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# *Global Challenges to Improve Air Navigation Performance* **European ATFM**

11-13 February 2015

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Network Manager Directorate

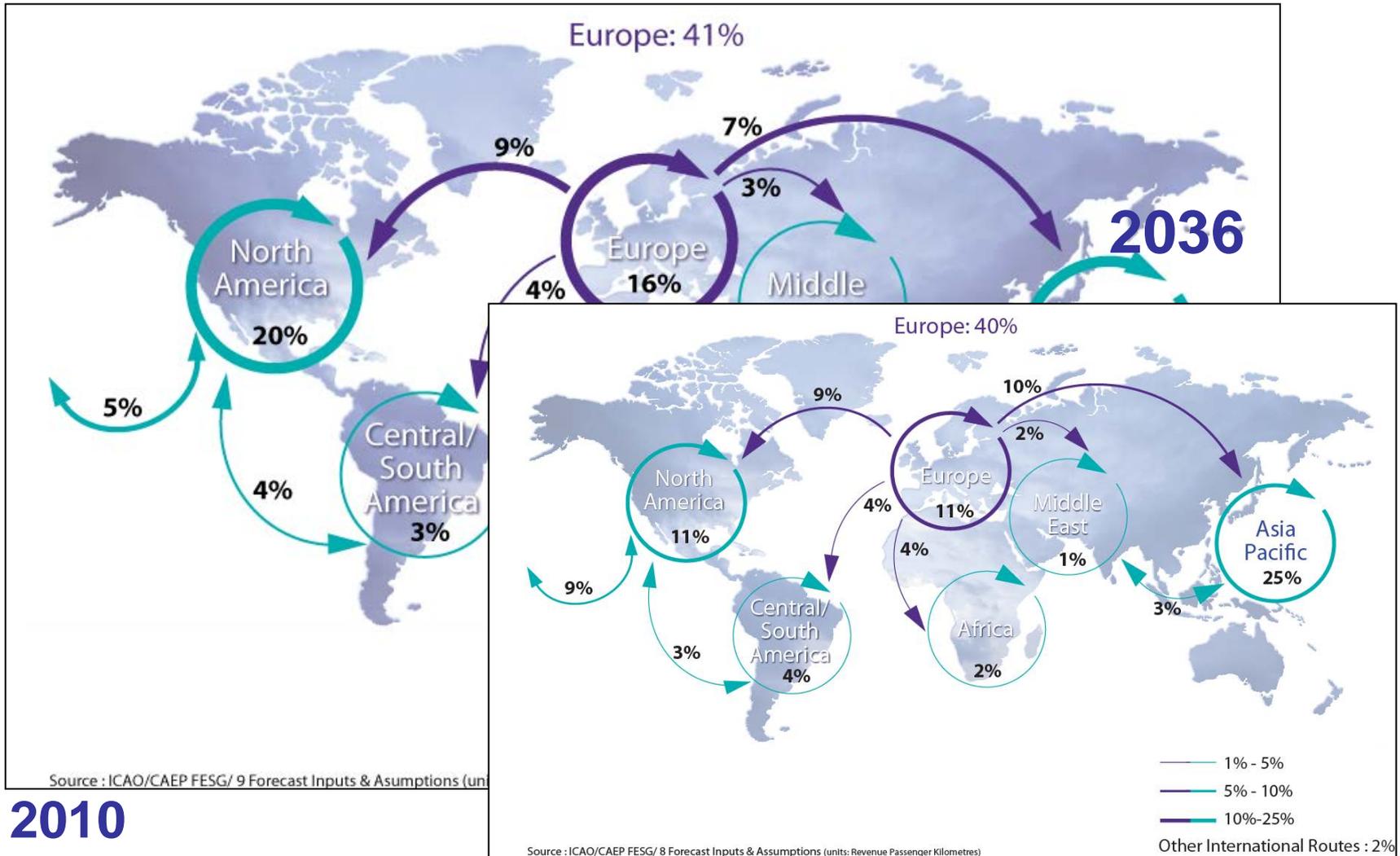


# An idea of Europe's demand / capacity balancing act

- European landscape
- What upsets the balance
- Local ATFM techniques
- Network ATFM techniques
- Global – Cyprus example
- Future ATFM techniques
- NM's future performance ideas



