-12-38-29_FLY021.DAT	0g	Full flight
4	(4) 23-02-17-01-30-22_FLY022.DAT	897g = 1.98 pounds	Motor overload – auto land
5	(5) 23-02-17-01-37-12_FLY023.DAT	472g = 1.04 pounds	Full Flight
6	(6) 23-02-17-02-15-46_FLY024.DAT	472g	Full Flight

Table 3. Experiment Notes Continued

Flight number	File Name	Payload including harness	Notes
7	(7) 23-02-17-03-32-32_FLY025.DAT	472g	Full Flight
8	(8) 23-02-17-04-18-10_FLY027.DAT	472g-0g	Payload Drop Mid Flight
<u>Environment Conditions</u>		<u>Drone System Measurements</u>	
Indoors		Mavic 2 Zoom Dry = 898	
67 Degrees F		Airdrop Harness = 68g	
617 Feet Above Sea Level		Payload 1 = 829g	
20-Foot-Tall Ceilings		Payload 2 = 404g	
VPS – Flight (No GPS)			
Atmoshperic Pressure = 29.40			

To conduct the experiment, we first took measurements of the space. The temperature was constant 64-degree F and any air movement in the building was nonintentional from drafts between rooms and considered negligible. Humidity was not recorded.

The drone was weighed dry, placed on the floor, battery inserted, and turned on. After linking with the Smart Controller, the motors were started and then the drone was made to lift off to a height of 7 feet above ground level (AGL). The drone was allowed to maintain that hover for the life of the battery (down to roughly 25% or 3.6volts). Then the drone was landed, turned off and battery taken out for recharge. This process was repeated 2 more times to conduct a total of 3 dry-weight baseline control flights.

For the wet test-flight the same process was applied, but first the harness was attached, and the drone weighed with harness. Then the payload was weighed and attached to the harness. The metal washers made for a good payload because they would flatten out on the ground and not impede the drone's landed feet. Again, the drone hovered at 7' AGL for the life of the battery. Note: The first payload (flight 4) was 897g, double the weight of the drone itself. This flight was able to lift off but after a few seconds warnings went off on the controller indicating "max motor speed reached" and the drone automatically landed. The payload was then roughly halved to 472g (about 1lbs), and the next 3 flights were conducted without incident.

For the last flight of the experiment with dwindling time and battery life before the venue closed, we were able to do one flight with a few minutes at hover at 7 feet with the payload attached then dropped the payload mid-flight.

With the 8 flights complete we transferred the data from the controller to the micro-SD card. To do this on the smart controller one must go to the home screen. Find settings gear in the upper right corner and then follow the file path

“/storage/other/DJI/dji.go.v4/Flightrecord/MCDatFlightRecords” then copy the desired flight log files and eject the SD card.

With the files copied onto a computer the next step is making the data readable. The files were encoded but the desktop app CSV view v4.2.7 was used to decode the data into a spread sheet format (this app is used in many other papers about Drone forensics including the ones mentioned in the previous research chapter). For this experiment we consolidated the Motor Speed and Motor Current columns into one excel document, with one sheet per flight. This simply made the data more manageable. Before simple calculating mean and standard deviation of each column, we realized that for the purpose of this research we needed to only look at numbers where the controller input was zero. We only wanted to calculate numbers that were recorded when the drone was in full “auto-pilot”. To do this we also transferred the data columns from each flight that corresponded with the controller input for pitch, yaw, roll and throttle titled “Mr_controller:ctrl_[pitch,yaw,roll, throttle]:D". With these columns we then manually isolated the data cells where (after liftoff and before landing) the controller inputs were all zero. These isolated rows were then used to calculate the mean and standard deviation for each motor’s RPM and Current for each flight.

CHAPTER IV

RESULTS

This first graph is a visual representation of RPM for each motor during flight 8 where the payload was dropped midflight. This graph includes data rows before motor startup, lift off, landing, and shutdown. Of the 349 data columns we only looked at RPM for each motor, Current Amperage for each motor and the controller input recording. The controller input columns are simply a recording of the movements the pilot makes on the controller sticks. For later analysis we isolated data rows where the drone was in flight, but the controller input values for pitch, roll, yaw, and throttle were zero. What this does is show us how the computer automatically makes adjustments without any pilot input to maintain altitude.

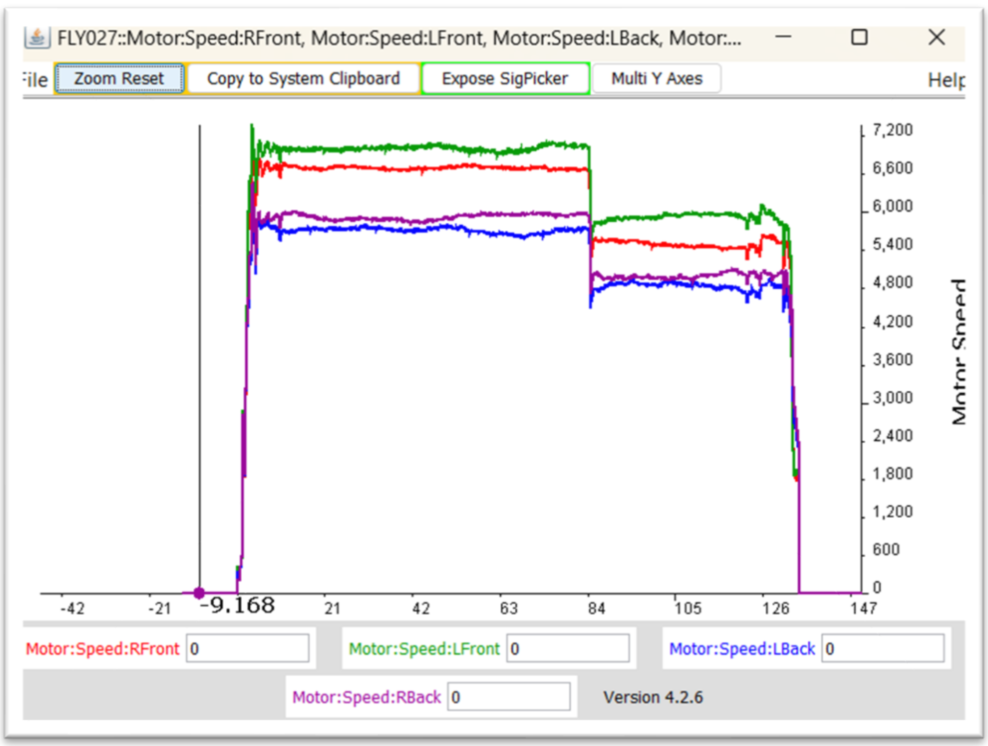

Figure 1. Graph of Motor RPMs for Flight 8

This Graph shows the exact moment where the payload was dropped. The RPM decreased to prevent the drone from gaining altitude after it was free of the extra load.

This next table was created by taking the mean and standard deviation value of each motor RPM and Current draw for that flight, then averaging those values over the 3 dry and 3 wet flights (while only looking at isolated rows where controller input values equal zero indicating an automated hover).

Table 4. Data Calculations for Mean and Standard Deviation

	RPM RFront	RPM LFront	RPM LBack	RPM RBack	AMP RFront	AMP LFront	AMP LBack	AMP RBack
Mean – Dry	5387	5590	4650	4806	4.32	4.07	3.31	2.90
St. D- Dry	45.85	57.73	53.04	52.87	.058	.078	.078	.082
Mean - Wet	6707	6992	5706	5938	6.79	6.63	4.92	4.55
St. D - Wet	62.11	73.81	66.14	80.75	.107	.159	.095	.115

The next two tables graph the calculations from table 4 so we can clearly see the difference between wet vs dry data. The first graph is motor RPM and the second is RPM Standard deviation. We found that reporting the Motor Current to be redundant for this work. From this point on in the paper we will only mention RPM. Think of motor current like pushing the gas pedal on a car. If the current goes up the RPM goes up with it, so to simplify we will only mention RPM. In either case the results are the same. When a payload is added to the drone the motors must work harder (greater motor current = greater RPM) to generate more lift that compensates the weight of the payload.

