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IMPACTS OF MILITARY EXERCICES

JAMMING OPERATIONS WITH MAJOR IMPACTS



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XLAD26 EXERCISE



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DESCRIPTION OF XLAD26 (MILITARY AUTHORITY)

Jamming regulatory framework in France

- **Jamming is allowed by the French law¹ for public order, defense and national security, or for the public service of justice**
 - C-UAS² operations or MIL NAVWAR Testing: usually includes GNSS frequency bands jamming
- **Subject to prior approval by the competent authority (MoD, Prefect) based on a preliminary impact assessment conducted by governmental bodies in charge of frequency bands management**
 - **ANFR** has the role to manage the overall process and requests an impact assessment to evaluate the collateral effects on other spectrum users
 - **DSNA** as responsible of aeronautical frequency bands in France is consulted and determines the GNSS RFI impact area, defines the related operational mitigation measures and provides the result of the assessment to ANFR (within 4 weeks)
 - The governmental authority takes into consideration this assessment when executing the testing exercise

1: Code des Postes et Communications Electroniques (CPCE): article L33-3-1

2: Code de la Sécurité Intérieure: article R213-5

GNSS RFI¹ impact area determination

- GNSS RFI impact area estimated based:
 - On aeronautical GNSS receiver performance criteria w.r.t resistance to interference defined by ICAO Annex 10 (GPS signal is very weak)
 - On jammer characteristics (power + waveform) + line of sight propagation

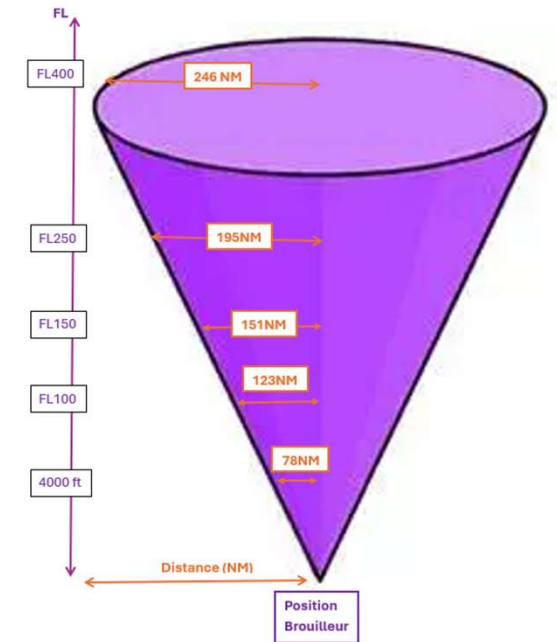
➔ distance of impact

- Considering radio horizon protection

$$R_{NM} = 1,23\sqrt{H_{ft}}$$

- Computation of propagation distance in line of sight has sometimes led to underestimated impact area determination, due to erroneous jammer technical parameters.

1: Radio Frequency Interference



XLAD 26 exercise

- Various jamming devices used, no spoofing on the GNSS signals used by civil aeronautical GNSS receivers

