

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



DCA25LA065

RECORDED DATA FACTUAL REPORT

Specialist's Factual Report

June 11, 2026

TABLE OF CONTENTS

A. ACCIDENT.....	3
B. RECORDED DATA FACTUAL REPORT SPECIALIST.....	3
C. DETAILS OF THE INVESTIGATION	3
1.0 UVIFY IFO DESCRIPTION.....	3
1.1 UVify IFO Data Recovery.....	6
1.2 UVify IFO Recording Description.....	6
1.2.1 UVify IFO Engineering Unit Conversions.....	6
1.2.2 Recorded Position	6
1.3 UVify IFO Time Correlation.....	6
D. FIGURES AND TABULAR DATA.....	7
APPENDIX A. PROVIDED PARAMETERS FROM UVIFY IFO DRONE.....	12

A. ACCIDENT

Location: Orlando, Florida
Date: December 21, 2024
Time: 1835 Eastern Standard Time
Vehicle/Operator: Uvify IFO, Sky Elements , unregistered

B. RECORDED DATA FACTUAL REPORT SPECIALIST

Specialist Christopher Babcock
Aerospace Engineer
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

A group was not convened.

The NTSB Vehicle Recorder Division received the following electronic devices:

Recorder Manufacturer/Model:	UVify IFO (labeled 1134)
Part Number:	810-00028
Recorder Serial Number:	221482IFOD01050100834

1.0 UVify IFO Description

The UVify IFO is a drone designed for drone swarm light shows (Figure 1). A microSD card was installed in each drone in the swarm. Each drone recorded a log file for each flight (Figure 2). According to law enforcement, drone 1134 was the drone that struck and seriously injured the victim. The Uvify IFO was damaged in the event. The aft left rotor arm was fractured. The propellers were not damaged. Upon arrival, the drone weighed 1.4 pounds without the battery (Figure 3). According to the UVify IFO user guide, the battery would add an additional 415 grams, or about 0.9 pounds, and that the maximum reference speed of the IFO is 60 kilometers per hour, or about 32 knots (Figure 4).

