



ICAO MID

الهيئة العامة للطيران المدني
Civil Aviation Authority
دولة قطر • State of Qatar



الاجتماع الثامن للمدراء العاميين للطيران المدني في منطقة الشرق الأوسط (DGCA-MID/8)

Eighth Meeting of the Directors General of Civil Aviation-Middle East Region (DGCA-MID/8)



ICAO MID



Oman Airspace Strategic Project

Ajwaa Programme

Strategic Airspace Enhancement and Inter-Regional Cooperation

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Executive Summary

- 1** **Demand:** 643,000 flights in 2024 and 1.2 million by 2040 – overflights, 82% of traffic, will nearly double
- 2** **Stress test:** the June 2025 contingency added 17% more traffic and pushed the northern sectors to their limit
- 3** **Constraint:** larger separation minima at the eastern interfaces – Mumbai above all – multiply controller workload up to six times
- 4** **Solution:** Ajwaa redesign with FRA and FUA: +130% capacity, –30% conflicts, –12% fuel and CO₂, validated in real-time simulation
- 5** **Cost of inaction:** up to USD 315 million a year in ATFM delay costs by 2040
- 6** **Our request:** support the India–Oman action plan and the APAC–MID Interface Task Force

Oman at the Crossroads of East–West Traffic

82% of Muscat FIR traffic is overflights linking the Middle East with India, Asia and Africa

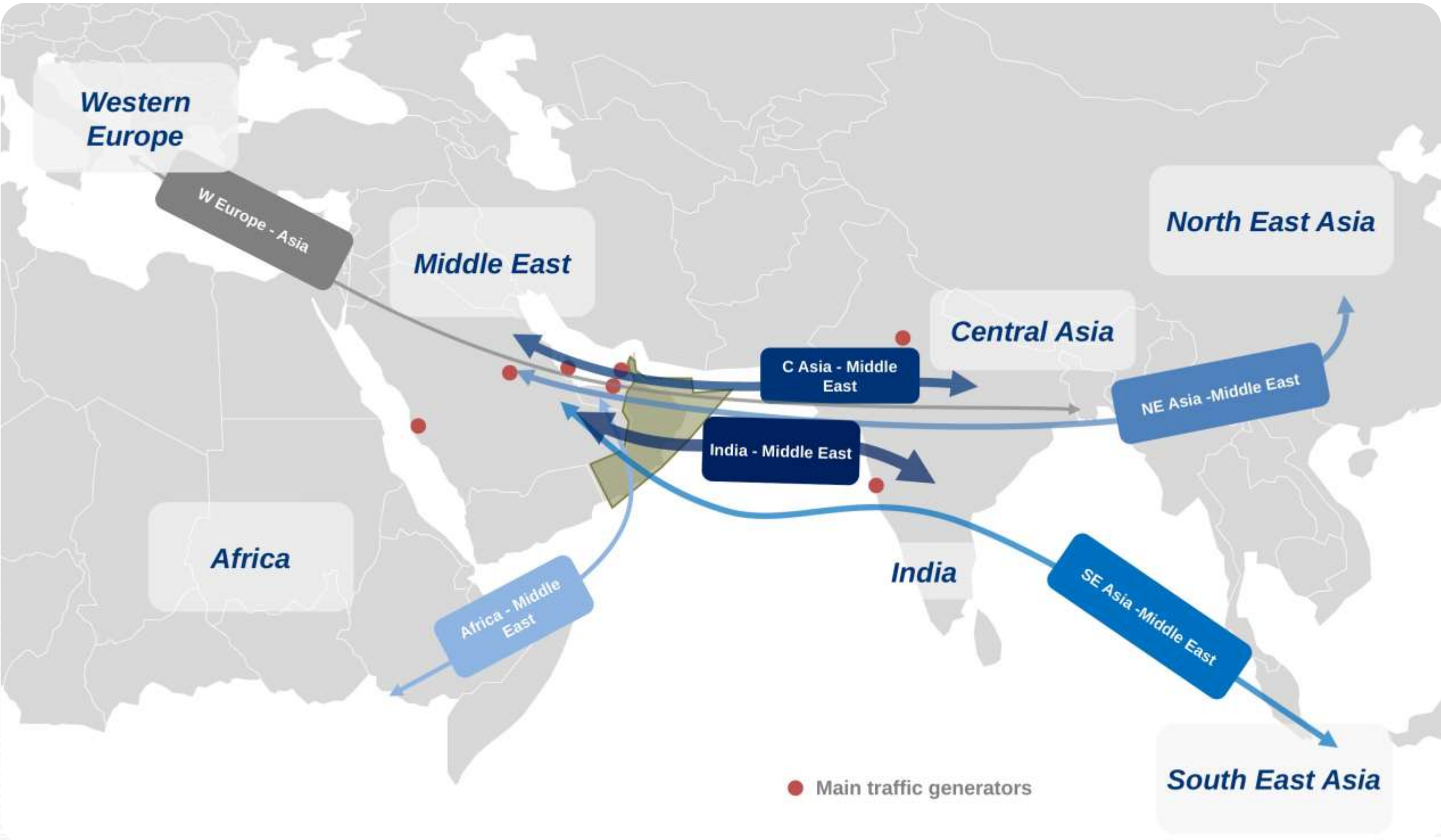
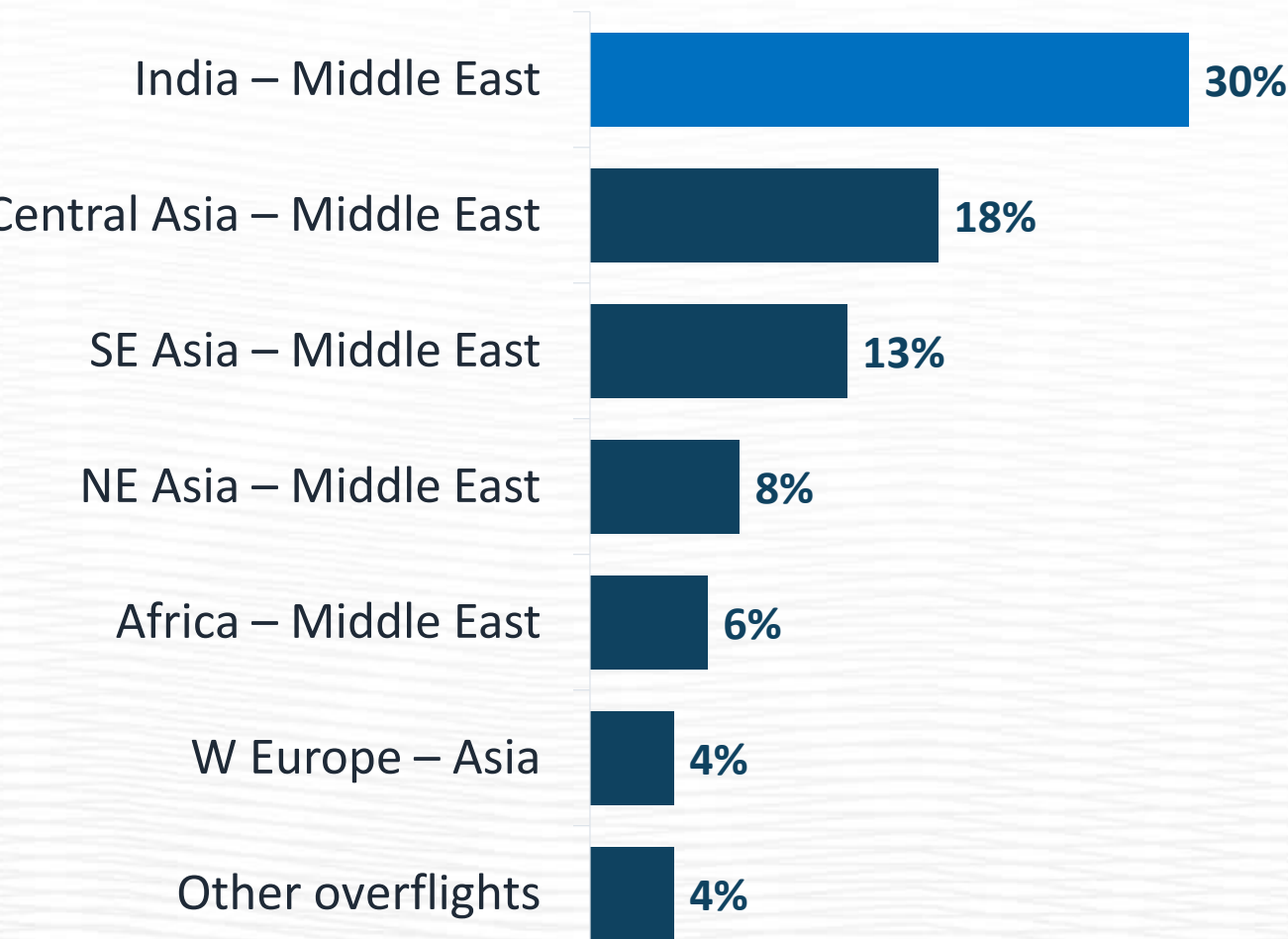
82%

