



Civil / Military Cooperation in Singapore

Pauline Yip

20 November 2014

CAAS

Civil Aviation Authority of Singapore

Scope

- Overview
 - Civil / Military Cooperation Framework
 - Airspace Management in Singapore
- Need for Civil / Military Cooperation
- Civil / Military Cooperation in Singapore
 - Military Exercises
 - Flexible Use of Airspace (FUA)
 - Independent Runway Operations
 - Benefits
- Future Plans

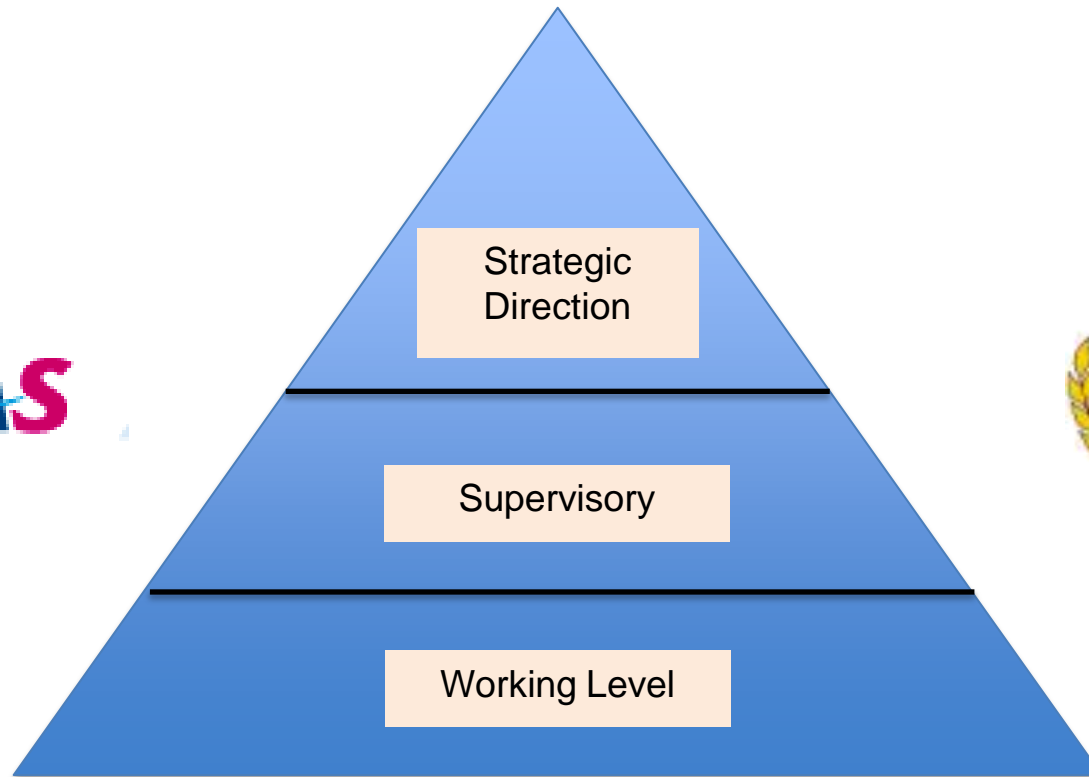


Overview

Civil-Military Cooperation Framework (1/2)

