

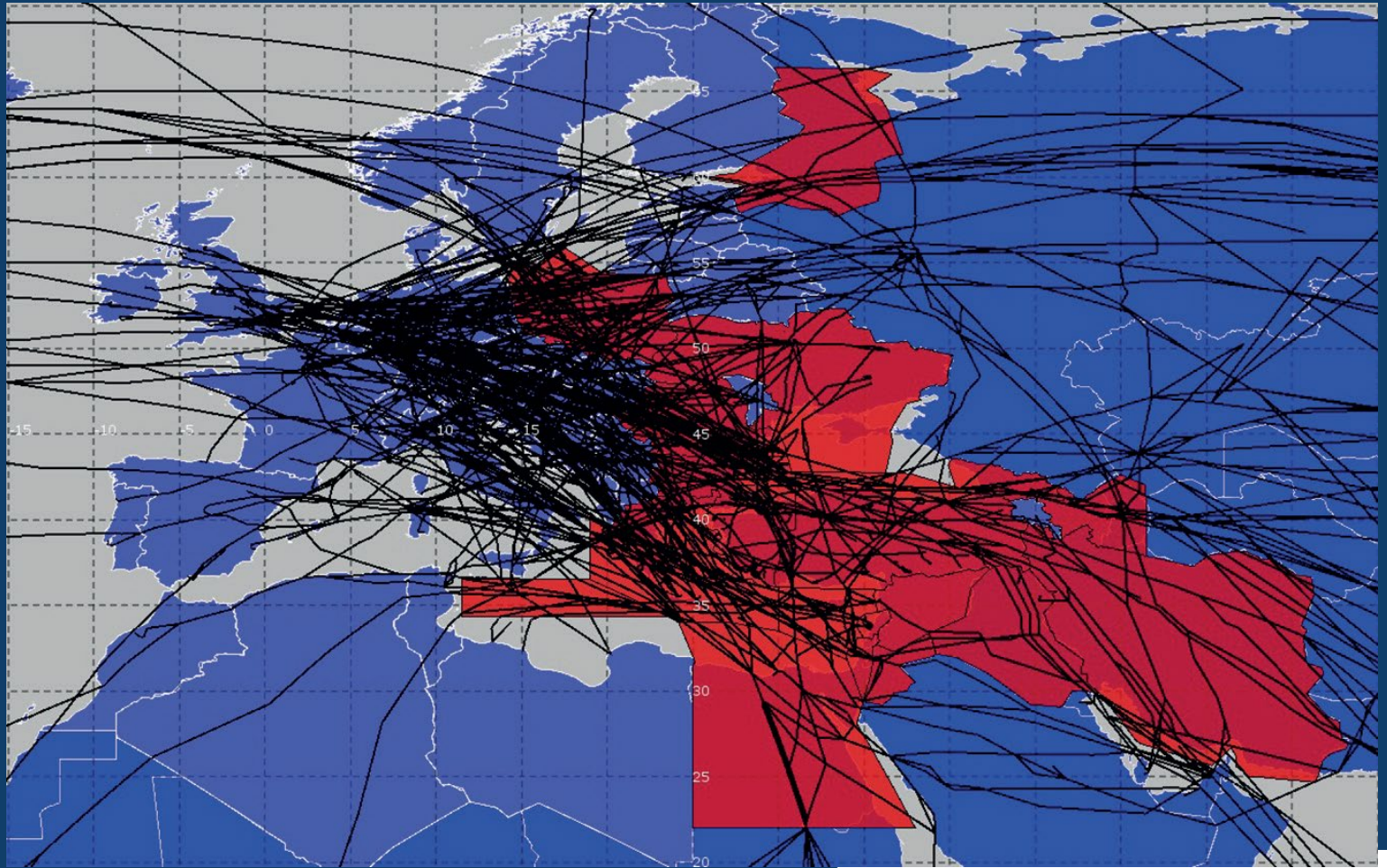
# GNSS RFI WG-FM Civil/Military 2022

Raffi Khatcherian

