MINISTÈRE
CHARGÉ
DES TRANSPORTS

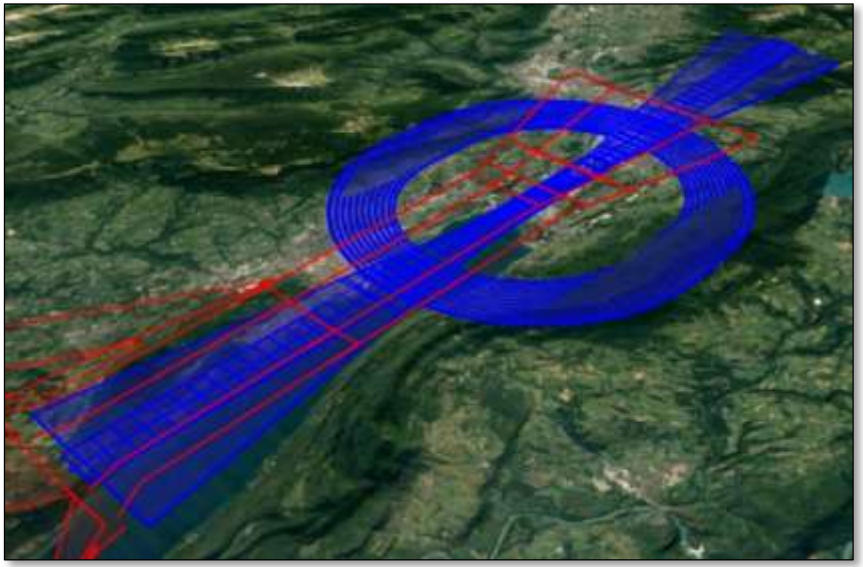
Liberté
Égalité
Fraternité

dgac direction générale de l'Aviation civile

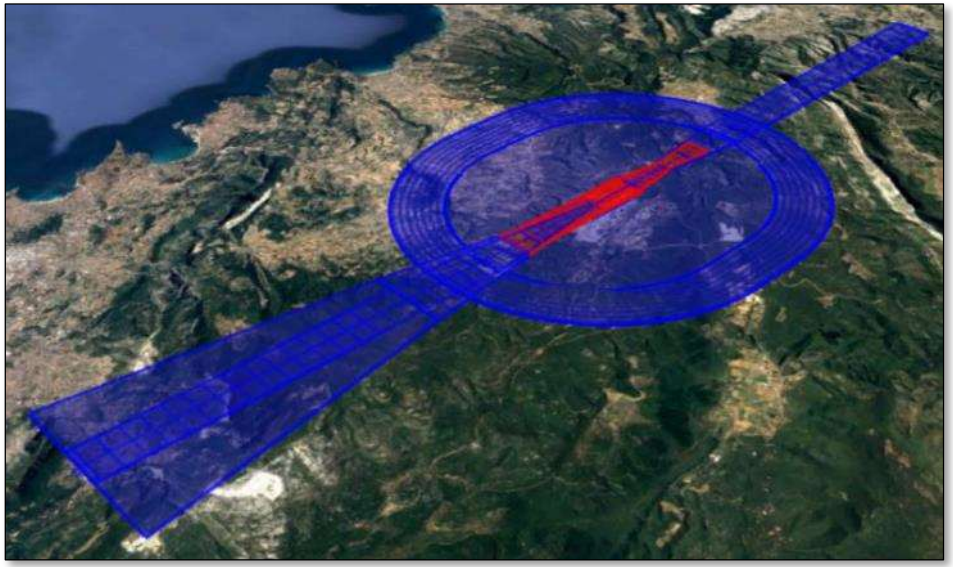
THE NEW SURFACES – OBSTACLE FREE SURFACES (OFS)