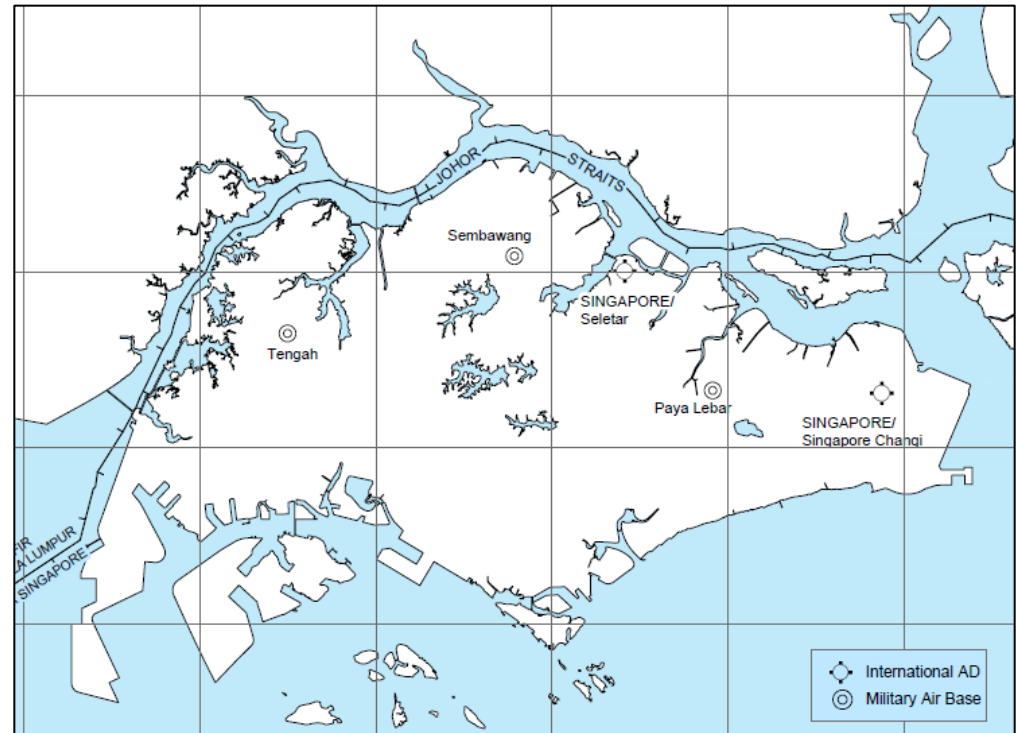
- CAAS and RSAF commitment to share the limited airspace in Singapore
- Memorandum of Understanding between CAAS-RSAF on Airspace and Air Traffic Management Arrangements established since February 2012
- Foster close cooperation on airspace and ATM matters
- Strategic direction by CAAS-RSAF Steering Committee on Airspace and ATM (co-chair by Director General of Civil Aviation and Chief of Air Force)
- Develop and implement Joint Civil Military Aviation Programmes

CAAS-RSAF Cooperation Framework (2/2)



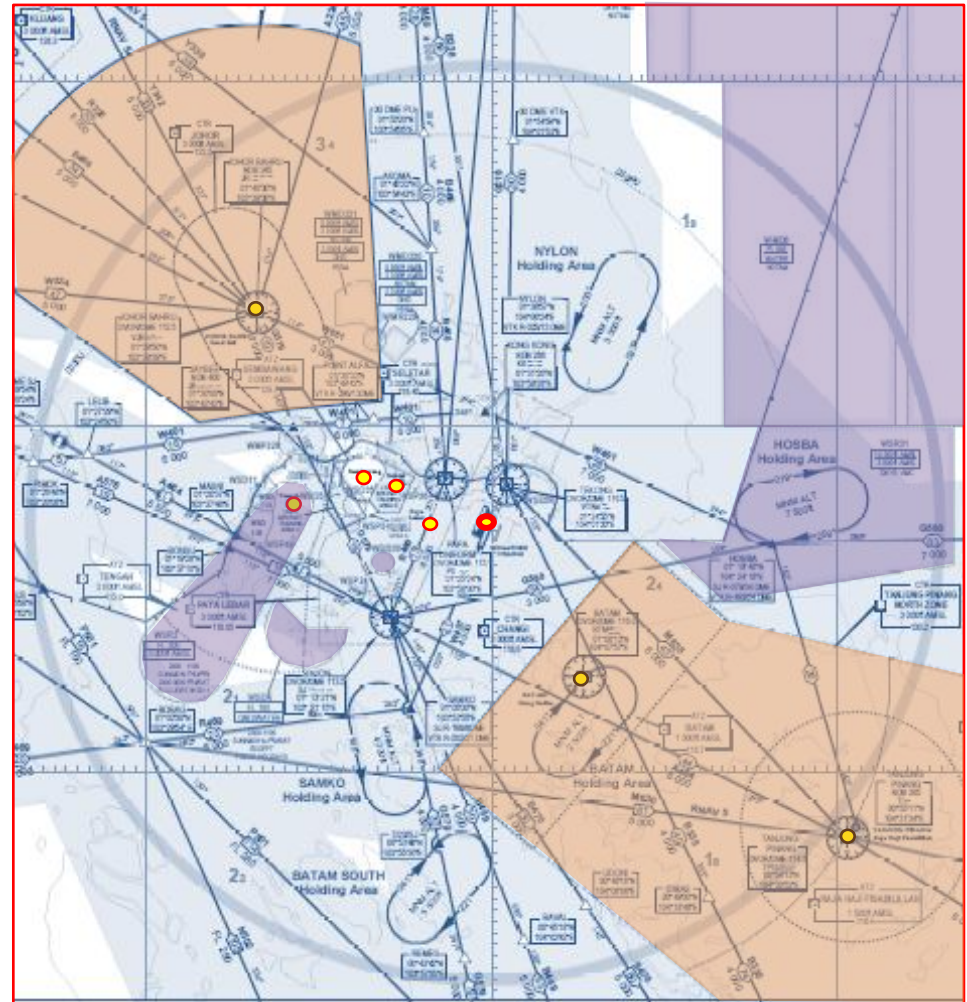
Airspace Management in Singapore (1/2)