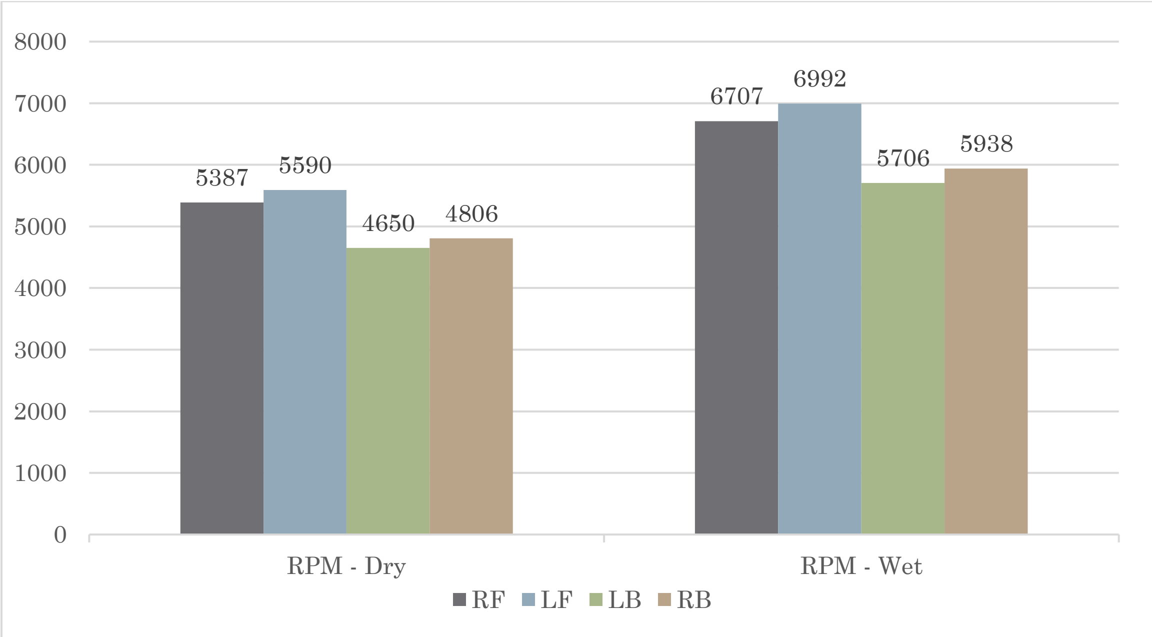

Figure 2. Average RPM Wet vs. Dry – All Motors.

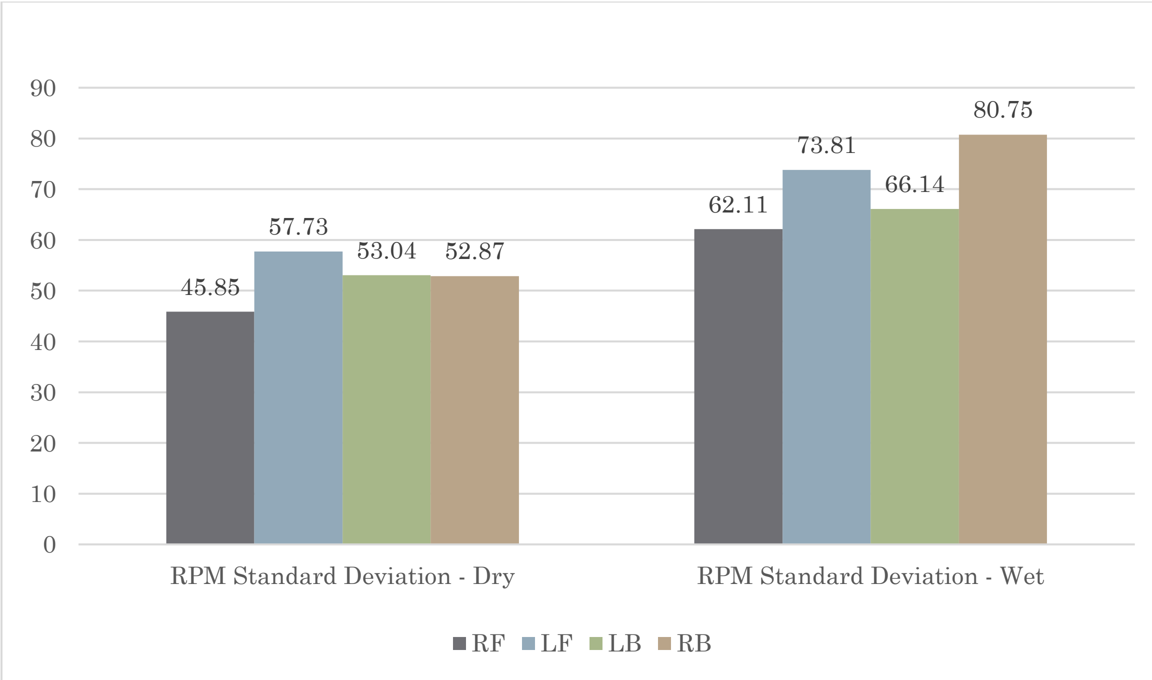

Figure 3. Averaged RPM-Standard Deviation Wet vs. Dry – All Motors.

CHAPTER V

CONCLUSIONS

When we look at the difference between the wet and dry RPM averages there is an increase of about 1100-1300 RPM when the drone is carrying a payload of %50 its own weight depending on which motor we analysis that's an increase of around 20% RPM. What is also interesting is that the standard deviation for RPM also increases for wet flights. What this means is that when the payload is applied the drone becomes less stable and the RPM varies more drastically up and down to maintain stable flight. This will be especially interesting in future research where the drone is maneuvering in air and a payloads inertia may act strangely on the flight system. Another interesting finding is that the Left-Front motors spin faster but require less electrical current to do so than the Right-Front motor. This is consistent with both wet/dry flights. We are not sure why this is, but it is possible that there are variations in the manufacturing of each motor component, or it's a product of purposeful engineering.

In any case, the point of this paper was not to prove that an airfoil must create more lift if the aircraft weight is increased, but to show that this model of drone will make those adjustments automatically and that that data is observable in the flight records. When a payload is applied to the drone the current increases across all motors which causes an increased RPM. These lab-created flights are a first step in understanding what baseline flight looks like for this drone. With the steps taken here we can confidently show scientific evidence that a significant payload will show its mark on the recorded motor-data and can tell a story if linked with other data columns in the flight records. This research was designed to be proof of concept. We believe the data here shows that the concept is sound and with more research the forensic community has a lot more to be discovered.

Future Research

Future research for this topic is near endless, as this experiment is a novel one. The first route is to expand on the same data set and find other data columns that are affected by payload. The next route is to fly the same drone in a more real-world manner, outside from point to point doing controlled maneuvers and measuring how payload affects flight in 360-degree flight. Then take that a step further by flying the wet vs dry flights in a completely random fashion. Another experiment could be defining at what point the payload is so little that it does not reflect in the data. Another question is do we need to analyze the entire flight from takeoff to landing or just isolated moments of stationary hover? Furthermore, if this sort of research is used in tandem with the knowledge, we already have of mapping a drone's flight path coordinates, then we may see a clearer picture of when the "drop" was made. All the questions that are answered for this drone must then be tested for every other drone on the market, and it is daunting to say the least. We believe that any drone that utilizes automated positioning systems will record motor rpm and motor amperage, therefore this research should be continued not only deeper into the other data field, but into all the consumer level drones on the market.

Finding mathematical ways to compare wet vs. dry flight data will be the key to courtroom excellence. It is quite easy to visually see the payload drop on graph during a simple hovering flight but with real world aircraft maneuvers and atmospheric forces affecting the data the visual evidence may be less clear. Based on this research one avenue for real-world flight analysis may be to only analyze a drone during moments when stick input is neutral and the drone is at hover. The goal is to find a means to say scientifically "this is what this drone's flight data looks like under normal conditions and random controller input" If the motor data looks different form that baseline then we must first question the effect of the environment on the flight before asking if there are signs that a payload was detached during flight. According to this research, we expect an increase in average motor-rpm, battery current, and the standard deviation of those values when a drone is carrying a payload. When the suspect-drone evidence is brought into question there will need to be more analysis than just the motor RPM. It would behoove us to tell a story by taking the findings of this research and bringing them into tandem with the data that shows the flight path, controller inputs, and physically collected evidence.

