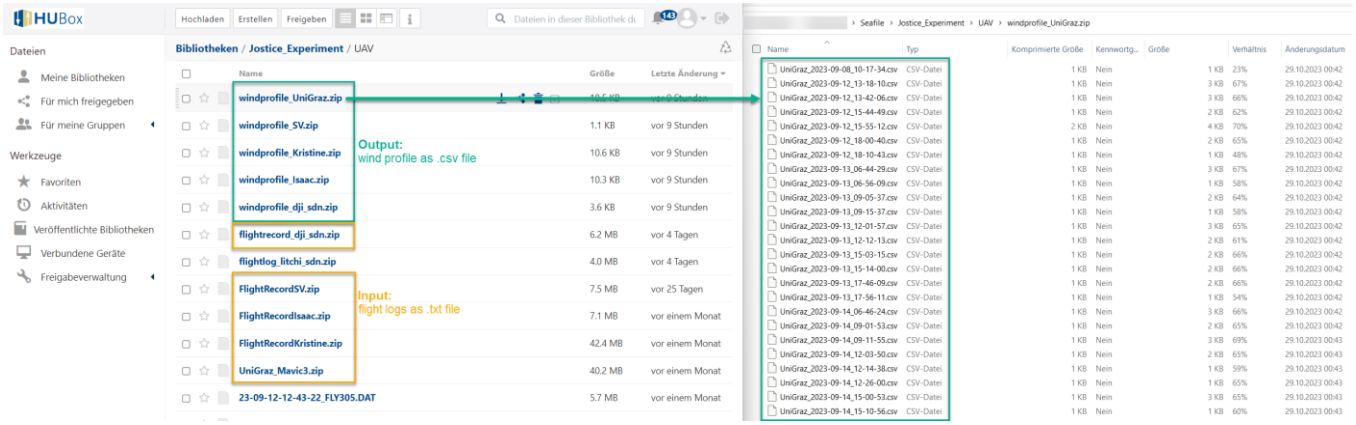
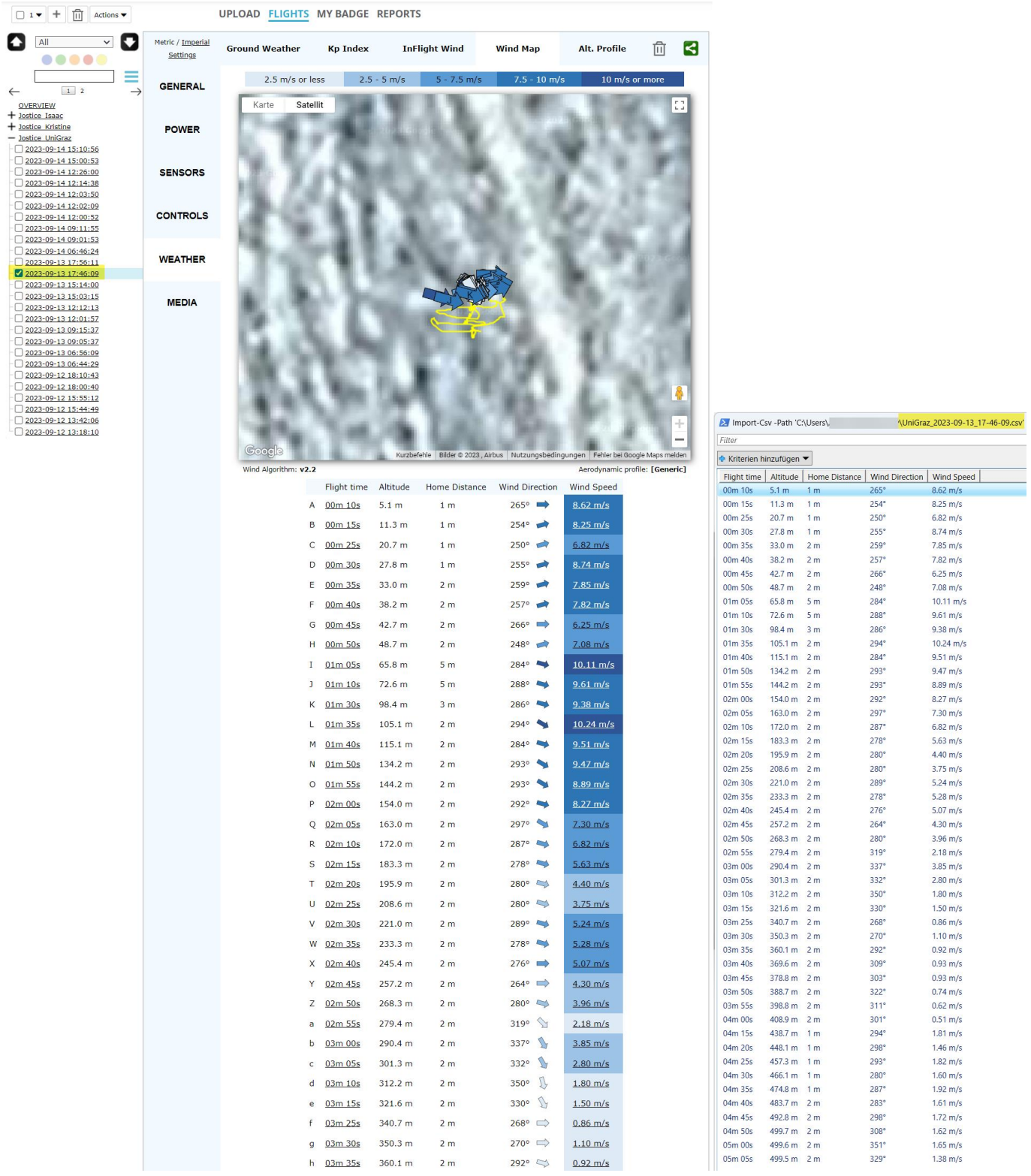
AirData UAV Wind Data

