GACA
الهيئة العامة للطيران المدني
General Authority of Civil Aviation

SANS
خدمات الملاحة الجوية السعودية
Saudi Air Navigation Services

ICAO • OACI • ИКАО
国际民航组织 • ايكاو

Cairo FIR Optimisation

ATM SG/10TH AND CNS SG/13TH MEETINGS

2024

20 - 23 October

Saudi Arabia, Jeddah, Ritz Carlton

جمهورية مصر العربية
وزارة الطيران المدني

الشركة الوطنية لخدمات الملاحة الجوية
NANSC

Enhancements Within Cairo FIR

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وزارة الطيران المدني

الشركة الوطنية لخدمات الملاحة الجوية
NANSC

On going Projects:

1-Airspace Restructure 2024-2025.

2-Establishment of National Airspace Management Center (NASMC)2024.

3- ATM System Modernization: 2025-2026

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OLDI/AIDC Connections:

1- OLDI Athens: established.

2-AIDC Jeddah ACC :established.
AIDC Riyadh ACC: Ongoing

3- AIDC AMMAN: 2025: Ongoing

MID Region Tension

1053 Daily OVR FLY

+110%

Comparing to AVG daily -7

- Traffic flow start utilizing Cairo FIR by early morning on the 14th April.
- The traffic increase by 514 flights.
- The traffic growth by 110% comparing to the average daily overflying before the closure take place.

2. Closure Information.

BEFORE

AFTER

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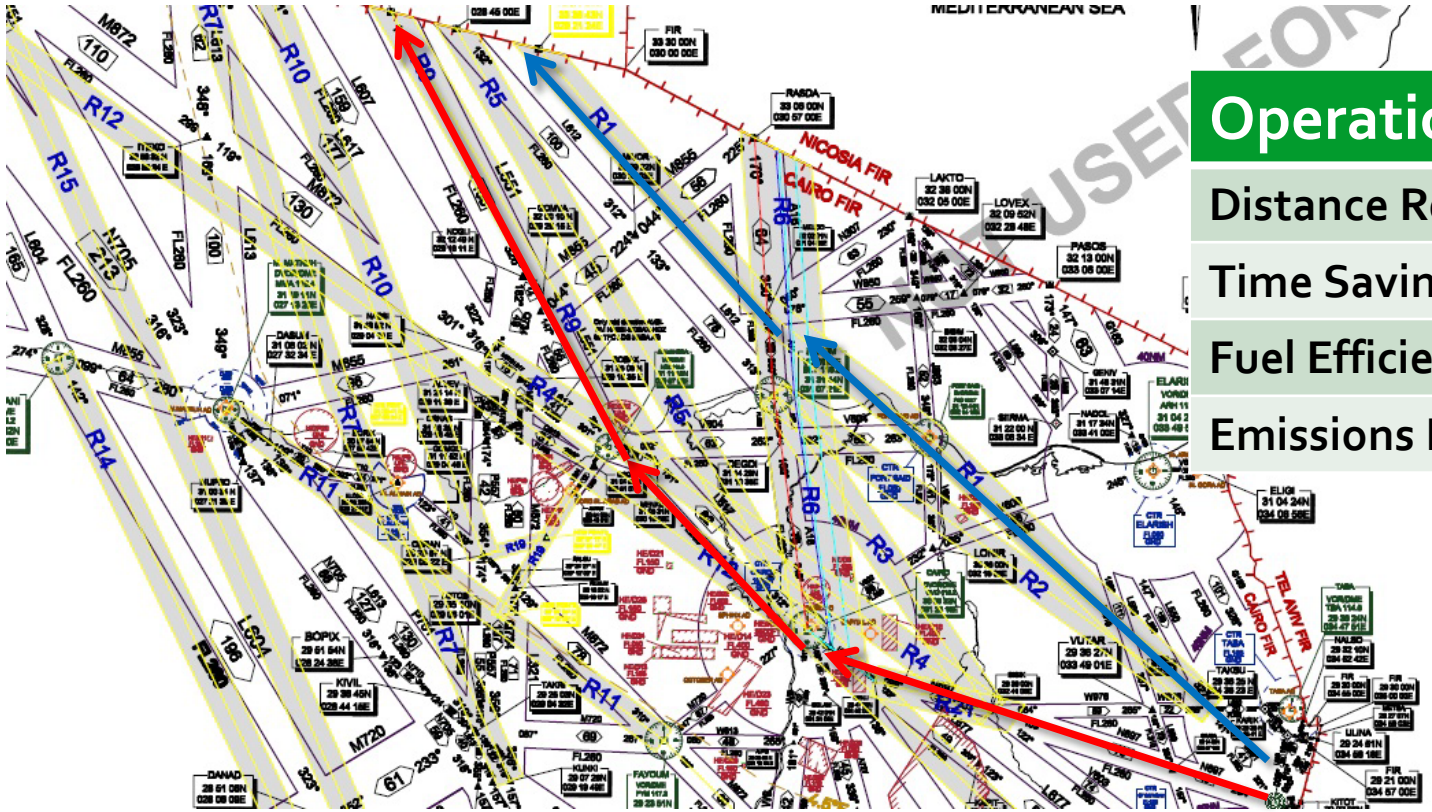
الشركة الوطنية لخدمات الملاحة الجوية
NANSC

Airspace Restructure Enhancements with adjacent FIRs

Inside Cairo FIR – Phase III

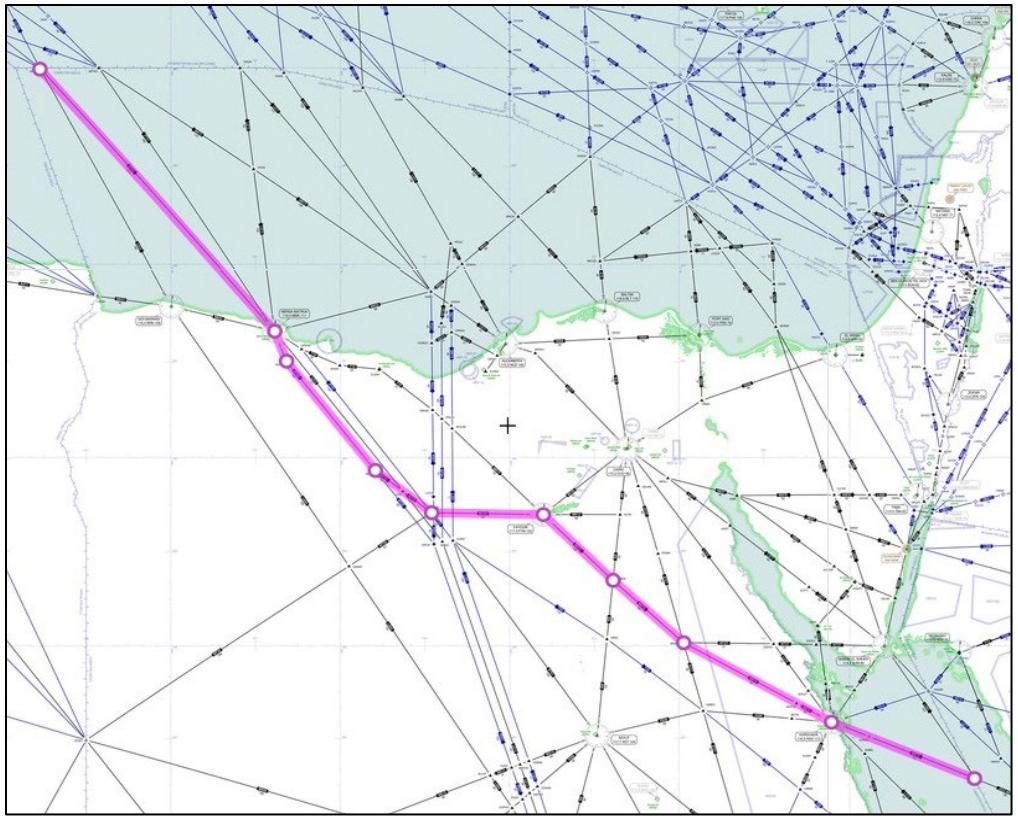
- (**DATOK-PSD-MELDO-NEW POINT Athens FIR**) to Connecting Jordanian and Saudi airspace to Greek airspace, enhancing flight efficiency by reducing flight time and shortens flight distance by **88.3**

