MIDANPIRG PBN SG/3 Meeting
Cairo, Egypt, 11-13 February 2018

I.R.IRAN

MOHAMMAD KARIMI

Head of Procedure design office

Presentation Outline

- Brief of the State National PBN Implementation Plan
- Status of Implementation
- Post assessment results of the PBN Implementation
- Lessons Learned
- Challenges
- Thoughts/Recommendations

Current status

- **9 Primary/major international aerodromes**
  - **(** OIKB OIFM OIMM OISS OITT OIIE OIII OIYY OIZH)
- **30 Secondary/Other international aerodromes**
- **48 National aerodromes**

Status of Implementation

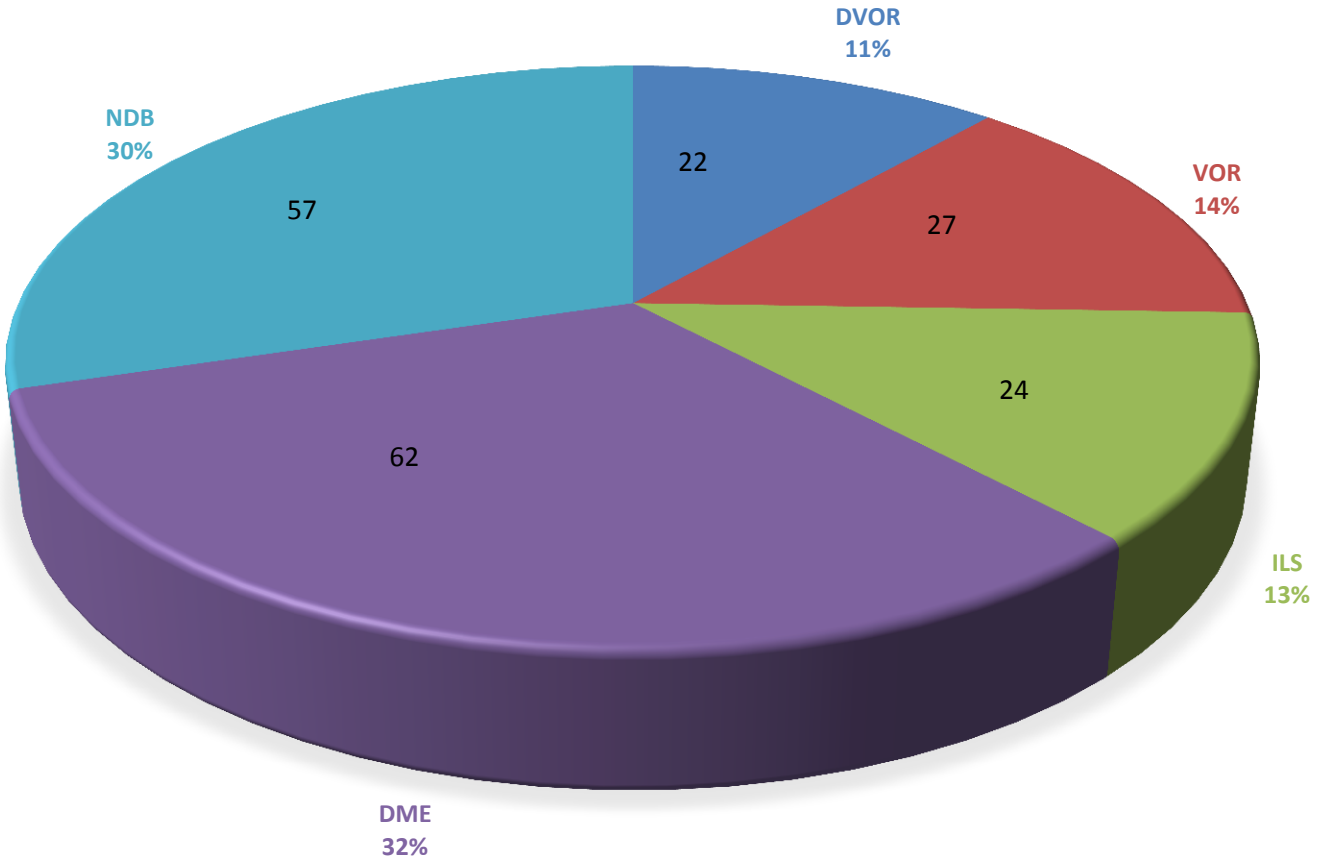
overview of the State's PBN capabilities:

- Regulations : CAO of I.R. Iran
- PANS-OPS Inspectorate : 2 persons (CAO)
- Airspace concept : 3 persons
- Procedure Design Entity : 1 IAC
- Number of procedure designers : 6 conventional & 3 PBN experts
- Automated tools :GEOTITAN