- Airfields in Singapore
 - WSSS
 - WSSL
 - WSAP
 - WSAG
 - WSAT
- Flight Procedures jointly developed with RSAF for military airfields



Airspace Management in Singapore (2/2)

- Navigation Hazard published in the AIP
 - Danger Areas
 - Restricted Areas
 - Prohibited Areas
- Ad-hoc Aerial activities that affect civil operations coordinated in advance and NOTAM published 7 days ahead in accordance to Annex 15



Need for Civil / Military Cooperation

Need for Civil / Military Cooperation (1/2)

- For co-existence of civil / military at Singapore Changi Airport
 - Integration of civil / military traffic
 - Close coordination and established civil / military procedures to ensure smooth day-to-day operations
- Limited airspace and increasing air traffic movements
 - Need to increase capacity to meet the higher demand
 - Explore more efficient use of unused / under utilised restricted airspace
 - Enhance efficiency and throughput to handle increasing air traffic movements

Need for Civil / Military Cooperation (2/2)

- Meet requirements of all airspace users

Civil

Airlines' expectations: safe, want to fly at / near optimum flight levels, track shortening, fuel savings, minimum delay to meet schedules

Military

National security requirements. Military exercises are required to maintain high level of readiness and some may entail airspace closures

- Need to balance demands by more efficient / optimised sharing of limited airspace
- Ensures safe and efficient civil / military flight operations through coordinated civil / military procedures

Civil / Military Cooperation in Singapore

Military Exercises

- CAAS support activities relating to multilateral defence agreement between States
 - Five Power Defence Arrangement (FPDA); twice annual Air Defence Exercise (ADEX)
 - Other bilateral defence exercises between RSAF and their defence partners
- Close coordination between other civil aviation authorities and their military counterparts for ad-hoc military exercises