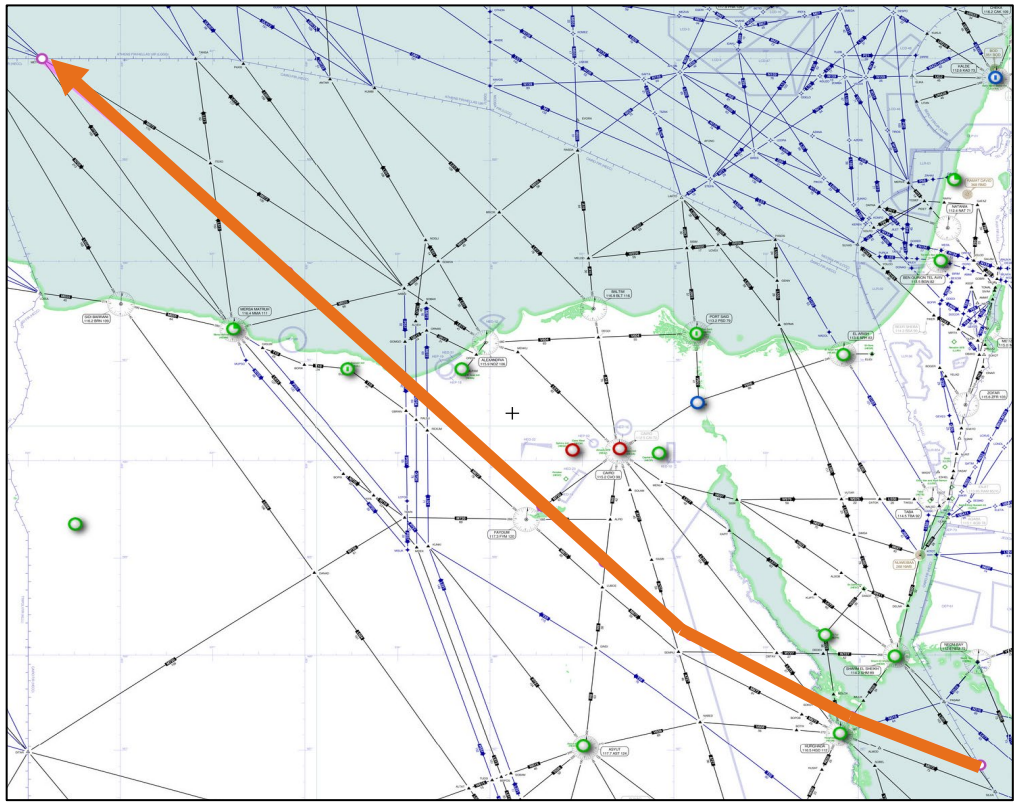


Operational benefits:	
Distance Reduction	**80.3** nm
Time Savings	Approx. **10** MINs
Fuel Efficiency	Approx. **466.9** kg
Emissions Reduction	Approx. **1475.4** kg

Inside Cairo FIR – Phase III

- The dualization of **M872** accommodates a larger volume of air traffic while improving traffic flow and connectivity between the Far East, the Gulf, and North Africa/Europe .

