ICAO APAC PBNICG/11

Smart Procedure Validation

Pieter-Bas Oortman

PVS aero(IFPDAVA)

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ICAO

Smart Procedure Validation

01 **Flight Operational Perspective**
ICAO EUR Doc 025 EUR –
FVP @ project start

02 **ICAO Doc 9906 Vol 5**
Flow chart difference between Edition 1 and Edition 2

03 **9906 Vol 5 – No Flight Validation**
Extract and example

04 **9906 Vol 5 – Aircraft Flight Validation**
Extract and example

05 **9906 Vol 5 – SIM Flight Validation**
Extract and example

06 **Regulator Opinion**
Simulator Flight Validation for RNP APCH with LNAV, LNAV/VNAV and LPV

07 **Multiple Procedures / Airports**
Experiences and Take Aways

08 **Your Opinion**
on the validation of RNP 10

01 Flight Operational Perspective

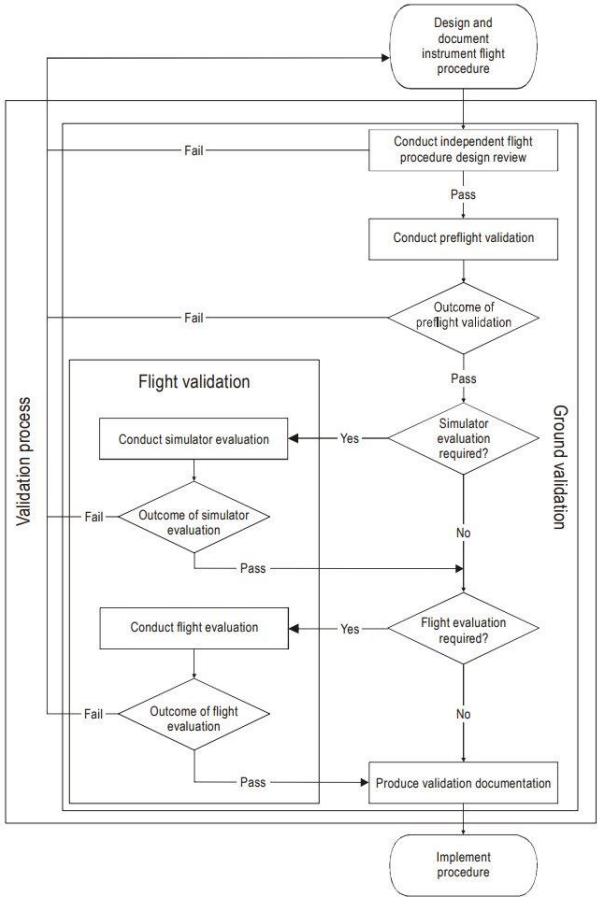
ICAO EUR Doc 025

5.2.3.1 A **multi-disciplinary team** is needed to ensure **all** necessary **aspects** of the implementation of RNP Approach procedures are **recognised** and adequately **addressed**