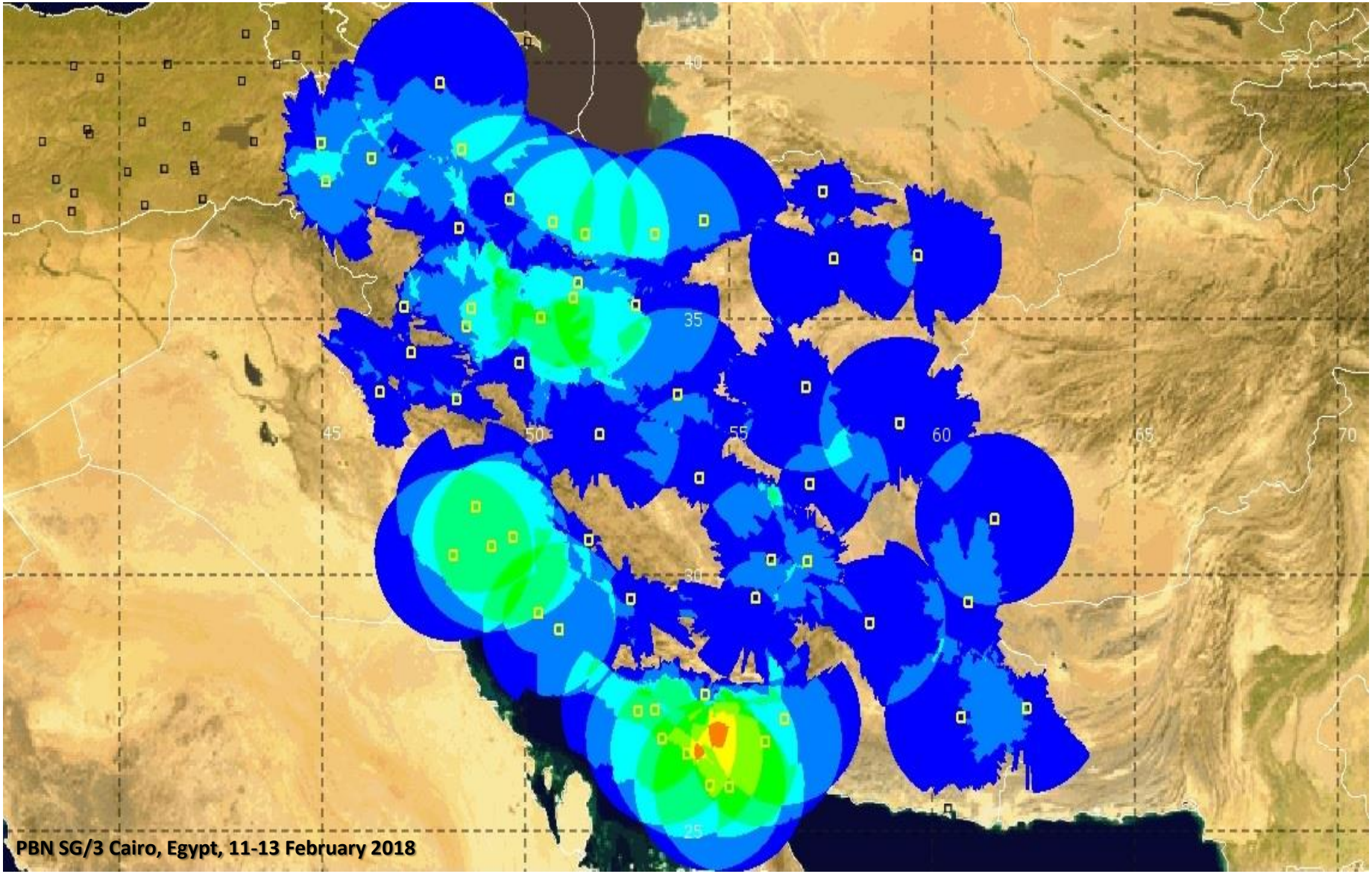
Current Status (Conventional SIDs/STARs/IAPs)

- 50 ILS CAT I IAP
- 2 ILS CAT II IAP
- 130 VOR/DME IAP
- 91 VOR IAP
- 50 NDB/DME IAP
- 97 NDB IAP
- 670 STARs
- 750 SIDs