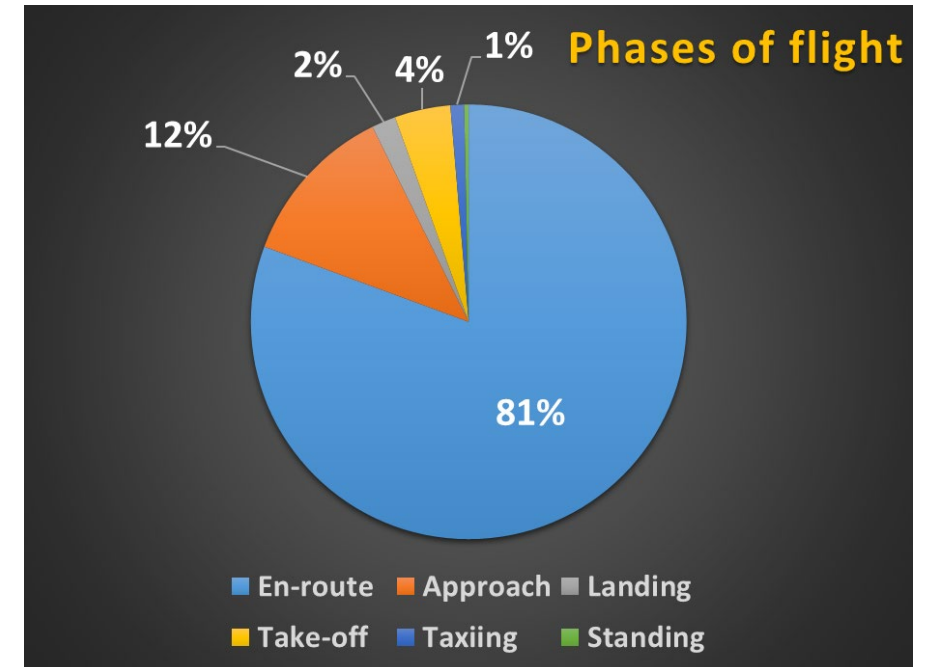
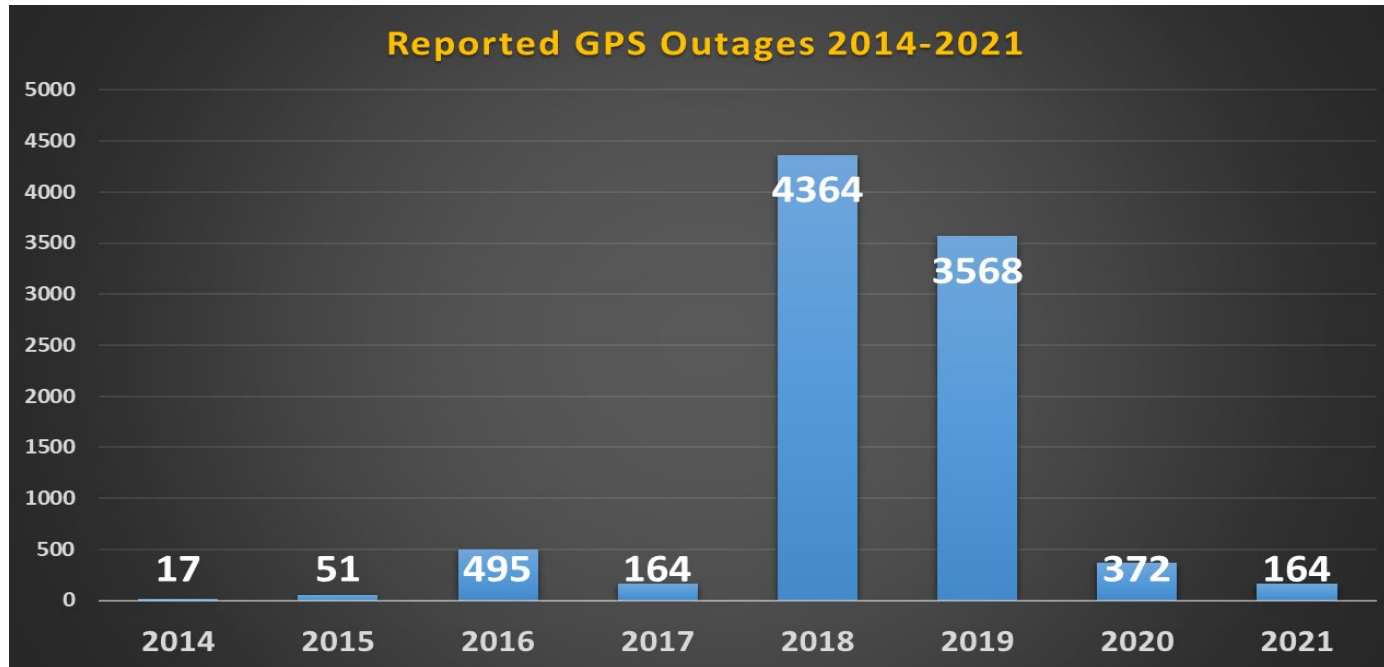
ATM Senior Expert

