Volatility in air traffic and its impact on ATM Performance

Towards more predictability

Jean-Michel Edard, Thomas Hellbach – *FABEC*

Introduction of FABEC Volatility TF

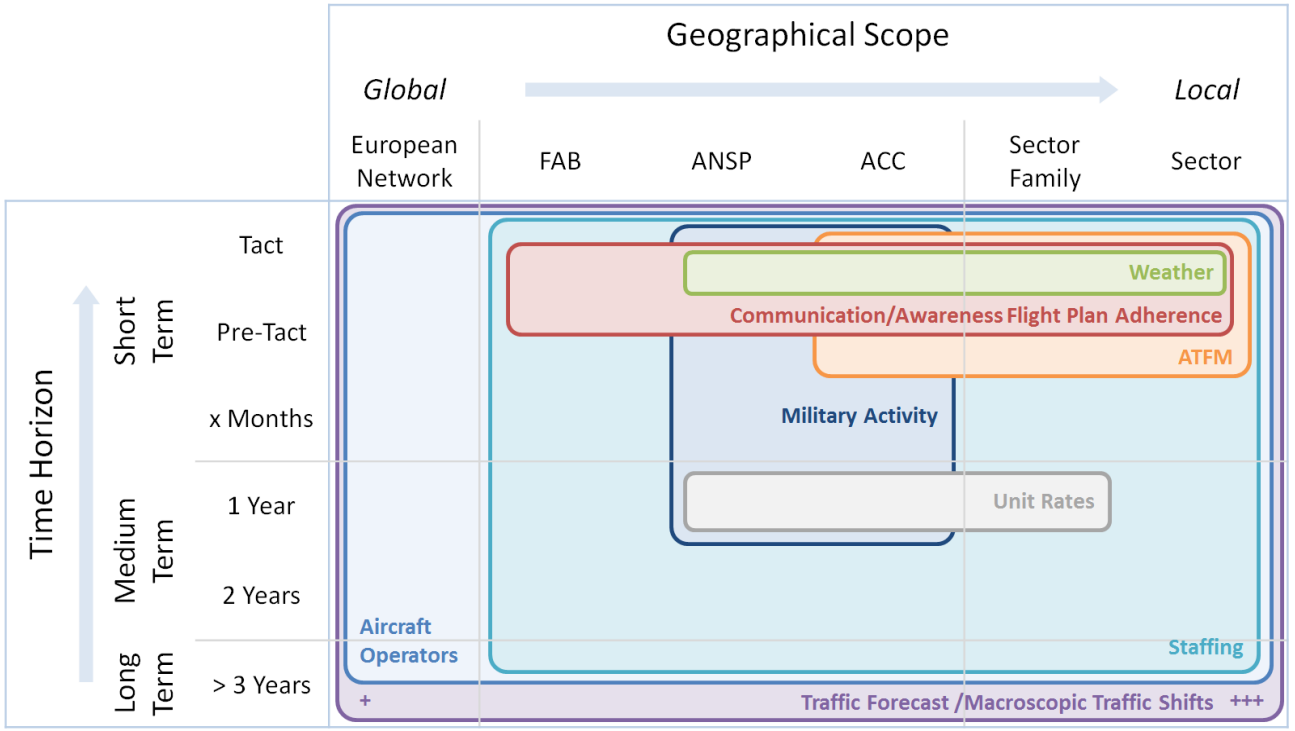
- Where is Volatility TF coming from ?
  - SCO (Standing Committee Operations) asked in 2017 for a study « how to deal with traffic volatility? »

- 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

Sources of Volatility

- 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

FABEC

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

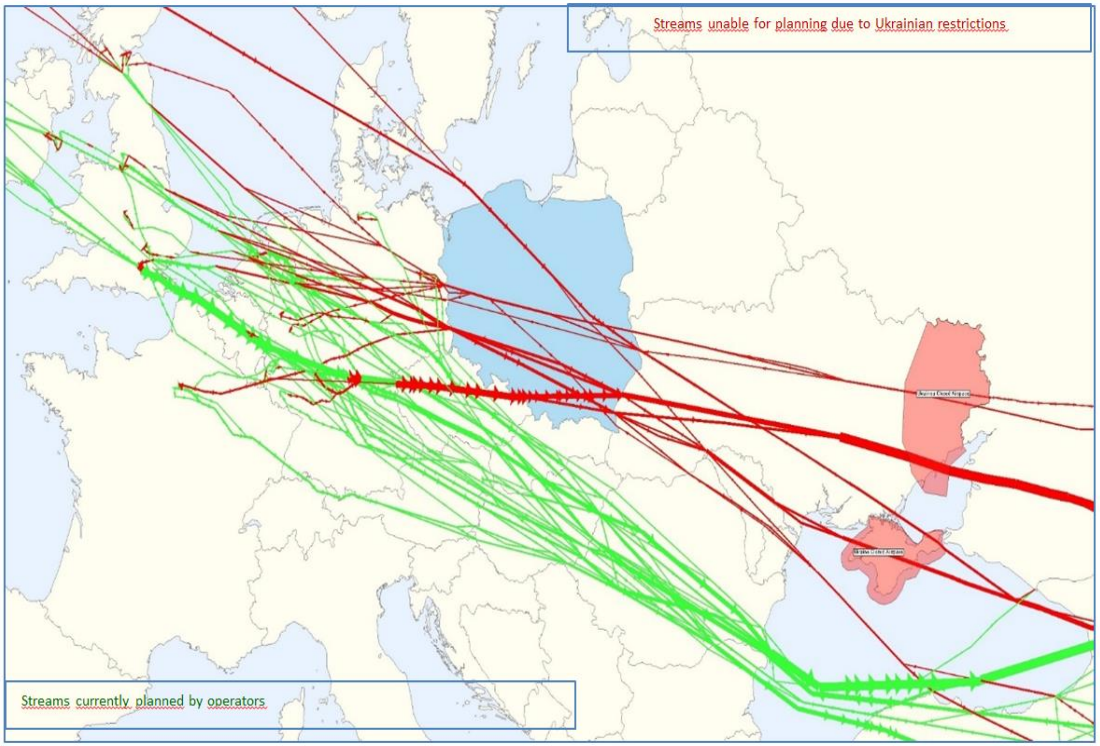
- 1 proposal for GEOPOLITICS and MACROSCOPIC TRAFFIC SHIFTS
- 3 proposals for TRAFFIC FORECAST
- 3 proposals for UNIT RATES
- 3 proposals for STAFFING
- 3 proposals for FUA and MILITARY ACT
- 3 proposals for AIRCRAFT OPERATORS
- 3 proposals for WEATHER
- 5 proposals for COMMUNICATION
- 10 proposals for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

