

GNSS/GPS spoofing

ASRG/5 meeting

05 October 2023

Analysis Scope – Event Definition

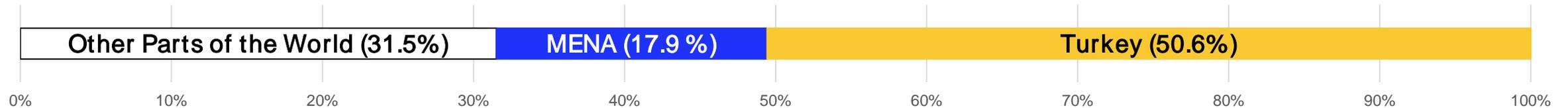
The analysis utilized three datasets: Incident Data Exchange (IDX), Flight Data Exchange (FDX), and NOTAM information held by the IATA. The analysis covers the time period of January 2022 to December 2022.

Incident Data Exchange (IDX)

The analysis revealed 524 GNSS/GPS jamming or suspected interference reports from 12 operators in the MENA region and adjacent states gathered through the Incident Data Exchange (IDX) from January 2022 to December 2022. A total of 462 reports of GNSS interference were excluded from the analysis because the exact location of the incident could not be determined for flights that departed from or arrived in the MENA region.

Flight Data Exchange (FDX)

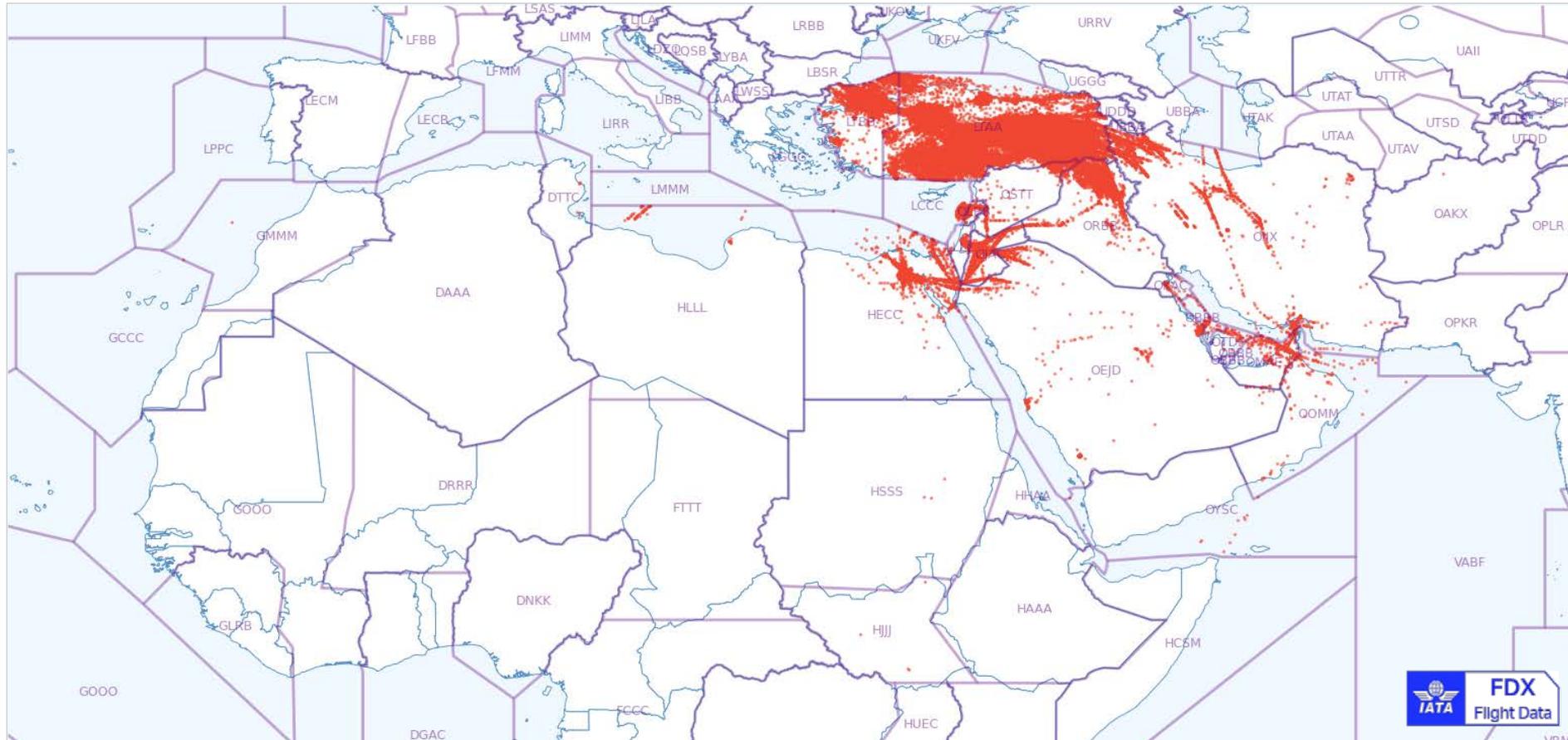
The analysis also utilized data from the Flight Data Exchange (FDX) to extract a total of 162,654 ‘GPS signal loss’ events from 54 operators in the MENA region and adjacent states from January 2022 to December 2022. This is 68.5 % of all GPS Signal Loss Events in FDX database in 2022. The Total Event Count around the world was 237,489.



