

# The Flymaster Tracker 360

Notes on system usage, May 2018

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*This document and all accompanying files can be found at <http://wiki.fai.org/x/CQAgAg>*



## Overview

The Flymaster Tracker is a small (93 gr) 72 channel GPS/GLONASS logger with c. 20 hour battery life, memory capacity of some 83 hours @ 1 sec fixes, is quite robust, and waterproof.

It transmits real time data @ 1 sec fixes by 2G or 3G (depending on the device variant) and Flymaster provide a website at <https://lt.flymaster.net> which displays tracker position in near-real-time (c. 4 min delay) and provides a method of downloading the saved data in .igc file format. .igc data can also be downloaded directly from the device if necessary.

While they may be great in principle, there is practically no information available as to how to actually use the system.

These notes inevitably don't cover everything, but here's hoping it might be useful to someone.

## Advance planning

### Hardware

If you plan on renting trackers it is strongly recommended you book early, especially if the event is in the European summer. Early means 12 months before.

### Software

There is a variety of integrated softwares out there eg Airtribune: <https://airtribune.com> or <http://fastretrieve.com> but these are all paid services and mostly quite unsuitable for microlight or paramotor events.

The flymaster system itself is quite powerful and has an API of sorts.

## Tracker usage

Trackers can be configured in two firmware modes: 'Normal' and 'Competition'. Trackers can only be changed between these two modes by commands via the server of a type which is not available to a competition organizer; if trackers are rented then the mode will be set by the rental company.

In Competition mode the tracker can only be turned off when the tracker is being charged.

### Advantages of Competition mode

Flymaster trackers have a unique type of charging connection which most pilots will not have so this is a useful feature when the trackers are rented because the person who rented them has some time to find missing ones before the battery runs out.

### Disadvantages of Competition mode

Because the user cannot turn the tracker off, the comp organizer must be equipped and ready to collect every tracker after nav tasks, turn them off, charge them overnight, turn them on and distribute them the next day. This makes work and responsibility for the organizer.

To turn on a tracker you press the left button 1 and then confirm this by pressing right button 2 within five seconds. To turn off a tracker in normal mode you do the same thing. In competition mode, this turn off action does not turn off the tracker, instead it puts the tracker into 'retrieve mode' which sends a signal to the server that the pilot needs help, but not the kind of critical help they might need had they pressed the SOS button. As with SOS, admin can acknowledge a retrieve signal and the indicator lights will show this.

In events with inexperienced users it is possible to have **many** inadvertent activations of retrieve mode, and this is bad because in retrieve mode the tracker only sends one fix per minute (enough for a retrieve) rather than 60. These inadvertent activations occur because users, especially before takeoff, often wish to see battery level, and this is done by a single press of right button 2, however, in practice they seemed as likely to press left button 1 as right button 2 to achieve this, but when their press of left button 1 didn't display what they expected, they immediately pressed right button 2 which instead of displaying battery level, simply confirmed the command to go into retrieve mode....

And unlike SOS, there is no simple way to get out of retrieve mode; it requires a general reset (simultaneously press SOS and button 2 for ~2 seconds and the tracker reboots).

### Usage conclusion

Retrieve mode may be useful in HG & PG where landing out and retrieve is usual, but for Microlight & Paramotor competitions where landing out is rare but inadvertent activations seem common, then it is better to operate them in normal mode.

The risk of operating them in normal mode is that the user can turn his tracker off and then the tracker cannot be found.

## Loss of rented trackers

It is quite difficult to lose trackers at an event, especially when they are in competition mode and the user cannot turn them off. In any case they are inextricably linked by ID to the server so if one does go home with a competitor it will be found the next time it is turned on.

At 200 € to 250 € each, loss in transit, especially when returning them at the end of the rental period, is a significant issue which must be carefully considered before hiring them in quantity.

## Manual data download from a tracker

Install gpsDump for your OS from <https://www.flymaster.net/downloads> there is also an instruction manual.

Turn the tracker on and connect USB cable.

Click the Flymaster button to get a list of track logs; select the one you want, select the data you want to download, go File --> Save log in IGC format.

Unfortunately gpsDump .igc output includes one line intolerable to microFlap. Open the file in a suitable text editor like Notepad, near the top you will find a line like `HFDTEDATE : 300418, 01` where date is the date of the flight in `ddmmyy` format. Change it to `HFDTE300418` and save. microFlap should now be happy to read the file.

## Troubleshooting trackers

### General reset:

Press the SOS, and button 2 simultaneously, after 1 or 2 sec all lights go out momentarily, release both buttons. Device reboots into normal recording mode. (useful if pilot has put it in retrieve mode and wants to undo it).

### Bad SIM contact:

If the blue (mobile signal) light flashes continuously, this indicates there is probably a bad contact with the sim card. Switch off, open the sim compartment with a very small Phillips screwdriver and carefully pack the back of the sim card with one layer of sticky tape so it will have a tighter fit against the contacts. Reassemble and try it again.