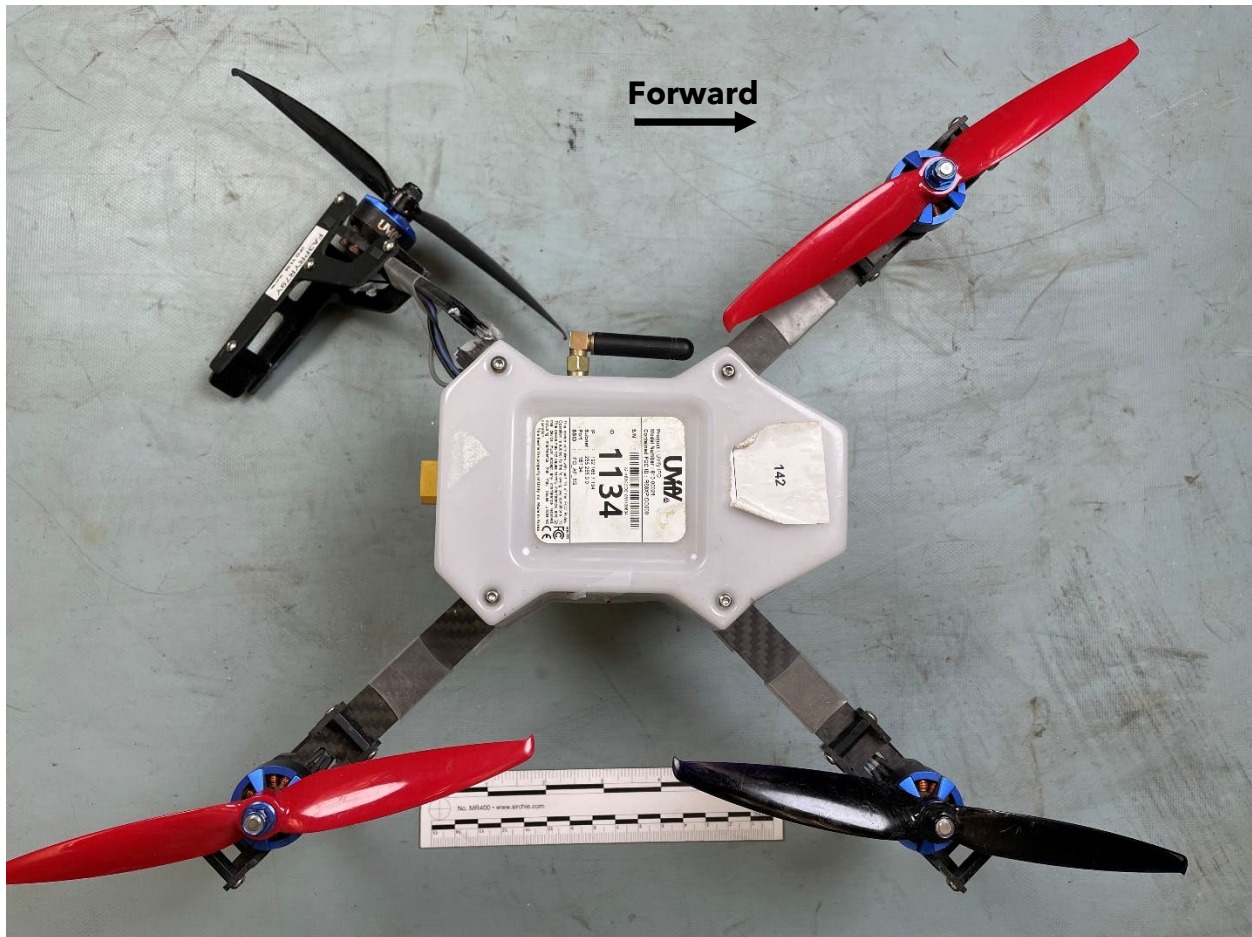


Figure 1. UVify IFO accident drone, as received.

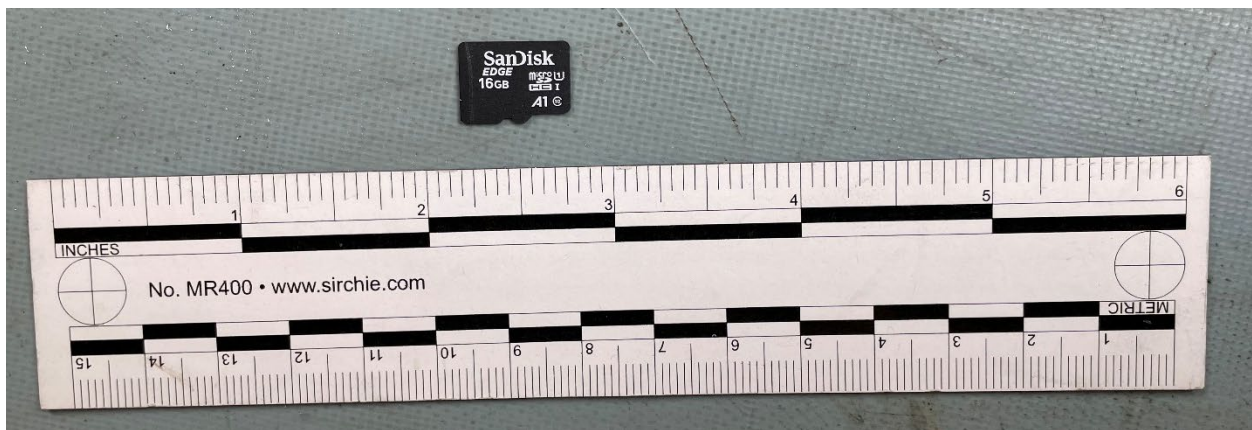


Figure 2. MicroSD card installed in accident drone.



Figure 3. Weight of accident drone without battery.

TECHNICAL SPECIFICATIONS

Aircraft	
Type	Quadcopter
Dimensions	27.5 cm x 27.5 cm (without propellers) 40 cm x 40 cm (with propellers)
Height	12.5 cm
Rotor diameter	7" (~18cm)
Number of rotors	4
Weight	635 g / 1,050 g (with battery)
Max. flight time	25 mins (with 4S, 4200 mAh battery, hovering, no additional payload)
Max. airspeed	60 km/h
Max. takeoff weight	1.7 kg
Max. control range	1 km (with supplied remote control)
Max. operational altitude	500 m (height above sea level)
Max. sustained wind	15 knots
Remote frequency	2.4 GHz (Remote control) 2.4 / 5.8 GHz (Wi-Fi) Sub 1 GHz (Telemetry)
Hover accuracy range (RTK enabled)	Vertical: ± 0.1 m Horizontal: ± 0.1 m
RGB LED	27W, 840 lm (max)
Electronic speed controller	Designed and manufactured by UVify
Motor	Designed and manufactured by UVify Direct drive 3-phase brushless DC motor
Battery	Lithium Polymer 4S 4200 mAh 415 g 14.8 V

Figure 4. Technical specifications of the Uvify IFO.