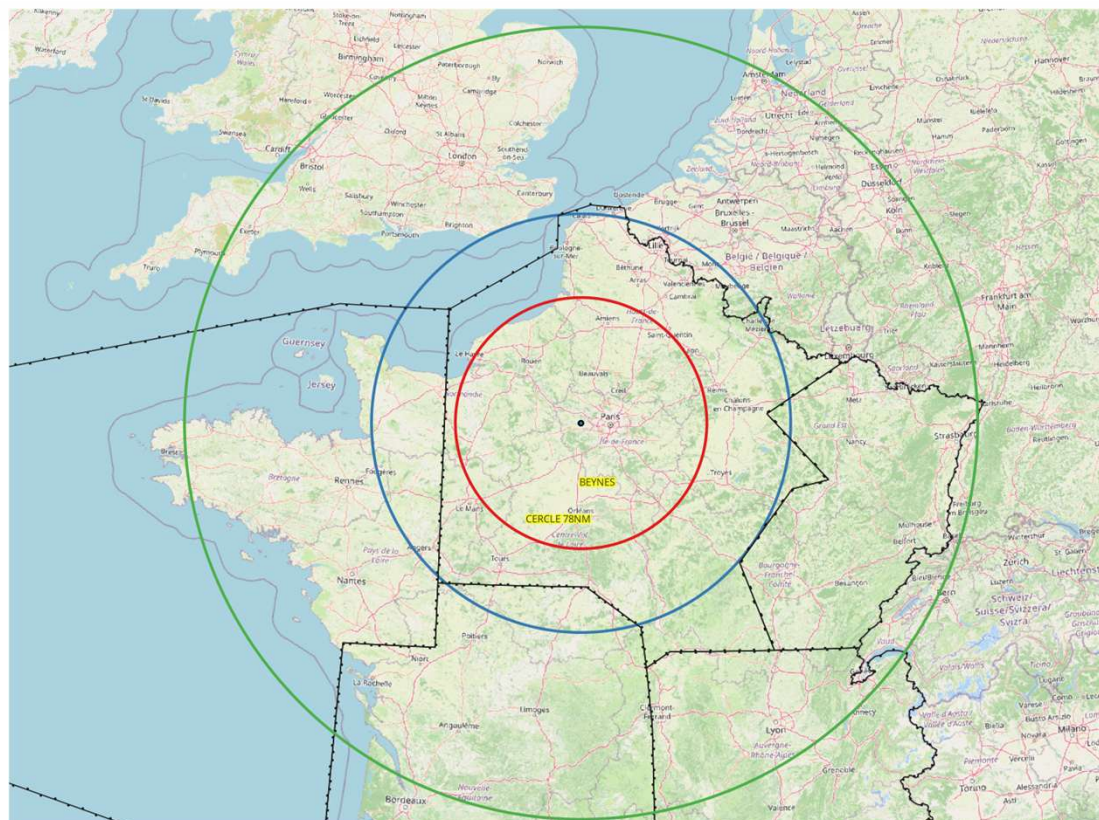
XLAD 26

Location	Beynes (78) Paris region
Period	3 consecutive afternoons on 15, 16 and 17th of September, between 12h and 15h UTC
Target	GPS L1 jamming only, short pulses (20s max) but repeated during the slot

XLAD 26 impact area

- Various jamming devices used, 3 distinct volumes
- PSN 48°51'41"N 001°53'18"E
 - 4000ft/78NM => **RNP procedures suspended (VOLUME1)**
 - FL100/130NM => **GNSS likely unavailable (VOLUME2)**
 - FL400/246NM => **GNSS lost possible (VOLUME3)**

Jamming not expected to have large scale effects in VOL3 → NOTIFY IF GPS UNAVAILABLE BEYOND 130 NM



XLAD 26 NOTAM

- NOTAM issued (ref LFFA-F1828/26)

FROM : 2026 09 15 12:00 TO: 2026 09 17 15:00

A) LFFB LFFC LFFD LFMM LFRF

Q) LFXF / QGWAF / IV / NBO / E / 000/999 / 4852N00153E246

D) 1200-1500

E) GNSS JAMMING RISK : GPS SIGNAL DEGRADATION/INTERFERENCE MAY
AFFECT GPS

RECEIVERS IN THE BEYNES (78) AREA

GNSS LIKELY UNAVAILABLE DURING SHORT AND REPEATED PERIOD OF TIME

WITHIN THE FOLLOWING VOLUME :

- LATERAL LIMITS: CYLINDER WITH A RADIUS

OF 130NM CENTRED AT PSN 485141N 0015318E

- VERTICAL LIMITS : SFC/UNL

- IFR RNP APPROACH PROCEDURES SUSPENDED AT : LFRK, LFOH, LFRG, LFAQ,
LFAY, LFQA, LFOK, LFOZ, LFOQ, LFRM, LFOP, LFOB, LFPT, LFPB, LFPG,
LFPO, LFPN, LFPM