# Europe in World Traffic 2010/2036





## ATM Structure in Europe

**42 States**

**65 En-route centres = 1750 Sectors**

**1940 Aircraft Operators**

**520 Airports**

**61 FMPs**

# Network Operations

**6700+ connected end-users**

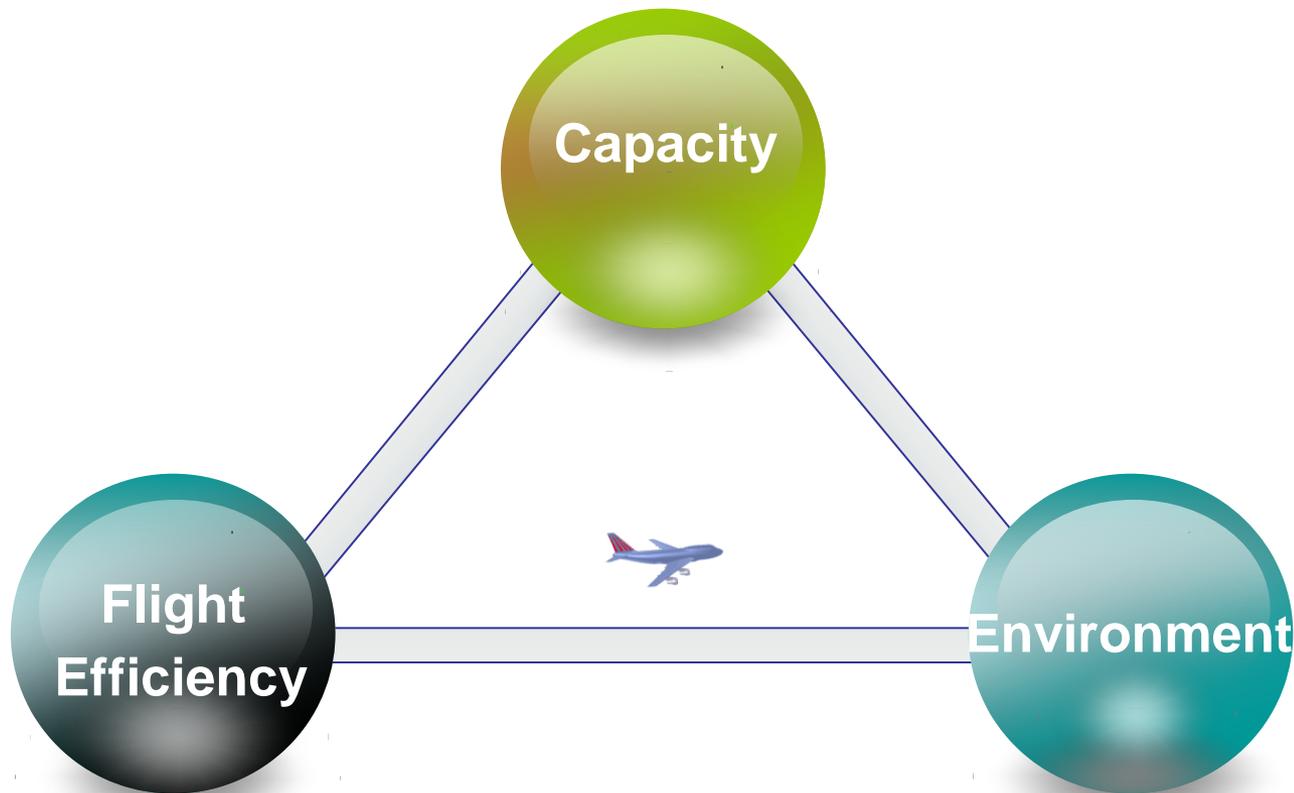
**Peaks 32 600+ flights a day**

**9 670 000+ flights a year**

**One single  
Flow Management  
System over  
Europe**



# Performance priorities

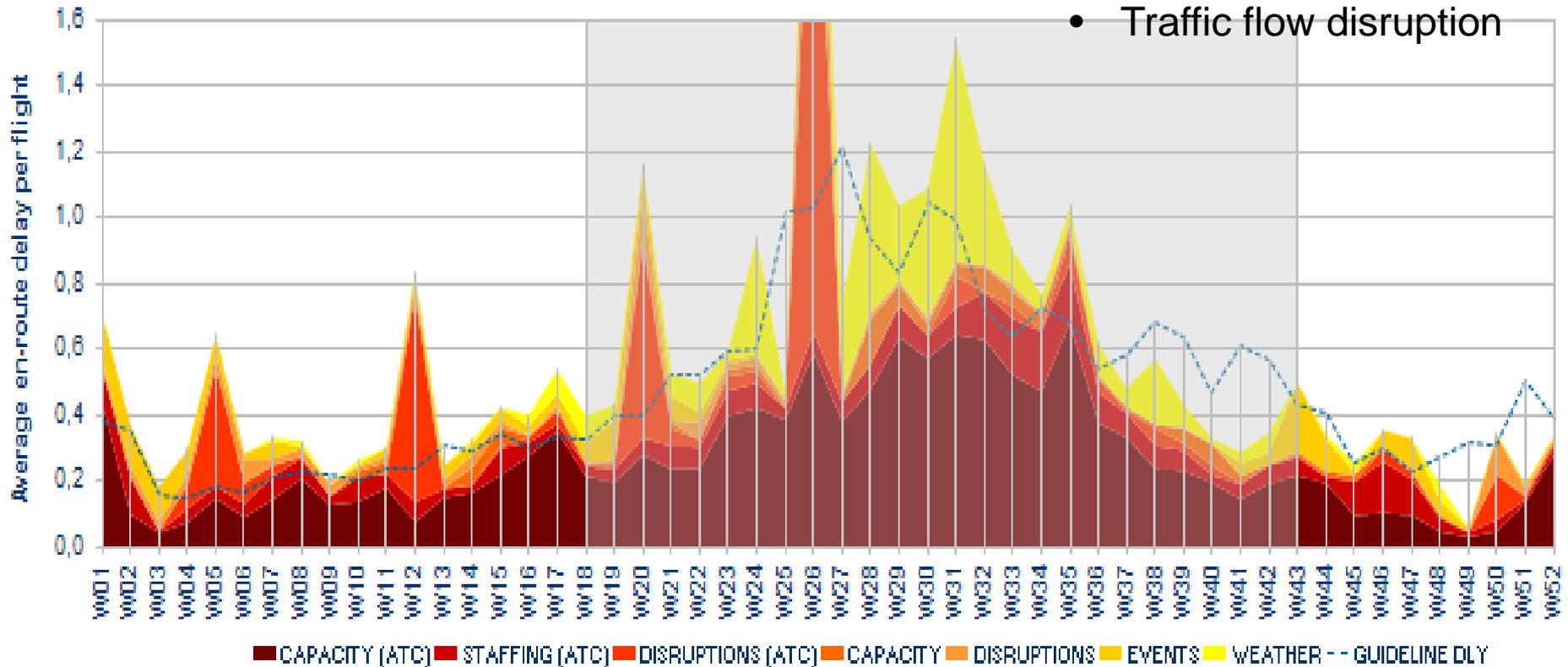




# What upsets the balance?

- ATC capacity /staffing
- Disruptions
- Weather
- Traffic flow disruption

Weekly Network en-route delay per flight





# The ATFM techniques

## Tactical

1. Capacity increase
2. Sector configuration management
3. Cherry picking, STAM, Rerouteing proposals, CARA...
4. Mandatory level capping scenarios
5. Mandatory rerouteing scenarios
6. ATFM regulation
  - Slot list management
    - **ad-hoc manual exclusions in coordination with FMP**
    - **Slot manipulation (e-helpdesk or delayed flight list monitoring)**

} Local and NM

} NM applied



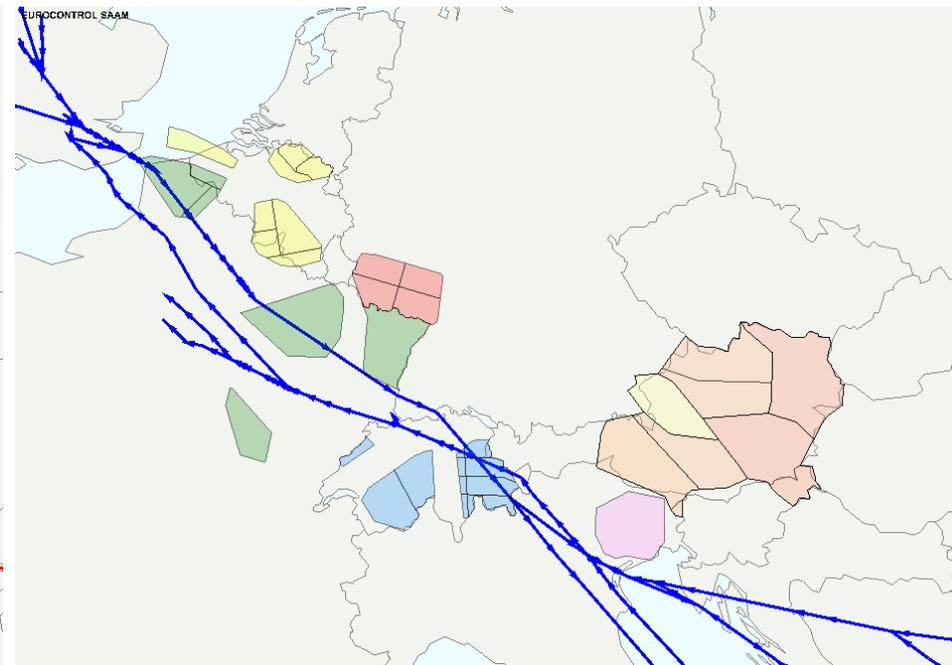
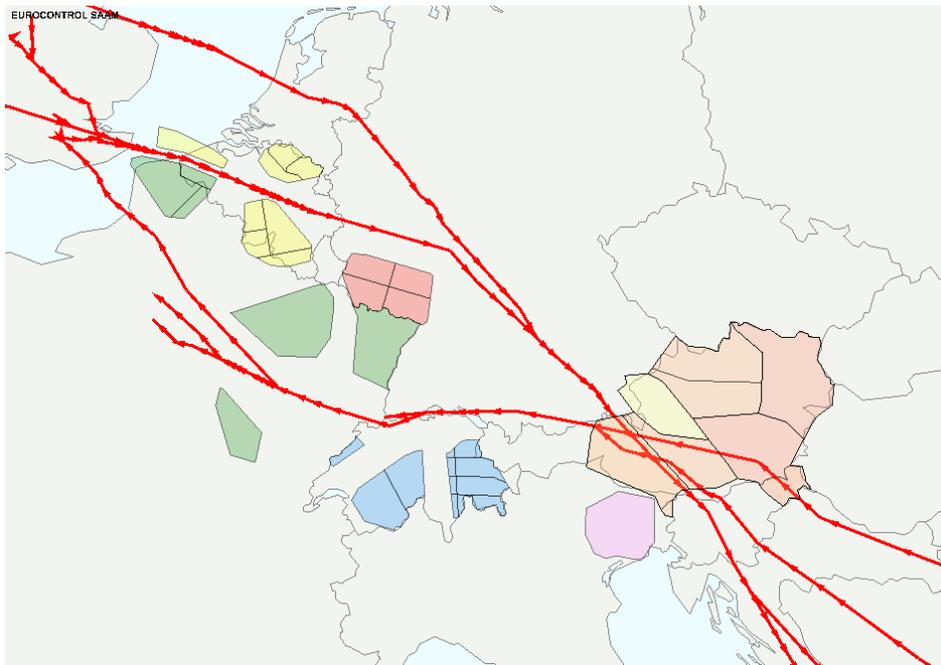
# Network techniques – Capacity

- NM negotiation with local units on configurations
- Airspace management negotiations

