

# Airport Design Stages

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- Introduction
- Stage I. Airport Site Evaluation and Selection
- Stage II. The Chosen Site Inspection
- Stage III. Schematic Design Stage
- Stage IV. Detailed Design Stage

# Introduction

This presentation is to highlight the Design stages for The Airport According to ICAO Standards

# Stage I. Airport Site Evaluation and Selection

# Stage I. Airport Site Evaluation and Selection

**Broad  
Assessment  
of the Land  
Area  
Required**

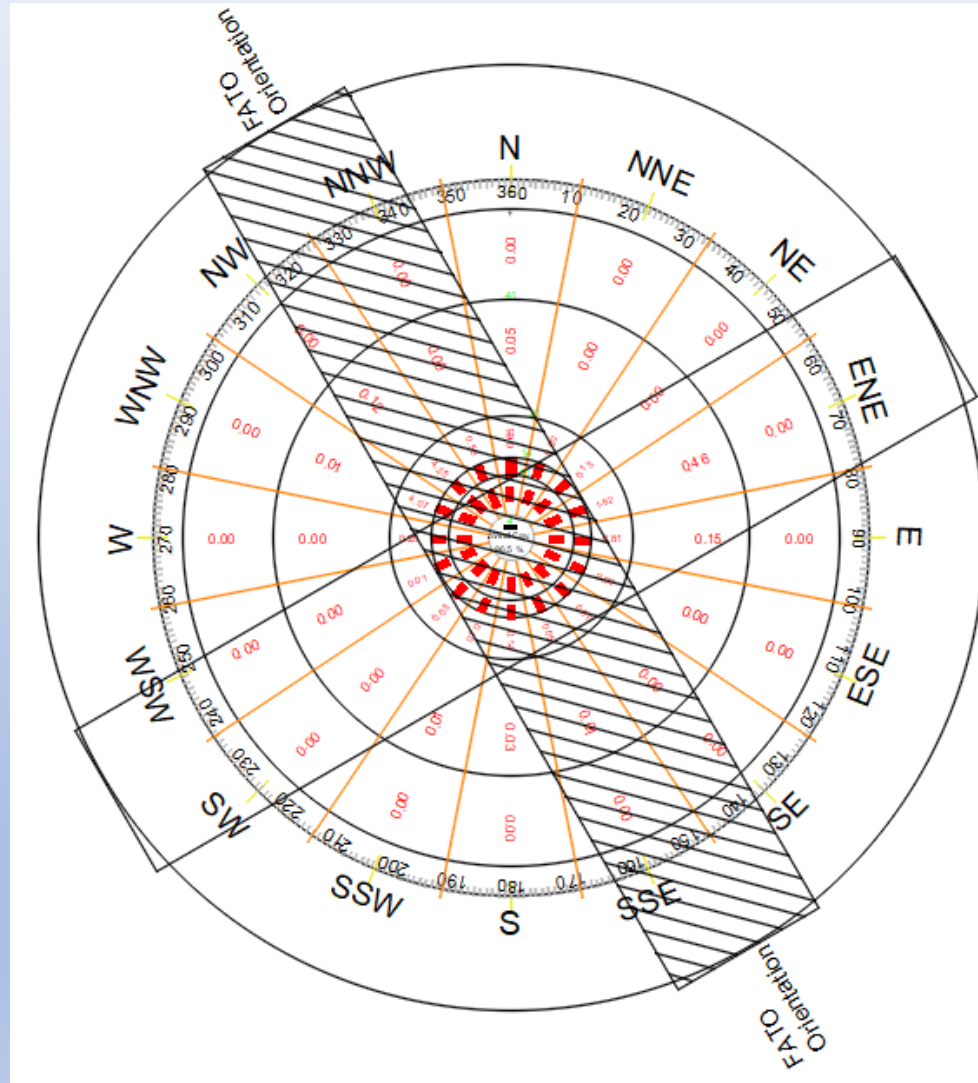
**Runway Length**

**Runway Orientation**

**Number of Runways**

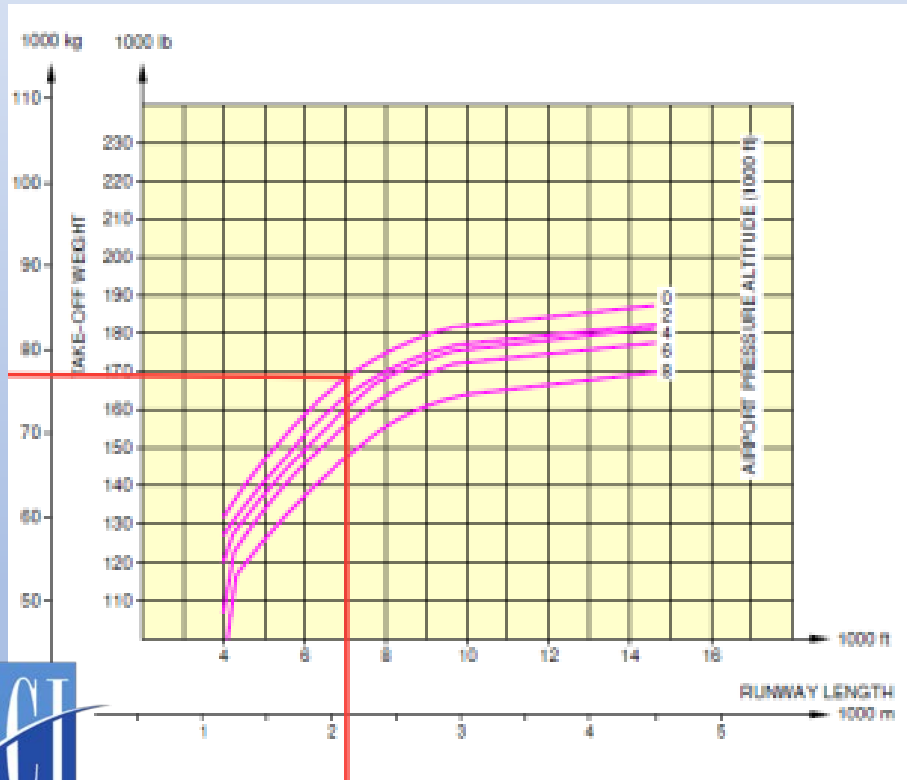
# Stage I. Airport Site Evaluation and Selection