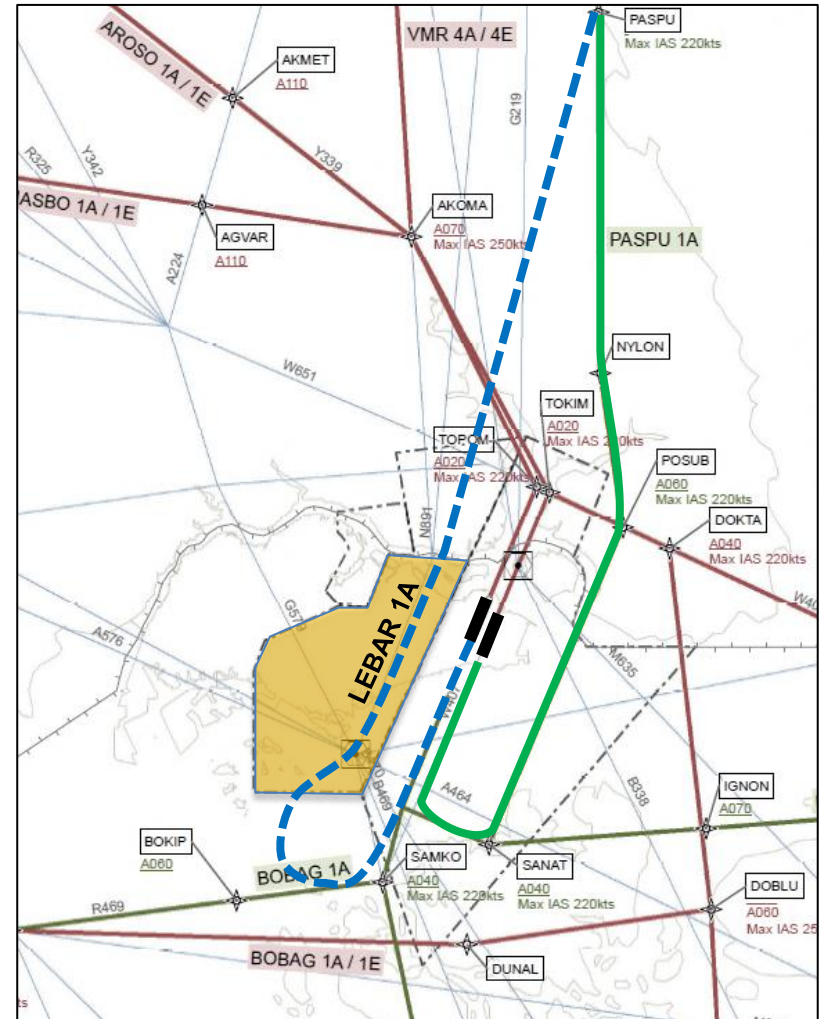
Flexible Use of Airspace (FUA) (1/3)

- Airspace overhead Singapore serves to safeguard national security and military training needs.
- Coordination between CAAS and RSAF to release areas of restricted airspace for civil use when there is no military activities within that area, for effective utilization.
- FUA over Paya Lebar (WSAP) allowed the development of a new arrival procedure designated as LEBAR STAR (*operational trial is currently on-going before full implementation*)
- Conditions for use:
 - Released for civil use when there are no military activities
 - Adhere to lateral and vertical profile to balance flight efficiency and national security requirements

Flexible Use of Airspace (FUA) (2/3)

