

## Embracing Change

### Introduction on the new concept and surfaces

(Total no. of words: 2250. Duration: 28 minutes)

#### Slide 1

Once again, hello to everyone. My colleague Aubin has shared in his presentation the gaps associated with the existing Obstacle Limitation Surfaces. The task force viewed these gaps as areas of improvement and have come up with proposals that will help to address them.

#### Slide 2

One of the key challenges faced by the task force is in deciding the approach or method to be used in making changes. There are existing surfaces which are still relevant and do not need to be reviewed. The task force proceeded on identifying existing surfaces which are deemed not performing the function that it is intended for.

#### Slide 3

The method chosen is critical in ensuring the surfaces do not just undergo 'cosmetic' changes. The task force had considered two possible methods in conducting the review. One possible method is to limit the changes to just modifying the surfaces without reviewing the concept. In the next few slides, I will explain why this method is not desirable. The other option or method is to conduct a holistic review of the concept, make adjustment to the surfaces where required and introduce additional surfaces if needed.

#### Slide 4

From this illustration, you can see that making lateral adjustment to cover additional airspace will result in having surfaces that are over conservative. At the same time, it is a challenge to define a single surface with specific dimensions as it may not contain all type of operations. Lastly, the more extensive surface will hamper and constraint land use further. It will impose a more constraining height limit compared to today's surfaces.

## Slide 5

This illustration shows the impact of reducing the length of the surfaces. In this case, the approach surface. Presently, this surface extends up to distance of 15 kilometres. The broad purpose of these surfaces is to define the volume of airspace that should ideally be kept free from obstacles in order to minimize the dangers presented by obstacles to an aircraft, either during an entirely visual approach or during the visual segment of an instrument approach. If we design the surface based on this purpose, we can reduce the length considerably. However, by reducing the length, areas beyond will not be protected. In order to reduce the length, additional surfaces will need to be introduced.

## Slide 6

The data used in reviewing the surfaces confirm that it is possible to raise the slope of the surfaces. You can see from the illustration that raising the slope will result in areas below the surfaces being exposed to likely obstacles that could impact the safety and regularity of operations. Likewise, additional surfaces are needed to protect the different operations conducted at the aerodrome.

## Slide 7

Based on slides 4 to 6, we realise that it is not possible to just make 'cosmetic' changes to the surfaces as there are trade-offs that are not acceptable. A more holistic review of the concept and surfaces are required where the possibility of having additional surfaces will need to be considered. How then we conduct such a holistic review. What principles should be considered and used as guidance in this review exercise. Let's look at some of these principles adopted by the task force to guide us in the review.

## Slide 8

The concept was developed based on the agreed principles or philosophies. These principles guide the task force in reviewing the existing surfaces and identifying materials that will need to be developed in PANS-Aerodromes and Annex 14.

The first principle involves the determination of the protection surfaces required to protect the airspace for the intended flight operations. The surfaces should protect

the volume of airspace necessary to allow existing and planned operations of a given aerodrome.

The second principle is to ensure the adequacy and proportionality of the dimensions of surfaces. This is to guide the task force in:

- a. Limiting the requirements to what is strictly necessary.
- b. Making a clear distinction between what is necessary for safety and/or accessibility;
- c. Ensuring that future aircraft performance and navigation capabilities can be accounted for;

The third principle is to give States some flexibility to extend the requirements to make them either more or less restrictive. The purpose for allowing this flexibility is to empower States and aerodrome operators to make informed decision on what is needed at the aerodrome to account for existing and planned or future operations. Some of these flexibility includes:

- a. Allowing authority to make an OES, or parts thereof, a free surface;
- b. Allowing authority to adapt and make adjustment to an OES to support a specific operation
- c. Allowing authority to adjust an OFS based on the type of operations conducted at the runway. For example, when there is curved approaches or when the approach angle is higher than the designed angle of 3 degrees.

The fourth principle is to use PANS Aerodromes as a tool to ensure a harmonized application of the surfaces worldwide. The PANS Aerodrome will:

- a. Provide guidance on application of OFS-OES at aerodromes.
- b. Specify procedures for the control of obstacles by authorities.
- c. Provide rational justification to support States in their Zoning/Urban planning decisions
- d. Provide detailed guidelines on the how to modify or adapt OFS and OES
- e. Provide guidance for the conduct and/or evaluation of Aeronautical studies

Looking at existing surfaces, the gaps and applying the principles shared in the earlier slides, several changes will have to be made to the current concept and the surfaces. These changes proposed by the task force will bring about a paradigm shift in how airspace protection is done. The changes to be proposed by the task force include:

- a. Introducing a new concept on airspace protection. The new concept involves having surfaces which have clear purposes and application. These surfaces are selected based on the type of runway and operations conducted at the runway. In addition, there will be flexibility built in the surfaces where they can be adapted to existing and future needs of the runway and aerodromes. To support these adaptability and flexibility, the task force will be including the necessary standards and recommended practices in the Annex and further elaboration in the PANS-Aerodromes. States and aerodrome operators will have sufficient guidance to assist them in implementing these proposed surfaces.
- b. The task force members had also reviewed existing OLS dimensions. The task force members see the need to provide clarity on the application of these surfaces. Those surfaces that are closer to the runway and deemed critical for the final phase of approach or initial phase of take-off are rebranded as Obstacle Free Surfaces. By just looking at the term OFS, we know that these surfaces shall be kept clear of obstacles. However, based on our experiences with the application of existing surfaces, we expect that there will be obstacles that penetrate these surfaces. As such, the task force is mindful to include mandatory requirements for an aeronautical study to be conducted under such situations. Special provisions will also be made available to address the issue relating to holding aircraft at runway holding position penetrating the approach surface.
- c. The task force sees a need to reinforce the OLS with additional surfaces termed as Obstacle Evaluation Surfaces (OES). These evaluation surfaces are additional surfaces that safeguard the flight operations or procedures that are designed for the runway. When penetrated, it will trigger an aeronautical study. The aeronautical study is required to examine the impact of the penetrations on the flight operations or flight procedures. The study is also intended to identify the necessary mitigations needed when there is impact. Unlike the free surfaces, the evaluation surfaces are more flexible and can be adapted to account for the obstacle environment. The characteristics and dimensions of these surfaces are mostly adopted from PANS-Operations. Participants may recall in my first presentation; I mentioned the need to harmonize these two groups of surfaces together. Unlike in PANS-OPS where these surfaces function more of obstacle assessment or identification surfaces, in Annex 14, these surfaces will be elevated to be safeguarding surfaces which can be included by States or aerodrome operators into their local legislation and possibly zoning laws.

- d. The other key change that participants will get to know is the introduction of the Aeroplane Design Group (ADG). Most of you are aware that today's surfaces are tabulated and categorized using the Aerodrome Reference Code Number 1 to 4. The task force assessed and had consulted several stakeholders on the relevancy of the ARC. It is was decided that the aeroplane design group, using the aircraft's approach speed at threshold and wingspan are more appropriate means of categorizing the proposed OFS and OES. You will hear more on the details of the ADG on the second day of the symposium.

### Slide 10

The task force is proposing a review of the OLS concept. OLS is now made up of two sets of surfaces: Obstacle Free Surfaces and Obstacle Evaluation Surfaces. These surfaces will have clear purposes which are distinct and make them easy to implement. By rebranding certain OLS surfaces as OFS and introducing additional surfaces as OES, the entire OLS concept is strengthened. The OFS protect the usability of aerodromes whilst OES protect the usability of the flight procedures. Both these surfaces contribute to safety and efficiency of flight operations.

### Slides 11 and 12

Obstacle Free Surfaces (OFS) are set of surfaces applies within a defined airspace to be maintained free from obstacles with the following exceptions:

- a. Existing Obstacles and/or terrain
- b. Visual aids required for air navigation or for aircraft safety purposes and which need to be sited within the OFS and satisfying the relevant frangibility requirement

The Approach, Transitional, Take-off climb surface, Inner Approach, Inner Transitional and Balked Landing will be proposed OFS surfaces. The task force will be retaining the current definition and composition of the Obstacle Free Zone. Based on the new concept, the OFZ will consist of the inner approach OFS, inner transitional OFS and balked landing OFS.

For precision approach runway, the inner transitional surface of the obstacle free zone is being used to control mobile objects such as aircraft and vehicle. However, there is no similar surface made available for non-precision and non-instrument runways. The task force will be proposing an inner transitional OFS for non-precision and non-instrument runways.

Penetration of OFS by new obstacle shall be discouraged. Appropriate wordings will be captured in the SARPS to ensure States do not allow penetrations which are likely to affect safety, efficiency and capacity. Options such as displacing the threshold and adjusting the approach slope are not recommended and should be done only when it is deemed necessary.

Most of the surfaces will be adjusted. Participants can expect an Approach OFS that is narrower, steeper, and shorter in length as compared to current OLS dimension. Being less restrictive doesn't compromise safety as there are other surfaces below and beyond the approach OFS that protect operations. These are the OES surfaces.

In areas where data quality is not acceptable, the task force will examine other factors to determine the surfaces. This qualitative assessment also considers other best practices and existing provisions in ICAO's Annexes and PANS documents.

### Slide 13

Obstacle Evaluation Surfaces (OES) are additional surfaces that are applied in a defined airspace, below and beyond the OFS, to be evaluated against obstacles. The purpose of the Obstacle Evaluation Surfaces is to determine the acceptability of obstacles by evaluating their impact to planned or existing operations outside the OFS, both on safety and regularity. This is done through aeronautical study.

The OES act as a trigger for an aeronautical study which will evaluate the potential impact of obstacles to planned or existing aeroplane operations outside the OFS. The penetration may be acceptable when after the aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

The task force acknowledged that it is not practical and desirable to have all templates associated with flight procedures to be included in the Annex 14. As such, only OES associated with flight procedures that are generic such as straight-in approaches will be defined in Annex 14. For those not specified in the Annex, the relevant authority will need to define these surfaces to account for operations that are specific to the runway. This practice is no different than today but by making it a requirement for authorities to define the necessary OES to protect the various operations, we can ensure the airspace is protected and safeguarded against any potential obstacles that could have an adverse impact to safety and regularity. You will get to know more of the OES tomorrow.

The OES are defined based on PANS-Operations Doc 8168 criteria. States shall consider current and future flight procedures when deciding on the required OES for the

aerodrome. States have the flexibility to either vary an OES to make it into a specific OES or adopt an OES as a free surface.

The task force acknowledged that there will be authorities that may want to retain the existing OLS. This will not be possible once SARPS are applicable. However, States may consider retaining the current dimensions which are more stringent than the proposed OFS. There will be considerable trade-offs if authorities were to embark on this approach.

That is the end of my introduction on the new concept and OFS and OES. Tomorrow, my fellow speakers will be elaborating and showing you details of OFS and OES. There will also be a demonstration on how these surfaces are being applied.

Thank you.