Data

- Flight logs have been uploaded to website https://airdata.com/
- Website data has been downloaded as .csv file via Python html parser



- Result:



	Flight time	Altitude	Home Distance	Wind Direction	Wind Speed
A	00m 10s	5.1 m	1 m	265°	8.62 m/s
B	00m 15s	11.3 m	1 m	254°	8.25 m/s
C	00m 25s	20.7 m	1 m	250°	6.82 m/s
D	00m 30s	27.8 m	1 m	255°	8.74 m/s
E	00m 35s	33.0 m	2 m	259°	7.85 m/s
F	00m 40s	38.2 m	2 m	257°	7.82 m/s
G	00m 45s	42.7 m	2 m	266°	6.25 m/s
H	00m 50s	48.7 m	2 m	248°	7.08 m/s
I	01m 05s	65.8 m	5 m	284°	10.11 m/s
J	01m 10s	72.6 m	5 m	288°	9.61 m/s
K	01m 30s	98.4 m	3 m	286°	9.38 m/s
L	01m 35s	105.1 m	2 m	294°	10.24 m/s
M	01m 40s	115.1 m	2 m	284°	9.51 m/s
N	01m 50s	134.2 m	2 m	293°	9.47 m/s
O	01m 55s	144.2 m	2 m	293°	8.89 m/s
P	02m 00s	154.0 m	2 m	292°	8.27 m/s
Q	02m 05s	163.0 m	2 m	297°	7.30 m/s
R	02m 10s	172.0 m	2 m	287°	6.82 m/s
S	02m 15s	183.3 m	2 m	278°	5.63 m/s
T	02m 20s	195.9 m	2 m	280°	4.40 m/s
U	02m 25s	208.6 m	2 m	280°	3.75 m/s
V	02m 30s	221.0 m	2 m	289°	5.24 m/s
W	02m 35s	233.3 m	2 m	278°	5.28 m/s
X	02m 40s	245.4 m	2 m	276°	5.07 m/s
Y	02m 45s	257.2 m	2 m	264°	4.30 m/s
Z	02m 50s	268.3 m	2 m	280°	3.96 m/s
a	02m 55s	279.4 m	2 m	319°	2.18 m/s
b	03m 00s	290.4 m	2 m	337°	3.85 m/s
c	03m 05s	301.3 m	2 m	332°	2.80 m/s
d	03m 10s	312.2 m	2 m	350°	1.80 m/s
e	03m 15s	321.6 m	2 m	330°	1.50 m/s
f	03m 25s	340.7 m	2 m	268°	0.86 m/s
g	03m 30s	350.3 m	2 m	270°	1.10 m/s
h	03m 35s	360.1 m	2 m	292°	0.92 m/s