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APPENDIX

1. “Aviation Handbooks & Manuals.” *Aviation Handbooks & Manuals | Federal Aviation Administration*, https://www.faa.gov/regulations_policies/handbooks_manuals/aviation.
2. “Code of Federal Regulations.” *Federal Register :: Request Access*, https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-107.
3. *Flight Records Analysis Tutorial*. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://dl.djicdn.com/downloads/DJI+Support/Flight+Controller+Data+Analysis+Series+Tutorials+V1.0.pdf.
4. “Mavic 2 - Download Center - DJI - Manual .” *DJI Official*, https://www.dji.com/downloads/products/mavic-2.
5. Below - Excerpt of all data columns from .dat file converted to excel document from Flight 8 at the time of payload drop

Clock:Tick#	Clock:offse	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(
5.06E+08	84.166			85.93325	86.1267	1.876632		6	-0.38007	-0.53708	-69.8898	-0.00608
5.06E+08	84.231			86.0363	86.1234	1.979683		5	-0.45594	-0.47886	-69.9556	-0.00752
5.06E+08	84.265			86.0363	86.1234	1.979683		5	-0.45594	-0.47886	-69.9556	-0.00752
5.06E+08	84.322			86.1235	86.1245	2.066879		5	-0.50126	-0.48838	-69.8878	-0.00677
5.06E+08	84.365			86.1235	86.1245	2.066879		5	-0.50126	-0.48838	-69.8878	-0.00677
5.07E+08	84.43			86.26883	86.12159	2.212211		5	-0.42996	-0.33171	-69.8658	-0.0135
5.07E+08	84.465			86.26883	86.12159	2.212211		5	-0.42996	-0.33171	-69.8658	-0.0135
5.07E+08	84.522			86.16048	86.14105	2.103866		5	-0.2498	-0.13198	-69.8356	-0.01008
5.07E+08	84.565			86.16048	86.14105	2.103866		5	-0.2498	-0.13198	-69.8356	-0.01008
5.07E+08	84.63			86.13143	86.18576	2.074814		5	-0.15519	0.01869	-69.8507	-0.00281
5.08E+08	84.665			86.13143	86.18576	2.074814		5	-0.15519	0.01869	-69.8507	-0.00281
5.08E+08	84.721			86.03633	86.22342	1.979713		5	-0.17836	-0.14004	-69.8549	-0.00467
5.08E+08	84.764			86.03633	86.22342	1.979713		5	-0.17836	-0.14004	-69.8549	-0.00467
5.08E+08	84.83			86.1394	86.24968	2.082786		6	-0.26832	-0.35548	-69.8733	-0.00393
5.08E+08	84.864			86.1394	86.24968	2.082786		6	-0.26832	-0.35548	-69.8733	-0.00393
5.09E+08	84.921			85.94126	86.25465	1.884643		6	-0.26466	-0.51428	-69.7977	-0.00706

IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(
0.007677	-1.00212	1.002164	2.64562	-8.91709	4.270731	10.23489	0.031035	-0.03143	-0.01167	0.045688	0.044173	136
0.005271	-1.0097	1.009738	-11.8535	1.955486	-18.4948	22.05414	0.031029	-0.03156	-0.00854	0.045077	0.044261	139
0.005271	-1.0097	1.009738	-11.8535	1.955486	-18.4948	22.05414	0.031029	-0.03156	-0.00854	0.045077	0.044261	139
0.006539	-1.00474	1.004786	4.245569	-5.28483	3.736371	7.740463	0.031382	-0.03072	-0.00936	0.044901	0.043914	145
0.006539	-1.00474	1.004786	4.245569	-5.28483	3.736371	7.740463	0.031382	-0.03072	-0.00936	0.044901	0.043914	145
0.013423	-1.29305	1.293193	7.467036	-4.06376	6.610786	10.76909	0.028586	-0.03246	-0.02983	0.052543	0.043253	151
0.013423	-1.29305	1.293193	7.467036	-4.06376	6.610786	10.76909	0.028586	-0.03246	-0.02983	0.052543	0.043253	151
0.007094	-1.20486	1.204927	3.772203	7.319671	8.202905	11.62303	0.027202	-0.03045	-0.38989	0.392019	0.040834	136
0.007094	-1.20486	1.204927	3.772203	7.319671	8.202905	11.62303	0.027202	-0.03045	-0.38989	0.392019	0.040834	136
0.009205	-0.90023	0.900282	5.582617	5.391726	11.20048	13.6267	0.026772	-0.02427	-0.41656	0.418123	0.036136	136
0.009205	-0.90023	0.900282	5.582617	5.391726	11.20048	13.6267	0.026772	-0.02427	-0.41656	0.418123	0.036136	136
0.007179	-0.88476	0.884798	6.244299	1.218589	7.933362	10.16929	0.026862	-0.0195	-0.30006	0.301887	0.033191	131
0.007179	-0.88476	0.884798	6.244299	1.218589	7.933362	10.16929	0.026862	-0.0195	-0.30006	0.301887	0.033191	131
0.005905	-0.91765	0.917677	-3.2299	8.091111	-2.28787	9.007368	0.027383	-0.01716	-0.20017	0.202762	0.032318	145
0.005905	-0.91765	0.917677	-3.2299	8.091111	-2.28787	9.007368	0.027383	-0.01716	-0.20017	0.202762	0.032318	145
0.005929	-0.93706	0.937102	8.106438	11.02561	16.66036	21.56029	0.025793	-0.01789	-0.08412	0.089784	0.031393	145

IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMUCalcs(	IMUCalcs(
335	1271	1321	65.02	-69.8898	0.657943	-105.175	-35.2856	290.1102	-70.1319	-0.24211	0	0
335	1274	1324	64.99	-69.9556	0.661185	-113.551	-43.5958	290.0444	-69.5973	0.358349	0	0
335	1274	1324	64.99	-69.9556	0.661185	-113.551	-43.5958	290.0444	-69.5973	0.358349	0	0
338	1274	1326	64.99	-69.8878	0.699818	-115.633	-45.7456	290.1122	-68.9797	0.908094	0	0
338	1274	1326	64.99	-69.8878	0.699818	-115.633	-45.7456	290.1122	-68.9797	0.908094	0	0
343	1271	1325	65.03	-69.8658	0.543036	-122.216	-52.35	290.1342	-67.8292	2.036606	0	0
343	1271	1325	65.03	-69.8658	0.543036	-122.216	-52.35	290.1342	-67.8292	2.036606	0	0
338	1277	1327	65.03	-69.8356	0.282522	-131.985	-62.1497	290.1644	-68.8288	1.00685	0	0
338	1277	1327	65.03	-69.8356	0.282522	-131.985	-62.1497	290.1644	-68.8288	1.00685	0	0
343	1277	1329	65.07	-69.8507	0.156312	-166.718	-96.867	290.1493	-68.5082	1.342525	0	0
343	1277	1329	65.07	-69.8507	0.156312	-166.718	-96.867	290.1493	-68.5082	1.342525	0	0
341	1274	1325	65.02	-69.8549	0.226766	-121.717	-51.862	290.1451	-69.6588	0.196161	0	0
341	1274	1325	65.02	-69.8549	0.226766	-121.717	-51.862	290.1451	-69.6588	0.196161	0	0
338	1274	1326	65.02	-69.8733	0.44537	-106.919	-37.0458	290.1267	-68.2678	1.605477	0	0
338	1274	1326	65.02	-69.8733	0.44537	-106.919	-37.0458	290.1267	-68.2678	1.605477	0	0
335	1277	1328	65.04	-69.7977	0.578373	-97.0286	-27.2309	290.2023	-68.6072	1.190591	0	0