- 34 proposals in total

One proposal per domain:

1. GEOPOLITICS and TRAFFIC SHIFTS

More information regarding flight intentions are needed from AOs

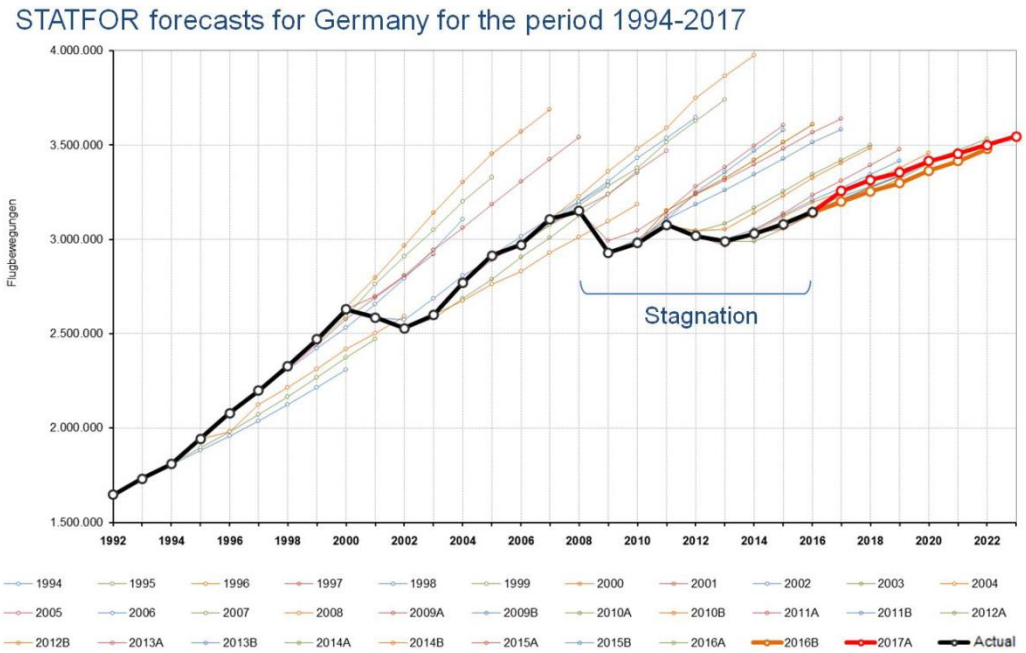


- **Prop: The NM to intensify relationship with AOs (e.g. STATFOR and the AOs) and encourage them to provide more information regarding flight intentions (DDR2)**