**Network wide implementation required**

Before

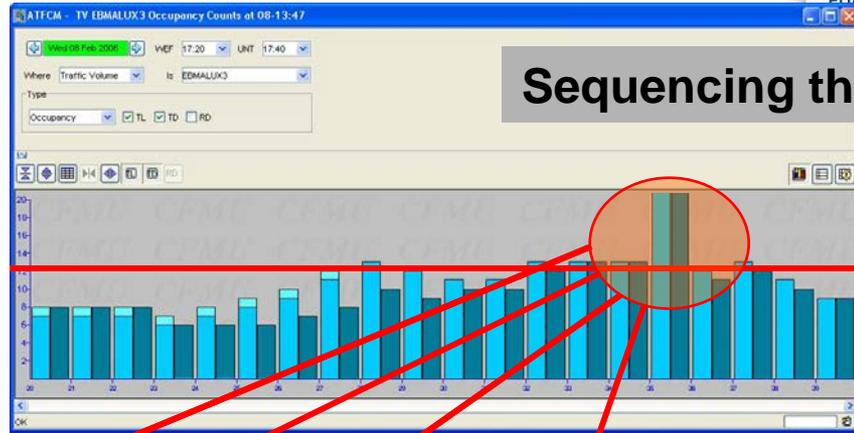
After





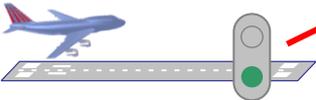
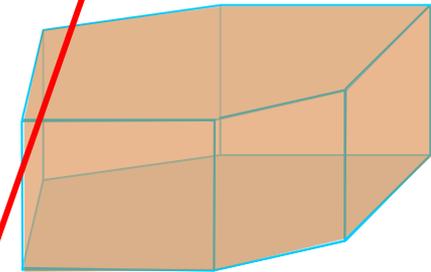
# ATFM regulation avoiding congestion

