Point in Space Procedure Design Course

APAC FPP – Beijing, China

(11-15 May 2026)

Tentative Schedule

Date	09:00-10:00	Coffee Break	10:20-11:50	Lunch Break	13:20-14:30	Coffee Break	14:50-16:40
11/05/2026 Mon.	IFR Procedure Introduction M		Cat H IFP Specific Criteria (Departure and Approach) L		PinS Approach Concept M		Criteria for IFR PinS Approach Segments L
12/05/2026 Tue.	PinS Approach Visual Segment (Direct-VS) L		PinS Approach Visual Segment (Manoeuvring-VS) M		PinS Approach Proceed VFR L		Exercise for PinS Approach(Direct-VS) M
13/05/2026 Wed.	Criteria for IFR PinS Departure Segments M		PinS Departure Visual Segment (Direct-VS) L		PinS Departure Visual Segment (Manoeuvring-VS) M		Exercise for CATH Departure L
14/05/2026 Thur.	Exercise for PinS Departure(Manoeuvring-VS) L		PinS RNP APCH for LPV Minima M		Charting and Practice Sharing L		Progress Test
15/05/2026 Fri.	Evaluation		Evaluation				

Let's Focus/Propose/Plan Together

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A United Nations Specialized Agency

PinS RNP APCH for LPV Minima

ICAO APAC FPP Beijing

SBAS Vertical Guidance Benefits

- Lots of IFR helicopters are SBAS receivers equipped
- **Integrity and accuracy improvement**
- **Higher availability**
- A nominal path can be defined everywhere thanks to FAS data block (does not depend on any local ground aid or infrastructure)

- **Lateral and vertical guidance**
- **Reduced landing minima (descend to 250ft)**
- **Easy to fly**

Key advantages for helicopter operations

PinS PROCEDURES DOWN TO LPV MINIMA

FHP (fictitious heliport point) and PinS locations

- **The final approach segment**, ending at the PinS, is oriented on a Fictitious Heliport Point (FHP).
- **Distance requirement:**The horizontal distance between the PinS and the FHP is **equal to 800 meters**.
- **Elevation reference:**The FHP elevation is set equal to the elevation of the landing heliport.

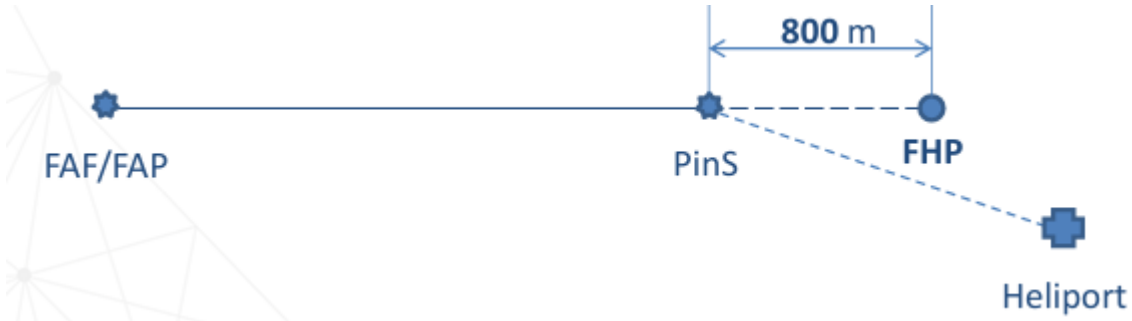
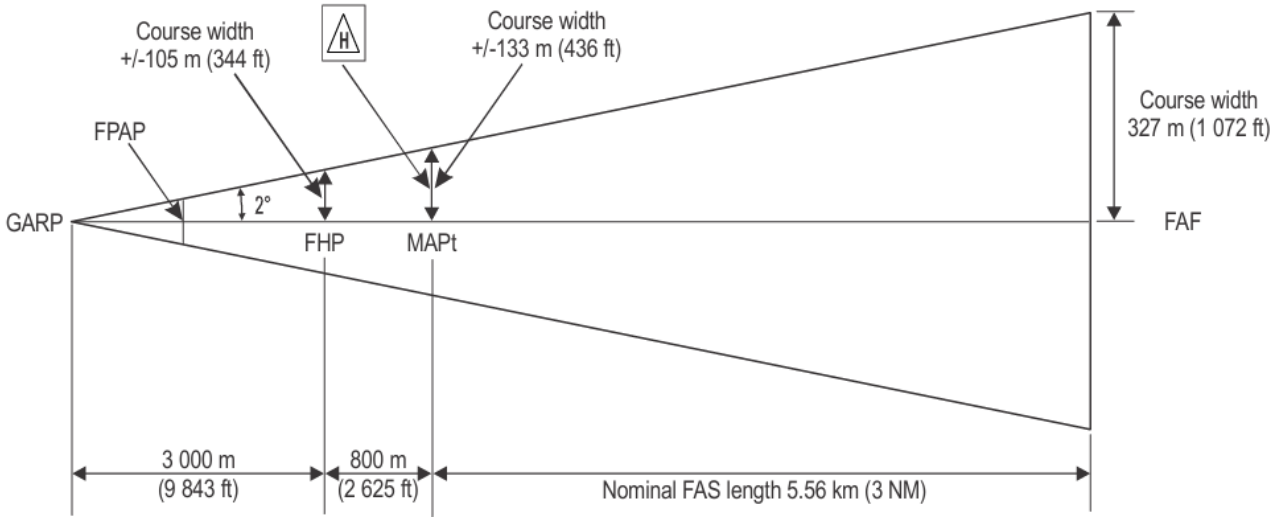


Figure: Schematic illustration of the spatial relationship between the FHP (Fictitious Heliport Point) and PinS (Point-in-Space) along the final approach path.

Display Scaling and Fictitious Helipoint Orientation Lateral display

Flight path alignment point (FPAP)

GNSS azimuth reference point (GARP)



FHP Lateral Course Width

At the FHP, the lateral course width is **+/-105 m**.

Angular Splay

With a 3000 m distance between FHP and GARP, the resulting angular splay is **2°**.

Optimal Flyability

Flight testing has determined the best balance results from an 800m distance between PinS/MAPt & FHP, with a lateral width of **+/-133 m** at the PinS/MAPt.

FPAP Location: positioned **305 m before the GARP**.

Definition of an operational FAS

What is an Operational FAS?

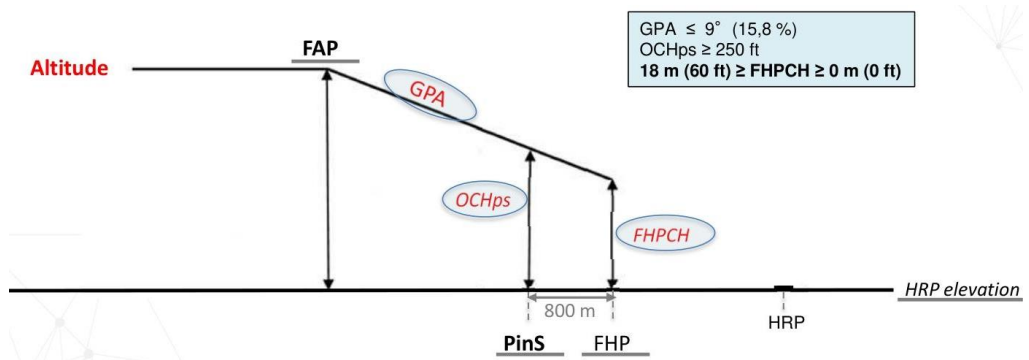
Once the PinS (Point of Intended Touchdown) and the FHP (Final Heliport Point) locations have been defined, an operational FAS (Final Approach Segment) can be established.

