

EU's transition to PBN in SES

ICAO EUR/MID Radio Navigation Symposium

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Your safety is our mission.

Implementation timeline

AP = approach
EN = en route
A/D = arrival/departure

By 3 DEC
2020

- ⑩ AP: RNP APCH to LNAV, LNAV/VNAV & LPV minima or RNP AR APCH procedures at all IREs without PA, except if located at 'PCP airports', plus RF where required
- ⑩ EN: RNAV 5 for continental ATS routes at or above FL150
- ⑩ EN: RNP 4 or RNAV 10 for oceanic/remote ATS routes at or above FL150

By 25 JAN
2024

- ⑩ AP: RNP APCH to LNAV, LNAV/VNAV & LPV minima or RNP AR APCH procedures at IREs served with PA or IREs located at 'PCP airports', plus RF where required
- ⑩ EN: RNAV 5 for continental ATS routes established below FL150
- ⑩ EN: RNP 4 or RNAV 10 for oceanic/remote ATS routes below FL150
- ⑩ EN: RNP 0.3 or RNP 1 or RNAV 1 for ATS continental/remote routes for rotorcraft operations below FL150
- ⑩ A/D: RNAV 1 or RNP 1(+) for at least one established SID/STAR (at IREs)
- ⑩ A/D: RNP 0.3 or RNP 1 or RNAV 1 for at least one established SID/STAR for rotorcraft operations (at IREs)

By 6 JUN
2030

- ⑩ A/D: RNAV 1 or RNP 1(+) applicable to all SIDs/STARs, where established
- ⑩ A/D: RNP 0.3 or RNP 1 or RNAV 1 applicable to all SIDs/STARs for rotorcraft operations, where established

RNP 1(+) = RNP 1 including RF and/or vertical paths constraints, where required

IRE = instrument runway end
PA = precision approach procedure

Measures necessary for the implementation

Transition plans

Established and implemented by providers of ATM/ANS and aerodrome operators

Kept up-to-date and consistent with Common Projects and ATM Master Plan

Consulted with affected stakeholders

Approved by the competent authority

PBN contingency measures

Provision of services due to unavailability of GNSS or other navigation signals for PBN, i.e., in the event of PBN contingency

Include retaining a network of conventional navigation aids (MON), as well as the related SUR & COM infrastructure

Conventional navigation procedures and non-harmonised PBN applications are allowed in the event of PBN contingency

Navigation scenario after June 2030

- Exclusive use of PBN...
 - Only harmonised PBN applications and functionalities permitted
 - Conventional navigation procedures are no longer allowed
- ... except in the following cases
 - ILS CAT II & CAT III procedures
 - GLS CAT I, CAT II & CAT III procedures
 - **in the event of PBN contingencies**

What are the challenges?

- Operational restrictions to continue to use conventional navigation procedures as of 6 June 2030
 - Implementation delays experienced with the 2020 & 2024 deadlines
 - LPV minima (EGNOS) are expected to replace ILS CAT I minima
 - Some aerodromes remain out of the EGNOS (EU's SBAS) service areas
 - PANS-OPS design criteria cannot be met at all targeted runways
 - The fleet must be equipped to fly the required flight procedures
- GNSS RFI increase puts the benefits associated with PBN implementation at risk
 - By limiting PBN operations and the operational benefits, as planned
 - By limiting the possibilities of rationalization of ground NAVAIDS

GNSS outage (ECR data), mitigations

19.73K

Count of Occurrence > e2...

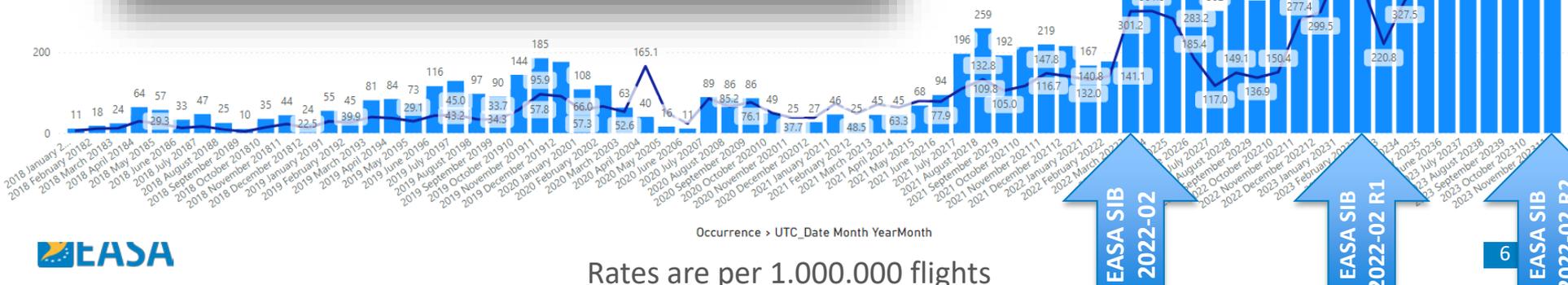
< Back to report

COUNT OF OCCURRENCE > E2ID AND RATIO PER MONTH BY YEAR, MONTH AND YEARMONTH

Count of Occurrence > e2id Ratio per month

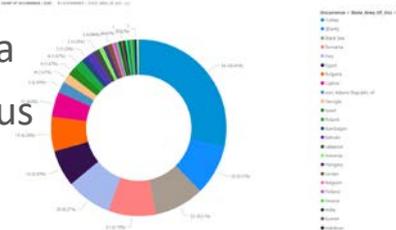


Continued increase in GNSS jamming and cases of spoofing resulted in EASA SIB 2022-02R2 being issued in November 2023