1.1 UVify IFO Data Recovery

Log files were recovered from the internal microSD card.

1.2 UVify IFO Recording Description

1.2.1 UVify IFO Engineering Unit Conversions

The microSD card contained 122 log files dating back to November 23, 2022. The log files used the ULog format and were parsed, which applied proper engineering units to the data.¹ The parser produced several comma-separated text files containing various datasets.

Where applicable, changes to the conversions have been made to ensure the parameters conform to the Safety Board's standard sign convention that climbing right turns are positive (CRT=+).²

Appendix A lists the parameters verified and provided in this report.

1.2.2 Recorded Position

The log file contained two recorded positions. The fused position took in GPS and other sensor data and fused that information together to provide a calculated position. Raw GPS position data was also recorded in the log file. The fused global position data ended well before the accident and deviated from the recorded GPS data. The GPS data appeared valid and is recorded all the way to where the drone was recovered by law enforcement. GPS ground speed was also calculated and recorded in the log file.

The initial GPS fix type was a real time kinematic fix (RTK Fix) which used a base station to provide resolution of satellite ambiguities, which provided 1-3 cm accuracy. At 18:34:50.1, the fix type switched to "RTCM Code Differential" which provided 1-2 m accuracy. At 18:34:52.5, the fix type switched to "RTK Float," which uses the same base station to correct satellite errors, but accurate to 20-40 cm.

1.3 UVify IFO Time Correlation

Each text file contained a time stamp field that recorded microseconds (μ s) from power on. While sampling rates varied slightly between each text file, all text files were on a common time basis. The text file that contained raw GPS data also contained a UTC time and date field in epoch time in microseconds that enabled a

¹ The Ulog format is an open standard format for logging system data and flight data for drones.

² CRT=+ means that for any parameter recorded that indicates a climb or a right turn, the sign for that value is positive. Also, for any parameter recorded that indicates an action or deflection, if it induces a climb or right turn, the value is positive. Examples: Right Roll = +, Left Aileron Trailing Edge Down = -, Right Aileron Trailing Edge Up = +, Pitch Up = +, Elevator Trailing Edge Up = +, Right Rudder = +.

correlation between the time stamp field and real-world UTC time.³ Once that correlation was established, 5 hours were subtracted to convert to local Eastern Standard Time (EST). For the accident flight, the correlation is:

109,603,644 μ s from power on= 1,734,823,905,799,558 Epoch μ s = December 21, 2024, 23:31:45.799558 UTC = December 21, 2024, 18:31:45.799558 EST

D. FIGURES AND TABULAR DATA

Figures 5-7 contain log data recorded during the event on December 21, 2024. All the parameters listed in table 1 are plotted.

Figure 5 shows the flight path of the accident drone. Figure 6 shows an oblique view of the flight path. The normal geofence is indicated in white. When the drone penetrates the normal geofence, the drone should execute a "return home" command and return to its starting point. The hard geofence was 5 meters outside of the normal geofence. When the drone penetrates the hard geofence, the drone should disable the motors.

The drone took off at 18:34:26 and ascended to about 138 feet GPS altitude where it paused for about 9 seconds. At 18:34.49.8, the event log indicated that a falling impact was detected and the drone began descending. The drone started flying to the southwest at about 18:34:51. At about 18:34:53, the drone turned toward the south. At 18:34:53.9, the fused global position was lost, but raw GPS position was still recorded. At 18:34:55, the drone turned toward the southwest while descending. At 18:34:57.1, the event log indicated that the drone was approaching the geofence and that the hard fence was violated 0.1 second later. The event log indicated another falling impact was detected at 18:34:57.7. The last position was recorded at 18:34:57.9. The drone reached a top speed at the point it violated the hard geofence of 29.9 meters per second (m/s), or 58.1 knots (kts), and the last recorded speed was 22.2 m/s (43.2 kts).

These figures are configured such that right turns are indicated by the trace moving toward the bottom of the page, left turns towards the top of the page, and nose up attitudes towards the top of the page.