## Runway Orientation



# Stage I. Airport Site Evaluation and Selection

## Runway Length



Ref.	Aircraft Type	MTOW (tonnes)	Source of Aircraft Data	Reference Field Length (metres)	Corrected for Elevation + Temperature + Slope (metres)	Source of Aircraft Data	Reference Field Length (metres)	Corrected for Elevation + Temperature + Slope (metres)
1	A320-200	77	Aircraft manual	2,200	2,394	ICAO 9981	2025	2,516
2	A320neo	79	Aircraft manual	2,000	2,176	Not in ICAO 9981		
3	A321-100	89	Aircraft manual	2,300	2,502	Not in ICAO 9981		
4	A321-200	93.5	Aircraft manual	2,700	2,938	ICAO 9981	2533	3,147
5	A321neo	97	Aircraft manual	2,600	2,829	Not in ICAO 9981		
6	B737-100	50	Aircraft manual	2,600	2,829	Not in ICAO 9981		
7	B737-200	58	Aircraft manual	2,750	2,992	ICAO 9981	2295	2,852
8	B737-200 advanced	58	Aircraft manual	2,800	3,046	Not in ICAO 9981		
9	B737-300	63	Aircraft manual	3,250	3,536	ICAO 9981	2170	2,696
10	B737-400	68	Aircraft manual	2,700	2,938	ICAO 9981	2550	3,168
11	B737-500	60.5	Aircraft manual	2,700	2,938	ICAO 9981	2470	3,069
12	B737-600	65	Aircraft manual	2,300	2,502	ICAO 9981	1690	2,100
13	B737-700	70	Aircraft manual	3,100	3,373	ICAO 9981	1600	1,988
14	B737-800	79	Aircraft manual	2,500	2,720	ICAO 9981	2090	2,597
15	B737-900	79	Aircraft manual	3,000	3,264	ICAO 9981	2240	2,783
16	B737-900ER	85	Aircraft manual	3,300	3,590	ICAO 9981	2470	3,069
17	A330-300	233	Aircraft manual	3,000	3,264	ICAO 9981	2490	3,094
18	B787-800	228	Aircraft manual	3,300	3,590	ICAO 9981	2660	3,305
19	B787-900	253	Aircraft manual	3,100	3,373	Not in ICAO 9981		
20	B747-400	397	Aircraft manual	3,400	3,584	ICAO 9981	3048	3,787
21	B747-800	442	Aircraft manual	3,200	3,482	ICAO 9981	3070	3,815
22	A380-800	560	Aircraft manual	3,000	3,264	ICAO 9981	2779	3,453
23	B777-300ER	352	Aircraft manual	3,250	3,536	ICAO 9981	3060	3,802
24	A350-900	280	Aircraft manual	3,000	3,264	Not in ICAO 9981		

# Stage I. Airport Site Evaluation and Selection

Evaluation  
of Factors  
Affecting  
Airport  
Location

Aviation Activity  
Determination

Atmospheric Conditions  
(Wind usability-Visibility)

Topo/Manmade Survey

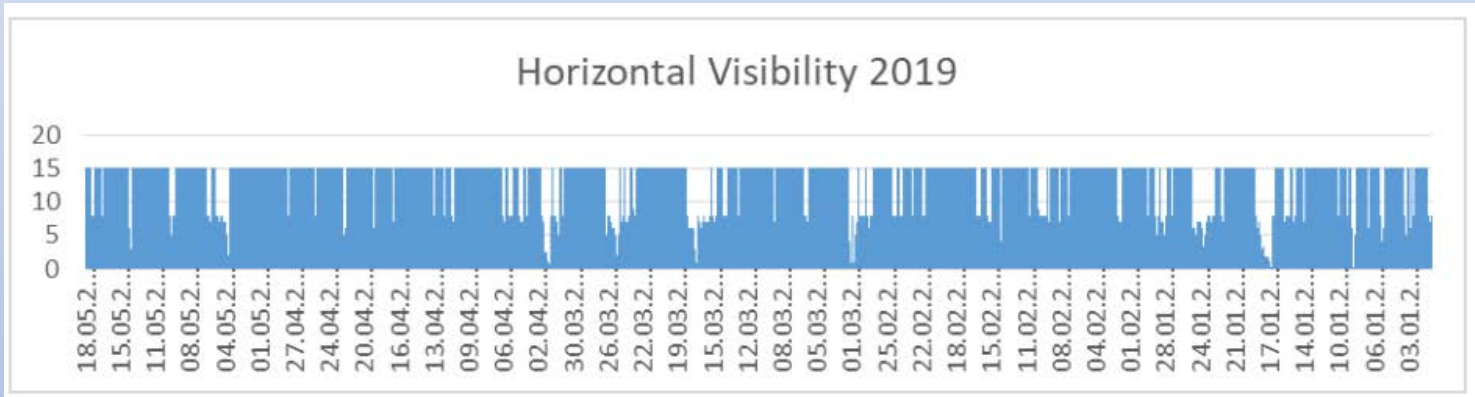
Environmental Impact

Presence of other near airports



# Stage I. Airport Site Evaluation and Selection

## Visibility




- Observations to be considered because of ceiling conditions
- Observations to be considered because of visibility conditions
- Observations to be considered because of ceiling and visibility conditions

All wind directions		Visibility - Metres						Total Observations :		270388
Ceiling group in metres	Velocity groups in km	0-400	400-800	800-1200	1200-1600	1600-2400	2400-4800	4800+	Total Obs. (1 Min obs)	
271 to 300	1-7						10	205	215	
	8-15						5	80	85	
	16-23						5	45	50	
	24-47								0	
	48+								0	
<b>271 to 300 Total</b>		0	0	0	0	0	20	330	350	
181 to 270	1-7						5	1290	1295	
	8-15						5	475	480	
	16-23						25	210	235	
	24-47			5				10	15	
	48+								0	
<b>181 to 270 Total</b>		0	0	5	0	0	35	1985	2025	
151 to 180	1-7						5	625	630	
	8-15							225	225	
	16-23							85	85	
	24-47						5		5	
	48+								0	
<b>151 to 180 Total</b>		0	0	0	0	5	5	935	940	
121 to 150	1-7						15	835	850	
	8-15							235	235	
	16-23							115	115	
	24-47			5				5	10	
	48+								0	
<b>121 to 150 Total</b>		0	0	5	0	0	20	1185	1210	
91 to 120	1-7						20	1125	1145	
	8-15							455	455	
	16-23						20	265	285	
	24-47							15	25	
	48+								0	
<b>91 to 120 Total</b>		0	0	0	0	0	50	1860	1910	
61 to 90	1-7						60	915	980	
	8-15							490	490	
	16-23						10	240	250	
	24-47		5	10	5		5	5	30	
	48+								0	
<b>61 to 90 Total</b>		5	5	10	5	0	75	1650	1750	
31 to 60	1-7						10	625	635	
	8-15							385	385	
	16-23				10	10	25	510	555	
	24-47		10	25	15		10	10	70	
	48+								0	
<b>31 to 60 Total</b>		0	10	25	25	10	45	1530	1645	
30 or less	1-7						15	175	190	
	8-15							80	80	
	16-23						10	40	50	
	24-47				10			10	20	
	48+								0	
<b>&lt;=30 Total</b>		0	0	0	10	0	25	305	340	
<b>Observation to be considered</b>				20	5	5	205	7615	7850	
<b>Grand Total</b>		5	15	45	40	15	275	9780	10175	