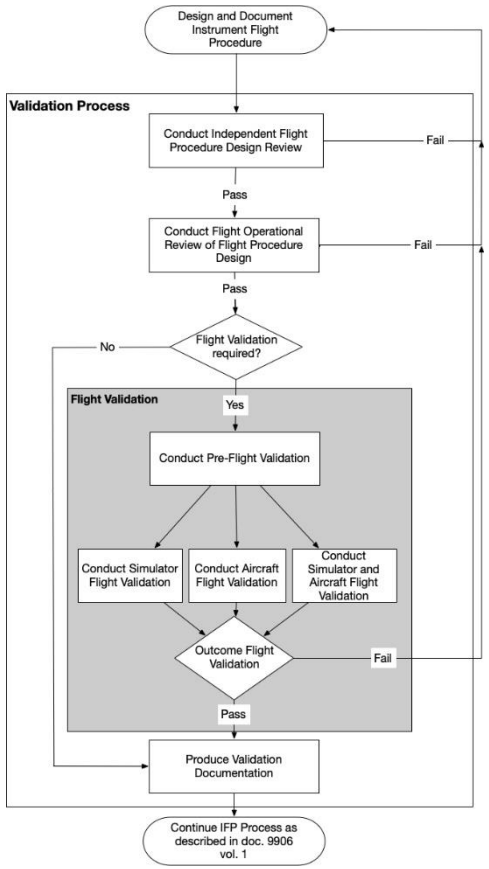
Use FVP at project start

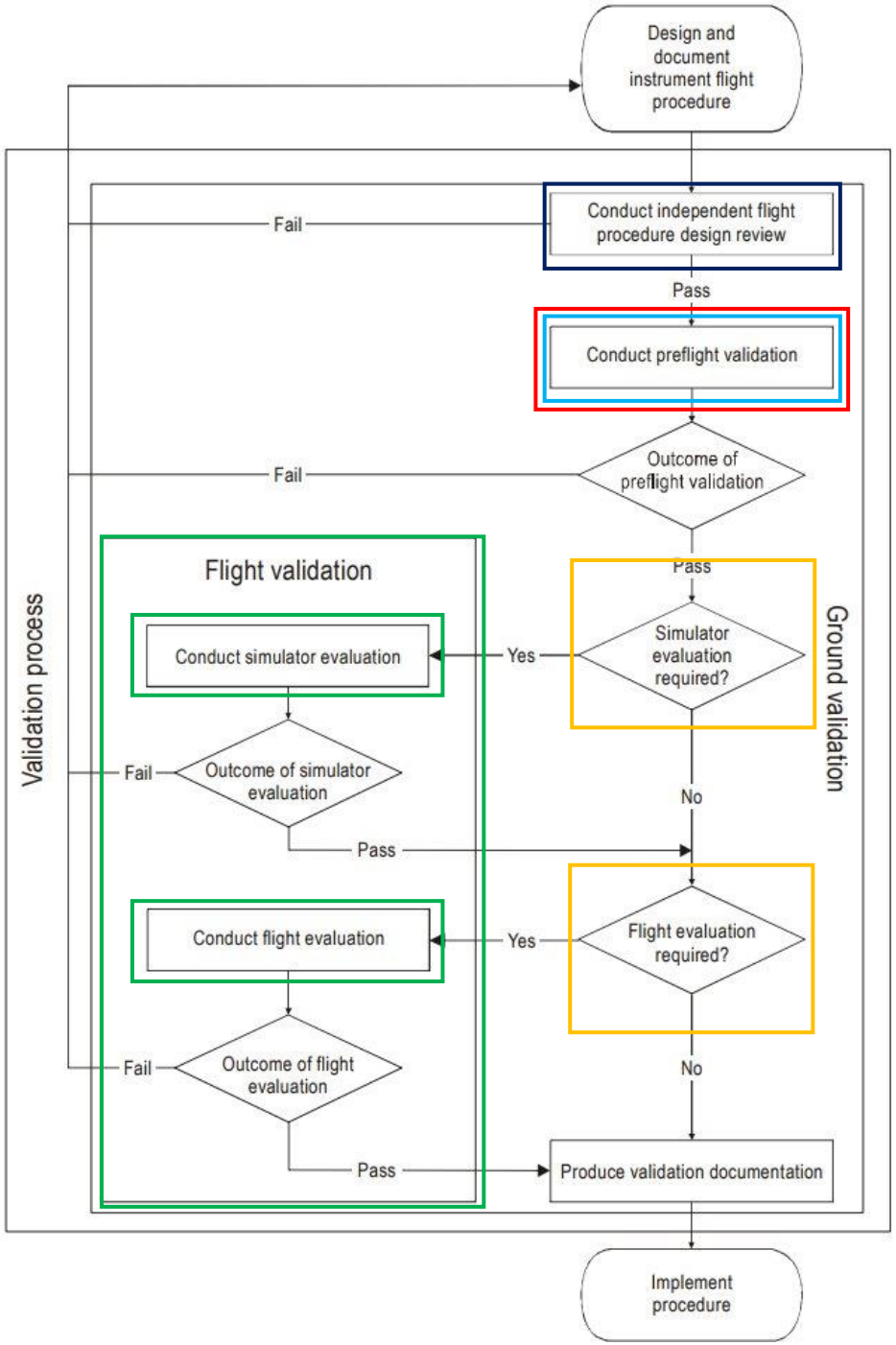
02 ICAO Doc 9906 Vol 5

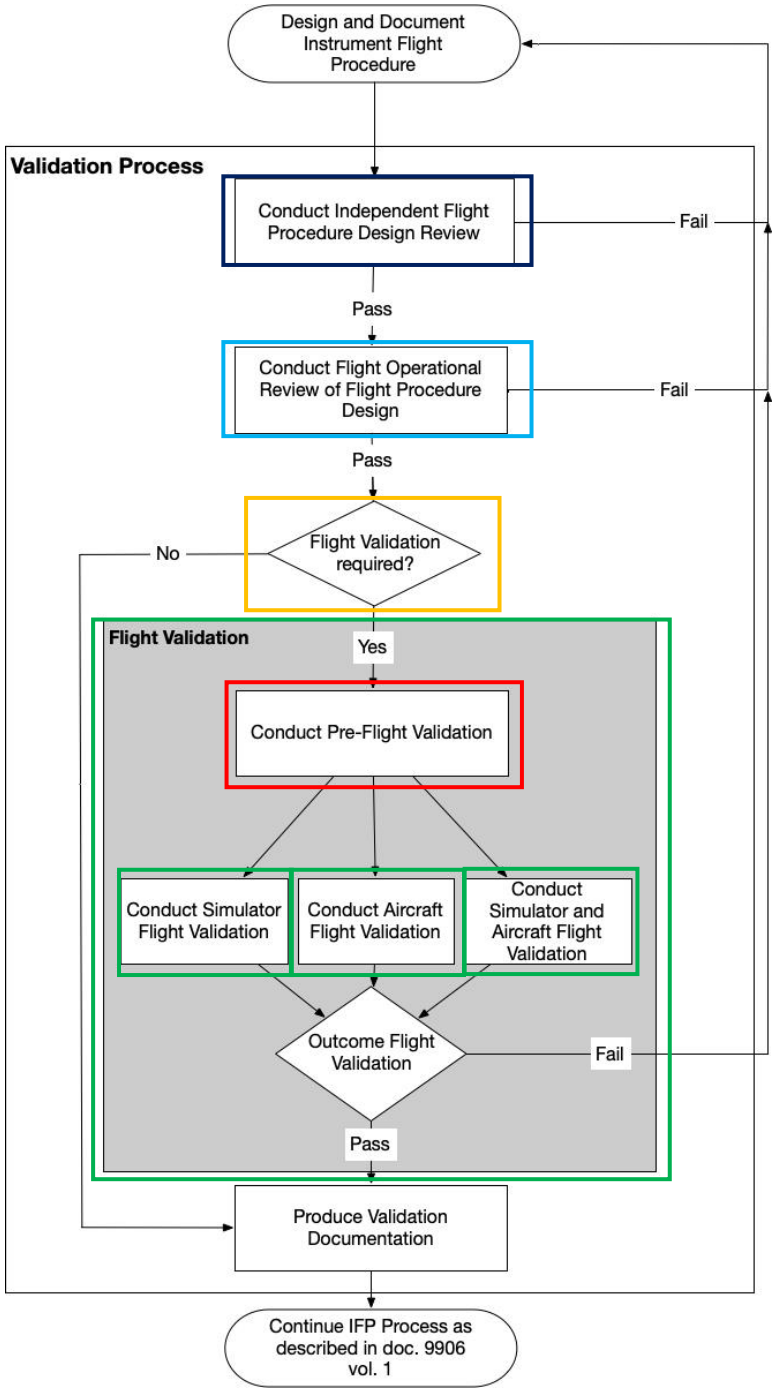
edition 1



edition 2




Design and document instrument flight procedure
Validation process
Conduct independent flight procedure design review
Fail
Pass
Conduct preflight validation
Outcome of preflight validation
Fail
Pass
Ground validation
Simulator evaluation required?
Yes
No
Flight validation
Conduct simulator evaluation
Fail
Outcome of simulator evaluation
Pass
Conduct flight evaluation
Fail
Outcome of flight evaluation
Pass
Flight evaluation required?
Yes
No
Produce validation documentation
Implement procedure


Design and Document Instrument Flight Procedure
Validation Process
Conduct Independent Flight Procedure Design Review
Fail
Pass
Conduct Flight Operational Review of Flight Procedure Design
Fail
Pass
Flight Validation required?
No
Yes
Flight Validation
Conduct Pre-Flight Validation
Conduct Simulator Flight Validation
Conduct Aircraft Flight Validation
Conduct Simulator and Aircraft Flight Validation
Outcome Flight Validation
Fail
Pass
Produce Validation Documentation
Continue IFP Process as described in doc. 9906 vol. 1