LEBAR 1A ARRIVAL

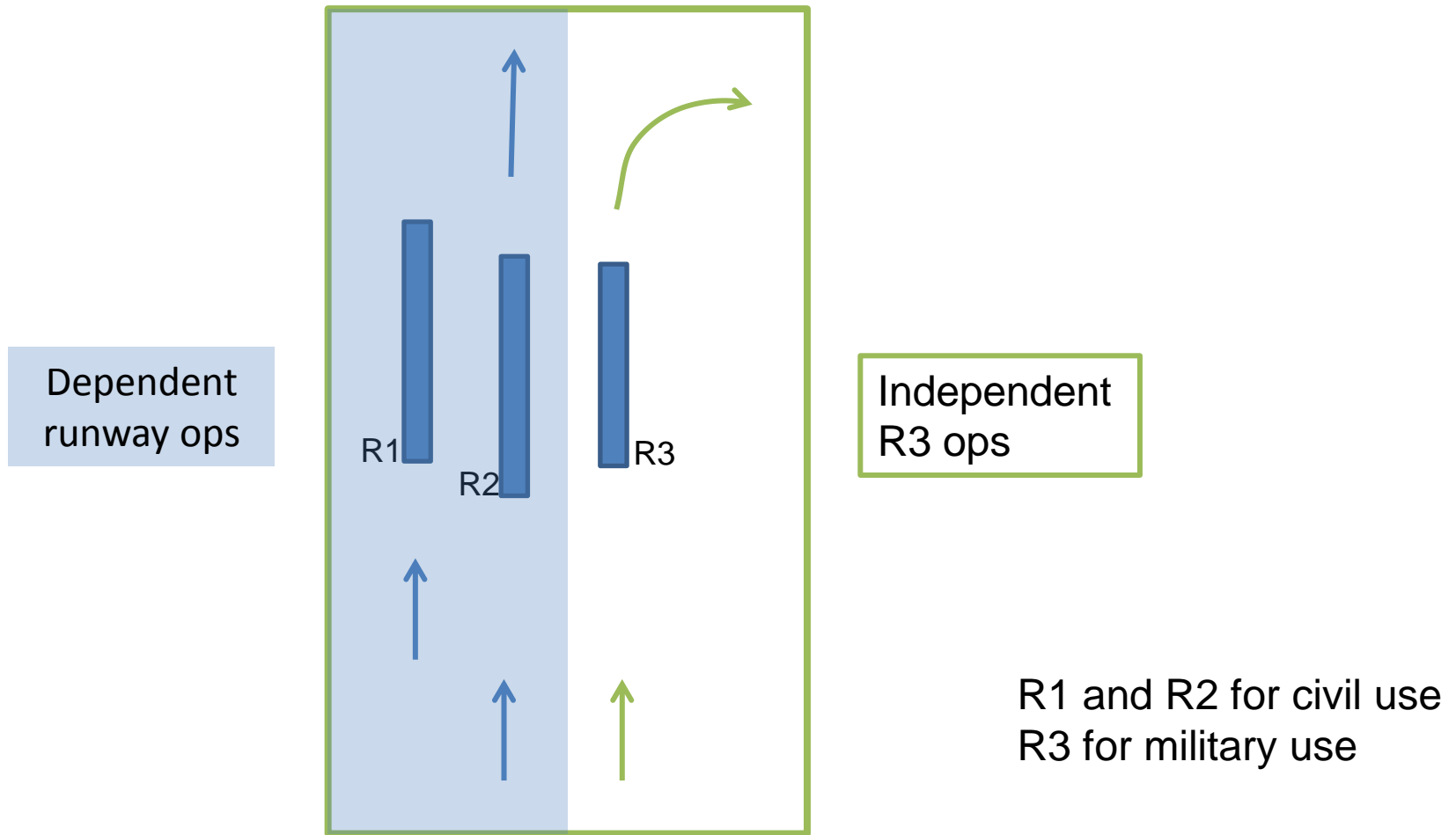
- Alternate route for arrivals from the north (PASPU) when Runway 02 is in use, to conduct a downwind leg over west of Singapore Changi Airport
- Dual downwind legs to support future plans to introduce simultaneous independent approaches at the airport
 - Left downwind for Runway 1
 - Right downwind for Runway 2



Independent Runway Operations at Changi Airport (1/2)

- Civil operates on Runway 1 and 2, mans the main Control Tower at Changi Airport
- Military operates on Runway 3, mans the Runway 3 Tower
- Civil provides Approach Control services
 - Approach Controller x 2, Arrival Controller x 2, Monitor Controller x 2 for Independent Runway Operations
 - No-Transgression Zone (NTZ)
 - Contingency – Blunder Warning System (BWS)
 - Simultaneous instrument approach
 - Simultaneous visual approach in Day VMC only
 - Diverging missed approach paths for Runway 1 / 2 civil traffic with Runway 3 military traffic

Independent Runway Operations at Changi Airport (2/2)



Benefits (1/2)

- More effective use of airspace in restricted area that has no planned military activities
 - Increase capacity in the approach area
 - Higher efficiency to meet the growing demand of aviation
- More optimal flight profiles
 - Track shortening
 - Fuel savings
 - Reduction in CO2 emission
- Ease congestion as traffic would otherwise convene to the east of the airport
 - Minimise conflict points and crossing path
 - Lower complexity
 - More vectoring space

Benefits (2/2)

- Allows dual downwind legs for implementation of simultaneous independent approaches in future
 - Reduction in arrival spacing
 - Increase runway capacity
 - Less holdings in the air
 - Lower complexity



Future Plans

Future Plans

- Explore feasibility of SID through FUA airspace over Paya Lebar (WSAP)
 - Consider departures' flyability
 - Traffic complexity is higher as compared to LEBAR STAR
 - Requires further study in collaboration with RSAF
- Plan for Civil/Military to co-use Runway 3
 - Collaborate to work towards simultaneous independent operations on all 3 runways at Changi Airport



Thank You