Key Assumption:

The OCA/H of the precision segment (OCA/Hps) is equal to the altitude/height of the nominal glide path at the PinS location.

Defining the FAS:

The operational FAS is defined by fixing **two out of three** key parameters: the Glide Path Angle (GPA), the OCA/Hps at the PinS, and the crossing height of the flight path angle above the FHP (FHPCH).



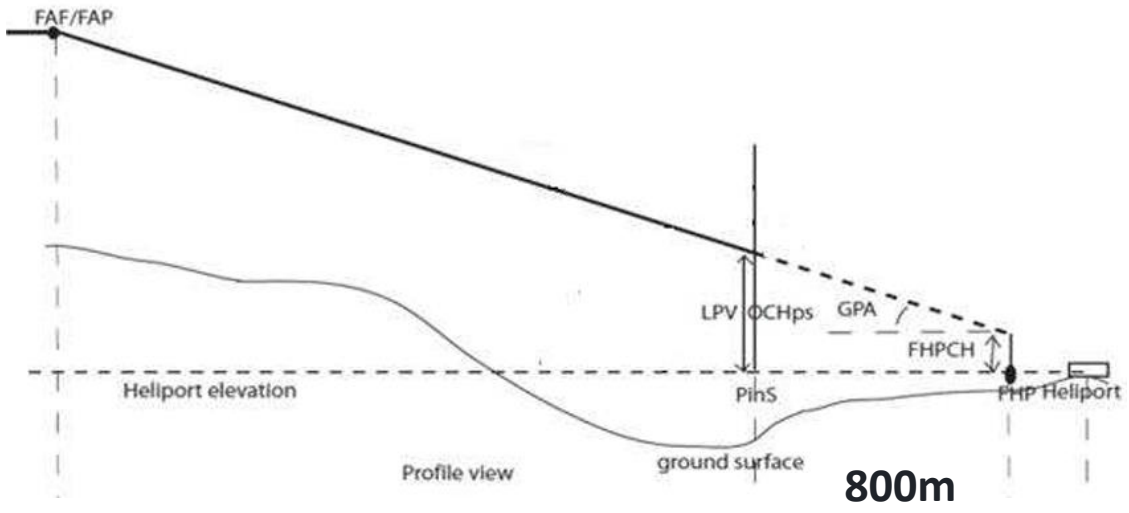
Key Constraints for Parameters:

a) Glide Path Angle (GPA): [redacted] / ⩽ 9° (15.8%)
b) OCHps (at PinS): ⩾ 250 ft
c) FHP Crossing Height (FHPCH): 0 m ⩽ FHPCH ⩽ 18 m (60 ft)

Note: The OCHps is always referenced to the heliport or landing location elevation.

Where an FHP elevation equal to the elevation of the landing heliport leads to an FHPCH greater than 18 m or less than 0 m, a different FHP elevation shall be determine using an FHPCH value of 15 m.

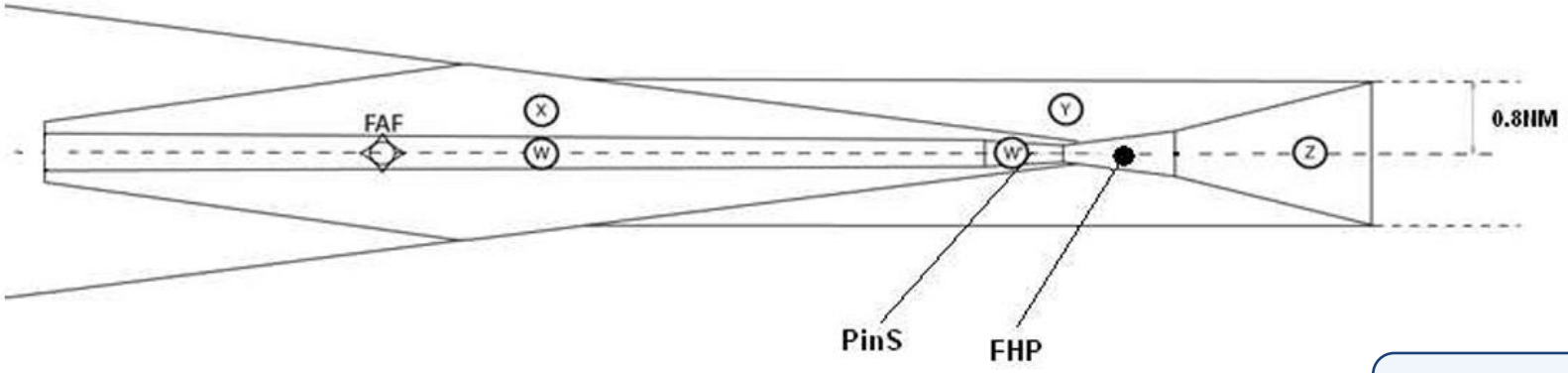
Representation of the LPV PinS APCH

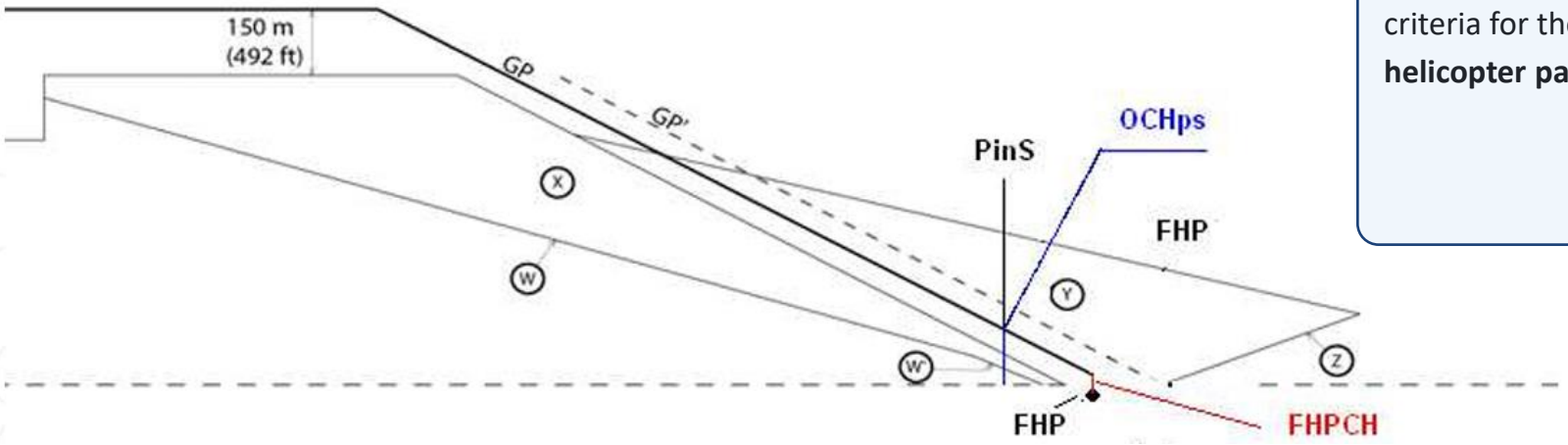


GPA Variations (OCHps = 250 ft)