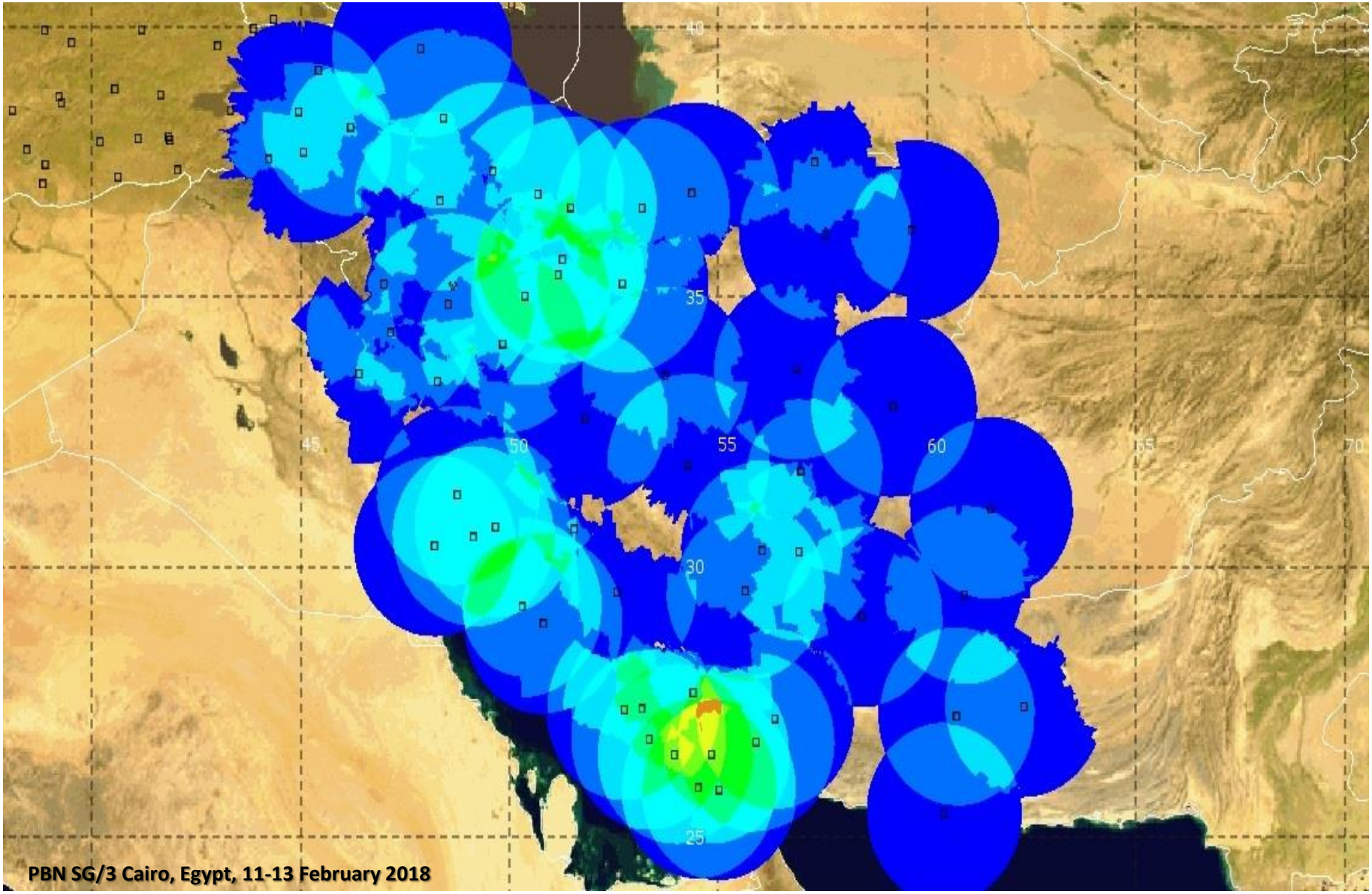
Navigation Infrastructure (Conventional NAV AIDs)



