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SERVICE INFORMATION LETTER

A. Subject

Effects of GPS Jamming/Spoofing on Honeywell's Flight Management Systems

B. Effectivity

(1) This Service Information Letter (SIL) is applicable to the aircraft certifications listed in Table 1.

Table 1. Applicable Part Numbers

Aircraft Identification	Part Number [1]
All NZ-2000 Equipped Aircraft (NZ6.0 or earlier)	7018879-02xxx
	7018879-03008
	7018879-0301x
	7018879-0302x
	7018879-03030
All NZ-2010 Equipped Aircraft	7018879-03034 (NZ6.1)
	7018879-03036 (NZ6.1)
	7018879-03038 (NZ6.1)
	7018879-03040 (NZ6.1)
	7018879-03042 (NZ6.1)
	7018879-03044 (NZ6.1)
	7018879-03046 (NZ6.1.1)
	7018879-03048 (NZ6.2.2)
Bombardier Global Express	7017300-6100x (NZ6.0 and earlier)
	7017300-61010 (NZ6.1)
	7017300-61013 (NZ6.1)
	7017300-61014 (NZ6.1.1)
Cessna Citation 550/560 (Bravo, Encore, Excel, XLS)	7017000-9x8xx

Publication Number D202311004193

Table 1. Applicable Part Numbers (Cont)

Aircraft Identification	Part Number [1]
Cessna Citation X	7017300-312xx (NZ6.0 or earlier)
	7017300-313xx (NZ6.0 or earlier)
	7017300-314xx (NZ6.0 or earlier)
	7017300-31524 (NZ6.0 or earlier)
	7017300-31534 (NZ6.0 or earlier)
	7017300-31554 (NZ6.1)
	7017300-31564 (NZ6.1)
	7017300-31574 (NZ6.1)
	7017300-31584 (NZ6.2.1)
Cessna Sovereign	EB7031847-00106 (Phase 4)
	EB7031847-00108 (Phase 4.1)
	EB7031847-00109 (Phase 4.2)
	EB7031847-00111 (Phase 5)
	EB7031847-00114 (Phase 5.2)
	EB7031847-00115 (Phase 5.3)
Dassault Falcon F900 EX/C	7017300-4xx1x (NZ6.0 or earlier)
	7017300-4xx20 (NZ6.0 or earlier)
	7017300-4xx22 (NZ6.0 or earlier)
	7017300-4xx23 (NZ6.0 or earlier)
	7017300-4xx24 (NZ6.0 or earlier)
	7017300-4xx25 (NZ6.1)
	7017300-4xx26 (NZ6.1)
	7017300-4xx27 (NZ6.1)
	7017300-4xx28 (NZ6.1.1)

Publication Number D202311004193

Table 1. Applicable Part Numbers (Cont)

Aircraft Identification	Part Number [1]
Dassault Falcon 2000 DX/EX/LX/S	EB7036889-00203 (EASy I, Load 12)
	EB7036889-00205 (EASy I, Load 14)
	EB7036889-00207 (EASy II 1st Cert, Legacy I/O)
	EB7036889-00208 (EASy II 2nd Cert, Legacy I/O)
	EB7036889-00209 (EASy II 2nd Cert, NGO)
	EB7036889-00210 (EASy II 3rd Cert, Legacy I/O)
	EB7036889-00212 (EASy II 3rd Cert, NGIO)
	EB7036889-00213 (EASy II 3rd Cert, NGIO)
	EB7036889-00215 (EASy II 4th Cert, NGIO)
	EB7036889-00216 (EASy II 4th Cert, Legacy I/O)
Dassault Falcon 6x	EB60001547-0101 (EASy IV Load 6.0)
	EB60001547-0101 (EASy IV Load 6.2)
Dassault Falcon 7x	EB7034843-00107 (EASy II, 2nd Cert)
	EB7034843-00108 (EASy II, 2nd Cert, NGIO)
	EB7034843-00110 (EASy II, 3rd Cert)
	EB7034843-00112 (EASy II, 4th Cert, Legacy I/O)
	EB7034843-00114 (EASy II, 4th Cert, NGIO)
	EB7034843-00118 (EASy II, 5th Cert, Legacy I/O)
	EB7034843-00119 (EASy II, 5th Cert, NGIO)
Dassault Falcon 7/8X	EB60007394-0116 (EASy IV, Load 18.0)
Dassault Falcon 8X	EB60001546-0109 (EASy III, 1st Cert)
	EB60001546-0111 (EASy III, 2nd Cert)
	EB60001546-0113 (EASy III, 3rd Cert)
	EB60001546-0115 (EASy III, Charts Fix)
	EB60001546-0117 (EASy III, I/O Mini Cert)