### Firmware update:

- Download Designer Installer for your OS from <https://www.flymaster.net/downloads>
- Install it on your system
- Turn on tracker and connect data cable - window should pop up "the firmware on the instrument is outdated, do you want to update?" click YES.
- Firmware installs in 2 or 3 sec and the tracker restarts. You can now disconnect the tracker - **DO NOT DISCONNECT WHEN FIRMWARE IS LOADING** - this may permanently destroy the tracker.

## Setting up lt.flymaster.net for a comp

Quite easy. If you don't already have one, **Create a login** at <https://lt.flymaster.net/>

A 'group' in competition mode is synonymous with a competition name, it has a from and to date, and all trackers in a group are displayed on the same page. **Go to my groups and Add Group**, you are the owner of this group.

You can **add group users** if they already have their own login to lt.flymaster.net. Group users have less permissions than the owner, but can download .igc zip files (which is useful, eg for a scorer)

In your group, **add group instruments**

Trackers are registered to your group by their flymaster serial No. This can be done manually but it emits an invitation to the tracker owner to confirm their tracker can be added to the group. This could be a very painful exercise to do manually.

Much better, **load all group instruments by uploading a .fsdb file** .fsdb is a CIVL designed xml format <sup>1</sup> and loading them this way doesn't require an invitation for a tracker to join a group, it is just joined <sup>2</sup>.

The fsdb file will also set some comp parameters like dates but not all items, so you need to review comp setup online.<sup>3</sup>

.fsdb files can also load task and results, though this might be limited to displaying the sort of simple things hg & pg people do.<sup>4</sup>

Retrieve events and SOS events are by default OFF for every instrument. Fsdb file does not set them ON so you need to manually edit every instrument.<sup>5</sup>

<sup>1</sup> See example .fsdb file in CIMA Flymaster Tracker user manual; Note that xml is case sensitive and very fussy about syntax, when loading a good file to flymaster it does say success, but it says nothing if the file is malformed.

<sup>2</sup> **To do:** create a simple fsdb file generator which will work for CIMA.

<sup>3</sup> **To do:** get a better example xml file or ideally a proper fsdb.xsd file for full spec of .fsdb file format

<sup>4</sup> **To do:** investigate capabilities of .fsdb capability to display task & results – need example xml file or ideally a fsdb.xsd file

Once some tracks have been recorded by the system you can download a whole day's worth of igc files in a .zip file. <sup>6</sup>

Downloads are by UTC day, so in the Far East you may need to download the day before too if some tracks started before midnight UTC. <sup>7</sup>

Downloaded files are split by when the tracker was switched on and off; there is no task window time filtering to separate recording out of window, which can make very big files full of useless data, or worse, if more than one nav task in a day, there is no way to split files into each task. (both of these features are intrinsic to FRDL and the AMOD)

The resulting igc files must be renamed to the CIMA specification and they are missing some of the CIMA required header info. <sup>8</sup> (all features intrinsic to FRDL and the AMOD)

It may be possible to implement a comprehensive solution to get track points almost live through the api interface via a CIMA stand-alone software which talks to the flymaster server at regular intervals and solves all these problems by building its own .igc files to exactly the CIMA specification. <sup>9</sup>

## Flymaster.net URL's

### View urls

Send your users directly to a group to view live by including the group id, eg

<https://lt.flymaster.net/?grp=2234>

To playback at a specific time, add d=xxx where xxx is number of seconds in local time since 01/01/2000 00:00:00 UTC so for the 2018 WPC eco-triangle task which happened on 5 may 2018 starting at about 12:30, then a good place to start viewing is 13:00 local (UTC + 7) which is 578815200.

<https://lt.flymaster.net/?grp=2234&d=578815200> (for best effect put playback --> speed to 5x)

### Get data URLs

*Note that all flymaster URLs after the first / are case sensitive*

[https://wlb.flymaster.net/get\\_active\\_trackers.php](https://wlb.flymaster.net/get_active_trackers.php)

[https://wlb.flymaster.net/get\\_trackers\\_pos.php](https://wlb.flymaster.net/get_trackers_pos.php)

Extending these URLs with more variables (standard URL notation; initial ? and then &)

If you put no variable in some pages it shows a help.

grpId=xxx where xxx is the group number - get this from the url in

<https://lt.flymaster.net/bs.php?grp=2234> where grp is the live group you have selected.

Add &json to get json output

Add &csv to get csv output

Add &ls=yyyymmddHHmmss a UTC date-time - only displays trackers with last seen after this date-time

'Reportback code' in /get\_trackers\_pos.php indicates the user status of the device.