Spoofing, keyword, ECR

- Turkey, Black Sea, Romania
- Iraq, Egypt, Bulgaria, Cyprus
- Iran, Georgia, Israel

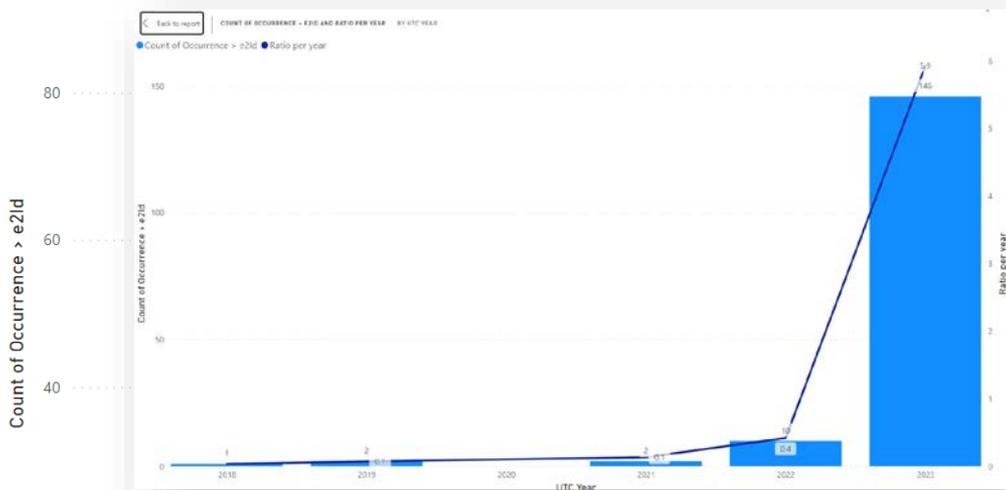


← Back to report

COUNT OF OCCURRENCE > E2ID AND RATIO PER MONTH BY YEAR, MONTH AND YEARMONTH

● Count of Occurrence > e2Id ● Ratio per month

100



239

Count of Occurrence > e2Id

Rates are per 1.000.000 flights

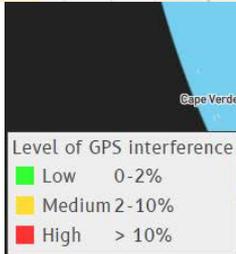
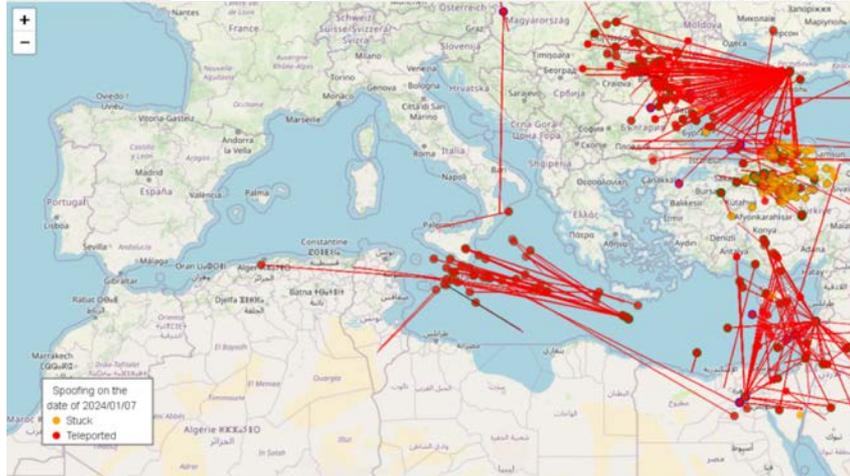


Spoofing and jamming

GPSJAM
Daily maps of GPS interference
[About](#) | [FAQ](#)

07/01/2024

More



Some EASA actions in response GNSS RFI

- EASA SIB 2022-02R2 on Global Navigation Satellite System Outage and Alterations Leading to Navigation / Surveillance Degradation
- ‘Over-reliance on satellite navigation’ is a safety issue (SI-0034) under assessment (CAT CAG) => completion by 2024 with proposed mitigations
- CARI (CAW) for TCH & OEM to evaluate effects of GNSS jamming or spoofing on CS25/CS29 products at system and aircraft level
- EASA/IATA Workshop on PNT Resilience hosted at EASA premises on 25 January 2024

Potential regulatory amendments

- Evaluation of the operational restrictions imposed as of June 2030
 - Impact assessment of restrictions to use conventional navigation in consideration of
 - PBN implementation status
 - aircraft capabilities
 - vulnerabilities of BARO-VNAV operations
 - up-to-date risk assessment of GNSS jamming and spoofing
- Timeline:
 - Impact assessment completion by 2024
 - New rulemaking task to propose regulatory amendments in 2025 (EASA NPA + Opinion)

Thank you for your attention

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