



SAFE SKIES.
**SUSTAINABLE
FUTURE.**



ICAO

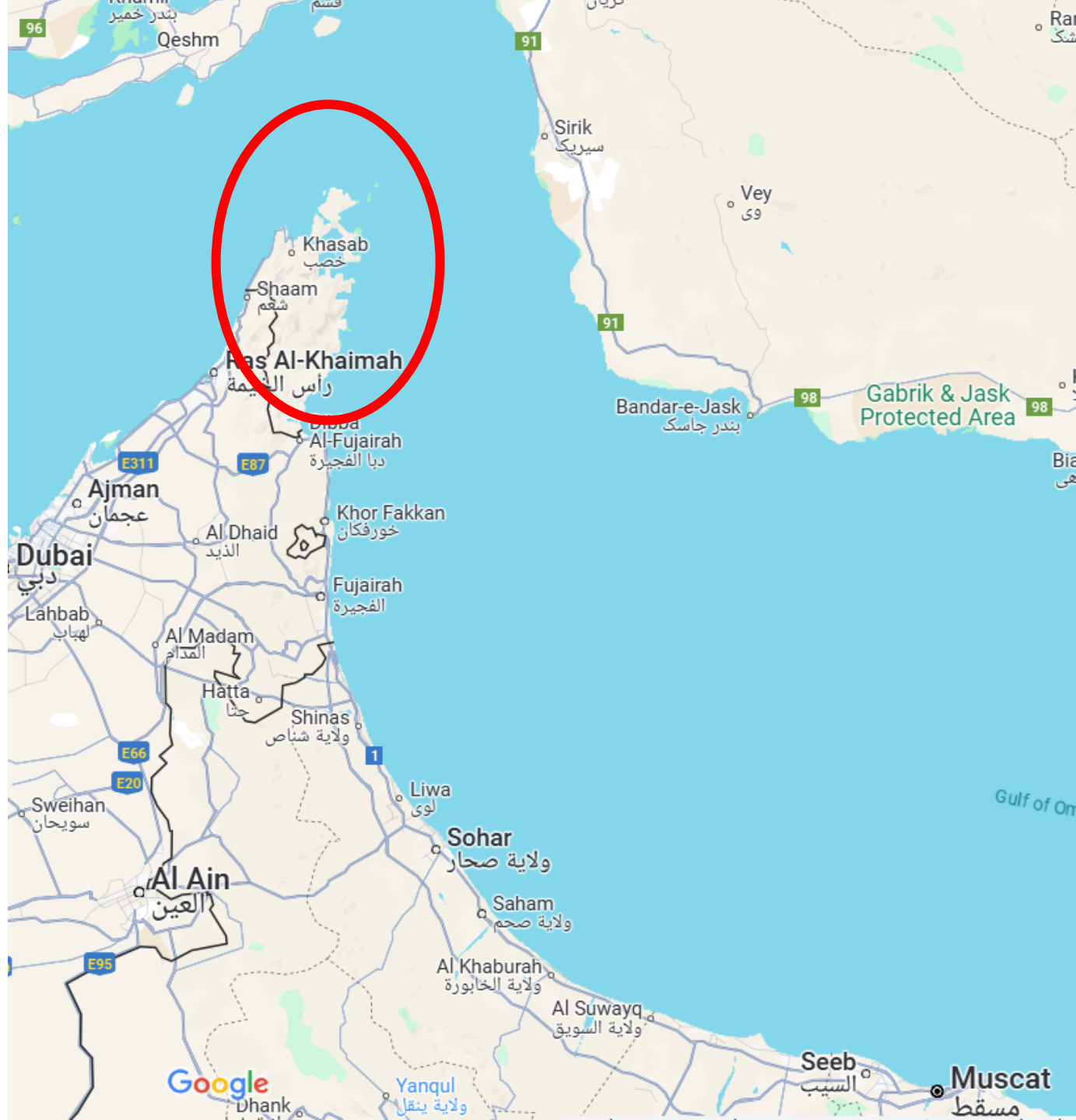
PBN SG/9
(Doha, Qatar, 9 - 11 December 2024)