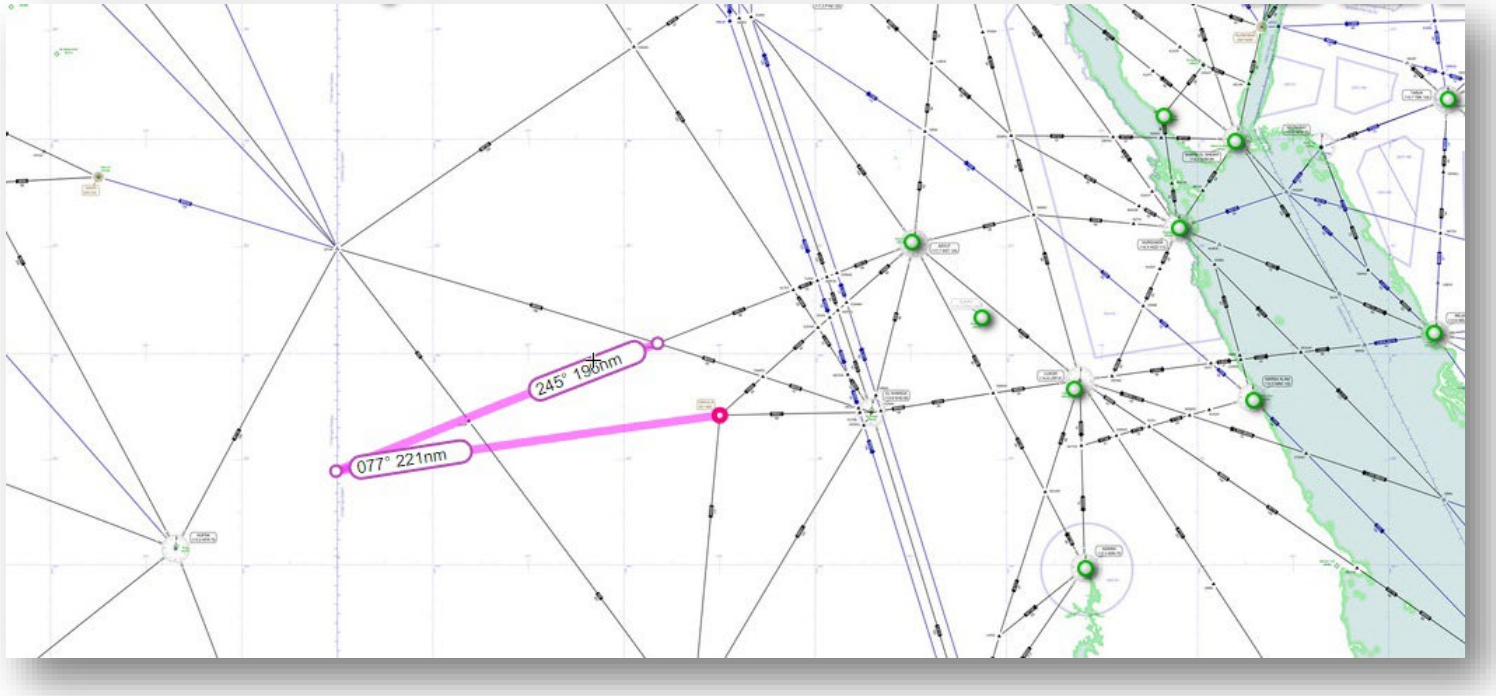




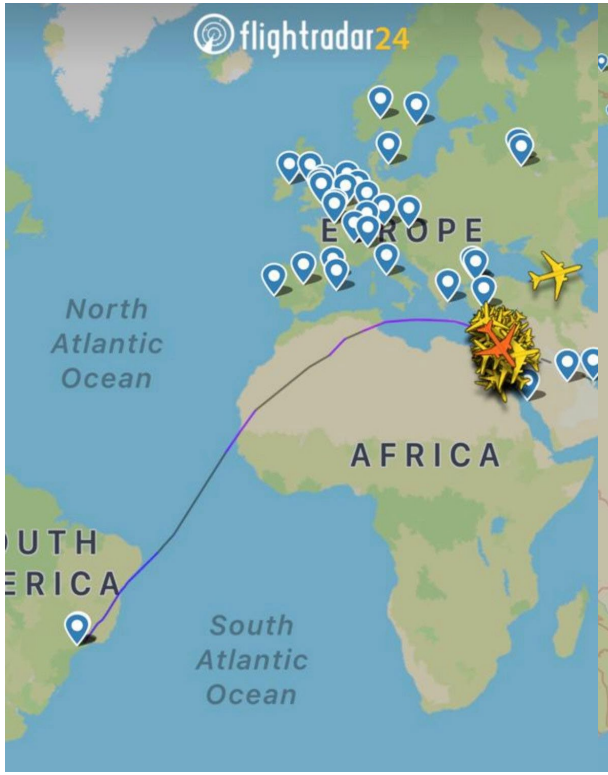
Route Connecting ASIA-AFRICA

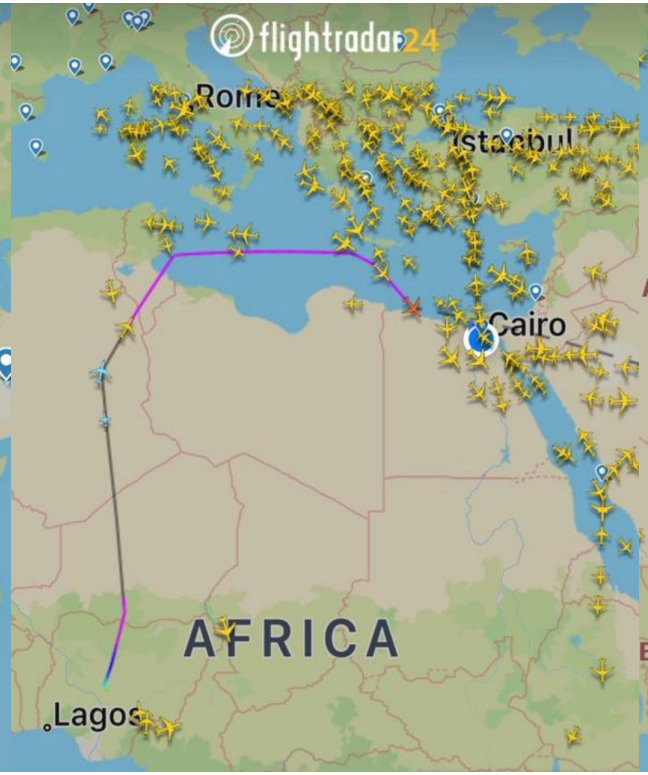
Via Libyan Airspace

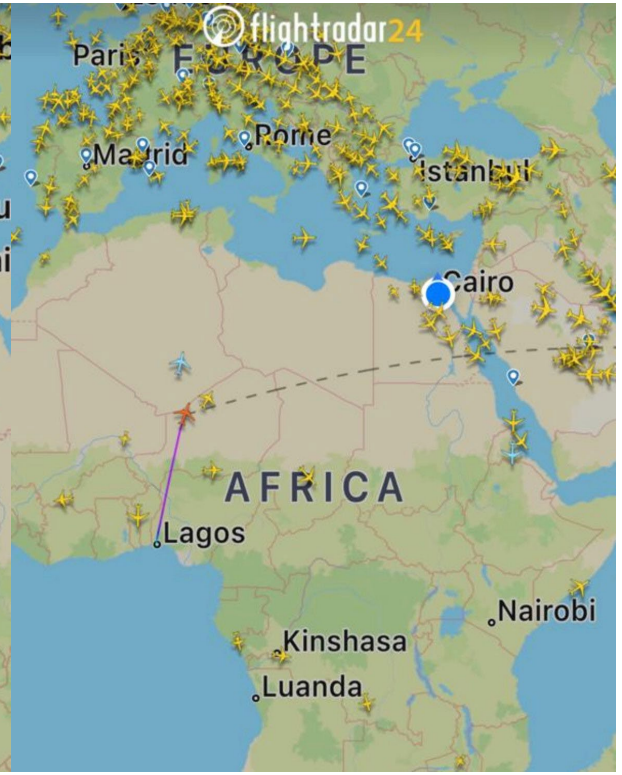
- A direct Route Connecting Regional ATS Routes Connecting KHG / NAKDO to KFR within Tripoli FIR.
- NEW COP with Tripoli FIR.
- Proposal is coordinated with Libyan Authorities.



Current Vs. Expected

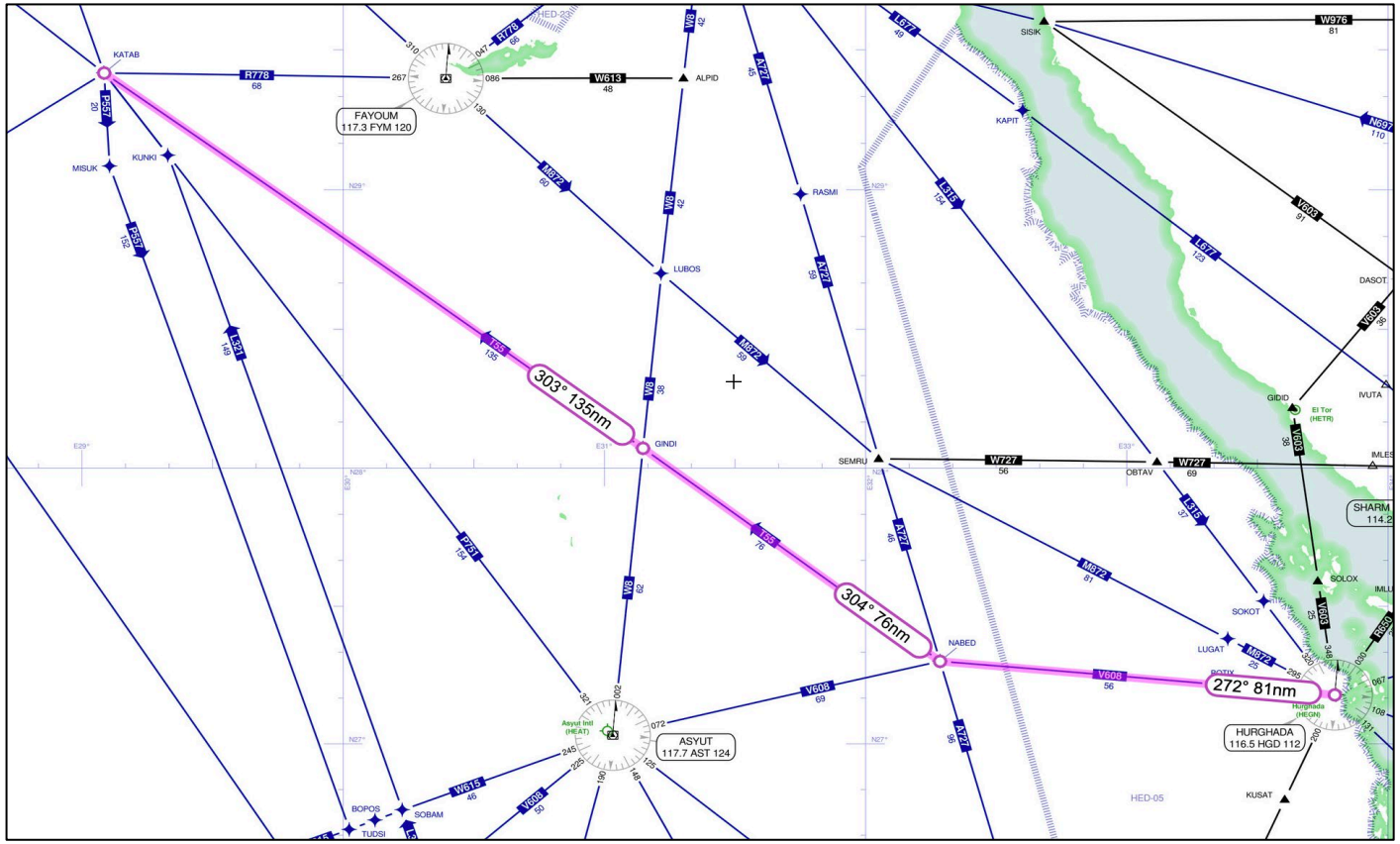






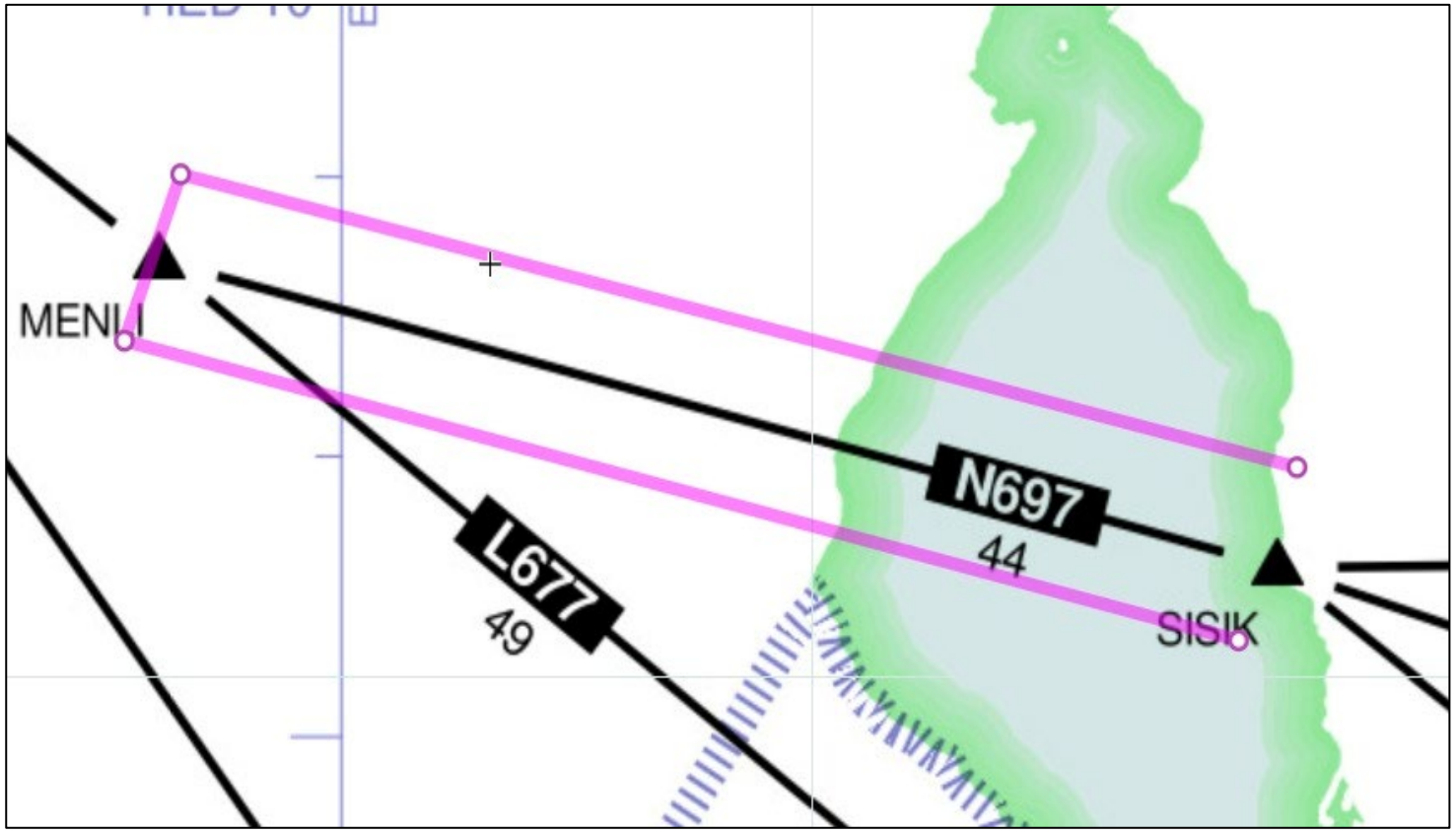
Inside Cairo FIR – Phase I

- Extend **T55** operation hours to be **24** hours and reduce the minimum flight level from FL330 to FL 260 to serve HEGN departures