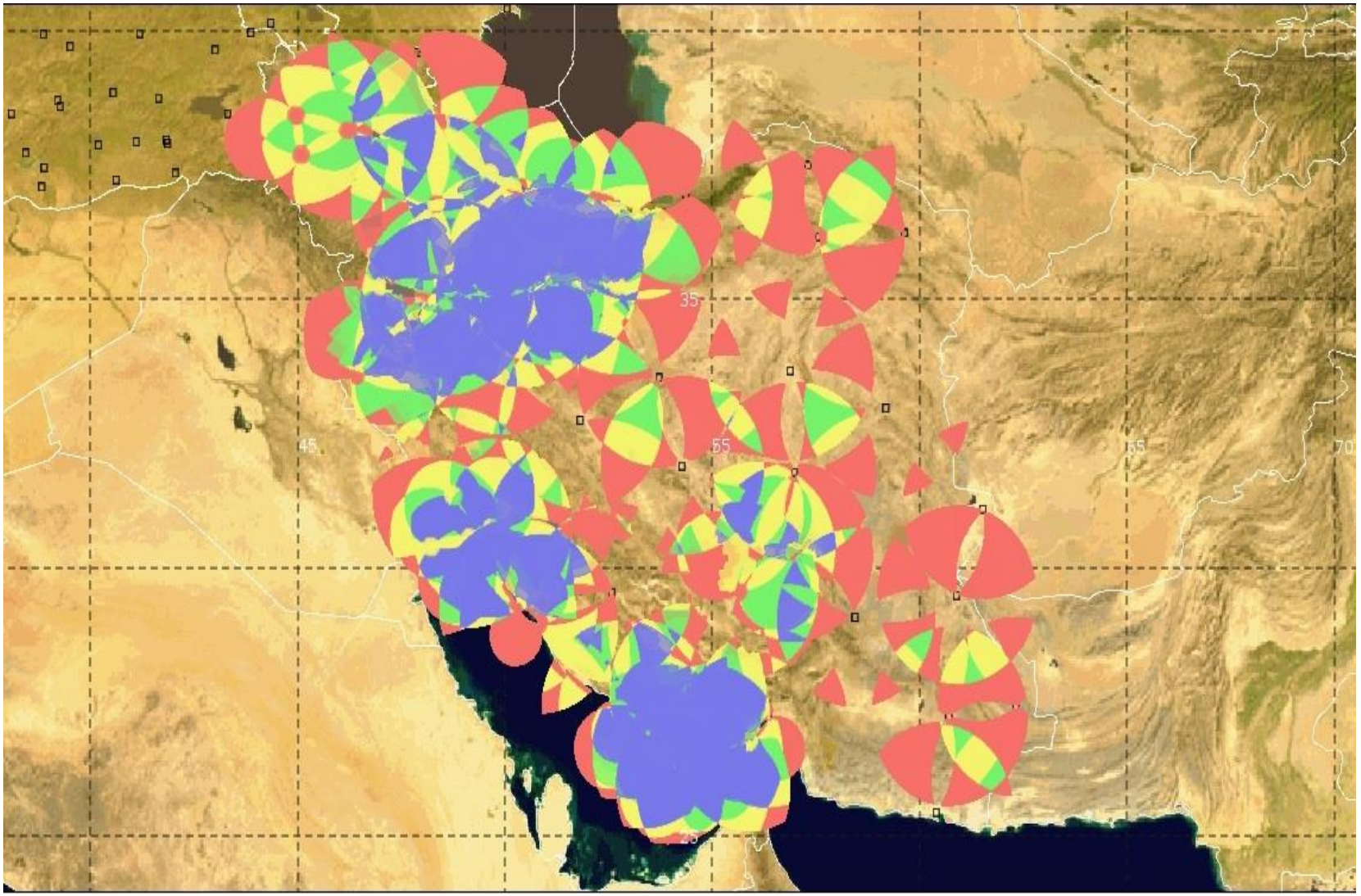
DME Coverage – 16000 FT



DME Coverage – 28000 FT



DME/DME Coverage Assessment



APTA Implementation Plan

Implementation Steps	Applicability	Performance Indicators/Metrics	Milestone	Targets	Status	Responsible Body	Remarks
LNAV/VNAV Flight Procedure	**OIIE 29R OIII 29L OIKJ OIZH OINN OIKQ**	Number of runway ends at International aerodromes with RNAV(GNSS) Approach Procedure (LNAV/VNAV)	**Publication of LNAV/VNAV Procedure in AIP**	**100% by DEC.2018**	**29R OIIE, OIKJ, OIZH, OIKQ and 29L OIII are Completed**	**IAC**	
	OIMM OIFM OITT OISS OIYY OIKB						
PBN PLAN	**FIR**	**-**	**Submission to ICAO MID**	**Completed**	**PBN Plan Developed and approved Completed**	**CAO**	**Fleet Assessment in progress**
WGS84	**FIR**	**Number of critical Points Coordination**	**Publication of Coordinates in AIP tables**	**Completed**	**Completed**	**IAC**	**Resurvey in progress**
Training of ATCOs	**ATC relevant staffs**	**-**	**Training courses and workshops**	**100% by Dec. 2018**	OIII in progress Other Airports will be planned	**IAC**	

CCO & CDO TEHRAN TMA Implementation Plan

Tehran TMA	Item Name	Start Date	Due Date	Point of Contact	Status
Plan	Conceptual design	Oct. 2015	Oct. 2015	Procedure Design	Done
	Stakeholder review	Oct. 2015	Nov. 2015	Procedure Design, ATC and Pilot	Done
Design	Final design (apply criteria)	Nov. 2015	Jan. 2018	Procedure Design	Done
Validation	Desktop simulation (ground validation)	Dec. 2017	Dec. 2017	Procedure Design	Done
	ATC simulator evaluation (Flight track/RADAR track)	Feb. 2018	Mar. 2018	ATC	In progress
	Flight validation	Jun. 2017	Aug 2018	Flight Inspection	-
Implementation	Procedure Publication	Sep 2018	8 Nov 2018	AIM	-