Publication Number D202311004193

Table 1. Applicable Part Numbers (Cont)

Aircraft Identification	Part Number [1]
Dassault Falcon F900 EX/C	EB7036889-00114 (EASy II 1st Cert)
	EB7036889-00117 (EASy II 2nd Cert, Legacy I/O)
	EB7036889-00118 (EASy II 2nd Cert, Legacy I/O)
	EB7036889-00120 (EASy II 2nd Cert, NGO)
	EB7036889-00121 (EASy II 3rd Cert, NGIO)
	EB7036889-00122 (EASy II 3rd Cert, Legacy I/O)
	EB7036889-00123 (EASy II 4th Cert, NGO)
	EB7036889-00124 (EASy II 4th Cert, Legacy I/O)
	EB7036889-00125 (EASy II 6th Cert, NGIO)
Dornier DO-328	7017300-1xxxx (NZ6.0 or earlier)
	7017300-11200 (NZ6.2)
	7017300-11210 (NZ6.2.1)
Embraer 170/175/190/195/Lineage 1000	PS7027709-00127, -00214 (Load 23.1)
	PS7027709-00129, -00217 (Load 23.2)
	PS7027709-00302 (Load 25.2)
	PS7027709-00304 (Load 25.3)
	PS7027709-00305 (Load 25.4)
	PS7027709-00309 (Load 25.5.0.1)
	PS7027709-00310 (Load 25.6)
	PS7027709-00311 (Load 25.7)
	PS7027709-00312 (Load 25.8)
	PS7027709-00315 (Load 25.9)
Embraer 170/175/190/195	PS60002067-0306 (Load 27.1)
	PS60002067-0308 (Load 27.2)
	PS60003259-0313 (Load 27.3)
	PS60003259-0314 (Load 27.4)
	PS60003259-0315 (Load 27.4.0.1)

Table 1. Applicable Part Numbers (Cont)

Aircraft Identification	Part Number [1]
Embraer 190 E2	PS60003155-0103 (Load 5.0.1)
	PS60003155-0104 (Load 5.7)
	PS60003155-0102 (Load 7.0)
	PS60003155-0105 (Load 7.5)
	PS60003155-0105 (Load 9.0)
Gulfstream GV	7017300-56020 (NZ6.0 or earlier)
	7017300-56021 (NZ6.0 or earlier)
	7017300-56022 (NZ6.0 or earlier)
	7017300-56023 (NZ6.0 or earlier)
	7017300-56025 (NZ6.0 or earlier)
	7018879-11009 (NZ6.0 or earlier)
	7018879-1101x (NZ6.0 or earlier)
	7018879-11023 (NZ6.0 or earlier)
	7017300-56026 (NZ6.1)
	7017300-56027 (NZ6.1)
	7017300-56028 (NZ6.1.1)
	7018879-11024 (NZ6.1)
	7018879-11025 (NZ6.1)
	7018879-11027 (NZ6.1.1)
Gulfstream G350/G450	EB7031236-00417 (ASC910)
	EB7031236-00420 (ASC911)
	EB7031236-00421 (ASC912)
	EB7031236-00422 (ASC912B)
	EB7031236-00424 (ASC912C)
Gulfstream G500	EB60001034-0102
	EB60001034-0104 (ASC900)
	EB60001034-0106 (ASC901)

Publication Number D202311004193

Table 1. Applicable Part Numbers (Cont)

