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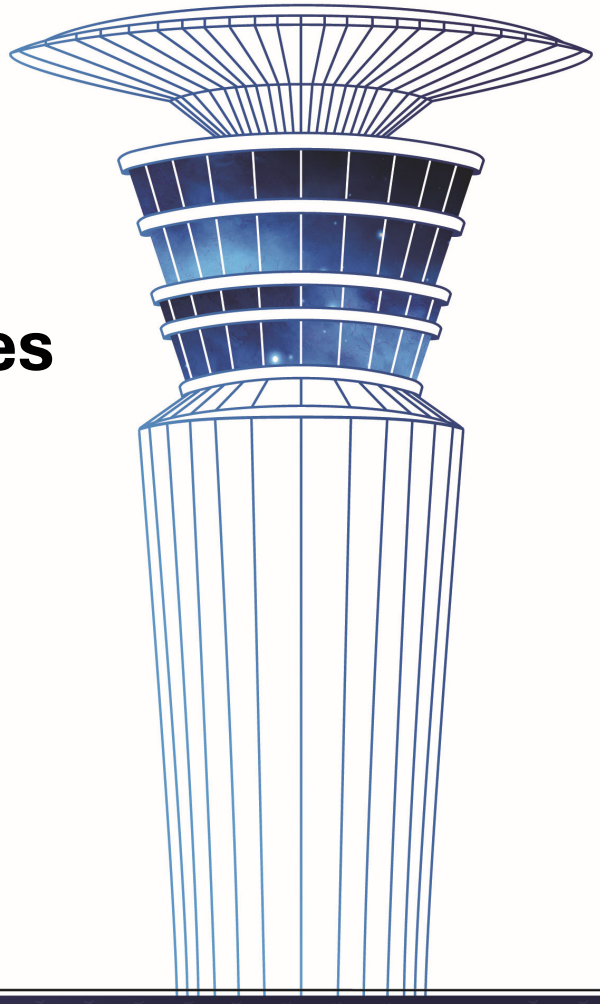
خدمات الملاحة الجوية السعودية
Saudi Air Navigation Services

Standardization of Arrival Procedures Based on Traffic Density

Saudi Future Airspace Concept – TMA System and Approach Procedures



ATM SG/11 Meeting
(Abu Dhabi, UAE, 19 - 23 October 2025)

Background

- The Saudi Future Airspace Concept (SFAC) is a comprehensive airspace modernization initiative under Vision 2030 to meet the demands of projected traffic growth through 2040.

- Under SFAC project, KSA Airspace will be redesigned (re-organized) with the goal of Enhancing:
  - Capacity,
  - Efficiency,
  - Positive impact on Environment
  - Flexibility
  - Safety
  - Access and Equity
  - Military Mission Effectiveness
  - Global interoperability

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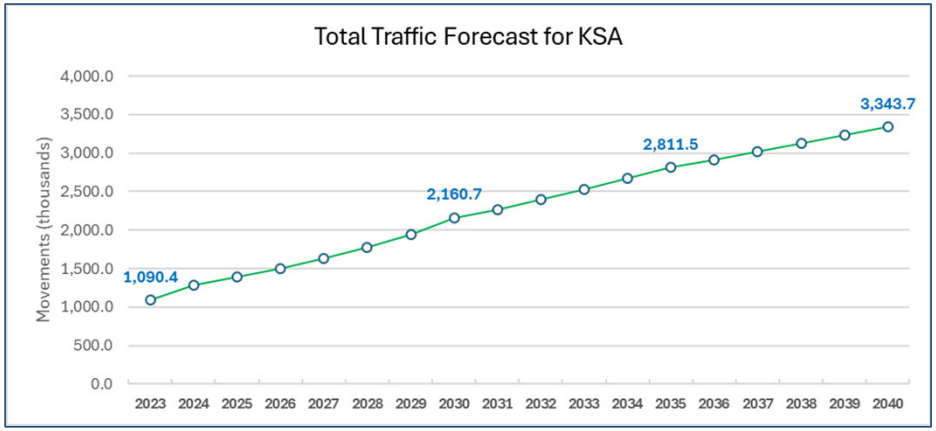

