

CSV Flight Log Specification

Drone Amplified, INC

Last updated in app version 2.20.2

FIRE MANAGEMENT TECHNOLOGY

IGNIS



1. File Format

All Drone Amplified apps will log flight data in this format.

The log file is formatted as a comma-separated-value file (.csv). This is a plain-text file encoded in UTF-8. Each line represents one row, and columns are separated by commas. Line endings are Unix-style ('\n').

The first row is a header row that contains the names of the columns, in English. All flight log files will use these column names, regardless of the user's language. The later rows are data rows, containing time stamps and the value of the column at that instant.

Not all columns will contain data on every row. If a line has fewer columns than the first line did, assume the rest of the columns are blank. The last character of the file will be a newline character ('\n'), so depending on how the file is parsed, you may encounter a blank line at the end. You should ignore lines that do not contain a timestamp.

Future versions of this format may include new columns. Therefore you shouldn't assume a particular ordering to the columns, and instead you should use the header row to identify where the columns are to ensure forwards-compatibility. New versions of the format will not change the names of existing columns, to ensure backwards-compatibility.

2. Logging Times

Whenever the drone takes off, a new log file will be created. While the drone is flying, new lines will be appended to the log file at roughly 10 Hz. However, this logging rate can fluctuate, so you shouldn't rely on this. The timestamps on each row are accurate representations of when the data was sampled.

Since data is only logged while the drone is flying, you can calculate the length of the flight by subtracting the first time stamp from the last.

If the app is closed or crashes mid-flight, logging will stop, however the previously-logged data will still have been saved to the file. If the app is reopened during that flight, it will write a blank line to indicate the break in logging, then resume writing data rows. The header row will not be re-written.

3. Column Descriptions

The column names are written exactly as they appear in the flight log. Some column names include units in parentheses. These are part of the column name. The following are the descriptions of the columns:

Unix Time (ms)

Milliseconds since the Unix Epoch. This will always be the first column.

Ex: 1528133323951

UTC

Coordinated Universal Time in yyyy-MM-dd HH:mm:ss format.

Ex: 2018-06-04 17:28:43

Local Time (Timezone)

Local time in yyyy-MM-dd HH:mm:ss format. The timezone part of the column name will be the local time zone (like Central Daylight Time). Since this column's name can vary, it may be easier to ignore it.

Ex: 2018-06-04 12:28:43

Latitude

Latitude of the drone represented as a decimal number.

Ex: 34.538763601

Longitude

Longitude of the drone represented as a decimal.

Ex: -77.817567348

Home Latitude

Latitude of the drone's home location (usually takeoff location) represented as a decimal number.

Ex: 34.5387594699

Home Longitude

Longitude of the drone's home location (usually takeoff location) represented as a decimal.

Ex: -77.8175700958

Altitude (meters above takeoff point)

Altitude of the drone above its takeoff location in meters.

Ex: 0.1000000015

Altitude (meters above ground level)

Altitude of the drone above the ground in meters. This is calculated using the downloaded elevation maps. If the app does not have elevation maps for this area, then this column will be blank.

Ex: 0.1000000015

Altitude (meters above mean sea level (computed from elevation map))

Altitude of the drone above mean sea level in meters. This is computed by adding the drone's altitude above its takeoff location to the elevation of the takeoff location calculated from the elevation maps. If the app does not have elevation maps for its takeoff location, then this column will be blank.

This column was added in version 2.11.0.

Ex: 384.04000000000974

Altitude (meters above mean sea level (from inputted takeoff elevation))

Altitude of the drone above mean sea level in meters. This is computed by adding the drone's altitude above its takeoff location to the elevation of the takeoff location inputted on the Settings page of the app.

This column was added in version 2.17.0.

Ex: 384.04000000000974

Altitude (meters above mean sea level (sensitive altimeter))

Altitude of the drone above mean sea level in meters. This is computed in the same way the altimeter in a manned aircraft works, which makes it useful to maintain separation with manned aircraft. It is derived from pressure measured by the drone's barometer and a user adjusted setting, and can be inaccurate if the setting is not correct. The altitude in meters is computed using this formula:

$$altitude = \frac{288.15}{-0.0065} \left(\left(\frac{pressure}{setting} \right)^{0.190255} - 1 \right)$$

This column was added in version 2.11.0

Ex: 384.04000000000974

Sensitive Altimeter setting (pressure at mean sea level in hPa)

Setting for the sensitive altimeter altitude measurement. This is the pressure at mean sea level in hectopascals. The standard value is 1013.25.