- For FHPCH = 0 m: GPA = 4.4° (7.7%)
- For FHPCH = 15 m: GPA = 5.4° (9.5%)
- For FHPCH = 18 m: GPA = 4.2° (7.3%)

Representation of the LPV PinS APCH

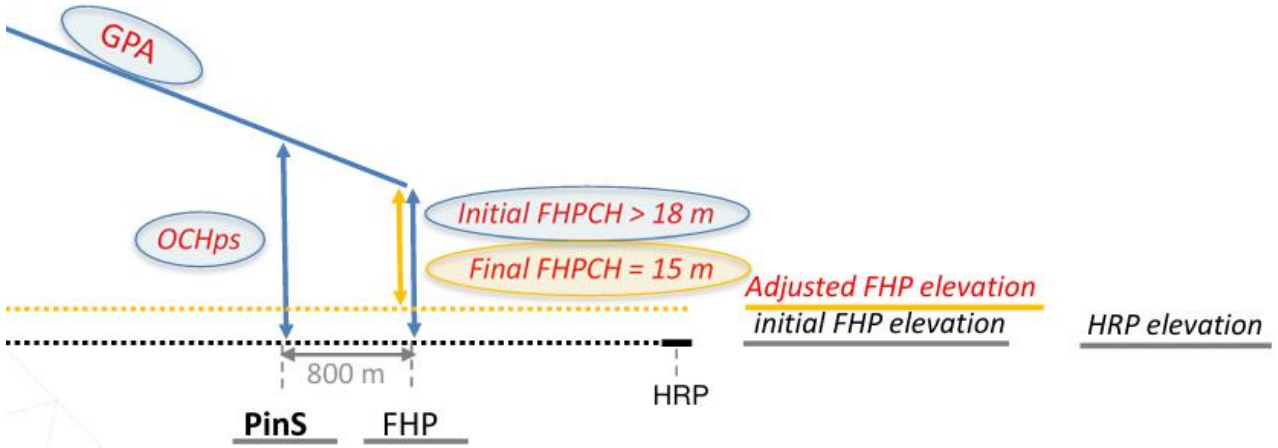




Protection Surface Coordinates & Criteria

The system of coordinates used to express protection surfaces shall be based on the FHP (Final Helicopter Point) location. General obstacle protection criteria for the LPV PinS APCH shall be applied using the standard**Category H helicopter parameters**.

FHP adjustment for FHPCH > 18 m



Condition

- GPA ⩽ 9° (15.8%)
- OCHps ⩾ 250 ft
- Initial FHPCH > 18 m (60 ft)

Result

Final FHPCH is capped to a value:

15 m (50 ft)

Adjustment Formula

To maintain obstacle clearance, the FHP elevation must be increased:

Adjusted FHP = HRP + (Initial FHPCH - 15 m)

FHP adjustment for FHPCH <0 m

📌 Condition

GPA ≤ 9° (15.8%), OCHps ≥ 250 ft, but initial FHPCH < 0 m/ft.

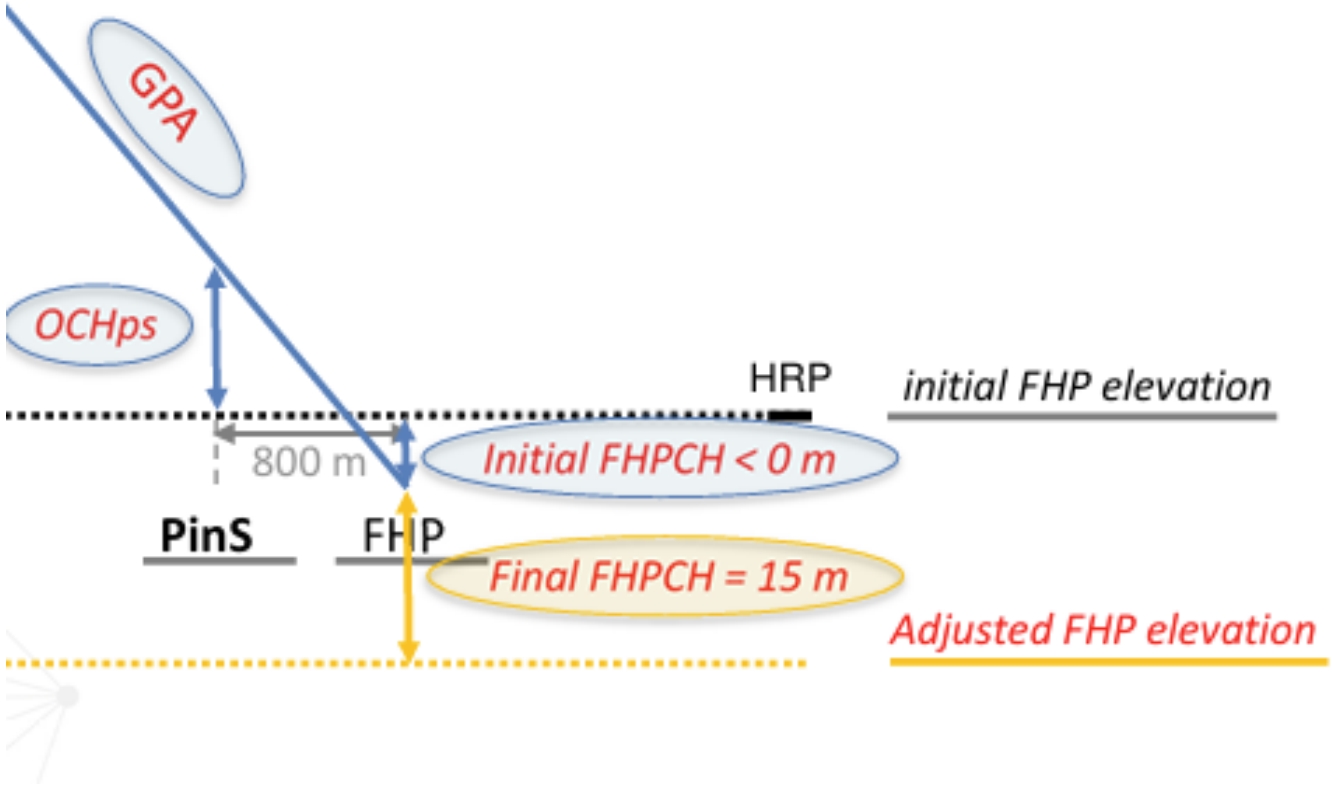
✅ Result

Final FHPCH is set to**15 m (50 ft)**.