1. Principles of the OFS

Principles of the OFS

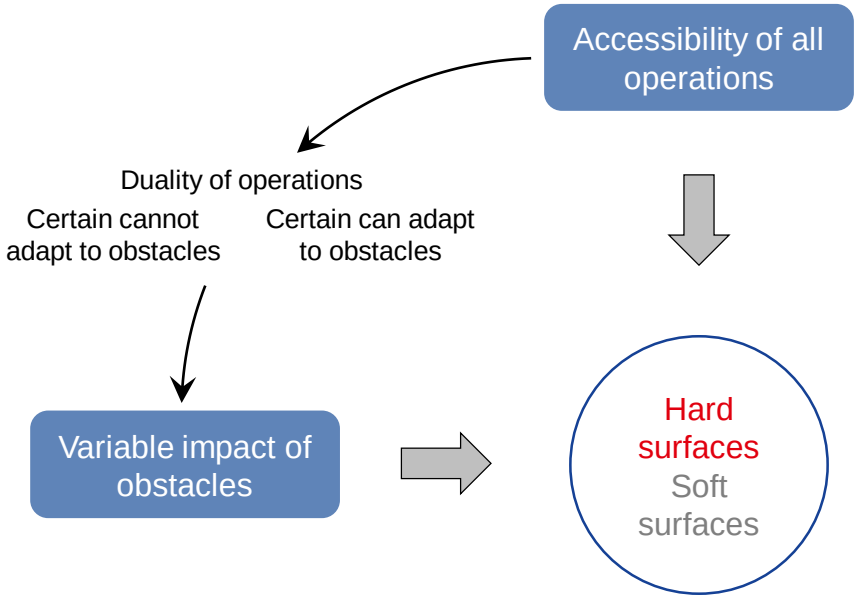


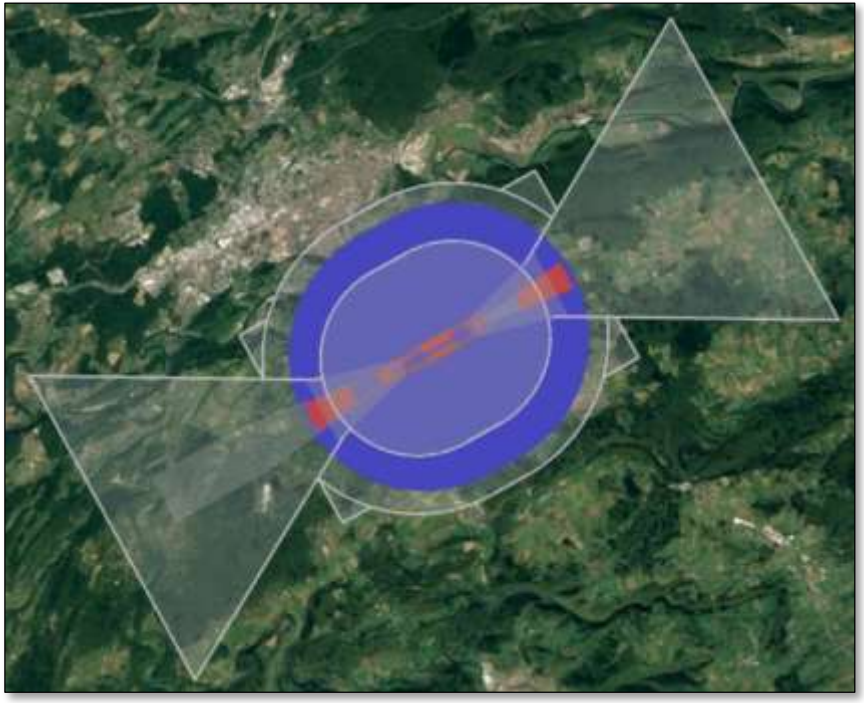
Need to increase **the accessibility to all operations**



Geographical **differentiation of the obstacle requirements**

Principles of the proposed OLS





Principles of the OFS

Consider operations that **can hardly adapt to obstacles**:

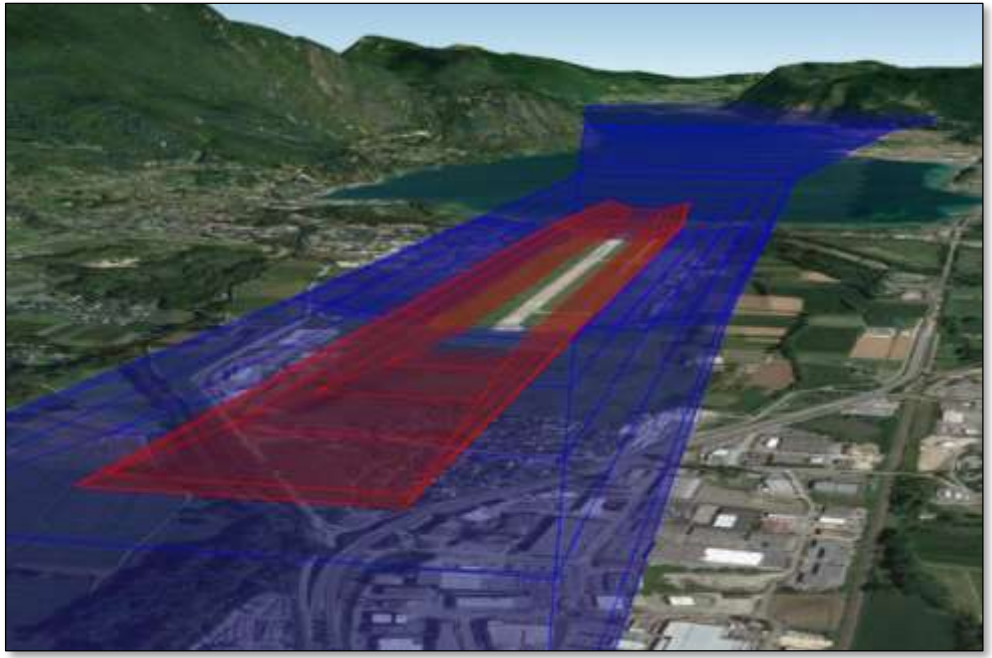
- **Approaches, go-arounds and balked landings**.
- **Take-off climbs**

For **fixed and mobile objects around all runways**

- Blue: Approach, transitional, take-off climb surfaces
- Red: Inner approach (all), inner transitional (all) and balked landing surface (precision)

Strict obstacle limitations.

- Blue: Fixed objects (except installations and equipment)
- Red: Mobile and fixed objects (except visual aids or objects for aircraft safety)



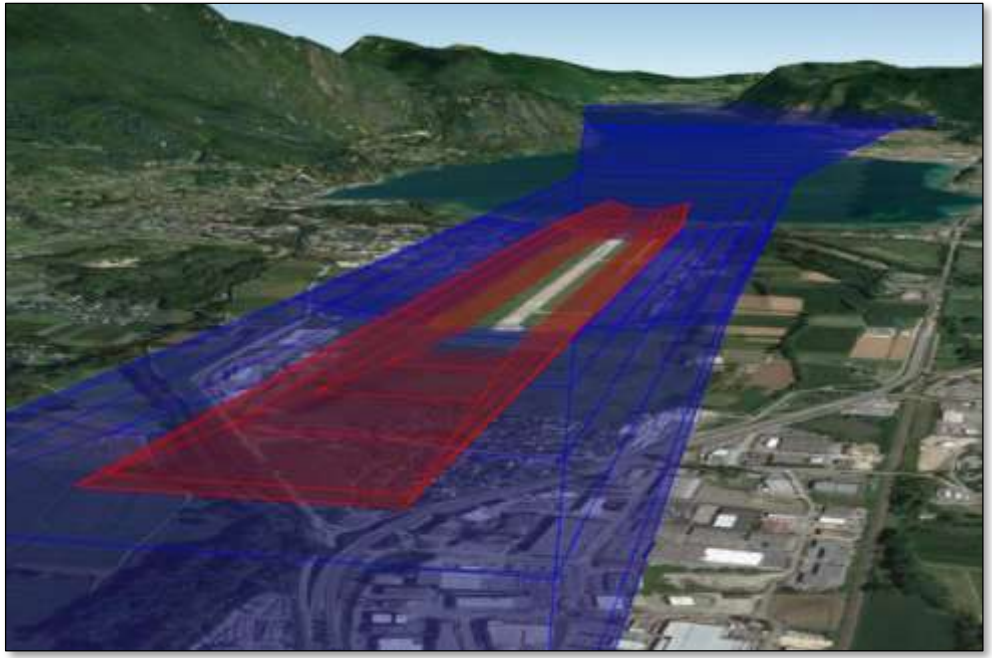
Principles of the OFS

Approach and transitional surfaces:

- Visual phase of instrument approaches and final phase of visual approaches.
- Standard dimensions for straight-in 3° approaches
- Possible adjustments

Take-off climb surface:

- Standard dimensions for straight take-off climbs
- Possible adjustments



2. Dimensions of the OFS

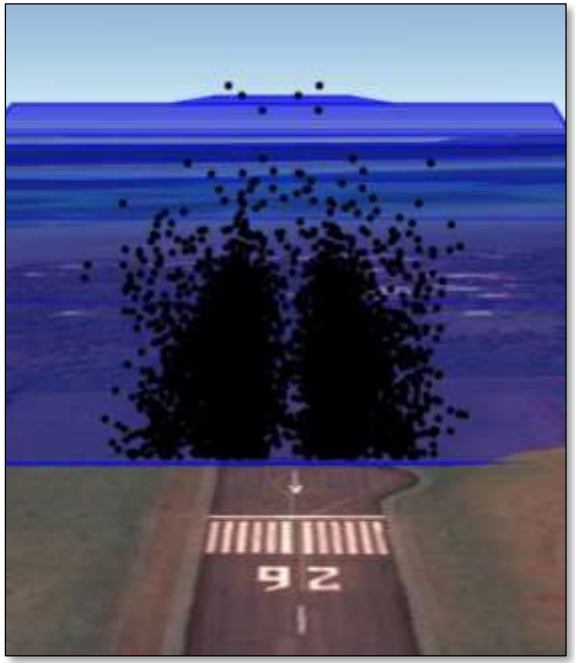
Dimensions of the OFS

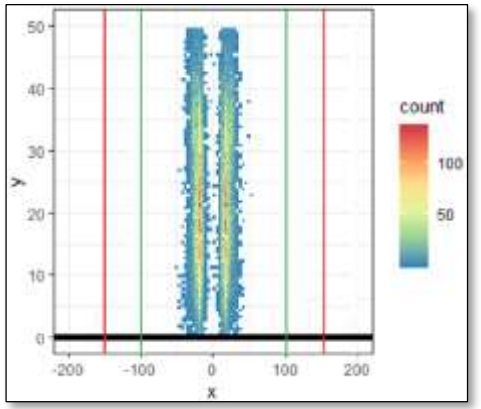
Statistical analysis and modelling of trajectories

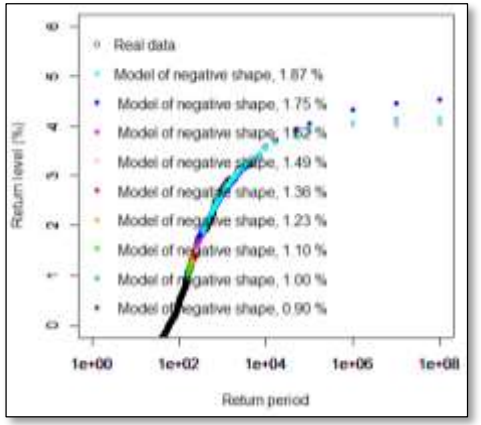
However, gathered trajectories are:

- Horizontally accurate
- Vertically inaccurate

Only for the lateral dimensions of approach surfaces



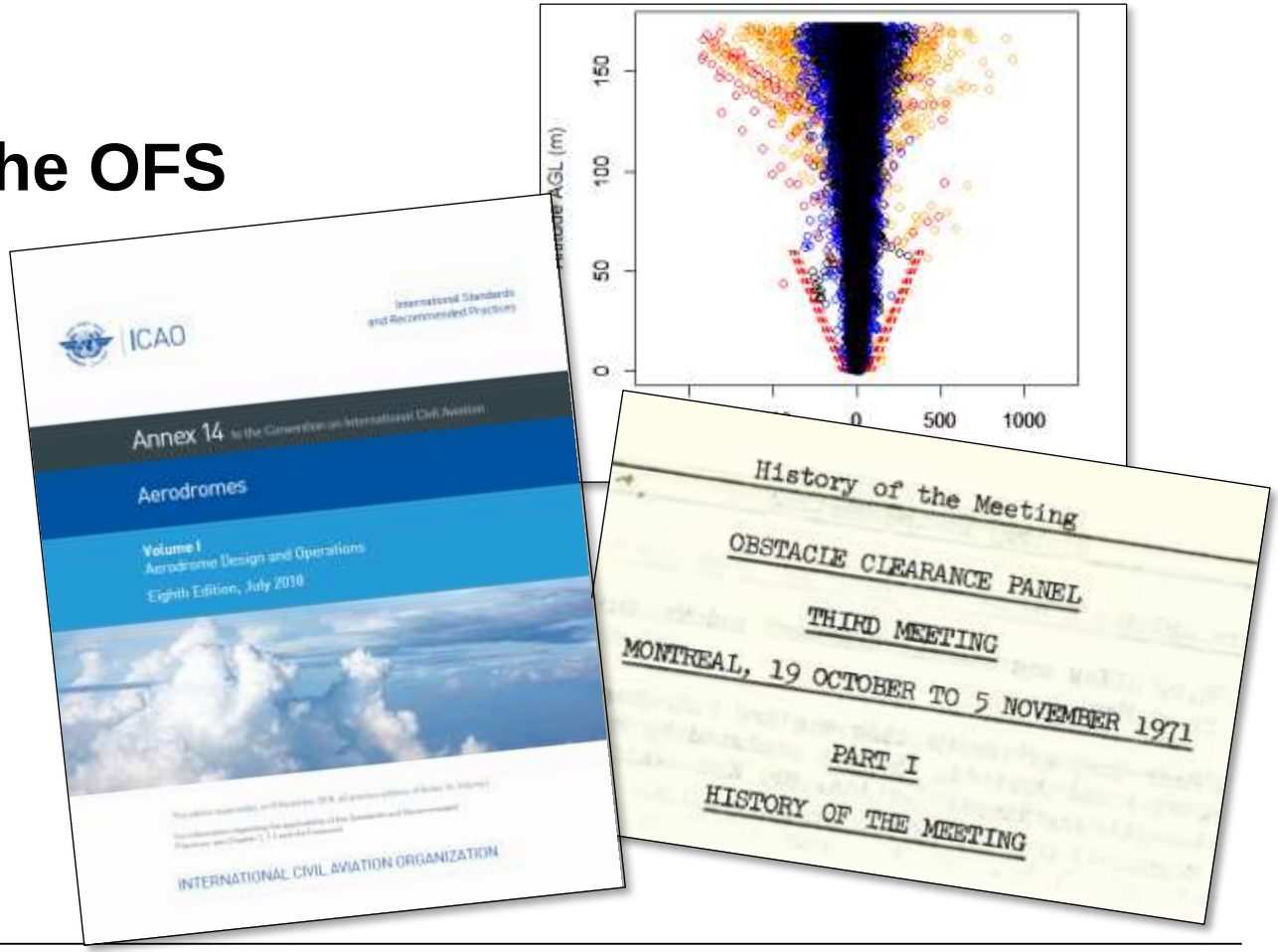




Dimensions of the OFS

For all other dimensions, a qualitative rationale based on:

- Observed trajectories
- Expected performances
- Existing dimensions



Dimensions of the OFS

Approach surface – instrument runways

- As existing
- Statistical deviation of trajectories plus wingspan
- Statistical divergence of trajectories
- Where the slope reaches 500 ft (typical OCH)
- Consistent with VSS, and slope for instrument runway of codes 1/2