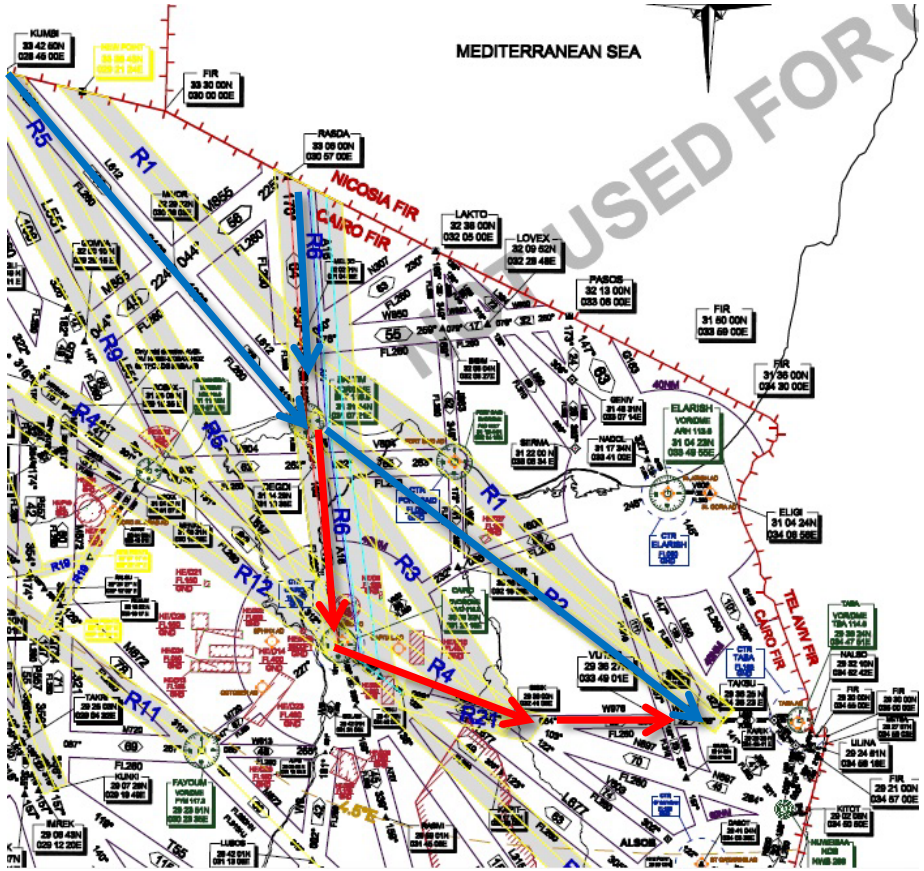
Inside Cairo FIR – Phase I

- Increase N697 Width to be **10NM** between MENLI & SISIK



Inside Cairo FIR – Phase II

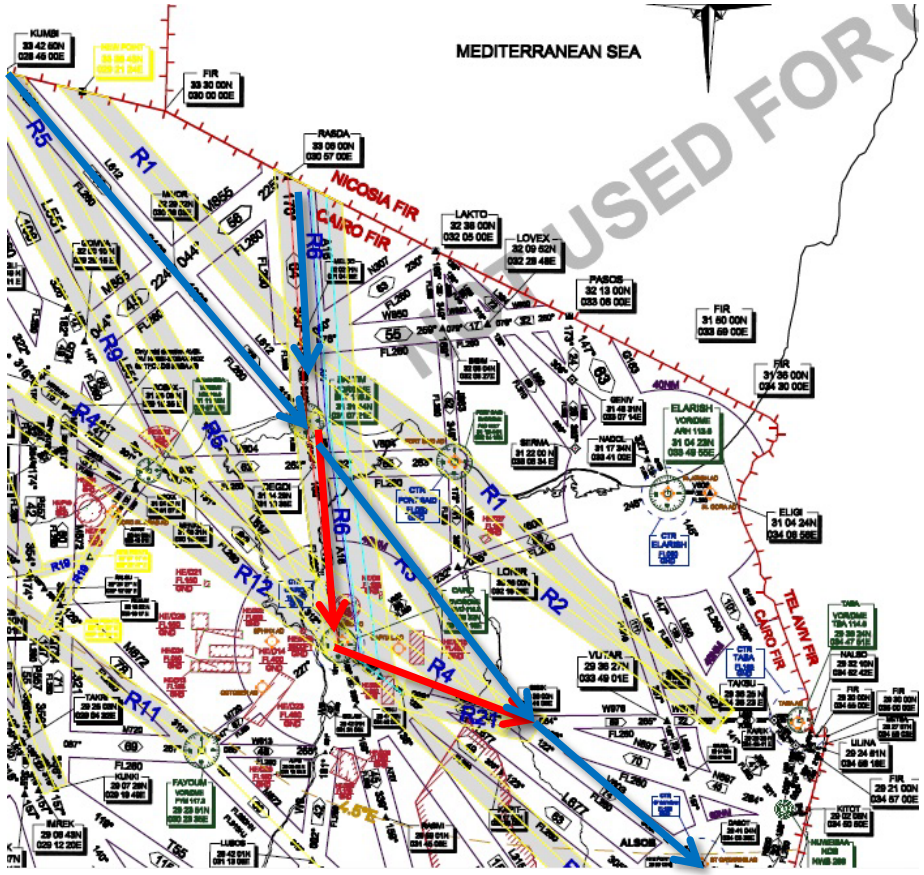
- A direct route between (**BLT-DATOK**) for air traffic from **RASDA** (NICOSIA FIR) to **ULINA** (AMMAN FIR).



Operational benefits:	
Distance Reduction	**45.3** nm
Time Savings	Approx. **6** MINs
Fuel Efficiency	Approx. **241.8** kg
Emissions Reduction	Approx. **764.088** kg

Inside Cairo FIR – Phase II

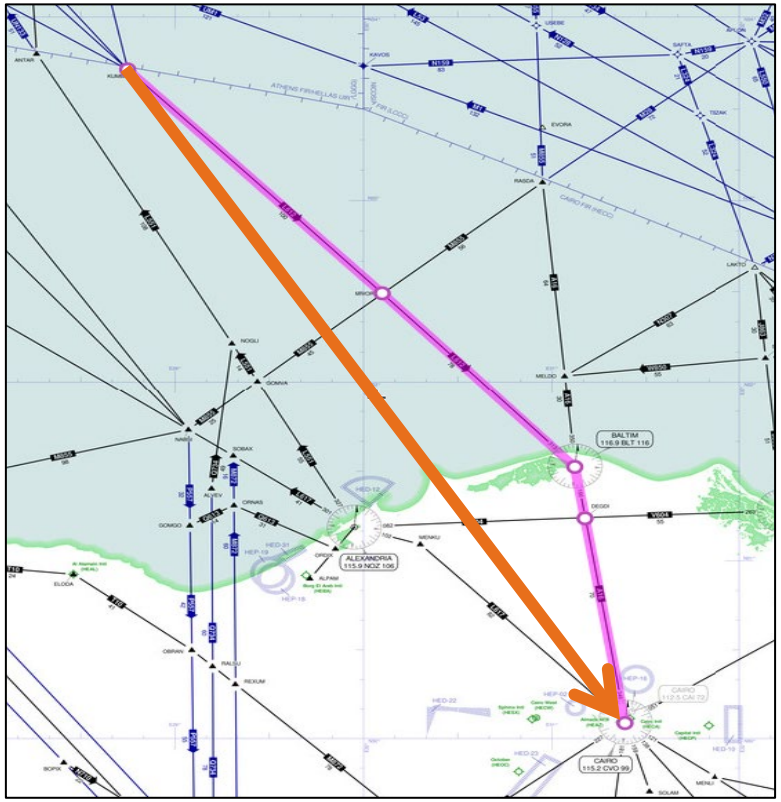
- A direct route between (**BLT-SISIK**) for flights arriving from Europe to HESH, avoids the congested portion of (BLT-CVO-MENLI)



