



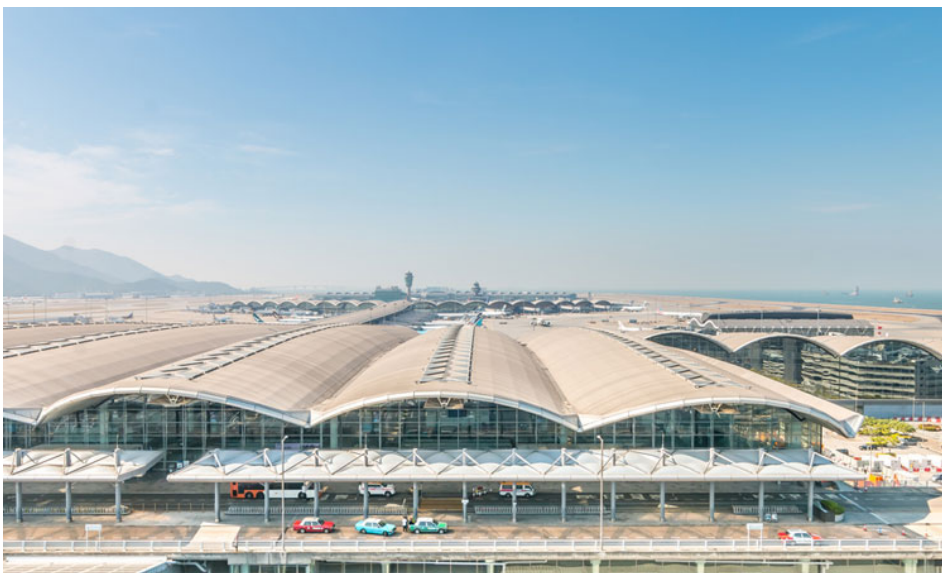
Thirty-Third Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/33)

Bali, Indonesia, Hybrid Meeting, 22 to 24 November 2022

**Agenda Item 3.4:
WP/18 - DEVELOPMENT OF
FULLY INTEGRATED SAFEGUARDING SURFACES
TO UPHOLD FLIGHT SAFETY WHILE FACILITATING PRESSING NEEDS OF
INFRASTRUCTURE/BUILDING DEVELOPMENTS IN HONG KONG**

Presented by Hong Kong, China

Hong Kong International Airport (HKIA)



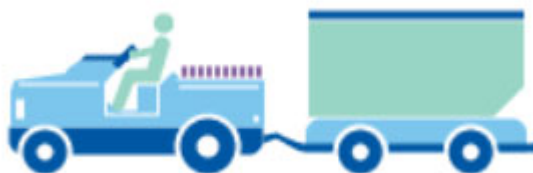
Opened in July 1998



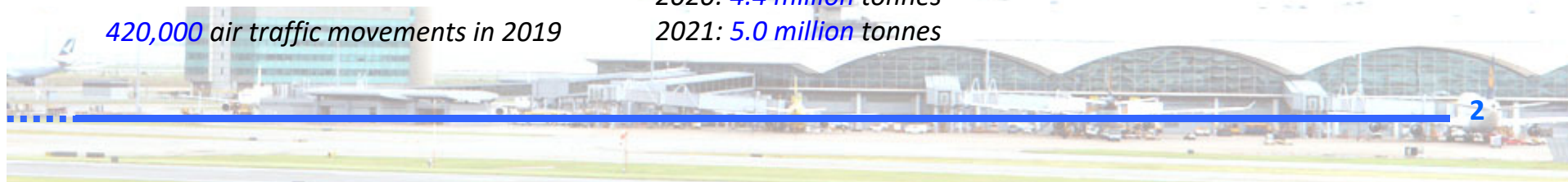
71.3 million passengers in 2019



420,000 air traffic movements in 2019



*2019: 4.7 million tonnes
2020: 4.4 million tonnes
2021: 5.0 million tonnes*



Expansion into Three Runway System



New buildings are being built on airport to support HKIA expansion

New buildings are planned to be built in vicinity of airport to support economic growth and development needs

New buildings, if not properly managed, could constitute changes that may cause impacts to airports & ATC operation

