



| ICAO

ESAF INNOVATION WEBINAR

2023



RPA and the ICAO Strategic Objectives

- **Strategic Objectives:**
 - I. **Safety**
 - II. **Air Navigation and Efficiency**
 - III. **Security and Facilitation**
 - IV. **Economic Development**
 - V. **Environmental Protection**

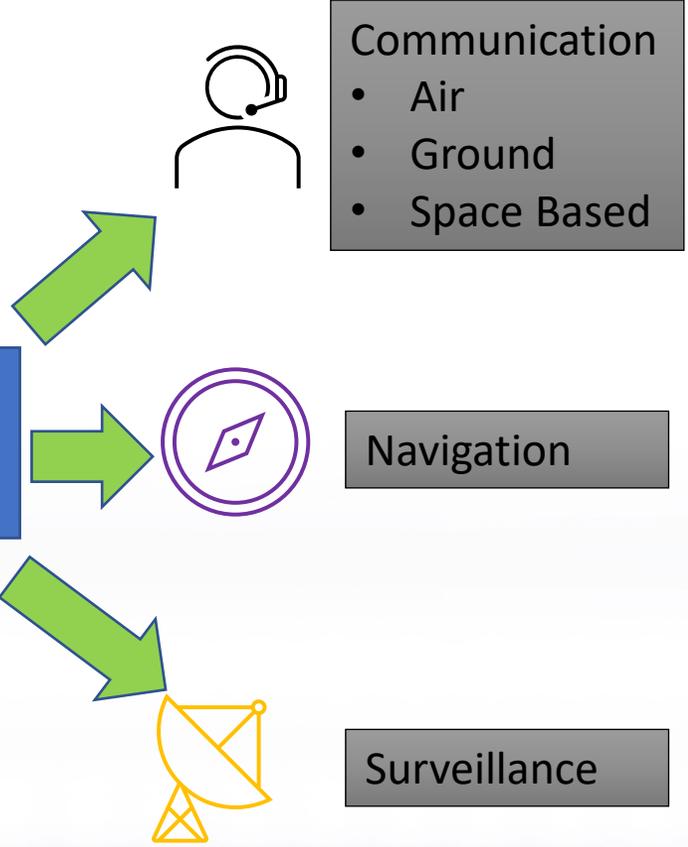


Collaboration
Integration of

ATM



Supported by



RPA and the ICAO Strategic Objectives

- **RPA – Remotely Piloted Aircraft**



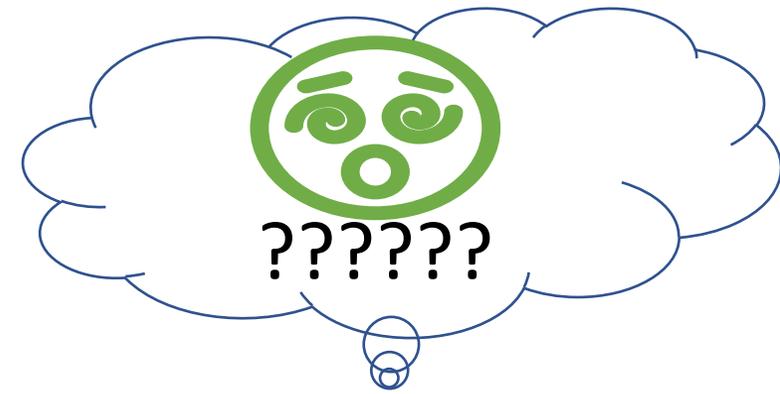
RPA and the ICAO Strategic Objectives

RPA

- Remotely piloted aircraft (RPA) — ICAO explains this term in Annex 2, **Rules of the Air**, as: “An unmanned aircraft which is piloted from a remote pilot station: expected to be integrated into the air traffic management system equally as manned aircraft [and,] real-time piloting control is provided by a licensed remote pilot.”



RPA Integration





Controlled



Controlled

Controlled

Controlled

Uncontrolled



Airspace

Segregated

- Airspace of specified dimensions
- Allocated for exclusive use to a specific user (s)
- ICAO Annex II, Rules of the air.