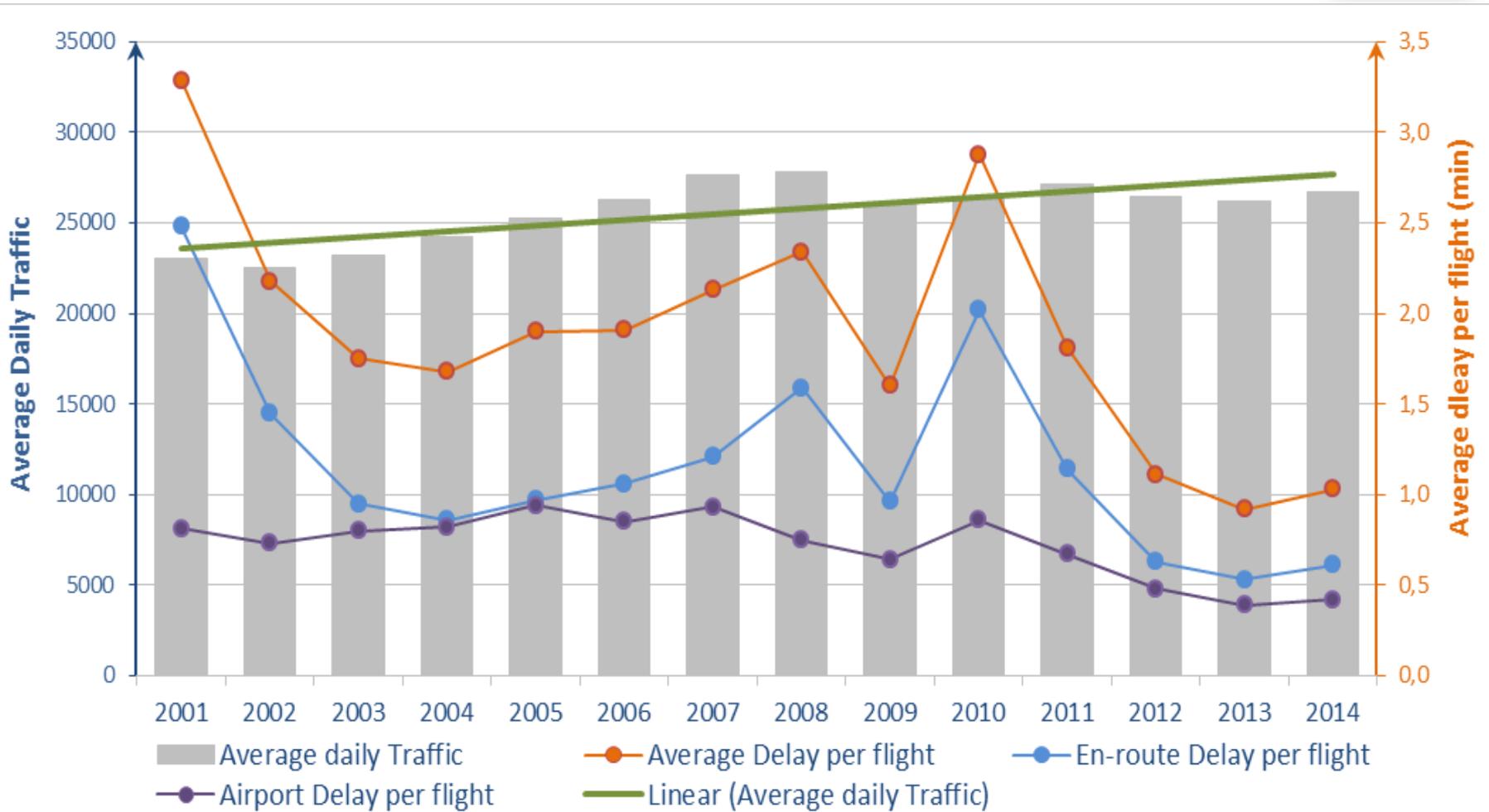
## Sequencing the traffic



### Optimisation:

- Exclusions
- Slot improvement
- Ground benefits







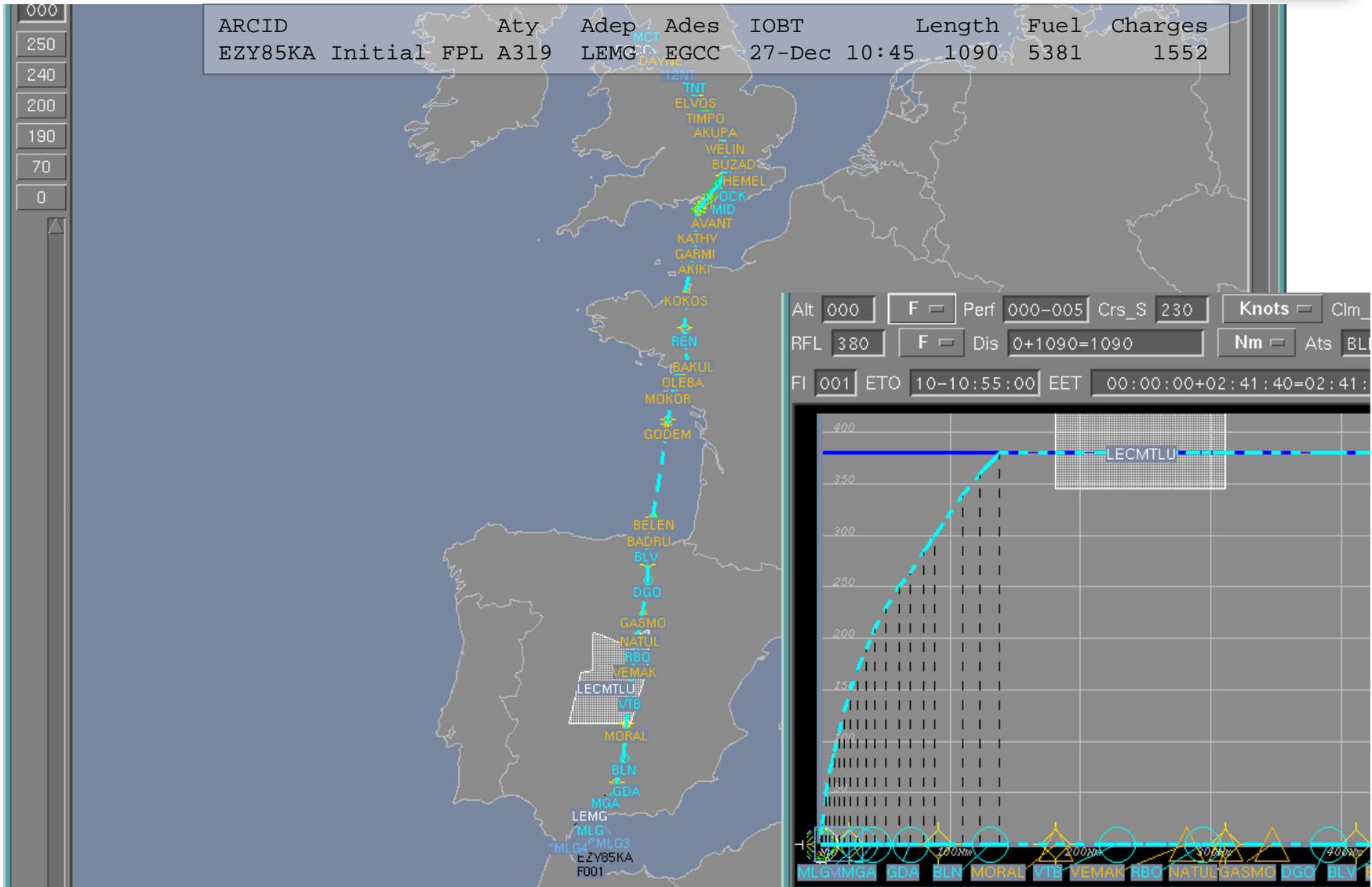
# Reroute scenario

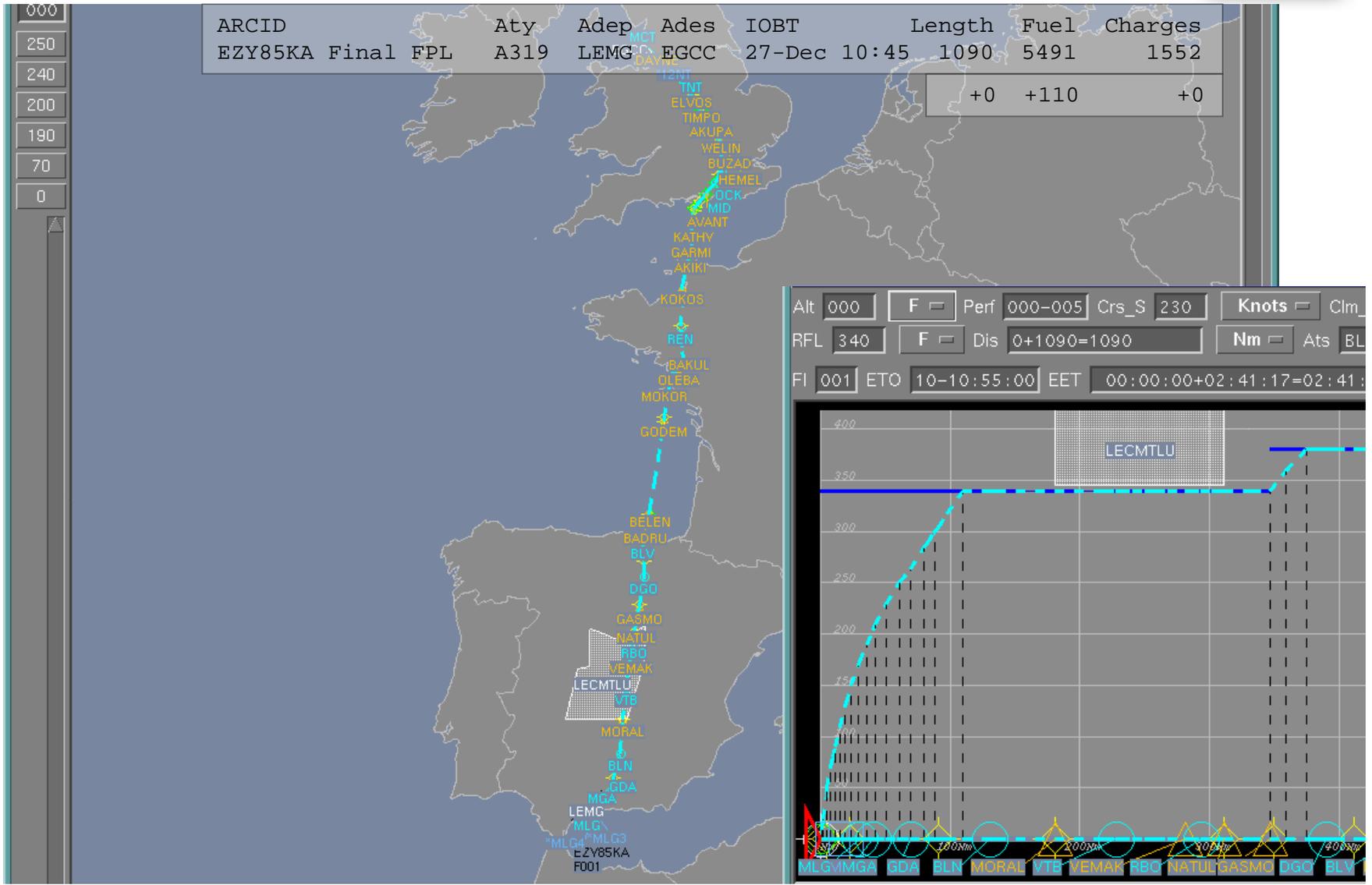






# FL level cap

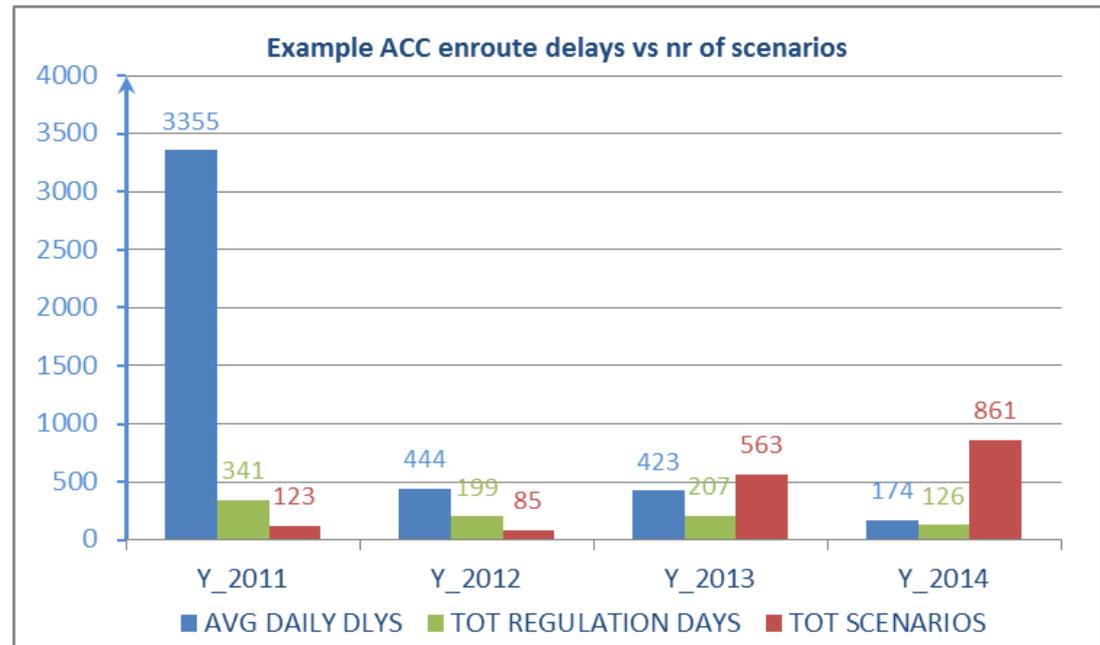






# Performance priorities

- ANSP's performance judged by ATFM delay
- Aircraft operators penalised by scenarios
- Environment (route extension FPL) impacted by scenarios

