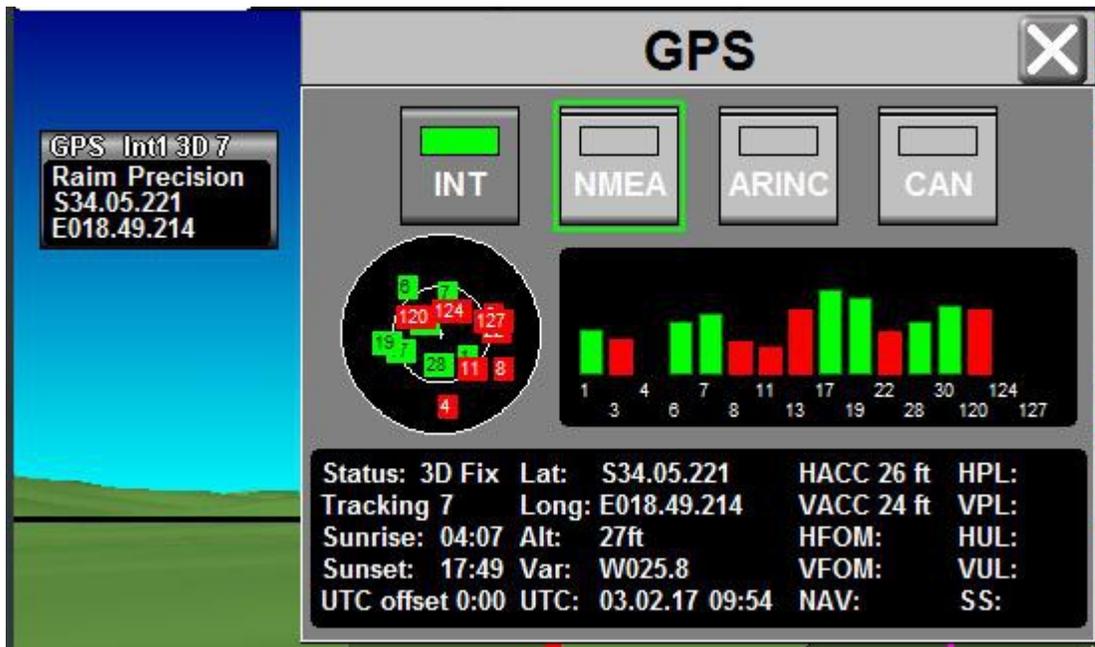


IEFIS GPS manual



Applicable to iEFIS G3 including "Lite" versions

Firmware 1.0.3.5 or later

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General

The iEFIS contains multi source GPS functionality with a priority scheme selecting the best possible GPS solution. In addition, it provides two independent GPS data channels, one of which is dedicated to ADSB transmissions as well as transponder mode-S extended squitters.

GPS sources

Internal GPS

The iEFIS contains a high quality WAAS GPS based on a u-blox chip set. This GPS engine is normally used in the system and provides very fast initial position acquisition and interference resistant tracking due to anti-jamming techniques.

The internal GPS includes RAIM ability and will exclude satellites detected as detrimental to the position calculations and continue only with those regarded as “healthy”.

This u-blox SBAS implementation is, in accordance with standard RTCA/DO-229D, a class Beta-1 equipment. All timeouts etc. are chosen for the En Route Case.

NMEA GPS

An external NMEA GPS source may be connected to an RS232 port setup as NMEA port. Ordinarily the NMEA port on the iEFIS sends out standard NMEA GPS information however it can be set to receive this information as well if selected.

ARINC GPS

This can receive standard ARINC GPS data and use this as GPS source. This data is available for example from Garmin G430 and later systems.

Note that this is the lowest priority GPS source in the system. It will only be used if it is the only source available. The reason for this is that the GPS data is extremely limited to a 2D position plus track and ground speed only.

CAN based GPS

This source refers to one or two MGL TABS compliant GPS sources connected to the EFIS via the CAN bus.

Two sources may be connected in which case the source with the most accurate horizontal position fix estimate will be used. Sources can thus change on the fly at any time.

Note that even if the TABS GPS is selected as source, many internal functions of the EFIS will continue to use the internal GPS if available. The reason for this is that the internal GPS tends to be considerably better than a certified GPS source at this point in time. The certified data however will be passed on to any connected ADSB or mode-S transponders.

Data channels

The iEFIS has two independent GPS data channels.

Main data channel

In normal use the main channel is connected to the internal GPS. Other sources can be used based on a priority scheme as follows:

- 1) Internal GPS
- 2) CAN based GPS
- 3) NMEA based GPS
- 4) ARINC GPS

You can also force the use of a particular GPS source. In case this does not provide a position, the highest priority source that does have a position will be used.