The corresponding tabular data used to create Figure 5-7 are provided in electronic comma-separated value (CSV) format as attachment 1 to this report.

³ Epoch time measures the number of seconds since midnight on January 1, 1970, UTC.

Submitted by:

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National Transportation Safety Board

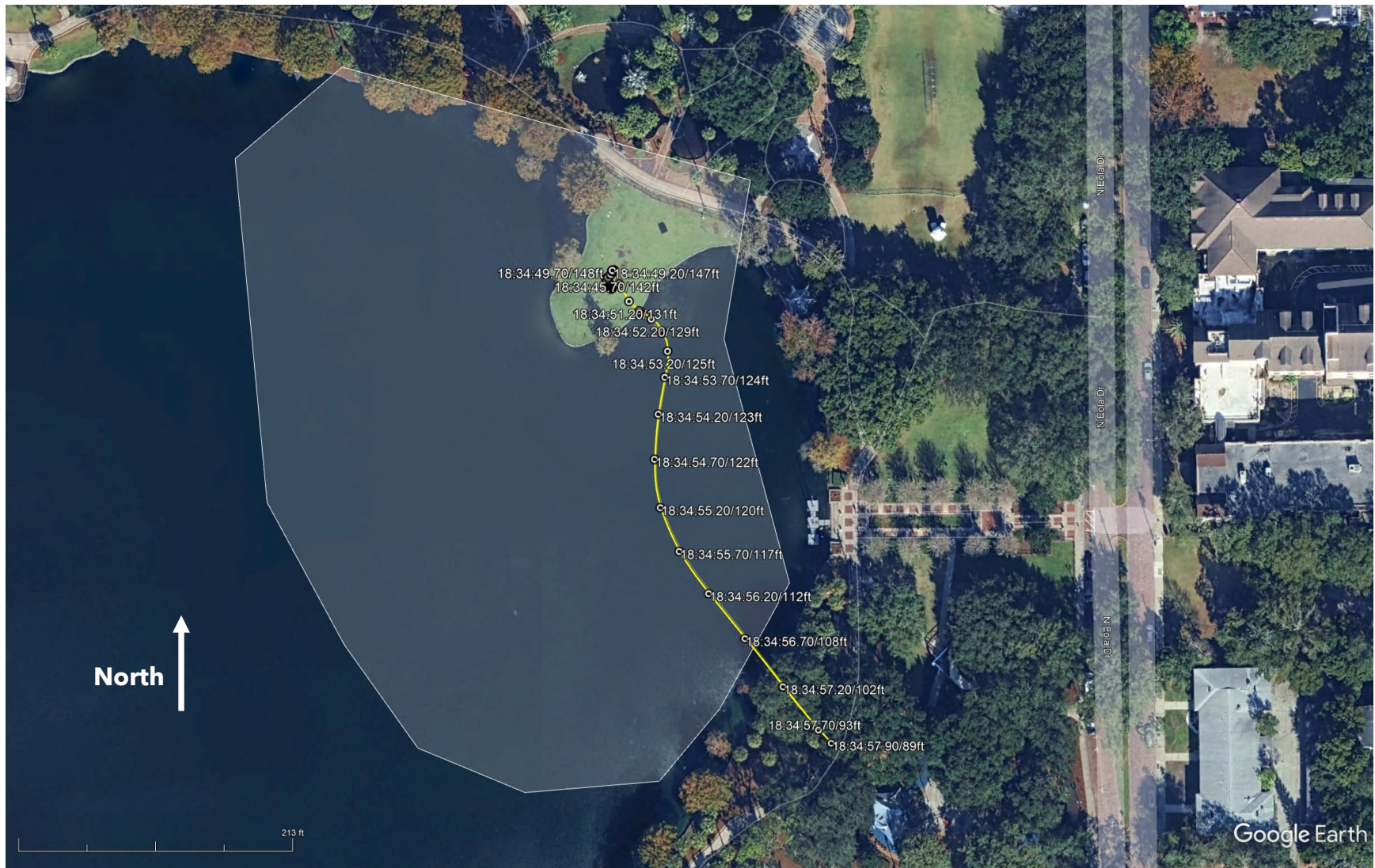


Figure 5. Overview of accident drone flight path in red (Times EST). Soft geofence is shown in white outline.