Simulator Flight Validation

Airplane or Helicopter

- Flyability - with most used aircraft type
- Human Factors and workload

- Efficiency – repositioning
- Weather – set as required
- Sustainable

- No interference with live traffic
- Enhanced GPWS (terrain DB) accurate

Aircraft Flight Validation

Airplane or Helicopter

- Obstacles and terrain reviewed
- Night flight validation
- Basic GPWS (radio altimeter) is correct

- GNSS interference identifiable
- Possible Flight Inspection combined with Flight Validation

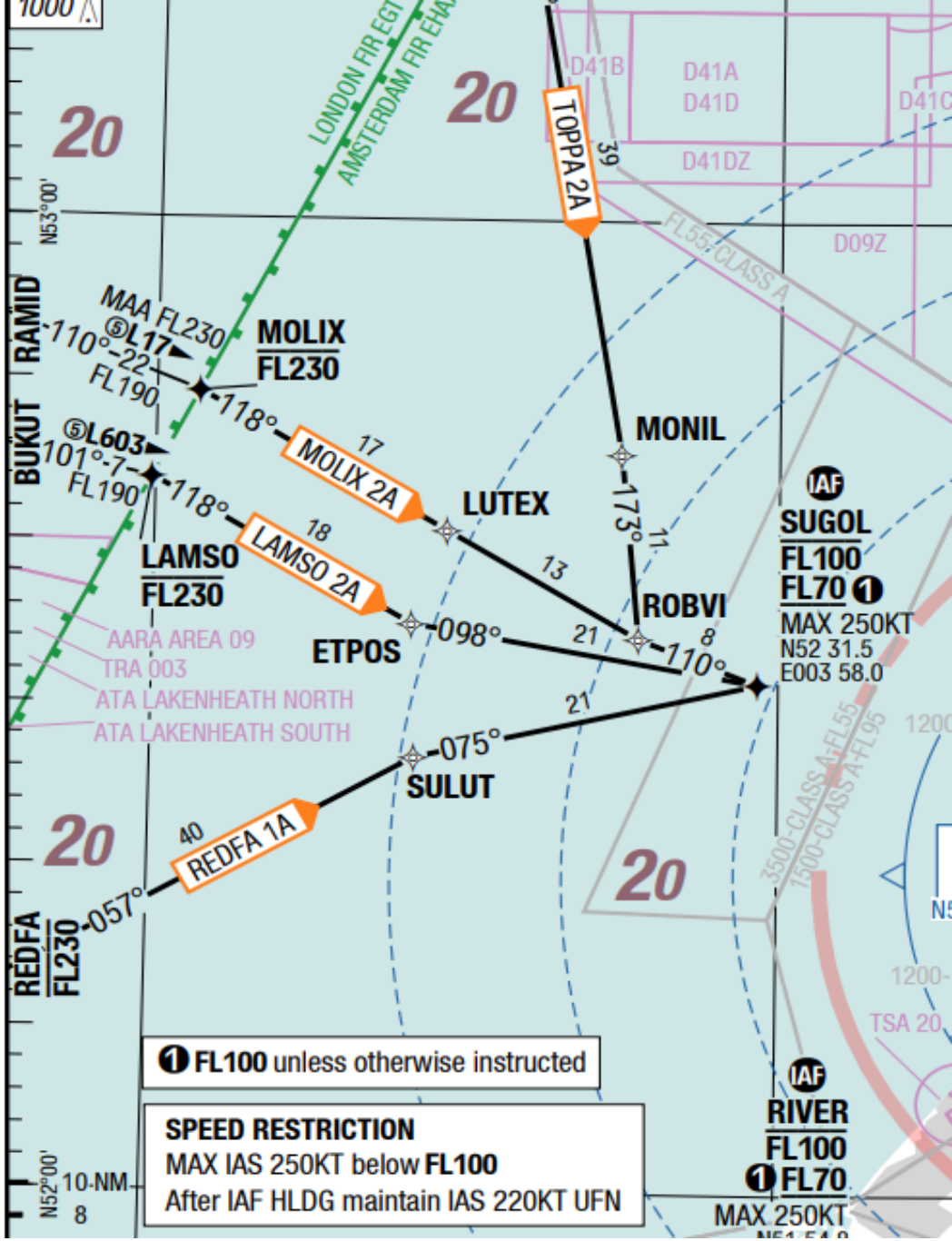
- Impact on life traffic flow can be assessed
- Human Factors and workload

03 No Flight Validation (GV only)

9906 Vol 5 ed. 1 para 1.2.4

- Flyability of the procedure can be determined without flying
- Procedure does not deviate from design criteria

→ What validation for MOLIX 2A?