overflights

18%

Oman origin or destination

Overflights by flow – share of total traffic, 2024

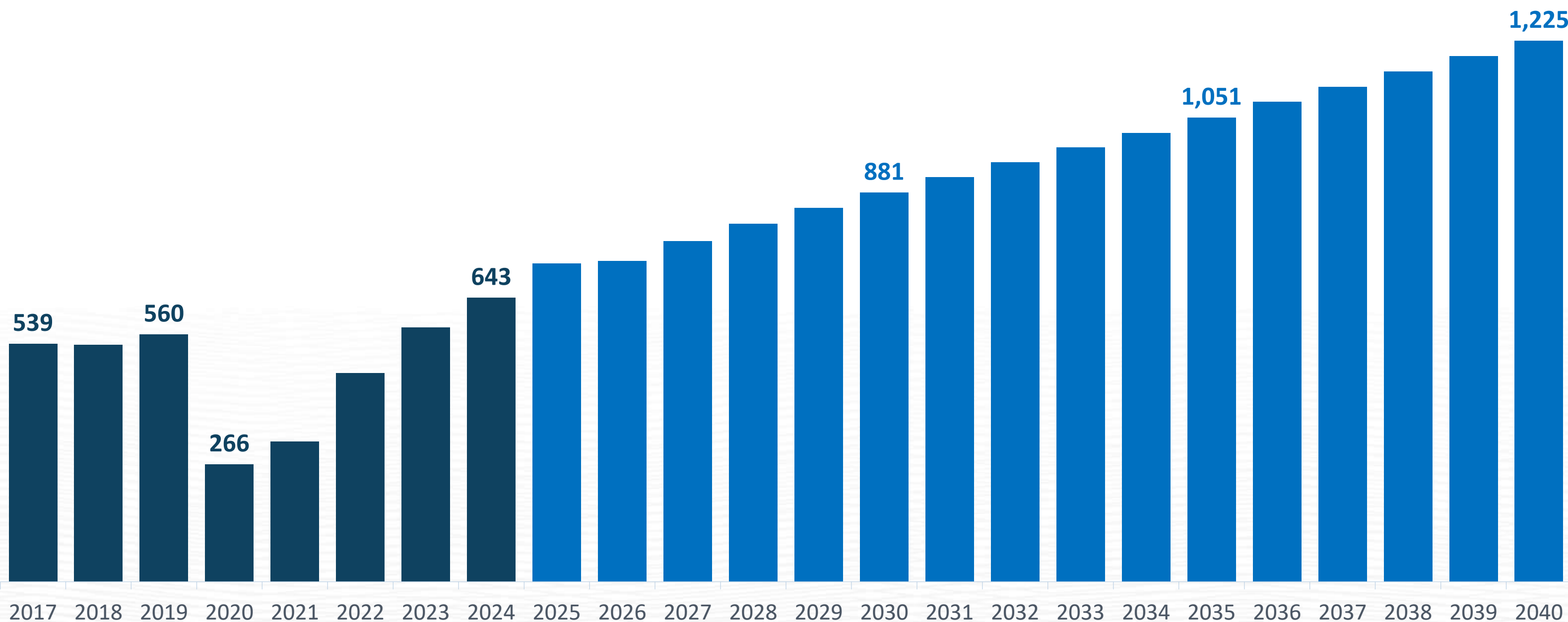


Main traffic flows crossing the Muscat FIR

Source: Oman CAA traffic data, ALG analysis

Traffic Will Nearly Double by 2040

Muscat FIR movements, thousands ■ actual ■ forecast



643k

movements in 2024

1,225k

forecast for 2040

×1.9

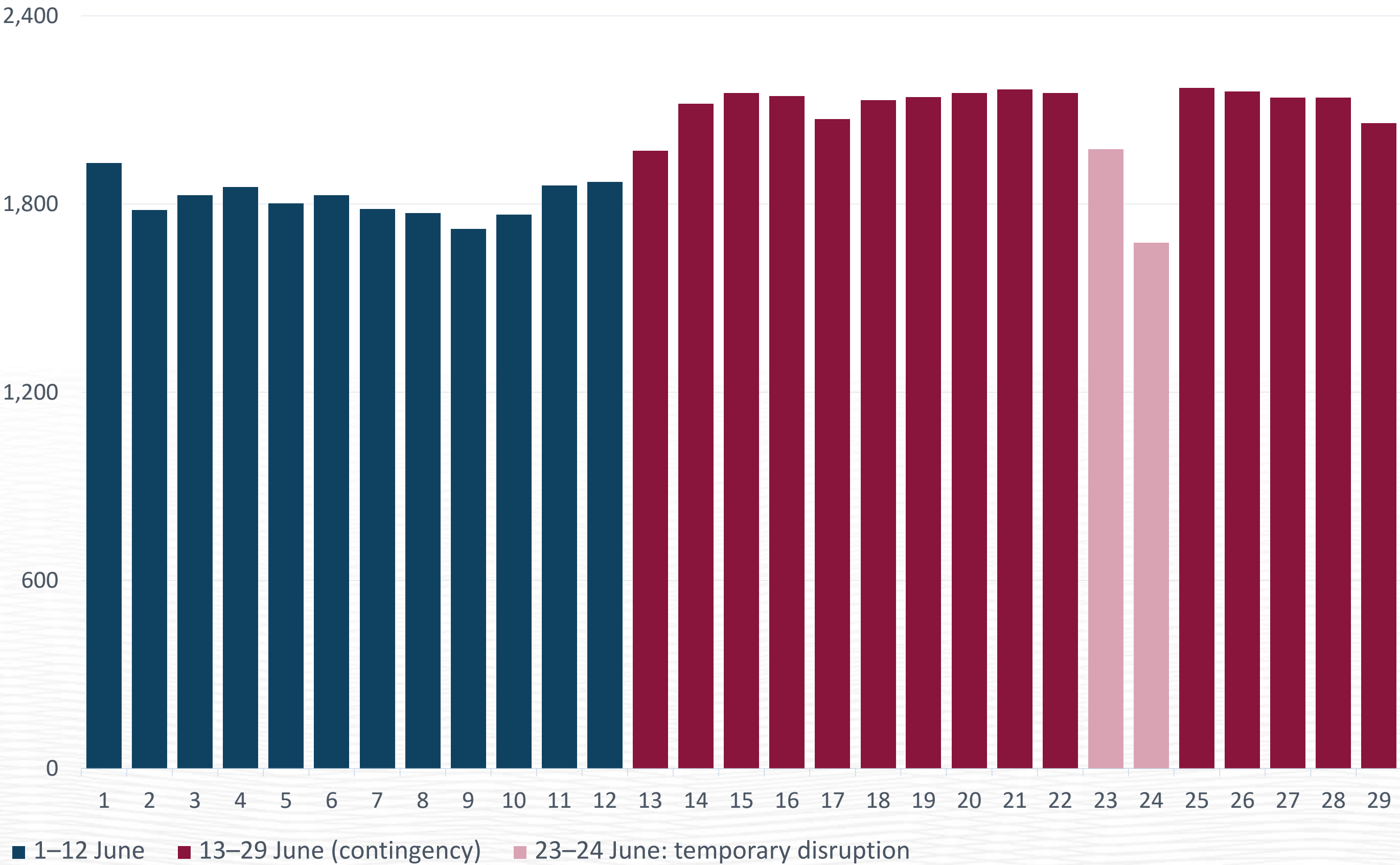
growth 2024–2040, driven by