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**

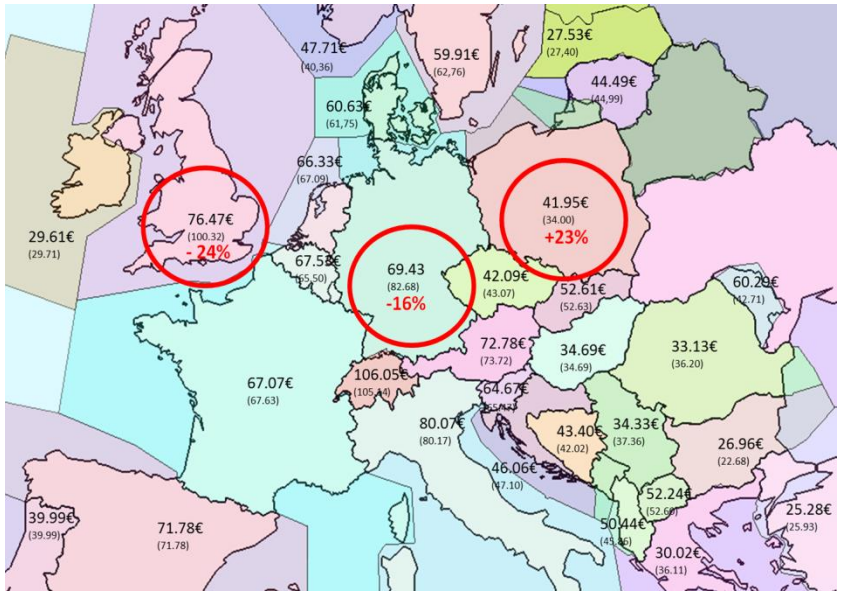


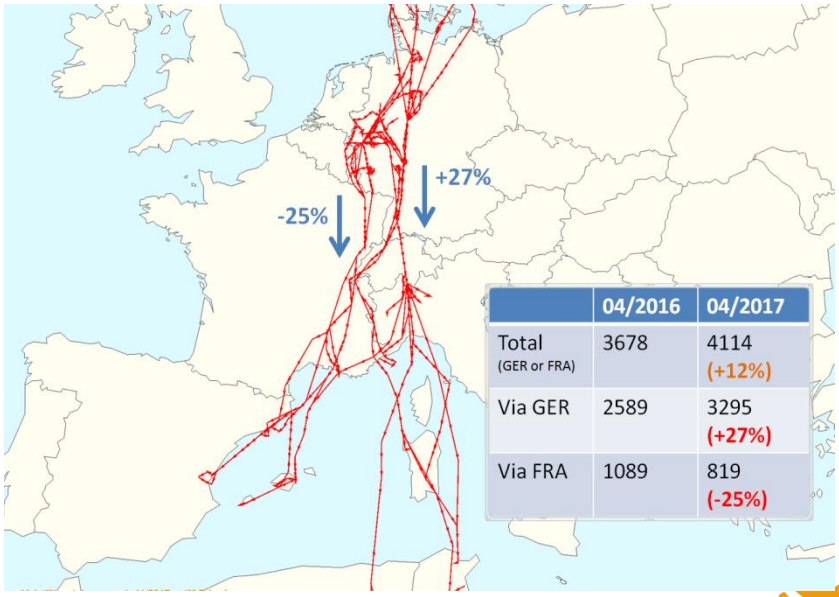
One proposal per domain:

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**

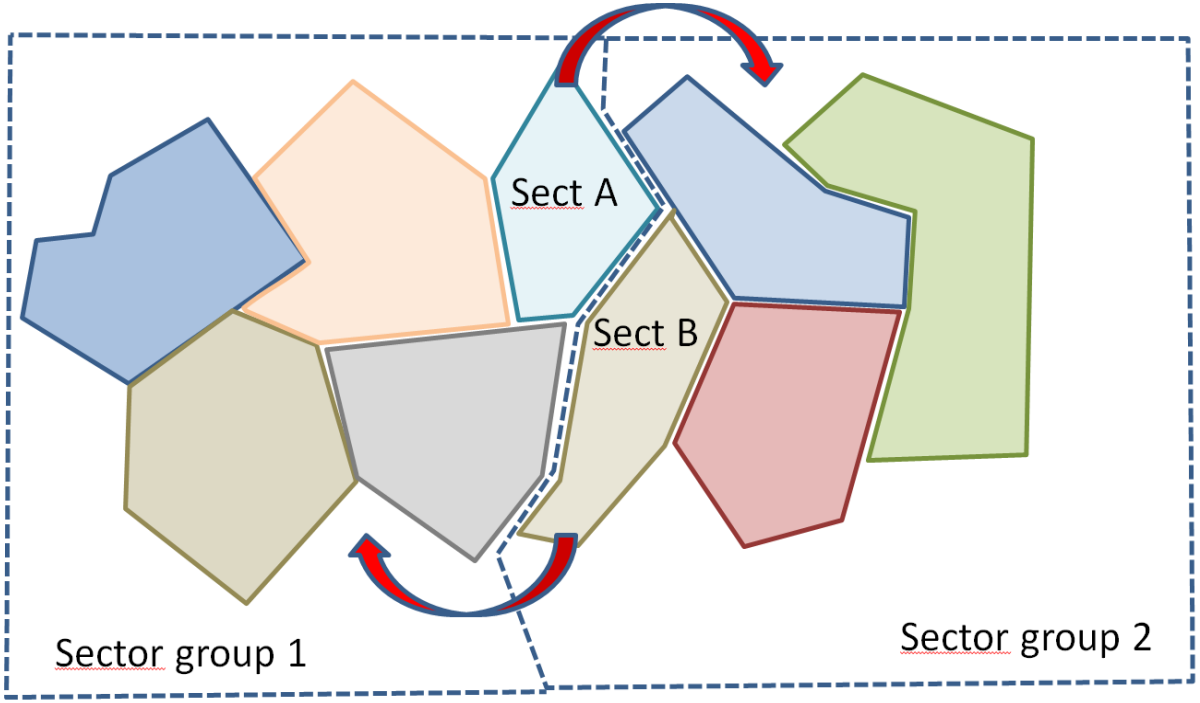




One proposal per domain:
4. STAFFING

Volatility due to staff shortage

- **Prop: Promote cross-licensing at sector family level wherever possible**

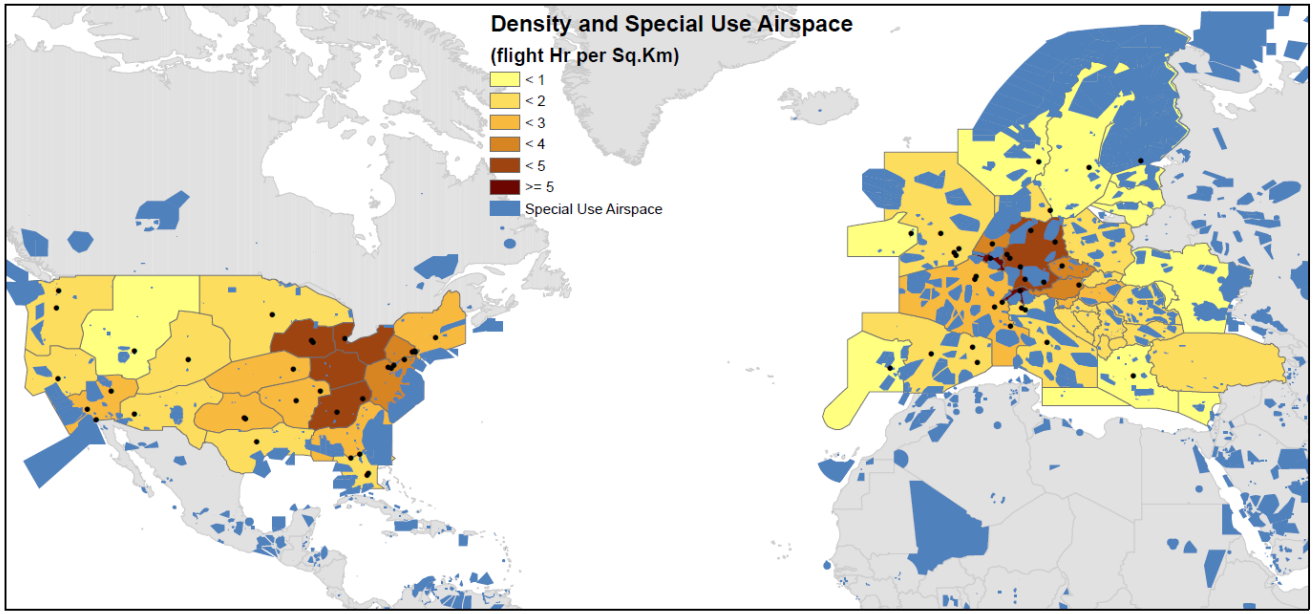


One proposal per domain:

5. FUA and MILITARY ACTIVITY

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

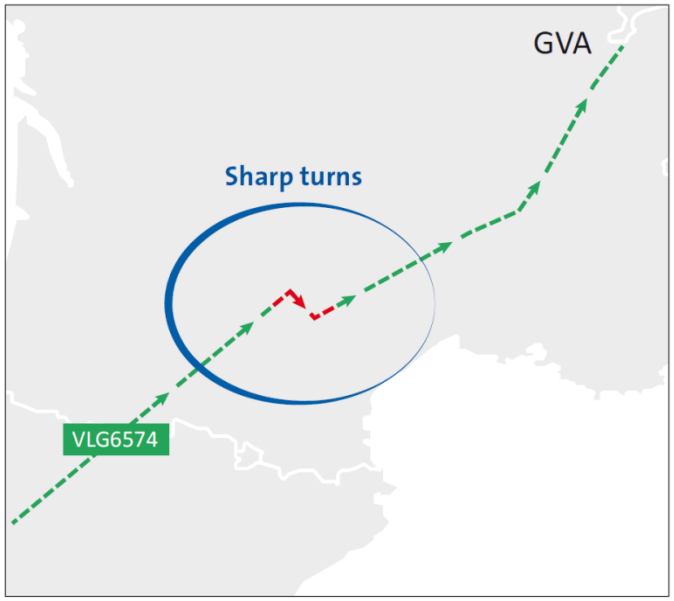
- **Prop: Where and when possible, adapt the vertical definition of military areas in the core area, allowing a more precise booking of military activity in upper airspace above a certain level during planned busy times for civil traffic**

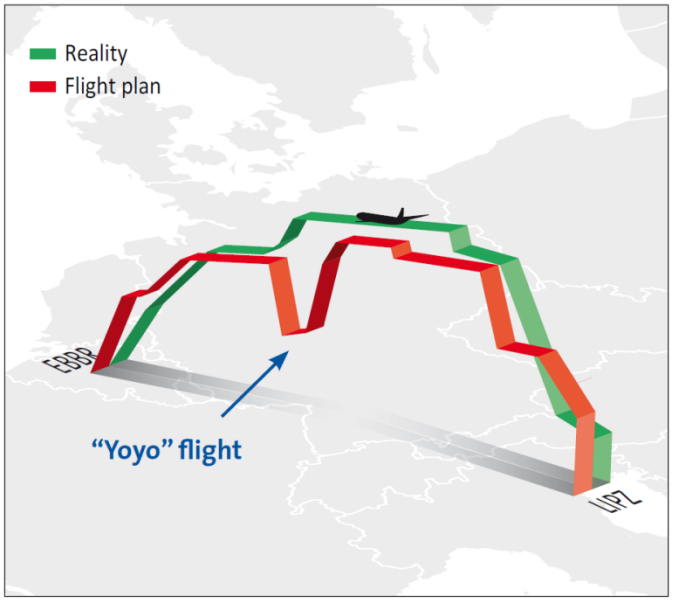


One proposal per domain:
6. AIRCRAFT OPERATORS

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!

