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# D-0017 Astro+ Pilot's Guide

LEVIL AVIATION  
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**AMENDMENT RECORD**

This procedure is reviewed to ensure its continuing relevance to the systems and process that it describes. A record of contextual additions or mission is given below:

<b>Revision No.</b>	<b>Date</b>	<b>Responsible Person</b>	<b>Description of Change</b>
1	4/22/20	Maureen Flintz	Initial release
2	12/08/2022	Maureen Magner	Name Update

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Levil Aviation warrants this product to the original purchaser to be free from defects in material and workmanship for a period of one year from the date of the original purchase. The following are not covered: software, damage resulting from accident, neglect, misuse, fire, or flood, improper voltage supply or failure to follow operational guidelines supplied with this product. Extended warranty is available for purchase on our website.

Please register your product online at: <https://shop.levil.com/pages/warranty-registration>

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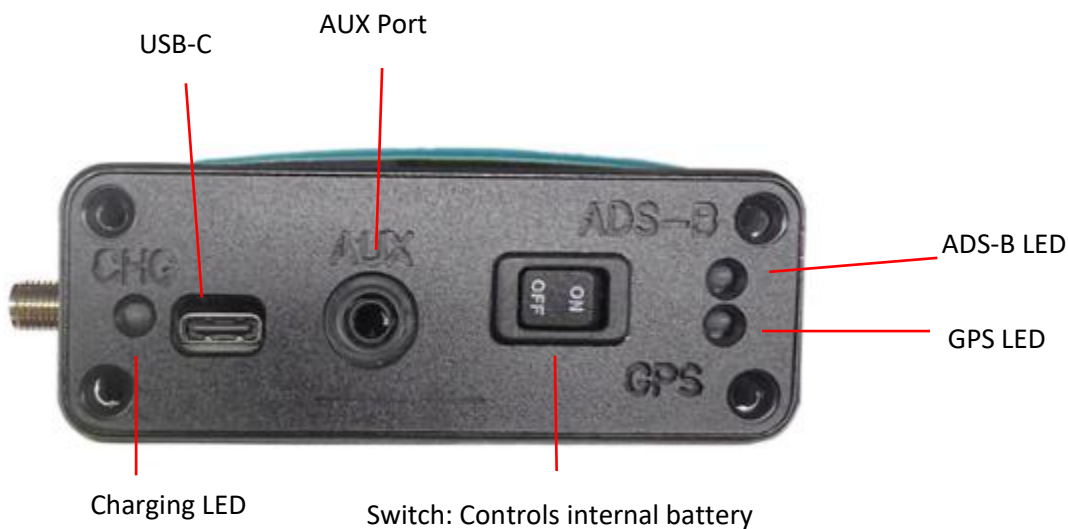
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### 1. Introduction

Every pilot should have a safety net when they go flying because no matter how much we hope for the best, it is always good to be prepared for the worst. The ASTRO+ provides an affordable solution to modernize the cockpit and give pilots the peace of mind they need to be able to safely overcome any instrument malfunction or related emergency.

The Astro+ is a fully independent, all in one avionics device. Avionics include WAAS GPS, ADSB-in, Air Data (Altitude ), AHRS (Attitude, Directional Gyro, Turn Coordination, rate of turn, VSI), Data recording, and the ability to connect to other external hardware such as EIS systems. Once it is installed, the Astro+ connect via Wi-Fi to a tablet inside the cockpit and data can be displayed on multiple Apps thanks to its open protocol.



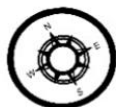
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Figure 1 Astro+ layout and features

### What makes the Astro+ special?

- Independent source of aviation-grade sensors, navigation and ADS-B information that fits in the palm of your hand.
- Affordable and safe way to modernize your cockpit
- Wireless platform offering iOS/Android compatibility
- Multiple App compatibility. For a full list of compatible apps visit our website <https://shop.levil.com/pages/compatible-apps>



GPS



ADS-B IN



Wi - Fi



Air Data



AHRS



Data  
Recording

## 2. Operating Limitations

- The Astro+ is not a required system and may not be used as a substitution for the certificated aircraft system.
- No operational credit may be taken for installation of the Astro+ system.
- No operational credit may be taken for such items as reduced approach speed and shorter landing distances.
- Although the Astro+ transmits AHRS Data is not to be used as a substitution for the certified AHRS instrumentation of the airplane. The AHRS supplied by the ASTRO+ is to be used only as supplemental information to the pilot.