Aircraft Identification	Part Number [1]
Gulfstream G550/G500-5000	EB7031236-00321 (ASC910)
	EB7031236-00323 (ASC911)
	EB7031236-00325 (ASC912)
	EB7031236-00328 (ASC912B)
	EB7031236-00330 (ASC912C)
Gulfstream G600	EB60001034-0103
	EB60001034-0106 (ASC901)
Gulfstream G650/G650ER	EB7038683-00104 (ASC902/902A)
	EB7038683-00106 (ASC902B)
	EB7038694-00105 (ASC903)
HAIG Y-12F	EB60002734-0106 (Load 4.8)
Hawker 4000	EB7030192-00104 (Load 19)
	EB7030192-00105 (Load 19)
	EB7030192-00107 (Load 19)
	EB7030192-00108 (Load 19)
	EB7030192-00109 (Load 19)
	EB7030192-00111 (Load 19)
	EB7030192-00113 (Load 19)
	EB60000578-00114 (Load 20)
Leonardo Helicopters AW139	EB7030191-00105 (Phase 4)
	EB7030191-00107 (Phase 5)
	EB7030191-00108 (Phase 6)
	EB7030191-00109 (Phase 6, DU HW3)
	EB7030191-00110 (Phase 7, v1)
	EB7030191-00111 (Phase 7, v3)
	EB7030191-00112 (Phase 7, v4)
	EB7030191-00114 (Phase 7 MC (sw 7.12))
	EB7030191-00115 (Phase 7 MC (sw 7.14))
	EB7030191-00117 (Phase 7 MC (sw 7.12.2))
	EB7030191-00118 (Phase 7 MC (sw 7.14.2))
	EB7030191-00113 (Phase 8)

Table 1. Applicable Part Numbers (Cont)

Aircraft Identification	Part Number [1]
Pilatus PC-12 NG/NGX	EB7037248-00104 (Build 7.2)
	EB7037248-00105 (Build 8)
	EB7037248-00106 (Build 8.3.3)
	EB7037248-00107 (Build 8.5)
	EB60000487-00108 (Build 8.6)
	EB60000487-00109 (Build 8.7)
	EB60000487-00111 (Build 8.8)
	EB60000487-00110 (Build 10)
	EB60000487-00112 (Build 10.9)
	EB60000487-00113 (Build 11)
	EB60000487-00114 (Build 11.1)
	EB60003299-00116 (Build 12.6.1)
Pilatus PC-24	EB60000491-0100 (Load 3.6)
	EB60000491-0101 (Load 3.6.1)
	EB60000491-0102 (Load 3.10)
	EB60000491-0104 (Build 5.0)
Viking DHC6-400	EB7032889-00101 (Load 1.3)
	EB60002734-0104 (Load 4.4)

NOTE:

1. This table is intended to represent the majority of aircraft with Honeywell FMS and navigation systems. However, do not consider it to be complete. Contact Honeywell AeroTechSupport for assistance or questions regarding applicability.

C. Reason

(1) The purpose of this SIL is to provide awareness of symptoms likely to be experienced when operating in an environment where GPS interference such as jamming or spoofing is taking place. Operators have reported being victims of GPS spoofing. Reports include loss of navigation sensors, FMS position, and the aircraft turning from the intended flight path.

D. References

(1) SIL Publication Number D202309004138, 'Terrain Awareness Caution (TACAUT)' and 'Terrain Pull Up (TAPU)' alerts from EGPWS systems due to GPS Jamming/Spoofing issue.

(2) Knowledge Article 000043548: Embraer 195 - GPS – Spoofing Event over Turkish Airspace.

(3) To find, see, and download Honeywell Technical Publications, go to https://aerospace.honeywell.com.

(4) External Resources:

(a) https://www.gps.gov/support/user/: GPS Service Outages and Status Reports

(b) https://gpsjam.org/: Daily map of GPS Interference.

E. Summary

(1) GPS Jamming:

(a) GPS jamming occurs when the signal to a GPS receiver is blocked or lost. This is often caused by inducing simple interference on the GPS frequency band. When jamming is experienced, the navigation system recognizes the loss of a legitimate signal and continues to operate per design without it. For example:

1 GPS Position blanks out

a The GPS status mode is not in NAVIGATION or DIFFERENTIAL. It is likely in ACQUISITION.

2 The flight management system uses other available sensors to maintain its position. EPU will increase slightly to that of the next sensor. The active navigation mode is displayed, likely IRS or DMEDME or VORDME.

3 Synthetic Vision reverts to basic 'Blue over Brown' mode.

4 ADS-B cannot broadcast GPS position.

(b) Common Alerts associated with GPS jamming:

1 GPS X FAILED

2 UNABLE RNP (If EPU exceeds the RNP of the current flight path leg)

3 UNABLE RNP NEXT WPT (If EPU is expected to exceed the RNP of the next flight path leg)

4 ADS-B FAIL/ATC ADS-B TRANSMITTER FAIL

5 FMS/GPS POSITION MONITOR UNAVAILABLE

(c) The Honeywell avionics and navigation systems are designed to handle loss of GPS and it will continue to operate as intended, using the remaining navigation sensors. GPS jamming does not result in misleading guidance.