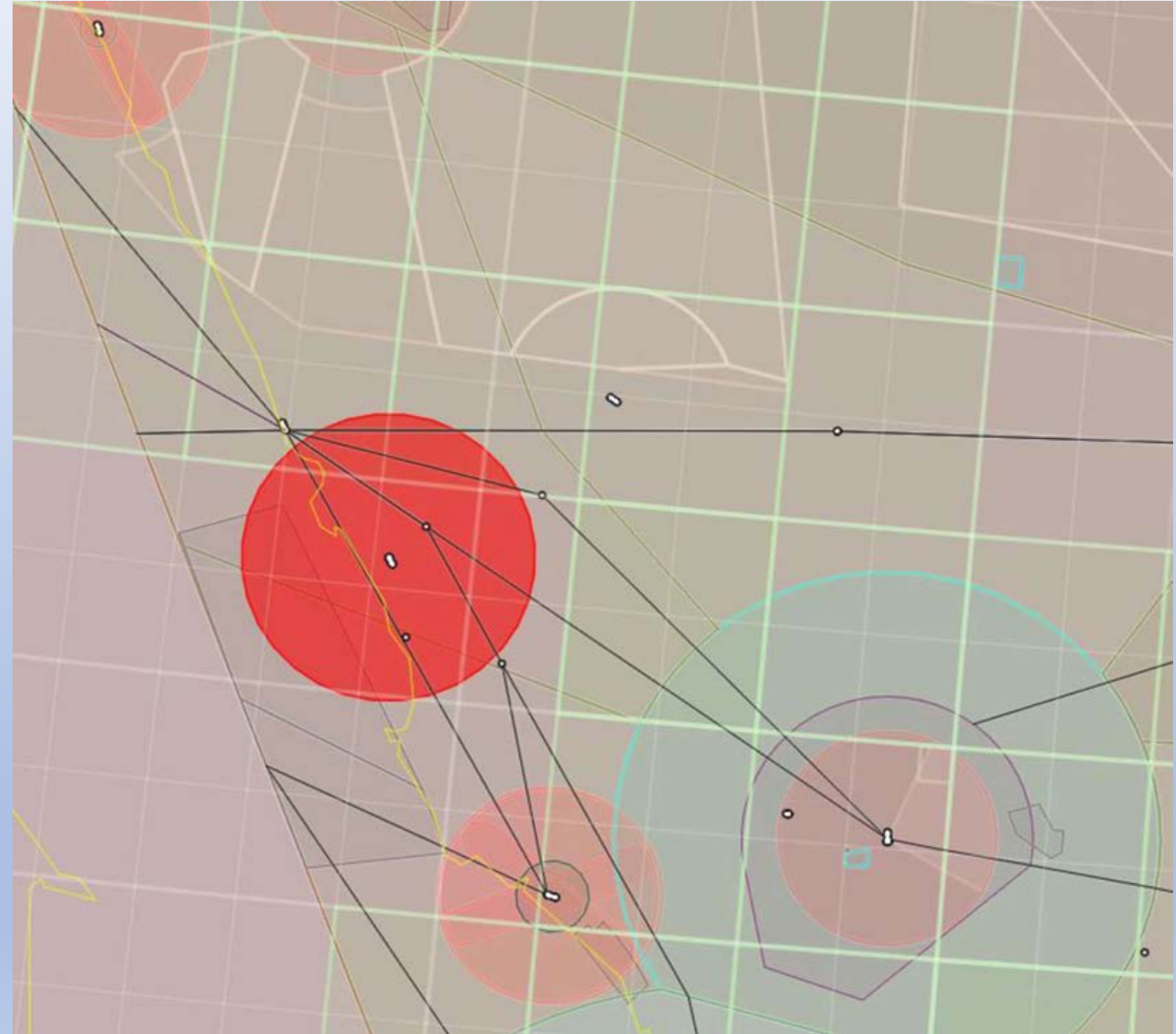
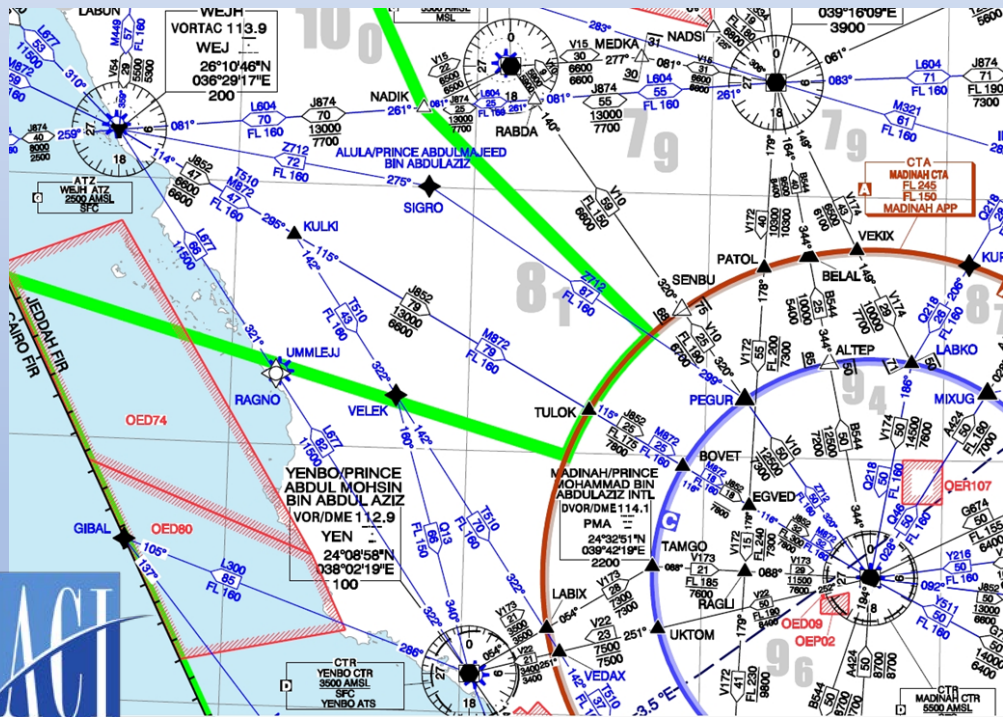
# Stage I. Airport Site Evaluation and Selection

## Topo/Manmade Survey

Ground Control Points		
Project:	RED SEA AIRPORT	Location: Between Umluj And Al Wajh Cities
Client: The Red Sea Development Company	Data Originator:	Site Name: Red Sea Airport
Country: Kingdom of Saudi Arabia	GCP ID: OEXX-B-2020	Date of Monumentation: 28-Feb-2020 Date of Survey: 28-Feb-2020 Method of Survey: GPS Static
WGS84 COORDINATES Latitude: 25°38'46.0658"N Longitude: 37°04'43.7396"E Ellip. Height: 51.828 m		UTM COORDINATES Easting: 307137.308 Northing: 2837895.679 Elevation(MSL): 40.738 m
WGS84 DATUM PARAMETERS Horizontal Datum : WGS84 Ellipsoid : WGS84 Semi-Major Axis (a): 6,378,137 m Flattening (1/f) : 1/298.257223563		UTM GRID PROPERTIES Projection Type: Universal Transverse Mercator Grid Zone : 37 North Central Longitude: 39 deg. E Central latitude: 0 deg. N False Easting: 500,000 E False Northing: 0 N Scale Factor at Origin: 0.9996 Geoid Model: EGM96 Vertical Datum: MSL
VERTICAL DATUM Vertical Datum : Mean Sea Level		
Description of Monument:	12 cm dia. stainless steel rod on 50cm x 50cm x 50cm concrete monument	
Photos		