This column was added in version 2.11.0

Ex: 1013.25

Pitch (degrees up)

How many degrees the drone's nose has pitched up from a level orientation.

Ex: -2.1

Roll (degrees right)

How many degrees the drone's body has rolled right from a level orientation.

Ex: -0.1

Yaw (degrees clockwise from north)

The drone's heading.

Ex: 61.8

Velocity North (m/s)

The north component of the drone's velocity, in meters per second.

Ex: 0.200000003

Velocity East (m/s)

The east component of the drone's velocity, in meters per second.

Ex: -0.3000000119

Velocity Down (m/s)

The downward component of the drone's velocity, in meters per second.

Ex: -0.3000000119

Gimbal Pitch (degrees above horizon)

How many degrees the drone's gimbal has pitched up from a level orientation. This value is not relative to the drone's orientation. This value will be 0 if the drone does not have a gimbal.

This column was added in version 2.11.0.

Ex: -2.1

Gimbal Roll (degrees right)

How many degrees the drone's gimbal has rolled right from a level orientation. This value is not relative to the drone's orientation. This value will be 0 if the drone does not have a gimbal.

This column was added in version 2.11.0.

Ex: 0

Gimbal Yaw (degrees clockwise from north)

The gimbal's heading. This value is not relative to the drone's orientation. This value will be 0 if the drone does not have a gimbal.

This column was added in version 2.11.0.

Ex: 61.8

Going Home

1 if the drone is autonomously flying to its home. 0 if not.

Ex: 0

Following Waypoints

1 if the drone is autonomously flying to waypoints. 0 if not.

Ex: 0

Flying along active segment of waypoint mission

1 if the drone is flying along the active segment of a waypoint mission (Following Waypoints will also be 1). 0 if not. This column was added in version 2.15.0

Ex: 0

Recording Video

1 if the drone is recording video. 0 if not.

This column was added in version 2.11.0.

Ex: 0

Video Timestamp (s)

Blank if the drone is not recording video. Otherwise, it is how many seconds of video have been recorded in the current video so far. Unfortunately, the app doesn't get anything more fine-resolution than the seconds, so this column will have integer values, and you'd have to do something complicated that incorporates the log's timestamps to estimate the video's time at a higher resolution. This column was added in version 2.15.0.

Ex: 0

Photo Info

Normally blank. A row with a non-blank value will be logged whenever the camera takes a photo. If you're using a Wiris-Pro, this contains the path and filename of the image file on the camera's storage. If you're using a NextVision camera, this contains the filename of the image on the SD Card. If you're using an Astro Mapping Kit, this contains the URL to visit to download the file when you connect your PC to the Astro's USB port. If you're using a DJI drone, then this contains the kind of photo that was taken (Single, Burst, Interval). If this is an interval photo, the interval period will be written afterward in seconds, (Interval 2s). The log only records the start and end of the interval photo sequence. It doesn't contain entries for each of the photos taken. You have to use the interval period to extrapolate that information from the start. When the interval photo is stopped, this column will contain "Interval Photo Done". Additionally, if you're using a visual/thermal camera, the entries for the thermal camera will have (Thermal) appended after their info in this column. This column was added in version 2.20.0.

Battery 1 Energy Remaining (%)

The percentage of the energy remaining in battery 1.

Ex: 84

Battery 1 Temperature (C)

The temperature of battery 1 in degrees Celsius.

Ex: 30.8

Battery 1 Voltage (mV)

The voltage across battery 1 in millivolts.

Ex: 25138

Battery 1 Current (mA)

The current into battery 1 in milliamps.

Ex: -192

Battery 1 Full Charge Energy (mAh)

The amount of charge contained in battery 1 when it is fully charged, in milliamp-hours.