(d) The FMS and other systems normally recover when out of the jamming area and corrective actions are not expected to be necessary.

(2) GPS Spoofing:

(a) GPS spoofing occurs when a counterfeit GPS signal is used to replace the true GPS signal with a fake position that the system does not identify as being false.

(b) When spoofing occurs the avionics systems that use GPS are compromised, but their behaviors differ. Due to variations in types of spoofing and which portions of GPS data are being spoofed, not all symptoms described here may be observed. When a spoofed GPS signal is received representing a non-moving GPS position, the following are commonly observed:

1 GPS position appears at a different location while Hybrid and FMS position drift towards it. Refer to Figure 1.

6 and 4- Line MCDU POS SENSORS | TSC Pos Sensors | Graphical Position Sensors (APEX) | Graphical Position Sensors (EASy)

ICN-58960-1000063012-001-01

Figure 1. Position Sensors -GPS Position is Notably Different than FMS Position

a Groundspeed and GPS altitude are incorrect (usually 0 kts or low speed, and at the altitude for the LAT/LON being spoofed). GPS navigation mode, Figure of Merit (FOM) and Horizontal Integrity Limit (HIL) appear to be correct. GPS time may be incorrect. GPS position is typically frozen. Refer to Figure 2.

b Initial distance to current FMS POSITION is large but getting smaller as FMS position drifts. Refer to Figure 2.

Publication Number D202311004193

6 and 4-Line MCDU GPS STATUS Pages

Graphical GPS Status (EASy and APEX)