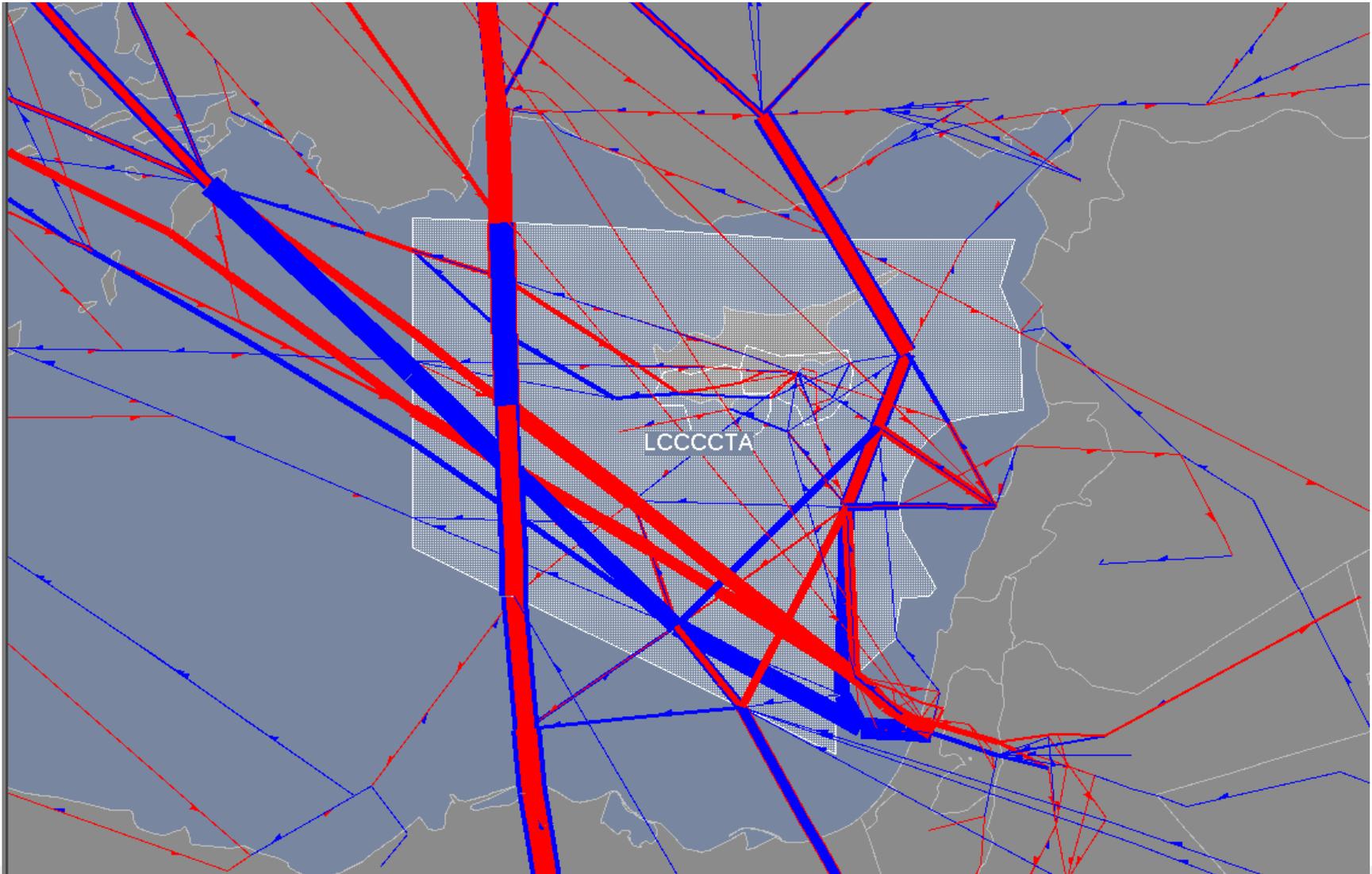




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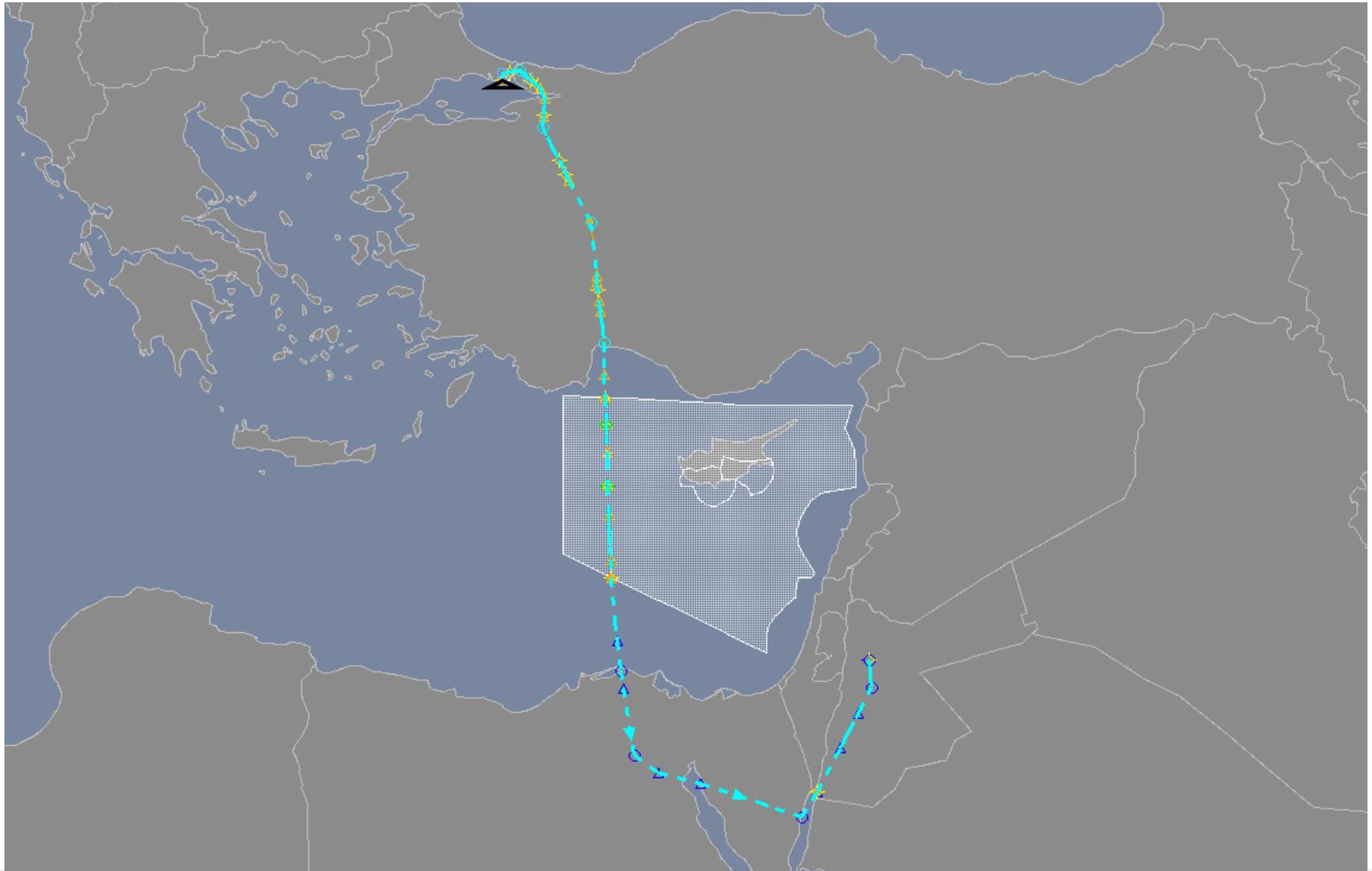