# Stage I. Airport Site Evaluation and Selection

## Investigating Near Airports



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 **UNITED ATS**  
COMMITTED TO AVIATION EXCELLENCE

# Stage I. Airport Site Evaluation and Selection

## Environmental Impact



# Stage II. The Chosen Site Inspection

# Stage II. The Chosen Site Inspection

Airspace

NAVAIDs

Obstacles

Hazards

# Stage II. The Chosen Site Inspection

## NAVAIDS

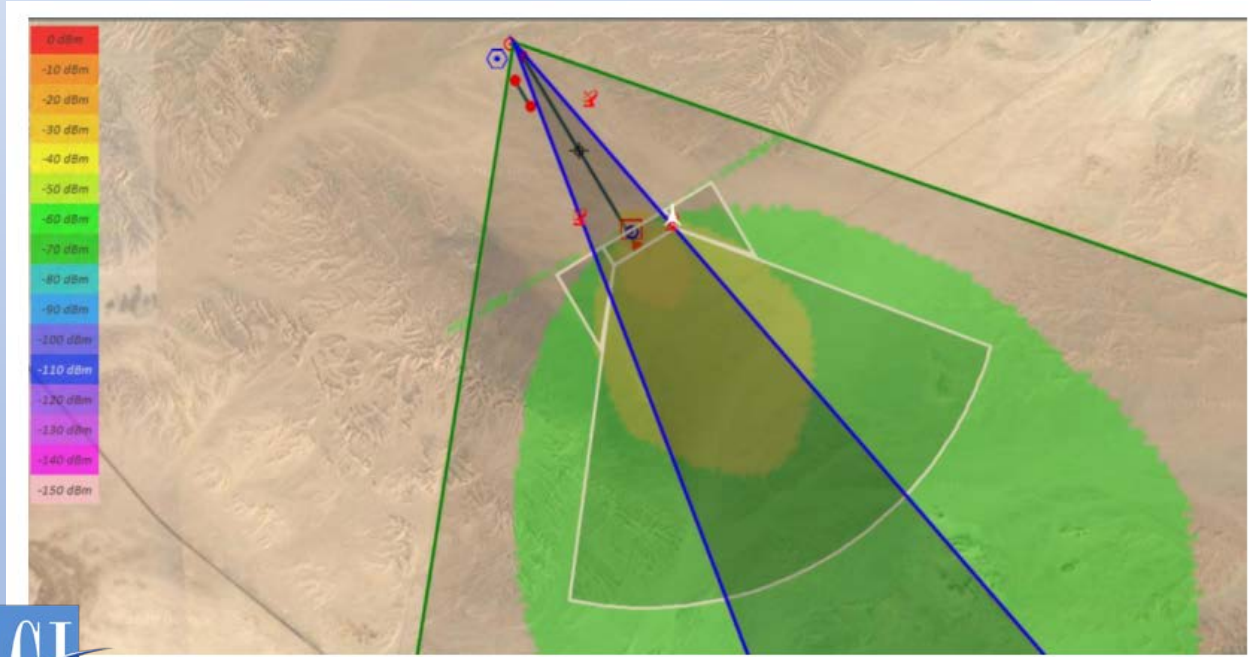
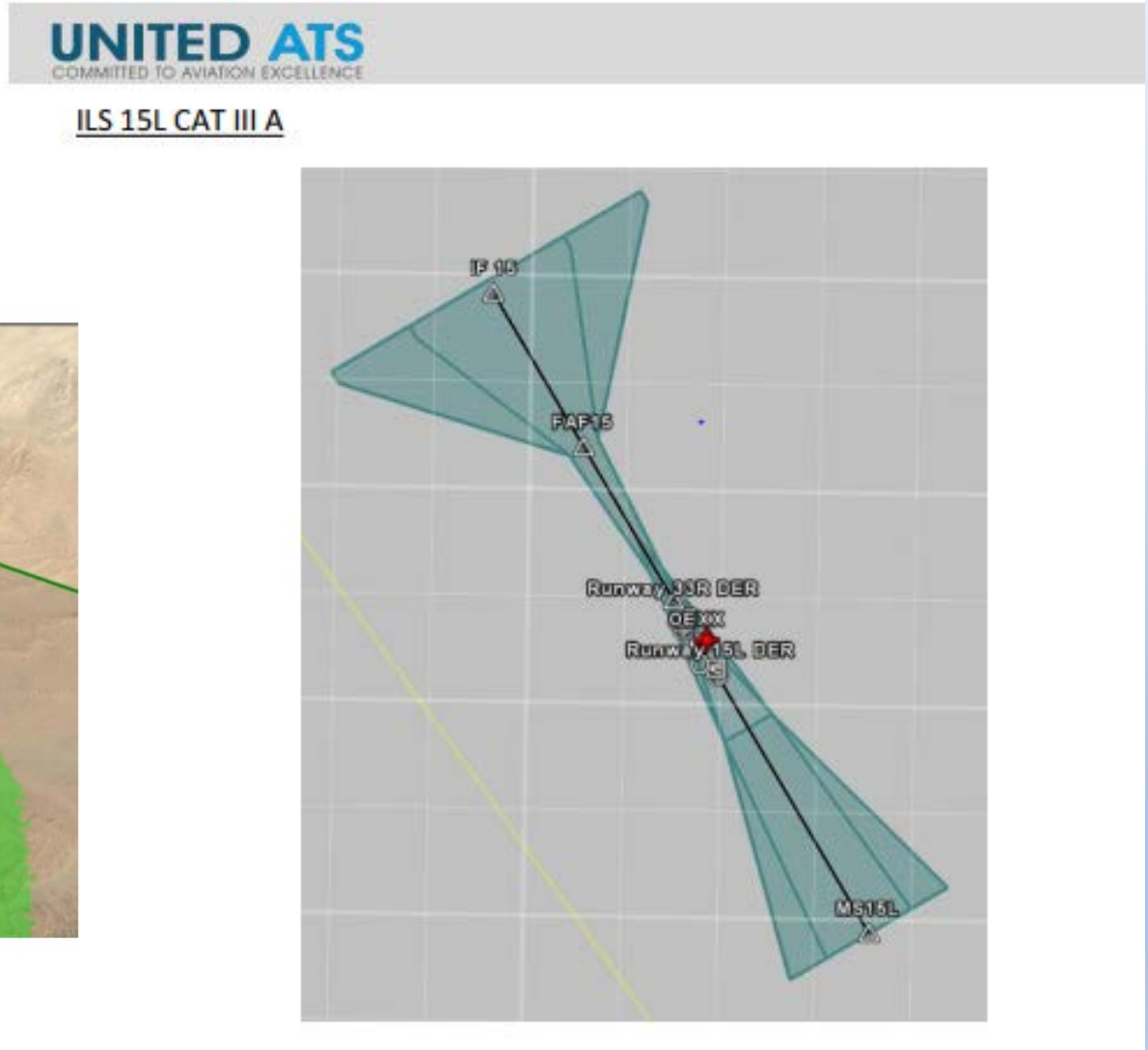