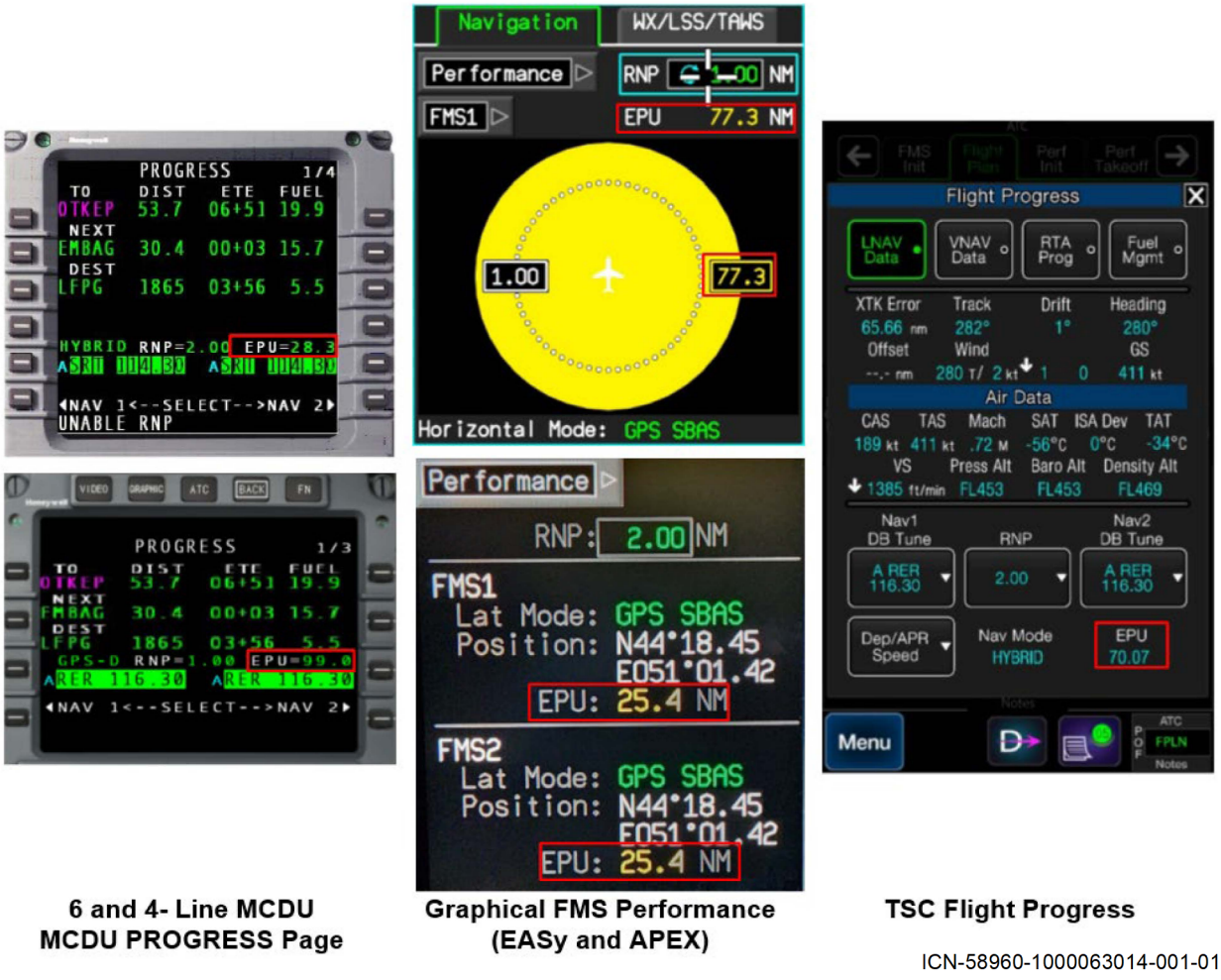
TSC GPS Tab

ICN-58960-1000063013-001-01

Figure 2. GPS STATUS Indicates Incorrect Position, Speed Altitude and Time, but Modes Appear to be Correct

2 FMS System EPU rapidly increases. This is due to conflicting position between the Hybrid IRS/GPS and Nav Radios and Pure IRS. Refer to Figure 3.

Publication Number D202311004193



6 and 4- Line MCDU MCDU PROGRESS Page

Graphical FMS Performance (EASy and APEX)

TSC Flight Progress

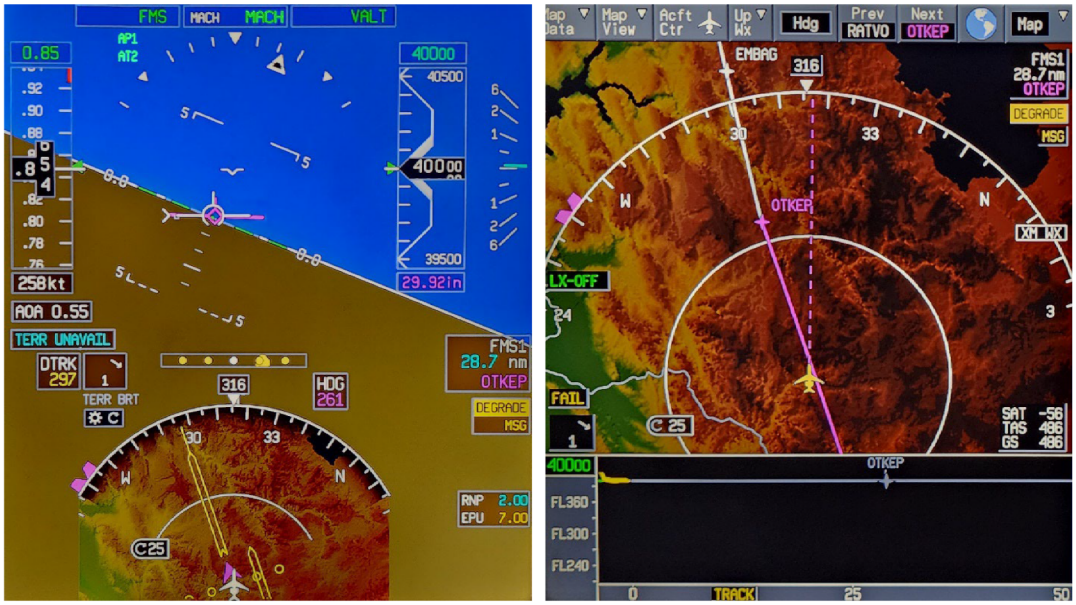
ICN-58960-1000063014-001-01

Figure 3. FMS System EPU During Spoof

a Aircraft position on Navigation Display pulls away from flight plan. Refer to Figure 4.

1. FMS commands turn (attempts to get back on path).
2. Lateral deviations increase.

Publication Number D202311004193



GPS position is far away from FMS/Pure IRS position. FMS position is being pulled towards it.

GPS position is far away from FMS/Pure IRS position. FMS position is being pulled towards it.