Ex: 4139

Battery 2 Energy Remaining (%)

The percentage of the energy remaining in battery 2. If the drone has fewer than 2 batteries, this column is blank.

Ex: 84

Battery 2 Temperature (C)

The temperature of battery 2 in degrees Celsius. If the drone has fewer than 2 batteries, this column is blank.

Ex: 30.8

Battery 2 Voltage (mV)

The voltage across battery 2 in millivolts. If the drone has fewer than 2 batteries, this column is blank.

Ex: 25138

Battery 2 Current (mA)

The current into battery 2 in milliamps. If the drone has fewer than 2 batteries, this column is blank.

Ex: -192

Battery 2 Full Charge Energy (mAh)

The amount of charge contained in battery 2 when it is fully charged, in milliamp-hours. If the drone has fewer than 2 batteries, this column is blank.

Ex: 4139

Battery 3 Energy Remaining (%)

The percentage of the energy remaining in battery 3. If the drone has fewer than 3 batteries, this column is blank.

Ex: 84

Battery 3 Temperature (C)

The temperature of battery 3 in degrees Celsius. If the drone has fewer than 3 batteries, this

column is blank.

Ex: 30.8

Battery 3 Voltage (mV)

The voltage across battery 3 in millivolts. If the drone has fewer than 3 batteries, this column is blank.

Ex: 25138

Battery 3 Current (mA)

The current into battery 3 in milliamps. If the drone has fewer than 3 batteries, this column is blank.

Ex: -192

Battery 3 Full Charge Energy (mAh)

The amount of charge contained in battery 3 when it is fully charged, in milliamp-hours. If the drone has fewer than 3 batteries, this column is blank.

Ex: 4139

Battery 4 Energy Remaining (%)

The percentage of the energy remaining in battery 4. If the drone has fewer than 4 batteries, this column is blank.

Ex: 84

Battery 4 Temperature (C)

The temperature of battery 4 in degrees Celsius. If the drone has fewer than 4 batteries, this column is blank.

Ex: 30.8

Battery 4 Voltage (mV)

The voltage across battery 4 in millivolts. If the drone has fewer than 4 batteries, this column is blank.

Ex: 25138

Battery 4 Current (mA)

The current into battery 4 in milliamps. If the drone has fewer than 4 batteries, this column is blank.

Ex: -192

Battery 4 Full Charge Energy (mAh)

The amount of charge contained in battery 4 when it is fully charged, in milliamp-hours. If the drone has fewer than 4 batteries, this column is blank.

Ex: 4139

Battery 5 Energy Remaining (%)

The percentage of the energy remaining in battery 5. If the drone has fewer than 5 batteries, this column is blank.

Ex: 84

Battery 5 Temperature (C)

The temperature of battery 5 in degrees Celsius. If the drone has fewer than 5 batteries, this column is blank.

Ex: 30.8

Battery 5 Voltage (mV)

The voltage across battery 5 in millivolts. If the drone has fewer than 5 batteries, this column is blank.

Ex: 25138

Battery 5 Current (mA)

The current into battery 5 in milliamps. If the drone has fewer than 5 batteries, this column is blank.

Ex: -192

Battery 5 Full Charge Energy (mAh)

The amount of charge contained in battery 5 when it is fully charged, in milliamp-hours. If the drone has fewer than 5 batteries, this column is blank.

Ex: 4139

Battery 6 Energy Remaining (%)

The percentage of the energy remaining in battery 6. If the drone has fewer than 6 batteries, this column is blank.

Ex: 84

Battery 6 Temperature (C)

The temperature of battery 6 in degrees Celsius. If the drone has fewer than 6 batteries, this column is blank.

Ex: 30.8

Battery 6 Voltage (mV)

The voltage across battery 6 in millivolts. If the drone has fewer than 6 batteries, this column is blank.

Ex: 25138

Battery 6 Current (mA)

The current into battery 6 in milliamps. If the drone has fewer than 6 batteries, this column is blank.

Ex: -192

Battery 6 Full Charge Energy (mAh)

The amount of charge contained in battery 6 when it is fully charged, in milliamp-hours. If the drone has fewer than 6 batteries, this column is blank.