IMUCalcs((	IMUCalcs((	IMUCalcs((	IMUCalcs((	IMUCalcs((	IMUCalcs((	IMUCalcs((	IMUCalcs((	IMUCalcs((	IMUCalcs((	IMUCalcs((	IMUCalcs((	IMUCalcs((
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-20.1542
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-20.864
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-20.864
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-21.6006
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-21.6006
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-21.0845
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-21.0845
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-20.3452
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-20.3452
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-19.3769
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-19.3769
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-18.4222
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-18.4222
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-18.1405
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-18.1405
0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	FALSE	FALSE	-17.4234

IMUCalcs(	IMUCalcs(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(
-6.45834	-46.4182		0			0.819699	-0.0054	-0.00194	-0.57277	0.019286	-0.02214	-0.00217
-6.91784	-46.7656		0			0.81937	-0.00566	-0.00114	-0.57324	0.01005	-0.02161	-0.01627
-6.91784	-46.7656		0			0.81937	-0.00566	-0.00114	-0.57324	0.01005	-0.02161	-0.01627
-7.29756	-46.9318		0			0.819709	-0.00603	-9.88E-04	-0.57275	-0.0534	-0.04099	0.001991
-7.29756	-46.9318		0			0.819709	-0.00603	-9.88E-04	-0.57275	-0.0534	-0.04099	0.001991
-6.71333	-47.3981		0			0.81982	-0.00473	-2.25E-04	-0.5726	0.003767	-0.01298	-2.58647
-6.71333	-47.3981		0			0.81982	-0.00473	-2.25E-04	-0.5726	0.003767	-0.01298	-2.58647
-6.15245	-47.2356		0			0.819973	-0.00245	3.03E-04	-0.5724	0.023239	0.055641	-1.87565
-6.15245	-47.2356		0			0.819973	-0.00245	3.03E-04	-0.5724	0.023239	0.055641	-1.87565
-5.6856	-46.6012		0			0.819898	-0.00102	9.09E-04	-0.57251	0.057092	0.0639	0.979255
-5.6856	-46.6012		0			0.819898	-0.00102	9.09E-04	-0.57251	0.057092	0.0639	0.979255
-5.09549	-46.2714		0			0.819877	-0.00198	-1.11E-04	-0.57254	0.020907	0.033629	1.162411
-5.09549	-46.2714		0			0.819877	-0.00198	-1.11E-04	-0.57254	0.020907	0.033629	1.162411
-4.94506	-45.8068		0			0.819784	-0.0037	-0.0012	-0.57266	0.050698	-0.00929	0.874982
-4.94506	-45.8068		0			0.819784	-0.0037	-0.0012	-0.57266	0.050698	-0.00929	0.874982
-4.70174	-44.853		0			0.820159	-0.00446	-0.00236	-0.57211	0.016258	-0.03113	0.715724

IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	GPS:Long	GPS:Lat	GPS:Date	GPS:Time	GPS:dateTi
0.002112	-5.61E-04	0.003213	500	2810	0	0	25972	-87.9479	43.11646	20230217	221952	2023-02-1
0.002112	-5.62E-04	0.003215	500	2812	0	0	25992	-87.9479	43.11646	20230217	221952	2023-02-1
0.002112	-5.62E-04	0.003215	500	2812	0	0	25992	-87.9479	43.11646	20230217	221952	2023-02-1
0.002113	-5.64E-04	0.003215	500	2811	0	0	26012	-87.9479	43.11646	20230217	221952	2023-02-1
0.002113	-5.64E-04	0.003215	500	2811	0	0	26012	-87.9479	43.11646	20230217	221952	2023-02-1
0.002116	-5.66E-04	0.003216	400	2811	0	0	26032	-87.9479	43.11646	20230217	221952	2023-02-1
0.002116	-5.66E-04	0.003216	400	2811	0	0	26032	-87.9479	43.11646	20230217	221952	2023-02-1
0.002116	-5.67E-04	0.003217	500	2811	0	0	26052	-87.9479	43.11646	20230217	221952	2023-02-1
0.002116	-5.67E-04	0.003217	500	2811	0	0	26052	-87.9479	43.11646	20230217	221952	2023-02-1
0.002116	-5.70E-04	0.003218	500	2811	0	0	26072	-87.9479	43.11646	20230217	221952	2023-02-1
0.002116	-5.70E-04	0.003218	500	2811	0	0	26072	-87.9479	43.11646	20230217	221952	2023-02-1
0.002116	-5.71E-04	0.003219	500	2812	0	0	26092	-87.9479	43.11646	20230217	221952	2023-02-1
0.002116	-5.71E-04	0.003219	500	2812	0	0	26092	-87.9479	43.11646	20230217	221952	2023-02-1
0.002115	-5.73E-04	0.00322	500	2811	0	0	26112	-87.9479	43.11646	20230217	221952	2023-02-1
0.002115	-5.73E-04	0.00322	500	2811	0	0	26112	-87.9479	43.11646	20230217	221952	2023-02-1
0.002113	-5.75E-04	0.003221	500	2811	0	0	26132	-87.9479	43.11646	20230217	221953	2023-02-1

GPS:height	GPS:hDOP	GPS:pDOP	GPS:sAcc	GPS:numG	GPS:numG	GPS:numS	GPS:velN	GPS:velE	GPS:velD	GPS:rawDa	GPS:rawTi	Mr_contro
185.414	2.63	4.81	138.75	2	3	5	0.03	0	-0.08	20230217	221952	6494
185.414	2.63	4.81	138.75	2	3	5	0.03	0	-0.08	20230217	221952	6494
185.414	2.63	4.81	138.75	2	3	5	0.03	0	-0.08	20230217	221952	6494
185.346	2.63	4.81	138.27	2	3	5	0.01	0.04	-0.08	20230217	221952	6494
185.346	2.63	4.81	138.27	2	3	5	0.01	0.04	-0.08	20230217	221952	6504
185.346	2.63	4.81	138.27	2	3	5	0.01	0.04	-0.08	20230217	221952	6504
185.346	2.63	4.81	138.27	2	3	5	0.01	0.04	-0.08	20230217	221952	6504
185.339	2.63	4.81	137.79	2	3	5	0.02	-0.04	-0.09	20230217	221952	6504
185.339	2.63	4.81	137.79	2	3	5	0.02	-0.04	-0.09	20230217	221952	6514
185.339	2.63	4.81	137.79	2	3	5	0.02	-0.04	-0.09	20230217	221952	6514
185.339	2.63	4.81	137.79	2	3	5	0.02	-0.04	-0.09	20230217	221952	6514
185.226	2.15	4.57	137.37	3	3	6	0.14	-0.16	-0.08	20230217	221952	6514
185.226	2.15	4.57	137.37	3	3	6	0.14	-0.16	-0.08	20230217	221952	6524
185.226	2.15	4.57	137.37	3	3	6	0.14	-0.16	-0.08	20230217	221952	6524
185.226	2.15	4.57	137.37	3	3	6	0.14	-0.16	-0.08	20230217	221952	6524
185.371	2.15	4.57	137.01	3	3	6	0.08	-0.08	-0.1	20230217	221953	6524

Mr_contro	Mr_contro	Mr_contro	Mr_contro	Controller:	Mr_contrc	Mr_contro	Mr_contro	Mr_contro	Mr_contro	Mr_contro	Mr_contrc	Mr_contro
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16
0	0	0	0	GPS_Atti	2	1	0	0	0	30	8000	16

Mr_contro	Mr_contro	Mr_contro	Mr_contro	Mr_contro	Mr_contro	Mr_contro	Mr_contro	Mr_contro	Mr_contro	Mr_contro	OA:avoidO	OA:emergl
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE
5	3	2	0	-1308	0	0	0	0	0	1	FALSE	FALSE

OA:radiusL	OA:airport	OA:ground	OA:horizN	OA:vertLo	OA:vertAir	OA:roofLin	OA:hitGro	Motor:Spe	Motor:Spe	Motor:Spe	Motor:Spe	Motor:Esc
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	6669	6993	5718	5920	67
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	6669	6993	5718	5920	67
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	6659	6992	5714	5931	68
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	6659	6992	5714	5931	68
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	6641	7012	5740	5904	68
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	6365	6631	5506	5823	67
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	6365	6631	5506	5823	67
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	6365	6631	5506	5823	67
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5425	5690	4671	4999	67
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5197	5458	4496	4712	67
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5197	5458	4496	4712	67
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5197	5458	4496	4712	67
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5268	5541	4570	4761	68
FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5326	5588	4597	4803	69
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	5326	5588	4597	4803	69
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	5326	5588	4597	4803	69