Operational benefits:	
Distance Reduction	**21.3** nm
Time Savings	Approx. **3** MINs
Fuel Efficiency	Approx. **104.8** kg
Emissions Reduction	Approx. **331.168** kg

Inside Cairo FIR – Phase II

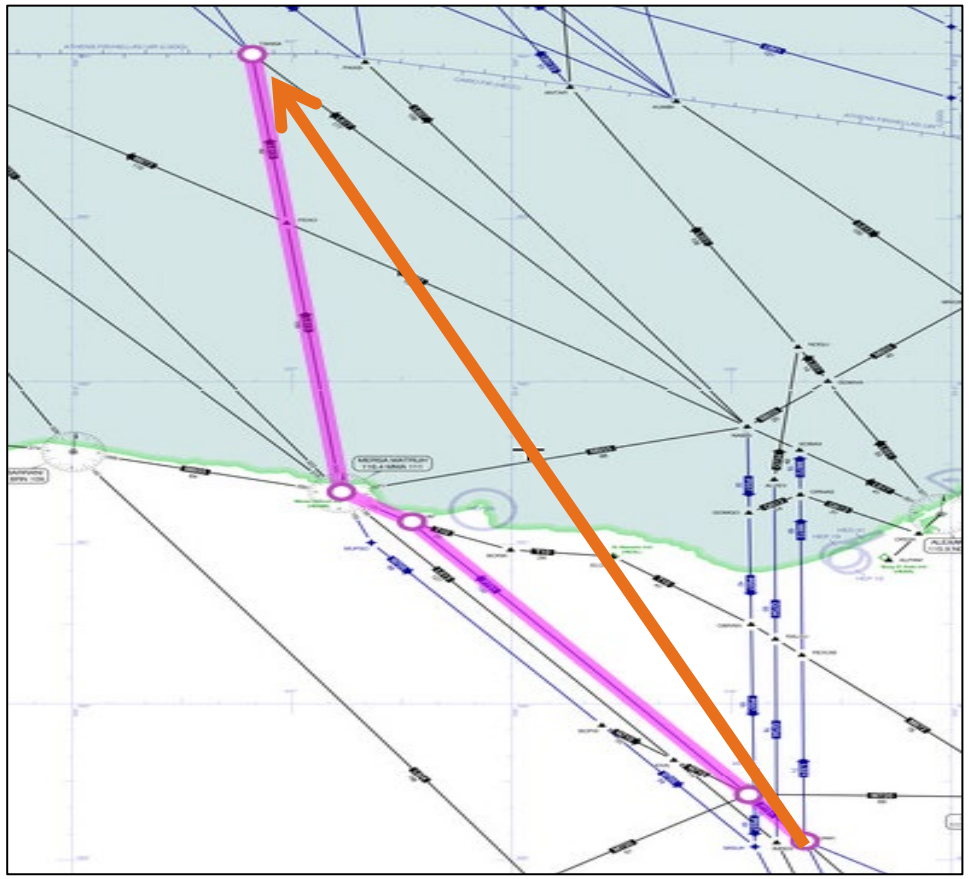
- A direct (**night**) route between (**KUMBI-CVO**) facilitates air traffic from Europe, separating traffic from Athena airspace via (KUMBI) from traffic on airway (A16), thus avoiding high-density points such as (BLT, DEGDI).



Operational benefits:	
Distance Reduction	**9.5** nm
Time Savings	Approx. **2** MINs
Fuel Efficiency	Approx. **50.4** kg
Emissions Reduction	Approx. **159.3** kg

Inside Cairo FIR – Phase II

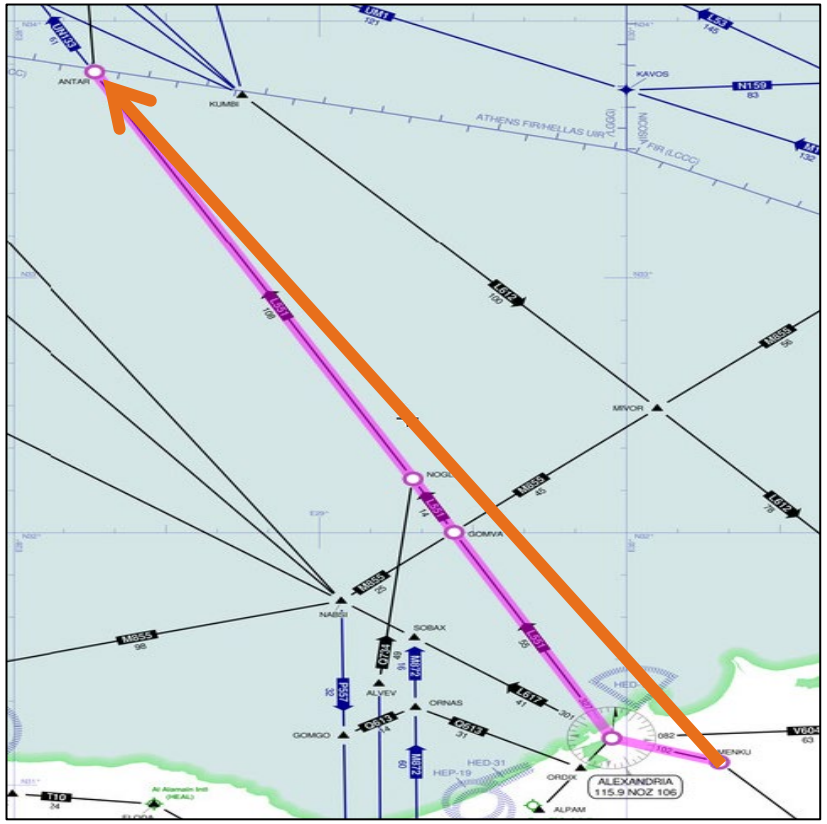
- A direct route between (**KUNKI-TANSA**) reduces flight time and aircraft turn rates and shortens the flight distance.



Operational benefits:	
Distance Reduction	**14.7** nm
Time Savings	Approx. **2** MINs
Fuel Efficiency	Approx. **74.8** kg
Emissions Reduction	Approx. **236.4** kg

Inside Cairo FIR – Phase II

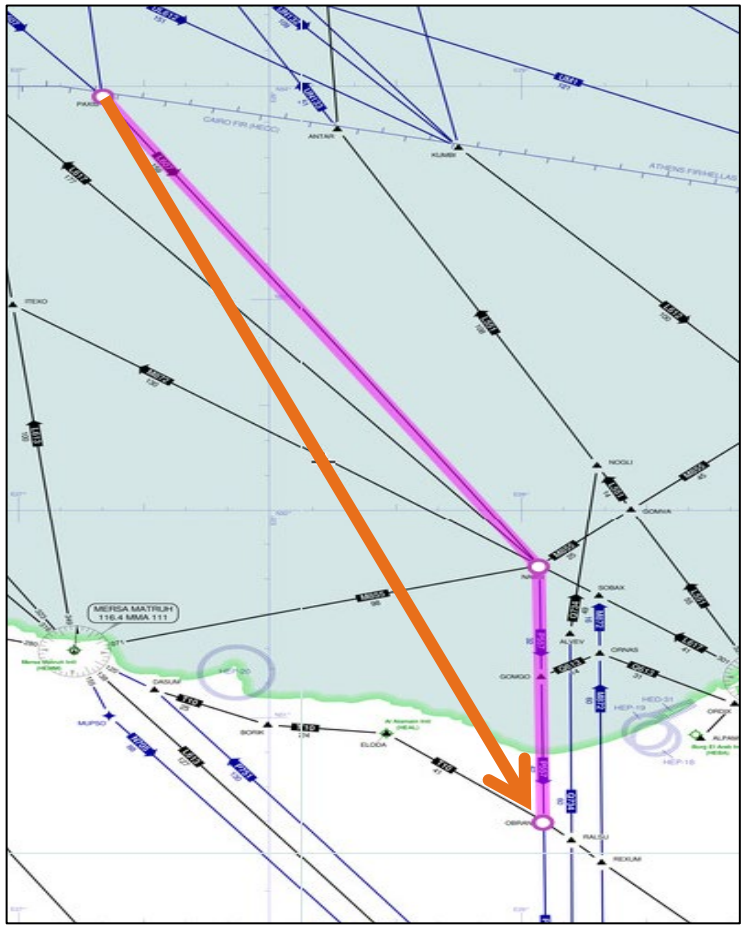
- A direct (**night)** route between (**MENKU-ANTAR**) reduces flight time and aircraft turn rates and shortens the flight distance.