# Cyprus airspace on a busy Thursday (1000 mvts)



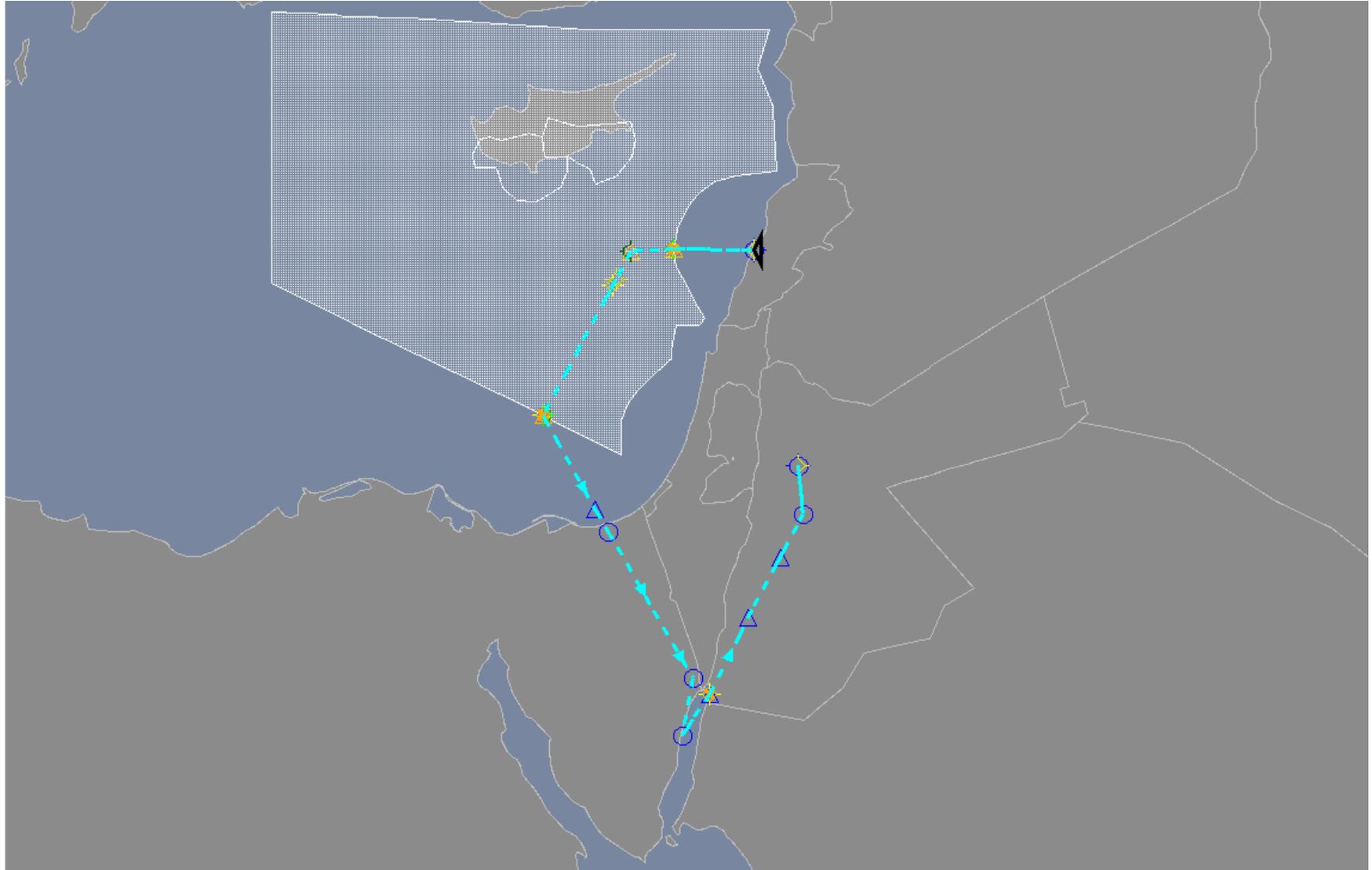


# Istanbul to Amman: 660nm becomes 1070nm



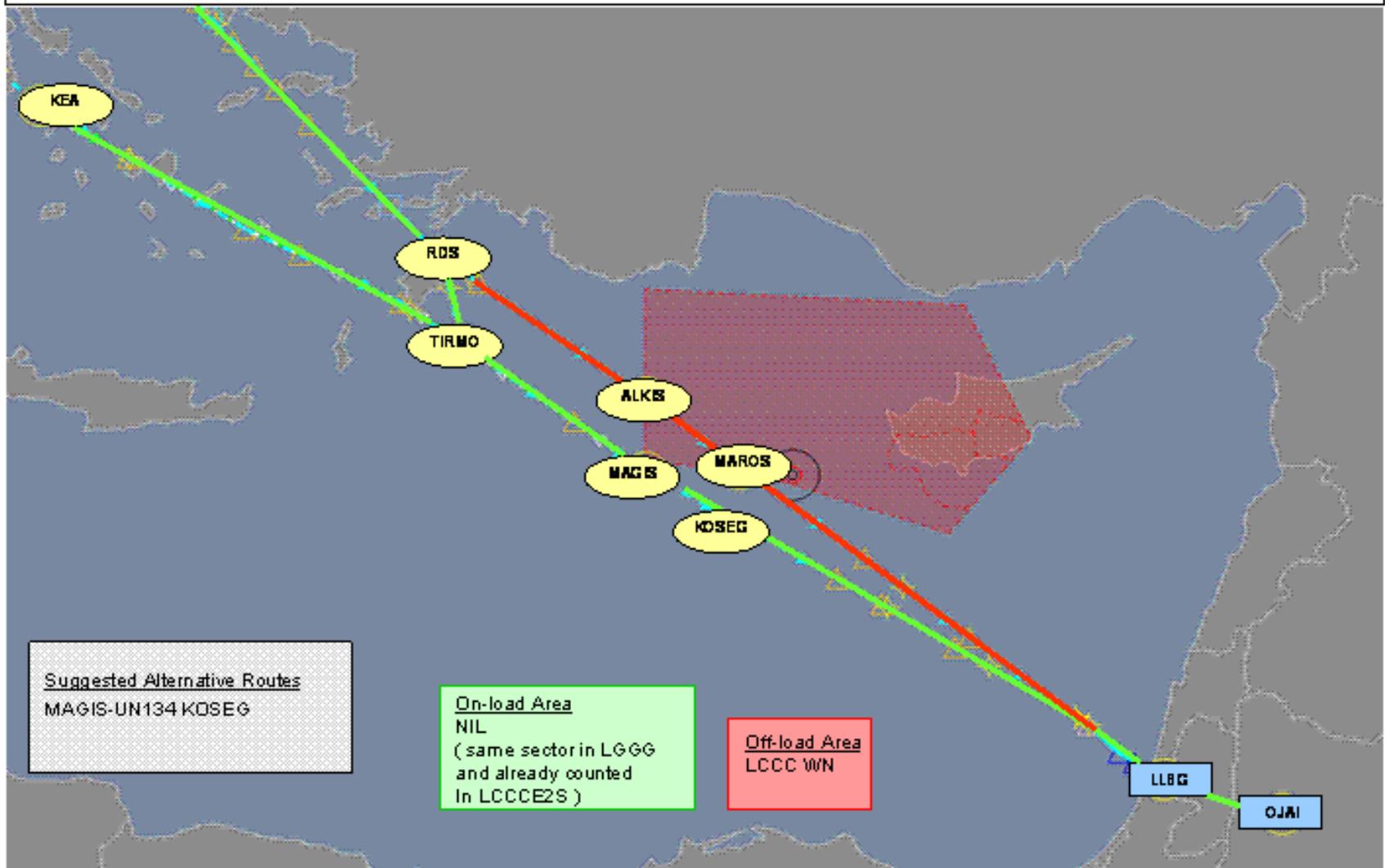


# Beirut to Amman: 130nm becomes 570nm



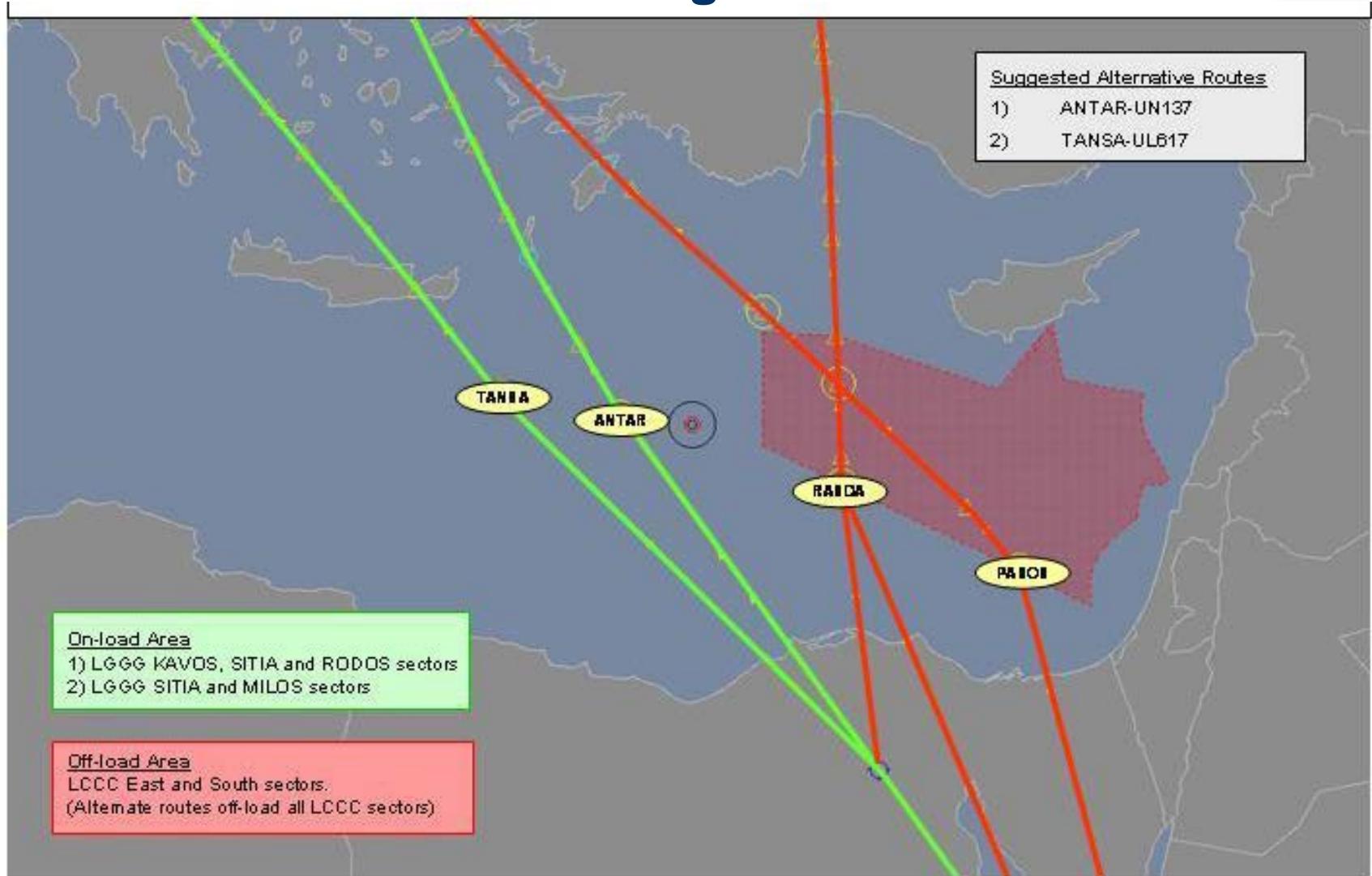


# Scenario RR1LCW off-loading LCCC West sector



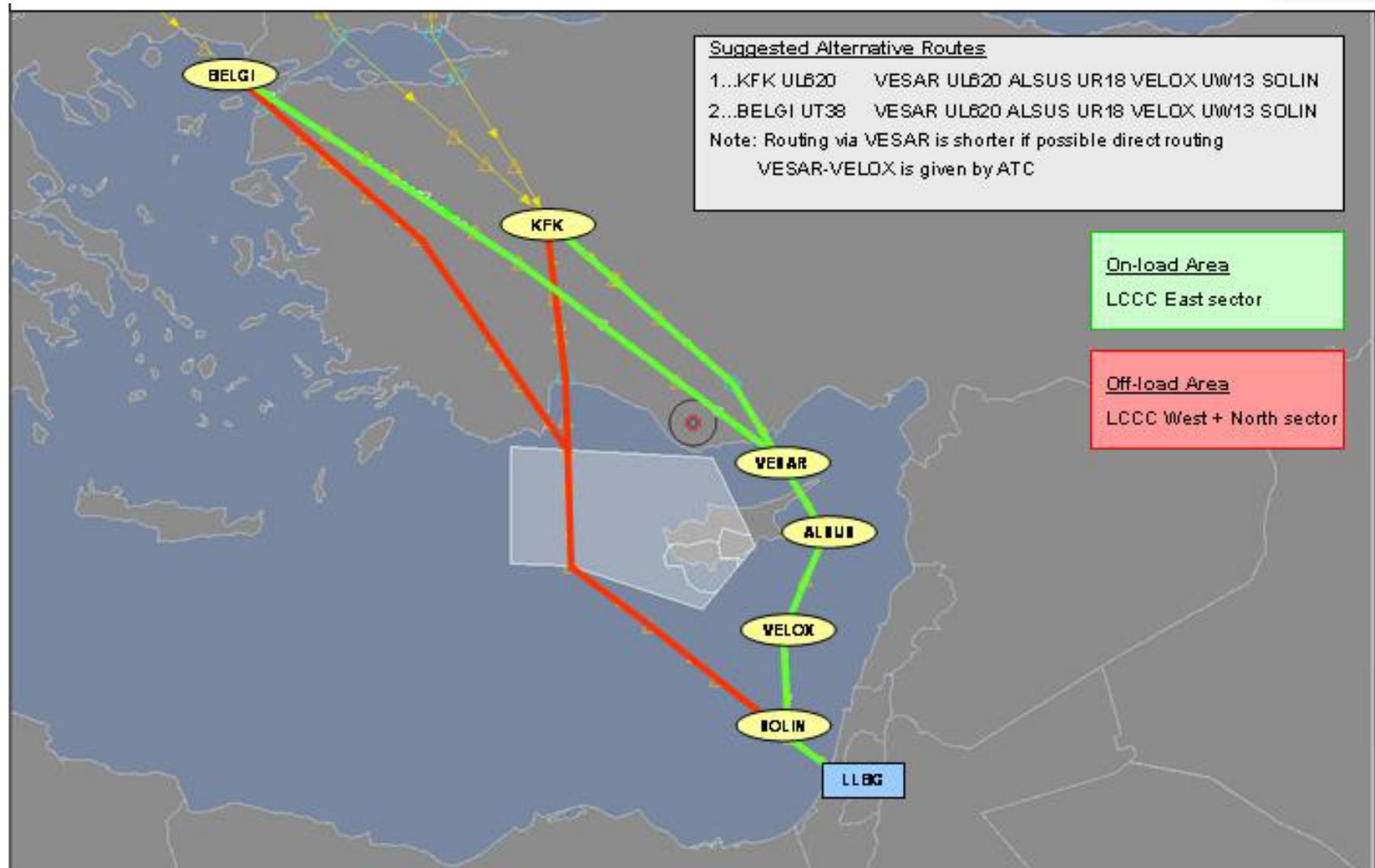