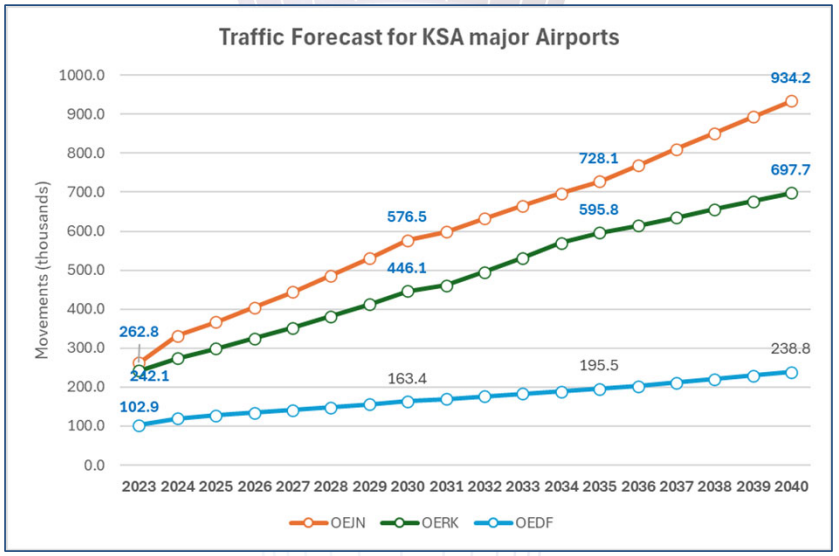

Fundamental Challenge in KSA Airspace

1. The primary driver for the Saudi Future Airspace Concept (SFAC) and the adoption of new Standard Instrument Arrival Routes (STARs) is the **massive projected air traffic growth** under Vision 2030.
2. The existing airspace structure is not scalable to handle this forecasted growth, leading to reliance on the new STAR systems to address the following specific operational challenges:

Rationale for New STARs (SFAC Objective)	Challenge
The new system (e.g., Point Merge System + Trombone) absorbs high traffic loads during peak hours, enabling efficient sequencing and significantly **Enhancing capacity**.	**Capacity & Efficiency**
The current system requires extensive radar vectoring; new structured STARs are designed for a **Reduction in vectoring** and improved predictability, thereby **Reducing ATC workload**.	**Controller Workload**
A key challenge is the lack of consistent arrival procedures across airports. The new STARs enforce a system based on traffic density (**High: PMS + Trombone**, **Medium: Three-Base-Leg Trombone**, **Low: T-Bar Structure**) to establish consistency and maintain a high level of standardization.	**Lack of Standardization**
The new concept enables better Integration with future **PBN/ATM** developments and supports environmental goals through **Continuous Descent Operations (CDO)**.	**Future Integration**

Why we Develop our STARs?

- Establish consistent and efficient arrival procedures across airports.
- Optimize TMA design based on traffic density.
- Enhance predictability, safety, and controller workload management.
- Enable scalable solutions adaptable to future growth.

Traffic Density Categories

Category	Daily Movements	Recommended Arrival Structure
High	> 200 (e.g., Riyadh, Jeddah)	Point Merge System (PMS) + Trombone
Medium	Up to 200	Three-Base-Leg Trombone
Low	Up to 50	T-Bar Structure

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High Density Airports: PMS + Trombone