Sulaiman Al Salmi

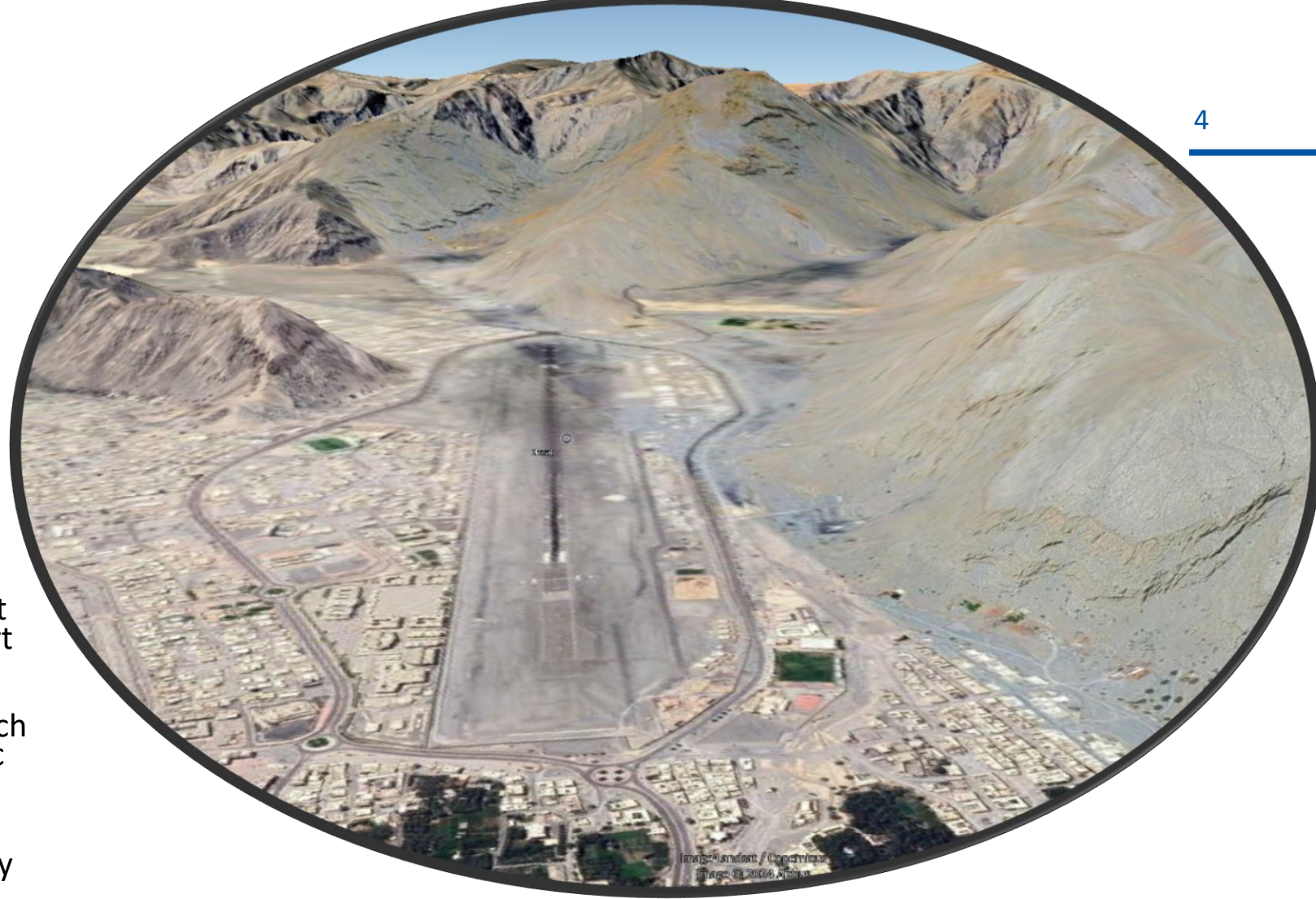
Airspace Standard Officer
DGAN/ Oman CAA