# Scenario RR1LCS off-loading LCCC South sector





# Scenario RR8LCW off-loading LCCC West sector

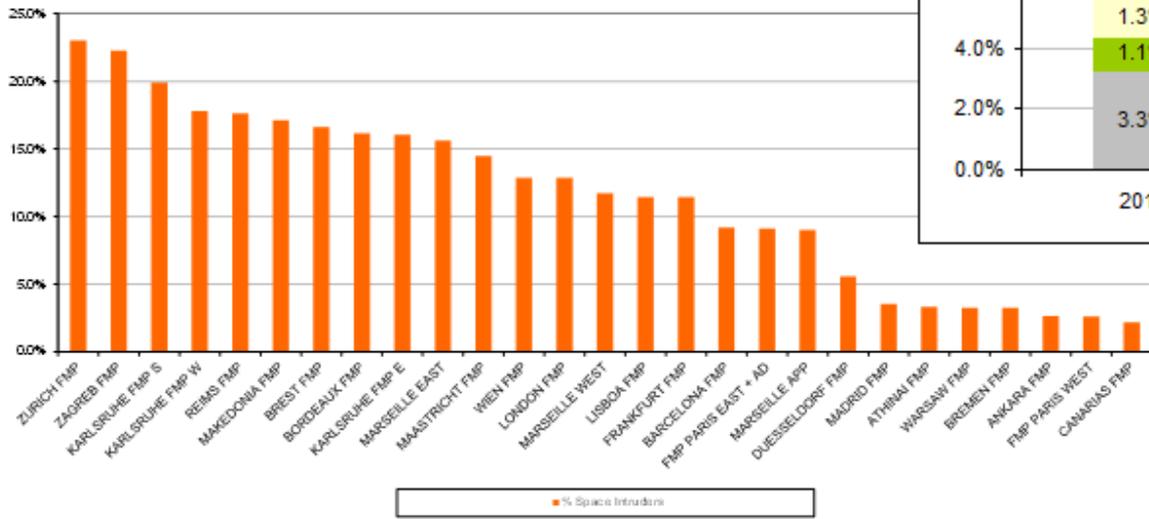




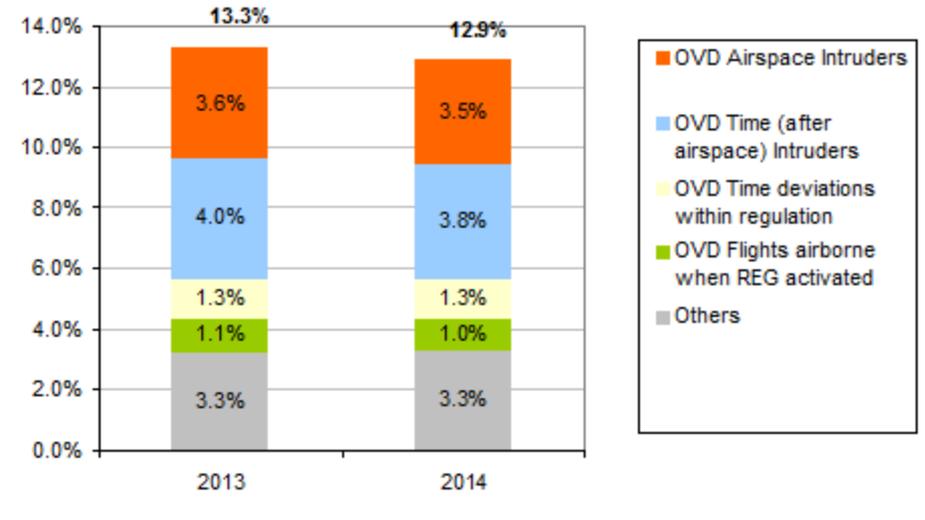
# POST OPS - overdeliveries

- Intruders – cause of unpredictability
- Finding the point of deviation

Top TVS per % airspace intruders in total entries  
At least 200 slices with OVD (Regulations with over-deliveries, 2013 - 2014)