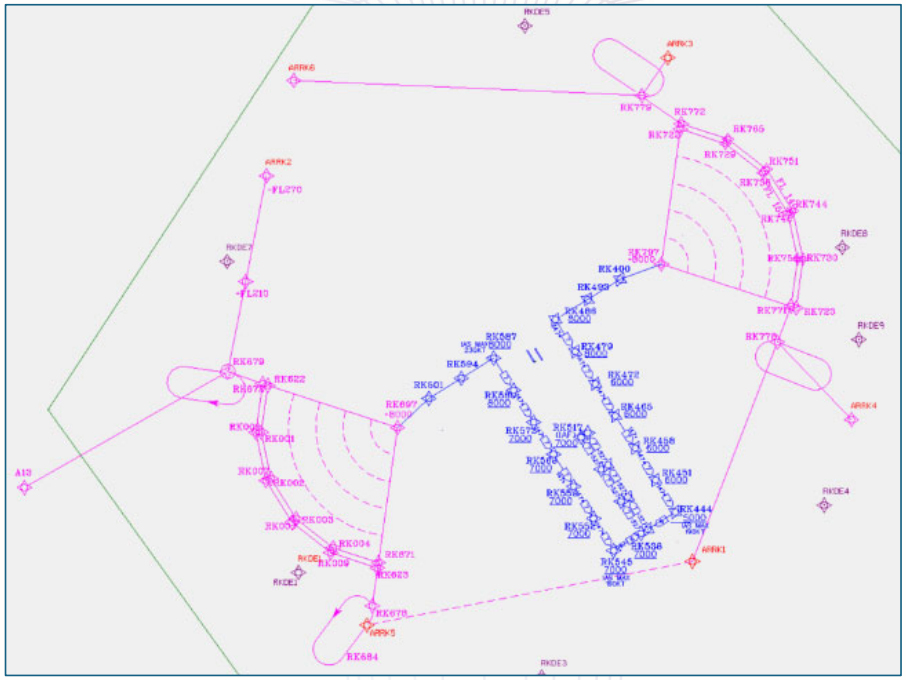
Airports: Riyadh (OERK) and Jeddah (OEJN)

Design Considerations:

- The traffic load during peak hours, is absorbed by trombones.
- Efficient sequencing of high arrival volumes
- Reduction in vectoring, improved controller workload
- Flexibility for peak periods

Benefits:

- Continuous descent operations (CDO)
- Standardized sequencing
- Integration with future PBN/ATM developments
- Reduced ATC workload



New STAR concept is designed to meet traffic forecasted till year 2040

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Medium Density Airports: Three-Base-Leg Trombone

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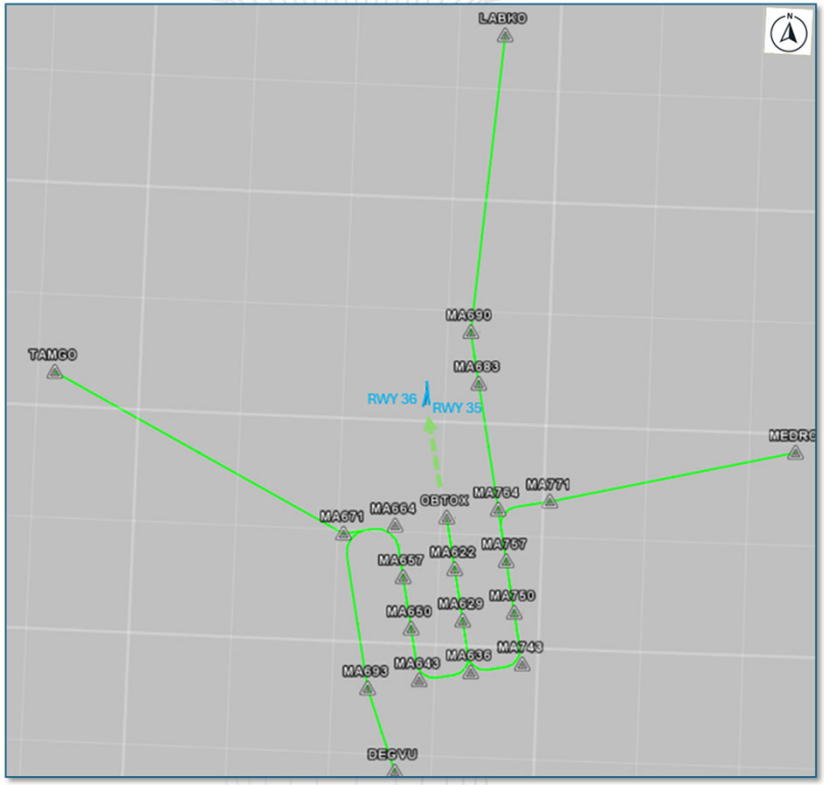
Applicable Airports: Daily movements up to 200