Expansion into Three Runway System



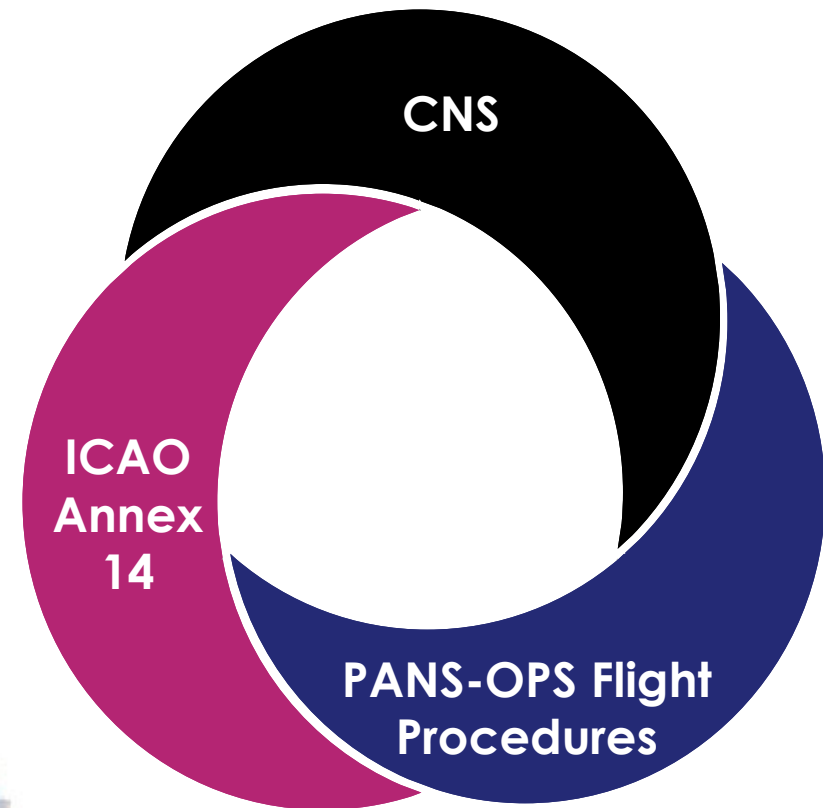
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Airport Height Restriction Plan (AHRP) in Hong Kong

- Published under **Hong Kong Airport (Control of Obstructions) Ordinance**
- **Advanced & mature** computer modelling technology available nowadays
- Derivation & integration of voluminous safeguarding surfaces with **high accuracy** is achievable using such technology
- Aims to ensure overall combined surfaces are **not overly stringent** while providing **sufficient protection**