Figure - 2 Effect of Radar location on the Signal Propagation of DME 33R



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# Stage II. The Chosen Site Inspection

## Obstacles

### ➤ Obstacles Penetrated Inner Horizontal Surface

#	Name	Latitude	Longitude	Obs. alt (M)	Surface alt (M)	Penetrated (M)	Type
1	OEXX_0017	25 39 34.60N	37 02 53.81E	101.82	86.75	15.07	Pylon
2	OEXX_0018	25 39 23.65N	37 03 01.51E	99.45	86.75	12.7	Pylon
3	OEXX_0019	25 39 12.56N	37 03 09.32E	99	86.75	12.25	Pylon
4	OEXX_0020	25 39 01.33N	37 03 17.21E	97.96	86.75	11.21	Pylon
5	OEXX_0021	25 38 50.82N	37 03 24.66E	93.69	86.75	6.94	Pylon
6	OEXX_0022	25 38 40.06N	37 03 32.18E	98.69	86.75	11.94	Pylon
7	OEXX_0023	25 38 28.86N	37 03 40.07E	97.47	86.75	10.72	Pylon
8	OEXX_0024	25 38 17.88N	37 03 47.77E	99.53	86.75	12.78	Pylon
9	OEXX_0025	25 38 06.94N	37 03 55.48E	100.51	86.75	13.76	Pylon
10	OEXX_0026	25 37 55.96N	37 04 03.18E	101.54	86.75	14.79	Pylon
11	OEXX_0027	25 37 45.01N	37 04 10.88E	101.73	86.75	14.98	Pylon
12	OEXX_0028	25 37 34.07N	37 04 18.59E	101.95	86.75	15.2	Pylon
13	OEXX_0029	25 37 23.09N	37 04 26.29E	104.06	86.75	17.31	Pylon
14	OEXX_0030	25 37 12.14N	37 04 34.00E	103.63	86.75	16.88	Pylon
15	OEXX_0031	25 37 01.16N	37 04 41.74E	105.58	86.75	18.83	Pylon
	OEXX_0032	25 36 50.22N	37 04 49.44E	104.17	86.75	17.42	Pylon
	OEXX_0033	25 36 39.24N	37 04 57.14E	106.78	86.75	20.03	Pylon
	OEXX_0034	25 36 28.30N	37 05 04.85E	106.31	86.75	19.56	Pylon
	OEXX_0035	25 36 17.32N	37 05 12.55E	106.8	86.75	20.05	Pylon