RNP AR approach for Khasab airport



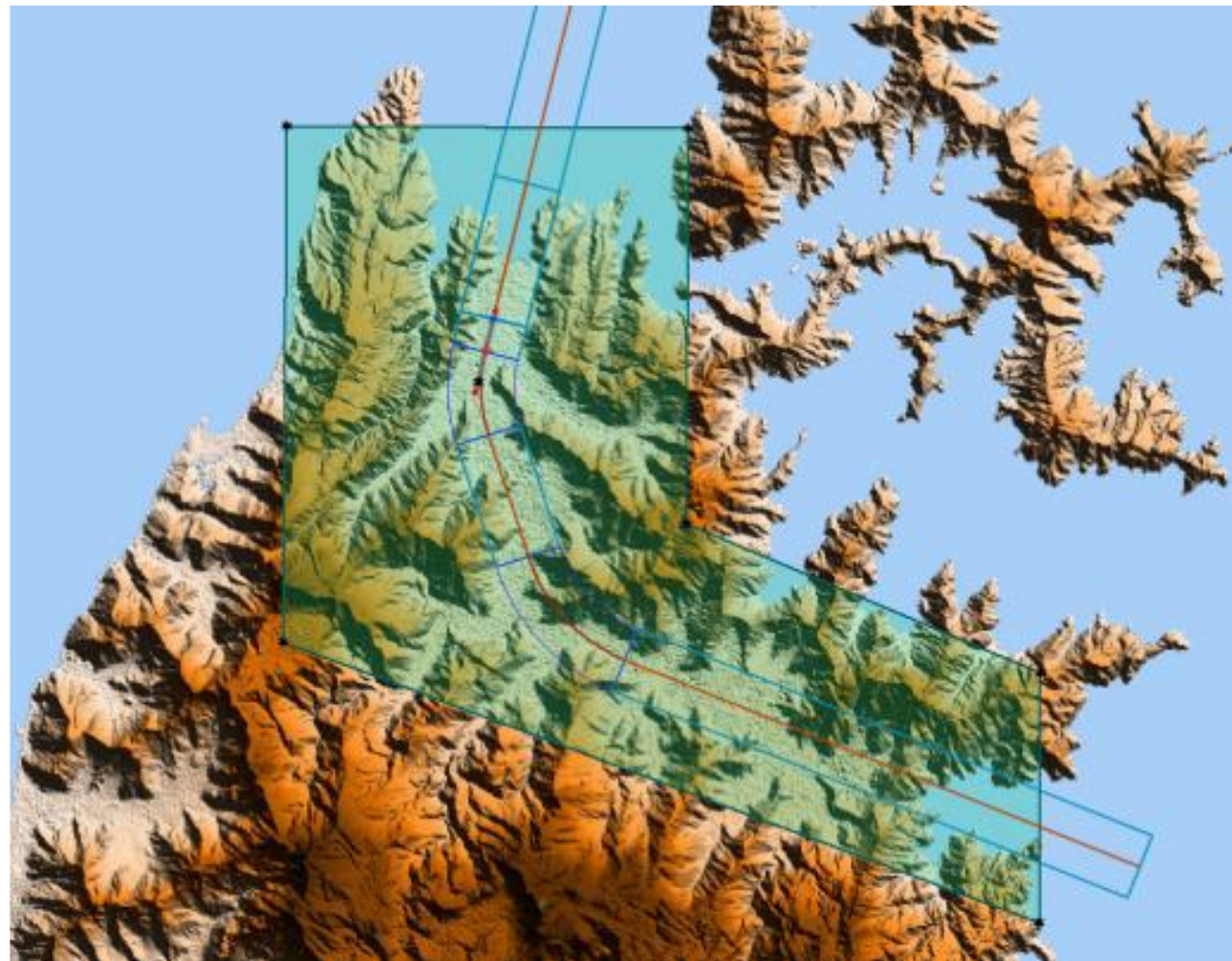
KHASAB Airport, *Instrument Flight Procedure Design (IFPD)*

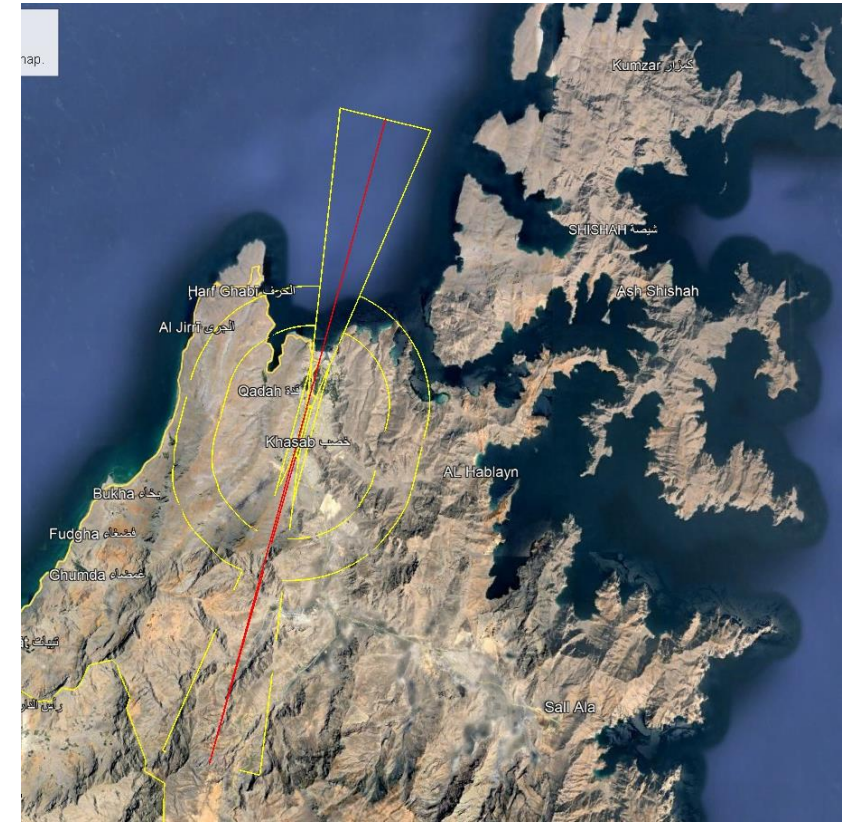
- Khasab Airport is currently a daytime VFR flight only operation using RNAV VISUAL.
- No instrument approach procedures published for the Airport.
- Inside a spectacular mountain peninsula that spreads out into the Arabian Gulf, the Airport is surrounded on three sides by mountains and the terrain restricts the development of any type of conventional instrument approach procedure. There is an operational Air Traffic Control Tower providing ATC service to the Airport.
- RNAV Visual RWY 19 approaches are the only approaches that have already been implemented in Khasab.



