FALCON
ADVANCED MULTIFUNCTION TRACKING SYSTEM

User Manual

Model(s)	Falcon 360-P
Firmware Version	1.0.01
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APEX FLIGHT OPERATIONS

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Introduction

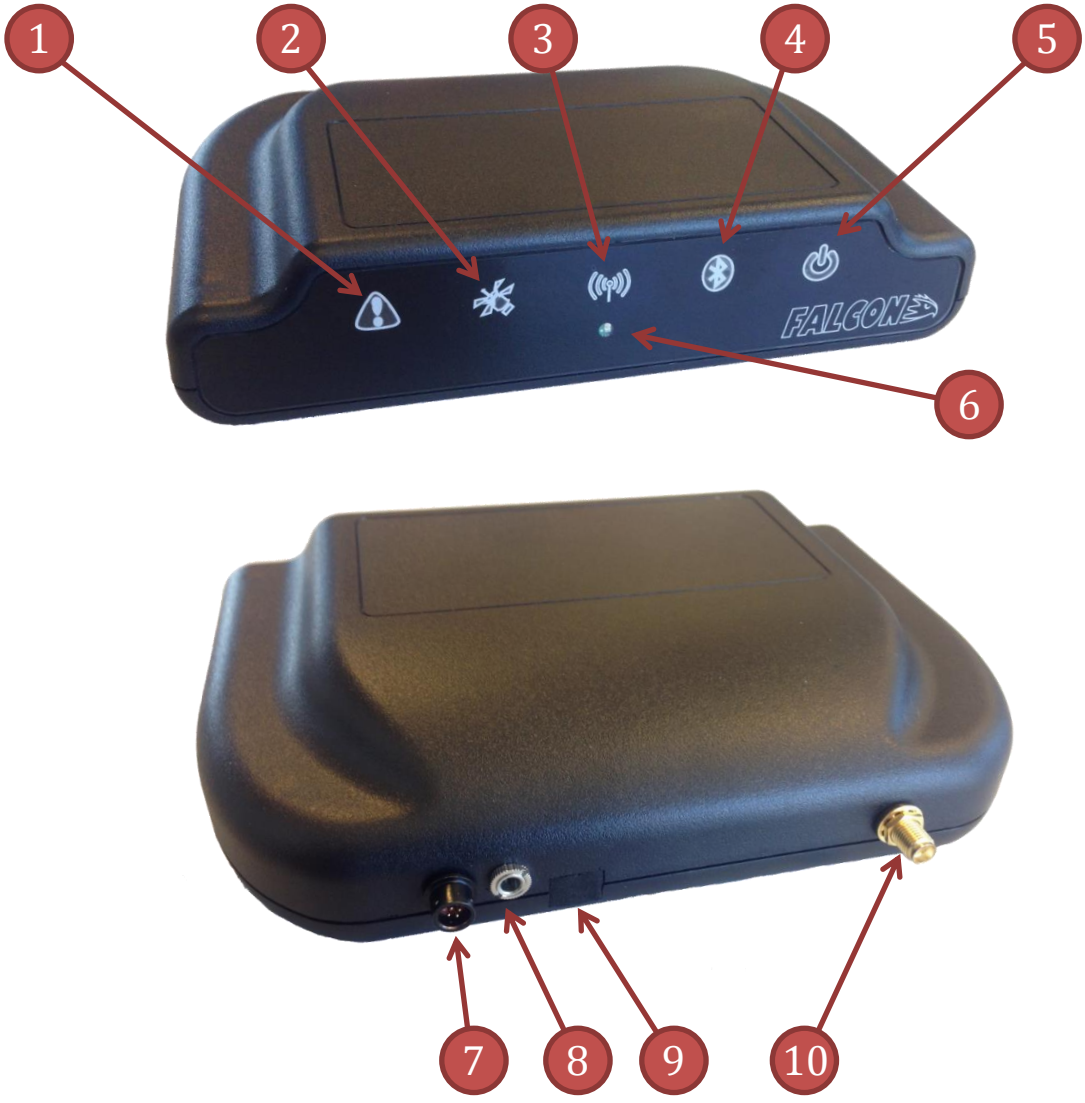
Thank you for purchasing the Falcon 360-P – we have designed this system to provide efficient and cost-effective tracking for your aircraft, as well as provide you with a tool for reliable communication and data gathering during your flight operations.

The Falcon is essentially a system that gathers information from the aircraft, and requires very little interaction from the flight crew. In normal installation and operation it will automatically track the aircraft whenever the Avionics bus is powered.

This document describes the hardware functions, as well as installation options – for details on the IndigoTrack Crew software application used to control the Falcon, please refer to the separate IndigoTrack Crew User Guide.