ADSB/Transponder data channel

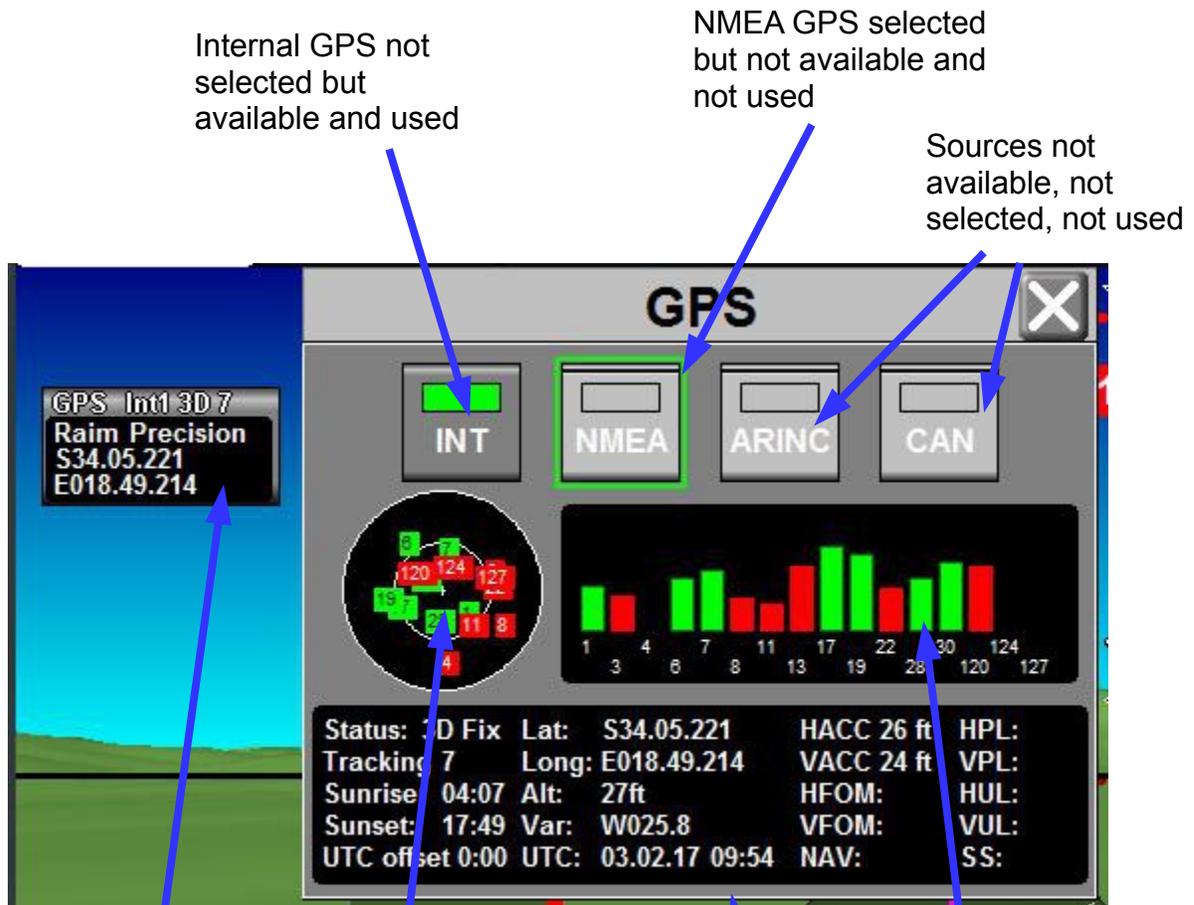
The ADSB/Transponder data channel will use the CAN based TABS data source if available as this allows the system to conform to the FAA 2020 ADSB mandate.

The system may also use an external NMEA data source provided it contains the required information that needs to be forwarded to the ADSB or transponder system.

This will automatically be selected if no CAN based GPS is available but such a source is available on the configured NMEA port, even if the NMEA port is not selected as EFIS GPS source.

If no certified GPS source can be found this channel will use GPS data based on the available sources using the above priority scheme.

GPS user interface



Internal GPS not selected but available and used

NMEA GPS selected but not available and not used

Sources not available, not selected, not used

GPS Int1 3D 7
 Raim Precision
 S34.05.221
 E018.49.214

INT NMEA ARINC CAN



Status: 3D Fix	Lat: S34.05.221	HACC 26 ft	HPL:
Tracking 7	Long: E018.49.214	VACC 24 ft	VPL:
Sunrise 04:07	Alt: 27ft	HFOM:	HUL:
Sunset: 17:49	Var: W025.8	VFOM:	VUL:
UTC offset 0:00	UTC: 03.02.17 09:54	NAV:	SS:

GPS status field here showing RAIM status, alternates with GPS based altitude

Satellite positions and elevations above the horizon relative to north (up)

GPS information displays

Satellites in view, green are tracked. Shows signal levels and IDs

Tap on the GPS status field to open the detailed GPS information display.