Operational benefits:	
Distance Reduction	**4.9** nm
Time Savings	Approx. **1** MINs
Fuel Efficiency	Approx. **25** kg
Emissions Reduction	Approx. **79** kg

Inside Cairo FIR – Phase II

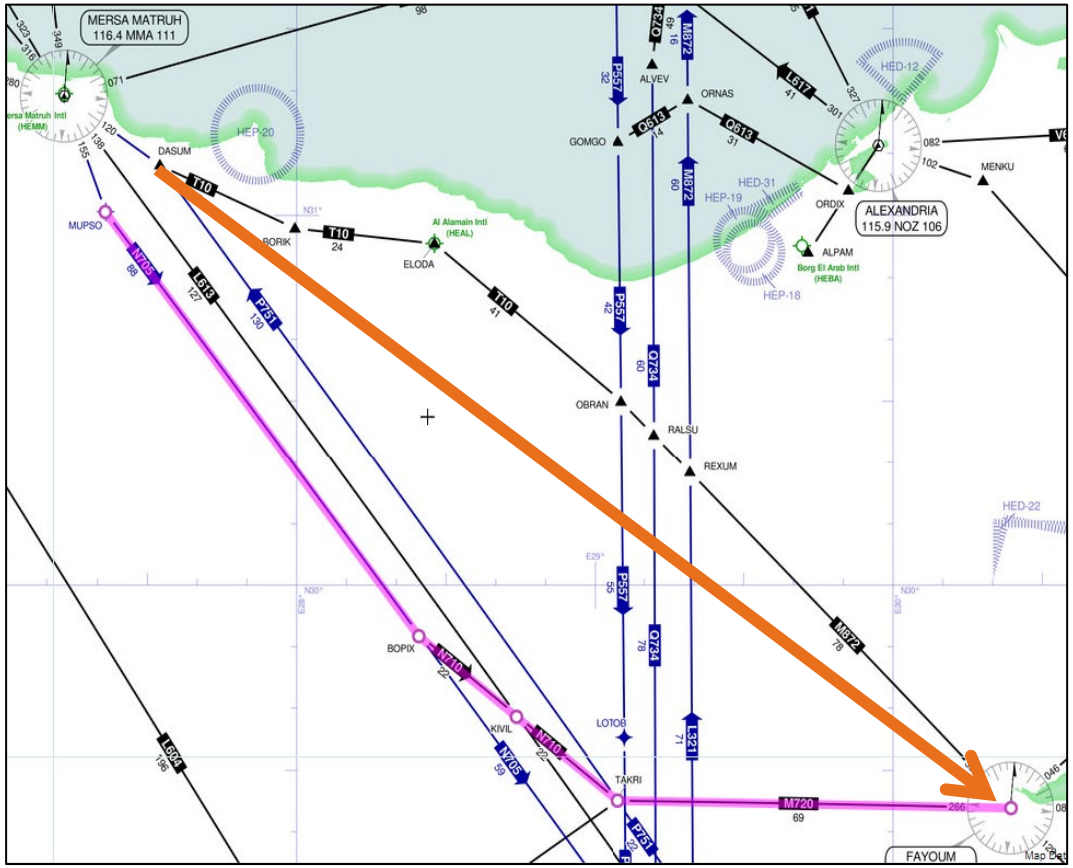
- A direct route between (**PAXIS-OBRAN**) reduces flight time and aircraft turn rates and shortens the flight distance.



Operational benefits:	
Distance Reduction	**7.9** nm
Time Savings	Approx. **1** MINs
Fuel Efficiency	Approx. **40.8** kg
Emissions Reduction	Approx. **128.9** kg

Inside Cairo FIR – Phase II

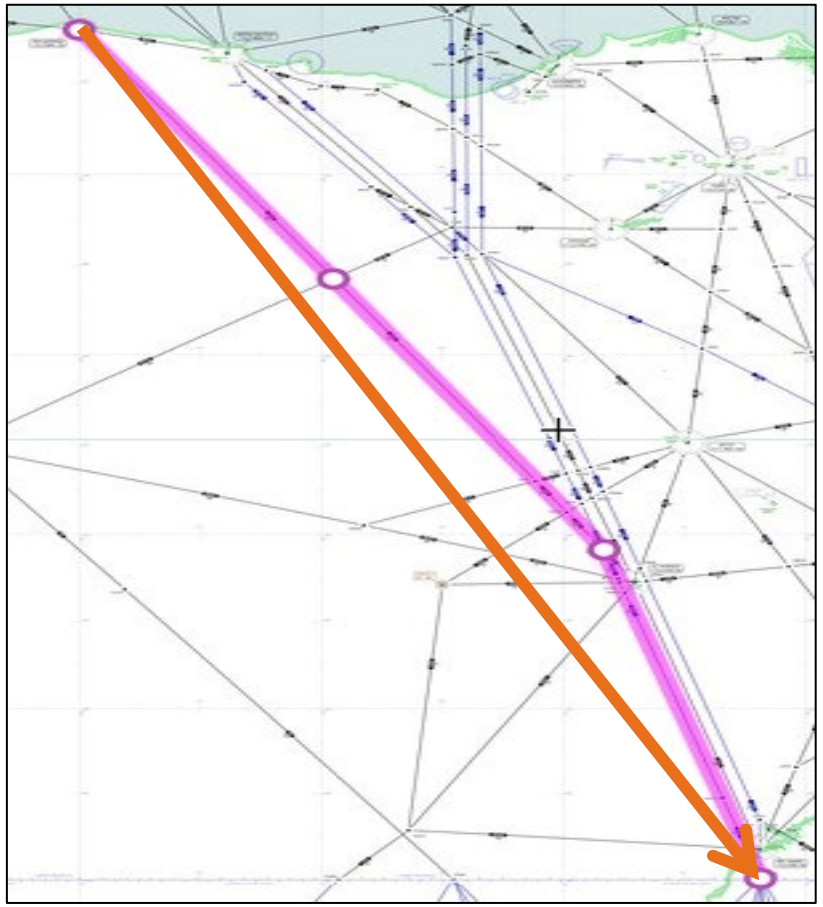
- A direct route between (**DASUM-FYM**) reduces flight time and aircraft turn rates and shortens the flight distance.



Operational benefits:	
Distance Reduction	**19.5** nm
Time Savings	Approx. **3** MINs
Fuel Efficiency	Approx. **97.9** kg
Emissions Reduction	Approx. **309.4** kg

Inside Cairo FIR – Phase II

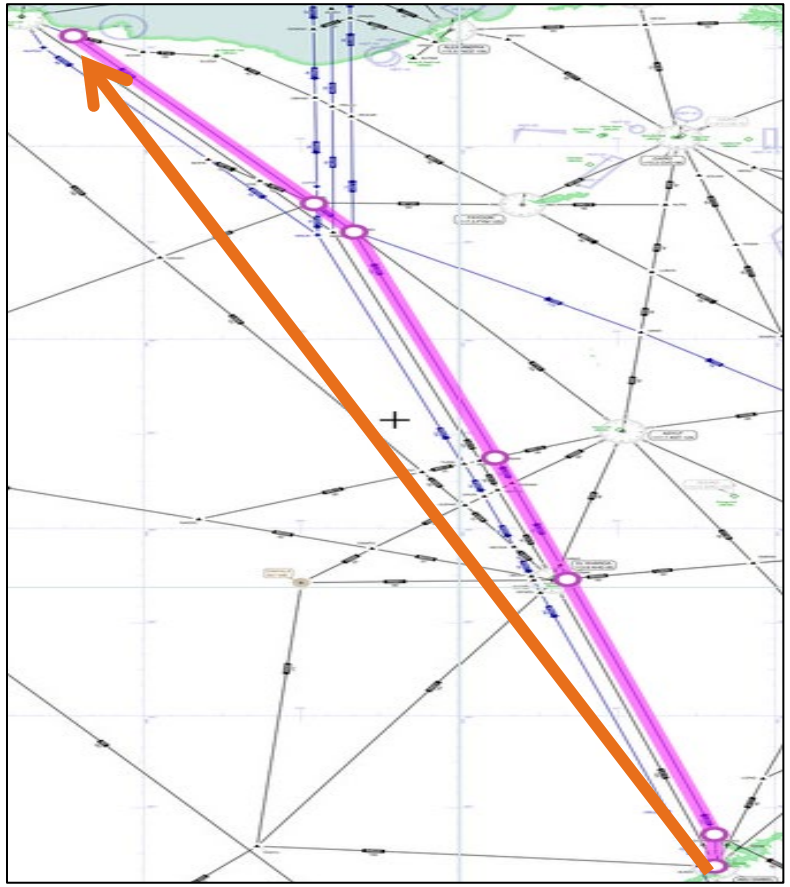
- A direct route between (**BRN-NUBAR**) reduces flight time and aircraft turn rates and shortens the flight distance by **5.2** NM.