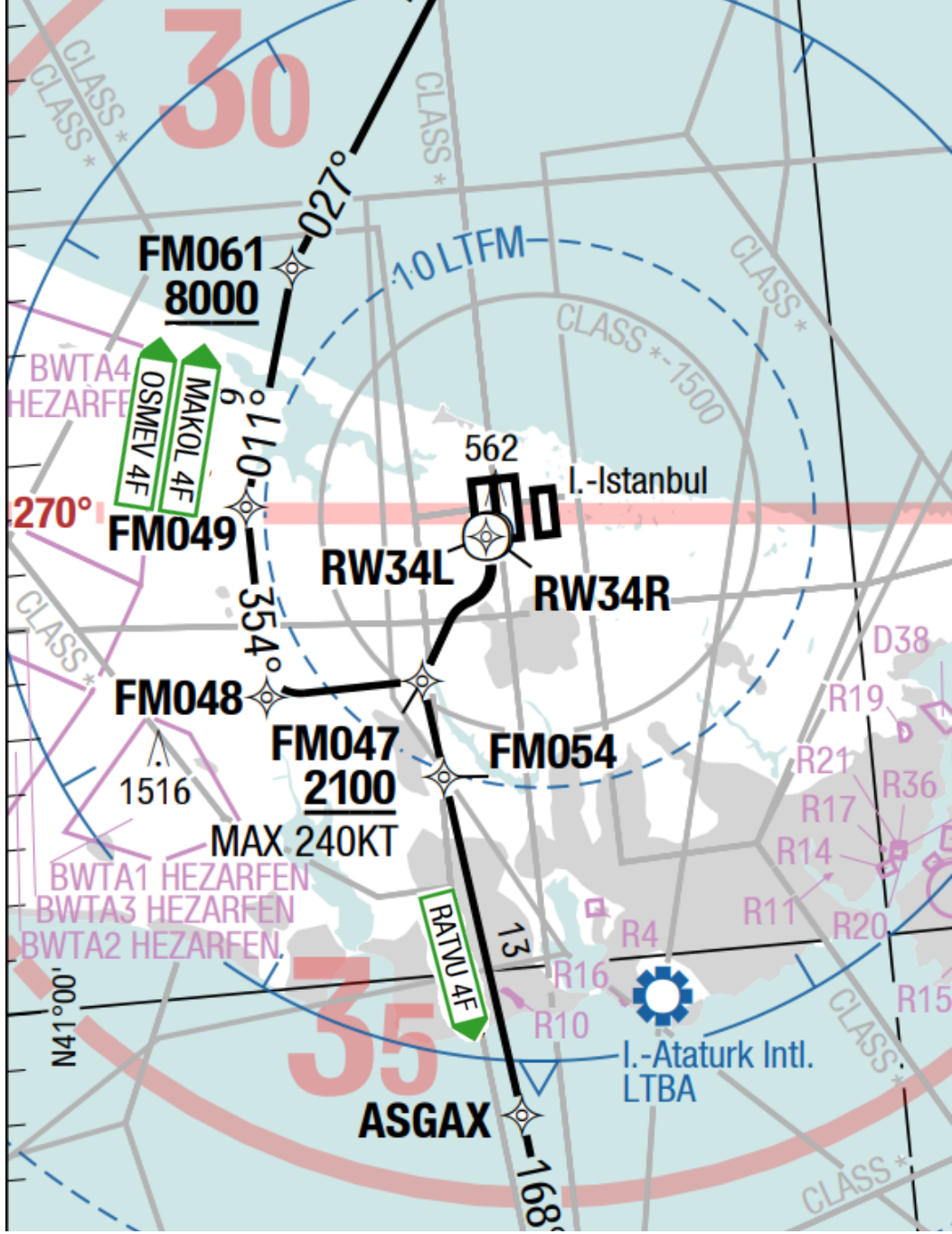
04 Aircraft Flight Validation

9906 Vol 5 ed. 1 para 1.2.4

- Flyability of the procedure cannot be determined by other means
- Procedure requires mitigation for deviations from design criteria
- Accuracy and/or integrity of obstacle and terrain data is insufficient
- New procedures differ significantly from existing procedures; and
- Helicopter PinS
- Night flight validation

→ New airport with new SIDS and deviation in first turn.

→ What validation for MAKOL 4F and RATVU 4F?