Head of International Spectrum Management

31 May – 1 June 2022



# EVAIR: Collecting Pilot Reports of “GPS Problems”



- EUROCONTROL Voluntary ATM Incident Reporting (EVAIR)
- 250 Participating Aircraft Operators
  - Coverage: Europe, Middle East, Northern Africa
  - Detail reports subject to confidentiality
- 2018 / 2019 trend: average of 10 GPS reports DAILY!
  - 2020 decrease due to reduced flights (COVID) and reporting

## Report Analysis

*RFI most probable cause in absence of GNSS constellation or solar issues, especially if multiple aircraft are affected in a region*

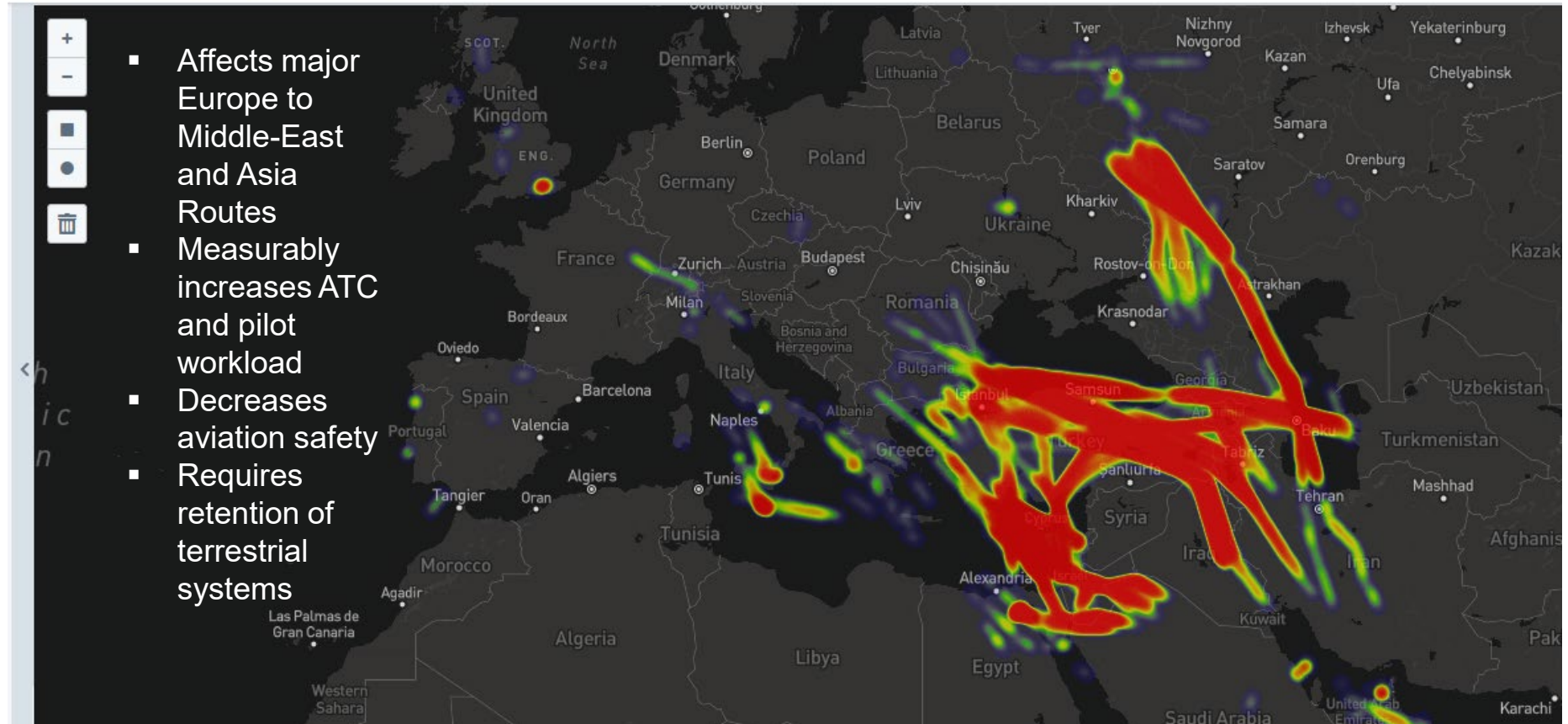


# GNSS RFI as detected by Airbus Aircraft

- Post-OPS Monitoring from participating aircraft operators
- 1 JAN 2021 to 31 DEC 2021
- **RFI continues despite reduced pilot reports**

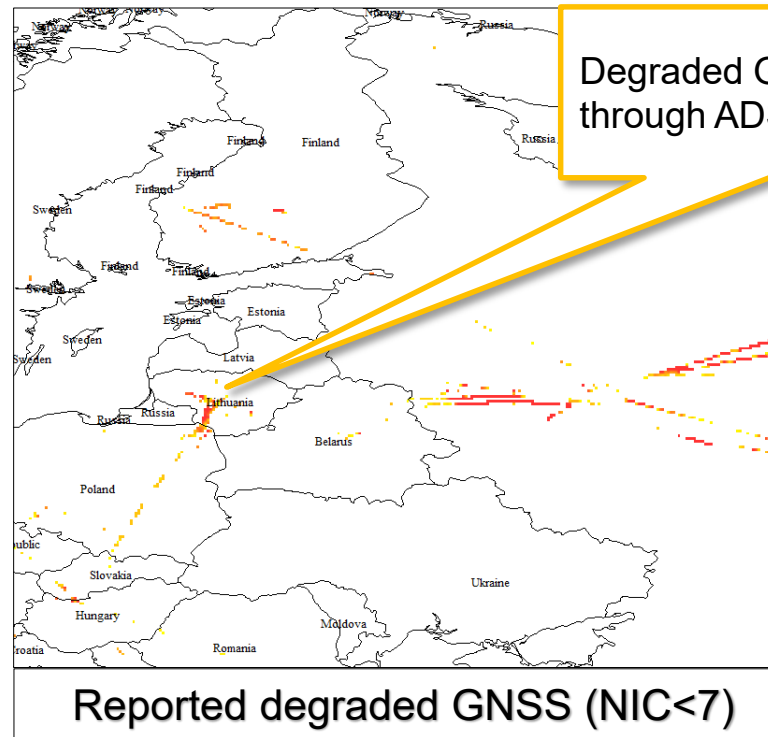
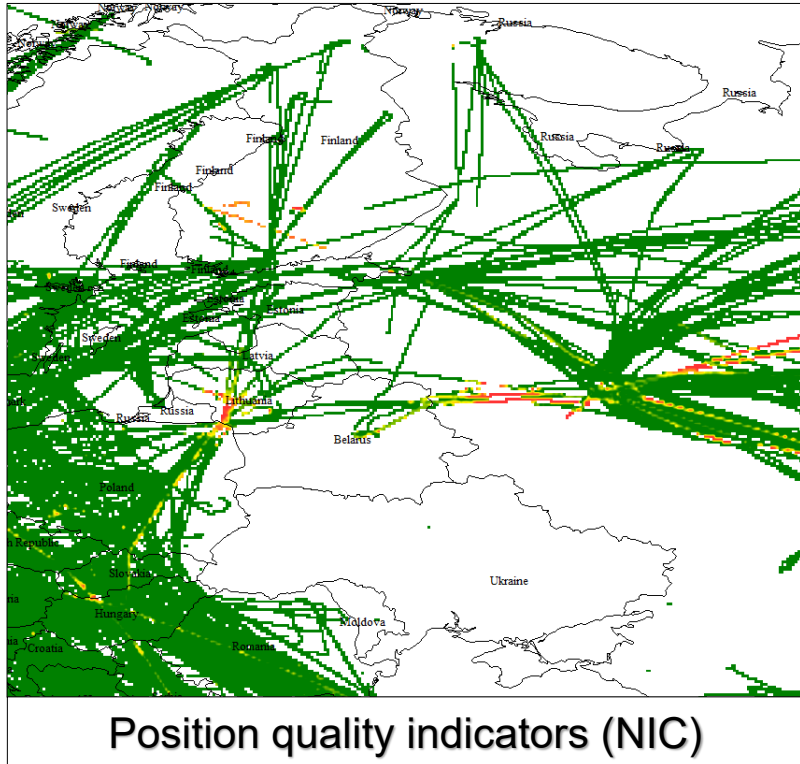
## GPS DEGRADATION DASHBOARD