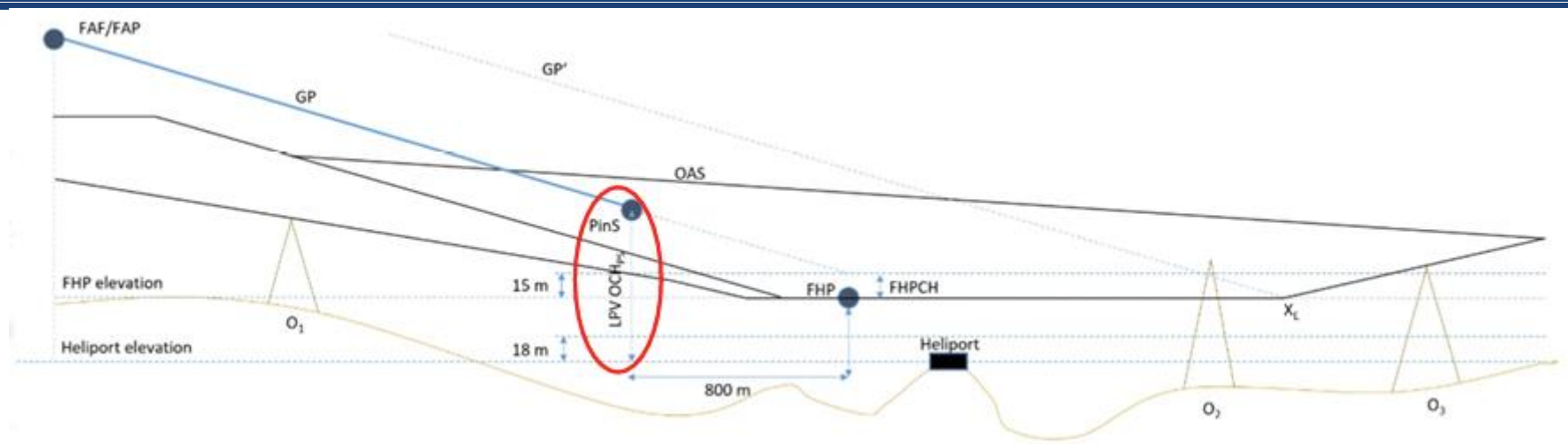
🔢 Formula

Adjusted FHP elevation =

HRP elevation - (15 m - initial FHPCH)



OCHps computation with adjusted FHP elevation



1. New Frame of Reference

The FHP, with its adjusted FHP elevation, defines the new frame of reference for the obstacle assessment, causing the OAS to rise or drop accordingly.

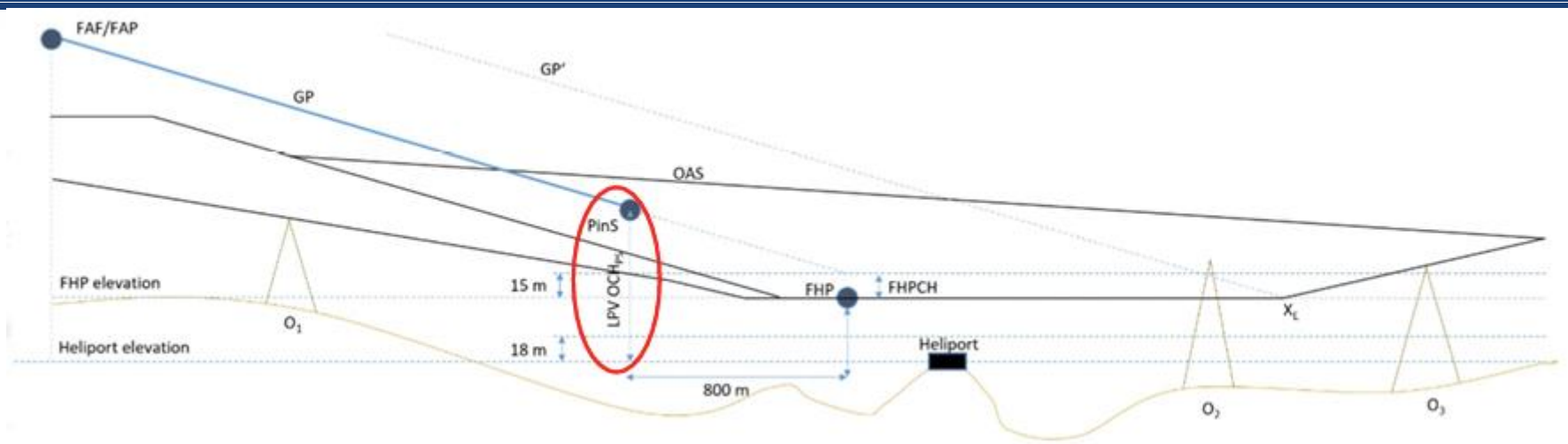
2. Missed Approach Obstacle Conversion

When converting missed approach obstacle heights to equivalent approach obstacle heights for OCA/H determination, all heights must be referenced to the adjusted FHP elevation.

Key Takeaway

The adjustment of the FHP elevation directly impacts the obstacle assessment surface (OAS) and the final obstacle clearance height (OCH). All calculations must consistently use the adjusted FHP as the new vertical datum to ensure safety.

OCHps computation with adjusted FHP elevation



- *The **OCA/H** shall be determined by **adding the appropriate "height loss altimeter margin"** to the height of the highest approach obstacle (real or equivalent), and, in order to account for the adjustment of the FHP elevation, **by adding or subtracting the difference between the adjusted FHP elevation and the landing heliport elevation as appropriate**.*

3. Final OCA/H Calculation

OCA/H = (Highest obstacle height + Altimeter margin) ± (Adjusted FHP elevation - Landing heliport elevation).

ENCODING OF THE FAS DATA BLOCK with an adjusted FHP elevation

01. Obstacle Protection Requirement

The coding of the FAS data block shall ensure in any case ***that the nominal GP crosses the PinS/MAPt at the appropriate OCHps for which obstacle protection is guaranteed.***

02. Data Block Coding Method

This shall be done by ***coding the ellipsoidal height of the adjusted FHP*** along with the **nominal FHPCH of 15 m (50 ft).**

Validation of the chosen operational FAS

a) No Penetration of Protection Surfaces

If no obstacles cause an OCA/H higher than OCA/Hps, the defined operational FAS is acceptable.
However, If not yet the most efficient, redefine the FAS (e.g., decrease OCA/Hps and FAF elevation; or increase GP and keep FAF elevation) and recheck protection surfaces to achieve lower minima.