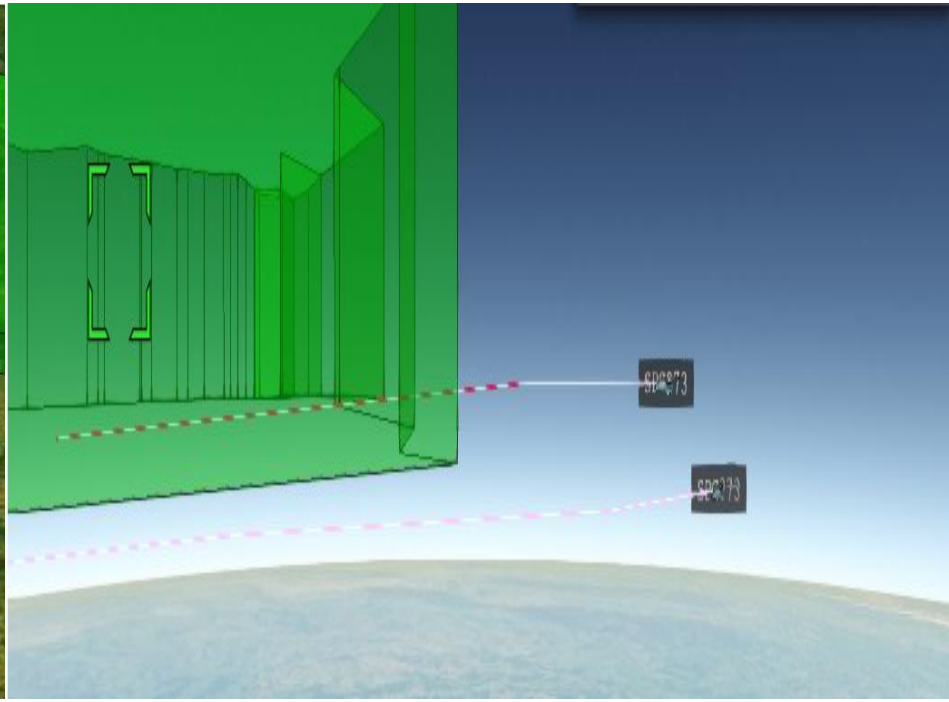
9. ATFM:Volatility in ICAO FPL F15 Route

- **Change of just 1 kt, or level change, or new Wpt**

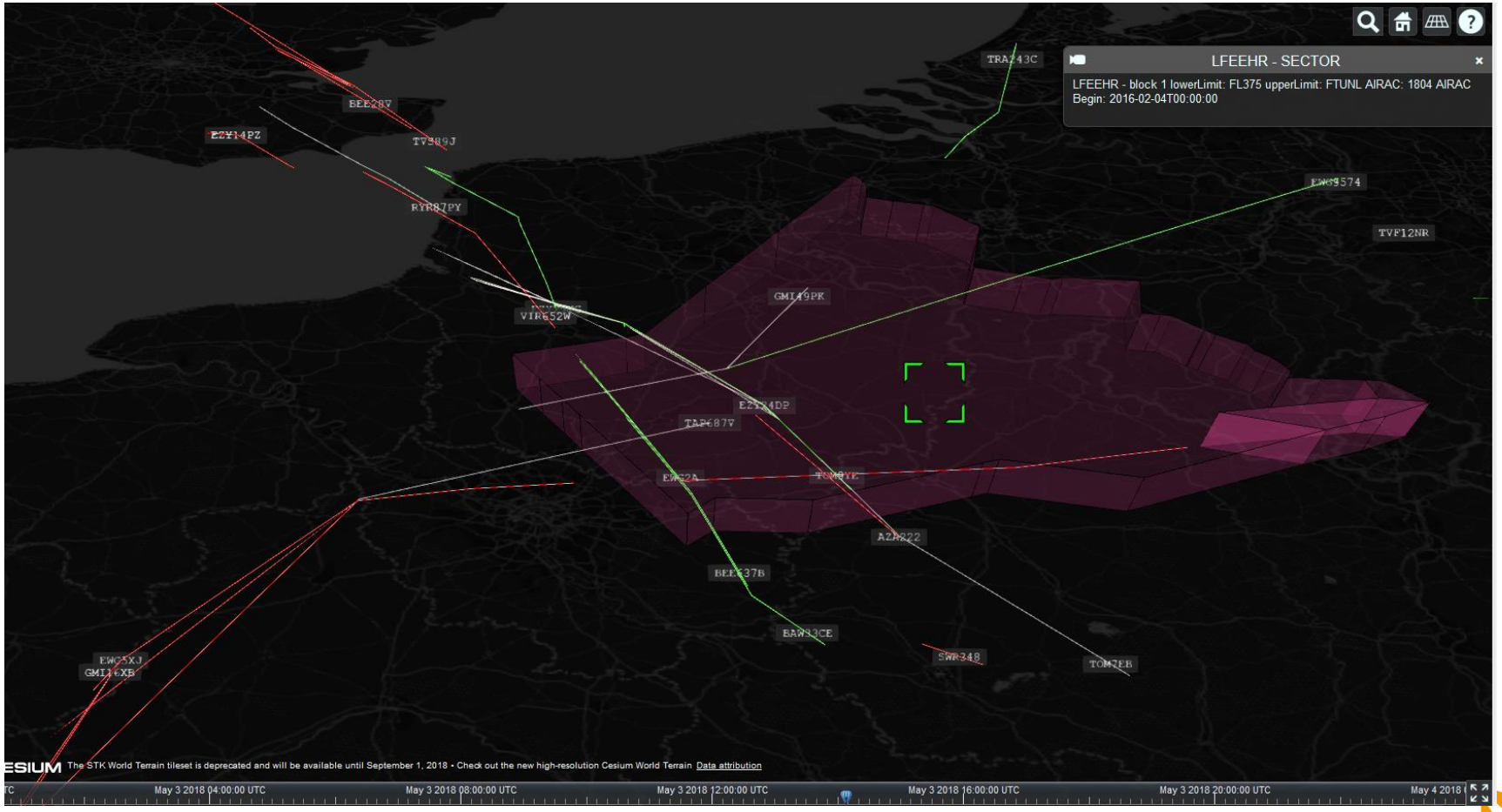
- History of F15(ICAO Route) filing :
- 2018-04-28 08:35-N040**2**F240 OPALE2A OPALE UT421 KUNAV TIMBA4B
- 2018-04-28 15:00-N040**3**F240 OPALE2A OPALE UT421 KUNAV TIMBA4B

