



GyroPilot
V3

Operator's Manual

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DISCLAIMER

The GyroPilot unit and any supporting software are Aids to Navigation.

They are very effective tools developed to support the person executes the pilotage. The equipment is intended to be used as part of an integrated strategy incorporating all the accepted principals of Bridge Resource Management. Reliance on the GyroPilot as the sole means of monitoring the ship's navigation position must be avoided.

Your use of this product and information it provides is at your own risk. You assume full responsibility and risk of loss resulting from the use of this product or information it provides. None of Navicom Dynamics Ltd. or its affiliates, or any directors, partners, principals, shareholders or employees thereof will be liable for any special, indirect, incidental, consequential or punitive damages or any other damages whatsoever, whether in an action of contract, statute, tort (including, without limitation, negligence) or otherwise, relating to the use of this product or information it provides.

1 UNPACKING

Unpack the GyroPilot and ancillary items from the box and check no items are missing or damaged.

Items shipped are as follows:

- GyroPilot main unit
- GyroPilot to AIS Pilot Plug data and charging cable
- Mains to USB power supply unit (with various country adapter plugs)
- GyroPilot dry-pouch carry bag
- Quick-Start guide with link to operator's manual

2 PRODUCT OVERVIEW

The GyroPilot is a smart AIS Pilot Plug interface with added solid-state gyros and backup GNSS receiver.

The gyro serves two purposes:

- a. Output Rate of Turn (ROT) of the vessel
- b. Smooth the raw AIS heading data, which is only available in integer degrees from the Pilot Plug, and output this to 1 decimal place for use by navigation software

All ship AIS data received (both own ship and other ships) is passed over the wireless link for use in navigation software.

The GyroPilot also outputs its battery status for display by the navigation software.

On loss of AIS input, the GyroPilot will switch to its internal GNSS sensor and output its position over the same wireless link.

GyroPilot Plus is available as an optional add on module. It is a highly accurate, wireless and independent GNSS sensor for the GyroPilot.

3 BEFORE USE

It is recommended the GyroPilot is fully charged before use.

3.1 Charging Instructions

Plug the USB end of the cable into the power supply unit then plug the power supply unit into the mains.

Plug the other end of cable connector on the GyroPilot.

Observe the battery LED on the front of the GyroPilot – see LED section for full details.

The GyroPilot can be charged whether it is switched off (recommended) or on. If charging when on, note that the charge time will be longer, and that care must be taken not to move the unit if it is in use (as described in the following section).

4 USAGE

4.1 Switching On

Do not switch on the GyroPilot until it has been placed on a flat surface in the required operating location. The base of the unit has a rubberised coating to help give it good adhesion to any flat surface.

For best performance, ensure the unit is placed on a flat surface.

Plug the GyroPilot cable into the AIS Pilot Plug.

Switch on the GyroPilot by pushing and holding the power button for approximately 2 seconds. The LEDs on the front of the unit will briefly flash in sequence along with beeps to indicate switch-on. After the initial start sequence the LEDs will follow the sequence given in Section 5.1.

Once the device is turned on, ensure that the unit is not disturbed. Any disturbance which causes the device to move will reduce the quality of the ROT information produced by the device.

To switch the unit off, simply repeat the process of pressing and holding the power button for 2 seconds. The LEDs will then turn off entirely.

4.2 Connectivity

The GyroPilot connects to a laptop or tablet by either a Wi-Fi or Bluetooth connection depending on the model.

The unit label, located on the bottom of the GyroPilot, indicates whether the unit is a Wi-Fi or a Bluetooth model.

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For Bluetooth connections please refer to your laptop and operating system manual on how to setup a Bluetooth connection. The baud rate is 38400.

For Wi-Fi connections, the SSID of the GyroPilot is named after its serial number, and the IP address and port over which the data is sent are as follows:

192.168.10.10 : 5003

Please note that if a hardwired connection is preferred (rather than a wireless connection), this can be established using the supplied USB cable. Once connected, the GyroPilot will be treated as a "USB Serial Port" by your laptop; this COM port can be selected in your chosen ECS.

4.3 Normal Operation

As soon as it is switched on, the GyroPilot will search for the AIS data coming from the Pilot Plug, regardless of any errors in the wiring of the Pilot Plug. This can take up to 30 seconds.

As soon as ship's data is received, the GyroPilot will automatically initialise its gyroscope calibration process. This calibration can take up to one minute.

ONE MINUTE GYRO CALIBRATION FOLLOWING STARTUP

Once the calibration is complete, GyroPilot will autonomously output ROT data, smoothed heading and all AIS data from the Pilot Plug and pass it over the wireless connection.

Please note that the GyroPilot will not automatically correct any heading error from the ship, but most good pilot navigation software will offer the pilot the opportunity to enter a heading correction if a ship's gyro error is observed.

All AIS messages received will be passed over the wireless connection to the laptop. The ECS should therefore be set up to take position information via AIS messages when in normal operating mode.

IMPORTANT: DO NOT TOUCH THE GYROPILOT ONCE SWITCHED ON

If the unit is moved for any reason, this will disturb the gyro and it will output invalid data. The fastest way to regain accurate data is to switch the unit off and on again, after which it will repeat the one-minute calibration process.