Three ingredient surfaces of AHRP

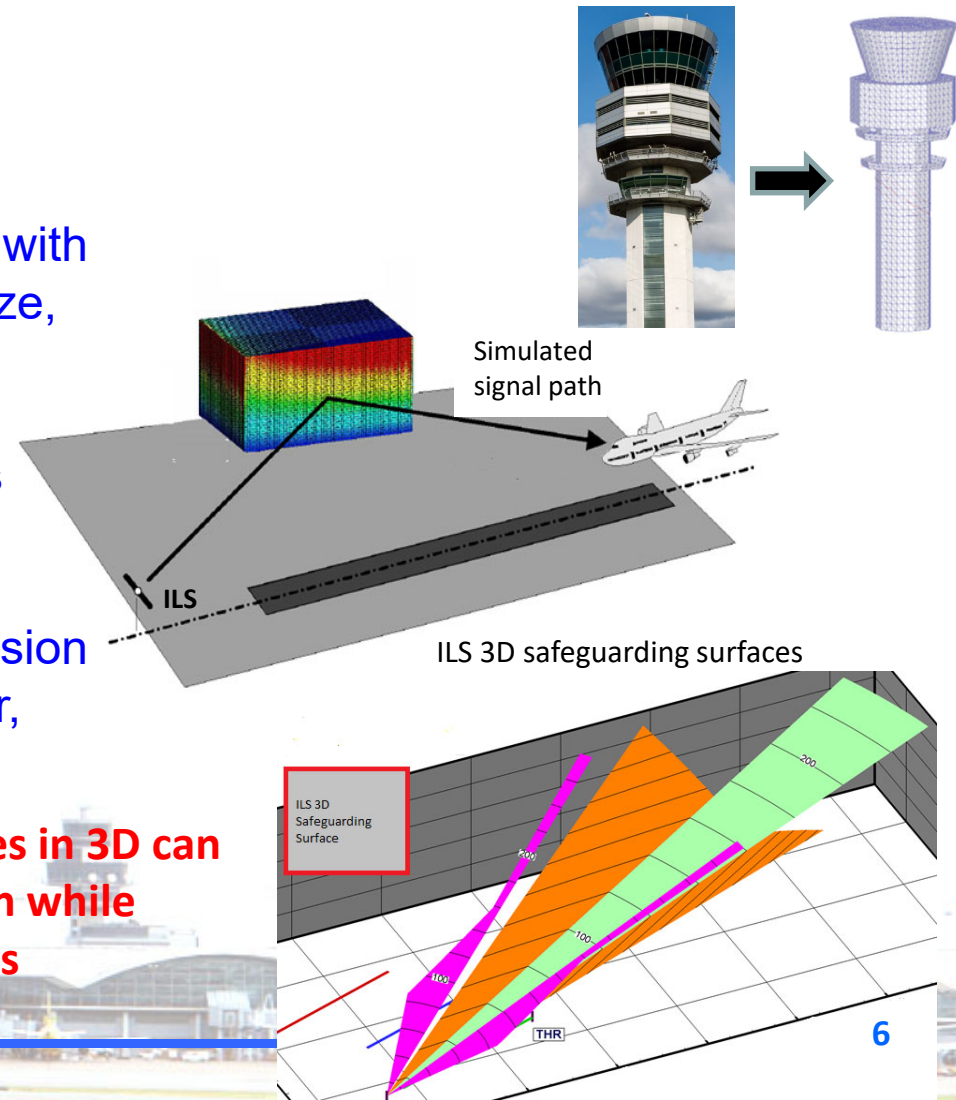


3-dimensional (3D) Computer Modelling for Deriving CNS Safeguarding Surfaces

3D Computer Modelling

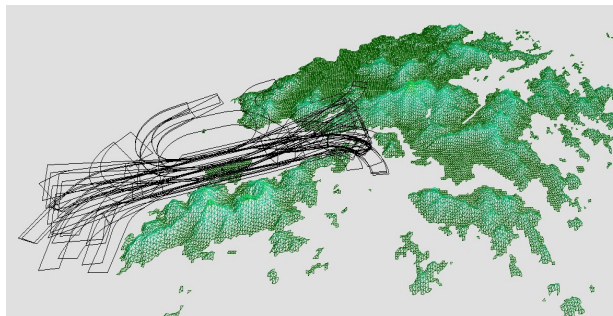
- a) **Local airport environment** : surrounding terrains and buildings with different height, location, shape, size, orientation and materials etc.
- b) **Moving objects** : aircraft, vehicles and construction cranes etc.
- c) **Characteristics** of signal transmission of CNS equipment (e.g. ILS, Radar, DVOR/DME, VHF & MLS etc.)

Highly accurate CNS safeguarding surfaces in 3D can be derived to ensure sufficient protection while minimising constraints to building heights