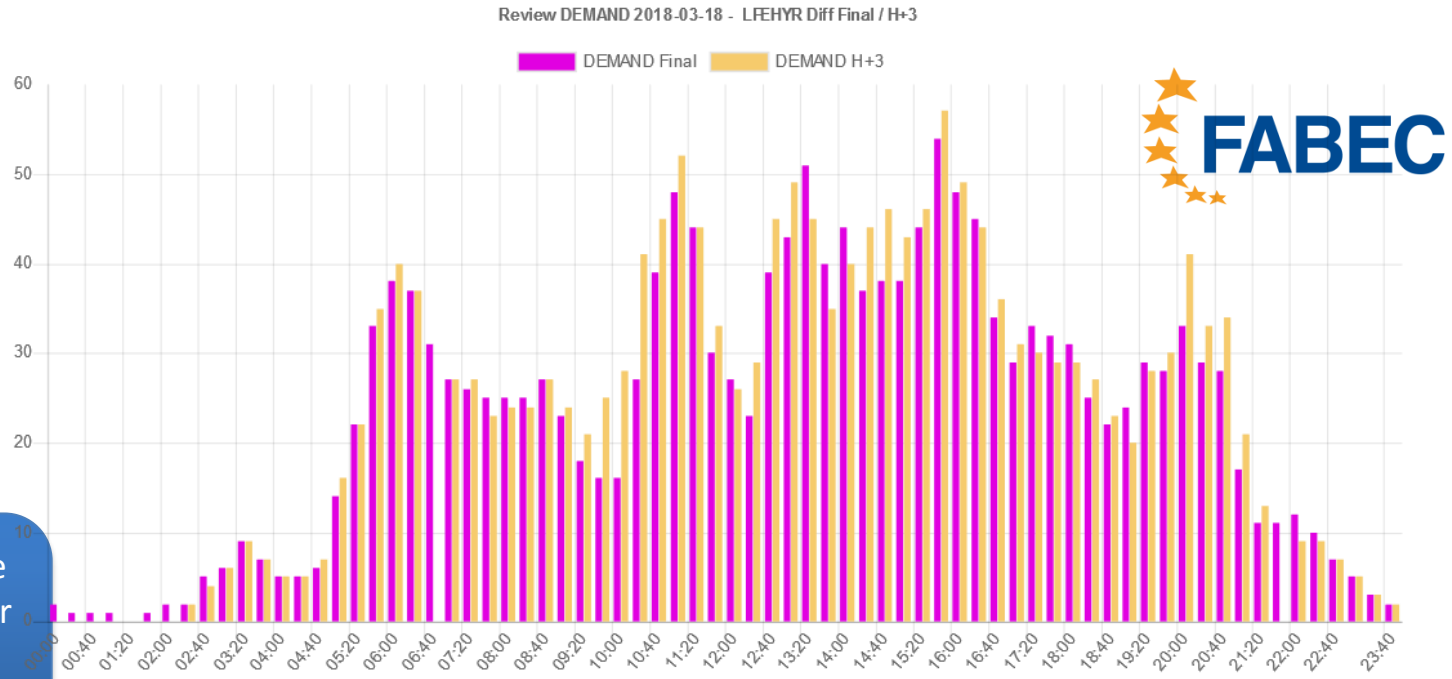
- Other example:
- 2018-04-28 10:39:-N0454F390 ERIXU6P ERIXU UN860 ETAMO UN855 PPG UP84 LORES
- 2018-04-28 10:44-N0452F350 ERIXU6P ERIXU UN860 ETAMO/N0454F390 UN855 PPG UP84 LORES
- 2018-04-28 11:52-N0454F370 ERIXU6P ERIXU UN860 ETAMO UN855 VALKU/N0453F390 UN855 PPG UP84 LORES