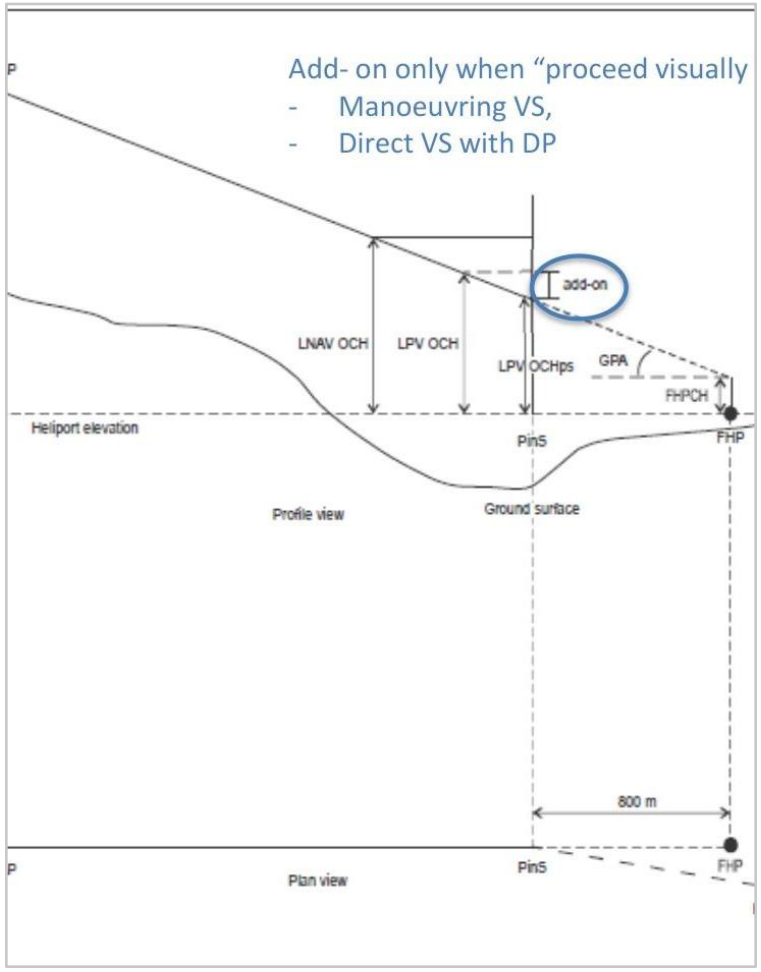
b) Penetration of Protection Surfaces Detected

If obstacles lead to an OCA/H greater than OCA/Hps, the FAS is not acceptable. A new operational FAS must be defined (e.g., increase both OCA/Hps and FAF elevation; or new FAS track decreasing GP) and the new obstacle protection surfaces shall be checked.

The process is iterative:**Check protection surfaces for obstacles → Evaluate OCA/H → (Re)define FAS.**

The goal is to achieve the most efficient procedure by determining the **lowest possible OCH** and ***lowest acceptable GPA***.

Visual phase, vertical profile



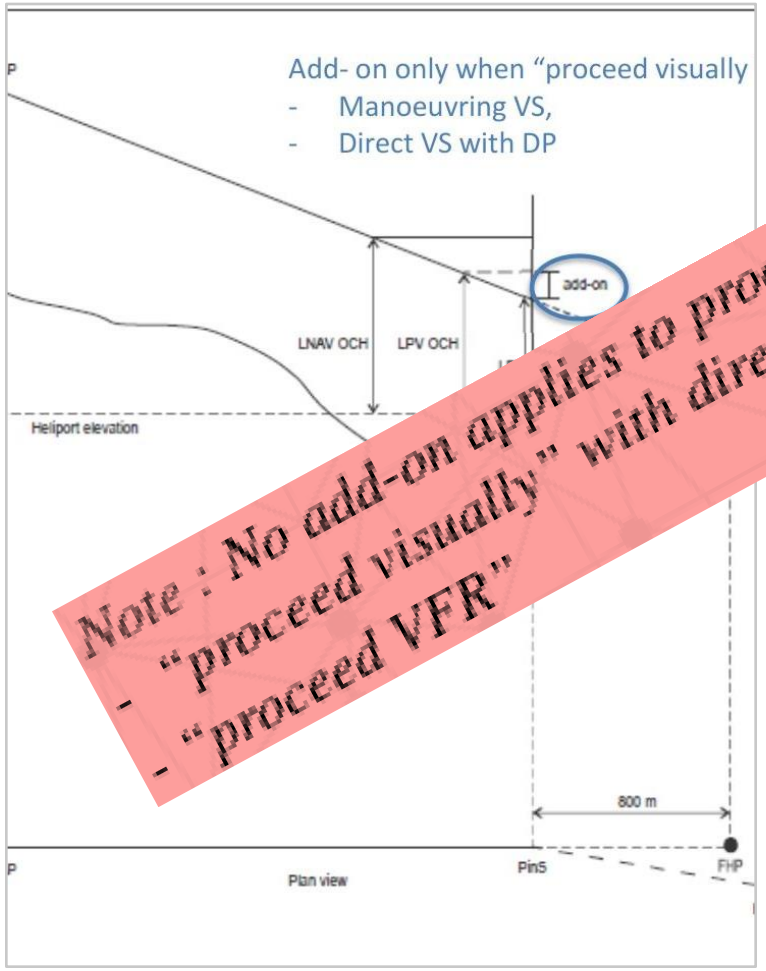
For procedures with “proceed visually” with “manoeuvring VS” or “direct VS” with DP:
In order to ensure adequate transition between the instrument phase of flight and the visual phase of flight, the final OCA/H is calculated by including an **“add-on” value** to the OCA/Hps.

Add-on value (en ft) = 1460 / 102 × GPA (in degrees)

This increase ensures that if the descent is stopped at OCA, the helicopter will be in level flight at OCAps at the PinS location before flying visually.

GPA (°)	Add-on value (ft)	Add-on value (m)
3° / 3.5°	43 / 50	13.1 / 15.3
4° / 5°	57 / 72	17.5 / 21.9
6° / 7°	86 / 100	26.2 / 30.5
8° / 9°	115 / 129	34.9 / 39.3

Visual phase, vertical profile



Note : No add-on applies to procedures with :
- “proceed visually” with direct visual segment without DP
- “proceed VFR”

For procedures … h “manoeuvring VS” or “direct VS” with DP:
In order t… tween the instrument phase of flight and the visual phase of flight, the f… ding an **“add-on” value** to the OCA/Hps.

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PINS RNP APCH with LPV & LNAV MINIMA

When LNAV and LPV minima for a PinS RNP APCH procedure are depicted on the same chart, the PinS and GPA of the two approaches shall be the same. The LNAV GPA shall equal the LPV GPA and shall not be calculated in accordance with paragraph 2.7.5 (see note). As per definition, the LPV OCA/Hps shall be reached at the PinS location and the LNAV OCA/H shall be reached before the PinS.

Note: The GPA LNAV will be equal to the GPA LPV and will not be computed as it is in general criteria §2.7.5: The final segment is calculated from the FAF altitude at the plotted position of the FAF to the OCA/H at the plotted position of the MAPt (PinS location).

Missed Approach

Turning Point (TP) Requirement

The missed approach turn shall be prescribed at a **designated Turning Point (TP)** to ensure consistent and safe execution of missed approach procedures.

Reference: See Part III, Section III, Chapter 5 for further details on TP designation criteria.

Note: TNA Criteria

Currently, criteria for turns at a designated altitude/height or "**as soon as practicable**" are**not defined**but are under active development.

Such criteria may be necessary in specific locations due to obstacle limitations, aiming to optimize the **LPV minima** while maintaining safety margins.

Climb Gradient Considerations

- If a climb gradient **higher than 4.2% (nominal)** yields an operational benefit, it may be designated as the **minimum practicable gradient**. In this case, the standard OCA/H for 4.2% is not published.
- If the nominal 4.2% gradient is operationally required, a **separate procedure** must be published with its specific OCA/H.