NOTAM (FAA SWIFT Portal)

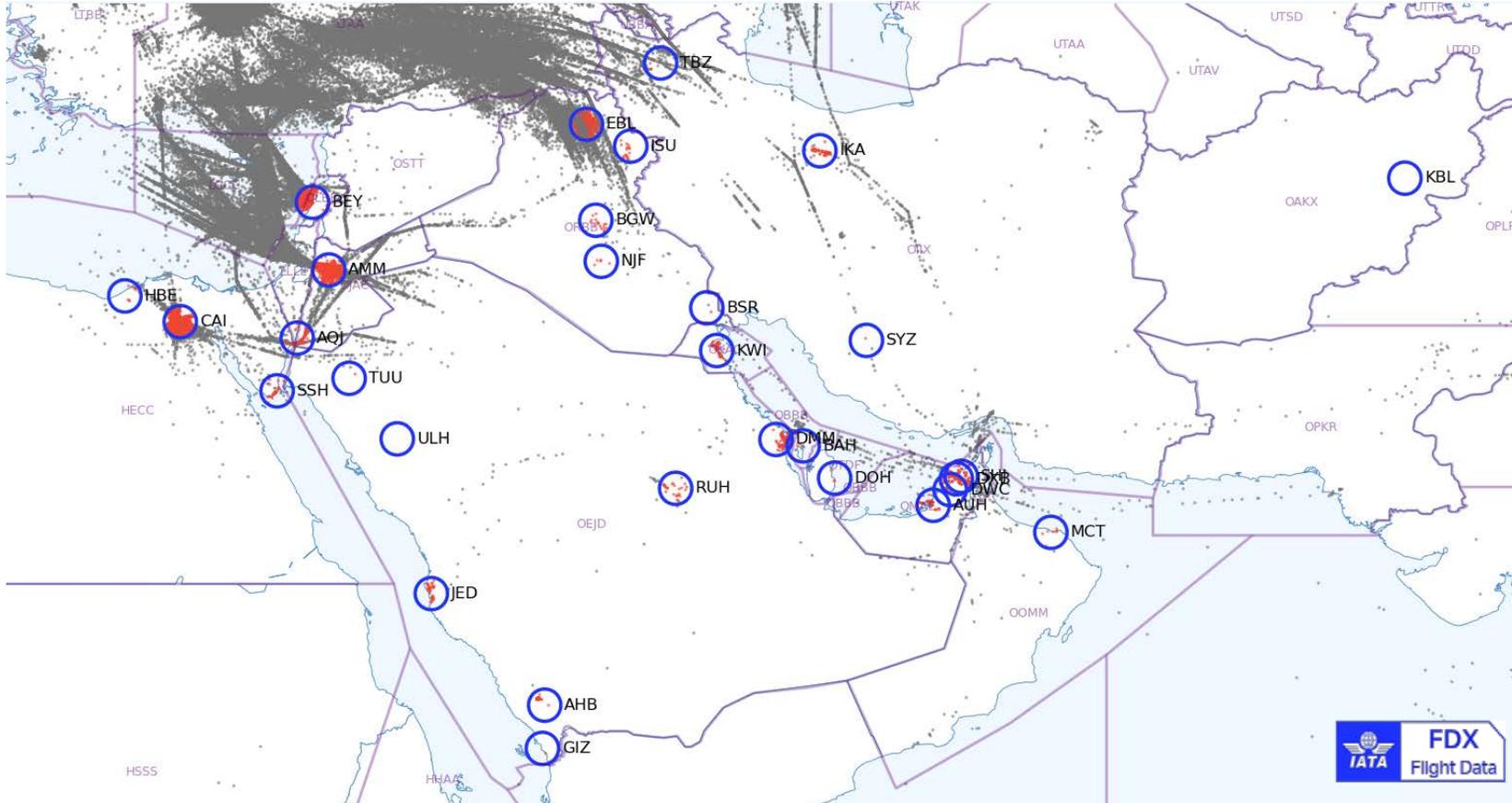
In addition to the above datasets, 66 GNSS interference NOTAMs were extracted from the NOTAM archive issued over MENA States from January 2022 to December 2022, sourced from the FAA SWIFT Portal.