overflights

WHY IT MATTERS

The airspace is already close to its limit today. Capacity must be in place before demand arrives – not after.

June 2025: A Real-Life Stress Test

Daily movements in the Muscat FIR during the regional contingency, 1–29 June 2025



+17%

average daily traffic (1,815 → 2,120 movements)

+20%

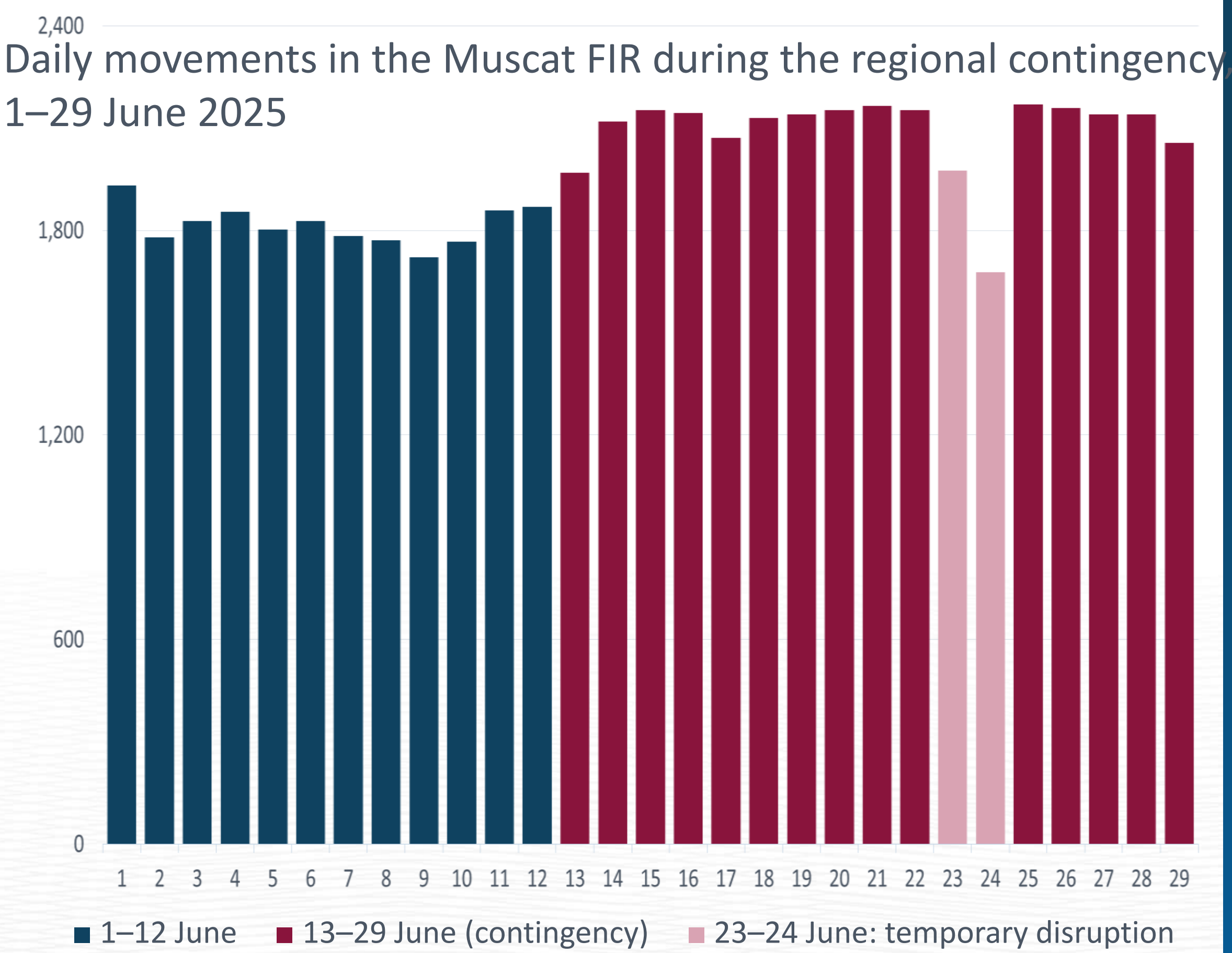
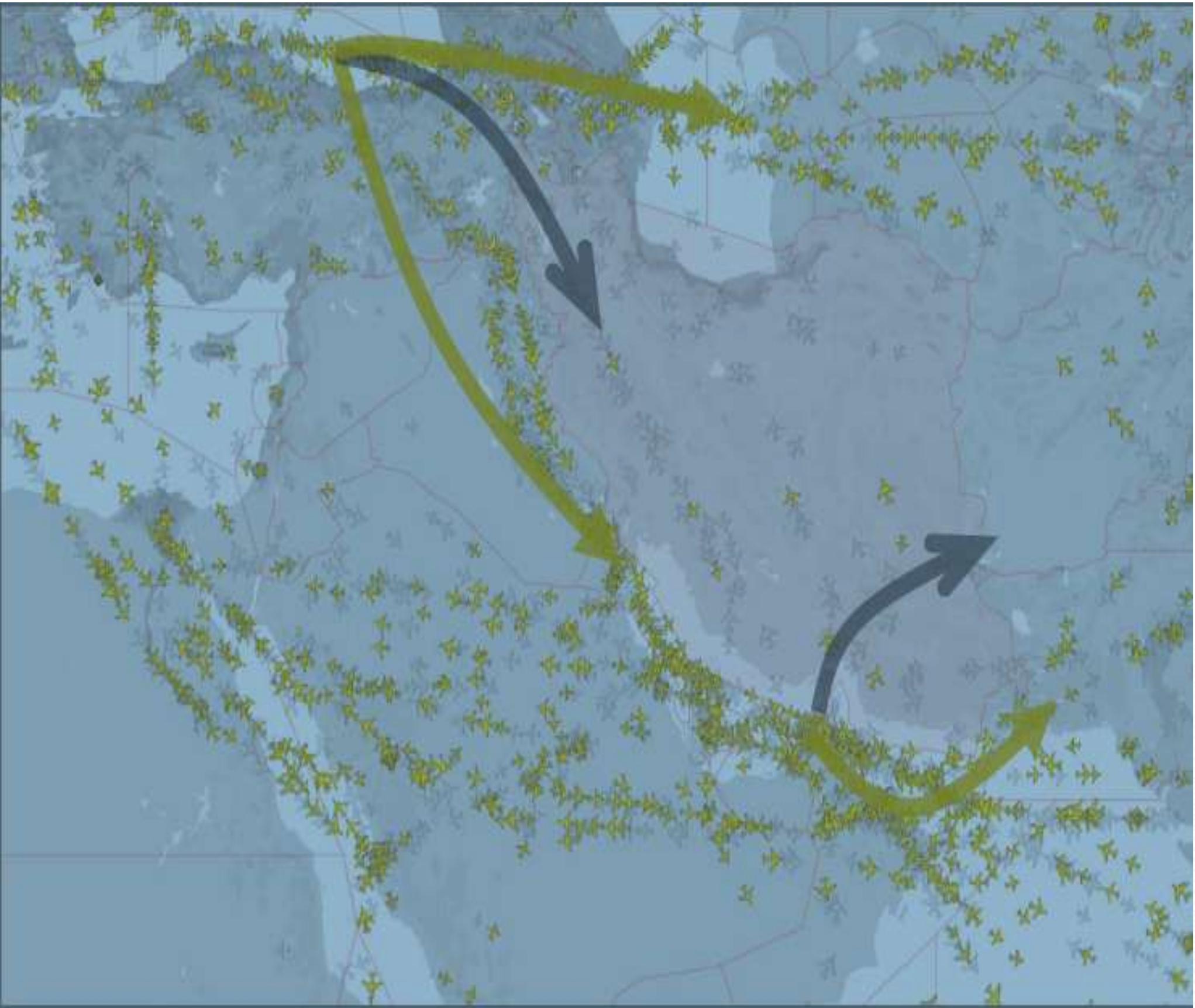
peak on 15 June compared with the normal average

