Volatility in air traffic and its impact on ATM Performance

Towards more predictability

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Introduction of FABEC Volatility TF

Where is Volatility TF coming from?
  - SCO (Standing Committee Operations) asked in 2017 for a study « how to deal with traffic volatility? »

Who attended to this Volatility TF?
  - FABEC partners from upper ACC/UAC (DSNA, DFS, MUAC, skyguide)
  - OPS and non OPS staff
    - ATFM domain (FMP)
    - Performance experts
  - Military
9 sources of volatility were identified, discussed, and clustered:

- GEOPOLITICS and MACROSCOPIC TRAFFIC SHIFTS
- TRAFFIC FORECAST
- UNIT RATES
- STAFFING
- FUA and MILITARY ACT
- AIRCRAFT OPERATORS
- WEATHER
- COMMUNICATION
- ATFM
Sources of Volatility

- After discussion, proposals/recommendations were made in each domain

- 1 proposal for GEOPOLITICS and MACROSCOPIC TRAFFIC SHIFTS
- 3 proposals for TRAFFIC FORECAST
- 3 proposals for UNIT RATES
- 3 proposals for STAFFING
- 3 proposals for FUA and MILITARY ACT
- 3 proposals for AIRCRAFT OPERATORS
- 3 proposals for WEATHER
- 5 proposals for COMMUNICATION
- 10 proposals for ATFM

- 34 proposals in total
One proposal per domain:
1. GEOPOLITICS and TRAFFIC SHIFTS

More information regarding flight intentions are needed from AOs

- Prop: The NM to intensify relationship with AOs (e.g. STATFOR and the AOs) and encourage them to provide more information regarding flight intentions (DDR2)
One proposal per domain:

2. TRAFFIC FORECAST

Information regarding Unit Rates could help STATFOR for more reliable data

- Prop: STATFOR to coordinate with states in order to take into account Unit Rates
One proposal per domain:

3. UNIT RATES

Shifts of traffic from one year to another, inconsistencies with capacity plans

- Prop: Update the charging mechanism with the aim at decoupling routing from Unit Rates
One proposal per domain:
4. STAFFING

Volatility due to staff shortage

Prop: Promote cross-licensing at sector family level wherever possible
One proposal per domain:
5. FUA and MILITARY ACTIVITY

Volatility due to planning avoiding military area but with actual trajectory allowed through military airspace

- Prop: Where and when possible, adapt the vertical definition of military areas in the core area, allowing a more precise booking of military activity in upper airspace above a certain level during planned busy times for civil traffic.
One proposal per domain:

6. AIRCRAFT OPERATORS

Volatility due to unrealistic flight plans

- Prop: Ask NM and its yoyo TF to give a clear definition of what a yoyo flight is and what a sharp turn is, in order to avoid creative flight plans and simplify the RAD.
One proposal per domain:

7. WEATHER

Global situation awareness in case of adverse weather

Prop: In case of flight suspended message (FLS) due to weather, additional information should be delivered by NM to AO about where to file a new flight plan.
One proposal per domain:

8. COMMUNICATION

Flight plan adherence

- Prop: Investigate safety impact by volatility due to non-flight plan adherence, and derive to a simultaneous campaign in FABEC ACCs and AOs, showing examples of “not to be done”, explaining interdependencies, in order to improve situation awareness for ATCOs and pilots
One proposal per domain:

9. ATFM

ATFM is the most impacted domain by volatility. 10 proposals were made to get to a better predictability.

- Prop: Extend Collaborative Advanced Planning to FABEC

But let’s have a look to some ATFM issues...
9. ATFM: Volatility in ICAO FPL F15 Route

- In Preflight phase, regular changes in F15 at regular time interval,
- Totally different/alternate routes,
- Slight Changes (SID/STAR, Route portion only, introduction of an intermediate point)
- RFL/Speed
  - Numerous changes of only speed at waypoint (1kt most often!)
  - RFL changes might imply changes in Airspace Profile
- In average, around 2 changes per flight every day
  - 10% of these changes are about speed change by one or few Kts on an exactly identical route!
9. ATFM: Volatility in ICAO FPL F15 Route

• Change of just 1 kt, or level change, or new Wpt

• History of F15 (ICAO Route) filing:
  • 2018-04-28 08:35-N0402F240 OPALE2A OPALE UT421 KUNAV TIMBA4B
  • 2018-04-28 15:00-N0403F240 OPALE2A OPALE UT421 KUNAV TIMBA4B

• Other example:
  • 2018-04-28 10:39-N0454F390 ERIXU6P ERIXU UN860 ETAMO UN855 PPG UP84 LORES
  • 2018-04-28 10:44-N0452F350 ERIXU6P ERIXU UN860 ETAMO/N0454F390 UN855 PPG UP84 LORES
  • 2018-04-28 11:52-N0454F370 ERIXU6P ERIXU UN860 ETAMO UN855 VALKU/N0453F390 UN855 PPG UP84 LORES
9. ATFM: Examples of unexpected flights / Issue in sector distribution
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The traffic count can be overestimated or underestimated at H+3 corresponding to the ATFCM decision.
Quantification of the Intruders/Extruders

13/03/2018
14/03/2018
15/03/2018

Intruders
Extruders

Volatility / Warsaw workshop May/2018 – JM.Edard / T.Hellbach
Is it possible to measure volatility?

- Volatility at strategic level difficult to measure
  - Too many factors/interdependencies to be taken into account would lead to very approximative results

- Volatility at tactical level and in post-ops analysis easier to measure
  - Planned/Regulated traffic is known
  - Actual traffic is known
    - Including planned traffic entering planned sectors
    - Including traffic entering unplanned sectors (capacity overload)
    - Excluding traffic who did not enter planned sectors (lost capacity)
    - Including/excluding traffic entering planned sectors but not on time (e.g. difference > 30’)

- Share of volatile traffic compared to planned/regulated traffic
Is it possible to measure volatility?

- Share of volatile traffic compared to planned traffic
  - Volatility ratio = (Intruders + Extruders) / Regulated traffic

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Thank you for your attention!