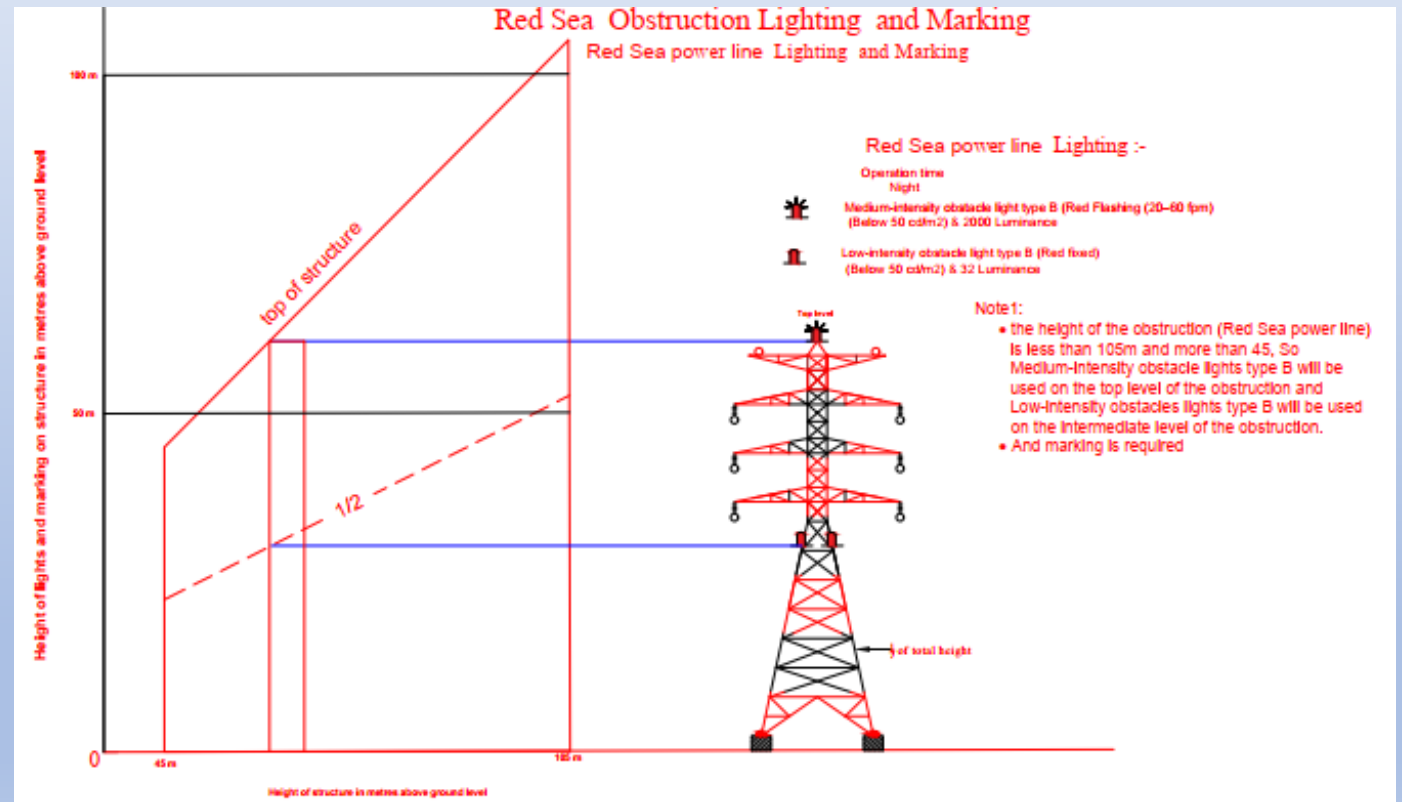


# Stage II. The Chosen Site Inspection

## Hazards

### Obstructions (geographic coordinates):

OBS ID	Latitude	Longitude	Aircraft Warning	Location Surface	Type
OEXX_0015	25 39 56.52N	37 02 38.37E	Marking and lighting	Conical	Pylon
OEXX_0016	25 39 45.56N	37 02 46.09E	Marking and lighting	Conical	Pylon
OEXX_0017	25 39 34.61N	37 02 53.80E	Marking and lighting	Inner Horizontal	Pylon
OEXX_0018	25 39 23.65N	37 03 01.51E	Marking and lighting	Inner Horizontal	Pylon
OEXX_0019	25 39 12.55N	37 03 09.32E	Marking and lighting	Inner Horizontal	Pylon
OEXX_0020	25 39 01.32N	37 03 17.22E	Marking and lighting	Inner Horizontal	Pylon
OEXX_0021	25 38 50.82N	37 03 24.65E	Marking and lighting	Inner Horizontal	Pylon
OEXX_0022	25 38 40.07N	37 03 32.19E	Marking and lighting	Inner Horizontal	Pylon
OEXX_0023	25 38 28.85N	37 03 40.06E	Marking and lighting	Inner Horizontal	Pylon
OEXX_0024	25 38 17.89N	37 03 47.77E	Marking and lighting	Inner Horizontal	Pylon
OEXX_0025	25 38 06.93N	37 03 55.48E	Marking and lighting	Inner Horizontal	Pylon
026	25 37 55.97N	37 04 03.19E	Marking and lighting	Inner Horizontal	Pylon
027	25 37 45.01N	37 04 10.89E	Marking and lighting	Inner Horizontal	Pylon
028	25 37 34.05N	37 04 18.60E	Marking and lighting	Inner Horizontal	Pylon



# Stage III. Schematic Design Stage

# Stage III. Schematic Design Stage

Obstacle  
Limitation  
Surfaces (OLS)

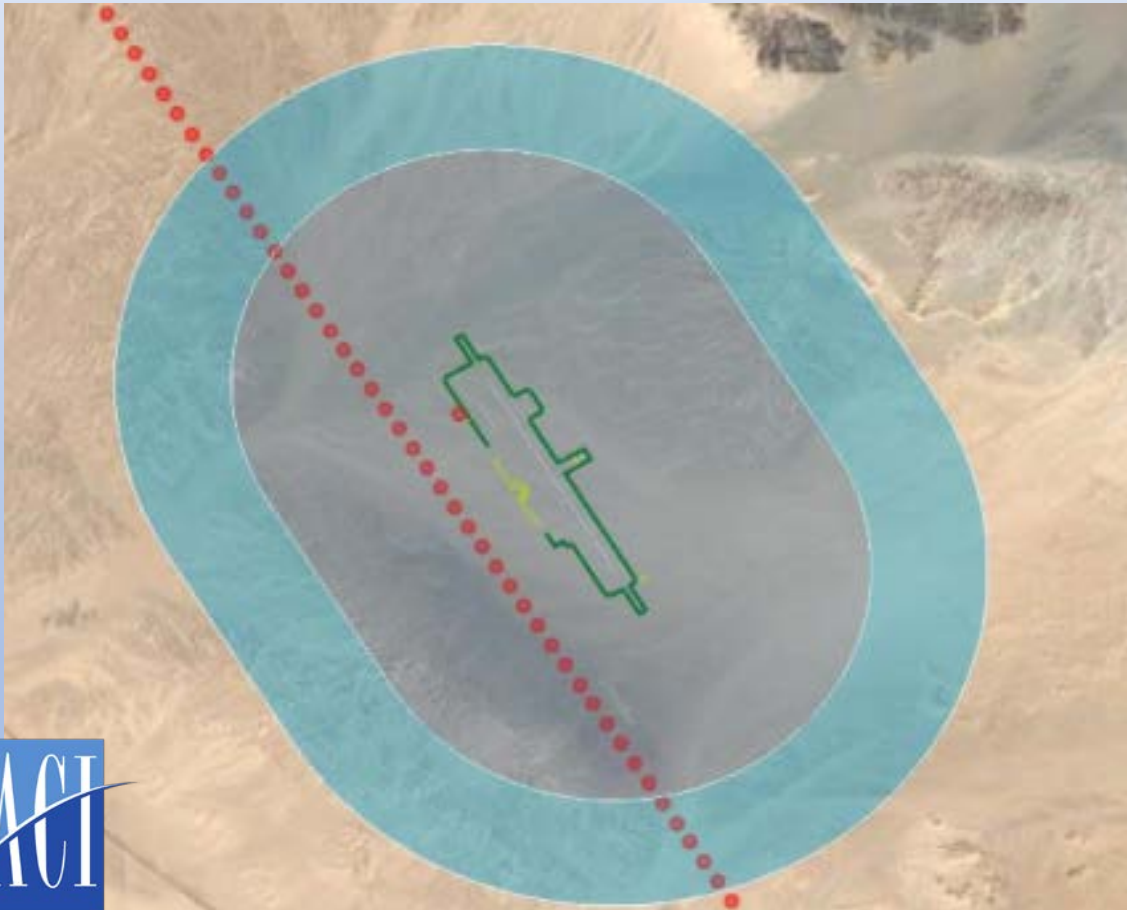
CNS Building  
Restricted  
Area (BRA)

Electro  
Magnetic  
Study (EMSS)