KHASAB Airport, *Instrument Flight Procedure Design (IFPD)*

- RNP AR procedures can provide significant operational and safety advantages over other area navigation (RNAV) procedures by incorporating additional navigational accuracy, integrity and functional capabilities.
- It permits operations using reduced obstacle clearance that enable approach and departure procedures in circumstances where other types of procedures are not operationally feasible.
- RNP AR Procedures allow the exploitation of high-quality, managed lateral and vertical navigation (LNAV/VNAV) capabilities that provide safe access to terrain and weather challenged destinations.

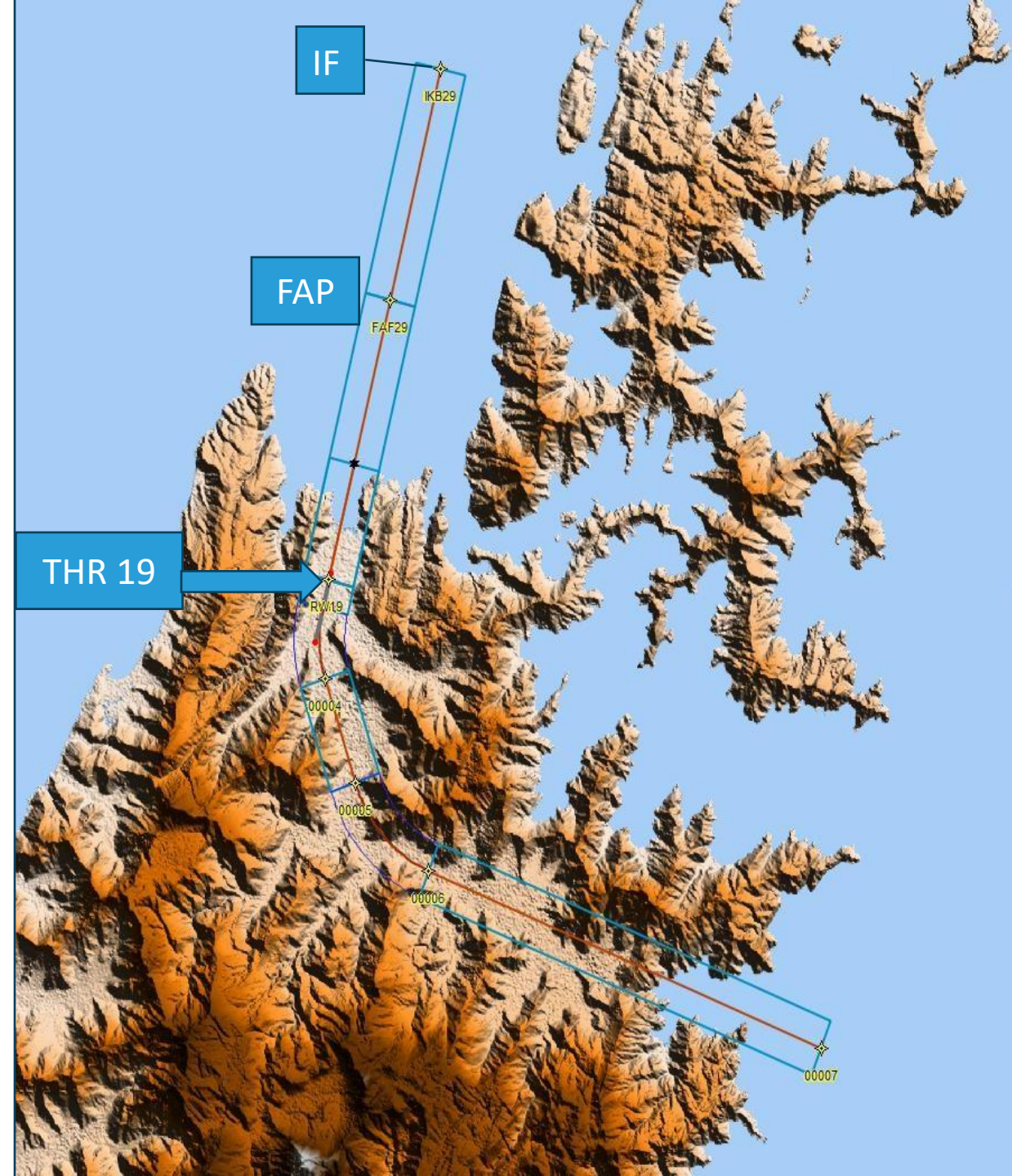




OLS

RNP AR RWY19

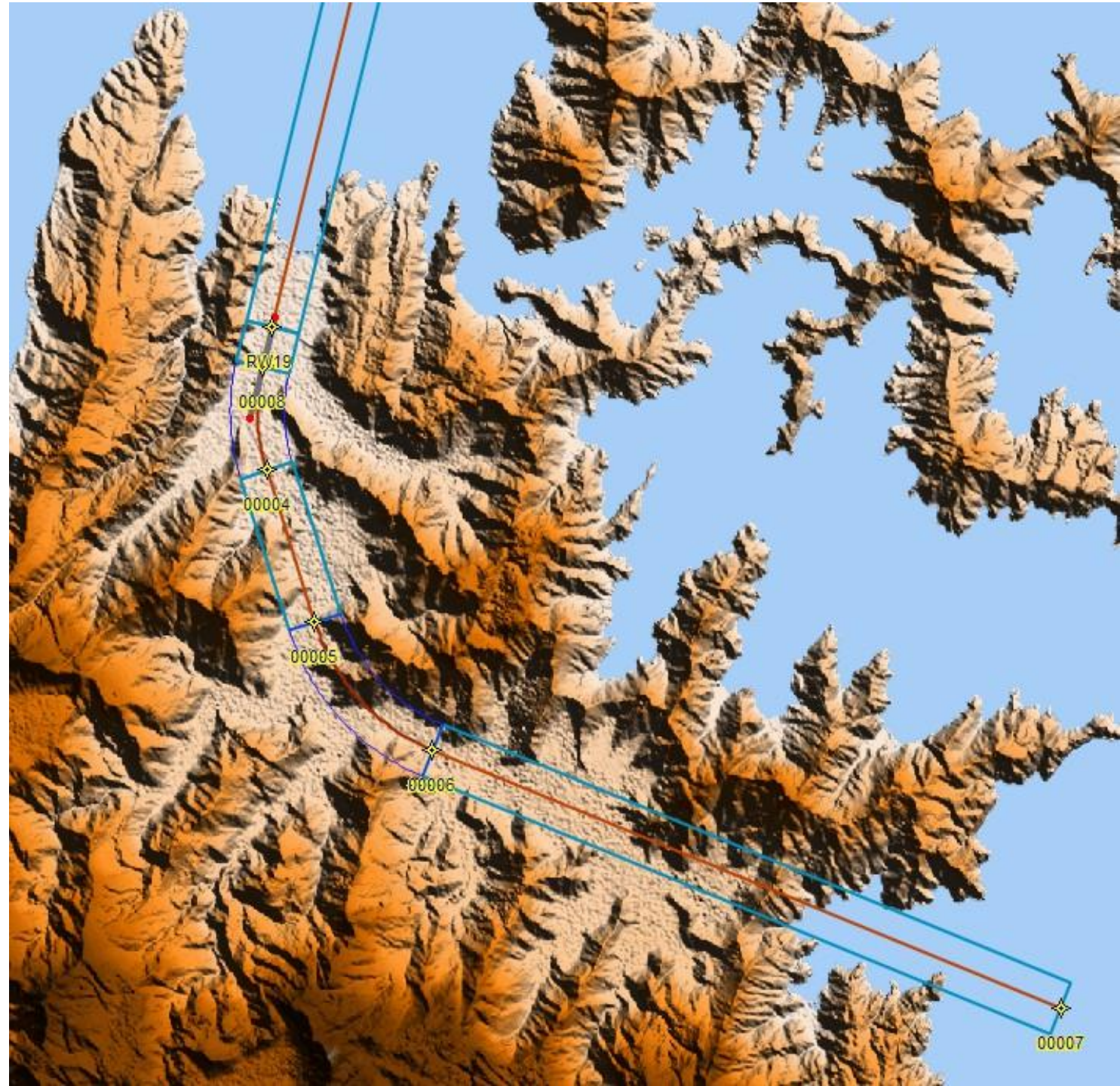
- FAF: 2000ft
- VPA: 3°
- The RNP value is maintained in Missed Approach.
- The following OCA in this presentation are estimated. A data survey and accurate data are needed for a full study and to calculate the operational OCAs.