ICN-58960-1000063015-001-01

Figure 4. GPS position is far away from FMS/Pure IRS Position. FMS position is being pulled towards GPS and away from the Flight Path

3 Synthetic vision jumps to spoofed GPS position and/or fails to blue-over-brown.

4 Ground proximity warnings/Pull Up and Terrain aural warnings associated with low GPS altitude.

5 If on approach:

a GPS-based lateral and vertical deviations are unreliable/pegged or failed.

6 System clock changes to spoofed GPS time.

a May cause CMF logs to be mixed up, messages to time out.

b Potential Impact to PNR/ETE/ETP, ETA/Fuel predictions.

c GPS Almanac goes out of date.

7 ADS-B fails.

8 Heads-up display position/path deviation data unreliable/pegged or failed.

(c) Common Alerts associated with GPS Spoofing:

1 CHECK GPS X POSITION (FMS and GPS position differ by more than 10nm)

Publication Number D202311004193

2 CHECK IRS X POSITION (FMS and Pure IRS position differ by more than 10nm)

3 CHECK VORDME X POSITION (FMS and Nav Radio position differ by more than 10nm)

4 FMS – GPS POS DISAGREE

5 FMS 1-2-3 GPS MISCOMPARE

6 DEGRADE annunciator

7 UNABLE RNP (when EPU exceeds the RNP of the current flight path leg)

8 UNABLE RNP NEXT WPT (when EPU is expected to exceed the RNP of the next flight path leg)

9 ADS-B FAIL/ATC ADS-B TRANSMITTER FAIL

(d) For Navigation/Guidance purposes, the FMS position can be protected if all GPS input is removed from the FMS position solution.

(3) GPS Spoofing and IRSs

(a) All IRSs provide a pure inertial position, that is unaffected by GPS spoofing while enroute.

(b) **Non-Hybrid IRS**

1 Non-hybrid IRS provides pure independent inertial position.

2 IRS position is Initialized at aircraft power-up.

a Pure IRS position is independently computed and naturally drifts during the flight.

b Position output is based on IRS internal sensors with an ADC altitude correction. There is no dependency on any other position sensor after alignment.

c GPS Spoofing has no impact on pure IRS position.

(c) Non-Hybrid Honeywell IRSs are typically found on aircraft with NZ-2000/2010 and IC-800/810 aircraft.

(d) **Hybrid IRS Position**

1 Hybrid IRS is a single unit that provides both separate pure IRS and GPS-augmented IRS positions.

2 Systems using Hybrid IRSs always consider the input as 2 separate position sensors. The FMS user interfaces vary as to how the separate positions are displayed.

3 Pure IRS position is initialized at aircraft power-up and is the same as described above in Paragraph E.(3)(b).

Publication Number D202311004193

4 GPS-augmented IRS position is Initialized at aircraft power-up.

a Internal sensor data and GPS pseudo-range is combined for better position accuracy including when GPS is unavailable.

NOTE: Some Hybrid IRS models detect large jumps in GPS position and remove the GPS portion from the Hybrid IRS position output.

b Hybrid IRS without GPS Step Protection (Laseref V)

1. The Hybrid IRS position continues to use the GPS signal even when the GPS signal is spoofed.
2. Hybrid IRSs without Step Protection are typically found on Embraer E1, Gulfstream G350/G450, G550/G500-5000 and Dassault EASy II aircraft.

c Hybrid IRS with GPS Position Step Protection (Laseref VI)

1. When the GPS signal is spoofed, a position step is detected and the GPS signal is removed from the Hybrid IRS position that is sent to the FMS.
   – GPS is excluded for a short duration of time (specific time varies depending on distance to spoofed position).
2. FMS continues to use the Hybrid IRS position and annunciates HYBRID as the Navigation Mode.
3. If nothing else changes regarding the spoofed GPS signal, the Hybrid IRS will re-introduce the spoofed GPS signal into its Hybrid IRS position output. If the Hybrid IRS is still being used by the FMS, the FMS position will begin to move towards the spoofed GPS position.
4. Hybrid IRSs with Step Protection are typically found on Embraer E2, Gulfstream G500/G600, G650 and Dassault EASy III/IV aircraft.

NOTE: Hybrid IRSs may be configured to operate in a non-hybrid mode. For aircraft configured this way, the operation regarding spoofing behavior is similar to the non-Hybrid IRSs. This is common with Embraer E1, Pilatus and Dassault EASy aircraft. Refer to OEMs if more information is needed regarding your configuration.