05 Simulator Flight Validation

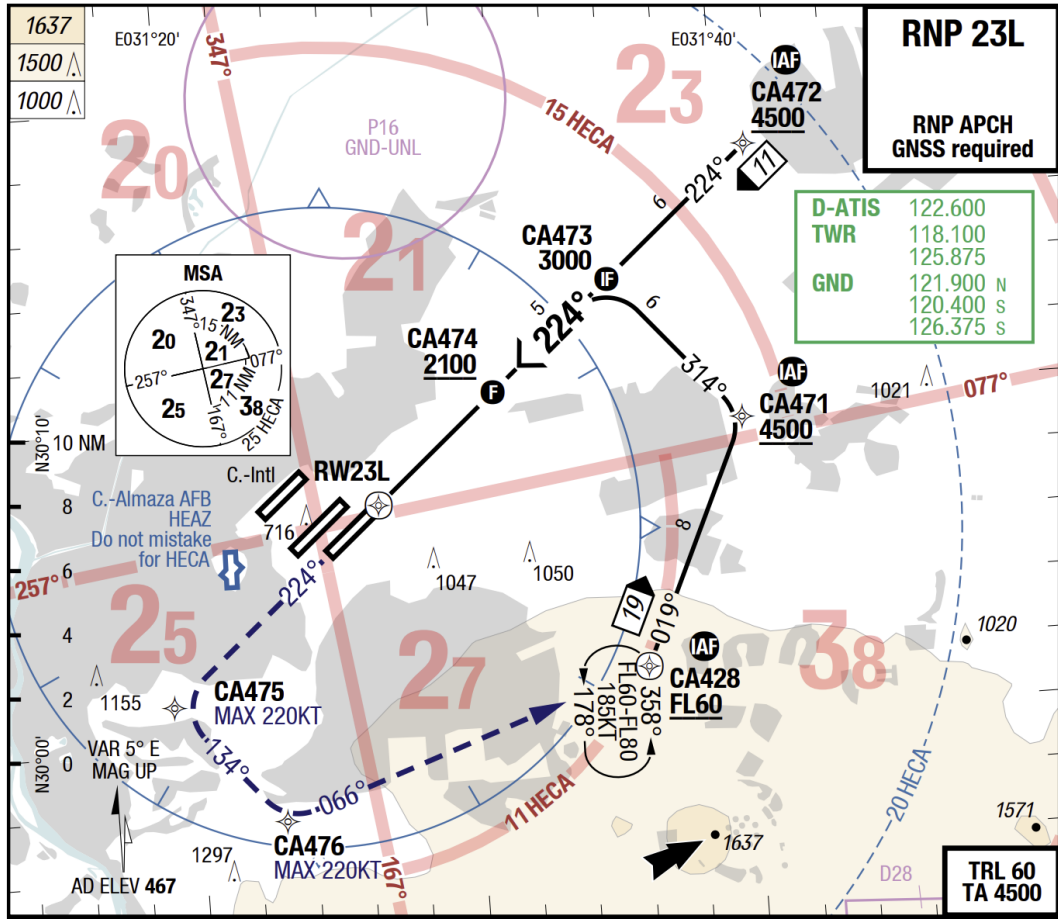
9906 Vol 5 ed. 1 para 1.2.4

- Flyability of the procedure cannot be determined by other means
- Procedure requires mitigation for deviations from design criteria
- ~~Accuracy and/or integrity of obstacle and terrain data is insufficient~~
- New procedures differ significantly from existing procedures; and
- Helicopter PinS
- ~~Night flight validation~~

→ Obstacle survey performed prior design

→ Existing airport and existing ILS used at night

→ What validation for new RNP 27?



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06 Regulator Opinion

Simulator Flight Validation for RNP APCH with LNAV, LNAV/VNAV and LPV

State / Regulator	FV with SIM only for RNP APCH – 3 minima lines *generally* accepted	Final decision based on
UK	yes	validation plan
Netherlands	yes	case by case
Denmark	yes	case by case
Sweden	no	n.a.
Italy	yes	case by case
Switzerland	yes	case by case

