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SAFE SKIES.
SUSTAINABLE FUTURE.

GNSS RFI in the Philippines

CAA Philippines, Air Navigation Service

ICAO APAC Radio Navigation Symposium

New Delhi, India
07-09 April 2025

Outline

01 Current PBN Nav Specs used

02 GNSS Signal Monitoring System at Philippine ATMC

03 Current PBN Operations (reference for possible GBAS alternative)

04 Establishment of Space-based ADS-B Surveillance

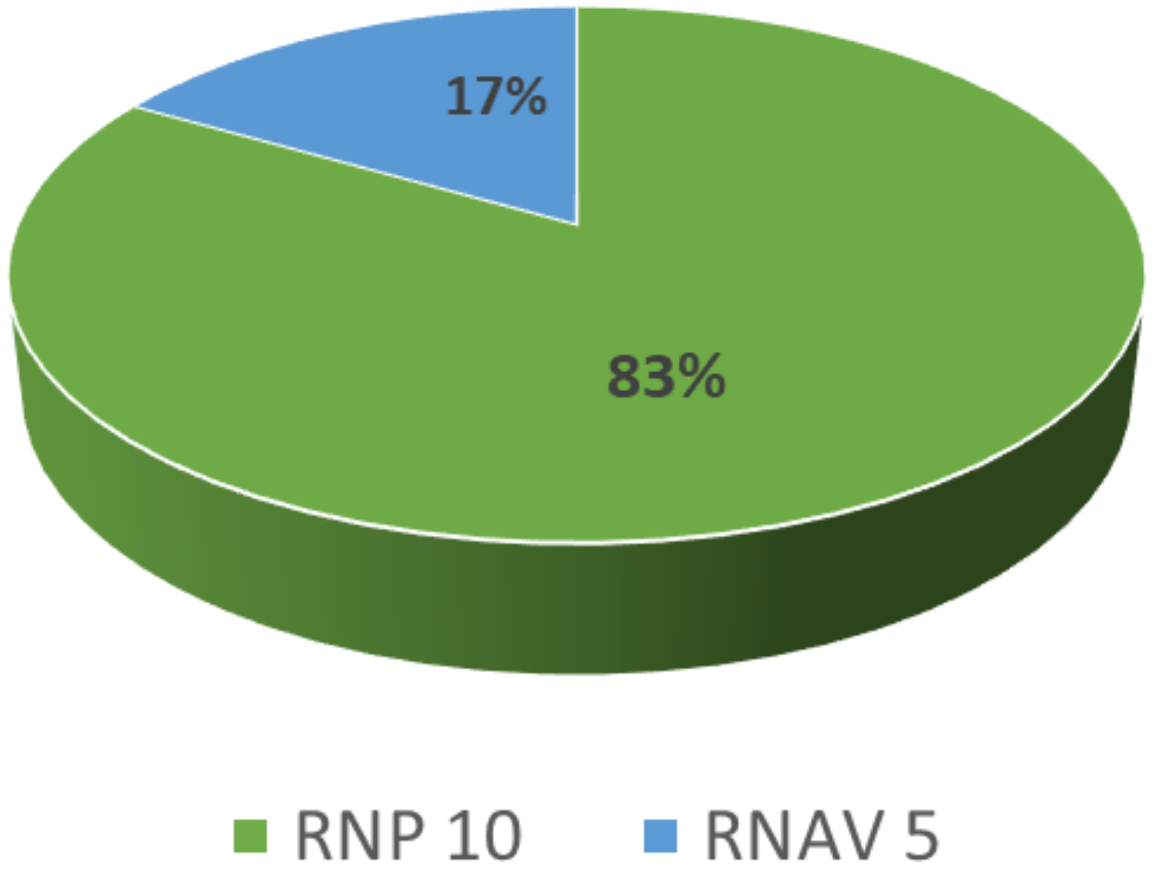
05 Challenges

01

Current PBN Nav Spec

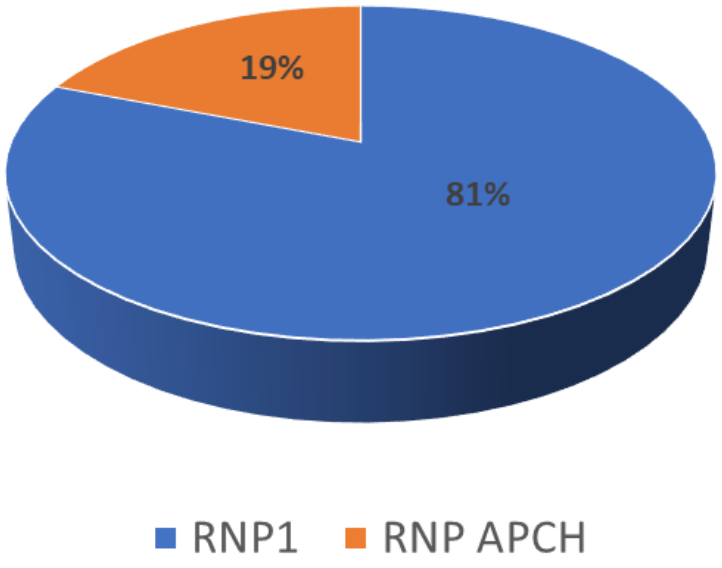
RNP 10 - for International Routes

RNAV 5 - for Domestic Routes

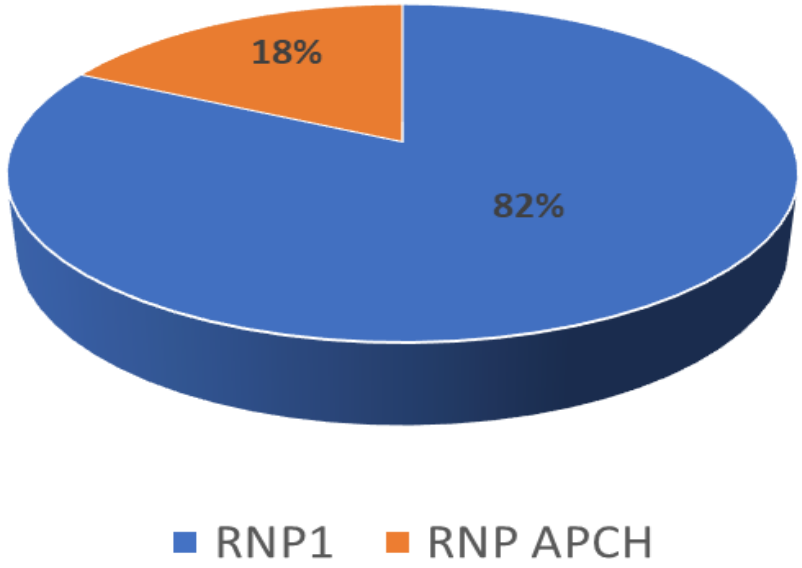


Current PBN Nav Spec

22 Airports with PBN



International Airports (8)