(4) Navigation and Guidance Behavior During Spoofing Events

(a) If nothing is done during a spoofing event, the FMS position will begin to drift towards the spoofed GPS position. Refer to Figure 5.

1 In the case of the Laseref VI, this behavior will be delayed for a few minutes but will eventually occur.

(b) As the FMS position pulls away from airplane's real position and the flight plan, if the aircraft remains in LNAV mode with the autopilot engaged, the FMS

commands a turn to steer the FMS position back onto the flight plan path. This steers the real position off the path, away from the GPS spoofed position.

1 Most reports indicate that the FMS position is pulling away faster than the aircraft can recover the path resulting in maximum lateral deviations

(c) The rate at which the FMS position pulls away from the flight path varies and is dependent on the type of IRS installed, the type of spoof, and how far the spoofed GPS position is from the true position

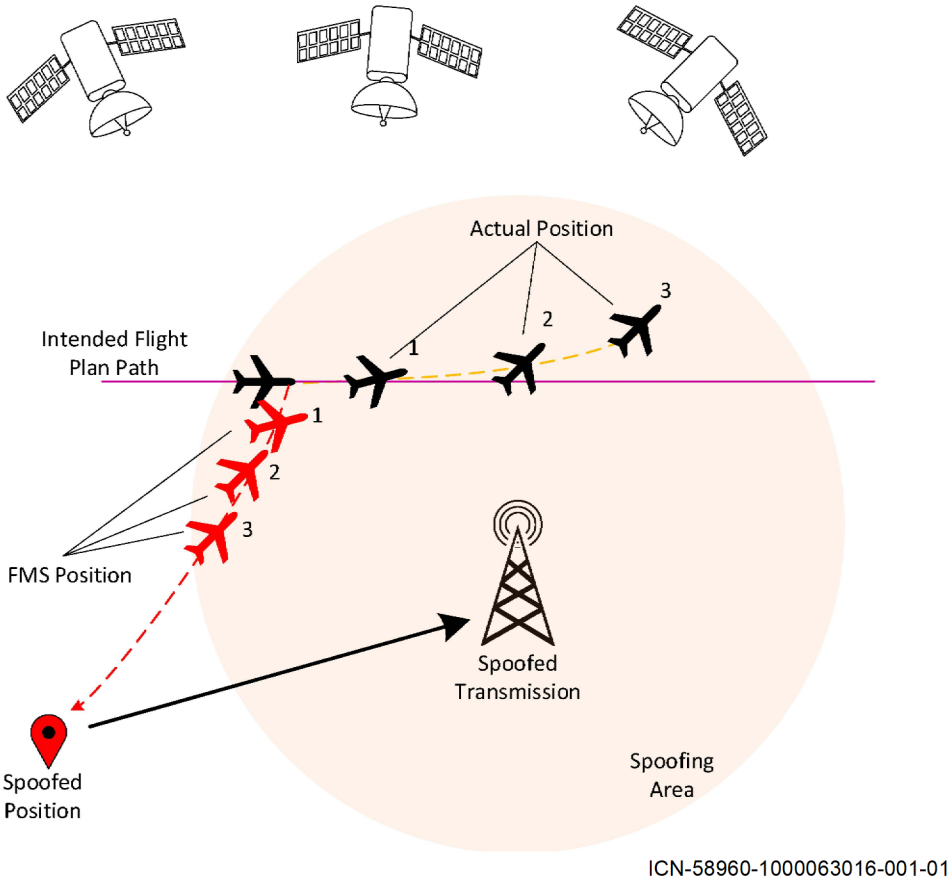


Figure 5. FMS Position and Steering During Spoof

(d) FMS Navigation Mode Selection is based on the sensor with the best individual accuracy. When all possible navigation sensors are enabled, the Navigation Mode hierarchy is:

1. Hybrid
2. GPS-D/GPS
3. Nav Radio (DMEDME)

Publication Number D202311004193

4. Nav Radio (VORDME)
5. IRS/AHRS

NOTE: Pure IRS EPU is based on the last best sensor accuracy, so it will often be the active navigation mode after GPS, but prior to a Nav Radio navigation mode being active. Its EPU increases due to the IRS drift rate.

(e) A spoofed GPS signal impacts the Hybrid IRS position and GPS position. When Hybrid IRS and GPS position sensors are disabled, the FMS operates using only Nav Radio and pure IRS positions.