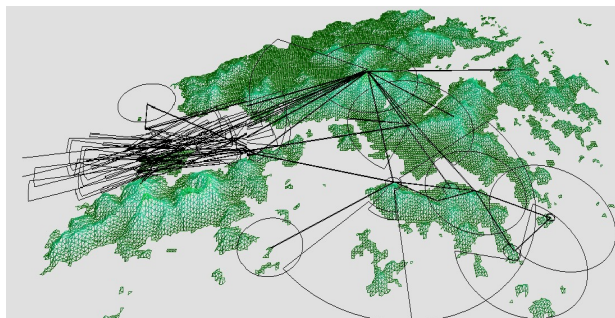


Integration of Safeguarding Surfaces

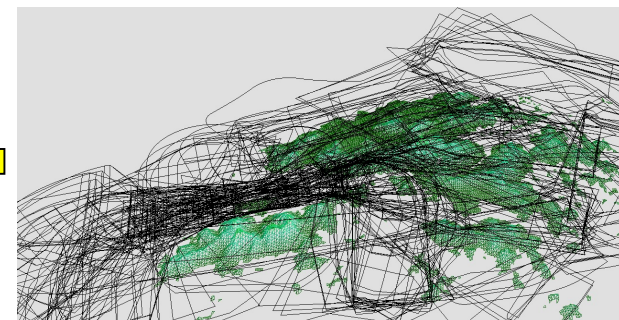
~ 100 nos. ICAO Annex 14 Surfaces



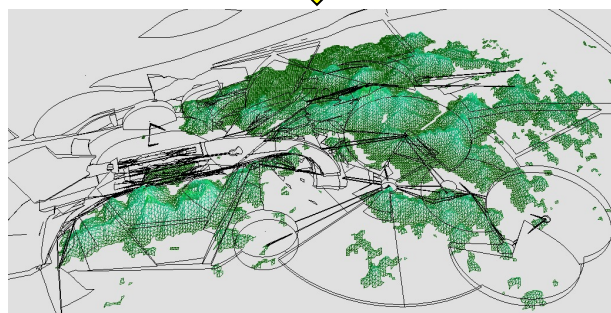
~ 60 nos. CNS Surfaces



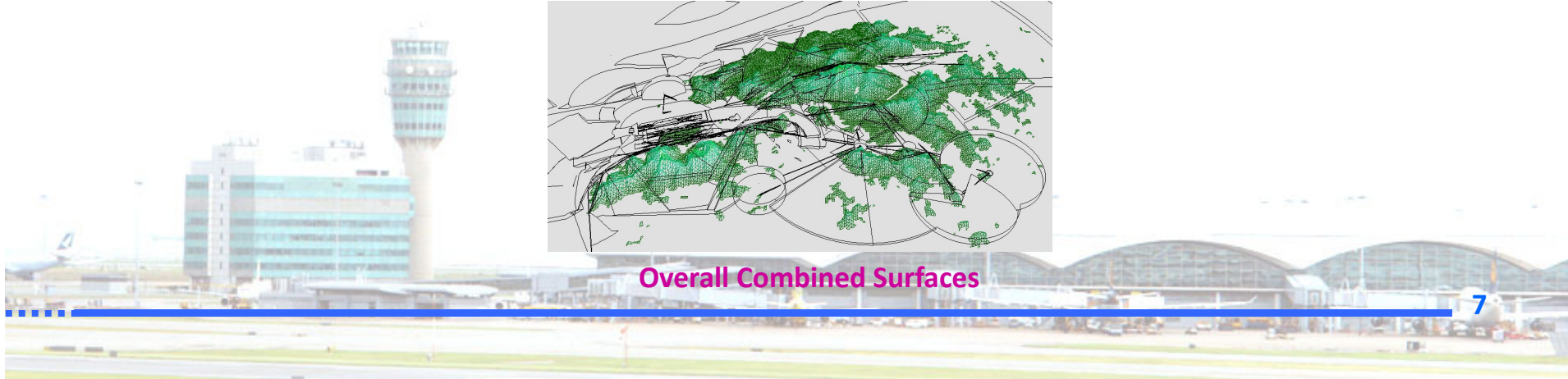
~ 90 nos. PANS-OPS Surfaces



Highly Iterative
& Complex
Process for
Integration



Overall Combined Surfaces



A Comprehensive and Systematic Approach

- **Beneficial to all stakeholders to facilitate development without jeopardizing aviation safety**
- **Handling exception in protrusion of surfaces:**
 - ✓ Considered on exceptional ground of public safety/interest e.g. broadcasting tower at hilltop
 - ✓ Subject to highly stringent scrutiny
 - ✓ Required detailed computer modelling assessment
 - ✓ Mitigating measures incorporated into early design of building
 - ✓ Regular monitor by flight/ground checks in all stages of construction



Lattice surface of tower to mitigate signal reflection

Action by the Meeting

The meeting is invited to :

- (a) note the **on-going developments at or in vicinity of airports**, if not properly managed, **could constitute changes which may cause impacts** to airports and ATC operation;
- (b) note the experience of Hong Kong, China and encourage States/Administrations to :
 - (i) be fully aware of the **potential risks induced by protrusion** of safeguarding surfaces; and
 - (ii) make use of **advanced computer modelling** to develop integrated safeguarding surfaces for CNS equipment, aerodrome and flight procedures with high accuracy, and **publish them under a regulatory framework**, so as to uphold flight **safety** while facilitating pressing needs of **infrastructure/building developments**



Thank you