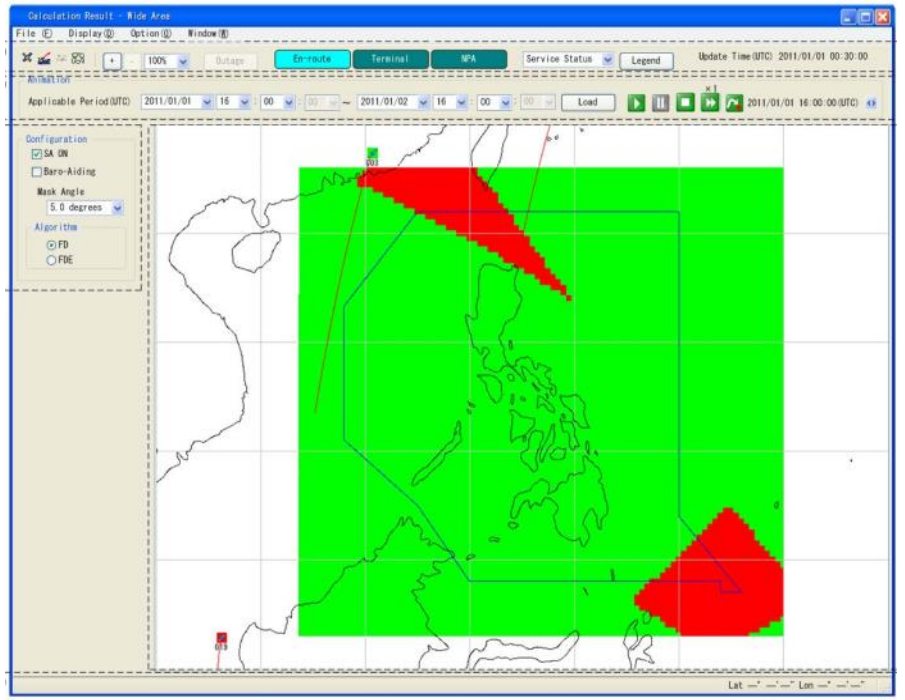


Principal Class I (14)

Source PH AIP 080 series

GSMS at Philippine ATMC

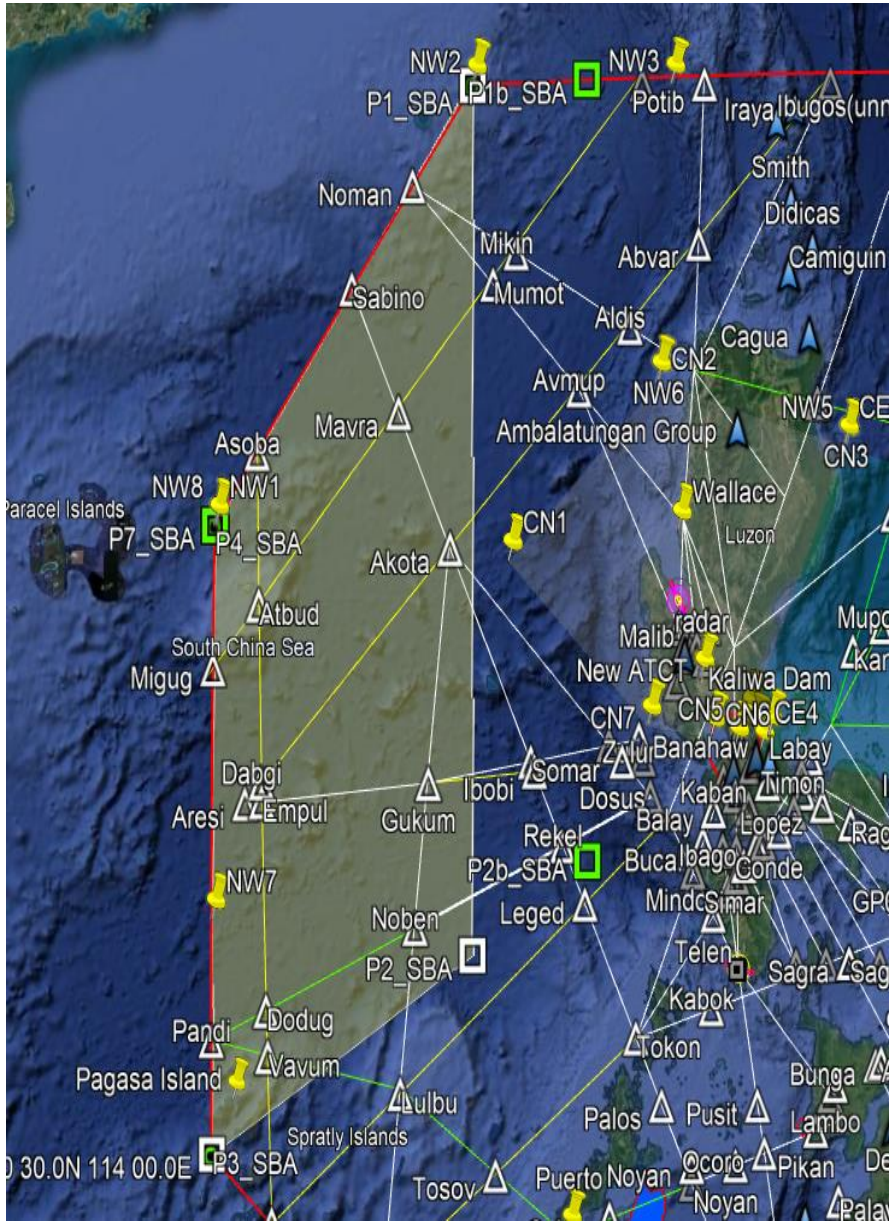
- Installed in 2017;
- Calculate the service level up to 72 hours ahead;
- Display predicted service levels graphically via internet; through registered accounts per flight phase;
- Provides future service level information in NOTAM; format via ftp to AIS System;
- Calculate service levels of registered airports in PH;
- Processes L1 GPS Signal



