Irish Aviation Authority The Times Building 11–12 D'Olier Street Dublin 2, Ireland www.iaa.ie	Údarás Eitlíochta na hÉireann Foirgneamh na hAmanna 11–12 Sráid D'Olier Baile Átha Cliath 2, Éire	AERONAUTICAL NOTICE No. S.31 ISSUE 3 DATE 26/05/2025	

Performance of the Global Navigation Satellite System (GNSS) Signal in Space (SiS)

1. Introduction and Scope

1.1 This aeronautical notice sets out the requirements and provides guidance on the assessment of the GNSS Signal in Space (SiS) which must be completed by ANSP's planning to implement or currently implementing GNSS Instrument Approach Procedure's (IAP's).

1.2 Commission Implementing Regulation (EU) 2017/373 as amended, lays down common requirements for providers of air traffic management/air navigation services.
For ATS providers, a safety assessment in accordance with Regulation (EU) 2017/373; ATS.OR.205 must be systematically conducted for any changes to their functional system. This safety assessment includes hazard identification, determination of safety criteria and risk assessment (risk analysis and risk evaluation including additional risk mitigation if required), verification and specification of monitoring criteria.
For service providers other than Air Traffic Services providers, a safety support assessment in accordance with Regulation (EU) 2017/373; ATM/ANS.OR.C.005, must be conducted out for changes to their functional system.

2. RNAV (GNSS) Instrument Approach Procedures

2.1 Planned changes to Air Navigation Services including instrument approaches supported by GNSS shall be assessed by the ANS Provider as being adequately safe.

2.2 Regulation (EU) 2017/373 requires that providers of navigation services shall be able to demonstrate that their working methods and operating procedures are compliant with the standards of ICAO Annex 10, Volume I.

2.3 When assessing the safety of a GNSS IAP, the ANSP shall consider the performance of the GNSS system, even though the GNSS system is outside of the ANSP's direct control. The ANSP shall establish a safety argument that the GNSS SiS meet's the minimum SiS performance requirements defined in ICAO Annex 10 Volume 1, Chapter 3, Table 3.7.2.4-1.

3. RNAV GNSS LNAV and LNAV/VNAV IAP's

3.1 LNAV (Lateral Navigation) and LNAV/VNAV (Lateral Navigation/Vertical Navigation)

refer to Non-Precision Approach and APV BARO VNAV respectively. The Non-Precision Approach requirements in Annex 10, Volume 1, Chapter 3, table 3.7.2.4-1 apply to the lateral aspects of both types of approach.

3.2 Continuity – ANSP's shall derive a continuity requirement in the range of values between 1-1x10^{-4}/h to 1-1x10^{-8}/h.
Note: Guidance on how to set the specific value can be found in ICAO, Annex 10, Attachment D, section 3.4.

3.3 Continuity – ANSP's shall verify that the GPS SiS performance meets the derived continuity requirement. Note: Loss of continuity is considered to be when the horizontal alert limit (556m or 0.3 NM) cannot be achieved for 10 Seconds or more, during a period when Receiver Autonomous Integrity Monitor (RAIM) is predicted to be available.

3.4 Availability - ANSP's shall derive an availability requirement in the range of values between 0.99 to 0.99999 and verify that the GPS SiS performance meets the derived availability requirement. Note: Guidance on how to set the specific value can be found in ICAO Annex 10 Attachment D section 3.5.

3.5 Horizontal Accuracy - An ANSP shall ensure that the GPS SiS Horizontal Accuracy is better than 220 m (720 ft).

3.6 Integrity - An ANSP shall ensure that the GPS SiS integrity performance meets a probability of 1-1 x 10^{-7}/h). Note: The integrity requirement is based upon the combination of the minimum performance of the receiver RAIM algorithm as specified in RTCA DO -208 and the GPS integrity performance.

3.7 To assist ANSP's assessing the performance of the GPS SiS for LNAV and LNAV/VNAV GNSS IAP's, the IAA has contracted a third party to monitor and analyse the performance of the GPS SiS, both by direct monitoring and analysis of NANU's (Notice Advisory to NAVSTAR Users), and to provide integrity and continuity analysis reports on a regular basis.

Note: It is reasonable to claim that this integrity and continuity analysis data would be representative of all locations in Ireland where terrain masking is not an issue.

Note: Real time monitoring of the GPS signal is vested in the RAIM algorithm of the aircraft receiver and is not the responsibility of the ANSP.

Note: When accessing the initial and ongoing compliance of the GPS SiS to ICAO SARP's, ANSP's may use the integrity and continuity analysis data being made available by the IAA or other third-party data.

3.8 These GPS integrity and continuity analysis reports are being made available by the

IAA to Irish ANSP's and can be accessed at https://www.iaa.ie/publications.

4. RNAV GNSS LPV IAP's

4.1 LPV refers to Approach Procedure with Vertical Guidance (APV I) which is achieved with GPS augmented by EGNOS.

4.2 Continuity - An ATS provider shall ensure that the GNSS SiS performance meets a continuity requirement of 1 - 8 x 10^{-6} per 15 Sec.
Note: EGNOS may not achieve the continuity requirement as defined above, this is recognised in guidance material in Annex 10 Volume 1 attachment D, which states that: 'the specific risk of loss of continuity for a given approach could exceed the average requirement without necessarily affecting the safety of the service provided or the approach.' Continuity risk should be considered in respect of air traffic management and ATC workload.

4.3 Availability - ANSP's shall derive an availability requirement in the range of values between 0.99 to 0.99999 and verify that the GNSS SiS performance meets the derived availability requirement. Note: Guidance on how to set the specific value can be found in ICAO Annex 10 Attachment D section 3.5.

4.4 Horizontal Accuracy - An ANSP shall ensure that the GNSS SiS Horizontal Accuracy is better than 16.0 m (52 ft).

4.5 Vertical Accuracy - An ANSP shall ensure that the GNSS SiS Vertical Accuracy is better than 20m (66 ft) for APV I.

4.6 Integrity - An ANSP shall ensure that the GNSS SiS integrity meets a probability of 1 - 2 x 10^{-7} in any approach.

4.7 The European Satellite Services Provider (ESSP) continually monitors the performance of EGNOS and publishes monthly performance reports on its website. http://www.essp-sas.eu These reports can be used by ANSP's to assess the initial and ongoing compliance of the GNSS SiS against the ICAO SARP's.

5. Further Information

Requests for further information should be submitted to: ansdinfo@iaa.ie