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- e) Levil Aviation does not provide or endorse any carry-on device that displays the information sent by the ASTRO+.
- f) Ferrous Materials near the Astro+ may affect the compass reading.
- g) When transporting or temporarily storing in an airplane or vehicle, temperature range should be no less than 20 ° F (-12 ° C) and not more than 150 ° F (65 ° C)
- h) Storing our device at temperatures higher than 170 ° F for extended periods of time (more than 2 hrs.) may cause damage to battery and possible fire.
- i) DO NOT disassemble, remodel, drop or modify the ASTRO+ as this will void the warranty of the unit.
- j) Do not use the ASTRO+ as an anti-collision system. Not all traffic is displayed using ADS-B in. Most aircraft are not currently ADS-B Out equipped and therefore not detectable by the ASTRO+.
- k) Levil Aviation does not provide a display for this unit. Any display the pilot chooses to integrate Should comply with FAA certification requirements or qualify as a carry-on device. Under no circumstances should any display be placed in any way that it will obstruct the pilot's views of the aircraft flight instruments or the external view which may be detrimental to the ability of the pilot to fight the aircraft.

### 3. Specifications

#### 3.1 AHRS

- 360-degree pitch and bank operations
- GPS Independent Attitude
- 500°/sec max turn rates
- 8 G's max rating
- Output: Roll, pitch, magnetic heading, slip indicator, rate of turn, G meter, Pressure altitude.

#### 3.2 Internal Battery

- Operating Time after flight (if fully charged) <= 4 hrs.

#### 3.3 Charging Requirements

- One amp at 5V

#### 3.4 Wi-Fi

- 2.4 Ghz
- Android and iOS compatible
- Support up to 6 devices connected simultaneously (UDP broadcast)
- Supports multiple protocols:



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- GDL90 (default)
- iLevil Proprietary
- NMEA

### 3.5 GPS

- Support WAAS
- Cold start < 60 sec. Typ. (open sky)
- 1 Hz output (5 Hz optional)

### 3.6 ADS-B in (978/1090 MHz)

- Receives regional and continental NEXRAD reports broadcasted by ADS-B towers within range: (Regional every 2.5 min. /Continental every 15 min.)
- Receives “GROUND TO AIR” traffic. (re-broadcast of traffic by ADS-B towers nearby)
- Receives “AIR TO AIR” traffic reports from other aircraft operating 978/1090 MHz transmitters: (978 MHz UAT ADS-B out and Mode-ES transponders with extended squitter)

### 3.7 LED Indicators

LED	Status	Description
Power/GPS	Slow Blink Green:	Power ON/ No GPS Fix
	Solid Green:	Power ON/ GPS fix acquired
		Power Off
ADS-B	Slow Blink Green:	Traffic Received
	Solid Green:	Weather and traffic received
	Off:	No traffic or Weather received
Charging (with 5V USB power)	Solid Green:	Charging
	OFF (with power):	Battery 100% charged
	OFF (no power):	Not charging

**NOTE:** Astro+ has a charging temperature protection. If the battery is above 40°C (104°F) and the Astro+ is connected to external power, the Astro+ will continue to operate from external power but the charging process will be disabled. The charging LED status will be set to OFF.

## 4. User Interface

The ASTRO+ is designed to be compatible with various Apps on both iOS and Android platforms by offering an open Broadcast of data using UDP communication. Third party





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developers can use the information broadcasted and display it on their App, but there are no restrictions on how or what data they can display. Refer to a table of compatible Apps on Levil Aviation's website to determine the capability of each App available.

#### 4.1 Connecting to your favorite app

The Astro+ offers the most compatibility with Apps on both iOS and Android platforms.