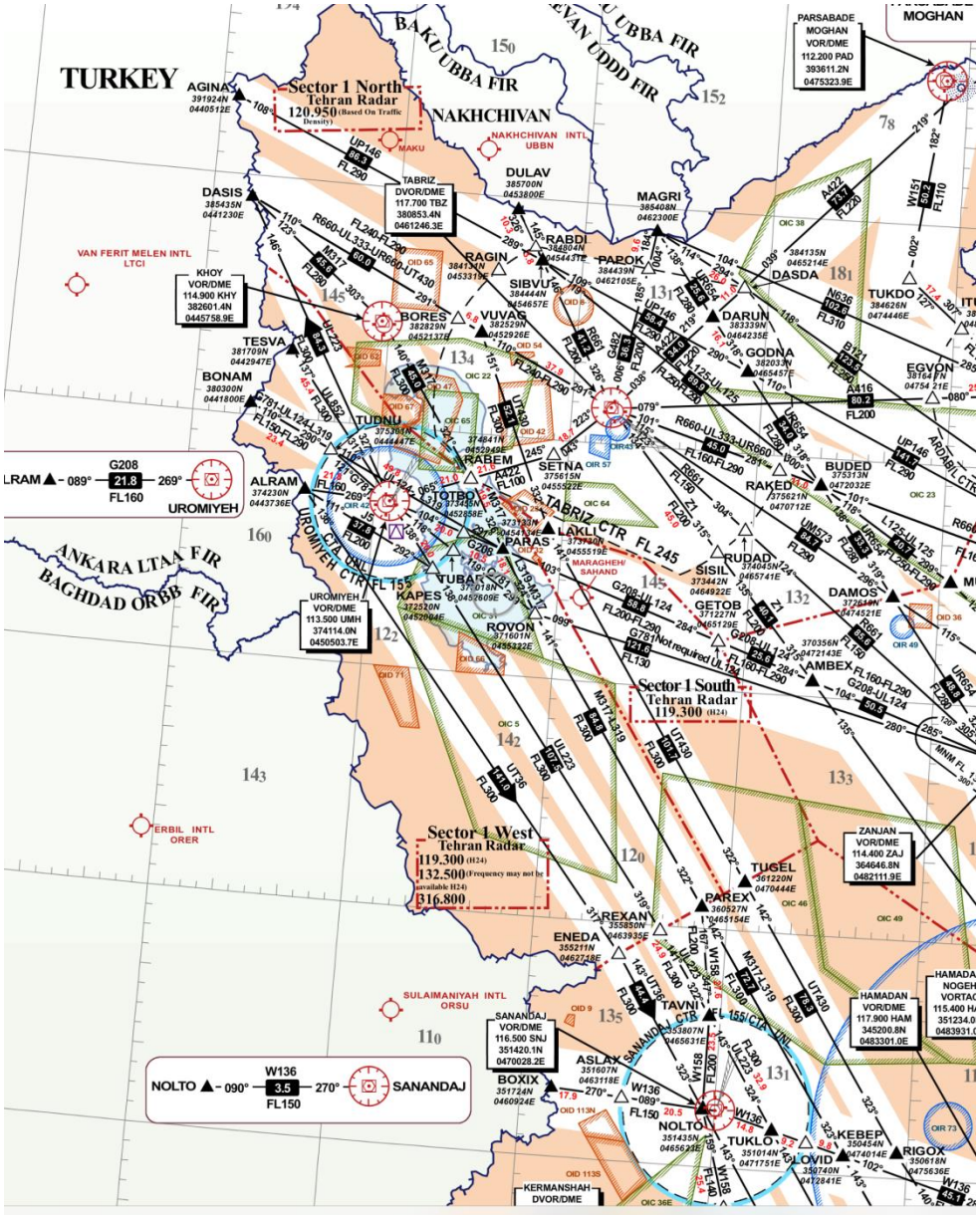
CCO & CDO Int'l airports Implementation Plan

Mashhad, Isfahan, Shiraz, Bandar Abbas TMAs Zahedan, Tabriz and Yazd CTRs	Item Name	Start Date	Due Date	Point of Contact	Status
Plan	Conceptual design	Oct. 2015	Oct. 2015	Procedure Design	Done
	Stakeholder review	Oct. 2015	Nov. 2015	Procedure Design, ATC and Pilot	Done
Design	Final design (apply criteria)	Nov. 2015	Dec. 2018	Procedure Design	In progress
Validation	Desktop simulation (ground validation)	Dec 2018	Mar. 2019	Procedure Design	Plan
	ATC simulator evaluation (Flight track/RADAR track)	Mar. 2019	Jul. 2019	ATC	Plan
	Flight validation	Jul. 2019	Dec 2019	Flight Inspection	Plan
Implementation	Procedure Publication	Nov 2019	Dec 2019	AIM	Plan

Enroute

- **RNAV 5**
- **48** RNAV 5 ATS Routes

- **RNAV 1**
- **7** RNAV 1 ATS Route



Status of Implementation

RWY Ends	ILS / CAT	LNAV	LNAV/ VNAV	LPV	RNP AR	RNAV SID	RNAV STAR
TEHRAN/IKA 29R & 11L	CAT I & II	LNAV	LNAV/VNAV				5 RWY 29R
TEHRAN/MEHRABAD 29L	CAT I		(RNP ILS) RWY 29L				
MASHHAD 31R	CAT I	Designed RWY 13	Designed RWY 31			Designed	Designed
BANDAR ABBAS 21L	CAT I	Designed RWY 03	Designed RWY 21			Designed	Designed
SHIRAZ 29L	CAT I	Designed RWY 11	Designed RWY 29			Designed	Designed
ESFEHAN 26R	CAT I	Designed RWY 08	Designed RWY 26			Designed	Designed