- SIGNAL INTERFERENCE MAY OCCUR WITHIN AN IMPACT VOLUME WITH A RADIUS
OF 246NM AT FL400 AND ABOVE, CENTERED AT PSN 485141N 0015318E

- PURSUANT 'EASA SIB 2022-02R4' REPORT OBSERVED GPS DISRUPTIONS TO
THE

APPROPRIATE ATC UNITS ONLY IF UNABLE TO CONTINUE RNAV OPERATIONS OR
IF ASSISTANCE IS REQUIRED

XLAD 26 OPS IMPACT

- GNSS/RNP procedures suspended
- Conventional navigation aids available (VOR/DME/ILS) ; VHF and Mode S surveillance are not affected
- ATC/traffic impact: control capacity may be reduced by approximately up to 30%, with traffic-flow restrictions and potential delays

Airlines are not expected to require flight program reductions.

- Detailed assessment by ATC unit :
 - CDG : ARR/DEP capacity reduced by 30%, **low delays expected**
 - Orly : no additionnal capacity reduction other than work on runway
 - Le-Bourget : capacity reduction by 50%, **moderate to high delays expected**
 - Paris ACC, Brest ACC, Bordeaux ACC : **no or low delays expected**
 - Reims ACC : **moderate delays**

XLAD 26 OPS IMPACT

For Flight crews :

- Monitor possible GNSS degradation,
- Follow EASA AIREP procedures (as per SIB EASA 2022-02R4 on RFI GNSS):
→ report unexpected interference or any safety impact to ATC, particularly when it occurs outside the expected (130NM) area and period.

« STOP JAMMING » : the exercise may be postponed or suspended if operational conditions deteriorate.

XLAD 26 OPS IMPACT – LESSONS LEARNT

For Flight Operators w/ FDM :

- Consider extensive analysis of GPS outage characterization (lat/long/alt/time)
- Will enhance Security Forces knowledge on jammers impact



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BLACK CROW EXERCISE

Black Crow 26

- From Sept 21st to October 1st 2026 (LIVEX)
- Central France (Massif Central)
- Realistic electromagnetic environment
 - ❑ Tactics Techniques and Procedures to be trained
 - ❑ EW C2 + military airspace monitoring
- Tight coordination with the French civil aviation authority