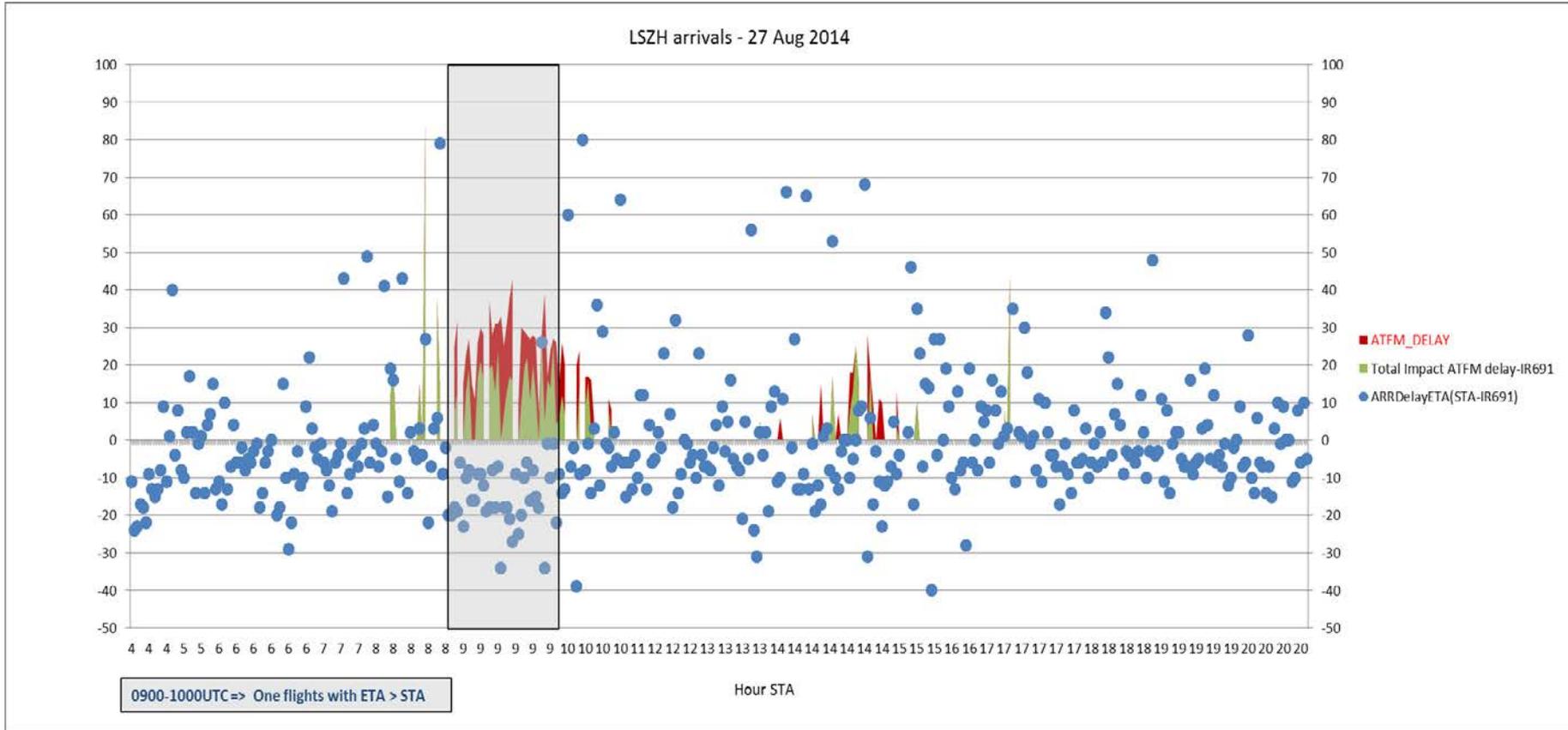


OVD indicator - Main contributors  
Regulations with over-deliveries  
AD + ENR, 2013-2014





# POST OPS – airport capacity Zurich





## FUTURE TECHNIQUES

- Data exchange
- Time based separation approach techniques
- Collaboration tools – SESAR trials



# Development of STAM

## Current trial: measure Editor

- Cherry Picked flights
- Precise and focussed
- Wider variety of measure type
- Coordinated workflow
- AU's preferences

Measure Editor - FrontMotion Firefox

https://pwbspra.cfm.eurocontrol.int/PORTAL/lastaweb/comp/PORTAL\_17.6.0.2.25/out-detached-v

Save Cancel

Measure Type

Identifier

Status

Target date

Definition

Take Off Not Before

Take Off Not After

Ground Delay

Flight Level Capping

Horizontal Rerouting

Minimum Departure Interval

Miles In Trail

Terminal Procedure

Airborne Flight Level Capping

Airborne Horizontal Rerouting

Other

M-CDM Required

M-CDM State

Measure Set Traffic Volume LFEUHL4

Hotspot 29/08/2013 Get Hotspots

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# Development of STAM

## STAM Collaboration Forum



Querying and  
filtering area

Incoming and  
outgoing  
Coordination  
request

Detail of the item to  
be coordinated

Notifications

Topic area  
Hotspots and STAM  
measures

Conversation  
history and Chat  
area

The screenshot displays the STAM Collaboration Forum interface. On the left, there is a 'Tasks' sidebar with a list of tasks such as 'JGDGPS2', 'BLOVB8', 'EHDLR2', 'JVIBRO4', 'PUZQV9', 'EHDLR2', and 'GHRER'. Below the tasks is a 'Notifications' section with messages like 'Measure GHRER/BAW946' and 'Measure EHDLR2'. The main area is titled 'Measures' and includes a filter section with fields for Date, ANU, ID, Measure, Status, TV Set, TV, Measure type, and AO. Below the filter is an 'Overview' table showing active measures. The table has columns for Topic ID, Type, M-CDM State, Status, Initiator, and Next deadline. One measure, 'EHDLR2', is highlighted in blue. To the right of the table is a detailed view for 'EHDLR2 - GDLAY', showing 'Measure kind' as Delay, 'M-CDM State' as Proposed, and a 'Voting summary' table. The voting summary table has columns for count, action, and initiator. Below the voting summary is a 'Conversation history' section with a chat area for sending messages.

Topic ID	Type	M-CDM State	Status	Initiator	Next deadline
LCS12WX 15-32-15:40					
GHRER	NEW	Proposed	Warning	LFRRMP	20-13:00
RYR6		Proposed	Warning		20-12:45
BAW946		Proposed	Success		20-12:45
EHDLR2		Proposed	Failure	EHAAFMP	20-12:05
EZY75UTY		Proposed	Failure		20-12:05
BMR18B		Proposed	Success		20-12:05

Count	Action	Initiator
2	Accepted	RYR, EZY
1	Rejected	BMR
1	Acknowledged	LFRRFMP
3	Unanswered	EDYYFMP, ...



# NM FUTURE PERFORMANCE

- Outcome
  - Airspace users – fly schedule / cost optimal
  - ATM – optimum use of capacity through traffic predictability
- Understanding
  - Airport capacity alignment
  - Airline schedule buffer
  - Cost optimal routes
- ATFM techniques
  - Scenarios
  - Local ATFM techniques



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# Thankyou