## WORLD MAPPING OF GPS INTERFERENCE AREAS

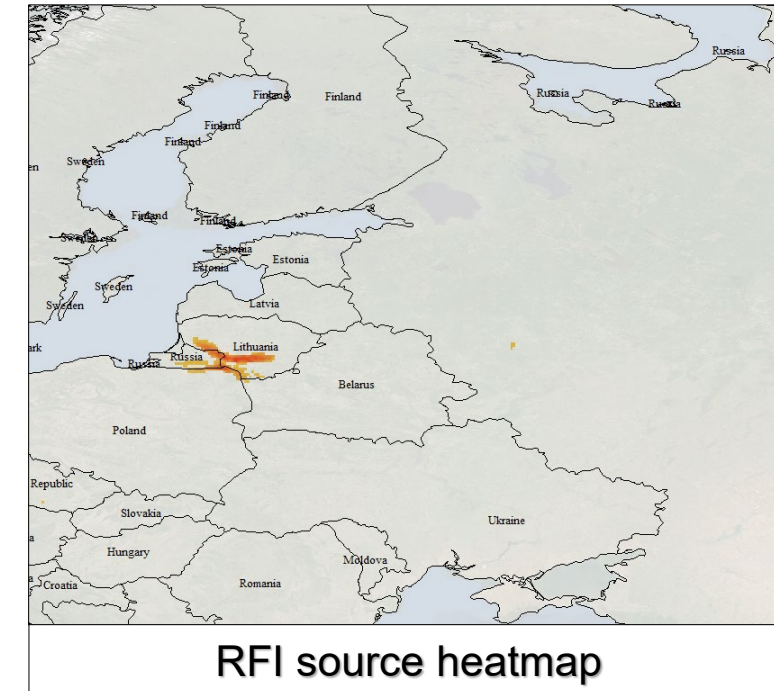


*This picture matches EVAIR Pilot Reports and has been “stable” since 2018*

# 12/03/2022



7 reports received between 11 and 12/03/2022



## Recommendations:

- Close monitoring of CNS (especially systems relying on GNSS) in the area
- Use of GNSS contingency procedures
  - Use of alternate NAV means by airspace users
  - ATS to provide radar vectoring to impacted flights
  - Reduce capacity in the concerned areas if needed