Design Features:

- Structured sequencing using three parallel base legs
- Efficient for moderate traffic while minimizing controller intervention

Advantages:

- Cost-effective
- Easier implementation than PMS
- Maintains high level of standardization



Low Density Airports: T-Bar Structure

Applicable Airports:

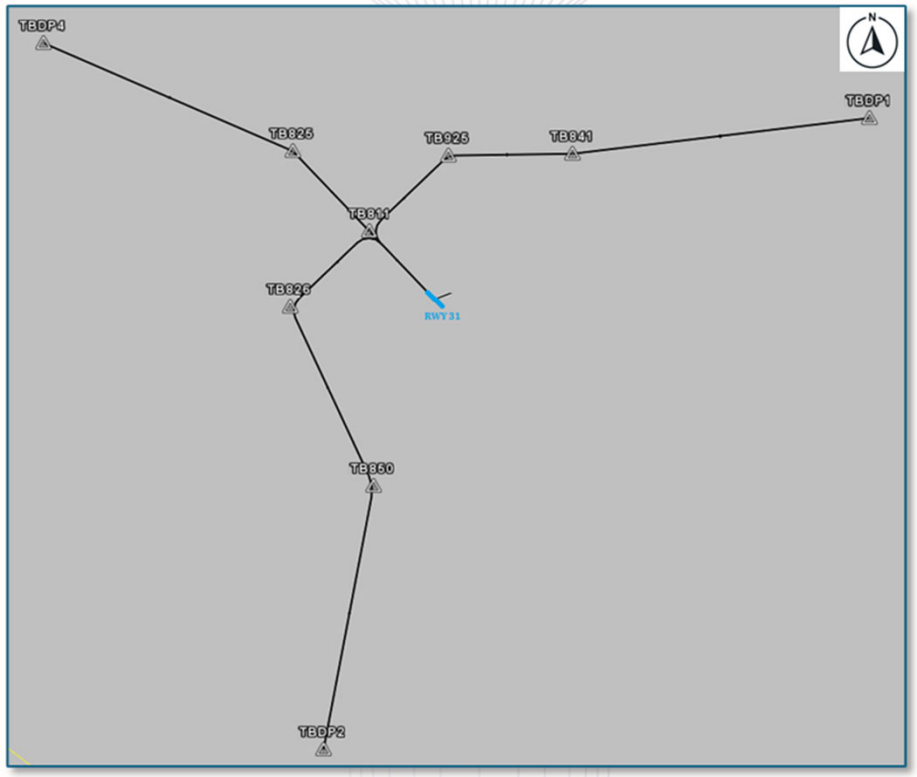
- Daily movements ~50

Design Features:

- Simple, structured arrival path
- Minimal complexity

Advantages:

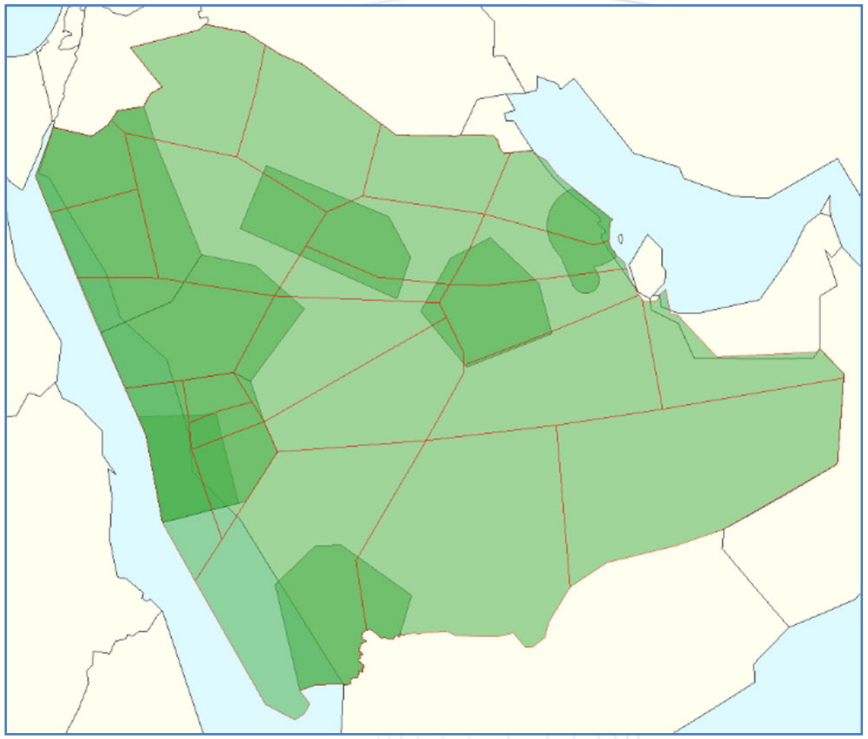
- Easy implementation
- Reduced training and operational impact
- Sufficient for low traffic levels



TMA System

The KSA TMA SYSTEM is composed of 7 TMA Systems:

- Riyadh TMA
- Jeddah TMA
- Madinah TMA
- Red Sea TMA
- Hail TMA
- Dammam TMA
- Abah TMA



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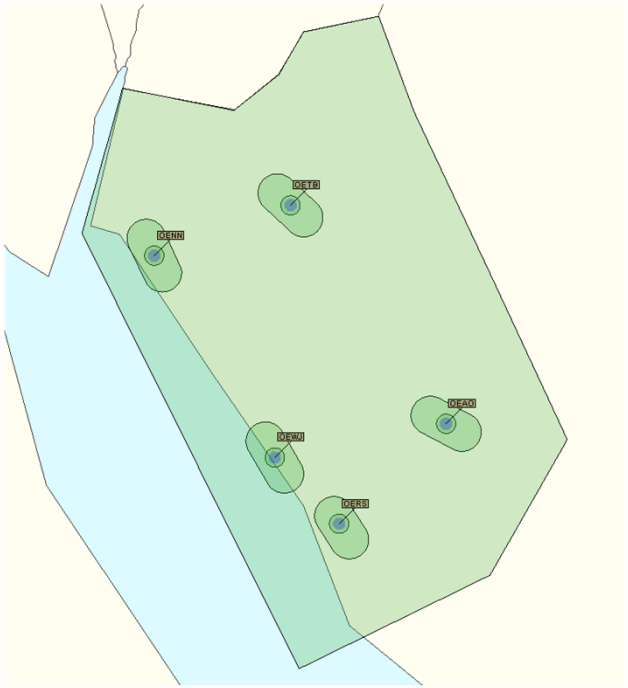
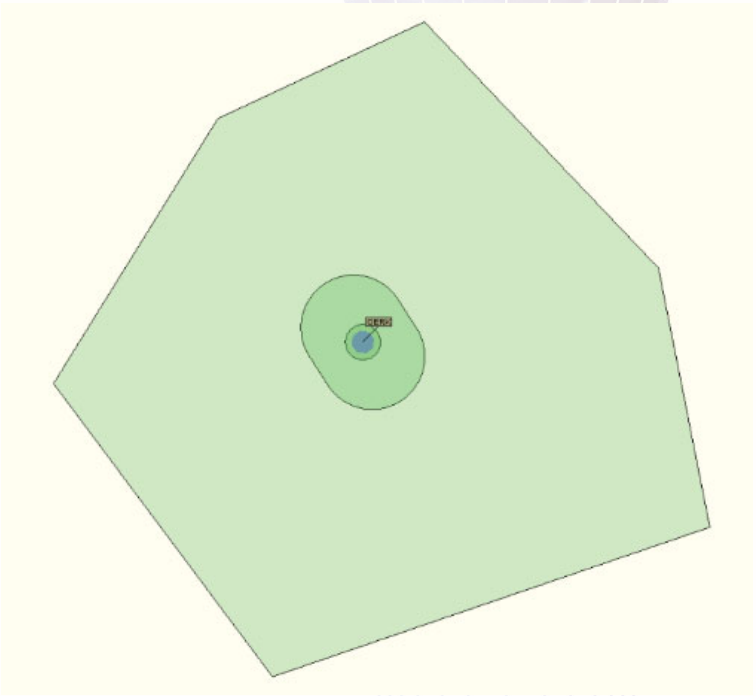
TMA System