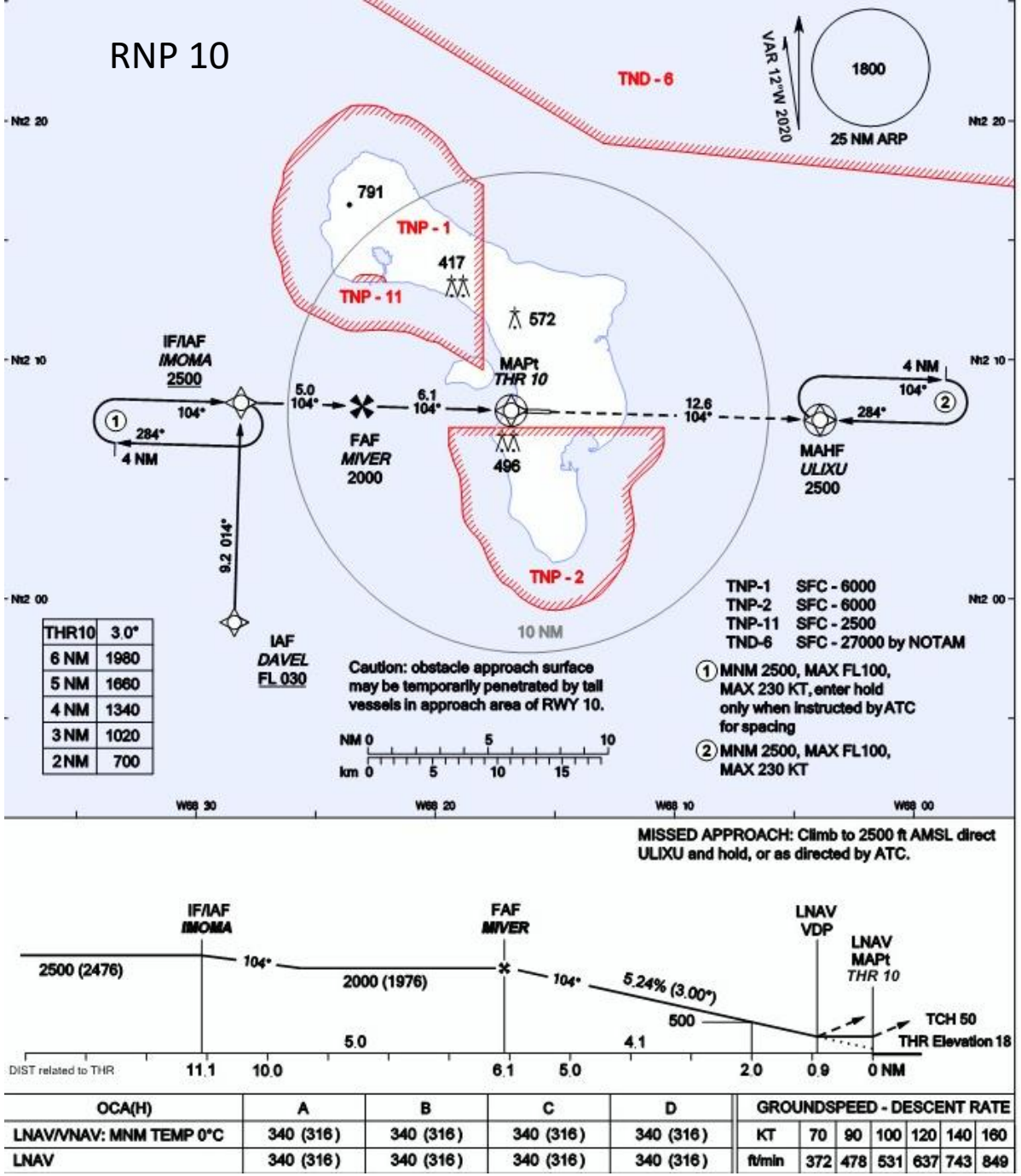
07 Multiple procedures / airports

Experiences and Take Aways

New/ amended procedure	PBN implementation project	IFP validation = Project
Small projects: → depends on the procedures	Large projects: ~ 50% no Flight Validation ~ 35% Simulator FV ~ 15% Aircraft FV	IFP Validation is part of Flight Procedure Design, which is project based, not yearly recurring activity. Flight Validation ≠ Flight Inspection

08 Your Opinion

RNP 10



OCA(H)	A	B	C	D	GROUNDSPEED - DESCENT RATE						
LNAV/VNAV: MNM TEMP 0°C	340 (316)	340 (316)	340 (316)	340 (316)	KT	70	90	100	120	140	160
LNAV	340 (316)	340 (316)	340 (316)	340 (316)	ft/min	372	478	531	637	743	849

Clarification?

info@pvs.aero

Thank You!

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