Ex: 4139

Number of GPS Satellites

The number of GPS satellites detected by the drone.

Ex: 15

GPS Signal Strength (0-5)

The strength of the signal received by the GPS. 0 is worst, 5 is best.

Ex: 5

Uplink Signal Strength (%)

The quality of the signal from the remote controller to the drone, represented as a percent. 0 is no signal, 100 is perfect.

Ex: 100

Downlink Signal Strength (%)

The quality of the signal from the drone to the remote controller, represented as a percent. 0 is no signal, 100 is perfect.

Ex: 100

Flight Controller Mode

The mode of the flight controller. Different models of flight controller will have different possible values here (DJI will be different from Pixhawk)

This column was added in version 2.14.0.

Ex: F-WP

Diagnostics

A message indicating miscellaneous issues with the drone. Different models of flight controller will have different possible values here. On DJI, the message will be displayed for as long as it's

applicable. On Pixhawk, the message will only be displayed at the time the app receives the message, and it is unclear for how long the issue persists.

The app will modify this message by replacing commas with semicolons and closing any unclosed quotes, so that it doesn't create any issues with parsing the flight log csv.

This column was added in version 2.14.0.

Ex: Aircraft is tilted; please keep the aircraft stationary and level before flight

Bottom Rangefinder (cm)

The range measured by the Drone Amplified rangefinder facing downward on the drone. This column only exists if the app has detected a rangefinder on the drone. A value of -1 means the distance is too large for the rangefinder. A value of -2 indicates an error. Added in 2.20.2.

Ex: 20

Front Rangefinder (cm)

The range measured by the Drone Amplified rangefinder facing forward on the drone. This column only exists if the app has detected a rangefinder on the drone. A value of -1 means the distance is too large for the rangefinder. A value of -2 indicates an error. Added in 2.20.2.

Ex: 20

Camera Rangefinder (cm)

The range measured by the Drone Amplified rangefinder mounted on the camera. This column only exists if the app has detected a rangefinder on the drone. A value of -1 means the distance is too large for the rangefinder. A value of -2 indicates an error. Added in 2.20.2.

Ex: 20

Ignis Status

A string representing Ignis's overall status. This column and header do not exist if the drone is not flying with the Ignis attachment.

Ex: IDLE

Some possible values:

IDLE Ignis is not dropping and does not have any errors

DROPPING Ignis is dropping and does not have any errors

DISARMED BY CONTROL BAR Ignis is disarmed

Other values here indicate Ignis is not dropping and has an error.

Ignis Temperature (C)

Ignis's temperature in degrees Celsius. This column and header do not exist if the drone is not flying with the Ignis attachment.

Ex: 21

Ignis Battery Voltage (V)

Ignis's battery voltage in Volts. This column and header do not exist if the drone is not flying with the Ignis attachment.

Ex: 11.5

Ignis Drop Count

Blank if Ignis did not drop an ignition sphere at this time. If not blank, then an ignition sphere was dropped at this time, and the value is the cumulative number of ignition spheres that Ignis has dropped while it was powered on. To count the number of ignition spheres dropped in this flight, subtract the first non-blank value from the last non-blank value and add 1. You can plot the drop locations by plotting the drone's latitude and longitude at each row where this column is not blank. This column and header do not exist if the drone is not flying with the Ignis attachment.

Ex: 105

Horizontal FOV Camera 0 (degrees)

The horizontal field of view of the video feed from the primary camera on the drone, measured in degrees. If the camera is recognized, then "Camera 0" in the name of this column will be replaced with the name of this camera's model. If no cameras are connected, this column will not exist.

This value is looked up from a database in our app based on the published specifications of each camera model, which may be incorrect. Some cameras have different lens options, which can also create differences. This column has a value in every row because cameras with optical zoom can have a time-varying field of view.

This column was added in version 2.11.0.

This column was fixed in 2.12.0, because it used to output the sensor's field of view, and now it outputs the field of view captured by the video.

Ex: 66.99658371374619

Vertical FOV Camera 0 (degrees)

The vertical field of view of the video feed from the primary camera on the drone, measured in degrees. If the camera is recognized, then "Camera 0" in the name of this column will be replaced with the name of this camera's model. If no cameras are connected, this column will not exist.