1 In this mode system EPU is naturally higher than GPS/Hybrid IRS EPU but is protected from the spoof.

(f) Nav Radio positions and pure IRS positions are unaffected by GPS spoofing.

(g) If a spoof event has occurred and Hybrid IRS and GPS sensors are removed from use, the EPU is likely to have ramped out of range. It can be restored by performing a manual FMS Position update to a pure IRS position and getting into a Nav Radio navigation mode.

1 FMS position is used to autotune nearby navaids, so it requires correction if it has been pulled too far away. Otherwise, manual Nav Radio tuning and navigation will be required.

2 Pure IRS position will have drifted since aircraft power-up but will be close enough to the true aircraft position to restore the FMS auto-tuning Nav Radio candidate list.

(h) Removing position sensors on the FMS does NOT influence other systems outside the FMS. It only protects the FMS position solution and FMS guidance to the flight plan. Systems outside of the FMS need to be dealt with separately.

(i) On aircraft with AHRS, FMS position follows the spoofed GPS position:

1 If the FMS also has IRS and/or Nav Radio tuning capability, EPU will increase due to mismatch in positions and associated alerting would be expected.

2 If FMS has neither IRS nor Nav Radio tuning capability, position comparison alerting will be limited.

(5) Monitoring for restored GPS signal

(a) If Hybrid IRS and GPS sensors have been removed from the FMS position solution and the FMS is navigating normally using Nav Radios and pure IRS, the GPS status page can be monitored for restoration of a normal GPS signal. Refer to Figure 6.

1 The GPS position will begin moving normally.

2 GPS groundspeed will be accurate.

3 The distance to FMS position will be reasonable.

4 The GPS clock will be correct.

5 The GPS altitude will be correct.

Publication Number D202311004193

GPS Status Page **Graphical GPS Status** **TSC GPS Status**

ICN-58960-1000063017-001-01

Figure 6. GPS Status After Leaving Spoofing area

(b) Other systems recover independently of the FMS when outside of the spoofing area, but each system is different and may require additional pilot action. Refer to your aircraft OEM and/or company information for guidance.

(6) Key Takeaways:

(a) GPS jamming and/or spoofing can occur in any phase of flight and normally self-recovers when out of the area.

1 Due to the evolving ability to jam/spoof a GPS and the abnormal conditions it causes, a GPS receiver may not recover without a restart. Refer to OEM guidance if this experienced.

(b) GPS sensor FAIL messages are an indicator of GPS jamming.

(c) CHECK GPS X POSITION and other ‘Position Miscompare’ messages are an indication of GPS spoofing. Not all systems self-recover when outside of the spoofing area and care needs to be taken to restore the desired navigation mode if mitigations have been applied.

(d) CHECK GPS X POSITION and FMS – GPS MISCOMPARE messaging is the first indication of a position mis-compare (likely a spoof). Additional messaging and negative behaviors begin to occur after that. Refer to your aircraft OEM and/or company information for guidance on any necessary actions.

(e) Non-Hybrid IRSs are not affected by GPS spoofing.

(f) Hybrid IRSs provide two sets of position data. The Hybrid IRS position is affected by GPS spoofing, while pure IRS position is not.

Publication Number D202311004193

(g) Nav Radio position is not affected by GPS spoofing, but autotuning capability is. FMS position may need to be corrected if autotuning is not finding any known nearby stations.

F. Action

(1) Honeywell recommends that the flight crews be prepared for the possibility of jamming/spoofing in any phase of flight. Review NOTAMs and refer to jamming/spoofing awareness maps or websites for information along your route.

(2) Refer to your aircraft OEM and/or company information regarding your aircraft's configuration and for operational guidance prior to departure. Follow that guidance for mitigating jamming and spoofing events and for recovery procedures. Each product using GPS sensor data is different and may require different mitigations and actions.

G. Contact Information

(1) The Honeywell Aerospace Technical Support (ATS) team can be contacted for additional information on this service information letter.
Go to Honeywell website for advanced troubleshooting, Technical assistance, or to speak with Honeywell ATS personnel.

https://aerospace.honeywell.com/us/en/support-and-resources/contact-us

H. Summary of Change

This is an INITIAL release.

I. Revision History

This service information letter has had no revision(s) as shown in Table 2.

Table 2. Revision History

Revision Number	Revision Date
0	15 Dec 2023

Export Control

These items are controlled by the U.S. government and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. government or as otherwise authorized by U.S. law and regulations.

ECCN: 9E991

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