Airspace Classification

Class A
Class B
Class C
Class D
Class E
Class G

Non segregated

- Operations outside of segregated airspace.
- Class G Airspace.



RPA

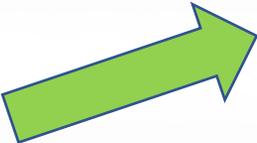
Factors

Non segregated
Airspace

SAFELY INTEGRATE

- Act and respond as manned A/C do, subject to technology.
- I.e., Transaction time and continuity of comms link + response time to ATC instructions.
- RPA operations are different, need to be managed differently. UAS traffic management (UTM).
- Flight intention, ID and tracking will be different.

UTM



- New services + tailored procedures.
- Ensure safe, efficient and secure access to airspace.
- Rely on high-speed digitization and automation of functions onboard or Ground-based unit.



RPA

Integration **FACTORS**:

- Organization of Airspace
- +
- Regulatory Framework for safe operations to address problem of collisions between RPA and manned Aircraft.



RPA

Measures in place

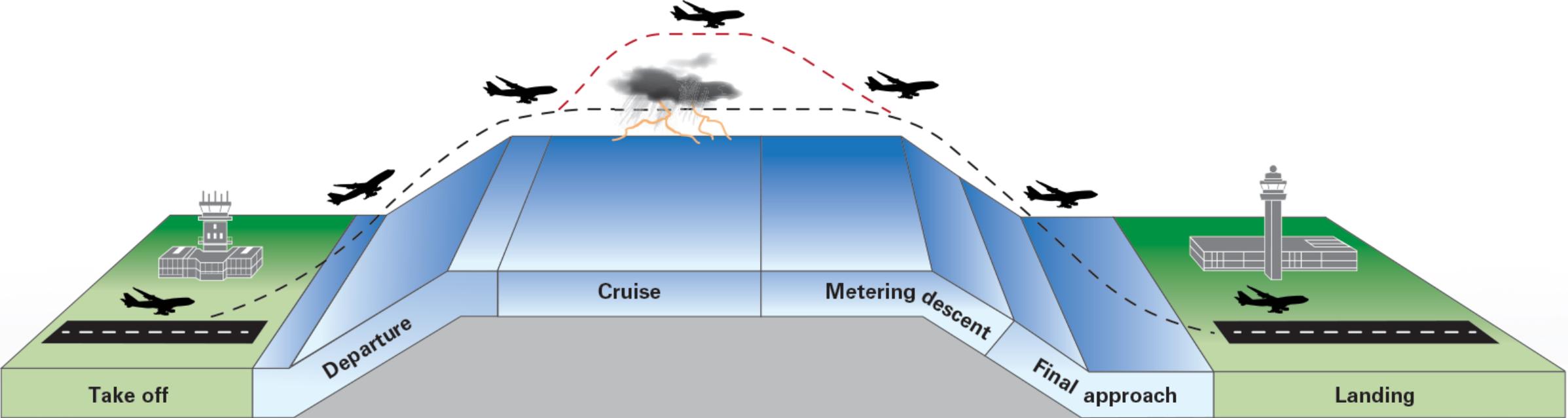
- **Visual line of sight and beyond visual line of sight**
- **Flying below 500 Ft – Traffic density is low**
- **Equipped with ID (Transponder)**
- **Geo-Limitations and being registered.**
- **Biggest challenge – Segregated airspace.**