Tap on any of the buttons to select a preferred GPS source (note that it may not necessarily get used depending on what sources are available).

Note that to make your selection permanent you should select the GPS source in the system setup menu → GPS operation setup menu.

GPS Information items

Status: No Fix, 2D Fix, 3D fix (ARINC can only be No Fix or 2D fix)

Tracking: The number of satellites that are tracked (not available with ARINC)

Sunrise/sunset: Time calculations based on your UTC offset (set in the “Common tasks menu”).

UTC offset: The time entered in the “Common tasks menu”

Lat/Long: Latitude and Longitude in the chosen position units (Units setup menu).

Alt: The GPS altitude above mean sea level if 3D fix is available.

Var: The magnetic variation at your location based on position and the date of your system real time clock.

UTC: UTC time from the GPS (not available with ARINC)

HACC/VACC Horizontal and vertical accuracy estimates for the internal GPS based on u-blox algorithms.

HFOM,VFOM: Horizontal and Vertical figure of merit (certified GPS source only)

NAV: Navigation quality status flags

HPL,VPL: Horizontal and Vertical protection limit (certified GPS source only)

HFOM,VFOM: Horizontal and Vertical figure of merit (certified GPS source only)

SS: SDA and SIL as dictated by the GPS module (only available for CAN based GPS)

Raim and accuracy

If Raim is available (at least 5 satellites must be tracked), estimated accuracy is provided as follows:

If better than 40meters horizontal and 50 meters vertical then

“Precision approach”

else if better than 0.3NM then

“Non-precision approach”

else if better than 1.0NM then

“Terminal”

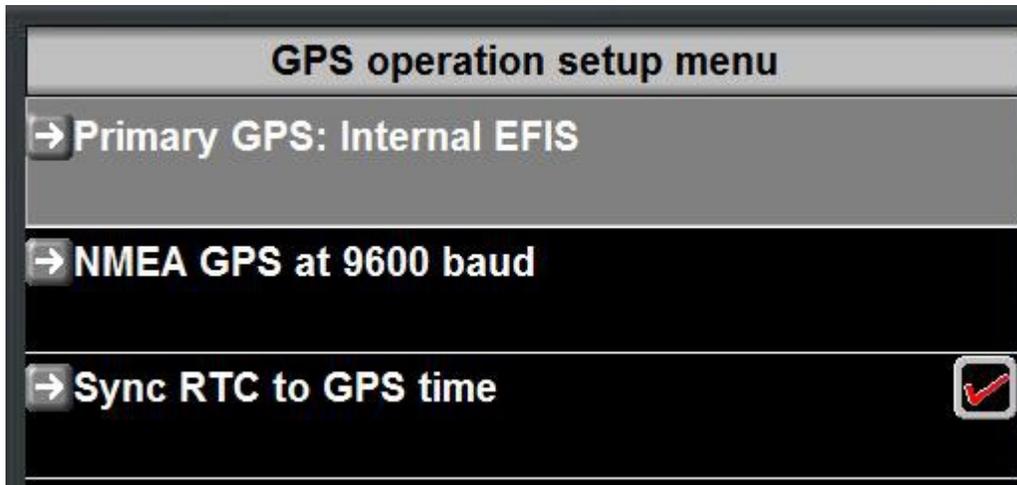
else if better than 2.0NM then

“Enroute”

else the GPS status field will show a yellow background with the text “>Limit”.

Raim accuracy is highly affected by blanking and few visible satellites so make sure your GPS antenna has a good view of the sky and no metallic or RF absorbing structures obscure any part of the sky as far as is possible.

GPS setup menu



Primary GPS

Select the desired primary GPS to use in the system. It is recommended to leave this in internal EFIS. Note that this does not affect the certified GPS data that may be available if you have a certified GPS source as this will be routed to the required destinations without intervention.

NMEA GPS baudrate

This is the baudrate applicable for your NMEA port both for receiving as well as transmitting NMEA data,

Note that some TABS compliant GPS sources transmit at 115.600 Baud.

Sync RTC to GPS time

Tick this box if you would like your internal real time clock to be synchronized to GPS time. Your UTC offset entered into the “Common Tasks menu” will be taken into account.

Synchronization happens about one minute after a valid GPS fix to allow time correction data to be received from the satellites as the actual time sent has now drifted significantly due to relativistic effects.