Add &rb=xxx (xxx being the code) to filter rows with just that code, eg a regular polling of

[https://wlb.flymaster.net/get\\_trackers\\_pos.php?grp=2234&rb=6](https://wlb.flymaster.net/get_trackers_pos.php?grp=2234&rb=6) will quickly show up a tracker in that group which has had its SOS button pressed.

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<sup>5</sup> Should be possible; need proper FsCustomAttribute codes to do this – need better example xml file or ideally a fsdb.xsd file

<sup>6</sup> **To do:** Find out what happens if you download .igc files before the end of a task – do you get incomplete files of those still flying or just files from trackers which have already been switched off.

<sup>7</sup> Would be much better if 'download days' was aligned with local time for the event, but still won't solve the day change from 23:59:59 to 00:00:00 which some analysis programs struggle with. The only solution is to timeshift the files from UTC to local.

<sup>8</sup> For a basic renamer, see CIMA flymaster utilities.xlsm

<sup>9</sup> **To do:** Discuss with Flymaster the possibility of direct access to track data via API

Codes:

&rb=999999 this row shows when the tracker was last switched on.

&rb=0 this row shows last known position of tracker. When comms available, sends this every min & back-fills fixes in between. Means that if comms have been out for a while and then returns, server gets latest pos first and other missing data comes in due course.

&rb=1 or &rb=2 or &rb=3 used for anonymous weather level reporting (not implemented in trackers but is on some other flymaster types)

&rb=4 means 'no retrieve needed' (not implemented in trackers but is on some other flymaster types).

&rb=5 Retrieve requested; For when a pilot lands out but is not SOS; Triggered in a tracker in competition mode by pressing button 1 and confirming with button 2, tracker goes into a 'slow' mode where only 1 fix per min is sent rather than 60.

&rb=6 SOS button pressed

&rb=7 SOS button cancelled

## Command URLs

<https://lt.flymaster.net/wlb/changeGroup.php> (has help)

Switch a tracker from normal mode to competition mode (and vice versa): Possible, but commands not known.

Switch a tracker from retrieve mode to normal via the server: Possible, but commands not known.

Acknowledge a retrieve mode message: Possible, but commands not known.

Acknowledge a SOS message: Possible, but commands not known.

## Fsdb structure

Note that xml is case sensitive and very fussy about syntax, when loading a good file to flymaster it does say success, but it says nothing if the file is malformed.

```
<?xml version="1.0" encoding="UTF-8"?>
<Fs version="3.4" comment="Supports only a single Fs element in a .fsdb file which must be the root element.">
  <FsCompetition id="" name="Panchgani" location="Panchgani" from="2018-02-12" to="2018-02-18" utc_offset="2"
discipline="pg">
  <FsScoreFormula id="GAP2016" use_distance_points="0" use_time_points="0" use_leading_points="0" min_dist="0" nom_dist="0"
nom_time="0" nom_goal="" day_quality="0" time_points_if_not_in_goal="0" jump_the_gun_factor="0"
normalize_1000_before_day_quality="0" time_validity_based_on_pilot_with_speed_rank="0"/>
  <FsCompetitionNotes>Some arbitrary note</FsCompetitionNotes>
  <FsParticipants>
    <FsParticipant id="123" name="Joe BLOGGS" nat_code_3166_a3="GBR" female="0" birthday="1993-05-29" glider="big one"
glider_main_colors="Grey/red /white" sponsor="" fai_licence="1" CIVLID="">
      <FsCustomAttributes>
        <FsCustomAttribute name="team" value="GBR"/>
        <FsCustomAttribute name="category" value="PF1"/>
        <FsCustomAttribute name="telephone" value="+447771234567"/>
        <FsCustomAttribute name="birthday" value="1993-05-29"/>
        <FsCustomAttribute name="FirstName" value="Joe"/>
        <FsCustomAttribute name="LastName" value="BLOGGS"/>
        <FsCustomAttribute name="Manufacturer" value="Big"/>
        <FsCustomAttribute name="Model" value="one"/>
        <FsCustomAttribute name="Tshirt" value="M"/>
        <FsCustomAttribute name="BID" value="FE570"/>
        <FsCustomAttribute name="Live" value="706325"/>
      </FsCustomAttributes>
    </FsParticipant>
  </FsParticipants>
</FsCompetition>
</Fs>
```

FsParticipant id is the comp No.

FsCustomAttribute name="BID" value is the flyEvent rental ID as physically on the tracker.

FsCustomAttribute name="Live" value is the Flymaster device serial No.

## References:

Specification: <https://www.flymaster.net/tracker>

Tracker user manual: <https://www.flymaster.net/downloads>

Live tracking: <https://lt.flymaster.net/>

Airtribune: <https://airtribune.com>

Manual downloader; GpsDump from <http://www.gpsdump.no/> & drivers from <https://www.flymaster.net/downloads>

Hire: Brett Janaway <http://flyevent.org/> brett@flyevent.org