Protection of the visual segment

Criteria used for the definition and the protection of the visual segment follow the general criteria for visual segments, with the following key exceptions for SBAS procedures:

OIS Dimensions at PinS (MAPt):

As SBAS OAS not have primary/secondary areas:
OIS outer edge connected to a 741 m (0.4 NM) semi-width;
Level OIS with connected 1,482 m (0.8 NM) semi-width
at the nominal PinS location.

OCA/H Replacement :

The standard OCA/H is replaced by the specific **OCA/Hps** value in SBAS procedures.

MOC Replacement:

MOC is replaced by **height loss margin**, which must be at least 35 meters.

MDA/H Replacement :

MDA/H is replaced by : **(DA/H – "add-on")** value.

Promulgation

PinS approaches to LPV minima shall be promulgated in accordance with**Volume II, Part III, Section 5, Chapter 1**and**Volume II, Part IV, Chapter 2, paragraph 2.11**.

A **vertical profile inset** shall be charted for these procedures, Information depicting the following:

a) visual segment profile;

b) heliport or landing location;

c) location of the MAPt;

d) final portion of the final approach segment;

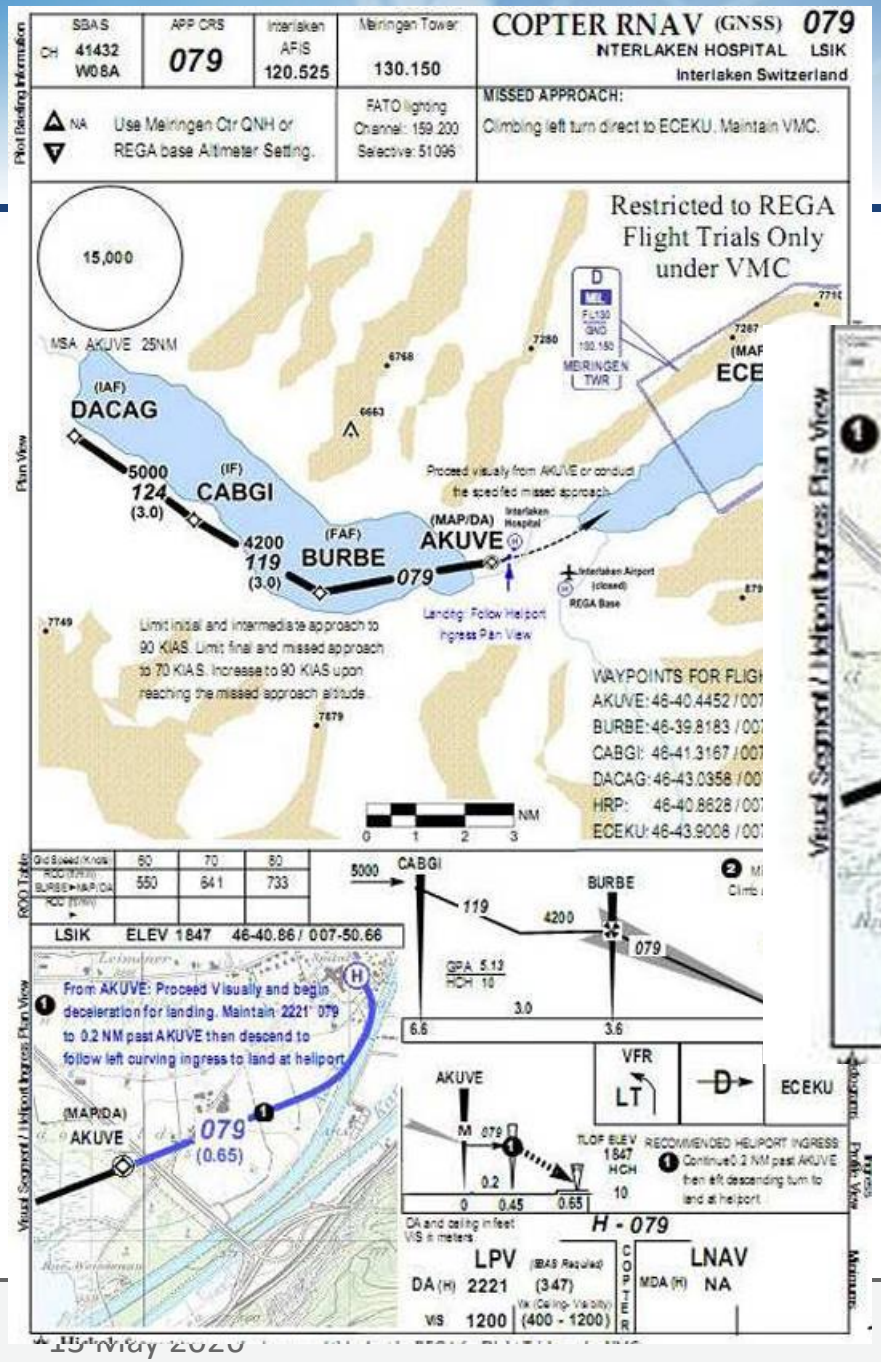
e) heliport elevation;

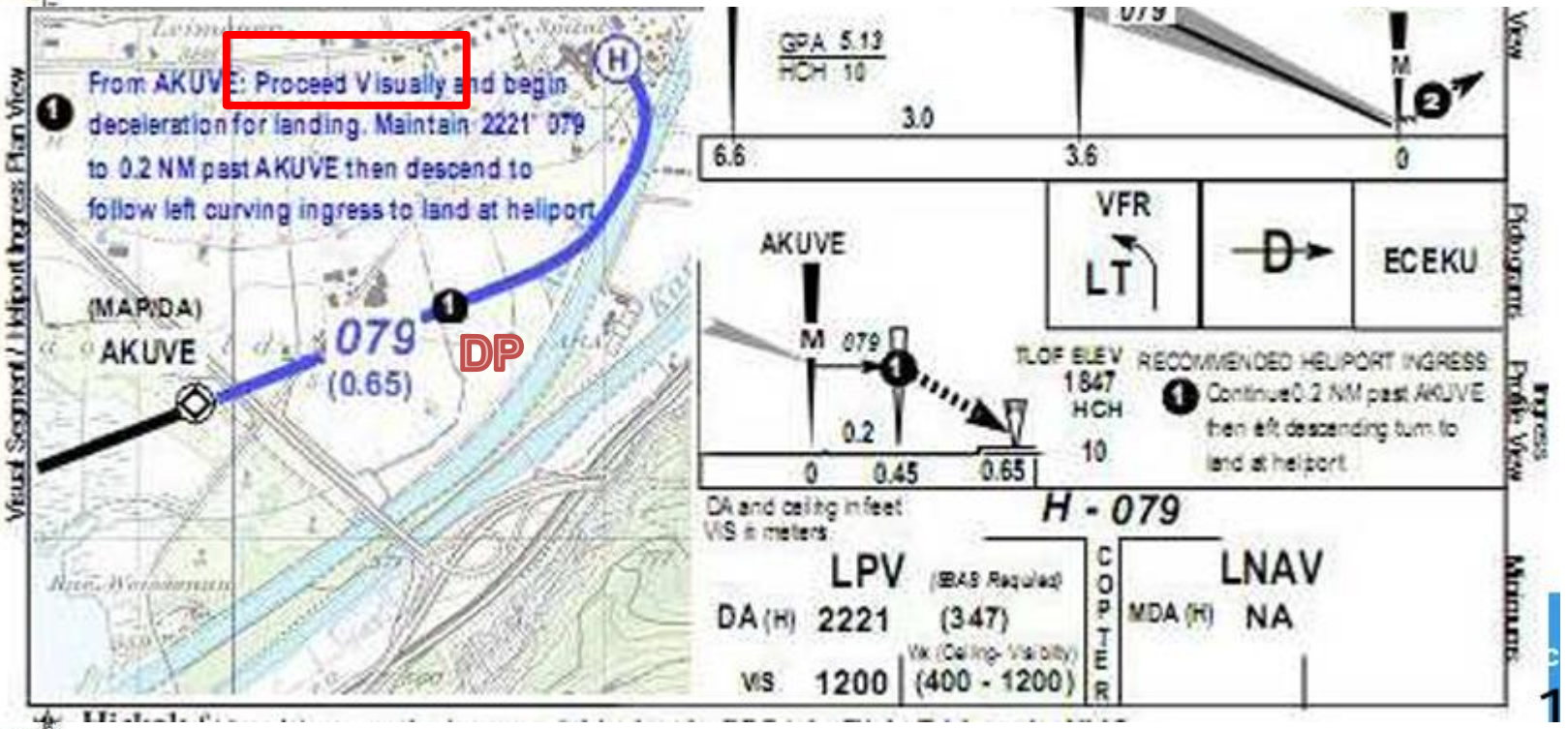
f) HCH;