Current PBN Operations

Airport	RWY	2024 Tower Air Traffic Movement
Clark	02 / 20	82,071*
Davao	05 / 23	37,922
General Santos	17	7,765
Mactan	04 / 22	128,590
NAIA	06 / 24	330,278
Puerto Princesa	27	18,680
Zamboanga LLZ	09	18,993
Bacolod-Silay	03	18,742
Iloilo	20	22,701
Laguindingan	27	17,654
Panglao	21	19,229

*as of November 2024

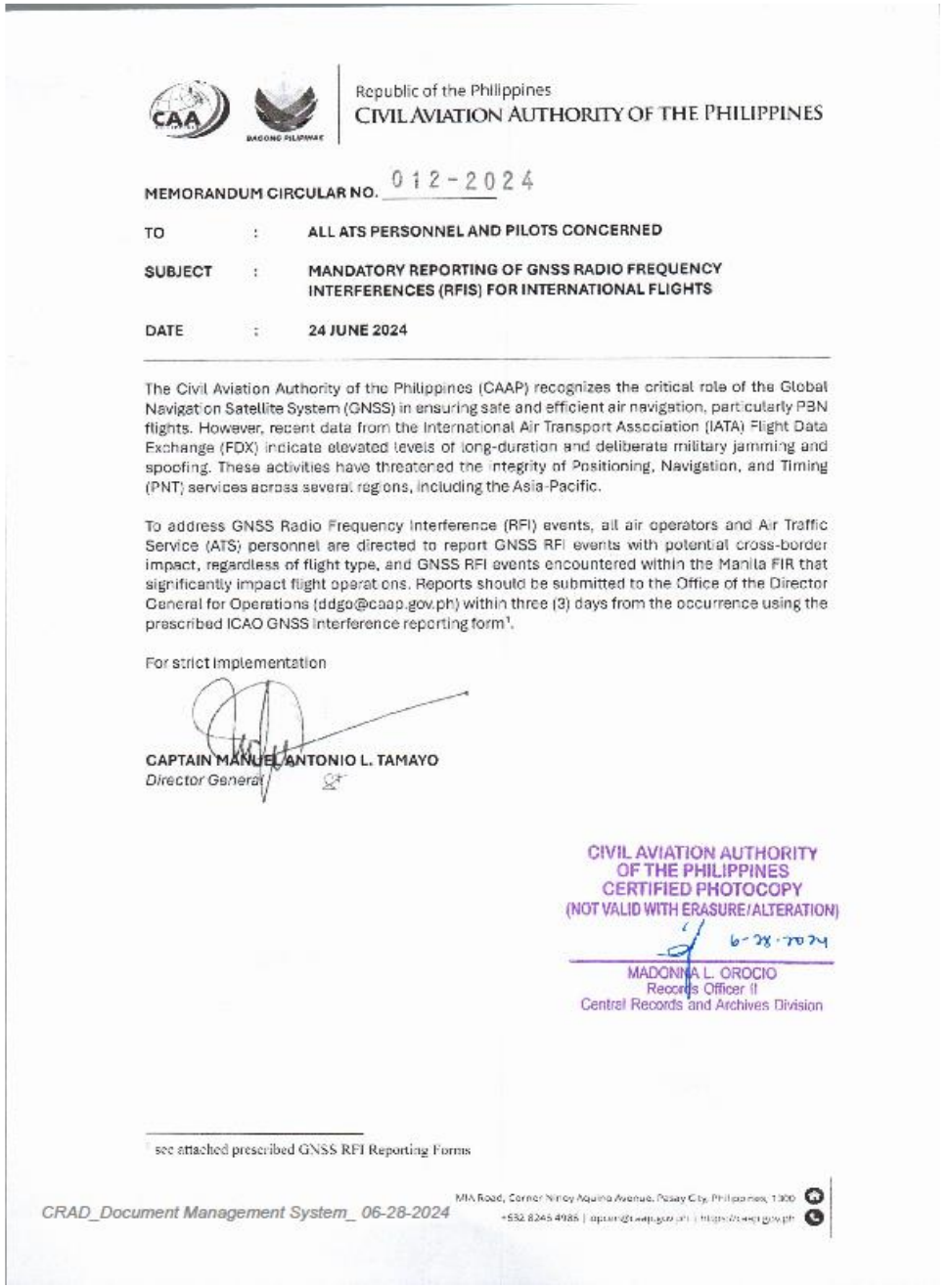


Establishment of Space-based ADS-B Surveillance

- North-West of the Philippine FIR
- Coverage at FL280+
- AIREON as surveillance data provider

CAAP MC
012-2024

Mandatory Reporting of GNSS RFI



Republic of the Philippines
CIVIL AVIATION AUTHORITY OF THE PHILIPPINES

MEMORANDUM CIRCULAR NO. 012-2024

TO : ALL ATS PERSONNEL AND PILOTS CONCERNED

SUBJECT : MANDATORY REPORTING OF GNSS RADIO FREQUENCY INTERFERENCES (RFIS) FOR INTERNATIONAL FLIGHTS

DATE : 24 JUNE 2024

The Civil Aviation Authority of the Philippines (CAAP) recognizes the critical role of the Global Navigation Satellite System (GNSS) in ensuring safe and efficient air navigation, particularly PBN flights. However, recent data from the International Air Transport Association (IATA) Flight Data Exchange (FDX) indicate elevated levels of long-duration and deliberate military jamming and spoofing. These activities have threatened the integrity of Positioning, Navigation, and Timing (PNT) services across several regions, including the Asia-Pacific.

To address GNSS Radio Frequency Interference (RFI) events, all air operators and Air Traffic Service (ATS) personnel are directed to report GNSS RFI events with potential cross-border impact, regardless of flight type, and GNSS RFI events encountered within the Manila FIR that significantly impact flight operations. Reports should be submitted to the Office of the Director General for Operations (ddgo@caap.gov.ph) within three (3) days from the occurrence using the prescribed ICAO GNSS Interference reporting form[1].