Status of Implementation

RWY Ends	ILS / CAT	LNAV	LNAV/ VNAV	LPV	RNP AR	RNP SID	RNP STAR
ZAHEDAN 35L	CAT I	LNAV 35L & 17R	LNAV/ VNAV 35L				8 RWY 35L 8 RWY 17R
Rasht	CAT I	LNAV 09	LNAV/ VNAV 27			Designed	Designed
Yazd 31	CAT I	LNAV 13	LNAV/ VNAV 31				RWY 13 RWY 31
JIROFT 31	-	LNAV				2 RWY 31	2 RWY 31
Nowshahr 28		Designed				Designed	Designed
Qeshm Iland		Designed				Designed	Designed

Mid Term (2018 – 2023)

Phase of Flight	Navigation Specification	Places
En - route	RNAV5 & RNAV1	Tehran FIR (At or Above FL 200)
TMA	RNAV1 in Surveillance Environments RNP1 in Non- Surveillance Environments	Domestic Airports
Approach	RNP APCH with Baro-VNAV	Domestic Airports
	In case of operational benefits, commencement of RNP AR study phase	Int. Airports

Long Term (2023 – 2028)

- **Enroute**:

  RNAV 1 at or above FL160
- **TMA**:

  Fully completed
- **Approach**:

  GLS for Int. Airports

Lessons Learned

Airlines: must be familiar with PBN Procedures and its benefits

Procedure Designers: Get more experience to PBN procedures

Managers: must be informed to benefits of PBN Implementation

Training

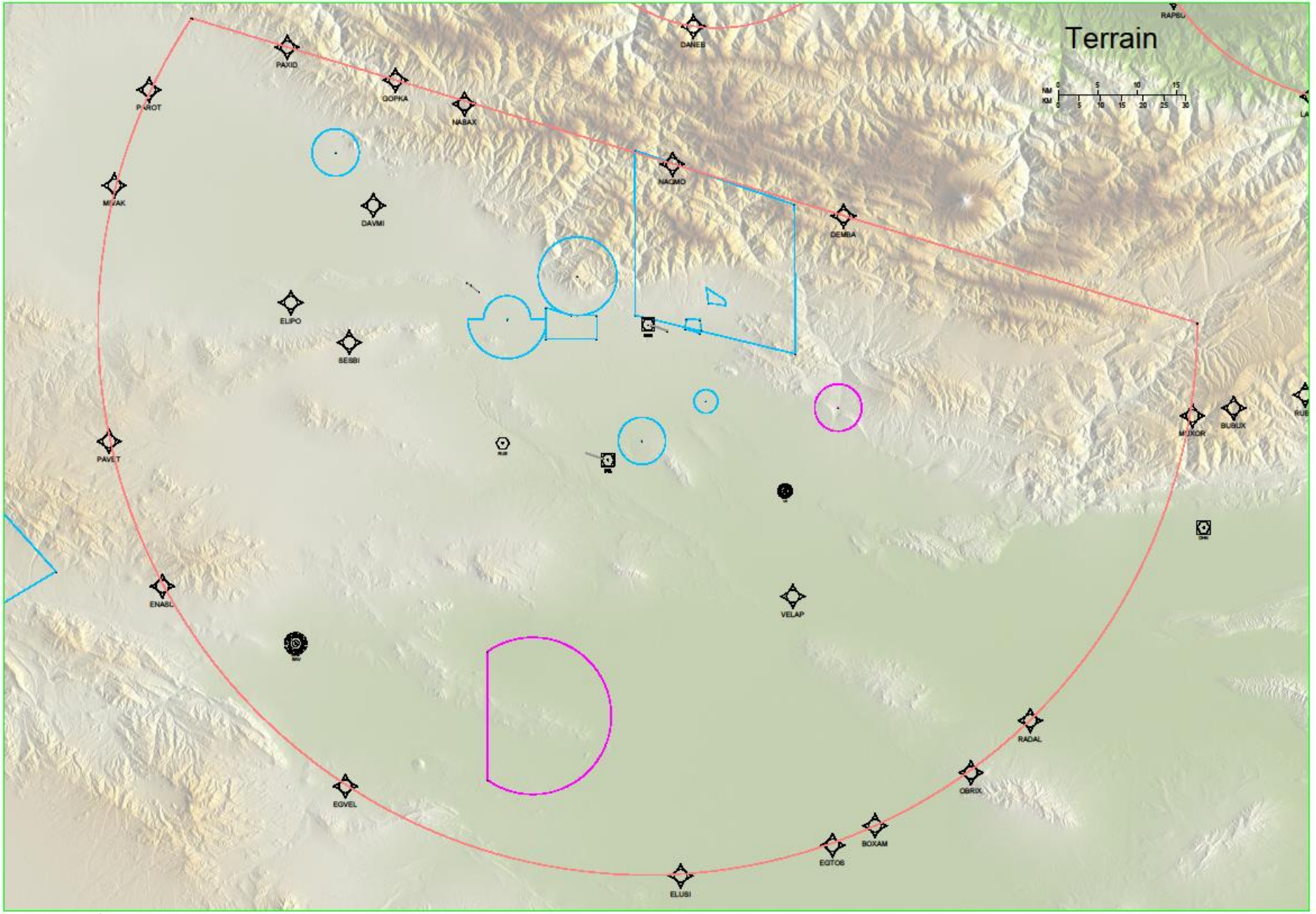
- **ATC**: In Progress
- **Procedure Designers**: 3 officers were trained in SAA and 4 persons are in progress