Motor:Esc	Motor:Esc	Motor:Esc	Motor:PPM	Motor:PPM	Motor:PPM	Motor:PPM	Motor:PPM	Motor:PPM	Motor:PPM	Motor:PPM	Motor:V_c	Motor:V_c
71	71	66	91.77084	91.92709	86.09375	87.03125	90.36459	91.30209	85.57291	85.88541	0	0
71	71	66	91.77084	91.92709	86.09375	87.03125	90.36459	91.30209	85.57291	85.88541	0	0
72	71	67	91.5625	92.39584	86.04166	86.82291	90.41666	91.61459	85.36459	85.67709	0	0
72	71	67	91.5625	92.39584	86.04166	86.82291	90.41666	91.61459	85.36459	85.67709	0	0
71	71	68	91.5625	92.03125	86.14584	86.45834	90.52084	91.35416	85.20834	85.88541	0	0
72	72	66	86.77084	87.86459	80	83.59375	85.67709	86.82291	78.69791	79.79166	0	0
72	72	66	86.77084	87.86459	80	83.59375	85.67709	86.82291	78.69791	79.79166	0	0
72	72	66	86.77084	87.86459	80	83.59375	85.67709	86.82291	78.69791	79.79166	0	0
69	69	67	82.44791	83.02084	76.97916	78.85416	81.51041	82.03125	76.61459	77.86459	0	0
70	71	67	83.17709	83.80209	78.22916	79.16666	82.13541	82.96875	77.96875	78.80209	0	0
70	71	67	83.17709	83.80209	78.22916	79.16666	82.13541	82.96875	77.96875	78.80209	0	0
70	71	67	83.17709	83.80209	78.22916	79.16666	82.13541	82.96875	77.96875	78.80209	0	0
72	72	68	83.95834	84.16666	78.59375	80	83.07291	83.69791	77.76041	78.95834	0	0
72	72	69	84.01041	84.6875	78.75	79.84375	83.07291	83.80209	78.07291	79.27084	0	0
72	72	69	84.01041	84.6875	78.75	79.84375	83.07291	83.80209	78.07291	79.27084	0	0
72	72	69	84.01041	84.6875	78.75	79.84375	83.07291	83.80209	78.07291	79.27084	0	0

Motor:V_c	Motor:V_c	Motor:Vol	Motor:Vol	Motor:Vol	Motor:Vol	Motor:Cur	Motor:Cur	Motor:Cur	Motor:Cur	Motor:Sta	Motor:Sta	Motor:Sta
0	0	1428.2	1425.8	1427	1429.5	6.72	6.49	4.81	4.41	0	0	0
0	0	1428.2	1425.8	1427	1429.5	6.72	6.49	4.81	4.41	0	0	0
0	0	1426.4	1425.2	1427.6	1427	6.7	6.62	4.9	4.52	0	0	0
0	0	1426.4	1425.2	1427.6	1427	6.7	6.62	4.9	4.52	0	0	0
0	0	1427	1427	1428.2	1427.6	6.57	6.71	5.03	4.37	0	0	0
0	0	1451.5	1450.3	1452.8	1449.7	4.47	4.39	3.04	3.34	0	0	0
0	0	1451.5	1450.3	1452.8	1449.7	4.47	4.39	3.04	3.34	0	0	0
0	0	1451.5	1450.3	1452.8	1449.7	4.47	4.39	3.04	3.34	0	0	0
0	0	1459.5	1457.7	1458.9	1460.8	2.66	2.64	1.92	1.78	0	0	0
0	0	1452.8	1452.2	1451.5	1454.6	4	3.91	3	2.57	0	0	0
0	0	1452.8	1452.2	1451.5	1454.6	4	3.91	3	2.57	0	0	0
0	0	1452.8	1452.2	1451.5	1454.6	4	3.91	3	2.57	0	0	0
0	0	1452.2	1449.7	1450.9	1452.2	4.3	4.21	3.3	2.92	0	0	0
0	0	1451.5	1450.3	1451.5	1451.5	4.34	4.25	3.18	2.94	0	0	0
0	0	1451.5	1450.3	1451.5	1451.5	4.34	4.25	3.18	2.94	0	0	0
0	0	1451.5	1450.3	1451.5	1451.5	4.34	4.25	3.18	2.94	0	0	0

Motor:Stat	AirSpeed:c	AirSpeed:v	AirSpeed:v	eventLog	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(
0	0.20129	0.357686	0				86.03102	86.41871	1.974403		0	-0.31661
0	0.20129	0.357686	0				86.03102	86.41871	1.974403		0	-0.31661
0	0.20129	0.357686	0				86.06537	86.41824	2.008751		0	-0.44547
0	0.20129	0.357686	0				86.06537	86.41824	2.008751		0	-0.44547
0	0.20129	0.357686	0				86.25562	86.41863	2.198997		0	-0.34469
0	0.20129	0.357686	0				86.25562	86.41863	2.198997		0	-0.34469
0	0.20129	0.357686	0				86.00459	86.4384	1.947967		0	-0.19278
0	0.20129	0.357686	0				86.00459	86.4384	1.947967		0	-0.19278
0	0.20129	0.357686	0				86.17107	86.47794	2.114448		0	-0.08966
0	0.20129	0.357686	0				86.17107	86.47794	2.114448		0	-0.08966
0	0.20129	0.357686	0				86.05483	86.51084	1.998214		0	-0.12724
0	0.20129	0.357686	0				86.05483	86.51084	1.998214		0	-0.12724
0	0.20129	0.357686	0				86.1077	86.53053	2.051079		0	-0.16318
0	0.20129	0.357686	0				86.1077	86.53053	2.051079		0	-0.16318
0	0.20129	0.357686	0	6529 [L-FMU/MOTOR]safe_nea			85.95184	86.54221	1.895218		0	-0.21454
0	0.20129	0.357686	0				85.95184	86.54221	1.895218		0	-0.21454

IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(
-0.43378	-73.9977	-0.00887	0.025055	-1.01248	1.012833	7.919208	0.509305	17.66819	19.36848	0.006539	-7.50E-04	-0.01498
-0.43378	-73.9977	-0.00887	0.025055	-1.01248	1.012833	7.919208	0.509305	17.66819	19.36848	0.006539	-7.50E-04	-0.01498
-0.40172	-74.0475	-0.00688	0.011371	-1.00177	1.001859	-2.30821	6.171157	-3.636	7.52539	0.00613	-0.0016	-0.01391
-0.40172	-74.0475	-0.00688	0.011371	-1.00177	1.001859	-2.30821	6.171157	-3.636	7.52539	0.00613	-0.0016	-0.01391
-0.271	-74.015	-0.01202	0.006943	-1.22404	1.224119	5.300742	14.74538	-3.91925	16.15192	-0.00459	-0.00354	-0.03576
-0.271	-74.015	-0.01202	0.006943	-1.22404	1.224119	5.300742	14.74538	-3.91925	16.15192	-0.00459	-0.00354	-0.03576
-0.12092	-74.0401	-0.00989	0.010438	-1.22384	1.223926	4.376506	-1.13876	-5.34346	7.000227	-2.31E-04	4.86E-04	-0.3735
-0.12092	-74.0401	-0.00989	0.010438	-1.22384	1.223926	4.376506	-1.13876	-5.34346	7.000227	-2.31E-04	4.86E-04	-0.3735
0.030125	-74.0681	-0.00249	0.003459	-0.9053	0.905309	-4.95033	-7.98773	-8.9747	12.99442	-9.85E-05	0.00698	-0.39568
0.030125	-74.0681	-0.00249	0.003459	-0.9053	0.905309	-4.95033	-7.98773	-8.9747	12.99442	-9.85E-05	0.00698	-0.39568
-0.08791	-74.0605	-0.00333	-4.13E-04	-0.8783	0.878305	-9.04638	-8.84532	-9.14556	15.61147	-0.00226	0.012831	-0.27571
-0.08791	-74.0605	-0.00333	-4.13E-04	-0.8783	0.878305	-9.04638	-8.84532	-9.14556	15.61147	-0.00226	0.012831	-0.27571
-0.36106	-74.015	-0.00524	0.003328	-0.91551	0.915532	-2.11358	-10.4879	-1.11365	10.75656	-0.00196	0.014833	-0.16945
-0.36106	-74.015	-0.00524	0.003328	-0.91551	0.915532	-2.11358	-10.4879	-1.11365	10.75656	-0.00196	0.014833	-0.16945
-0.54309	-74.0467	-0.00691	-0.00992	-0.93659	0.936667	-7.24032	-9.95411	-17.09	21.06119	6.97E-06	0.014797	-0.0897
-0.54309	-74.0467	-0.00691	-0.00992	-0.93659	0.936667	-7.24032	-9.95411	-17.09	21.06119	6.97E-06	0.014797	-0.0897

IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(
0.016363	0.006582	139	335	1274	1324	64.98	-73.9977	0.537029	-110.123	-36.1251	286.0023	-69.2823
0.016363	0.006582	139	335	1274	1324	64.98	-73.9977	0.537029	-110.123	-36.1251	286.0023	-69.2823
0.015283	0.006336	142	335	1274	1324	65	-74.0475	0.599837	-122.004	-47.9561	285.9525	-68.9002
0.015283	0.006336	142	335	1274	1324	65	-74.0475	0.599837	-122.004	-47.9561	285.9525	-68.9002
0.036228	0.005797	151	346	1271	1325	65.01	-74.015	0.438461	-125.841	-51.8256	285.985	-67.7058
0.036228	0.005797	151	346	1271	1325	65.01	-74.015	0.438461	-125.841	-51.8256	285.985	-67.7058
0.373499	5.38E-04	136	338	1277	1327	65.01	-74.0401	0.227564	-131.943	-57.9033	285.9599	-68.7215
0.373499	5.38E-04	136	338	1277	1327	65.01	-74.0401	0.227564	-131.943	-57.9033	285.9599	-68.7215
0.395746	0.006981	136	343	1280	1332	65.05	-74.0681	0.094589	177.3607	-108.571	285.9319	-68.389
0.395746	0.006981	136	343	1280	1332	65.05	-74.0681	0.094589	177.3607	-108.571	285.9319	-68.389
0.276016	0.013028	131	341	1274	1325	65.01	-74.0605	0.154657	-129.42	-55.3591	285.9395	-69.4278
0.276016	0.013028	131	341	1274	1325	65.01	-74.0605	0.154657	-129.42	-55.3591	285.9395	-69.4278
0.170109	0.014962	142	338	1274	1325	65.04	-74.015	0.396221	-98.3358	-24.3208	285.985	-68.5865
0.170109	0.014962	142	338	1274	1325	65.04	-74.015	0.396221	-98.3358	-24.3208	285.985	-68.5865
0.090917	0.014797	142	335	1277	1327	65.04	-74.0467	0.583924	-95.6025	-21.5558	285.9533	-69.0776
0.090917	0.014797	142	335	1277	1327	65.04	-74.0467	0.583924	-95.6025	-21.5558	285.9533	-69.0776

IMU_ATTI(	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:
4.715371	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4.715371	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5.147366	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5.147366	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
6.309199	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
6.309199	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5.318565	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5.318565	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5.67908	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5.67908	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4.632726	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4.632726	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5.42846	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5.42846	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4.969117	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4.969117	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMUCalcs(:	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(
FALSE	FALSE	90.10683	63.61729	28.69478		0.03302			0.798645	-0.00448	-0.00136	-0.60178
FALSE	FALSE	90.10683	63.61729	28.69478		0.03302			0.798645	-0.00448	-0.00136	-0.60178
FALSE	FALSE	90.80688	63.89722	29.02805		0.033051			0.798383	-0.00521	-4.58E-04	-0.60213
FALSE	FALSE	90.80688	63.89722	29.02805		0.033051			0.798383	-0.00521	-4.58E-04	-0.60213
FALSE	FALSE	90.42979	64.04658	30.07203		0.033078			0.798555	-0.00383	-7.79E-05	-0.60191
FALSE	FALSE	90.42979	64.04658	30.07203		0.033078			0.798555	-0.00383	-7.79E-05	-0.60191
FALSE	FALSE	89.96768	64.52936	30.75085		0.033092			0.798425	-0.00198	1.70E-04	-0.60209
FALSE	FALSE	89.96768	64.52936	30.75085		0.033092			0.798425	-0.00198	1.70E-04	-0.60209
FALSE	FALSE	89.25315	64.50073	30.2954		0.033108			0.798277	-4.66E-04	6.81E-04	-0.60229
FALSE	FALSE	89.25315	64.50073	30.2954		0.033108			0.798277	-4.66E-04	6.81E-04	-0.60229
FALSE	FALSE	88.34902	63.80234	29.45549		0.033124			0.798317	-0.00135	5.63E-05	-0.60224
FALSE	FALSE	88.34902	63.80234	29.45549		0.033124			0.798317	-0.00135	5.63E-05	-0.60224
FALSE	FALSE	87.83697	63.24533	28.49054		0.03313			0.798555	-0.00303	-0.00166	-0.60191
FALSE	FALSE	87.83697	63.24533	28.49054		0.03313			0.798555	-0.00303	-0.00166	-0.60191
FALSE	FALSE	86.92881	62.77868	27.47072		0.033135			0.798385	-0.00435	-0.00266	-0.60213
FALSE	FALSE	86.92881	62.77868	27.47072		0.033135			0.798385	-0.00435	-0.00266	-0.60213

IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	IMU_ATTI(	usonic:uso	CtrlAllocat
0.139922	0.059153	-0.08259	0.002112	-5.93E-04	0.004673	400	2811	0	0	0	1.245	1.068056
0.139922	0.059153	-0.08259	0.002112	-5.93E-04	0.004673	400	2811	0	0	0	1.245	1.068056
0.004635	0.002235	0.04534	0.002113	-5.91E-04	0.004675	500	2811	0	0	0	1.245	1.828654
0.004635	0.002235	0.04534	0.002113	-5.91E-04	0.004675	500	2811	0	0	0	1.245	1.828654
-0.03362	-0.00639	-1.9228	0.002119	-5.92E-04	0.004682	500	2811	0	0	0	1.274	0.614512
-0.03362	-0.00639	-1.9228	0.002119	-5.92E-04	0.004682	500	2811	0	0	0	1.274	0.614512
0.090782	0.06861	-2.01693	0.002118	-5.92E-04	0.004684	500	2811	0	0	0	1.274	0.584677
0.090782	0.06861	-2.01693	0.002118	-5.92E-04	0.004684	500	2811	0	0	0	1.274	0.584677
-0.03488	0.07585	0.81879	0.002118	-5.92E-04	0.004685	500	2811	0	0	0	1.739	-0.47541
-0.03488	0.07585	0.81879	0.002118	-5.92E-04	0.004685	500	2811	0	0	0	1.739	-0.47541
-0.00313	0.04051	1.194	0.002122	-5.94E-04	0.004689	500	2812	0	0	0	1.739	0.360459
-0.00313	0.04051	1.194	0.002122	-5.94E-04	0.004689	500	2812	0	0	0	1.739	0.360459
-0.02554	0.004133	0.848393	0.002124	-5.93E-04	0.00469	500	2811	0	0	0	2.132	-0.21513
-0.02554	0.004133	0.848393	0.002124	-5.93E-04	0.00469	500	2811	0	0	0	2.132	-0.21513
-0.13494	-0.02503	0.578402	0.002124	-5.93E-04	0.004688	500	2811	0	0	0	2.132	-0.23687
-0.13494	-0.02503	0.578402	0.002124	-5.93E-04	0.004688	500	2811	0	0	0	2.132	-0.23687

