



# 25<sup>th</sup> Meeting of the Communications/Navigation and Surveillance Sub-group (CNS SG/25) of APANPIRG

Video Tele-Conference, 18 – 22 October 2021

WP/25 Development of an Integrated Safeguarding Surface to Uphold Flight Safety while Facilitating Infrastructure/Building Developments in Hong Kong

Presented by Hong Kong, China

# 1. Introduction

- Hong Kong International Airport (HKIA) was opened in 1998
  - In 2019, HKIA served
    - 71.3 million passengers
    - 4.70 million tonnes of cargo
    - 420,000 air traffic movements
  - Despite global pandemic, HKIA continues as a leading international and regional aviation hub
- HKIA Three Runway System (3RS) project now in progress
  - To cope with future demands from passengers, cargo and aviation community
  - New infrastructure developments are built to support 3RS operation and serve the community
  - Changes to the environment for signal transmission, may lead to degradation of CNS equipment performance and ATC operation

# 1. Introduction

- “Airport Height Restriction Plan” (AHRP) under the Hong Kong Airport (Control of Obstructions) Ordinance combines the surfaces from:
  - CNS Safeguarding surfaces
  - ICAO Annex 14; and
  - ICAO PANS-OPS flight procedures
- With advanced and sophisticated computer modelling technologies being available and mature
- development of highly accurate CNS safeguarding surfaces is made feasible to meet operational needs



## 2. Discussion

- Hong Kong Civil Aviation Department (CAD), as civil aviation authority in Hong Kong, responsible for:-
  - Safeguarding the CNS equipment fulfilling ICAO requirements
  - Regulatory body of the airport
  - Supportive to infrastructure development in HKIA and within the territories in Hong Kong
  
- Taking the 3RS project opportunity to revamp the CNS, where by:
  - Designed CNS Safeguarding Surface to cope with 3RS operation
  - Engaged a specialized consultant to conduct comprehensive 3D computer modelling on CNS equipment
  - Providing sufficient protection CNS equipment operation while not being overly stringent, to cope with tight supply and high demands of lands for development in Hong Kong
  - Published safeguarding under a regulatory framework, so as to uphold flight safety while minimizing constraints to infrastructure/building developments

## 2. Discussion

- 3D computer modelling provides a practicable and cost effective method to simulate the complex local environment
- Simulation model may consisting of:
  - Surrounding terrains and buildings at different height, location, shape, size, orientation and materials etc.
  - CNS equipment signal transmission characteristics, based on vendor specific information
- Outcomes:
  - Designed CNS safeguarding surfaces that provides sufficient CNS equipment protection; while not being overly stringent constraints to building heights
  - Revamped safeguarding surfaces can be less stringent as compared with the existing ones
  - CNS equipment by potential buildings with different heights and locations can be accurately simulated and predicted before the buildings are erected

## 2. Discussion

- Professional service consultant was engaged to:
  - Integrate roughly total of 250 nos. surfaces, including CNS equipment, ICAO Annex 14, PANS-OPS
  - Combine surfaces for form the new Airport Height Restriction Plan (AHRP)
  - Make use of 3D computer modelling for surface formatting, transformation, various validation checks, smoothing and integration etc
- New AHRP Combined surfaces amended and gazetted as Hong Kong Airport (Control of Obstructions) Ordinance in August 2021



## 2. Discussion

- Assessment of New Building/Infrastructure
- A comprehensive and systematic approach is considered beneficial to all stakeholders, including:
  - CAAs/Air Navigation Service Providers (ANSPs)
  - Airport operators
  - Lands planners; and
  - Property owners/developers etc
- Exceptional cases on protrude the safeguarding surface
  - For public safety and interest, such as broadcasting tower at hilltops
  - Highly stringent scrutiny requiring detailed computer modelling assessment by project owner
  - Propose mitigating measures in the early design of the buildings
  - Keep monitoring CNS equipment performance by regular flight check/ground (during operation, construction and post-implementation)

## 3. Action by the Meeting

The meeting is invited to :

- a) note the on-going developments at or in vicinity of an airport, if not properly managed, could constitute changes to the operating environment of CNS equipment which may cause impact to the normal operation of CNS equipment, and in turn will affect safe and orderly ATC operation;
- b) note the experience of Hong Kong, China in making use of advanced computer modelling to proactively develop integrated safeguarding surfaces for CNS equipment, aerodrome and flight procedures, and publish them under a regulatory framework, so as to uphold flight safety while minimizing constraints to infrastructure/building developments;
- c) encourage States/Administrations to be fully aware of the potential risks induced by protrusion of safeguarding surfaces and take proactive steps for early engagement of advanced computer modelling technologies to enhance protection of their CNS equipment operation; and
- d) discuss any relevant matter as appropriate.

# Thank you



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