RNP AR RWY19

Estimated OCA for **RNP 0.3**, CAT C:

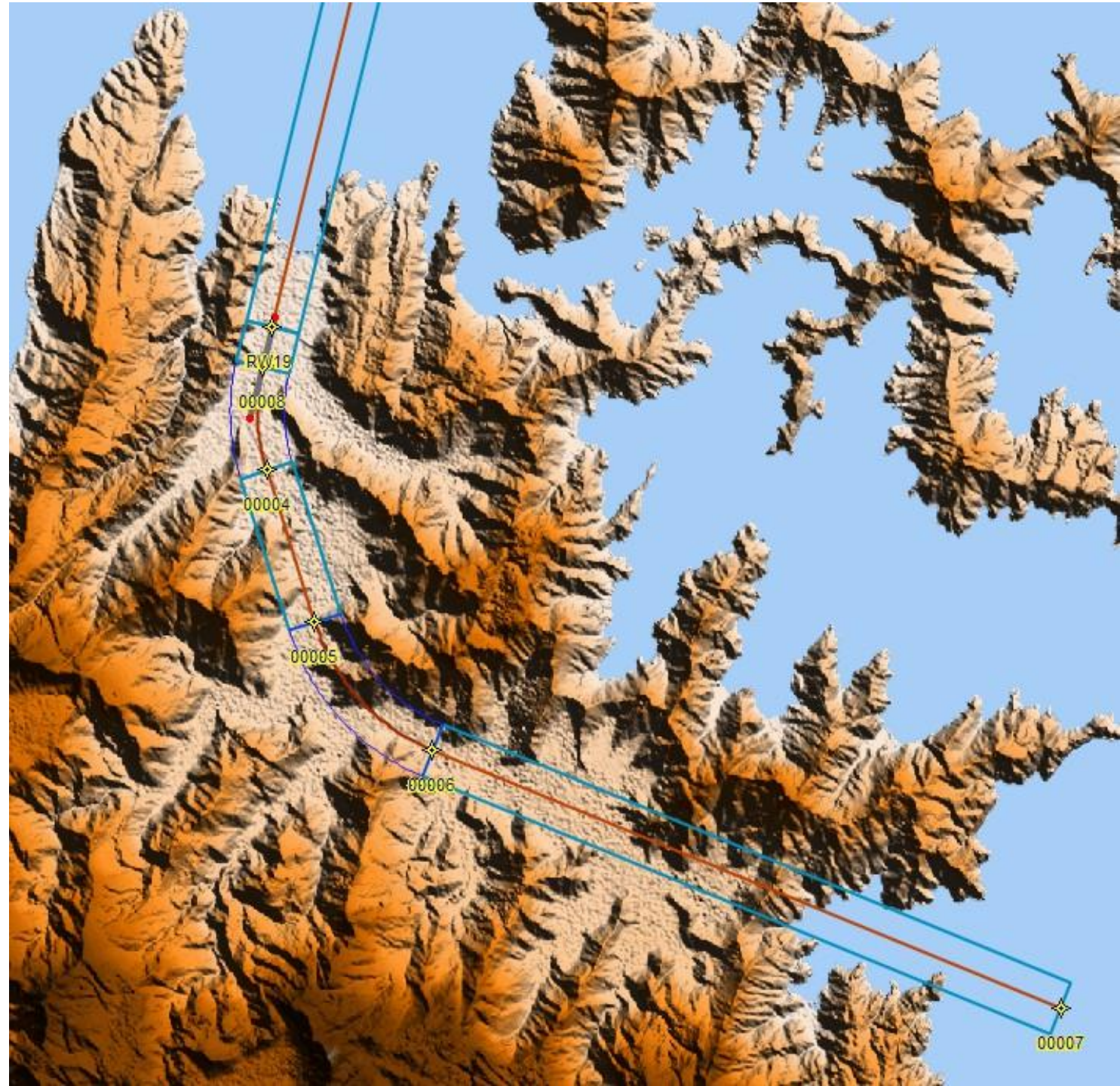
MA climb Gradient	OCA (ft)
2.5%	1350ft
3%	1290ft
4%	1200ft
5%	1130ft



RNP AR RWY19

Estimated OCA for **RNP 0.2, CAT C**:

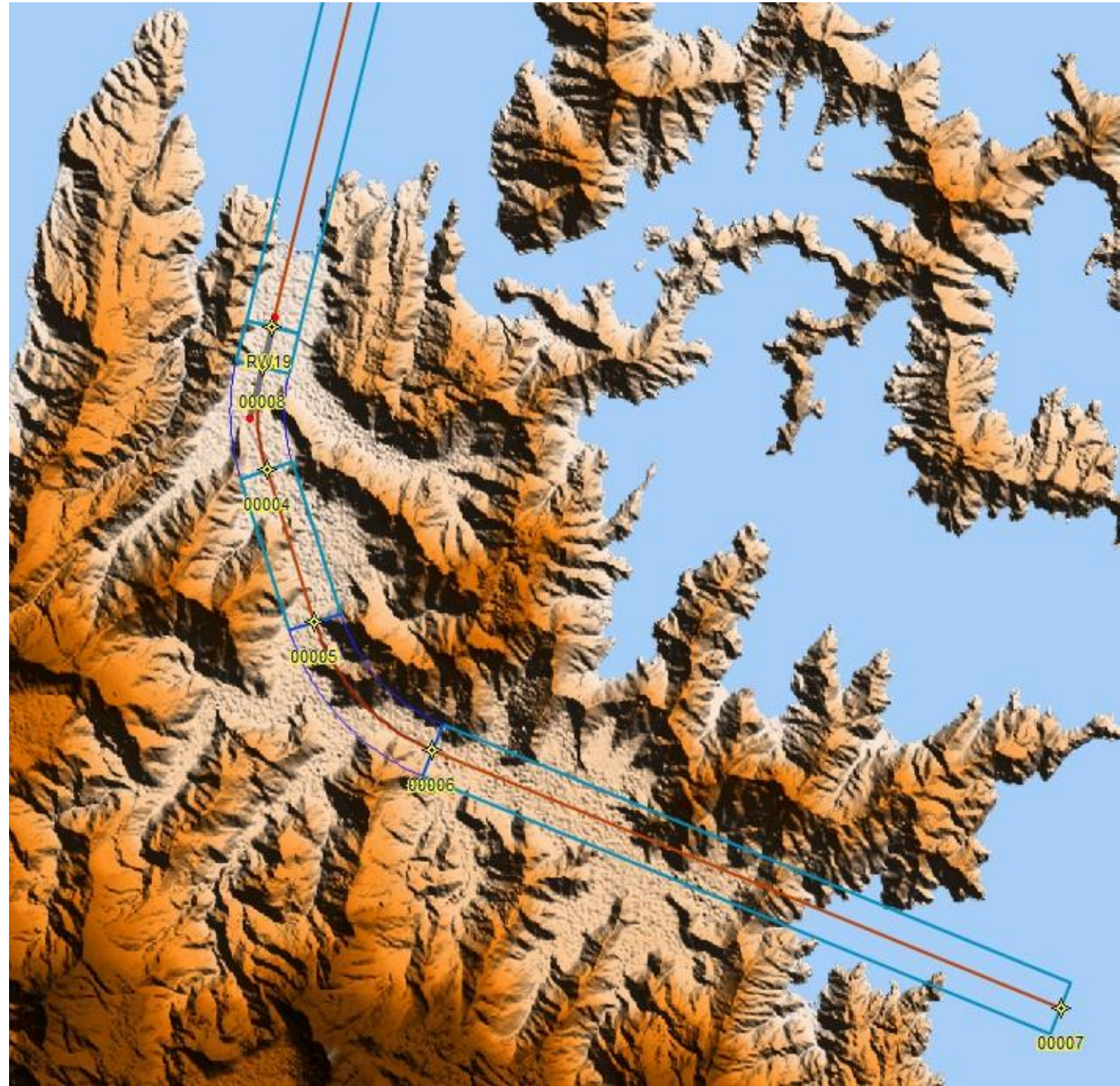
MA climb Gradient	OCA (ft)
2.5%	1140ft
3%	1050ft
4%	970ft
5%	910ft



RNP AR RWY19

Estimated OCA for RNP 0.1, CAT C:

MA climb Gradient	OCA (ft)
2.5%	930ft
3%	790ft
4%	560ft
5%	410ft



RNP AR RWY19

Estimated OCA for RNP 0.3

MA climb Gradient	OCA (ft)
2.5%	1350ft
3%	1290ft
4%	1200ft
5%	1130ft

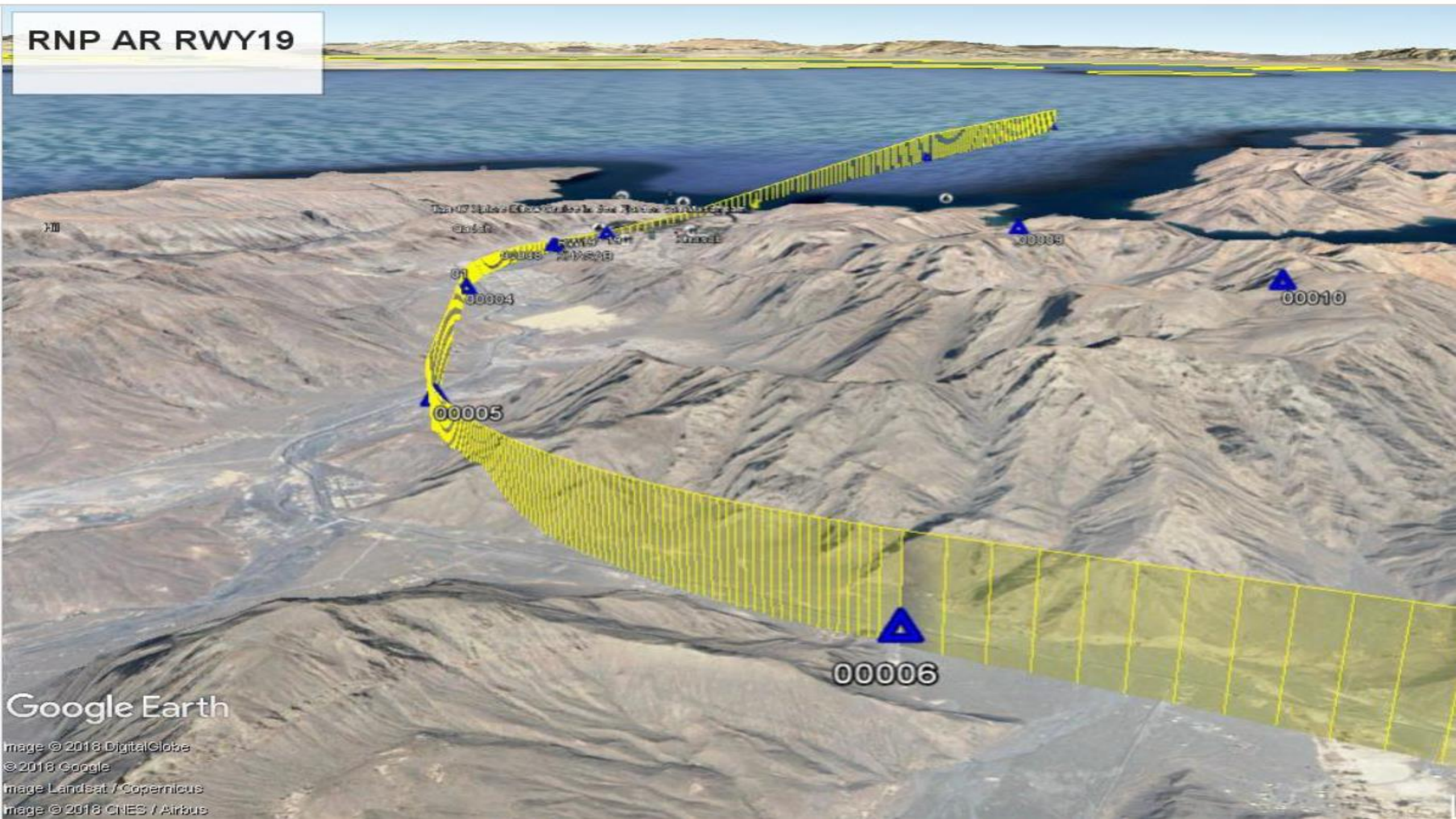
Estimated OCA for RNP 0.2

MA climb Gradient	OCA (ft)
2.5%	1140ft
3%	1050ft
4%	970ft
5%	910ft

Estimated OCA for RNP 0.1

MA climb Gradient	OCA (ft)
2.5%	930ft
3%	790ft
4%	560ft
5%	410ft

RNP AR RWY19



Google Earth

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RNP AR RWY 19

RNP AR approach RWY19 can be implemented in Current airport environment


RNP AR approach RWY19 could allow an IFR operation accessibility in the current situation.

- **To cross the cloud ceiling (Cloud break procedure)**
- **Airlines have to be RNP AR certified**


A specific certification is needed for airlines

A blue silhouette of an airplane is centered within a white square, which is itself inside a light blue circular background.


The application of RNP-AR procedures to terminal area and approach operations leverages the advanced capabilities and performance of modern aircraft to enhance safety, efficiency, capacity, and accessibility. By incorporating high levels of navigational accuracy, integrity, and functional capability, RNP-AR allows for precise operations in conditions where other approach types may be inadequate or unfeasible.

A blue traffic light with three circular lights is centered within a white square, which is itself inside a light blue circular background.

Additionally, capacity is enhanced by enabling more effective traffic management, especially under instrument meteorological conditions, which helps to de-conflict traffic flows and reduce delays.

Three blue chevrons pointing to the right are centered within a white square, which is itself inside a light blue circular background.

RNP-AR procedures increase safety by replacing visual or non-precision approaches with reliable, repeatable, and optimized flight paths. Efficiency is improved as aircraft follow more consistent and direct paths, reducing fuel burn and flight time.

A blue silhouette of a mountain range is centered within a white square, which is itself inside a light blue circular background.

Moreover, airport accessibility is significantly improved with RNP-AR, as it enables operations in challenging environments such as mountainous terrain or densely populated areas where traditional approaches are limited. This capability opens up access to airports under adverse weather conditions, expanding operational availability and supporting continuity of service.



Thank You