Challenges

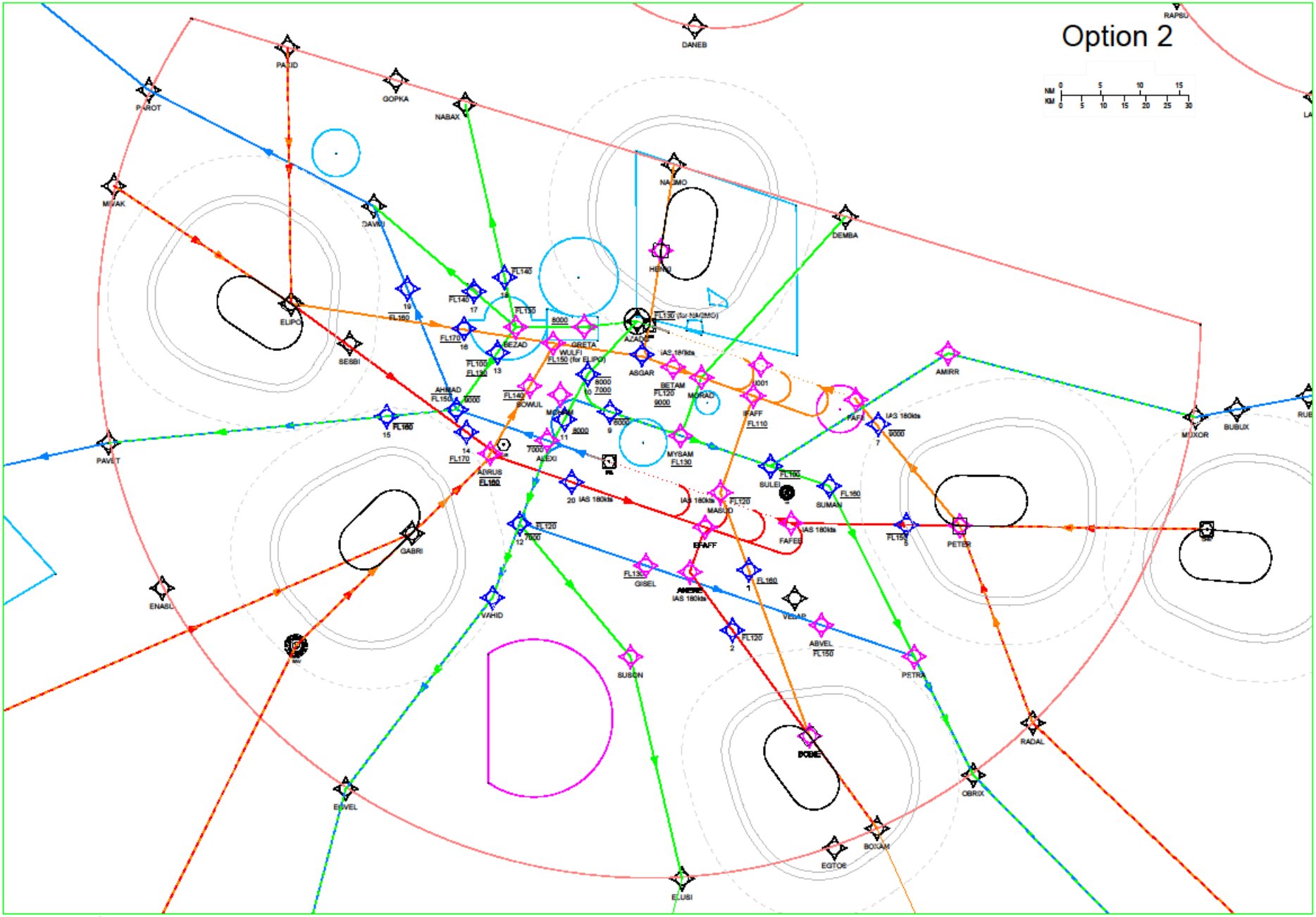
- Data gathering
- Data validation
- Flight Validation
- Shortage of PANS OPS and Airspace planners experts
- Military coordination