For strict implementation

CAPTAIN MANUEL ANTONIO L. TAMAYO
Director General

CIVIL AVIATION AUTHORITY
OF THE PHILIPPINES
CERTIFIED PHOTOCOPY
(NOT VALID WITH ERASURE/ALTERATION)
6-28-2024
MADONNA L. OROCIO
Records Officer II
Central Records and Archives Division

[1] see attached prescribed GNSS RFI Reporting Forms

CRAD_Document Management System_ 06-28-2024

MIA Road, Corner Ninoy Aquino Avenue, Pasay City, Philippines, 1300
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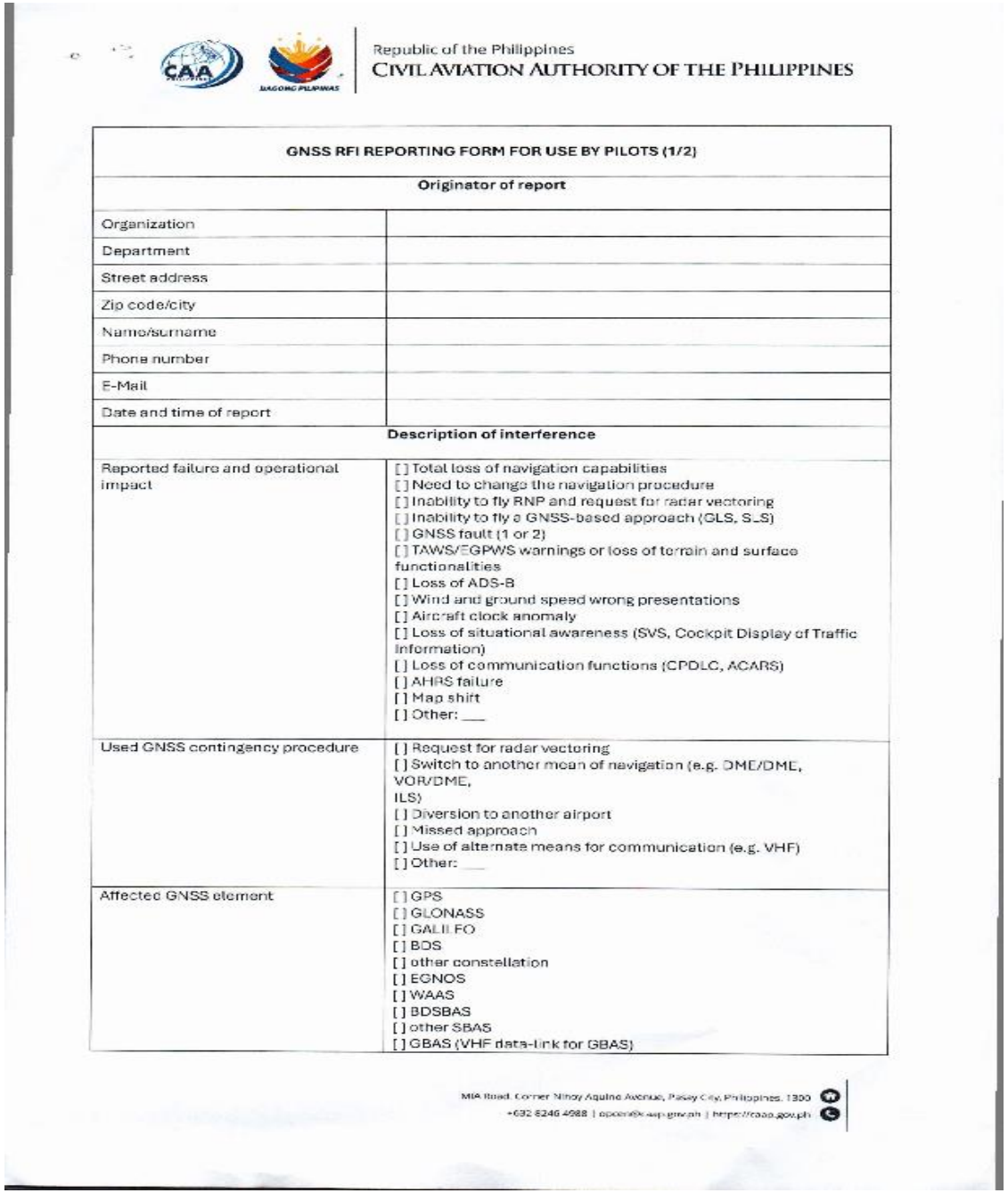
CAAP
Actual Report