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02m 20s	195.9 m	2 m	280°	4.40 m/s
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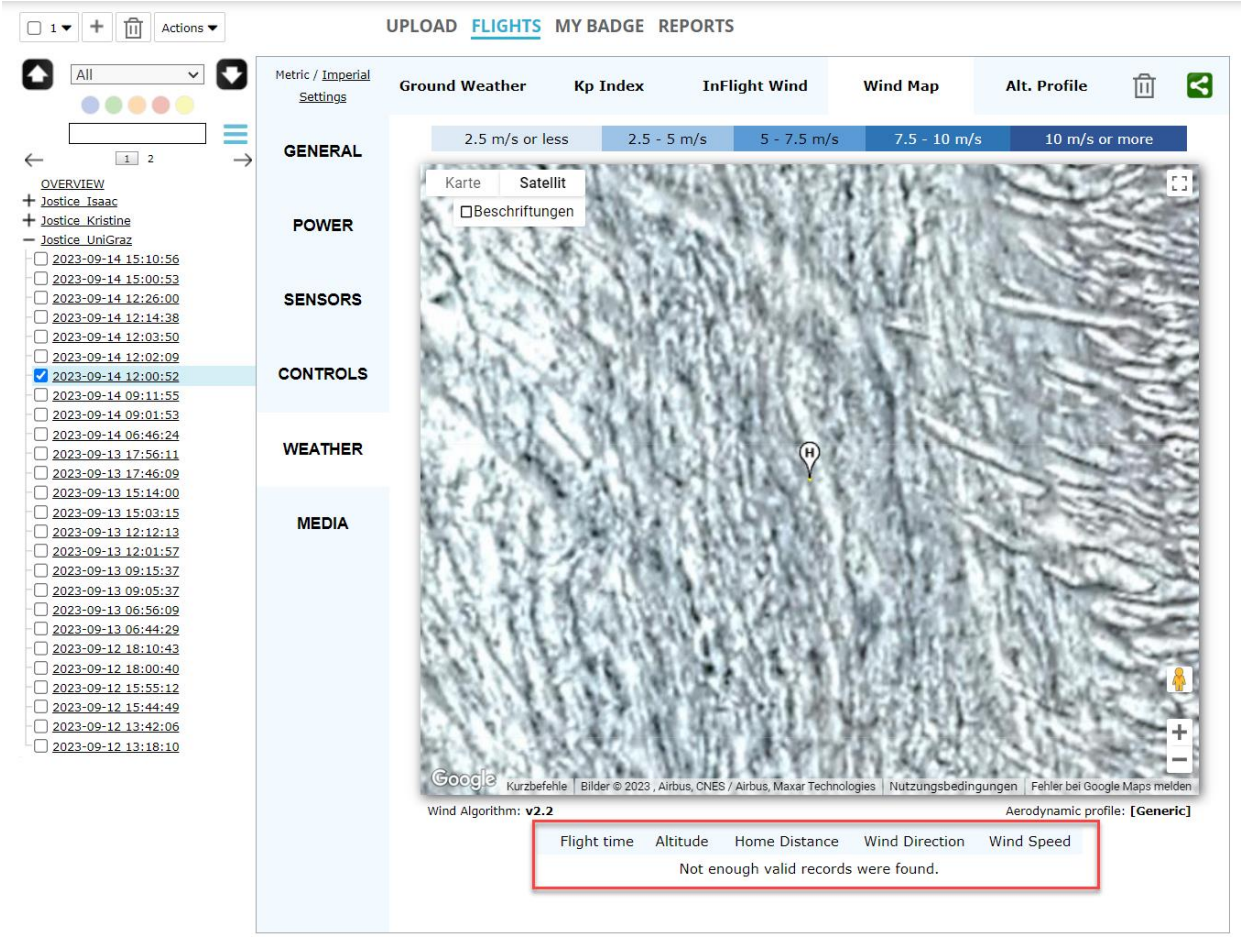
03m 15s	321.6 m	2 m	330°	1.50 m/s
03m 25s	340.7 m	2 m	268°	0.86 m/s
03m 30s	350.3 m	2 m	270°	1.10 m/s
03m 35s	360.1 m	2 m	292°	0.92 m/s
03m 40s	369.6 m	2 m	309°	0.93 m/s
03m 45s	378.8 m	2 m	303°	0.93 m/s
03m 50s	388.7 m	2 m	322°	0.74 m/s
03m 55s	398.8 m	2 m	311°	0.62 m/s
04m 00s	408.9 m	2 m	301°	0.51 m/s
04m 15s	438.7 m	1 m	294°	1.81 m/s
04m 20s	448.1 m	1 m	298°	1.46 m/s
04m 25s	457.3 m	1 m	293°	1.82 m/s
04m 30s	466.1 m	1 m	280°	1.60 m/s
04m 35s	474.8 m	1 m	287°	1.92 m/s
04m 40s	483.7 m	2 m	283°	1.61 m/s
04m 45s	492.8 m	2 m	298°	1.72 m/s
04m 50s	499.7 m	2 m	308°	1.62 m/s
05m 00s	499.6 m	2 m	351°	1.65 m/s
05m 05s	499.5 m	2 m	329°	1.38 m/s