System Components

The Falcon 360-P system consists of the tracking module which is mounted in a suitable position on the glareshield, and a power cable which is connected to an auxiliary power supply in the aircraft. Please refer to the Installation section for more information on installation options for the system. The tracking module is illustrated below:



1	Alert Button
2	Antenna Button
3	Signal Button
4	Bluetooth Button
5	Power Button
6	Light Sensor
7	Power Connector
8	Data Port
9	Micro-USB Port
10	Antenna Connector

Power Cable

USB Adaptor Cable

Low-Elevation Antenna or

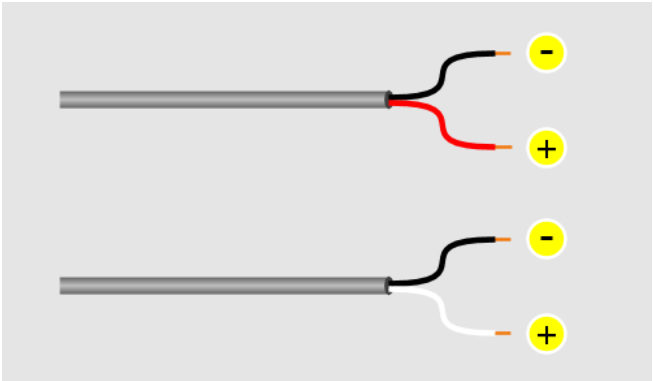
Normal Antenna

Installation

Power Cable

The Power Cable provided is has a self-locking connection to the Falcon unit to ensure that it cannot become accidentally unplugged whilst in operation. The other side of the cable is terminated with an Auxiliary power plug – this should be inserted into the Auxiliary Power socket in the aircraft.

If the aircraft does not have an Auxiliary Power socket, or you would prefer to have the cable connected directly to the aircraft power, the following wiring diagram should be used by your Aircraft Maintenance Organization to get approval for the modification to your aircraft – refer to the color key for the cable provided with your equipment.



Positioning the Components

The antenna component of the Falcon 360 Portable requires a view of the sky via the windshield of the aircraft, and should be positioned so that it is as clear of obstructions as possible. Depending on your configuration, you should take the following into account:

External Antenna

When using the portable external antenna, only the antenna needs to be positioned on the glareshield; to avoid cluttering the glareshield, the Falcon unit itself is usually located elsewhere in the cockpit. If the crew intends to use the Bluetooth-enabled App to control the Falcon, the unit can even be placed completely out of sight.

Internal Antenna

When using the internal antenna of the Falcon, the unit itself should be positioned on the glareshield.

Avoiding Possible Interference

The communication with the Inmarsat and GPS satellite constellations is hampered by metallic obstructions, so position the antenna in the best position to avoid shadowing from the roof of the aircraft, or the central divider (if present). The Falcon is best located on the co-pilot's half of the glareshield, positioned as far forward as possible. Below are some typical locations to illustrate the best position for the Falcon unit or the external antenna:

Basic Operation

The Falcon requires very little direct interaction from the pilot or aircrew and has only three functions available via the Buttons on the front panel.

Self-Diagnostics

During startup, the Falcon will run a number of self-diagnostic tests, which will determine whether the unit is in good working order. If any of these diagnostic tests fail, one or more of the indicators will flash amber – please consult the following table to determine what has failed, and what steps to take to rectify.

Flashing Icon	Issue and Resolution
	Modem Failure – unit needs factory inspection
	Antenna Failure – unit needs factory inspection
	Internal storage issue – the unit will continue to function, but no recording will take place.
	Bluetooth failure – no pairing via Bluetooth is possible, but other functions will continue to work
	Internal battery failure – the unit will function whilst powered by the aircraft, but will immediately shutdown when the aircraft is powered down. This may result in some corruption of data, and any last messages will not be transmitted.

For all diagnostic issues, please contact Apex Flight Operations technical support to determine the best course of action to resolving the problem.

Buttons and Systems Indicators

The unit features 5 buttons; the characteristics and function of each button is described in the reference table below:

Icon	Type	Description
	Button/Indicator	Triggers or Cancels the Alert Status
	Button/Indicator	Shows the Antenna Status (flashes during receive or transmit)
	Indicator	Satellite signal strength

	Button/Indicator	Bluetooth pairing initiation and status
	Button/Indicator	Power indicator and Quiet Mode button

These indicators are also illuminated during the startup diagnostic process – refer to the section on Diagnostics for more information on the various indications and their meanings. During normal operation, the indicators function as follows:

Alert Button/Indicator

The Falcon 360 features an Alert mode function which is triggered by pressing this indicator and holding the button for 2 seconds. The indicator is usually off, show normal operation mode – when triggered however, the indicator will flash red to show that the system is in Alert mode. In order to cancel the Alert, the button should be pressed and held for 2 seconds again. See the section on Alert Mode for more information.