- Use the manual ON/OFF Switch to turn the Astro+ ON.
- Go to your tablet's "Wi-Fi Settings".
- Connect to a network called Astroplus-xxxx, when xxxx is the unique serial number for the device.
- Once your connection is established, a checkmark will appear next to the network name.
- Open your favorite App, the connection will be automatic.
  - Some app do require a extra step for connection please contact your app of choice tech support

#### 4.2 AHRS Utility App

Levil Aviation developed a free app that makes the use of the Astro+ easy and reliable for pilots. The Levil Aviation App is an application capable to display the Astro+ data graphically and numerically.

This is a proprietary App developed by Levil Aviation that runs on iOS devices only (iPad /iPhone). This utility App is designed as a tool to help the pilot troubleshoot and calibrate the required systems, and as an aid for instrumentation display. Pilots can download the Levil Aviation app directly to their iOS devices from the App Store. Installers are recommended to use this App when installing the Astro+ to setup the unit.

#### NOTE:

- Other apps may require subscriptions, and some offer more features than others.
- Some Apps may not support all the features of the ASTRO+.
- You may choose to use one Navigation App or a combination of apps on multiple devices depending on your flying needs.
- For a complete list of compatible Apps go to <https://shop.levil.com/pages/compatible-apps>



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## 5. Magnetic Heading

There are two ways to obtain heading information from the ASTRO+, depending on the navigation App of choice, you may choose between the following:

- True Track: Heading information based on GPS track.
- Magnetic Heading: Heading information determined by a combination of 3-axis magnetometer and gyros that form part of the internal AHRS inside the Astro+.
  - You can choose your option in the settings page

### 5.1 When using Magnetic Heading, it is important to be aware of the following:

- Magnetic fields caused by other things, such as Magnetic Compasses, may affect the AHRS heading.
- Verify your magnetic heading after following alignment and installation procedures: using the Levil Aviation App → settings → Heading → Use magnetic
- In case of magnetic deviation, the internal AHRS will slowly learn your aircraft configuration during flight to compensate. This learning process requires the aircraft to turn both clockwise and counterclockwise for at least 40 seconds.
- After turning, or at the end of your flight, verify the magnetic heading again using the AHRS Utility App. If the AHRS was able to successfully compensate for errors, you may store this data inside the ASTRO+ and it will use this new configuration on the next power cycle:
  - Using the Levil Aviation App → Device Config → Commands → Compass Calib → Calibrate
- ERASE Magnetic data using Levil Aviation App before moving the ASTRO+ to a different aircraft or environment.
  - Using the Levil Aviation App → Device Config → Commands → Compass Calib → reset

## 6. Data Recording

The Astro+ will automatically begin recording once the unit is powered on and has acquired a GPS fix.

### 6.1 Save files

- File name will be saved as follows Astroplus xxxx-yyyymmddThhmmss
- The ASTRO+ will have three file formats in which to choose from to record (.gpx, .csv, .fdr)
- .gpx will be the default format from the factory and can be changed before flying using the Levil Aviation app.



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### **6.2 How to change recording format**

- Open Levil Aviation App
- Tap on the Device config tab
- Find Recording File Format
- Tap on Select, and choose desired format

### **6.3 How to change Callsign**

- Open Levil Aviation App
- Tap on the Device config tab
- Find Callsign
- Tap and type desired Callsign
- Press Apply

## **7. Helpful Tips**

- Charge the device fully before your first use.
- If you encounter Wi-Fi connection problems, try resetting the device's Wi-Fi in your iPad/iPhone Wi-Fi settings (disable/enable)
- If using Apple devices, you may use our free Levil Aviation app to see battery percent, GPS signal power, ADS-B Diagnostic etc.
- In most locations, it is not possible to received ADS-B information from ground towers unless you are airborne (typically above 2000 feet) with line of sight to the tower
- The Internal AHRS has a max rate of turn of 500<sup>o</sup>/sec. Most likely you will exceed this limit (or "tumble" it) when playing with the Astro+ in your hands. If this is the case, and the AHRS did not recover, you might "tumble" it again, and set it on a level surface. It will recover within 4 secs.