Table 4-2. Dimensions and slopes of approach surface — Instrument runways

Aeroplane design Group	I	IIA-IIB	IIC	III	IV	V
Distance from threshold	60 m	60 m	60 m	60 m	60 m	60 m
Length of inner edge	110[a] m	125 m[b]	155 m[c]	175 m	185 m	200 m
Divergence	10%	10%	10%	10 %	10%	10%
Length	4 500 m[d]	4 500 m[d]	4 500 m[d]	4 500 m[d]	4 500 m[d]	4 500 m[d]
Slope	3.33%[e]	3.33%[e]	3.33%[e]	3.33%[e]	3.33%[e]	3.33%[e]

[a] When the runway width is above 30 m, the inner width is increased to 125 m.
[b] When the runway width is above 30 m, the inner width is increased to 140 m.
[c] When the runway width is 30 m or less, the inner width is decreased to 140 m.
[d] See 4.2.1.9.
[e] See 4.2.1.7 and 4.2.1.8.
Note.— See Chapter 11 of PANS-Aerodromes *(Doc 9981, Chapter 11) for further information.*

Safety is ensured by the modelling of real aircraft trajectories, consistency with existing provisions or safe operational objectives.
The approach surfaces are generally less constraining than the current surfaces (except…)

Dimensions of the OFS

Approach surface – non-instrument runways

As existing

Main gear over the runway at THR plus wingspan

Cf divergence on instrument runways

Where aircraft descend through 500 ft

Consistent with existing slopes for non-instrument runways of codes 1/2/3

Table 4-1. Dimensions and slopes of approach surface — Non-instrument runways

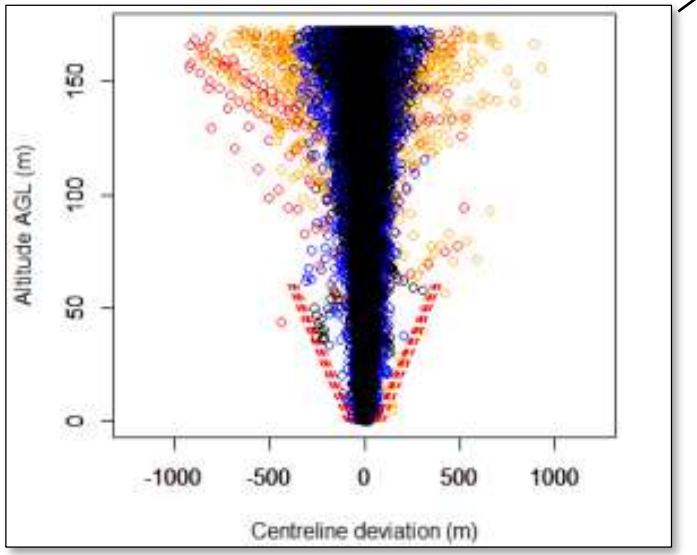
Aeroplane design Group	I	IIA-IIB	IIC	III	IV	V
Distance from threshold	30 m	60 m	60 m	60 m	60 m	60 m
Length of inner edge	60 m[a b]	80 m[c d]	100 m[d]	125	135 m	150 m
Divergence	10 %	10 %	10 %	10 %	10 %	10 %
Length	1 600 m[e]	2 500 m[e]	2 500 m[e]	2 500 m[e]	2 500 m[e]	2 500 m[e]
Slope	5 %[f]	4 %[f]	3.33 %[f]	3.33 %[f]	3.33 %[f]	3.33 %[f]

[a] where runway width is above 23 m and up to 30 m, the inner width is increased to 80 m
[b] where runway width is above 30 m, the inner width is increased to 100 m
[c] where runway width is above 30 m and up to 45 m, the inner width is increased to 100 m
[d] where runway width is above 45 m, the inner width is increased to 110 m.
[e] See 4.2.1.9.
[f] See 4.2.1.7 and 4.2.1.8.
Note.— See Chapter 11 of the PANS-Aerodromes (Doc 9981) for further information.