Exceptions

- Wind profile could not be determined for some flight logs due to insufficient data (usually flight time too short)



UAV	Total flight logs	Success	Failed
Isaac	17	14	3
Kristine	20	13	7
UniGraz	31	25	6
dji_sdn	9	6	3
SV	2	1	1

Wind profile algorithm

Information based on feedback received from AirData support:

Q: How can I download/export the wind map/data directly from the website?

A: As of now, we don't offer a direct option to download or export wind map data from the platform. However, your interest in this capability is duly noted. Your feedback is invaluable, and we'll take this as a feature request to enhance the functionality of our platform to better serve your needs.

Q: Why is it only showing data for the ascent but not for the descent?

A: The design of the wind map feature currently focuses on the ascent phase due to certain algorithmic limitations. During the descent of the drone, various factors can introduce instability in the measurements, which can impact the accuracy of the wind data generated by the algorithm. While we understand your interest in having a comprehensive wind map that includes the descent phase, ensuring the highest data accuracy is our top priority. We're continuously exploring possibilities to refine and expand our features based on user needs.

Q: Can the resolution be changed?

A: Again, your observation and suggestion for adjusting the resolution of the wind map are greatly appreciated. However, at the moment, the wind speed calculations are based on a 5-second average, and AirData will provide readings every 5 seconds if enough data is available. We understand that different applications might benefit from varying levels of resolution, and we'll certainly bring your request for customizable resolution to our engineering team for consideration in future updates.

Q: is there any documentation available on how the wind profile is calculated or which input parameters are considered?

While the algorithm itself is proprietary, we do have some additional documentation regarding how wind data is calculated in AirData.

The wind information is calculated based on a unique aerodynamic profile for each drone type. We look at the actual behavior of the drone during the flight vs the expected behavior. In terms of accuracy, based on our internal testing and feedback from others, the wind information is fairly accurate, but we do not have a specific margin of error at this point.

The in-flight wind information is generated by AirData.

In-flight wind is calculated using the angle of the aircraft and the speed of the aircraft at each point of the flight. The wind speed calculations are based on a 5-second average.