Conceptual  
Design-IFPD

# Stage III. Schematic Design Stage

## Obstacle limitation surfaces (OLS)



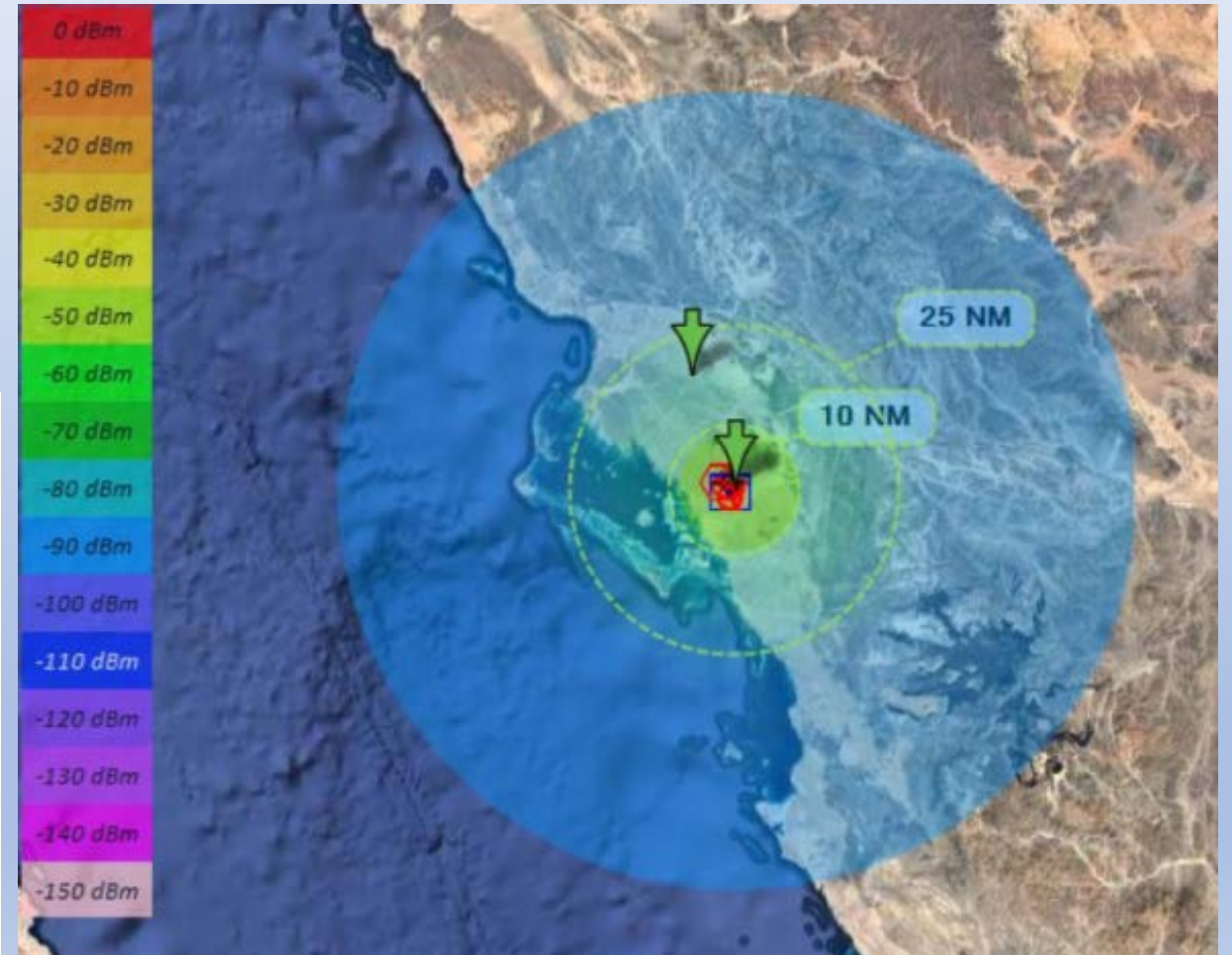
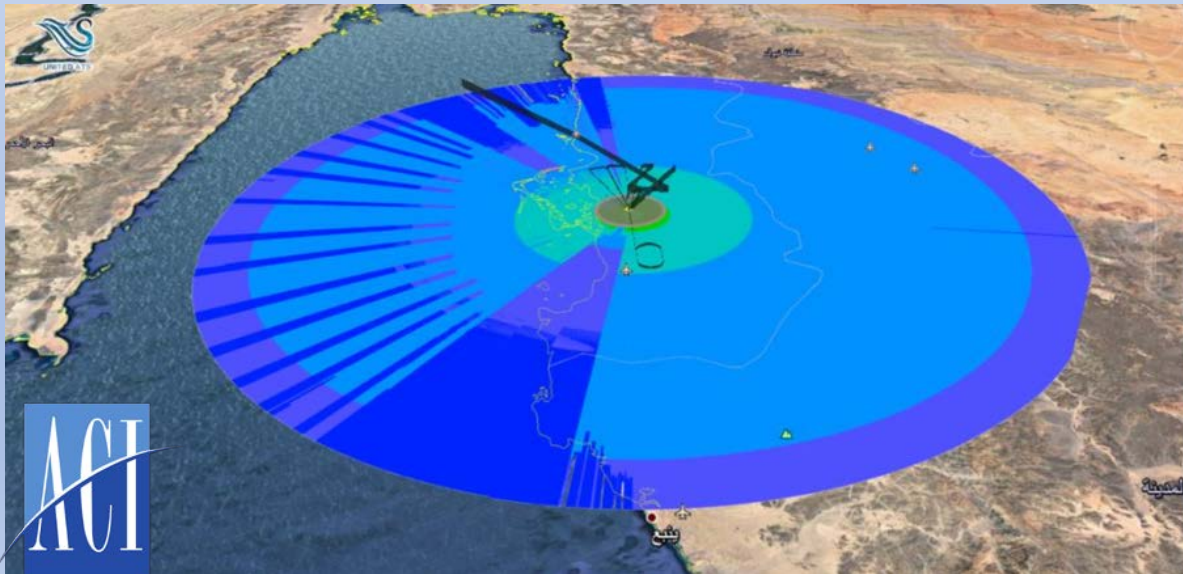
# Stage III. Schematic Design Stage