PBN

= Performance Based Navigation



↑
RNP 1
SIDs

↑
RNP 2

↑
RNP 1
STARs

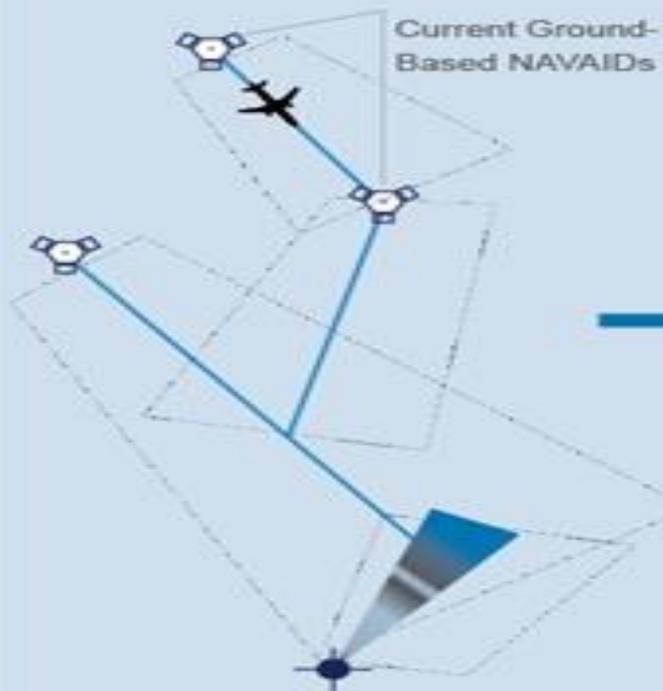
↙
RNP APCH or RNP AR APCH



PBN

Current Ground NAVAIDs

Limited Design Flexibility



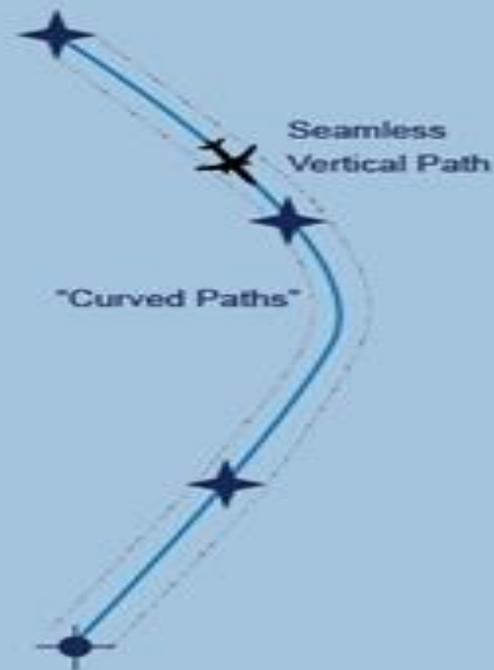
RNAV

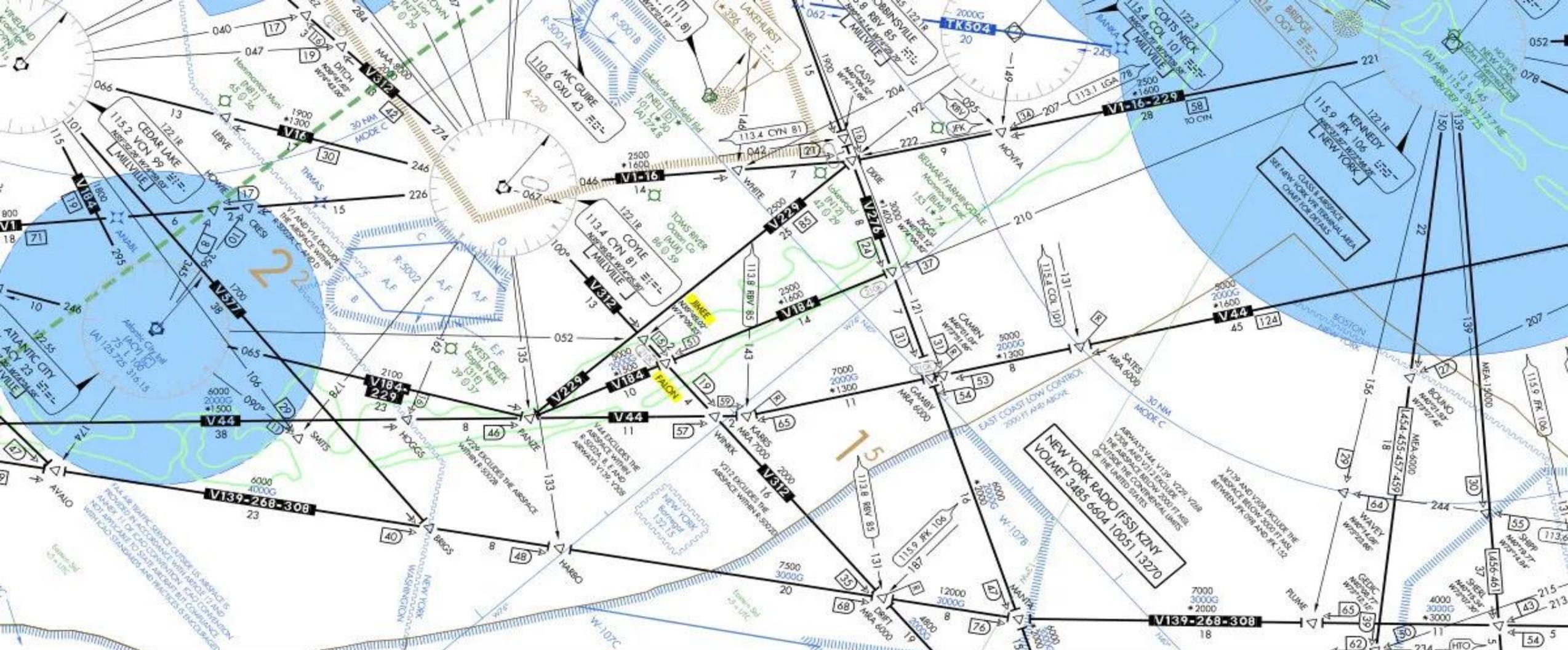