~305

extra flights a day, mainly Gulf ↔ North India and Pakistan

Source: Oman CAA traffic data. Averages exclude 23–24 June.

The geopolitical conflicts in the Regine led to ~ 305 daily additional flights over Omani airspace (+17% vs the average)



+17%

average daily traffic (1,815 → 2,120 movements)

+20%

peak on 15 June compared with the normal average

~305

extra flights a day, mainly Gulf ↔ North India and Pakistan

Sectors at the Limit

Peak ATC workload per sector, from fast-time simulation

72–82%

TODAY

Northern sectors (West, North, Central, Alpha) run near or above the maximum acceptable workload at peak times

99–100%

JUNE 2025 CONFLICT DAYS

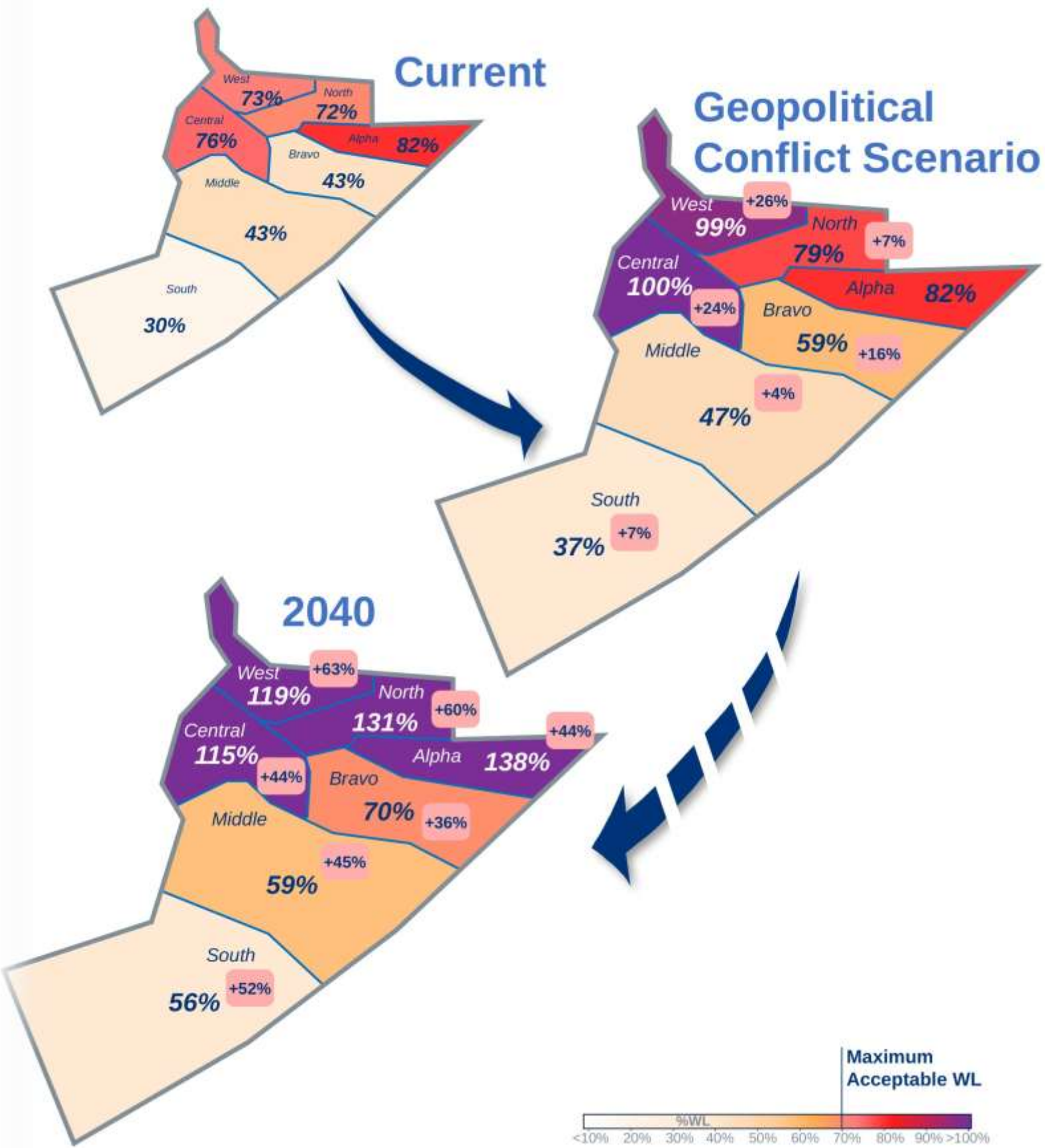
West and Central sectors reached full capacity – a real-time stress test of today's design

115–138%

2040, WITHOUT CHANGES

Four sectors would exceed capacity: forecast growth cannot be handled safely in today's airspace

Source: ALG analysis via fast-time simulation



KEY CHALLENGE

The Interface Constraint

5–10 min

time-based separation required at the eastern and northern interfaces, including Mumbai