# EASA SIB 2022-02

- Affected systems and Recommendations to NAA, ANSP and AO:
  - Contingency plan incl alternative procedures in case of GNSS jamming or spoofing
  - Essential conventional navigation infrastructure, particularly ILS, are retained and fully operational
  - Proactive mitigation measures incl NOTAM
  - Collect information on GNSS degradations in order to promptly notify airspace users
  - Readiness to provide reliable surveillance
- Flight crews promptly report to ATC
- Assess operational risks and limitations linked to the loss of on-board GNSS
- Verify the A/C position by means of conventional NAVAIDs
- Revert to a conventional arrival procedure where appropriate
- Ensure, in the flight planning and execution phase, the availability of alternative conventional arrival and approach procedures



## Safety Information Bulletin

Operations – ATM/ANS

SIB No.: 2022-02

Issued: 17 March 2022

### Subject:

Global Navigation Satellite System Outage Leading to Navigation / Surveillance Degradation

EASA SIB No.: 2022-02

# GNSS RFI: Letter to the ITU BR

- GNSS RFI threat picture evolved from 2014 (“GPS always works”) to one where now there are regular and repeated complaints from the operational community
  - 20% of Airbus flights on Europe – Middle East routes encounter RFI
  - GNSS Spoofing no longer excluded as possible cause in some observed events
- EUROCONTROL Network Manager wrote to ITU BR and report on GNSS RFI affecting the European aviation network (Nov 2021)
  - While political realities are recognized, it is important to show that RFI events are seen, recorded and analysed
  - Aim is to make as much political pressure as possible about this matter at ITU
  - RFI report jurisdiction driven by aircraft state of registry, not necessarily RFI location
  - EUROCONTROL Letter supported by Cyprus, Poland and France

# GNSS RFI: Response from the ITU BR and some follow up

- Response from the ITU BR
  - Reply to EUROCONTROL in January 2022
  - Director BR reported to ITU Radio Regulations Board
  - RRB agreed in March to issue a Circular to all ITU Member States to raise awareness on the current situation and recall ITU regulations
  - Will be part of ITU-BR report to WRC-23
  - ***Further support from States will be appreciated to increase political weight of the issue***
- European paper to ICAO Assembly

“Improving Communication Navigation and Surveillance (CNS) Resilience through Global Navigation Satellite System (GNSS) Interference Mitigation”
- Follow-up from 40<sup>th</sup> Assembly and ICAO State Letter 2020 / 089
  - Proposing Assembly Resolution in CNS Context (Appendix C to AR-35-15)
  - **Support from European States requested through NMB**
  - Aircraft: Better Complementary Integration of GNSS / INS / DME
  - Ground: Better Complementary Integration of ADS-B and SSR

# Summary & Recommendations



- Despite the decrease of the number of pilot reports in 2021, GNSS interferences continue to affect aviation operations significantly and may increase further in the coming months
  - Noting that the initial peak of RFI near Ukraine in March has reduced again currently
  - GNSS RFI may escalate beyond “operational nuisance” if coinciding with unusual traffic pattern linked to Ukraine airspace closure
- Support from States to EUROCONTROL letter to ITU (in line with ITU process) quite limited so far
  - GNSS (GPS L1) is the main aviation infrastructure today
  - Absence of formal radio reports does not mean absence of problems
  - Important to maintain close connection with State radio regulator / Telecom ministry
  - Important to make political pressure especially if “cooperation among States” is limited
- EUROCONTROL developing automated, near-real time GNSS RFI reporting tools
  - Still struggling to figure out how this should be integrated into national and EUROCONTROL RFI reporting process in detail