g) range scale originating from the MAPt to the heliport, which is also used to identify the DP, if one exists in the visual segment;

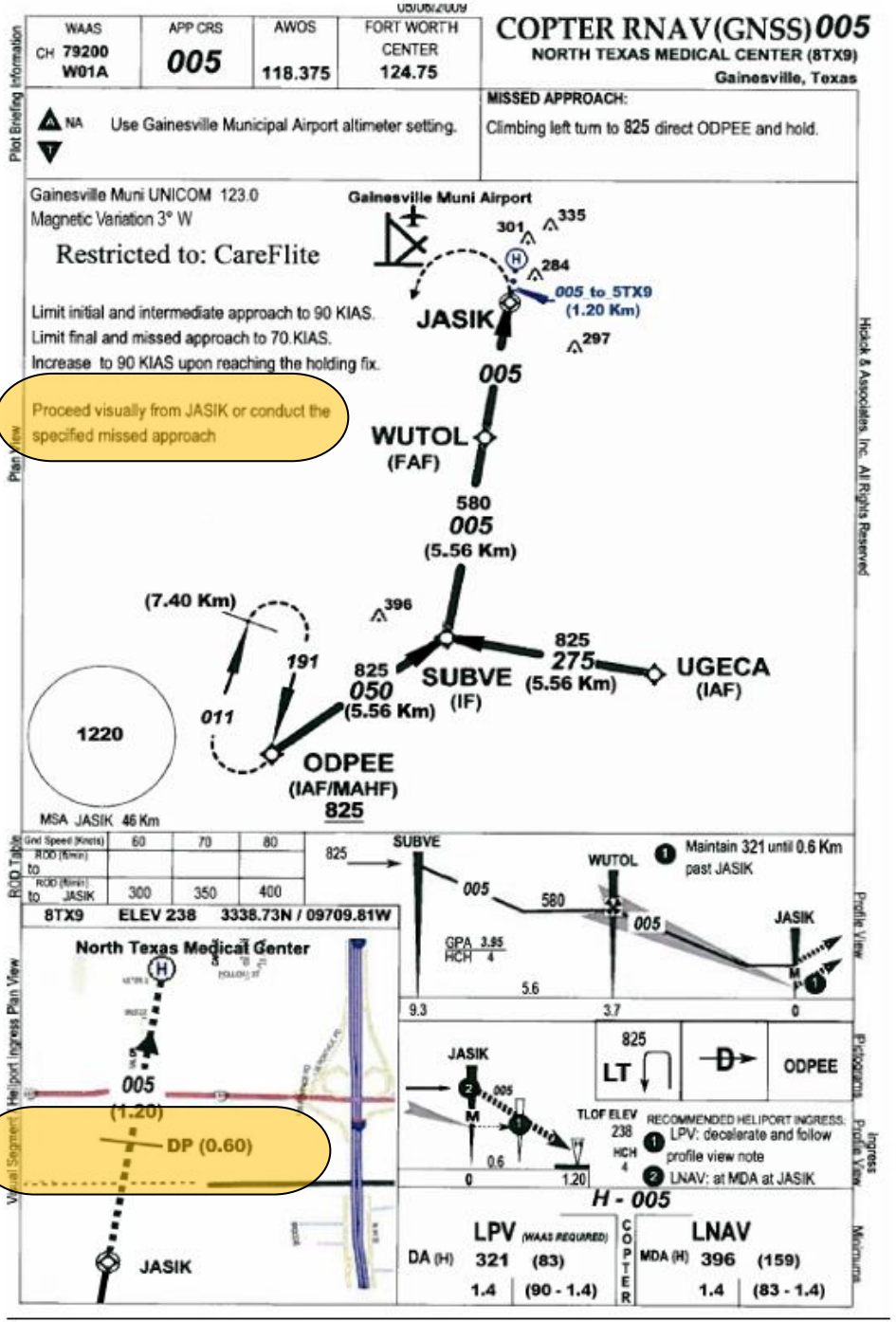
h) visual segment track;

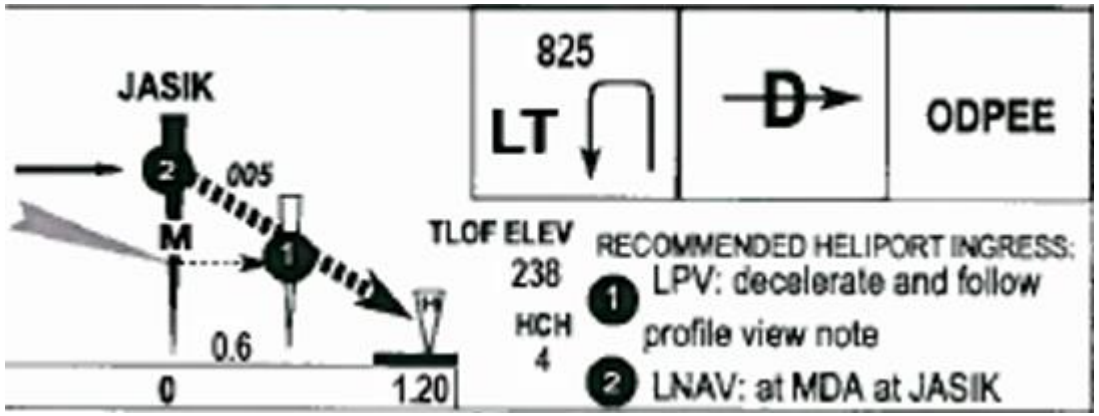
i) necessary notes needed to highlight certain attributes of the visual segment profiles.


