

# PYXIS GPS

## model tracker

Quick Reference Guide **V1.3**

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### Introduction


The **PYXIS** tracker is a free flight model retrieval system based on the Global Navigation Satellite System (GNSS), that uses multiple satellite networks like GPS, GLONASS, Galileo, Beidou and other regional systems. It does not require the user to transmit any data, operates independently on any telephonic or internet reception and works anywhere on the Earth where there is an unobstructed line of sight to four or more satellites.

The **PYXIS** tracker is made up of a receiver (hand-unit) and a beacon (transmitter installed on the model). Each unit has its own GNSS module that makes it aware of its location. A long-range radio link allows the transmission of the model position to the hand-unit, that in combination with the data from a local electronic compass, displays the distance and the heading in a straight line to the model, whatever the route followed to approach it.

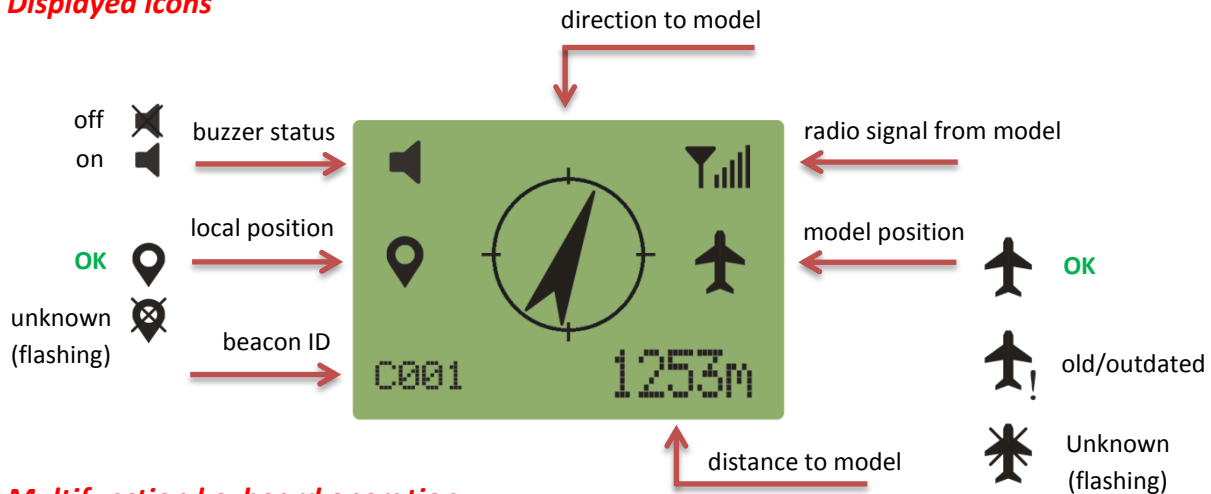
## PYXIS Receiver



### Switching the receiver ON/OFF

Press and hold the  button (2 seconds approx) to switch the receiver ON/OFF

### Displayed icons



### Multifunction keyboard operation

Press and hold **SETUP** to enter the setup menu. Press and release **UP/DN** to select a menu, press and release **ENTER** to enter the selected menu. Press and release **ESC** to leave a menu.

### Standard microUSB socket for battery recharge

The receiver has a standard microUSB socket in the bottom end, to recharge the battery through a mobile phone charger, computer USB, microUSB powerbank or car cigarette lighter plug. The red LED ON indicates that charge is in progress, the green LED ON indicates that charge is complete.


## PYXIS BEACON

### Positioning the beacon

Position the beacon with the radio antenna wire leaning out of the top of the pylon. With conductive pylons (e.g. made in carbon fiber), the top dent of the beacon (about 4.5mm high) must completely lean out of the top of the pylon outline

### Beacon power options and LED indications

- separate LiPo battery (1 cell, 3.7Vdc 170mAh 20C recommended) or shared e-timer battery
- direct connection to the TRACKER output of the Sidus e-Timer (adapter lead needed)

 The GREEN and RED lights visible on the bottom side of the beacon have various flashing patterns. The RED light goes ON during position transmission, the GREEN light indicates the status of the GPS (flashing = GPS acquisition, solid = GPS locked, off = beacon sleeping)

### Beacon Position transmission and power saving policy


A sophisticated power management scheme is implemented in the beacon. It transmits its actual position periodically, with a time interval that depends on the model attitude. If the model is laid on the ground for some time, the beacon enters a sleep status but keeps transmitting its position

at longer time intervals. The beacon is capable to wake up if the model is moved or lift, acquire the new position and resume its cyclic transmission.


## OPERATE THE SYSTEM

### *How model tracking works*


With the model flying, the beacon transmits a position update every 10/15 seconds, the radio signal from the beacon to the receiver has no obstacles and the range is very long. If the beacon signal is lost when the model lands (due to uneven terrain, tall grass, obstacles etc.) the receiver will head towards the latest position received from the beacon. Anyhow the beacon keeps transmitting its position at longer intervals even after landing, therefore the receiver will get updated about the landing position as the model is approached during the retrieval. The receiver permanently stores the last known coordinates when it is switched OFF and restores them when switched ON, that makes it possible to complete the retrieval at a later time.







 the accuracy of the coordinates provided by the GPS system is affected by numerous factors that introduce a position jitter. In the worst conditions, the accuracy is limited to 15-20 meters. For this reason, the distance counter on the receiver flashes for distances under 25 meters, as a warning that distance and direction may only be indicative.