Increased Airspace Efficiency



RNP

Optimized Use of Airspace





INNOVATION
WORKSHOP



UTC 20:38

TAS 206 GS 207

FMS1

CRS 044

WN514

1.4 NM

TTC : 00:00

175/11

TCAS OFF
NORM
ALT 040



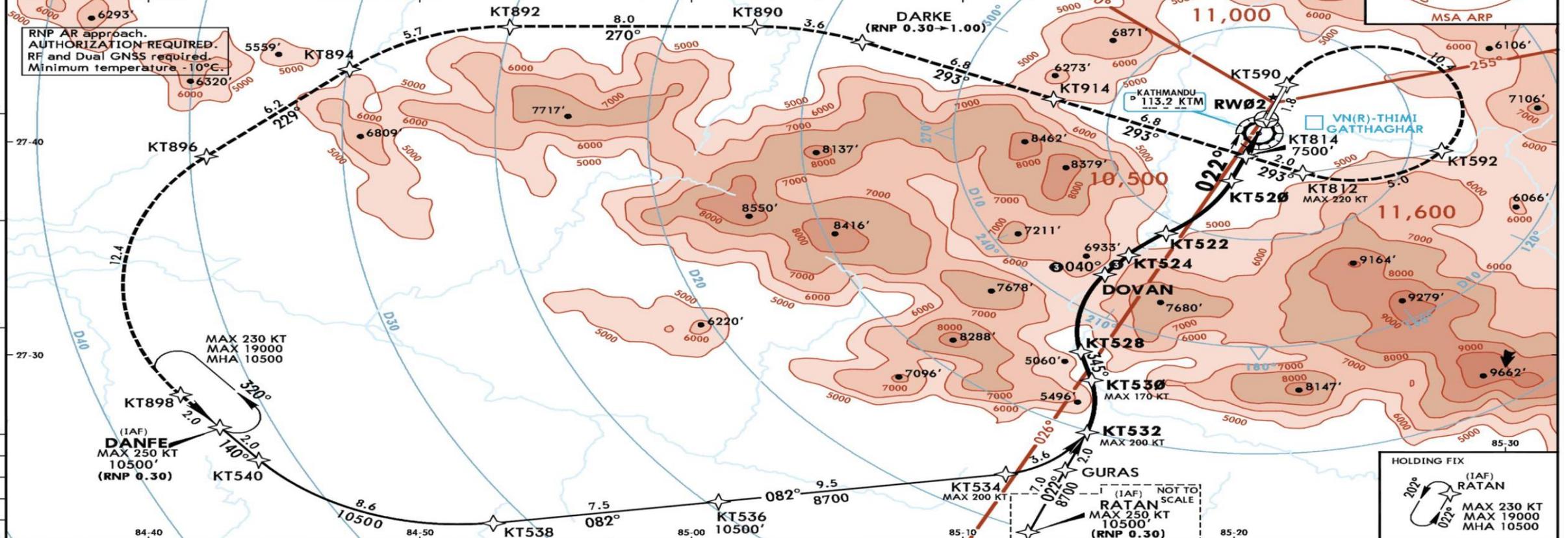
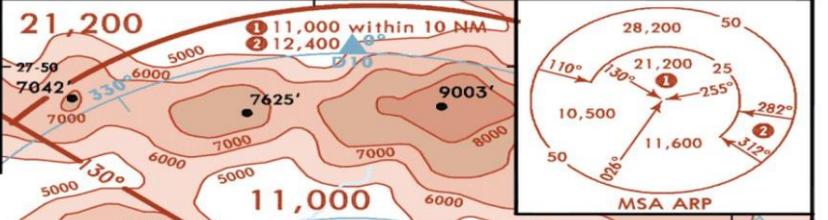
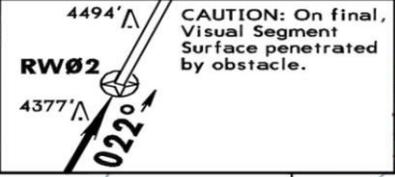
FMS1 ↑