## CNS Building Restricted Area (BRA)



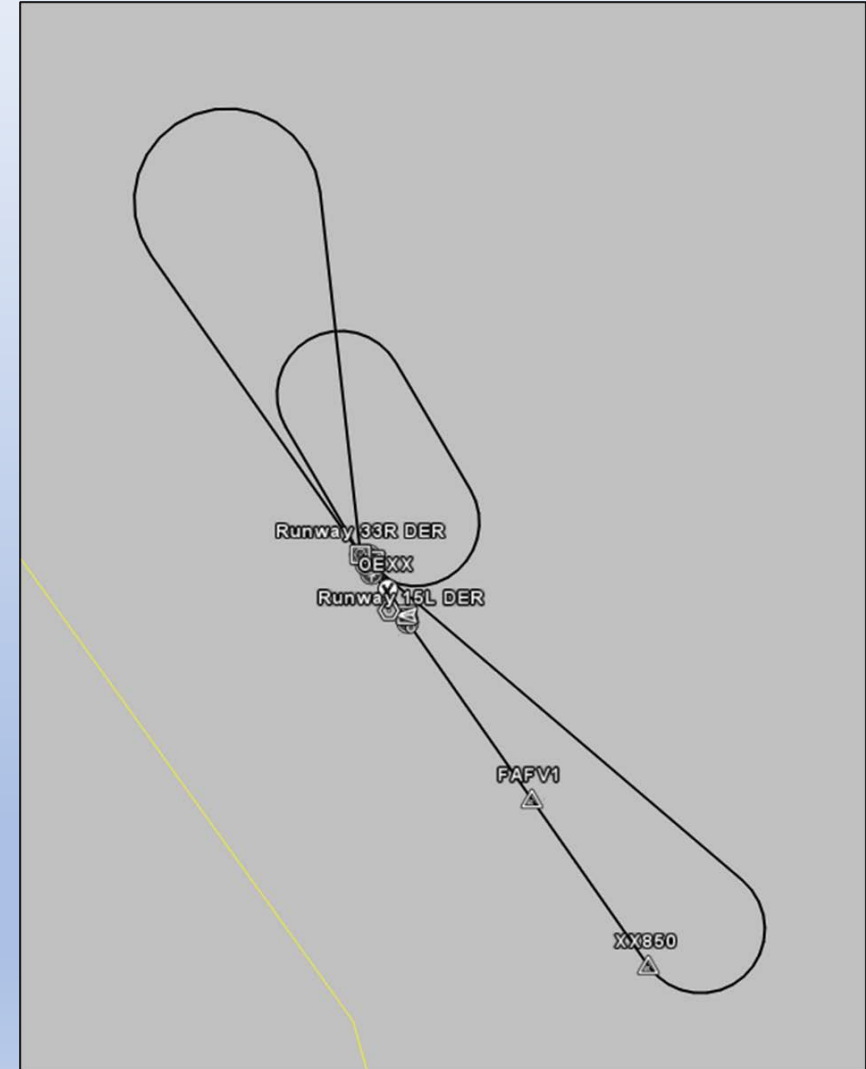
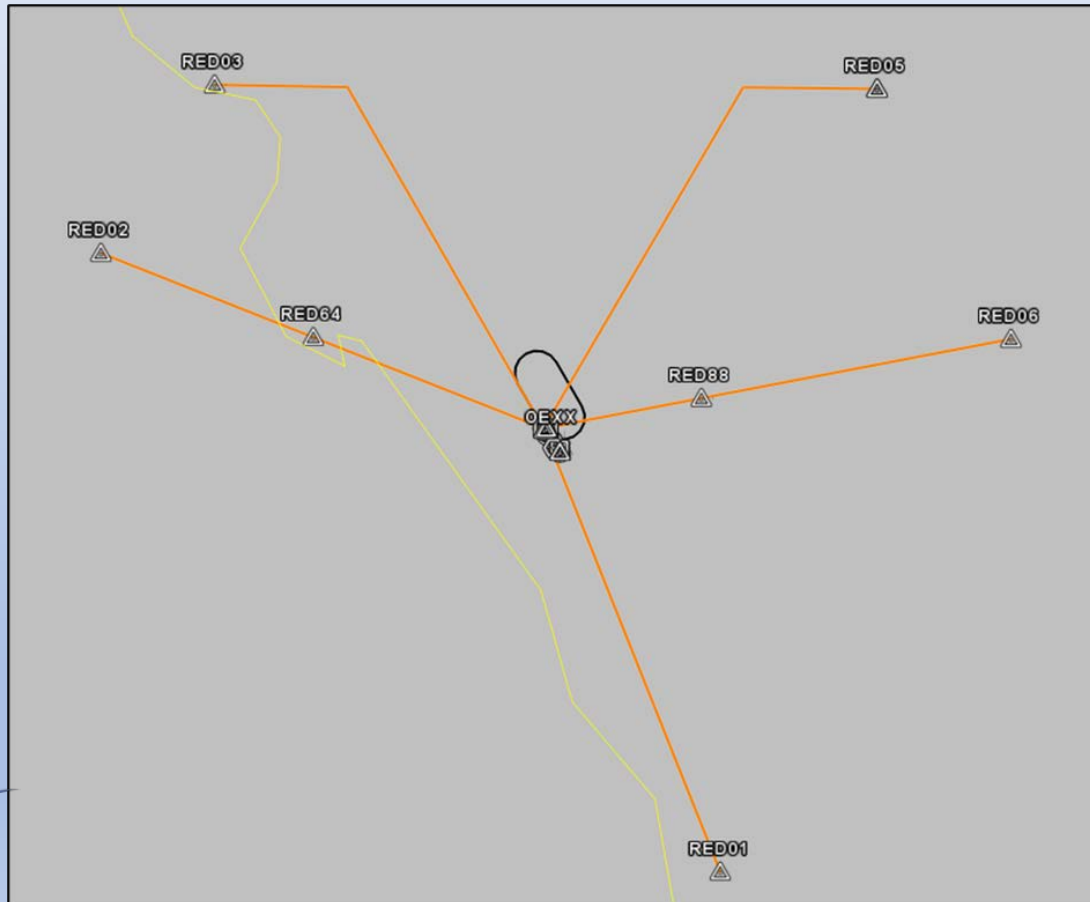
# Stage III. Schematic Design Stage

## Electro Magnetic Study (EMSS)



# Stage III. Schematic Design Stage

## Conceptual Design-IFPD



# Stage IV. Detailed Design Stage



# Stage IV. Detailed Design Stage

IFPD  
Workshop  
with ANS

Updating OLS,  
BRA & EMSS  
Studies

Studying Final  
NAVAIDs  
locations

Producing  
Draft Charts  
For AIP

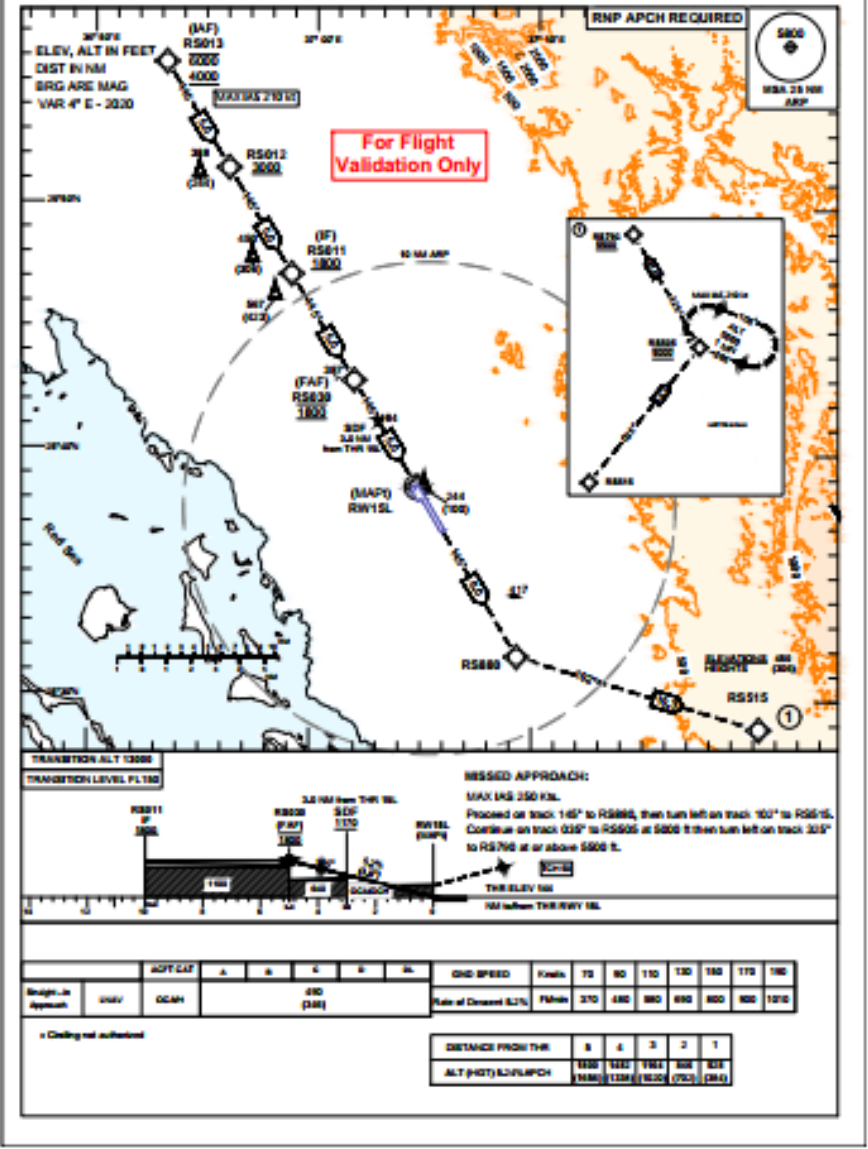
# Stage IV. Detailed Design Stage

IFPD Workshop with Stakeholders



# Stage IV. Detailed Design Stage

Producing Draft Charts



# Thank You For your Participation

## Any Question