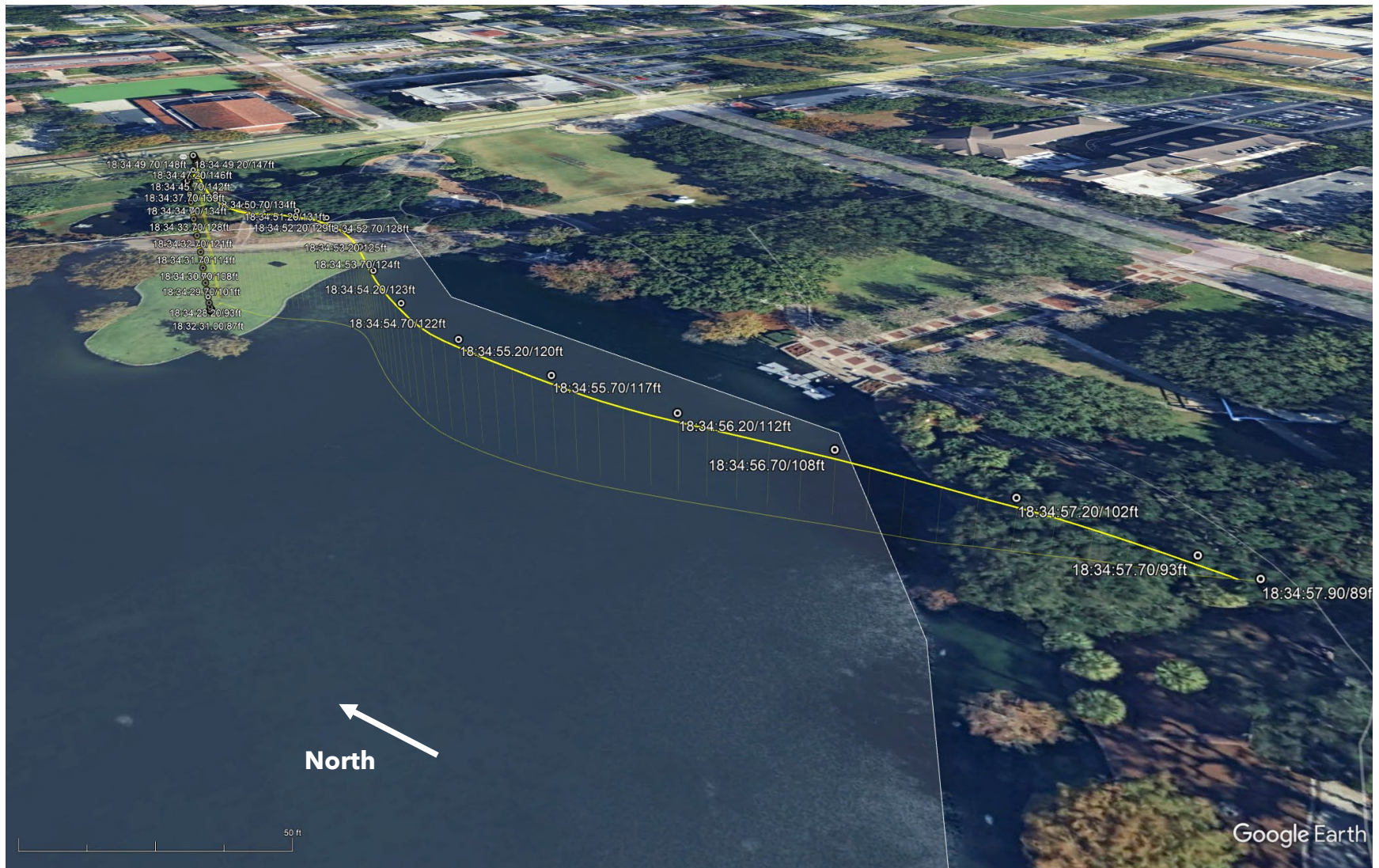


Figure 6. Oblique view of flight path (Times EST). Soft geofence is shown in white outline.