CtrlAllocat	CtrlAllocat	CtrlAllocat	CtrlAllocat	CtrlAllocat	CtrlAllocat	CtrlAllocat	CtrlAllocat	CtrlAllocat	CtrlAllocat	CtrlAllocat	CtrlAllocat	MotorCtrl:
13.56762	-1.14824	55.24477	1.068056	13.56762	-1.14824	55.24477	66.74199	0	1	1	1	2
13.56762	-1.14824	55.24477	1.068056	13.56762	-1.14824	55.24477	66.74199	0	1	1	1	2
13.67629	-1.39481	55.30021	1.828654	13.67629	-1.39481	55.30021	67.65867	0	1	1	1	2
13.67629	-1.39481	55.30021	1.828654	13.67629	-1.39481	55.30021	67.65867	0	1	1	1	2
14.18286	-1.25125	55.23803	0.614512	14.18286	-1.25125	55.23803	66.9526	0	1	1	1	2
14.18286	-1.25125	55.23803	0.614512	14.18286	-1.25125	55.23803	66.9526	0	1	1	1	2
12.46283	-1.35071	37.81082	0.584677	12.46283	-1.35071	37.81082	48.38752	0	1	1	1	2
12.46283	-1.35071	37.81082	0.584677	12.46283	-1.35071	37.81082	48.38752	0	1	1	1	2
7.962422	-1.02851	31.28185	-0.47541	7.962422	-1.02851	31.28185	37.60447	0	1	1	1	2
7.962422	-1.02851	31.28185	-0.47541	7.962422	-1.02851	31.28185	37.60447	0	1	1	1	2
7.824979	-0.85611	33.57488	0.360459	7.824979	-0.85611	33.57488	40.21897	0	1	1	1	2
7.824979	-0.85611	33.57488	0.360459	7.824979	-0.85611	33.57488	40.21897	0	1	1	1	2
8.799808	-1.06274	34.39797	-0.21513	8.799808	-1.06274	34.39797	41.53099	0	1	1	1	2
8.799808	-1.06274	34.39797	-0.21513	8.799808	-1.06274	34.39797	41.53099	0	1	1	1	2
8.285107	-1.20117	34.7318	-0.23687	8.285107	-1.20117	34.7318	41.62394	0	1	1	1	2
8.285107	-1.20117	34.7318	-0.23687	8.285107	-1.20117	34.7318	41.62394	0	1	1	1	2

MotorCtrl:	MotorCtrl:	MotorCtrl:	MotorCtrl:	ATTI_MINI	ATTI_MINI	ATTI_MINI	ATTI_MINI	ATTI_MINI	ATTI_MINI	ATTI_MINI	ATTI_MINI	ATTI_MINI
77.19	79.48	65.11	65.78	0.898295	-0.0054	-0.00216	-0.43935	0.664633	-0.04971	52.12663	86.11498	-0.03332
77.19	79.48	65.11	65.78	0.898295	-0.0054	-0.00216	-0.43935	0.664633	-0.04971	52.12663	86.11498	-0.03332
76.77	80	65.31	65.49	0.898817	-0.00611	-0.00169	-0.43828	0.714583	-0.1331	51.99004	86.09969	-0.04008
76.77	80	65.31	65.49	0.898817	-0.00611	-0.00169	-0.43828	0.714583	-0.1331	51.99004	86.09969	-0.04008
77.58	79.61	64.36	65.76	0.898817	-0.00611	-0.00169	-0.43828	0.714583	-0.1331	51.99004	86.09969	-0.04008
77.58	79.61	64.36	65.76	0.898817	-0.00611	-0.00169	-0.43828	0.714583	-0.1331	51.99004	86.09969	-0.04008
64.52	67.52	48.44	50.41	0.898817	-0.00611	-0.00169	-0.43828	0.714583	-0.1331	51.99004	86.09969	-0.04008
64.52	67.52	48.44	50.41	0.898817	-0.00611	-0.00169	-0.43828	0.714583	-0.1331	51.99004	86.09969	-0.04008
55.9	57.25	43.85	46.69	0.898817	-0.00611	-0.00169	-0.43828	0.714583	-0.1331	51.99004	86.09969	-0.04008
55.9	57.25	43.85	46.69	0.898817	-0.00611	-0.00169	-0.43828	0.714583	-0.1331	51.99004	86.09969	-0.04008
57.7	59.88	47.18	48.44	0.898817	-0.00611	-0.00169	-0.43828	0.714583	-0.1331	51.99004	86.09969	-0.04008
57.7	59.88	47.18	48.44	0.898817	-0.00611	-0.00169	-0.43828	0.714583	-0.1331	51.99004	86.09969	-0.04008
59.52	61.11	46.78	49.33	0.899308	-0.00374	-0.00195	-0.4373	0.483485	0.013914	51.86331	86.19007	-0.174
59.52	61.11	46.78	49.33	0.899308	-0.00374	-0.00195	-0.4373	0.483485	0.013914	51.86331	86.19007	-0.174
59.4	61.22	47.38	50.23	0.899308	-0.00374	-0.00195	-0.4373	0.483485	0.013914	51.86331	86.19007	-0.174
59.4	61.22	47.38	50.23	0.899308	-0.00374	-0.00195	-0.4373	0.483485	0.013914	51.86331	86.19007	-0.174

ATTI_MINI	ATTI_MINI	ATTI_MINI	ATTI_MINI	VIO:cnt:D	VIO:velN	VIO:velE	VIO:velD	VIO:posX	VIO:posY	VIO:posZ	VIO:pcov0:	VIO:pcov1:
-0.08411	0	0	25909	2359	-0.005	-0.003	-0.007	-0.03403	0.158207	1.995787	0.01	0
-0.08411	0	0	25909	2359	-0.005	-0.003	-0.007	-0.03403	0.158207	1.995787	0.01	0
0.006106	0	0	26009	2359	-0.005	-0.003	-0.007	-0.03403	0.158207	1.995787	0.01	0
0.006106	0	0	26009	2363	0.003	NaN	-0.005	-0.03347	0.158704	1.996765	0.01	0
0.006106	0	0	26009	2363	0.003	NaN	-0.005	-0.03347	0.158704	1.996765	0.01	0
0.006106	0	0	26009	2363	0.003	NaN	-0.005	-0.03347	0.158704	1.996765	0.01	0
0.006106	0	0	26009	2363	0.003	NaN	-0.005	-0.03347	0.158704	1.996765	0.01	0
0.006106	0	0	26009	2367	-0.001	NaN	-0.007	-0.03405	0.159298	1.997469	0.01	0
0.006106	0	0	26009	2367	-0.001	NaN	-0.007	-0.03405	0.159298	1.997469	0.01	0
0.006106	0	0	26009	2367	-0.001	NaN	-0.007	-0.03405	0.159298	1.997469	0.01	0
0.006106	0	0	26009	2367	-0.001	NaN	-0.007	-0.03405	0.159298	1.997469	0.01	0
0.006106	0	0	26009	2371	-0.005	0.006	-0.419	-0.03465	0.159724	2.049738	0.01	0
0.916589	0	0	26109	2371	-0.005	0.006	-0.419	-0.03465	0.159724	2.049738	0.01	0
0.916589	0	0	26109	2371	-0.005	0.006	-0.419	-0.03465	0.159724	2.049738	0.01	0
0.916589	0	0	26109	2371	-0.005	0.006	-0.419	-0.03465	0.159724	2.049738	0.01	0
0.916589	0	0	26109	2375	-0.003	0.013	-0.2	-0.03601	0.161513	2.112332	0.01	0

VIO:pcov2:	VIO:pcov3:	VIO:pcov4:	VIO:pcov5:	VIO:vcov0:	VIO:vcov1:	VIO:vcov2:	VIO:vcov3:	VIO:vcov4:	VIO:vcov5:	VIO:pz:D	VIO:pz_co\	VIO:rsvd0:
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7
0	0.01	0	0.04	1.00E-04	0	0	1.00E-04	0	0.0025	-1	0	7