Version 2 (current version) of our wind algorithm has the following enhancements:

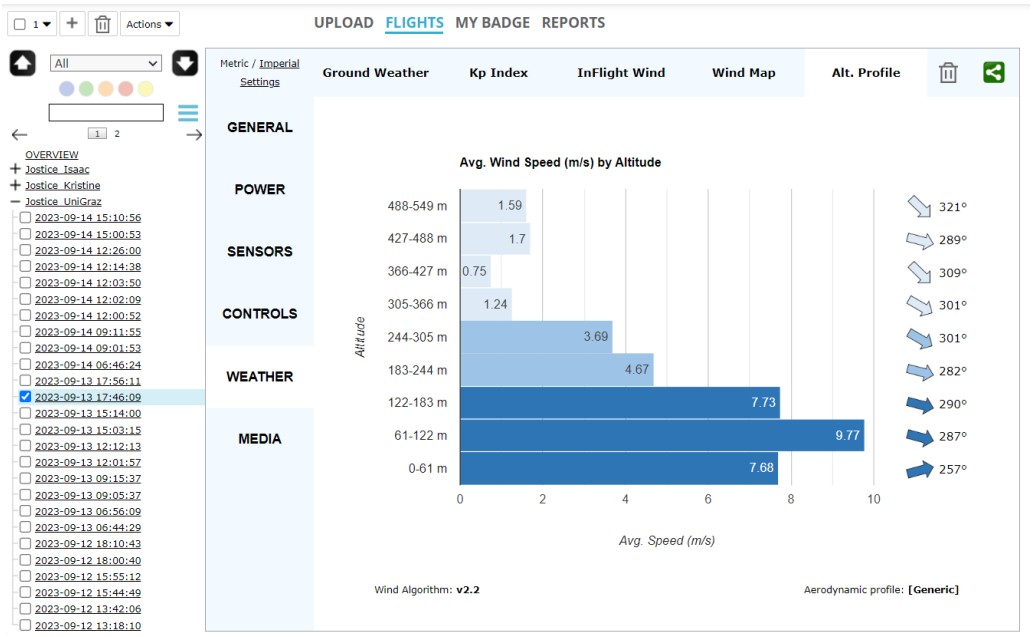
- Comprehensive aerodynamic profile for each drone type;
- All flight modes are now supported;
- Higher resolution: wind will be reported at all speeds;
- The new algorithm will handle turns and altitude changes;
- Better accuracy: balancing functions to compensate for non-balanced IMUs.

Note: Version 2 will not report wind during sharp maneuvers, such as steep decline or fast turns.

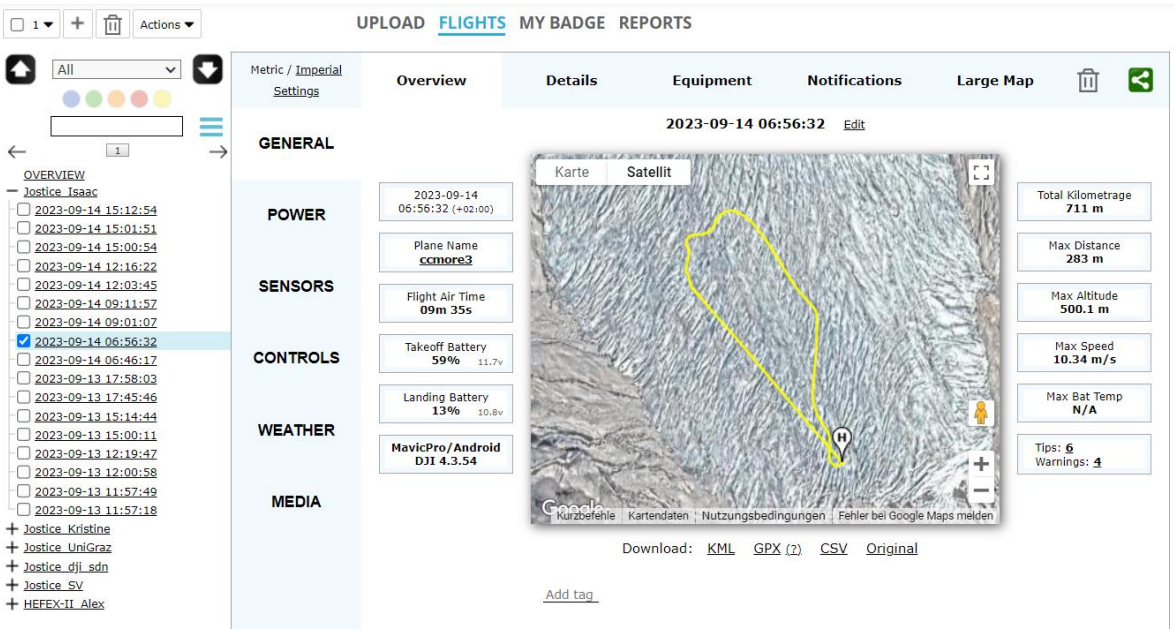
The wind speed calculations are based on a 5-second average, and AirData will provide readings every 5 seconds if enough data is available. To get wind readings every 5 seconds, there needs to be stability with the wind and drone/controls. A gap in wind readings indicates that either the wind or the drone/controls were not stable enough during that period for our algorithms to accurately provide readings. You can add to the stability of the drone/controls by hovering or flying in a straight, constant line.