Operational benefits:	
Distance Reduction	**5.2** nm
Time Savings	Approx. **1** MINs
Fuel Efficiency	Approx. **27.2** kg
Emissions Reduction	Approx. **85.9** kg

Inside Cairo FIR – Phase II

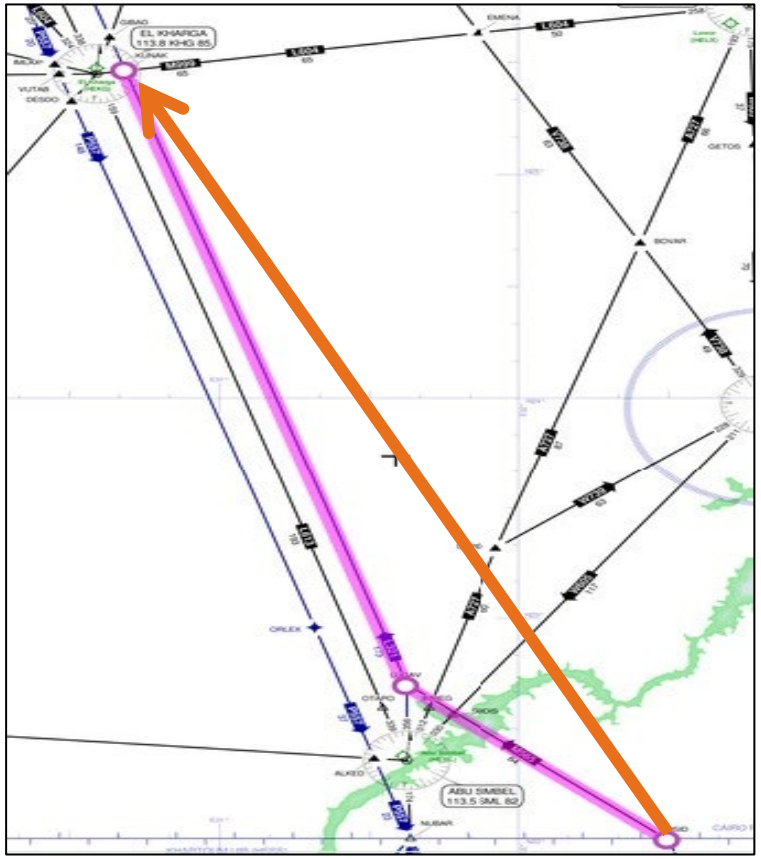
- A direct route between (**SML-DEPKA**) reduces flight time and aircraft turn rates and shortens the flight distance by **10.6** NM.



Operational benefits:	
Distance Reduction	**10.6** nm
Time Savings	Approx. **1** MINs
Fuel Efficiency	Approx. **55.8** kg
Emissions Reduction	Approx. **176.3** kg

Inside Cairo FIR – Phase II

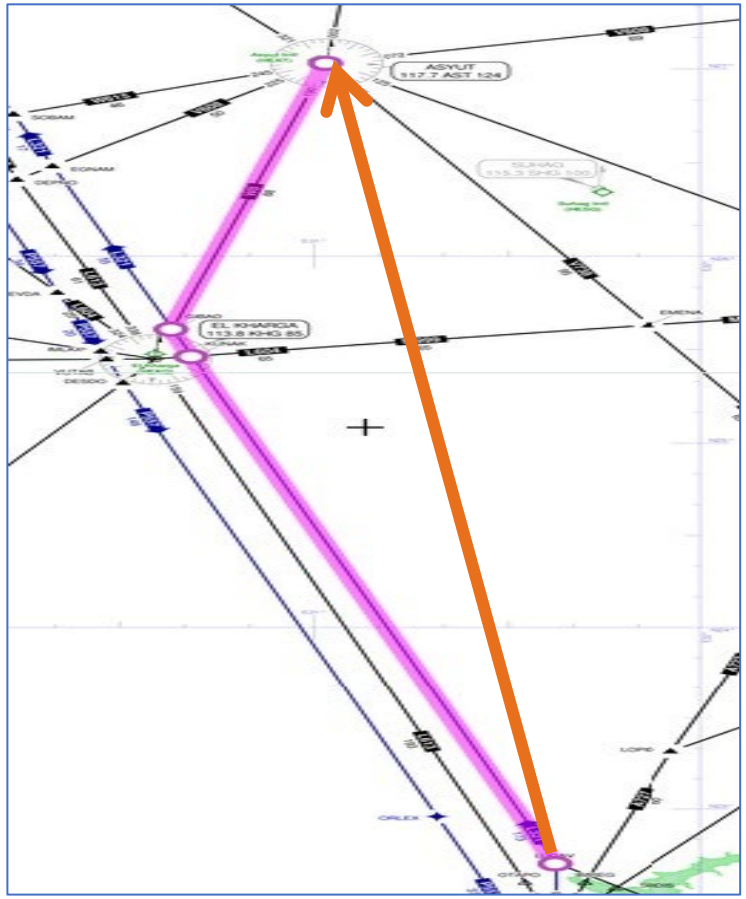
- A direct route between (**SISID-KUNAK**) reduces flight time and aircraft turn rates and shortens the flight distance by **7.3** NM.



Operational benefits:	
Distance Reduction	**7.3** nm
Time Savings	Approx. **1** MINs
Fuel Efficiency	Approx. **37.2** kg
Emissions Reduction	Approx. **117.6** kg

Inside Cairo FIR – Phase II

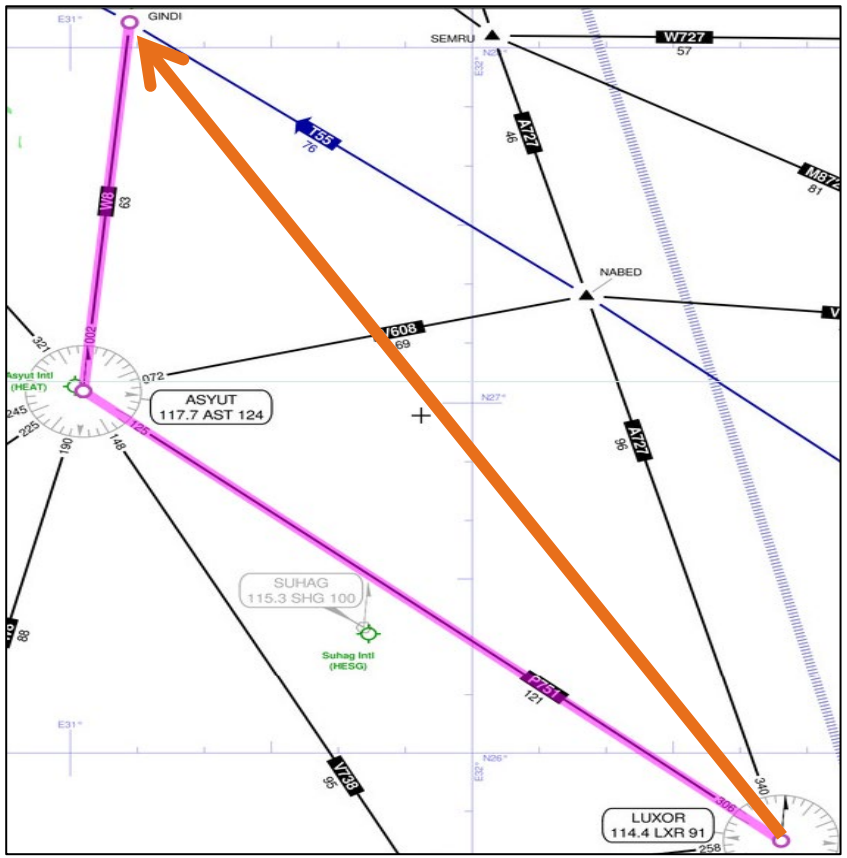
- A direct route between (**LUGAV-AST**) reduces flight time and aircraft turn rates and shortens the flight distance by **8.9** NM.



Operational benefits:	
Distance Reduction	**8.9** nm
Time Savings	Approx. **1** MINs
Fuel Efficiency	Approx. **46.2** kg
Emissions Reduction	Approx. **146.0** kg

Inside Cairo FIR – Phase II

- A direct route between (**LXR-GINDI**) reduces flight time and aircraft turn rates and shortens the flight distance by **19.6** NM.