Off	Normal tracking operation
Flashing Red	Alert Mode

Antenna Indicator

This indicator shows the antenna status – it shows the following conditions:

White	External antenna is connected
Flashing White	External antenna is connected – transmit or receive in progress
Green	Internal antenna
Flashing Green	Internal antenna connected – transmit or receive in progress
Flashing Red	Antenna failure
Flashing Amber	Unit is in house-keeping mode during shutdown, and there are still messages awaiting transmission

When in normal operation, the indicator will also flash 3 times each time the unit transmits or receives a message via the satellite.

Press and hold the Antenna button for 2 seconds to alternate between using an internal or external antenna.

Satellite Signal Indicator

This indicator shows the satellite signal strength, GPS acquisition state, and Inmarsat communication lock – the various states are indicated as follows:

Green	Good satellite visibility, GPS acquisition, Inmarsat lock
Green/Blue Flashing	Good satellite visibility, GPS acquisition, no Inmarsat lock

Amber	Non-optimal satellite strength – delays in transmission, GPS acquisition, Inmarsat lock
Amber/Blue Flashing	Non-optimal satellite strength, GPS acquisition, no Inmarsat lock
Red	Low signal strength – receive only, GPS acquisition, Inmarsat lock
Red/Blue Flashing	Low signal strength, GPS acquisition, no Inmarsat lock
Flashing Red	Low signal strength, no GPS acquisition, no Inmarsat lock

The satellite signal indication is refreshed every 2 seconds when not connected with the satellite, and every 10 seconds once connected – this indication can be used to determine the best position for the unit in the aircraft for satellite visibility.

Bluetooth Button/Indicator

This button is used to initiate the pairing process with a Bluetooth device (such as an iPad, Tablet or laptop), as well as to show the connectivity status once paired. The following are used to display the various states:

Off	No Bluetooth connection
Flashing Blue	Bluetooth pairing in process
Blue	Bluetooth device paired
Flashing White/Blue	Message received but not yet acknowledged by Bluetooth device
Flashing White	Message received but Bluetooth device not paired

The button is pressed and held for 3 seconds to initiate the Bluetooth pairing process, and pressed and held again for 2 seconds to cancel any pairing in progress and/or close the current Bluetooth connection. Please refer to the section on Bluetooth for more information.

Power Button/Indicator

This indicator shows the power status – it shows the following conditions:

White	External power is connected and available
Green	Internal battery in use – good condition
Amber	Internal battery in use – less than 50% available
Red	Internal battery in use – less than 15% battery available
Flashing Red	Internal battery in use – too low for transmission

The button can be used to put the Falcon into a Quiet Mode – press and hold for 3 sec to enter this mode, and press any button to exit. In Quiet Mode, all indicator lights are extinguished, with the exception of the Bluetooth message waiting indication.

Using the External Antenna

Apex Flight Operations provides an external antenna with the Falcon 360-P system. There are two types of external antenna available; an interior antenna and an exterior antenna:

Interior Antenna

The interior antenna provides an option of mounting just the antenna on the glareshield, whilst positioning the Falcon unit somewhere else in the aircraft. This is typically used where there is limited space on the glareshield, or where the client would prefer to have the Falcon mounted elsewhere in the cabin. The cable provided with the interior antenna should be connected to the external antenna connection point on the Falcon and routed carefully so as to prevent snagging or interference with flight controls and equipment.

Exterior Antenna

The exterior antenna allows clients to maximize the reception capabilities of the Falcon; it is mounted outside the aircraft body, and requires modification approval from your civil aviation authority. The cable provided with the exterior antenna should be connected to the external antenna connection point on the Falcon – please follow the separate installation instructions for the exterior antenna.

Alert Function

The Falcon features an Alert function, which gives the aircrew a quick and reliable means of notifying ground operations of an emergency situation on board the aircraft. This Alert function can be triggered both from the Falcon itself, as well as via IndigoTrack Crew. To trigger the Alert on the Falcon, press and hold the Alert button for at least 2 seconds – to trigger the Alert via IndigoTrack Crew, please refer to the IndigoTrack Crew User Guide.

When triggered, the Alert indicator on the Falcon will flash red, and if the unit has been configured with a normal reporting interval greater than 30 seconds, this will also change so that the Falcon reports positions every 30 seconds.

To cancel an Alert, hold the Alert indicator again for at least 2 seconds.

Support

For further support and assistance with your Falcon, please contact Apex Flight Operations technical support via email at support@apexflightops.com or check our website www.apexflightops.com for other contact information.

WARNING: Temperatures on the glareshield can reach excessive levels when the aircraft is on the ground – please take the necessary steps to prevent the surface temperature of the Falcon exceeding 80°C (176°F) as damage to the unit can occur above this temperature.

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