Safety is ensured by the consistency with existing provisions or safe operational objectives.
The approach surfaces are generally less constraining than the current surfaces (except…)

Dimensions of the OFS

Transitional surface



Statistical deviation of trajectories plus wingspan

Transitional surface with a slope of 20%, starting at the edge of the approach surface, rising to 60 m.

Existing operational hypothesis on balked landings and missed approaches

Safety is ensured by the observation of real aircraft trajectories and consistency with existing safe operational hypothesis.

Dimensions of the OFS
OFZ on precision approach runways

OFZ for all precision approach runways.

Existing dimensions are maintained, but the height is increased to 60 m (instead of 45 m).

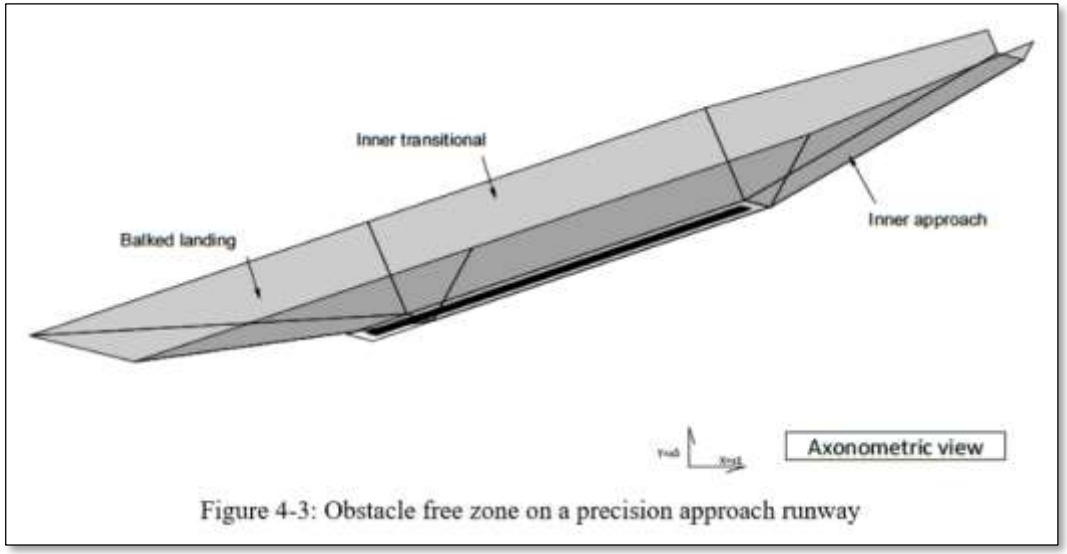


Figure 4-3: Obstacle free zone on a precision approach runway

Safety is ensured by the conservation of existing dimensions.
The surfaces should not affect the holding positions (except where the ADG is "higher" than the existing code)

Dimensions of the OFS

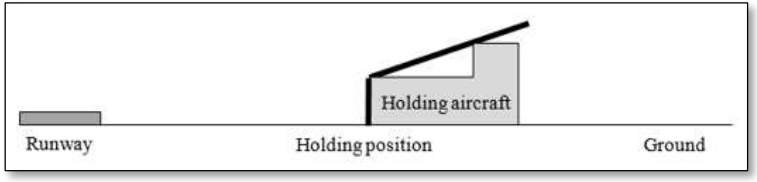
Inner approach and transitional surfaces on other runways

The **inner transitional** surface:

- is compatible with **holding points.**
- have the **slope of the inner transitional surface of the OFZ**

The **inner approach surface** is:

- in the **approach surface**



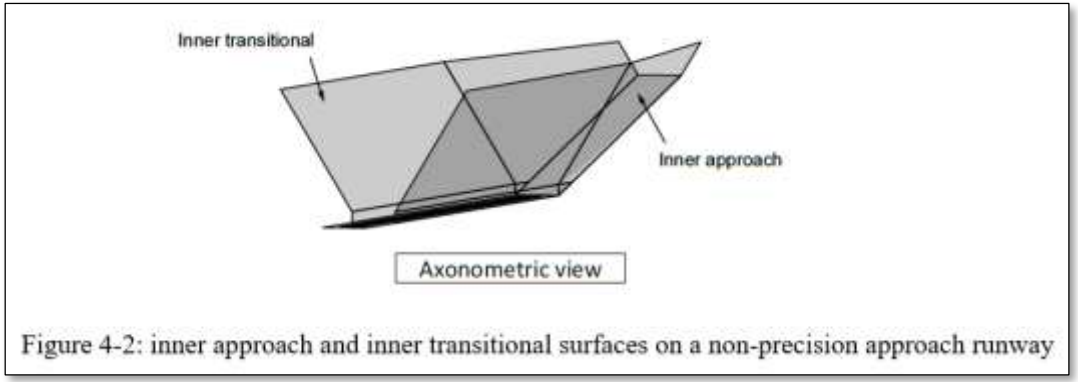


Figure 4-2: inner approach and inner transitional surfaces on a non-precision approach runway

Safety is ensured by the conservation of existing dimensions and the equal treatment of all mobile obstacles.
The surfaces should not affect the holding positions (except where the ADG is "higher" than the existing code)

Dimensions of the OFS

Take-off climb surface

As existing

Table 4-13. Dimensions of take-off climb surface – runways with operations of aeroplanes with a mass up to 5 700 kg

Aeroplane design group	I	IIA-IIB	IIC[a]	III[a]	IV[a]	V[a]
Distance from TODA[b]	30 m	60 m	-	-	-	-
Length of inner edge	60 m	80 m	-	-	-	-
Divergence (each side)	10%	10%	-	-	-	-
Final width	380 m	580 m	-	-	-	-
Length	1 600 m	2 500 m	-	-	-	-
Slope	5%[c]	4%[c]	-	-	-	-

a. Aeroplanes with a mass up to but not including 5 700 kg generally belong to aeroplane design groups I, IIA and IIB.
b. The take-off climb surface starts at the end of the clearway if the clearway length exceeds the specified distance.
c. The operational characteristics of aeroplanes for which the runway is intended should be examined to see if it is desirable to reduce the slope when critical operating conditions are to be catered to. The degree of this reduction depends on the divergence between local conditions and sea level standard atmospheric conditions, and on the performance characteristics and operational requirements of the aeroplanes for which the runway is intended. It may be advisable for the slope to be reduced to as low as 1.6%.

Safety is ensured by the conservation of existing dimensions.
The take-off climb surface is generally as constraining as the current surface (except…)

Dimensions of the OFS

Take-off climb surface

As per Annex 6 requirements

To match the Type A Chart (and satisfying height)

Consistent with PANS-OPS (under assessment)

Table 4-14. Dimensions of take-off climb surface – runways with operations of aeroplanes with a mass above 5 700 kg

Aeroplane design group	I	IIA-IIB	IIC	III	IV	V
Distance from TODA	-	-	-	-	-	-
Length of inner edge	144 m	156 m	156 m	172 m	180 m	180 m
Divergence (each side)	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
Final width	1 800 m[a]	1 800 m[a]	1 800 m[a]	1 800 m[a]	1 800 m[a]	1 800 m[a]
Length	10 000 m	10 000 m	10 000 m	10 000 m	10 000 m	10 000 m
Slope	2.5%[b]	2.5%[b]	2.5%[b]	2.5%[b]	2.5%[b]	2.5%[b]

[a] Where given operational conditions and performances are met, the final width can be decreased. Specifications concerning this reduction are contained in PANS-Aerodromes (Doc 9981, Chapter 11).

b. The operational characteristics of aeroplanes for which the runway is intended should be examined to see if it is desirable to reduce the slope when critical operating conditions are to be catered to. The degree of this reduction depends on the divergence between local conditions and sea level standard atmospheric conditions, and on the performance characteristics and operational requirements of the aeroplanes for which the runway is intended. It may be advisable for the slope to be reduced to as low as 1.6%.

Safety is ensured by the conservation of existing criteria.
The take-off climb surface may vary from the existing ones, but will be consistent with existing criteria