8–20 NM

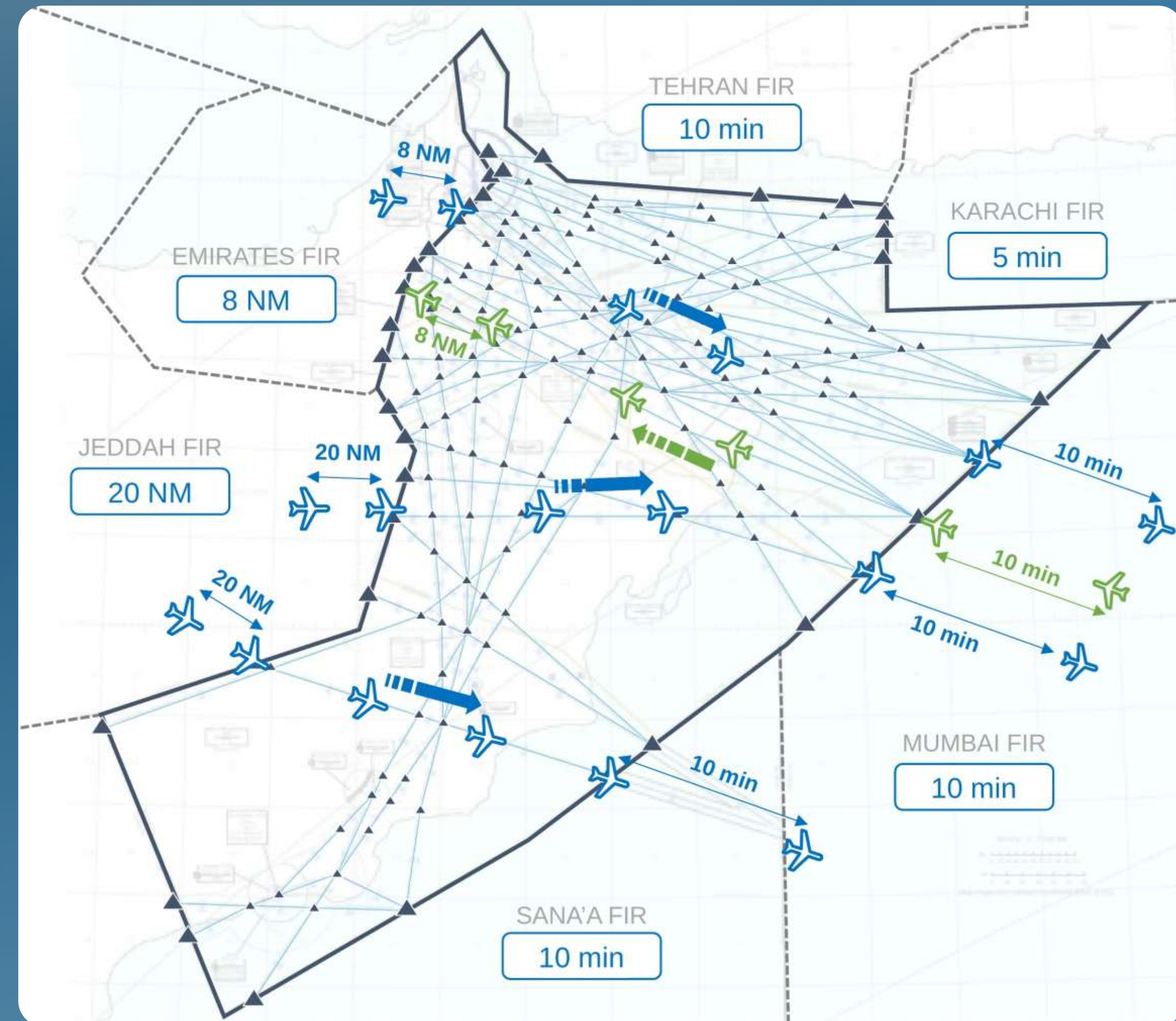
distance-based separation from the Emirates and Jeddah FIRs

Up to 6×

more spacing to build while crossing Oman – more workload, less sector capacity

South sector

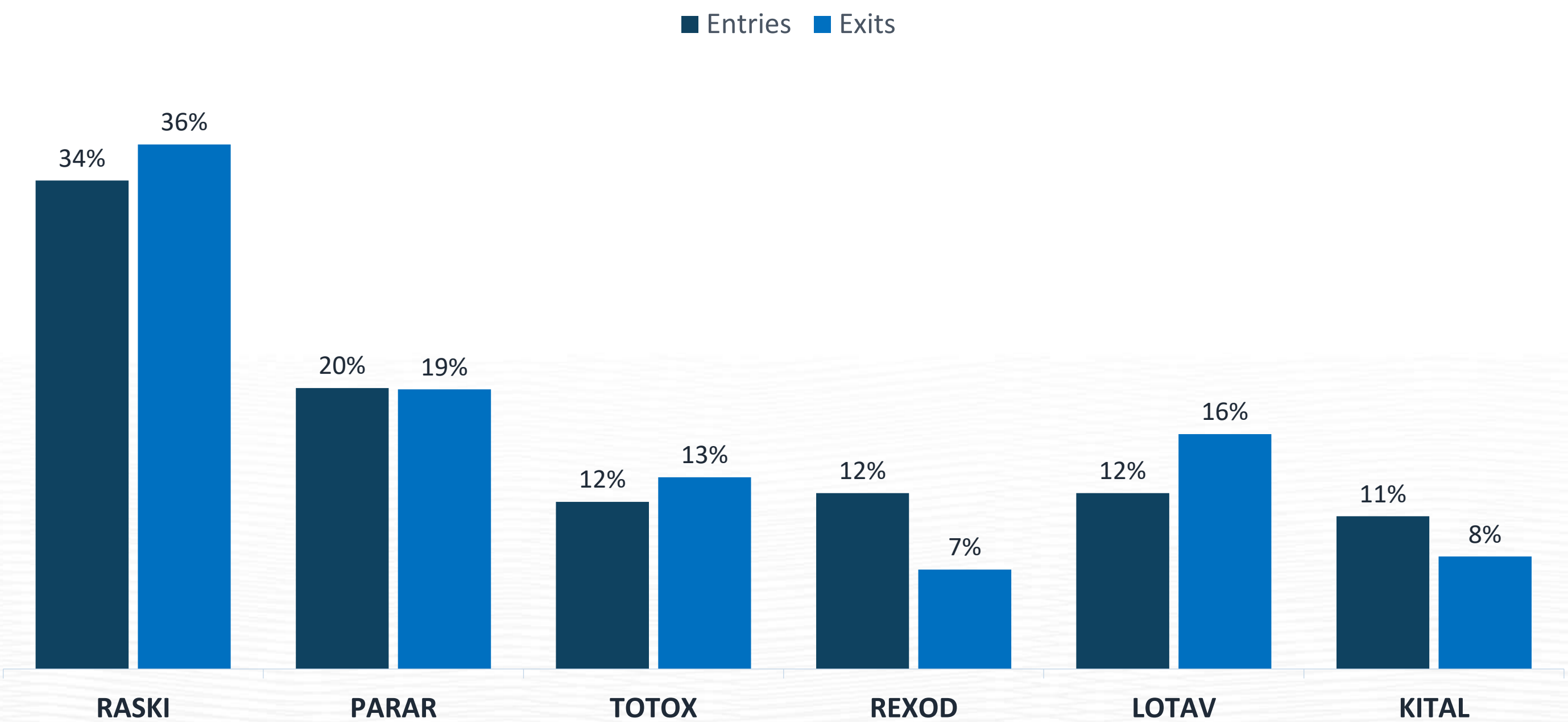
the least distance available to build that extra spacing



Mumbai FIR: The Critical Interface

Six transfer points, 50 NM apart, carry most of Oman's eastbound and westbound flows

Share of entries and exits per transfer point



AIDC STATUS

Automated flight-data exchange (AIDC) with Mumbai has been tested; the connection is pending the upgrade of Mumbai's system.
MID Region target: December 2026.