The unit is supplied with a rubberised mat which can be used to reduce the chances of slipping under accidental cable movement.

4.4 Emergency GNSS Mode

In the event that data is lost from the AIS Pilot Plug, the GyroPilot will automatically set itself to GNSS emergency mode and output standard global position and COG data.

The receiver is a combined GPS/GLONASS receiver. The purpose of the receiver is to provide emergency functionality that is better than a smart-phone or a similar device and whose data is able to be transferred to any ECS. During this time, the GyroPilot will not output ROT or smoothed Heading.

During normal AIS operation, the GPS receiver is switched off to save battery power. The GNSS receiver automatically switches on if the AIS feed is lost for approximately 2 minutes.

Once the GNSS receiver is switched on, there will be a short delay while the receiver acquires and computes a solution; this delay will vary in length of time depending on the view of the sky that it is able to see.

Position information from the GNSS receiver will be sent over the wireless connection using NMEA sentences. The ECS should therefore be set up to take position information via NMEA when in emergency GNSS mode.

Once AIS data is found again, the unit will automatically switch out of emergency GNSS mode and back to normal operation, including output of ROT and smoothed Heading

WARNING: EMERGENCY USE ONLY

The purpose of this GNSS functionality is for emergency use when no other options are available. We recommend that the internal GyroPilot GNSS receiver should not be relied upon for normal navigation.

5 FEATURES

5.1 LED Indicators

There are three LED indicators on the front of the GyroPilot unit – these show the status of the battery, the status of the data link and the GNSS status.

The Three LEDs are labelled as follows:

- The **GNSS LED** which is represented by a satellite symbol is present on the left of the front panel
- The **CONNECTION LED** which is represented by 2 arrows pointing in opposite directions is present in the middle of the front panel
- The **Battery LED** which is represented by a battery icon is present on the right of the front panel

Battery Indicator Behaviour:		
Green Solid		Battery Medium to Full (>40%) or fully charged
Orange Solid		Battery Low to Medium (20% to 40%)
Red Solid		Battery Low (<20%)
Blue Solid		Battery Charging

Connection LED Indicator Behaviour:		AIS Status:	BT/Wi-Fi Status:
Red and Yellow Flashing		No AIS Data	No connection
Blue and Red Flashing		AIS Locked	No Connection
Blue and Yellow Flashing		No AIS Data	Connection Established
Blue Solid (normal operating mode)		AIS Locked	Connection established

GNSS LED Indicator Behaviour:				
Red Solid		No AIS Data	No GPS	
Green Solid		AIS LOCKED		
Yellow Flashing		Backup GPS	No Lock	
Yellow Solid		Back up GPS	Locked	
Blue Flashing		External GPS	No Lock	
Blue Solid		External GPS	Locked	
Blue and Red Flashing		Pairing mode		

Note - in order to save power and to minimize distraction when navigating at night, the brightness of the LED indicators can be dimmed for "night mode". The LED indicator brightness can be set to night mode with a single press of the power button, as described in the next section.

5.2 Power Button Presses

As well as switching the unit on and off, the power button also serves two further purposes:

- Single Quick Press – toggle the LED indicators to their maximum brightness after they being set into night mode or go back to night mode if they are currently at full brightness. (see section 5.1).

5.3 Use with GyroPilot Plus

- The configuration button can be used to pair with a GyroPilot Plus (GP+). Hold down until the GPS LED starts flashing red and blue. If a GP+ is in close proximity to the GyroPilot and it is in pairing mode, the GyroPilot and GP+ will pair. Once paired, the GPS information from the GP+ will be forwarded to the ECS via the GyroPilot.
- Once paired, the GyroPilot will remember the last paired GP+ device. If the paired GP+ device is found, the GP will automatically connect to the GP+. If you wish to connect to another GP+ device, you must perform the manual pairing action again by holding down

the configuration button on both units and waiting until the units have paired.

IMPORTANT

- When using the GyroPilot along with the GP+ unit, it is critical that the pilot pay close attention to the source from which you are acquiring the position data. The GNSS LED (refer to GNSS LED Indicator) should be periodically monitored to ensure that the GP+ unit is able to relay the GNSS information to the GyroPilot unit. If the GyroPilot is not able to connect to a GP+ unit, the electronic charting software may switch to using the position from the AIS stream of the pilot plug.
- Monitoring the GNSS indicator will enable the pilot to quickly change the antenna offsets in software in case the source of the GPS information changes - thus ensuring that an accurate representation of the vessel position on the ECS software

5.4 Leave-Behind Alarm

Once a laptop connection is established (either wireless or hard-wired), the GyroPilot will monitor the status of this connection. If the connection is lost, a 30-second timer will start, after which time an alarm will sound. The purpose of this alarm is to act as a warning in case the pilot leaves the unit behind when leaving the ship. Note that this alarm can be silenced by re-establishing the connection to the laptop, by double-pressing the power button as described above, or by switching the unit off.