Sky Elements, Uvify IFO, UNREG

Location, Date: Orlando, Florida, 12/21/24

NTSB No. DCA25LA065

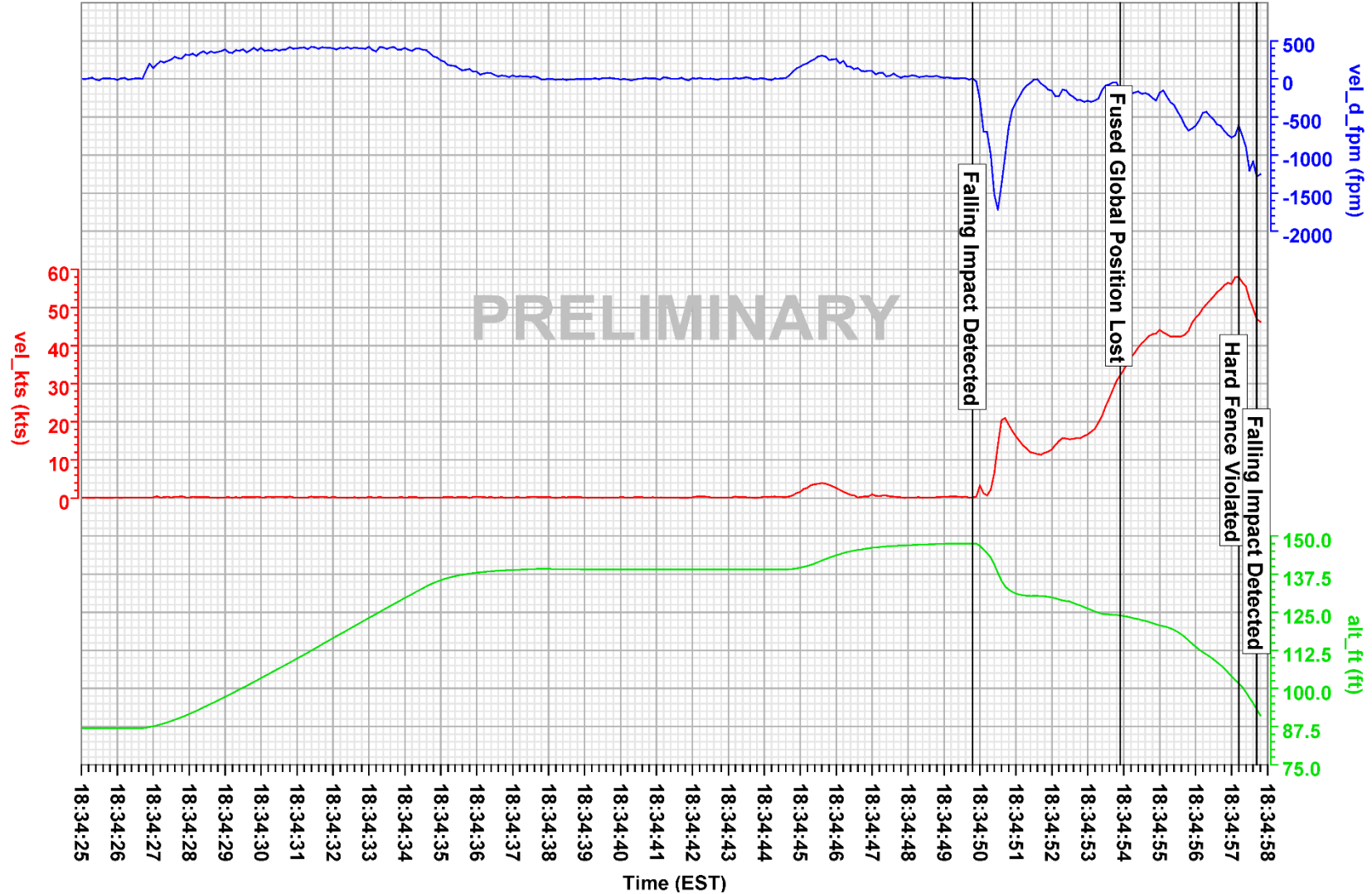


Figure 7. Recorded GPS data from accident flight.

APPENDIX A. PROVIDED PARAMETERS FROM UVIFY IFO DRONE

This appendix describes the parameters provided and verified in this report. Table 1 lists the UVify IFO parameters.

Table 1. Verified and provided parameters.

Parameter Name (units)	Parameter Description
alt_ft	GPS Altitude (feet)
fix_type	GPS Fix Type (discrete)
Latitude (deg)	Latitude (degrees)
Longitude (deg)	Longitude (degrees)
vel_d_fpm	Vertical Speed (feet per minute)
vel_kts	Groundspeed (knots)