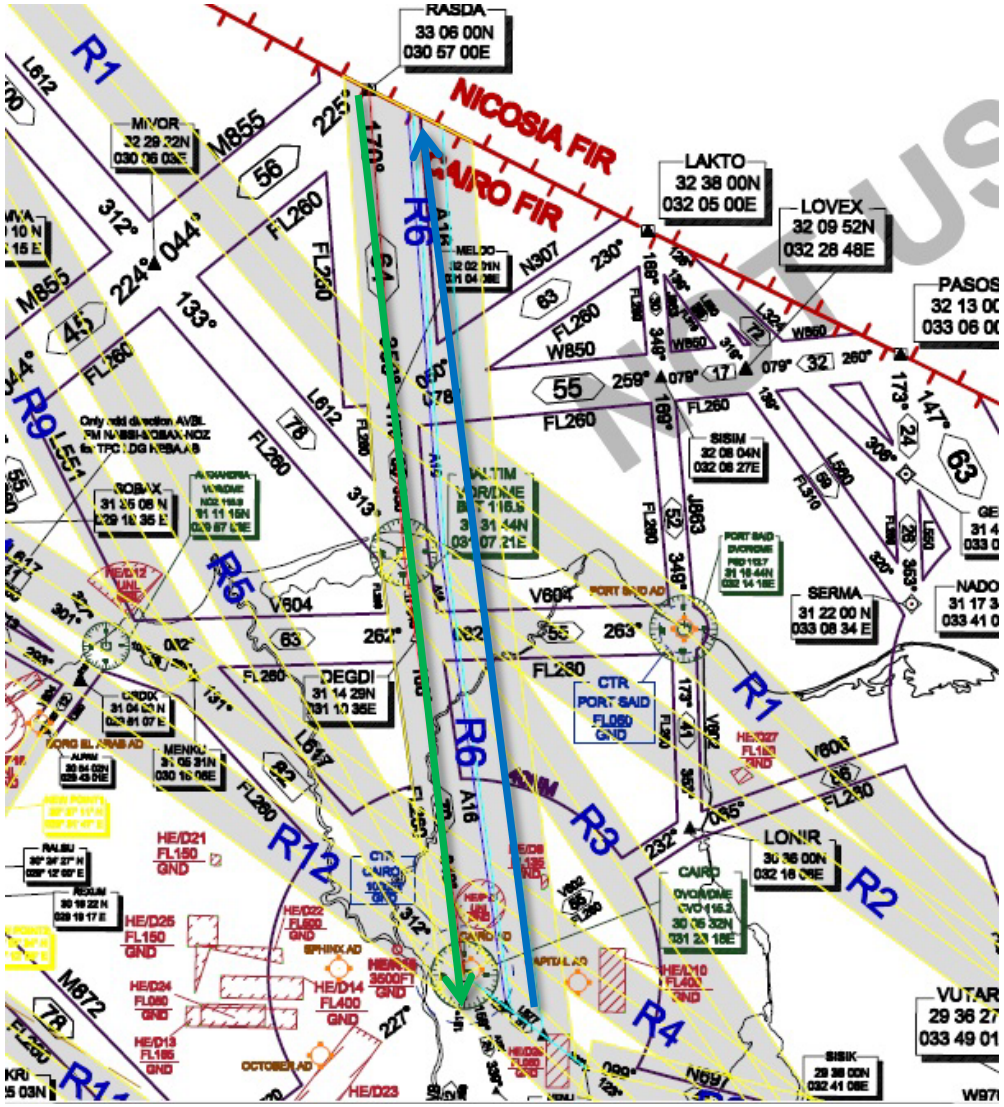


Operational benefits:	
Distance Reduction	**19.6** nm
Time Savings	Approx. **3** MINs
Fuel Efficiency	Approx. **107** kg
Emissions Reduction	Approx. **338.1** kg

Inside Cairo FIR – Phase II

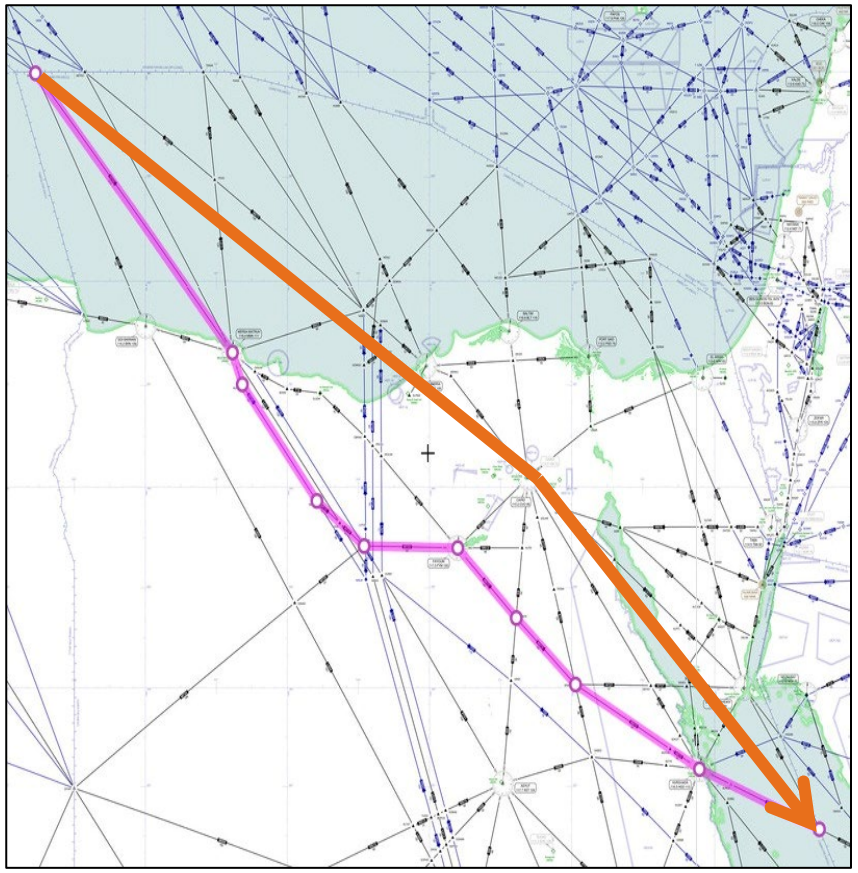
-Dualization of**A16**

- Increases airspace capacity,
- Enhancing safety by reducing congestion and separating conflicting flight paths for traffic to and from Nicosia FIR,
- Reduces workload.



Inside Cairo FIR – Phase II

- (**Night**) route (**SALUN-CVO-SILKA**) Increase flight Efficiency By reducing flight time, Saves distance by **30.5** NM, Available for overflight , HECA ARR/DEP.



Operational benefits:	
Distance Reduction	**30.5** nm
Time Savings	Approx. **4** MINs
Fuel Efficiency	Approx. **156** kg
Emissions Reduction	Approx. **492.9** kg

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Fast-Time Simulation Results

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Fast-Time Simulation

Analytical tool that allows the evaluate and analyze various airspace scenarios without the need for real-time trials.

Fast-Time Simulation

The analysis was conducted for a base –line scenario of traffic sample of August 15, 2024, involving 1,276 flights.

Fast-Time Simulation Parameters

- **Sector-based evaluation**: Each sector's load was analyzed to identify critical areas for improvement.

- **Conflict detection**: The simulator was used to detect and compare potential aircraft conflicts for each scenario to reach optimum solutions.
- **Environmental impact**: Fuel consumption and emission levels were calculated and compared.

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Fast-Time Simulation Results

➢ **Environmental Impact:**

Emission Type	Before Improvements (tons)	After Improvements (tons)
Mass of Fuel	9619.615	9001.832
Mass of CO_2	30013.199	29009.4
Mass of H_2O	9619.615	9001.832
Mass of NOx	355.926	310.461

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ATS Routes Optmisation Results

Route	Current Distance (NM)	Proposed Distance (NM)	Distance Saving (NM)	Fuel Consumption (Current) (kg)	Fuel Consumption (Proposed) (kg)	Fuel Savings (kg)	Fuel Savings (%)	Carbon Emission Savings (kg)	Cost Savings per Flight (USD)
DATOK-PSD-MELDO-NEWPOINT	435.5	347.2	88.3	2300	1833.1	466.9	20.3	1475.4	391.45
BLT-DATOK	243.3	198	45.3	1300	1058.2	241.8	18.6	764.1	202.73
BLT-SISIK	162.3	141	21.3	800	695.2	104.8	13.1	331.2	87.87
KUMBI-CVO	264.8	255.3	9.5	1400	1349.6	50.4	3.6	159.3	42.26
KUNKI-TANSA	333.8	319.1	14.7	1700	1625.2	74.8	4.4	236.4	62.71
MENKU-ANTAR	197.2	192.3	4.9	1000	975	25	2.5	79	20.96
PAXIS-OBRAN	233.1	225.2	7.9	1200	1159.2	40.8	3.4	128.9	34.21
DASUM-FYM	220.3	200.8	19.5	1100	1002.1	97.9	8.9	309.4	82.08
SALUN-CVO-SILKA	757	726.5	30.5	3900	3744	156	4	493	130.79
BRN-NUBAR	652.6	647.4	5.2	3400	3372.8	27.2	0.8	86	22.8
SML-DEPKA	596.4	585.8	10.6	3100	3044.2	55.8	1.8	176.3	46.78
SISID-KUNAK	236.9	229.6	7.3	1200	1162.8	37.2	3.1	117.6	31.19
LUGAV-AST	269.9	261	8.9	1400	1353.8	46.2	3.3	146	38.73
LXR-GINDI	183.5	163.9	19.6	1000	893	107	10.7	338.1	89.71

THANK YOU

2024

20 - 23 October

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