The Cost of Inaction

Capacity shortfalls would trigger flow restrictions across the region's hub network

USD 211 M

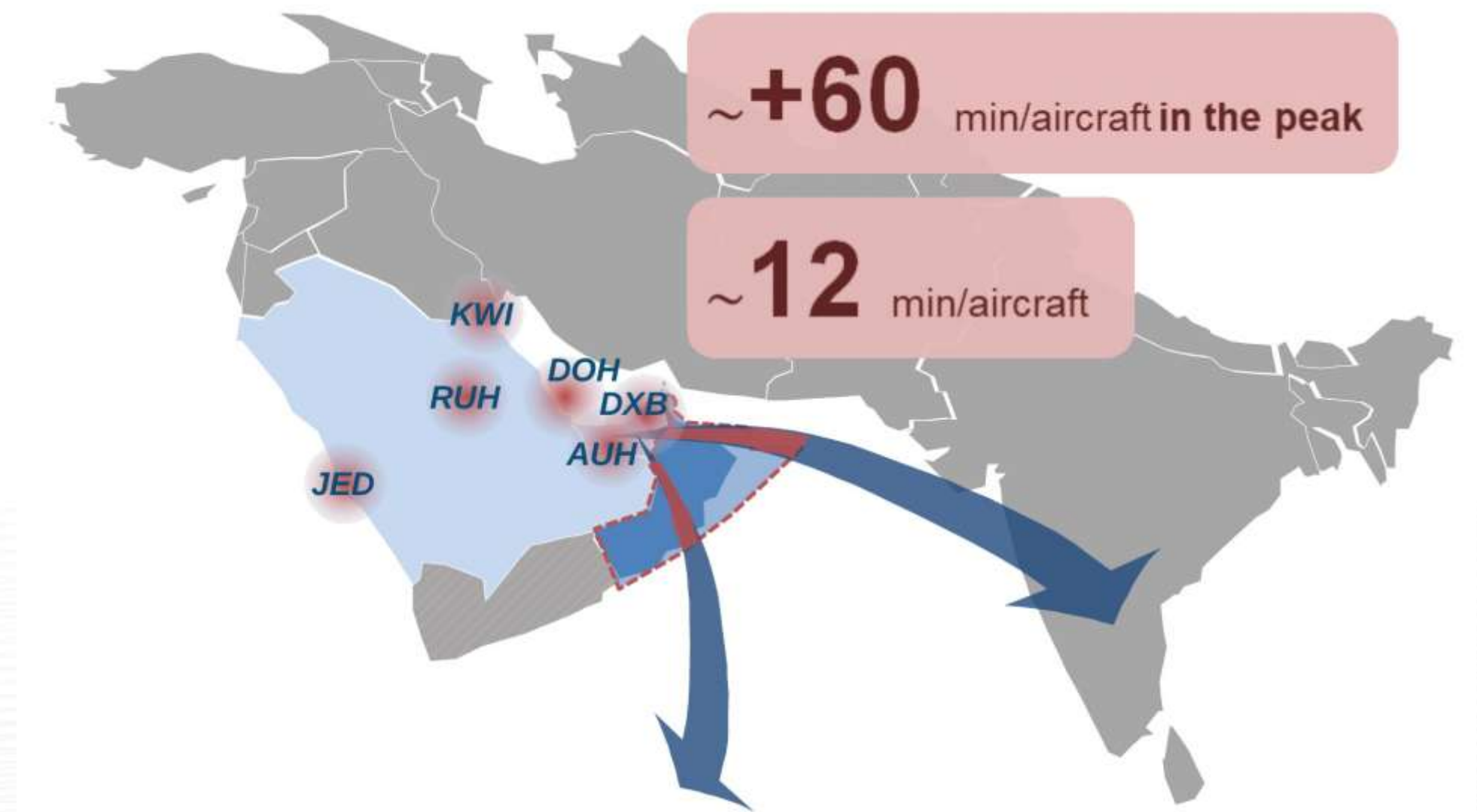
a year in ATFM delay costs by 2030 (about USD 640k a day)

USD 45 M

a year in extra fuel today from indirect routes (0.24 Mt CO₂)

Challenges and opportunities:

1. Operations of major Hubs in the region.
2. The geopolitical influence restrictions and limited options.
3. Military activities in civilian airspace and routes. Current arrangements are inadequate to address alternative options.
4. Airlines' capabilities optimization over high seas is not utilized.



Main hubs relying on the Muscat FIR, with expected ATFM delays

REGIONAL IMPACT

Without improvements, the Muscat FIR risks becoming a regional bottleneck – with few alternatives if neighbouring airspace closes.

The Ajwaa Solution

Four building blocks, tested in fast-time and real-time simulation



Flexible Use of Airspace

The development and implementation of FUA is optimal to **unblock the PRD Areas in the South sector**, enabling more efficient flows



Airspace Redesign

The new airspace and ATS routes design under the project will provide a **safer and more flexible en-route environment**