COPTER RNAV (GNSS) 079
INTERLAKEN HOSPITAL LSIK
Interlaken Switzerland
SBAS CH 41432 W08A
APP CRS 079
Interlaken AFIS 120.525
Meiringen Tower 130.150
Use Meiringen Ctr QNH or REGA base Altimeter Setting.
FATO lighting Channel: 159.200 Selective: 51096
MISSED APPROACH:
Climbing left turn direct to ECEKU. Maintain VMC.
Restricted to REGA Flight Trials Only under VMC
15,000
MSA AKUVE 25NM
(IAF) DACAG
5000 124 (3.0)
(IF) CABGI
4200 119 (3.0)
(FAF) BURBE
079
(MAP/DA) AKUVE
Proceed visually from AKUVE or conduct the specified missed approach
Landing: Follow Heliport Ingress Plan View
Limit initial and intermediate approach to 90 KIAS. Limit final and missed approach to 70 KIAS. Increase to 90 KIAS upon reaching the missed approach altitude.
WAYPOINTS FOR FLIGHT
AKUVE: 46-40.4452 / 007
BURBE: 46-39.8183 / 007
CABGI: 46-41.3167 / 007
DACAG: 46-43.0358 / 007
HRP: 46-40.8628 / 007
ECEKU: 46-43.9008 / 007
MEIRINGEN TWR
Interlaken Airport (closed)
REGA Base
NM
ROD Table
Grid Speed (Knots) 50 70 90
ROC (ft/min) 550 641 733
BURBE►MAP/DA
LSIK ELEV 1847 46-40.86 / 007-50.66
From AKUVE: Proceed Visually and begin deceleration for landing. Maintain 2221' 079 to 0.2 NM past AKUVE then descend to follow left curving ingress to land at heliport.
(MAP/DA) AKUVE
079 (0.65)
GPA 5.13
HCH 10
3.0
6.6
3.6
0
VFR
LT
D
ECEKU
TLOF ELEV 1847
HCH 10
RECOMMENDED HELIPORT INGRESS
1 Continue 0.2 NM past AKUVE then left descending turn to land at heliport.
0.2
0.45
0.65
DA and ceiling in feet
VIS in meters
H - 079
LPV (SBAS Required)
DA (H) 2221 (347)
VIS 1200 Vx (Ceiling - Visibility) (400 - 1200)
COPTER
LNAV
MDA (H) NA
Plan View
Visual Segment / Heliport Ingress Plan View
Profile View
Ingress Profile View
Minimums


From AKUVE: Proceed Visually and begin deceleration for landing. Maintain 2221' 079 to 0.2 NM past AKUVE then descend to follow left curving ingress to land at heliport.
(MAP/DA) AKUVE
079 (0.65)
DP
GPA 5.13
HCH 10
3.0
6.6
3.6
0
AKUVE
VFR
LT
D
ECEKU
TLOF ELEV 1847
HCH 10
RECOMMENDED HELIPORT INGRESS
1 Continue 0.2 NM past AKUVE then left descending turn to land at heliport.
0.2
0.45
0.65
DA and ceiling in feet
VIS in meters
H - 079
LPV (SBAS Required)
DA (H) 2221 (347)
VIS 1200 Vx (Ceiling - Visibility) (400 - 1200)
COPTER
LNAV
MDA (H) NA
Visual Segment / Heliport Ingress Plan View
Profile View
Ingress Profile View
Minimums

LPV only





- Starting at JASIK (MAPt), the chart depicts two vertical visual segment profiles. The first represents the LPV procedure, Ball Note 1 in the profile view inset clarifies that for the LPV procedure, the aircraft maintains a level flight from PINS to the descent point (0.6 km past JASIK), where the final descent to landing is initiated.
- The second is the vertical profile from JASIK to the HCH for the LNAV procedure. It is highlighted with ball note 2.

Example: FAS DATA BLOCK

Operation Type	0
SBAS Provider	1
Airport Identifier	LFLG
Runway	21
Runway Direction	0
Approach Performance Designator	0
Route Indicator	
Reference Path Data Selector	0
Reference Path Identifier	E21A
LTP/FTP Latitude	451447.0480N
LTP/FTP Longitude	0055220.4130E
LTP/FTP Ellipsoidal Height (metres)	271.0
FPAP Latitude	451333.8980N
Delta FPAP Latitude (seconds)	-73.1500
FPAP Longitude	0055112.9790E
Delta FPAP Longitude (seconds)	-67.4340
Threshold Crossing Height	15.0
TCH Units Selector	1
Glidepath Angle (degrees)	3.60
Course Width (metres)	105.00
Length Offset (metres)	0
HAL (metres)	40.0
VAL (metres)	35.0

Encoding of the FAS DATA BLOCK (1)

a. Operation Type:0 is reserved for straight-in or PinS procedures.

b. Service Provider Identifier:0=WAAS, 1=EGNOS, 2=MSAS, 3=GAGAN, 4=SDCM. ID 15 = any provider, ID 14 = not for SBAS use.

c. Airport Identifier: Encode heliport identifier if available; otherwise use the procedure MAPt waypoint name.

d. Runway Number: Interpreted as the final approach course rounded to the nearest 10 degrees (2 digits).

e. Runway Letter: Since no letter is associated with the procedure, this field is encoded as 00.

f. Approach Performance Designator:*Not used for SBAS operations.*

g. Route Indicator: Encode the same as specified in ICAO Doc 8168, Vol. II, Part III, Section 2, Chapter 6 Appendix A.

h. Reference Path Data Selector (RPDS):*Not used for SBAS operations.*

i. Reference Path Identifier: Use the FAS track rounded to the closest 10 degrees (2 digits). Encode tracks 355° to 004° as 36.

j. LTP / FTP Latitude: Encode the geographic latitude of the Heliport Point (HP) or Fictitious Heliport Point (FHP).

Encoding of the FAS DATA BLOCK (2)

k. LTP/FTP-Longitude: Encode the HP/FHP longitude.

l. LTP/FTP Height Above Ellipsoid (HAE): Encode the HP/FHP height above ellipsoid.

m. Δ Flight Path Alignment Point (FPAP)-Latitude: Δ latitude of a point beyond the HP/FHP aligned with the FAS.

n. Δ Flight Path Alignment Point (FPAP)-Longitude: Δ longitude of a point beyond the HP/FHP aligned with the FAS.

o. Threshold Crossing Height (TCH): The designated crossing height of the flight path angle above the HP/FHP (FHPCH).

p. TCH Units Selector
Encode units.

q. Glidepath Angle
Encode the GPA.

r. Course Width at Threshold
+/- 105 m at HP/FHP.

s. Δ Length Offset
Encoded with a 0.

t. Horizontal Alert Limit (HAL)
HAL = 40 for PinS.

u. Vertical Alert Limit (VAL)
VAL ≤ 50 (vert guidance).

v. Final Approach Segment CRC Remainder
Calculate and encode.


North American Central American and Caribbean (NACC) Office MexicoCity
South American (SAM) Office Lima
ICAO Headquarter Montreal
Western and Central African (WACAF) Office Dakar
European and North Atlantic (EUR/NAT) Office Paris
Middle East (MID) Office Cairo
Eastern and Southern African (ESAF) Office Nairobi
Asia and Pacific (APAC) Office Bangkok
ICAO Asia Pacific Flight Procedure Programme (APAC FPP)
Co-located with ICAO APAC Regional Sub Office(RSO) in Beijing China

End