Thoughts/Recommendations

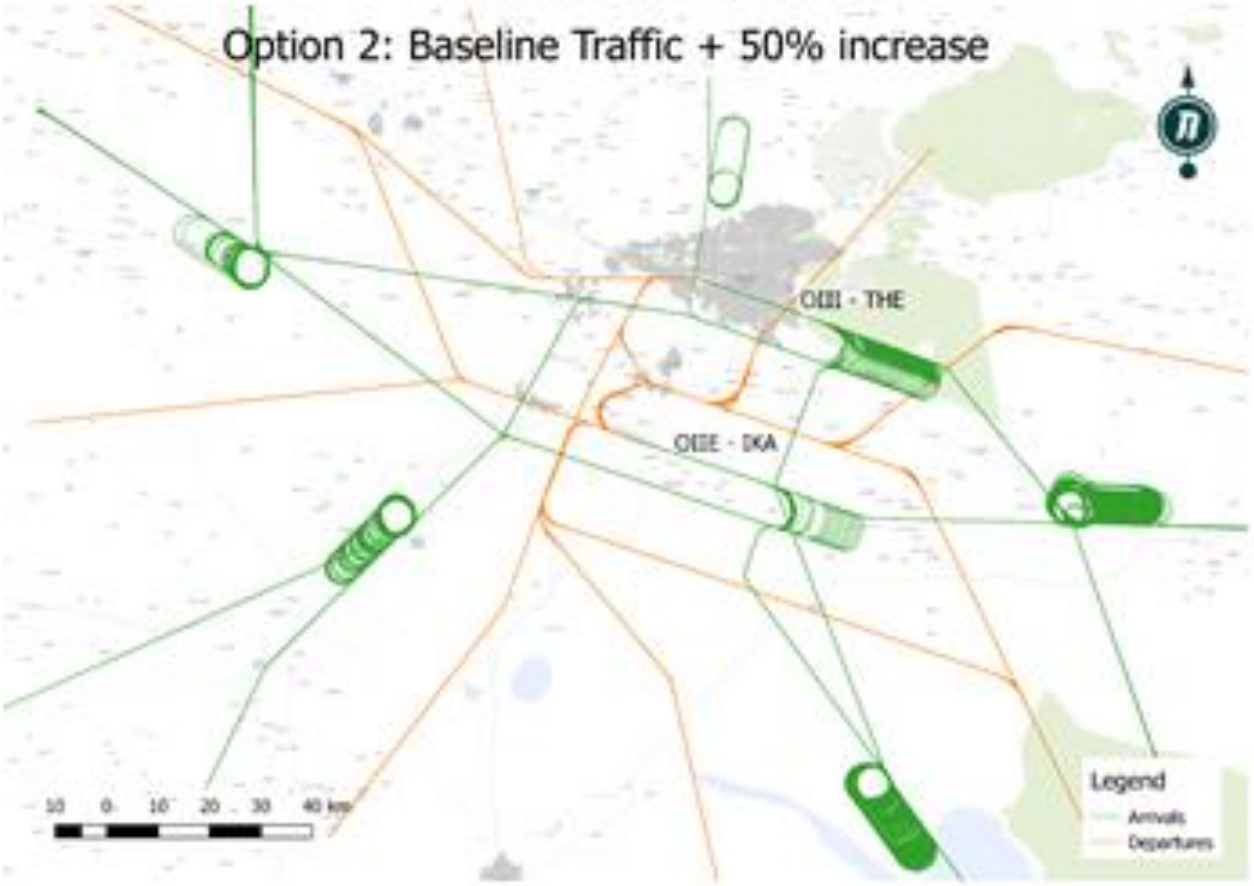
Redesign TEHRAN TMA



New RNAV TEHRAN TMA design (STARs/SIDs)



All tracks


Option 2: Baseline Traffic + 50% increase
OEII - THE
OEIE - DKA
10 0 10 20 30 40 km
Legend
Arrivals
Departures

Run of option 2 with 50% added traffic

Option 2:

When separation was<5*NM*: 54 conflicts

When separation was<4*NM*: 17 conflicts

When separation was<3*NM*: 0 conflicts

The remaining conflicts are between departures, faster aircraft overtaking slower ones on the same route
Controllers will have to solve such a conflict.

Summary

- Baseline
  <5NM 377 conflicts; <4NM 265 conflicts; <3NM 152 conflicts

- Opt2
  <5NM 25conflicts; <4NM 7 conflicts; <3NM 0 conflicts

Opt2 + 50%
<5NM 54 conflicts; <4NM 17 conflicts; <3NM 0 conflicts

Opt2 +50% + overlapping peaks
<5NM 54 conflicts; <4NM 20 conflicts; <3NM 0 conflicts

Comparison of number of current SIDs and STARs to the new design situation:

CURRENT:

OIII - Mehrabad
STARS: 30
SIDs : 27 + Mehrabad 1A and 1B

OIIE - Imam Khomaini
STARs: 15 + 4 RNAV
SIDs: 27 + IKA 1A and 1B

NEW DESIGN:

OIII - Mehrabad
STARs: 10 (all RNAV)
SIDs: 16 (all RNAV)

OIIE - Imam Khomaini
STARs: 8 (all RNAV)
SIDs: 10 (all RNAV)


Thank
you