- A TMA may encompass more than one aerodrome
- The TMAs are redesigned to protect the plan / vertical profile of the SIDs / STARs

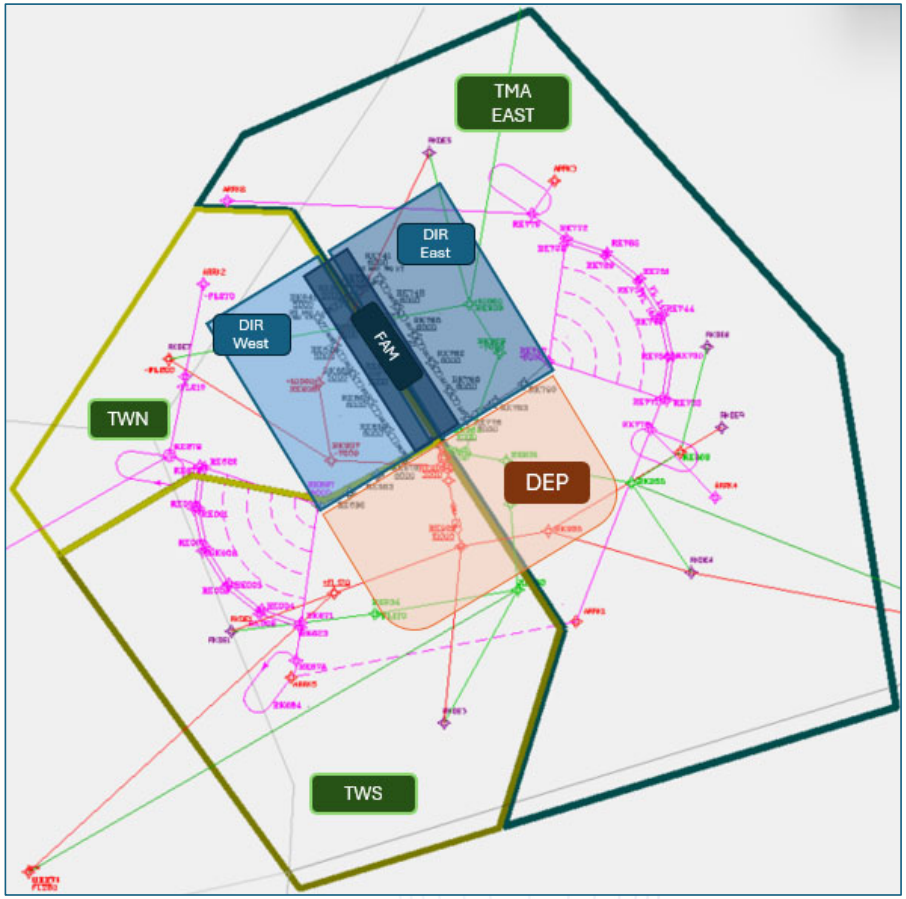




TMA System

TMA sectorization:

- A combination of Geographical and Functional sectorization at the major airports (Eg: Riyadh TMA)



Action by The Meeting

- Take note of the information contained in this paper, particular the challenges to be tackled by new STARs in Saudia Arabia.
- Encourage ICAO MID States specifically focusing on the adoption of modern arrival procedures and Continuous Descent Operations (CDO)..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Thank you