PBN Advantages

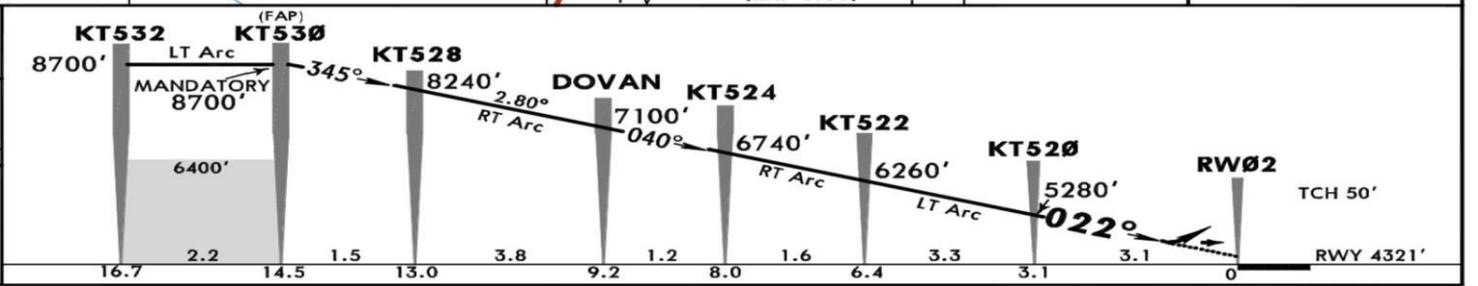
1. Flexible routes/terminal procedures
2. Reduce aviation congestion
3. Conserve fuel
4. Protect the environment
5. Reduce impact of aircraft noise
6. Improve safety
7. Accessibility to challenging airports
8. Increase airspace capacity



*ATIS 127.0	*KATHMANDU Approach 120.6 125.1	*KATHMANDU Tower 118.1 118.5	*Ground 121.9
RNAV	Final Apch Crs 022°	KT530 MANDATORY 8700' (4379')	RNP 0.30 DA(H) 4621' (300')
MISSED APCH: Climb to 10500' via RNP (AR) missed approach to DANFE and hold or start a new approach.		APT Elev 4395' RWY 4321'	
Alt Set: hPa	Rwy Elev: 149 hPa	Trans level: FL 150	Trans alt: 13500'



Gnd speed-Kts	120	140	160	180	HTALS
Glide Path Angle 2.80°	594	693	792	892	REIL PAPI
MAP at DA					Refer to Missed Apch above
STRAIGHT-IN LANDING RWY02					
RNP 0.30					
DA(H) 4621' (300')					
ALS out					
C	1100m		2000m		
D	1600m				



CHANGES: Chart reindexed. Procedure designation.

INNOVATION

WORKSHOP



ICAO

THANK YOU!