This value is looked up from a database in our app based on the published specifications of each camera model, which may be incorrect. Some cameras have different lens options, which can also create differences. This column has a value in every row because cameras with optical zoom can have a time-varying field of view.

This column was added in version 2.11.0.

This column was fixed in 2.12.0, because it used to output the sensor's field of view, and now it outputs the field of view captured by the video.

Ex: 47.616873762827424

Horizontal FOV Camera 1 (degrees)

The horizontal field of view of the video feed from the second camera on the drone (e.g. the thermal camera on the Zenmuse XT2), measured in degrees. If the camera is recognized, then "Camera 1" in the name of this column will be replaced with the name of this camera's model. If no cameras are connected, this column will not exist. This value is looked up from a database on in our app based on the published specifications of each camera model, which may be incorrect. Some cameras have different lens options, which can also create differences. This column has a value in every row because cameras with optical zoom can have a time-varying field of view.

This column was added in version 2.11.0.

This column was fixed in 2.12.0, because it used to output the sensor's field of view, and now it outputs the field of view captured by the video.

Ex: 66.99658371374619

Vertical FOV Camera 1 (degrees)

The vertical field of view of the video feed from the second camera on the drone (e.g. the thermal camera on the Zenmuse XT2), measured in degrees. If the camera is recognized, then "Camera 1" in the name of this column will be replaced with the name of this camera's model. If no cameras are connected, this column will not exist. This value is looked up from a database in our app based on the published specifications of each camera model, which may be incorrect. Some cameras have different lens options, which can also create differences. This column has a value in every row because cameras with optical zoom can have a time-varying field of view, however our app currently does not factor the optical zoom into this value.

This column was added in version 2.11.0.

This column was fixed in 2.12.0, because it used to output the sensor's field of view, and now it outputs the field of view captured by the video.

Ex: 47.616873762827424

Horizontal FOV Custom Camera (degrees)

The user-inputted horizontal field of view of the video feed from the camera they are using for mapping, measured in degrees. If the user did not select to use custom camera FOV parameters before taking off, this column will not exist. This column only has a value in its first row.

This column was added in version 2.11.0

Ex: 60.0

Vertical FOV Custom Camera (degrees)

The user-inputted vertical field of view of the video feed from the camera they are using for mapping, measured in degrees. If the user did not select to use custom camera FOV parameters before taking off, this column will not exist. This column only has a value in its first row.

This column was added in version 2.11.0

Ex: 40.0

Drone Name

A name for the drone, set by the user. This data is only recorded on the row immediately after

the header row.

Ex: Ignis 19

Drone Model Enum Name

A code for the model of the drone. This data is only recorded on the row immediately after the header row.

Ex: MATRICE_600_PRO

Drone Model Display Name

A nicely-formatted name of the drone's model for the user to read. May be in the user's language. This data is only recorded on the row immediately after the header row.

Ex: Matrice 600 Pro

Flight Controller Serial Number

The serial number of the flight controller on the drone. This data is only recorded on the row immediately after the header row.

Ex: 670138179

Flight Controller Firmware Version

The flight controller's firmware version. This data is only recorded on the row immediately after the header row.

Ex: 03.02.41.13

Remote Controller Name

A name for the remote controller, set by the user. This data is only recorded on the row immediately after the header row.

Ex: Igni19

Remote Controller Serial Number

The serial number of the remote controller. This data is only recorded on the row immediately after the header row.

Ex: 03LLAA00WV

Remote Controller Firmware Version

The remote controller's firmware version. This data is only recorded on the column immediately after the header row.

Ex: 1.2.10

App Name

The name of the app used to fly the drone. May be translated into the user's language. This data is only recorded on the row immediately after the header row.

Ex: Drone Amplified

App Package Name

A unique identifier of the app used to fly the drone. This data is only recorded on the row immediately after the header row.

Ex: com.droneamplified.unifiedapp

App Version

A string representing the version of the app. This data is only recorded on the row immediately after the header row.

Ex: 2.1.0