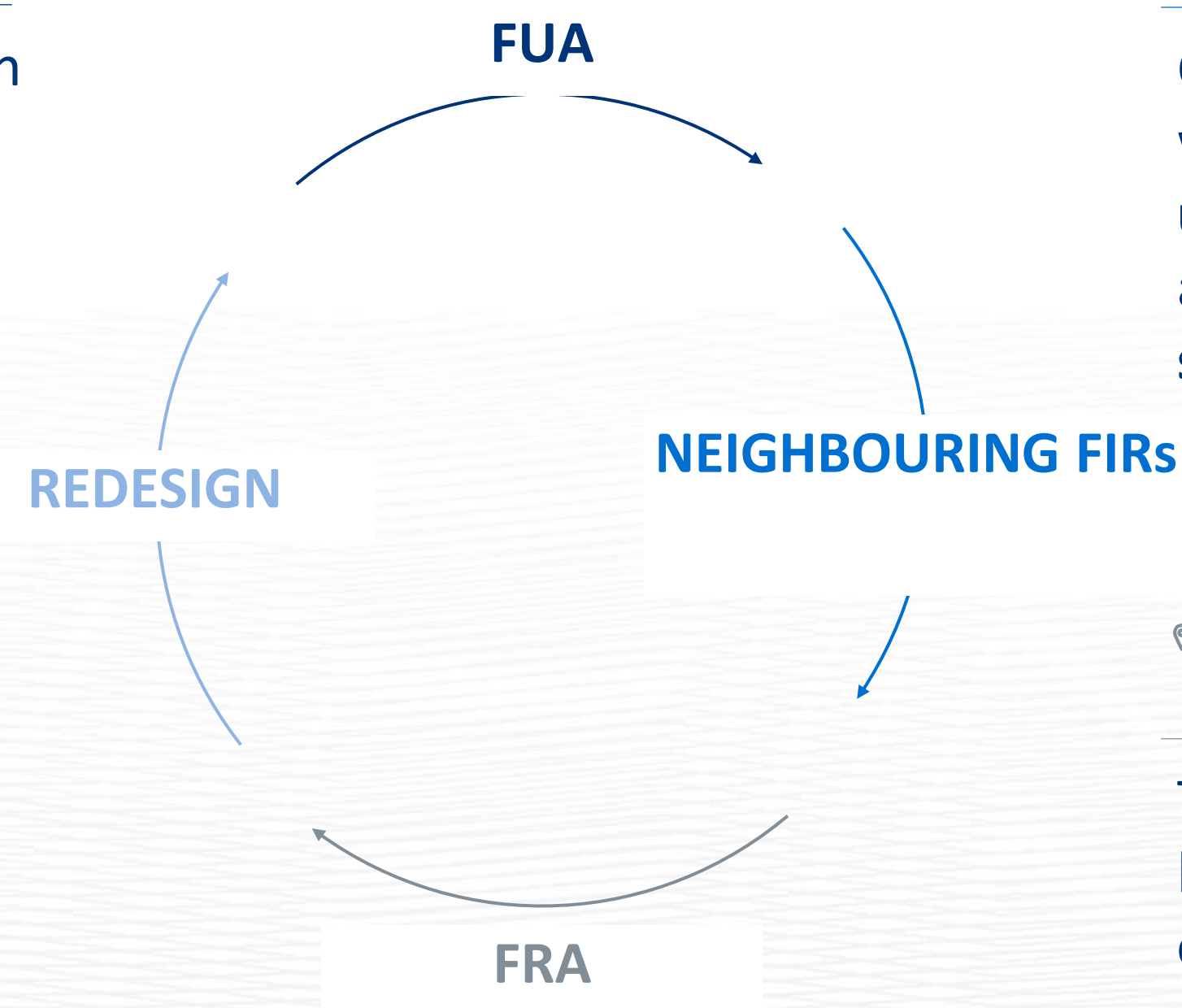
Neighbouring FIRs

Consultation and coordination with neighboring FIRs will allow **understanding traffic flows** and common **reflow & sectorization opportunities**



Free Route Airspace

The implementation of FRA is a key measure for **enhancing the efficiency of traffic flows** and overall operation of the airspace



Ajwaa Programme

Aligned with the ICAO GANP and the MID Air Navigation Plan (MID-ANP)

From Concept to Validated Design

Ajwaa Programme milestones – status as of October 2026



STAKEHOLDER ENGAGEMENT

30+
internal coordination meetings

40+
external meetings – airlines, ANSPs, ICAO, IATA

11
airlines consulted

5
neighbouring ANSPs engaged

The 2040 Target Design

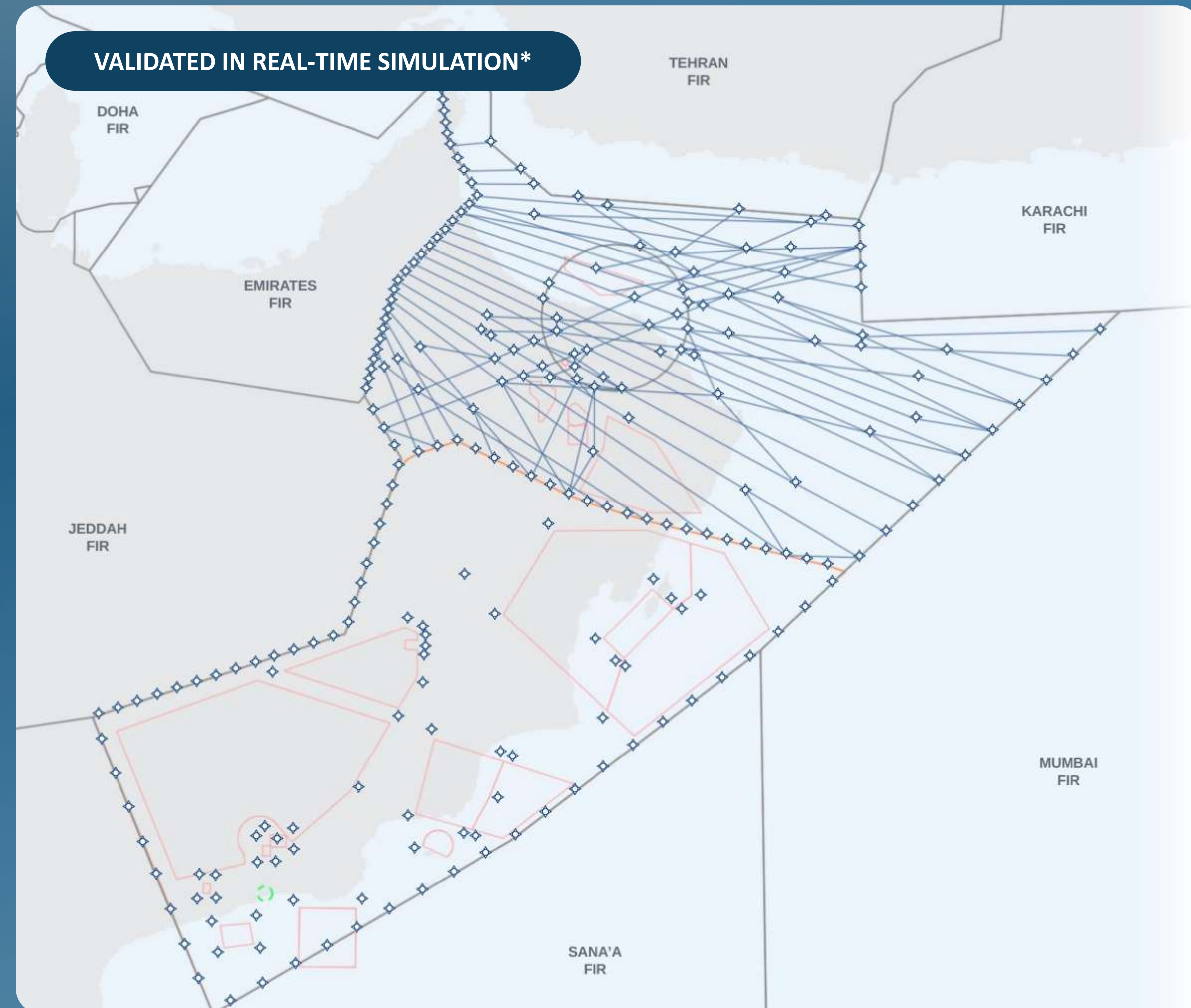
MEETS ALL PROJECT OBJECTIVES

- ✓ Compliance
- ✓ Capacity
- ✓ Safety
- ✓ Efficiency
- ✓ Systems
- ✓ Accessibility

DELIVERS THE AIRSPACE ENHANCEMENTS

- ✓ Improved airspace design
- ✓ Free Route Airspace
- ✓ Flexible Use of Airspace
- ✓ Latest ATM technology
- ✓ Lower CO₂ emissions

** Validated in real-time simulation. Ad-hoc RTS will be required before any implementation, to confirm forecast conditions.*



First Implementation – Block A

The near-term step: solving the most *urgent challenges* with changes achievable in the short term. This phase is split into two blocks due to *not reaching an agreement* with Mumbai FIR on the addition of extra COPs at the interface between MID and APAC.