Additional website data

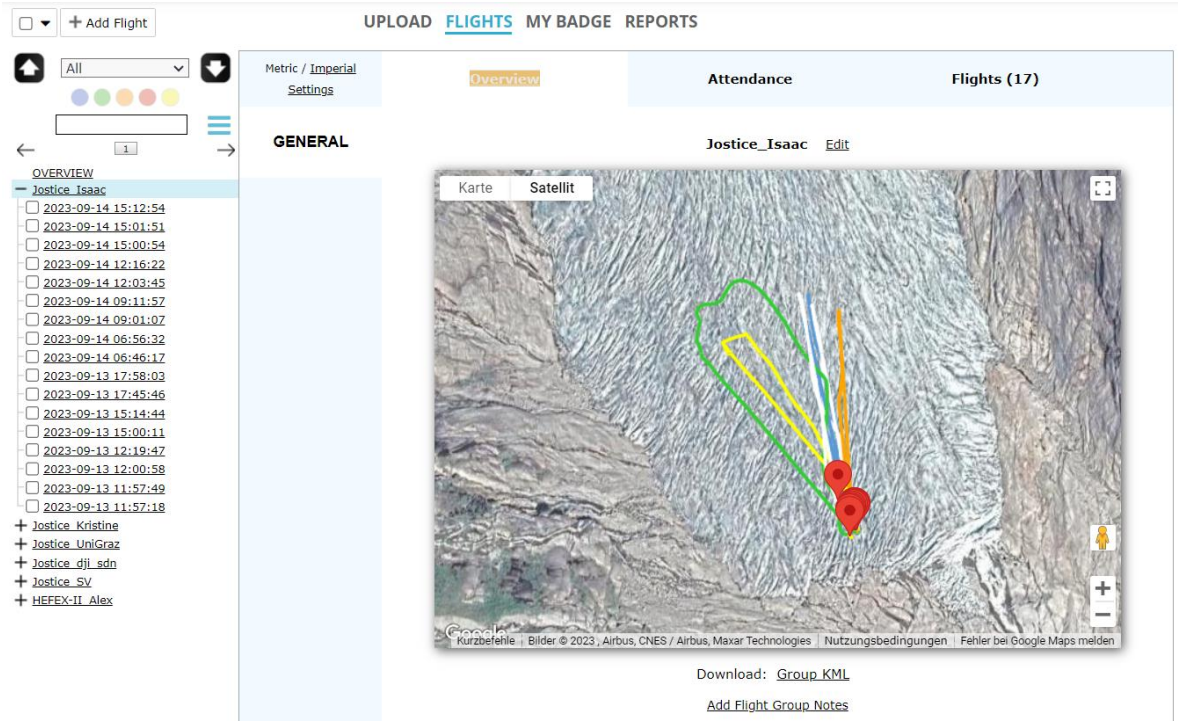
- Altitude profile:



- Flights stats for single flight



- Flight stats for collection of flights



- Flight stats can also be extracted and downloaded from this website: https://www.phantomhelp.com/logviewer/upload/