Safety

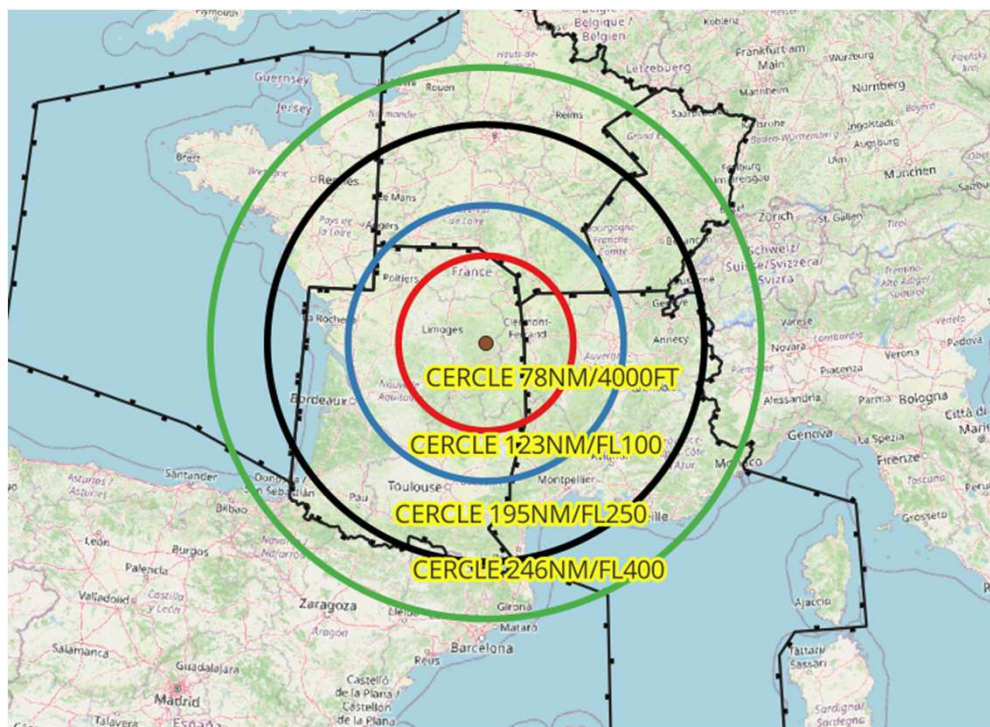
Black Crow 26 exercise

- Various jamming devices used, no spoofing on the GNSS signals used by civil aeronautical GNSS receivers

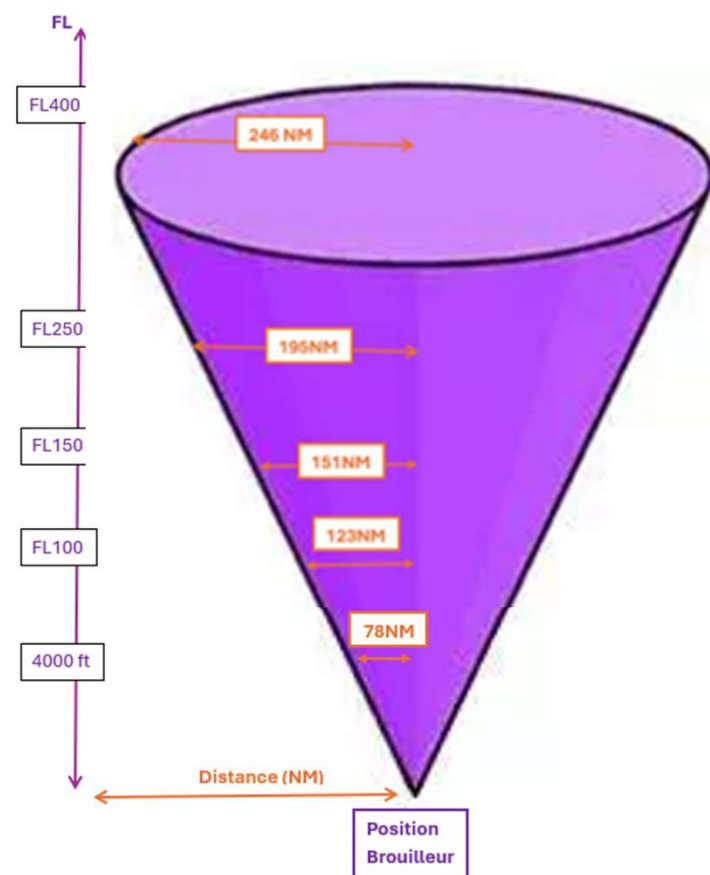
BLACK CROW 26	
Location	Center of mainland France (Corrèze & Cantal)
Period	Monday 21st to Friday 25th Sept and Monday 28th Sept to Thursday Oct 1st 0600-2200Z
Target	GPS (L1) sustained jamming

Black Crow 26 impact area

- Innovative MIL jammers, radio horizon protection



246NM/FL400 (green cercle)



Black Crow 26 OPS IMPACT

- GNSS/RNP procedures suspended within 78 NM
- Conventional navigation aids available (VOR/DME/ILS); VHF and Mode S surveillance are not affected.
- NOTAM will be issued
- No capacity reduction planned. If disruptions in traffic flow reported, exercise will stop for the remaining of the day and en-route capacity reduction up to 30% will apply for the following days of the exercise.

No flight program reduction required.

- Assessment of 30% capacity reduction scenario still ongoing, low to moderate delays expected for Bordeaux and Marseille ACC

Black Crow 26 OPS IMPACT

For Flight crews :

- Monitor possible GNSS degradation,
- Follow EASA AIREP procedures (as per SIB EASA 2022-02R4 on RFI GNSS):
→ report unexpected interference or any safety impact to ATC.

« STOP JAMMING » : the exercise may be postponed or suspended if operational conditions deteriorate.