- 1 Less complexity in the Central sector**
crossing flow removed and traffic segregated, as agreed with the UAE
- 2 More direct, unidirectional routes**
fewer crossings, less workload, more predictability
- 3 Parallel routes in the west**
fewer conflicts between climbing and descending traffic
- 4 Conditional routes**
safer, more efficient flows – and the first step towards FUA
- 5 Domestic and UAE flows segregated**
from en-route traffic, limiting the impact on overflights
- 6 Northern FIR aligned with 2040**
the first move towards the target scenario
- 7 Validated in real-time simulation**
less tactical vectoring and fewer communications per flight

Real-Time Simulation: All Six Objectives Validated

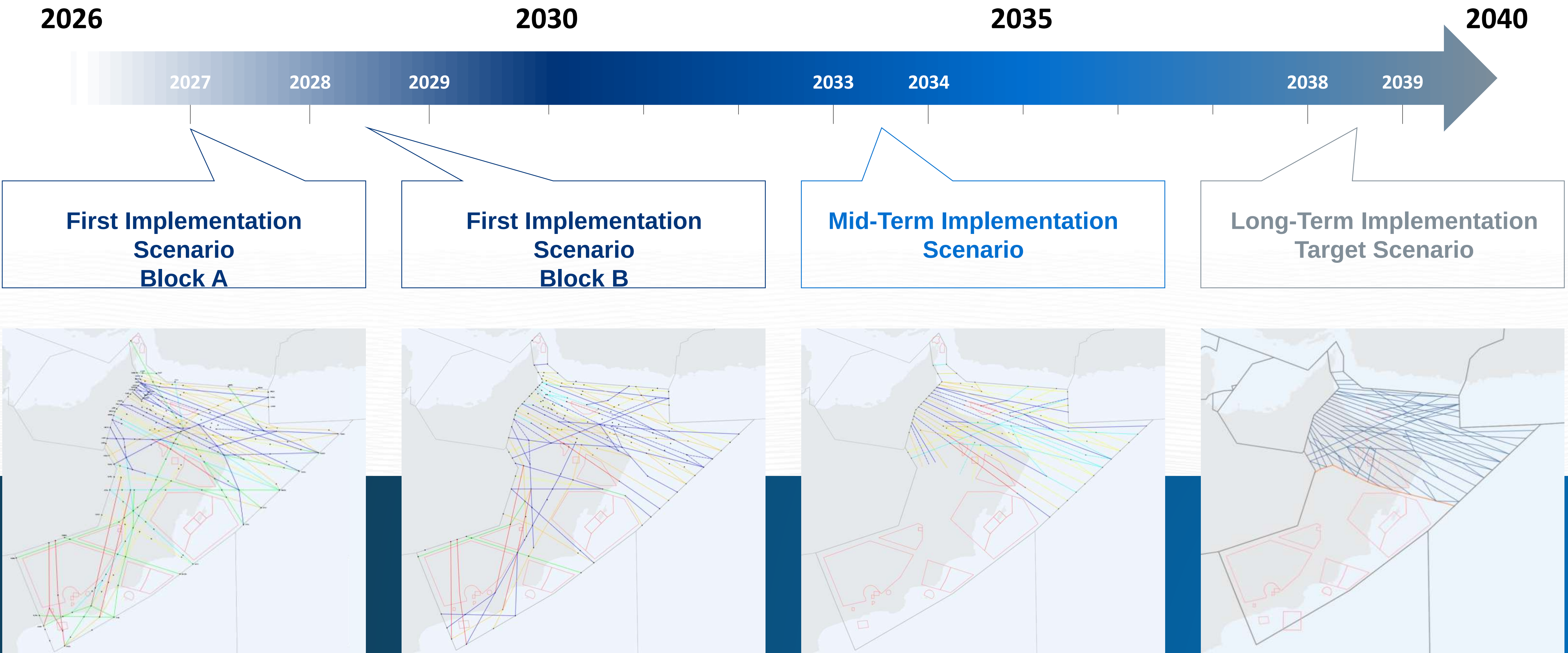
Controllers tested the new design in real-time simulation (ratings on a 1–5 scale)

Objective	What was assessed	Status	Key evidence
HL1 • Route network and sectorisation	New sectors and RNAV 1 routes absorb 2030/2040 demand	✓ Validated	+20% (first implementation B) and +73% (mid-term) flights at similar workload
HL2 • UAE interface	Arrival/departure segregation for Dubai and Abu Dhabi	✓ Validated	No loss of separation; flows rated manageable (3.9/5)
HL3 • Crossing-traffic tunnel	Jeddah–Karachi tunnel structure	✓ Validated	Operated safely (3.6/5); FLAS retained, as controllers find it crucial
HL4 • FRA and FUA	Free Route above FL305 with restricted areas active	✓ Validated	FRA rated acceptable (3.9/5); traffic absorbed with PRD areas active
HL5 • First implementation	Near-term designs, Blocks A and B	✓ Validated	Both blocks safe and rated better than today (3.7–4.4/5)
HL6 • Resilience	Stress traffic and contingencies	✓ Validated	Safe under adverse weather and loss of CPDLC (ratings around 3/5)

LIMITATIONS AND MITIGATIONS

Limits appear only at the highest traffic levels or in degraded conditions, and have clear mitigations: moving to the next design stage or opening more sectors.

Four implementation scenarios are defined to meet the forecasted demand of the three traffic milestones, ensuring a seamless transition



The Way Forward

What progress now depends on: enablers beyond Oman's airspace

- 1 Harmonised longitudinal separation**
reduce the 10-minute minimum at the Muscat–Mumbai interface, consistent with AN-Conf/14 Rec. 3.1/1
- 2 AIDC between Muscat and Mumbai ACCs**
complete the connection once Mumbai's system upgrade is in place
- 3 Coordinated flight levels and routes**
a jointly agreed FLAS and route structure over the high seas
- 4 APAC–MID Interface Task Force**
clear terms of reference, deliverables and timelines; reporting to MIDANPIRG and APANPIRG
- 5 Interface and ATFM with other MID FIRs**
Improve route structures within the MID region at the interface for better efficiency and flow, including the introduction of a multimodal ATFM unit.

MONITORED WITH GANP KPIs

KPI 05

En-route extension

KPI 06

En-route capacity

KPI 07

En-route ATFM delay

KPI 16

Additional fuel burn

KPI 18

Level capping

Inter-Regional Cooperation

Building on the India–Oman
action plan agreed in
Bangkok, 3–4 June 2026

Action by the Meeting

- a** **Note** the progress achieved, including the validated fast-time and real-time simulation results
- b** **Endorse** continued Oman–India engagement and the Bangkok action plan: reduced separation, AIDC and coordinated flight levels
- c** **Support** the APAC–MID Interface Task Force, coordinated by the ICAO MID and APAC Regional Offices
- d** **Encourage** neighbouring States to pursue coordinated enhancements at their interfaces with the Muscat FIR
- e** **Acknowledge** the impact of the regional situation and support continued engagement as conditions permit
- f** **Agree** on monitoring through GANP KPIs, with reporting to MIDANPIRG/24 and the next DGCA-MID



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Thank You

Gains Across Every KPA

Fast-time simulation 2: 2040 design vs. today's airspace

CAPACITY

+130%

total FIR capacity

EFFICIENCY

-50%

extra distance flown inside the FIR

ENVIRONMENT

-12%

fuel burn and CO₂ emissions

SAFETY

-30%

conflicts, despite traffic doubling

COST-EFFECTIVENESS

USD 1.5 M

per day in fuel savings in 2040, compared with today's
airspace

Source: ALG analysis via fast-time simulation (FTS 2)