### *Compass calibration*

 the internal e-compass calibration is recommended the very first time the system is used. Refer to the instructions given further on in this document

### *Quick retrieval instructions*

 the system is designed for **outdoor operations only**. Operating indoors will lead to a quick discharge of the batteries.

- Switch the receiver ON and apply power to the beacon
- The local position icon will blink (crossed)  for some time until the receiver gets valid signals from the GPS satellite network. Similarly, the model position icon will blink (crossed)  until the beacon gets valid GPS signals, or it will be steady  if the receiver has already stored an outdated coordinate from the same model referring to a previous retrieval session
- Model tracking is possible if the local position icon is stable  and the displayed model position icon is  (updated) or  (outdated)
- The arrow on the receiver LCD will head to the last known model position and the meter counter will indicate its distance in a straight line. Walk to the direction indicated by the arrow and check that the indicated distance decreases as the model is approached

 it is recommended to have the receiver working and displaying the stable  icon before launching the model. A fully charged receiver battery guarantees that it works continuously during all one day.

### *How to hold the receiver during tracking*

- Hold the receiver horizontal for model location. If the inclination of the receiver exceeds 20 degrees, a warning message appears on the LCD display
- Hold the receiver vertical and lift the arm to improve the reception of the radio signal from the beacon when it is extremely far

## SYSTEM SETTINGS - MENU ITEMS

Press and hold **SETUP** to enter the setup menu. The following describes each available menu item.

### *Learn Beacon Id*

Each beacon is manufactured with a unique identifier (beacon ID). This menu allows to bind a new beacon to the receiver. Currently the receiver is capable to handle up to 30 beacons.

- Enter **SETUP > LRN BEACON ID**
- Choose a free slot in the displayed list of beacon identifiers (ID1, .., ID30)
- Confirm the desired slot with ENTER
- power ON the new beacon and accept or discard its beacon ID when it appears on the LCD


### *Set Beacon Id*

The receiver can track one beacon a time. This menu allows to change the tracked beacon.

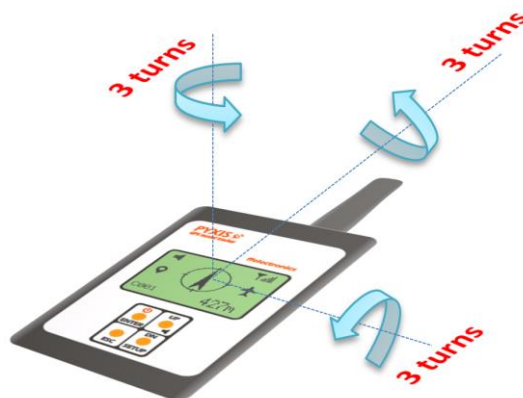
- Enter **SETUP > SET BEACON ID**
- Choose the desired beacon from the displayed list of beacon identifiers (ID1, .., ID30)
- Confirm with ENTER. The active beacon ID will be changed and displayed in the lower left corner of the LCD

### *Compass Calibration*

This procedure is needed to calibrate the internal magnetometer/accelerometer sensors. Calibrate the compass the very first time the receiver is used, and check/repeat calibration from time to time. It is recommended to recalibrate the compass when moving to different fields.

 The compass calibration must be performed in an open area outdoors, far from magnetic fields or metal objects.

- Enter **SETUP > COMPASS CALIB**
- Turn the receiver 3 or 4 times for each x, y, z axis in any order as indicated in the drawing below



The procedure ends automatically after about 20 seconds.

### ***Direction Adjustment***

This menu allows a fine adjustment of the arrow direction to compensate for magnetic declination (difference between true North and magnetic North in different places of the Earth). Usually this adjustment is not needed, as the direction error decreases with the distance from the beacon.

- Enter **SETUP > DIRECTION ADJ**
- Aim the receiver to the model from a distance of at least 100 meters
- If the arrow does not point straight to the model move it by pressing/releasing UP or DN
- Confirm the adjustment with ENTER

### ***Tracking***

This menu opens the tracking submenu

- Enter **SETUP > TRACKING**



### ***Set Home***

This menu allows to store the current receiver location as **HOME**

- Enter **SETUP > TRACKING**
- Move to **SET HOME** with **UP/DN** and confirm with **ENTER**
- Accept or discard with **UP/DN** and **ENTER**, or **ESC** to discard directly

### ***Go Home***

This menu sets the HOME location as target location. It is useful to be driven back HOME after the model has been retrieved, when the start location is hidden by hills, trees etc. or completely lost

- Enter **SETUP > TRACKING**
  - Move to **GO HOME** with UP/DN and confirm with ENTER
  - Direction and distance will refer now to the HOME location and the  icon will be displayed
-  after reaching HOME do not forget to set the receiver to track the beacon again

### ***Track Beacon***

This menu allows to track the beacon which identifier (ID) is the active ID

- Enter **SETUP > TRACKING**
- Choose **TRACK BEACON** with ENTER

### ***Show Lat/Lon***

This menu shows the actual coordinates recorded for the **Receiver**, **Beacon** and **Home** position

- Enter **SETUP > TRACKING**
- Choose **TRACK BEACON** with ENTER

**SYSTEM BATTERIES DURATION**

- Receiver built-in battery : > 20 hours continuously
- Beacon battery (170mAh 20C) : > 30-36 hours (estimated)