9. ATFM:Examples of unexpected flights / Issue in sector distribution

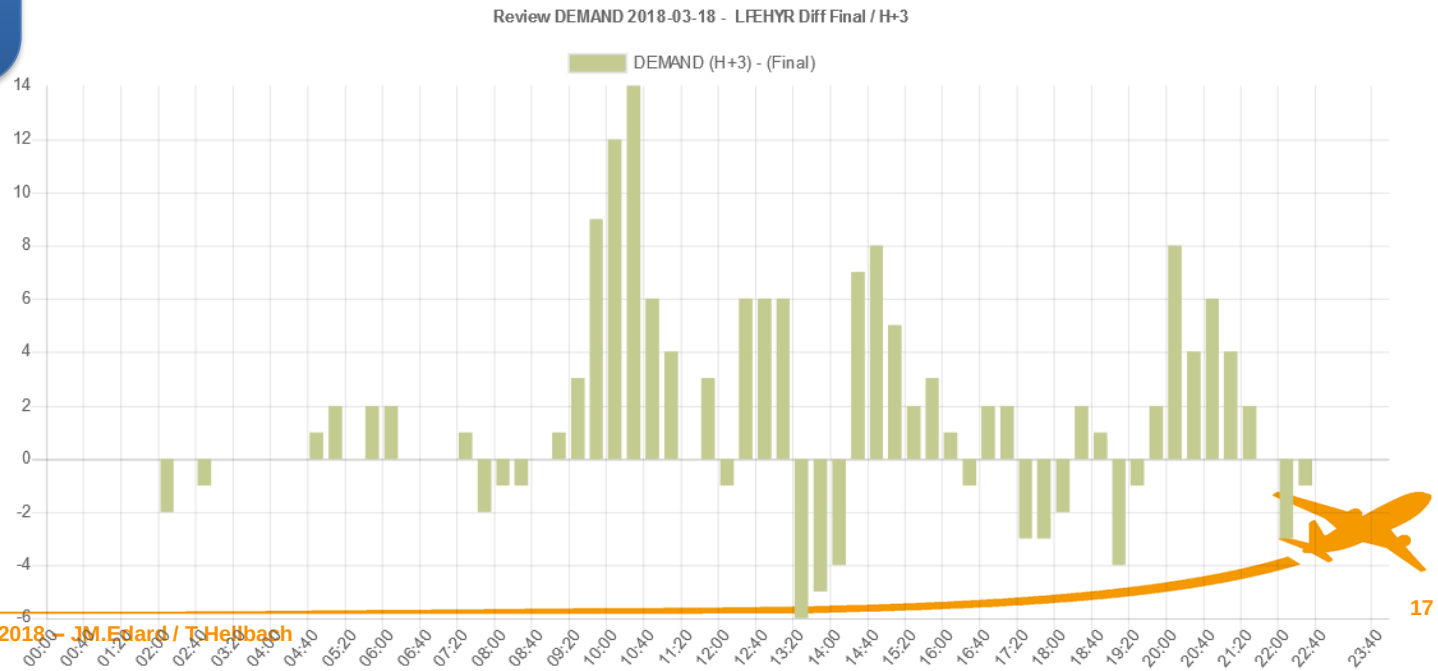


9. ATFM:Examples of unexpected flights / Issue in sector distribution



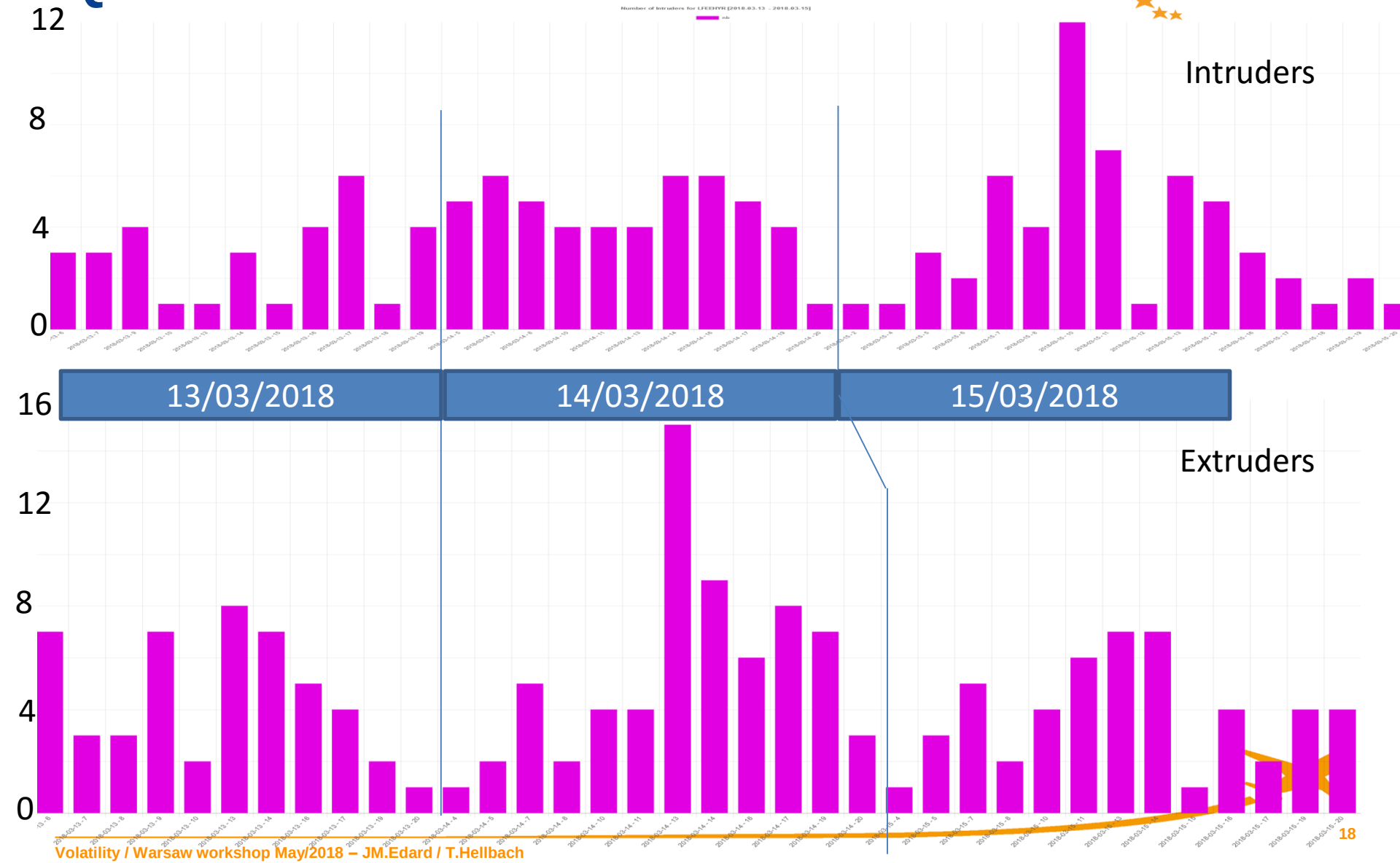


The traffic count can be over estimated or under estimated at H+3 corresponding to the ATFCM decision



Quantification of the Intruders/Extruders

FABEC