GPS Signal Loss Hot-Spots



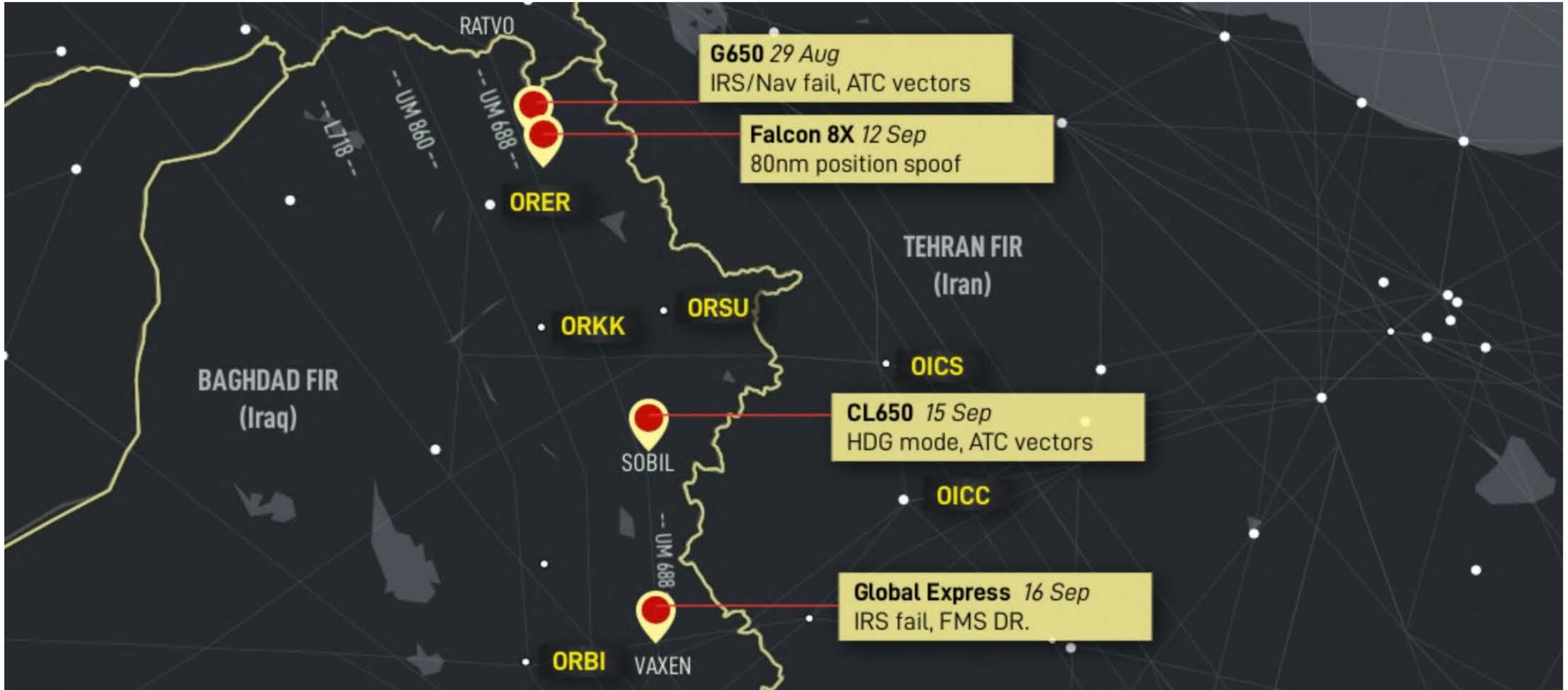
- The chart displays **164,577** red dots, each representing a single 'GPS Signal Loss' event in the MENA region.
- This highlights the need for increased awareness and proactive measures to address GPS Signal Loss issues in the region.

GPS Signal Loss Near Airports



- This chart depicts flights in the MENA region that have experienced 'GPS Signal Loss' during departure or arrival near airports.
- The 30 NM radius circle around the airport was used to determine the vicinity.
- Red dots within the airport area indicate where the interference occurred, while grey dots represent events that occurred outside the airport area or during the cruise phase.
- The intensity of the red color reflects the frequency of the events.
- Cairo International Airport has the highest number of events near the airport.

GNSS /GPS Spoofing /Location



GNSS /GPS Spoofing

Fake GPS signal (spoofed) gives the FMS the **indication it is 60nm off track**

- IRS failure follows rapidly
- No reliable on board navigation – ATC vectors required

Aircraft types affected so far:

- Gulfstream G650
- Boeing 777, 747, 737
- Bombardier Global Express
- Bombardier Challenger 604, 650
- Embraer E190
- Embraer Praetor 600, Embraer Legacy 650
- Dassault Falcon 8X

GNSS Spoofing

The spoofing reports are as alarming for **two reasons**:

- the sophistication of the methodology, and
- the unexpected “infection” of the IRS. (May update the IRS with bad data)
 - FMS and IRS have only been designed to cope with a loss of GPS signal, and not an intentional spoofed signal.

Current Status

- Highest Level of Reports in MID Region
- Lack of NOTAM updates

Next Steps

- State Engagement NOTAM
- IATA/ICAO MID – EUR Mtg with States
- Develop guidance material to include on how to deal with spoofing

Thanks You