VIO:rsvd1:	VIO:rsvd2:	VIO:rsvd3:	VIO:q0:D	VIO:q1:D	VIO:q2:D	VIO:q3:D	VIO:roll:C	VIO:pitch:(	VIO:yaw:C	VIO:qcov0:	VIO:qcov1:	VIO:qcov2:
0	1	0	0.785049	-0.00405	-0.00148	-0.61942	-0.25884	-0.42038	-76.5491	3.05E-06	0	0
0	1	0	0.785049	-0.00405	-0.00148	-0.61942	-0.25884	-0.42038	-76.5491	3.05E-06	0	0
0	1	0	0.785049	-0.00405	-0.00148	-0.61942	-0.25884	-0.42038	-76.5491	3.05E-06	0	0
0	1	0	0.784907	-0.00446	-0.00129	-0.6196	-0.30962	-0.43289	-76.5755	3.05E-06	0	0
0	1	0	0.784907	-0.00446	-0.00129	-0.6196	-0.30962	-0.43289	-76.5755	3.05E-06	0	0
0	1	0	0.784907	-0.00446	-0.00129	-0.6196	-0.30962	-0.43289	-76.5755	3.05E-06	0	0
0	1	0	0.784907	-0.00446	-0.00129	-0.6196	-0.30962	-0.43289	-76.5755	3.05E-06	0	0
0	1	0	0.784847	-0.00529	-6.59E-05	-0.61967	-0.47151	-0.3819	-76.5865	3.05E-06	0	0
0	1	0	0.784847	-0.00529	-6.59E-05	-0.61967	-0.47151	-0.3819	-76.5865	3.05E-06	0	0
0	1	0	0.784847	-0.00529	-6.59E-05	-0.61967	-0.47151	-0.3819	-76.5865	3.05E-06	0	0
0	1	0	0.784847	-0.00529	-6.59E-05	-0.61967	-0.47151	-0.3819	-76.5865	3.05E-06	0	0
0	1	0	0.784855	-3.47E-04	0.001156	-0.61968	-0.1133	0.07932	-76.5854	3.05E-06	0	0
0	1	0	0.784855	-3.47E-04	0.001156	-0.61968	-0.1133	0.07932	-76.5854	3.05E-06	0	0
0	1	0	0.784855	-3.47E-04	0.001156	-0.61968	-0.1133	0.07932	-76.5854	3.05E-06	0	0
0	1	0	0.784855	-3.47E-04	0.001156	-0.61968	-0.1133	0.07932	-76.5854	3.05E-06	0	0
0	1	0	0.784874	-0.00234	-8.28E-04	-0.61965	-0.15201	-0.24087	-76.5818	3.05E-06	0	0

VIO:qcov3	VIO:qcov4	VIO:qcov5	VIO:timest	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo
3.05E-06	0	3.05E-06	131445	14567	14312.53	353	1405	3627	12000	14428	14567	-14320
3.05E-06	0	3.05E-06	131445	14567	14312.53	353	1405	3627	12000	14428	14567	-14320
3.05E-06	0	3.05E-06	131445	14567	14312.53	353	1405	3627	12000	14428	14567	-14320
3.05E-06	0	3.05E-06	131645	14567	14312.53	353	1405	3627	12000	14428	14567	-14320
3.05E-06	0	3.05E-06	131645	14576	14312.53	353	1405	3626	12000	14444	14576	-14320
3.05E-06	0	3.05E-06	131645	14576	14312.53	353	1405	3626	12000	14444	14576	-14320
3.05E-06	0	3.05E-06	131645	14576	14312.53	353	1405	3626	12000	14444	14576	-14320
3.05E-06	0	3.05E-06	131845	14576	14312.53	353	1405	3626	12000	14444	14576	-14320
3.05E-06	0	3.05E-06	131845	14615	14321.42	352	1401	3626	12000	14583	14615	-14504
3.05E-06	0	3.05E-06	131845	14615	14321.42	352	1401	3626	12000	14583	14615	-14504
3.05E-06	0	3.05E-06	131845	14615	14321.42	352	1401	3626	12000	14583	14615	-14504
3.05E-06	0	3.05E-06	132045	14615	14321.42	352	1401	3626	12000	14583	14615	-14504
3.05E-06	0	3.05E-06	132045	14668	14321.42	352	1401	3626	12000	14720	14668	-14504
3.05E-06	0	3.05E-06	132045	14668	14321.42	352	1401	3626	12000	14720	14668	-14504
3.05E-06	0	3.05E-06	132045	14668	14321.42	352	1401	3626	12000	14720	14668	-14504
3.05E-06	0	3.05E-06	132245	14668	14321.42	352	1401	3626	12000	14720	14668	-14504

BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo
40	438	125	0	0	0	0	0	0	0	0	0	0
40	438	125	0	0	0	0	0	0	0	0	0	0
40	438	125	0	0	0	0	0	0	0	0	0	0
40	438	125	0	0	0	0	0	0	0	0	0	0
40	438	125	0	0	0	0	0	0	0	0	0	0
40	438	125	0	0	0	0	0	0	0	0	0	0
40	438	125	0	0	0	0	0	0	0	0	0	0
40	438	125	0	0	0	0	0	0	0	0	0	0
40	438	126	0	0	0	0	0	0	0	0	0	0
40	438	126	0	0	0	0	0	0	0	0	0	0
40	438	126	0	0	0	0	0	0	0	0	0	0
40	438	126	0	0	0	0	0	0	0	0	0	0
40	438	126	0	0	0	0	0	0	0	0	0	0
40	438	126	0	0	0	0	0	0	0	0	0	0
40	438	126	0	0	0	0	0	0	0	0	0	0
40	438	126	0	0	0	0	0	0	0	0	0	0

BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo	BatteryInfo
0	0	0	0	0	0	0	10.04237	100	0	0	0	0
0	0	0	0	0	0	0	10.04237	100	0	0	0	0
0	0	0	0	0	0	0	10.04237	100	0	0	0	0
0	0	0	0	0	0	0	10.04237	100	0	0	0	0
0	0	0	0	0	0	0	10.04237	100	0	0	0	0
0	0	0	0	0	0	0	10.04237	100	0	0	0	0
0	0	0	0	0	0	0	10.04237	100	0	0	0	0
0	0	0	0	0	0	0	10.04237	100	0	0	0	0
0	0	0	0	0	0	0	10.04344	100	0	0	0	0
0	0	0	0	0	0	0	10.04344	100	0	0	0	0
0	0	0	0	0	0	0	10.04344	100	0	0	0	0
0	0	0	0	0	0	0	10.04344	100	0	0	0	0
0	0	0	0	0	0	0	10.04462	100	0	0	0	0
0	0	0	0	0	0	0	10.04462	100	0	0	0	0
0	0	0	0	0	0	0	10.04462	100	0	0	0	0
0	0	0	0	0	0	0	10.04462	100	0	0	0	0

BatteryInfc	BatteryInfc	BatteryInfc	BatteryInfc	BatteryInfc	BatteryInfc	BatteryInfc	BatteryInfc	Attribute|'	ConvertDa	4.2.6
-3.14159	0	0	4.291417	0	179.7605	358.0104	0			
-3.14159	0	0	4.291417	0	179.7605	358.0104	0			
-3.14159	0	0	4.291417	0	179.7605	358.0104	0			
-3.14159	0	0	4.291417	0	179.7605	358.0104	0			
-3.14159	0	0	4.291417	0	179.7603	358.0103	0			
-3.14159	0	0	4.291417	0	179.7603	358.0103	0			
-3.14159	0	0	4.291417	0	179.7603	358.0103	0			
-3.14159	0	0	4.291417	0	179.7603	358.0103	0			
-3.14159	0	0	4.291417	0	179.7985	358.0485	0			
-3.14159	0	0	4.291417	0	179.7985	358.0485	0			
-3.14159	0	0	4.291417	0	179.7985	358.0485	0			
-3.14159	0	0	4.291417	0	179.7985	358.0485	0			
-3.14159	0	0	4.291417	0	179.8408	358.0908	0			
-3.14159	0	0	4.291417	0	179.8408	358.0908	0			
-3.14159	0	0	4.291417	0	179.8408	358.0908	0			
-3.14159	0	0	4.291417	0	179.8408	358.0908	0			