Is it possible to measure volatility?

FABEC

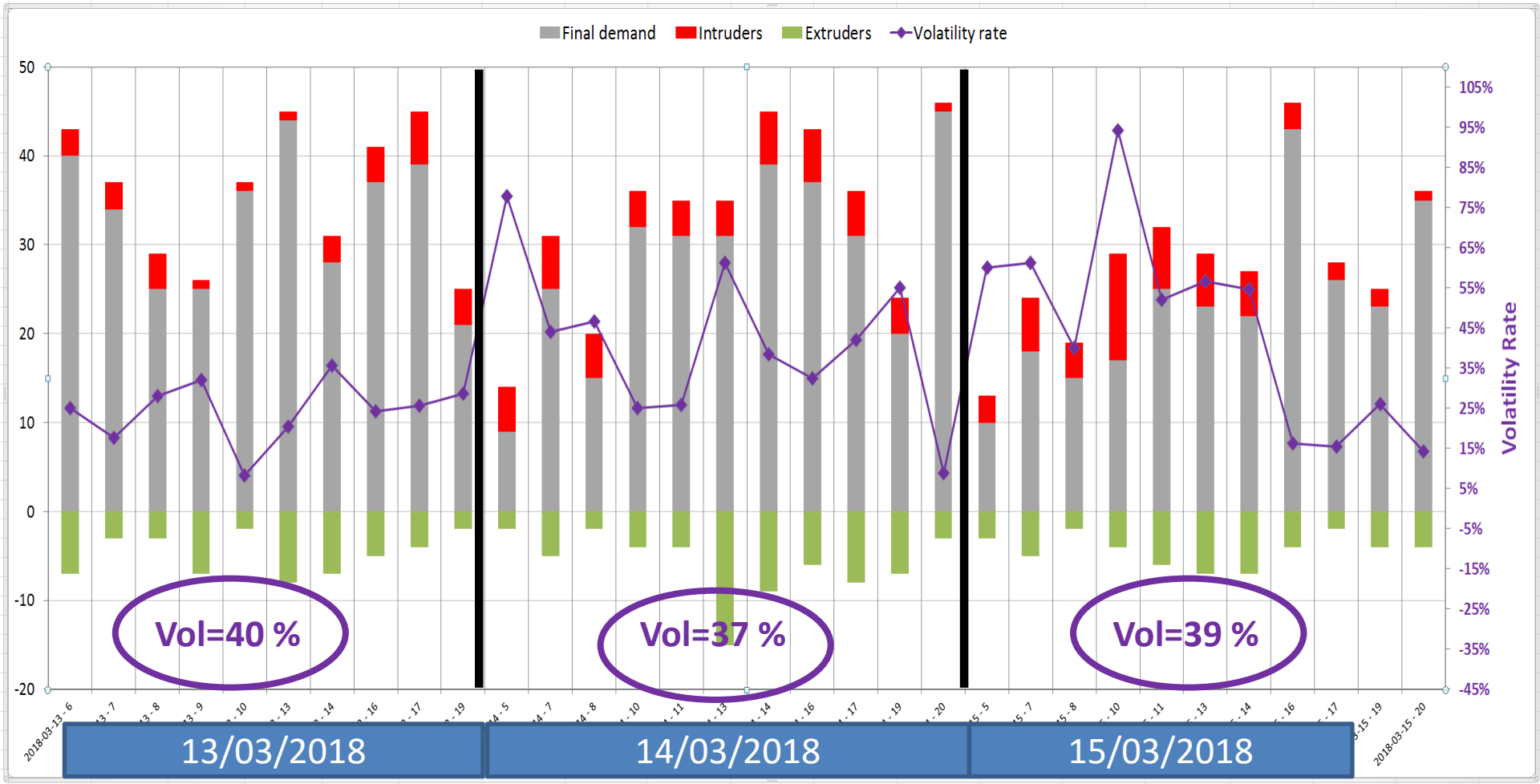
- Volatility at strategic level difficult to measure
  - Too many factors/interdependencies to be taken into account would lead to very approximative results

- 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 enterring 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



Thank you
for your attention!