Mandatory Reporting of GNSS RFI



Republic of the Philippines
CIVIL AVIATION AUTHORITY OF THE PHILIPPINES

GNSS RFI REPORTING FORM FOR USE BY PILOTS (1/2)	
Originator of report	
Organization	
Department	
Street address	
Zip code/city	
Name/surname	
Phone number	
E-Mail	
Date and time of report	
Description of interference	
Reported failure and operational impact	[ ] Total loss of navigation capabilities [ ] Need to change the navigation procedure [ ] Inability to fly RNP and request for radar vectoring [ ] Inability to fly a GNSS-based approach (GLS, SLS) [ ] GNSS fault (1 or 2) [ ] TAWS/EGPWS warnings or loss of terrain and surface functionalities [ ] Loss of ADS-B [ ] Wind and ground speed wrong presentations [ ] Aircraft clock anomaly [ ] Loss of situational awareness (SVS, Cockpit Display of Traffic Information) [ ] Loss of communication functions (CPDLC, ACARS) [ ] AHRS failure [ ] Map shift [ ] Other: ___
Used GNSS contingency procedure	[ ] Request for radar vectoring [ ] Switch to another mean of navigation (e.g. DME/DME, VOR/DME, ILS) [ ] Diversion to another airport [ ] Missed approach [ ] Use of alternate means for communication (e.g. VHF) [ ] Other: ___
Affected GNSS element	[ ] GPS [ ] GLONASS [ ] GALILEO [ ] BDS [ ] other constellation [ ] EGNOS [ ] WAAS [ ] BDSBAS [ ] other SBAS [ ] GBAS (VHF data-link for GBAS)

MIA Road, Corner Ninoy Aquino Avenue, Pasay City, Philippines, 1300
+632 8246 4988 | [illegible] | https://caap.gov.ph

CAAP
Actual Report

Mandatory Reporting of GNSS RFI

Affected constellation frequency	[ ] L1 [ ] L2 [ ] L5 [ ] All	[ ] L1 [ ] L2 [ ] L3 [ ] All	[ ] E1 [ ] E5a [ ] E5b [ ] E6 [ ] All	[ ] B1 [ ] B2 [ ] B3 [ ] All
GNSS RFI REPORTING FORM FOR USE BY PILOTS (2/2)				
Aircraft type and registration	A330-300. RP-C 8763			
Flight number	PR659			
Airway/route flown (airport RWY/gateway/parking gate in case of on ground detection)	5 DME Final runway 24			
Coordinates of the area of occurrence/time (UTC)	UTC: 0147Z Lat: 1433.2N / 12106.3E Long: FL/Altitude: Alt 1500			
Problem duration	Days, hours, minutes, seconds 5 minutes [X] continuous [ ] intermittent			

Challenges

RF interference

- (20 July **2024** 315z) Affected Final approach on RWY24 at about 5DME (no impact on flight as reported by pilot), loss of ADS-B at 5 min duration.

- (22 July **2024** 1200z) Affected ILS RWY24 approach approx. 3.2NM from TD at less than 1,100ft. GPS recovered at TDZ as reported by pilot.

Challenges

RF interference

- **(2016)** Affected NAIA RWY24 RNAV approach within 14DME of the RWY.

Findings through Inter-Agency collaboration:

- Source is from defective Digital TV Broadcasting Station about 6.5NM of extended RWY CL.

Other Issues and Concerns

- Proliferation and sale of GPS jamming devices online.
- Effective law-enforcement on usage of Radio Spectrum
- Management of RFI reports / data base for technical / statistical analysis.
- Cooperation of stakeholders.

Thank You

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