5.5 COG and SOG generation at low velocities

When the gyro pilot + is operating at low velocities, pilots may need to ensure that the generation of the COG and SOG are set to be derived from the GPS position. It is important to note that at low velocities the positional error as a fraction of the distance moved is greater, hence the derived COG and SOG information may not be of acceptable accuracy.

Commented [DS1]: ay

In order to have COG and SOG information available at low velocities, pilots may need to enable this feature in their ECS. The process of enabling this feature is different for each type of ECS. Because each ECS behaves differently, the user is advised to consult the owner's manual for their ECS.

Outlined below is a list of how to access this information for a few different types of ECS.

Qastor: Qastor will automatically derive a COG and SOG solution.

SEAIq: In SEAIq, the settings can be found by tapping the gear icon. Under the NMEA/AIS heading tap "Navicom Dynamics PPU's". Turn on the "Derive COG/SOG from GPS"

TRANSAS PILOT PRO: In settings (Tap the multiple Gear icon) under the heading NMEA, tap the "calculated COG & SOG" and choose the velocity at which you would like to use derived COG and SOG.

6 HANDLING AND STORAGE

6.1 After Use

When finished with the GyroPilot, switch it off, wipe the device if there is moisture, and store in a suitable dry place. Recharge as soon as possible.

6.2 Dry-Pouch Carry Bag

We recommend that the carry bag provided be used to carry the GyroPilot both to, from, and when onboard a vessel, since it protects against the elements. In order to close the bag, fold the top band away from away from the logo side of the pouch (i.e. to the rear side) at least once, and then secure the plastic fasteners on the rear side.

6.3 Long-Term Storage

If the unit is not going to be used for a long time, ensure the battery is around 50% charged before storage. It is recommended that the battery be recharged once every 3 months.

6.4 Operate Under Extreme Temperatures

If the unit is to be used on an open bridge without an AIS installation, particularly in temperatures below -20°C, it is important that the unit is warmed when switched on. Keep the

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unit in a place where the temperature is above 0°C before taking the unit outside and setting up. In extreme temperatures (hot or cold) the battery life will be shorter than specified.

7 SPECIFICATIONS

7.1 Technical and Performance

<i>ROT Accuracy:</i>	< 0.5°/min
<i>Heading:</i>	Smoothed AIS heading to 0.1°
<i>Data Link:</i>	Wi-Fi or Class 1 Bluetooth (model dependant), or USB cable
<i>Battery Longevity (normal operation):</i>	Bluetooth operation >36 hours Wi-Fi operation >24 hours Lithium-Ion rechargeable
<i>AIS and Charging Cable:</i>	Removable, 1.5m standard length (other lengths on request)
<i>Data Output (normal operation):</i>	All AIS messages from AIS Pilot Plug GPHDT (every 1sec) GPROT (every 1 sec) GPAUX (battery voltage, once every 10 secs)
<i>Data Output (backup GPS mode):</i>	GPGGA (every 1 sec) GPVTG (every 1 sec)
<i>Backup GPS:</i>	33-channel GPS/GLONASS receiver with SBAS NMEA sentences: GPGGA, GPVTG, GPGSV
<i>Firmware:</i>	User upgradable
<i>Testing:</i>	AIS test message built-in

7.2 Physical and Environmental

<i>Weight:</i>	300g
<i>Dimensions:</i>	120 x 75 x 40 mm
<i>Rated Temperatures:</i>	Storage: -40°C to +85°C Operating: -20°C to +74°C Charging: 0°C to +25°C
<i>Humidity:</i>	95% non-condensing
<i>Ingress Protection Rating:</i>	IP67
<i>Certification:</i>	CE (pending)

8 SUPPORT

8.1 Service and Help

Should you experience any technical issues, please contact your approved service agent as your first line of support.

If unavailable, please contact **Navicom Dynamics** directly using the information below:

Phone: + (64) 9 915-5330
Fax: + (64) 9 915-5331

Website: www.navicomdynamics.com
Support email: support@navicomdynamics.com

Physical Address: Navicom Dynamics
(for couriers) 2 Parkhead Place
Albany
Auckland 0632
NEW ZEALAND

Returning goods: Before shipping goods to Navicom Dynamics, please request an RMA number. No goods will be accepted without an RMA. An RMA form can be found and filled in on our web site www.navicomdynamics.com/repairs-and-returns

Office hours: Our office hours are from 9am to 5.30pm Mon–Fri NZ time. We are happy to take urgent calls outside work hours.

Note: NZ Standard Time is 12 hours ahead of UTC. In summer months this is adjusted forwards by one hour. To confirm the actual time in New Zealand, please visit www.timeanddate.com

8.2 Warranty Information

Your GyroPilot system was sold to you with the following warranty periods:

GyroPilot	24 months
Battery	12 months

The warranty must be validated by registering online at www.navicomdynamics.com/support within three months of your product being shipped to you.

Please read this operator's manual carefully, as failure to operate or handle the equipment properly may invalidate the warranty.

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Document Revisions

Date	Revision
8/12/2017	Initial Issue
5/02/2018	Changed error with led status. Added section on COG and SOG at low velocities.