Direct Routing Operations – Progressive Step Towards Free Route Airspace

15-16 September 2025

CAAS
Civil Aviation Authority of Singapore

Scope

- Background

- DRO as a progressive step towards FRA

- Singapore's phased implementation of DRO

- Considerations when implementing DRO

- Next Steps

- Q&A

Background

- Free-Route Operations (FRTO) is one of the threads in the Aviation System Block Upgrade (ASBU) that will bring about optimum capacity and flexible flights and will eventually pave the way for Trajectory-Based Operations (TBO)

- Direct Routing Operations (DRO) can be found under FRTO-B0/1

- Established with the aim of providing airspace users with additional flight planning route options

- Consists of flight-plannable direct routes, providing options to bypass certain waypoints
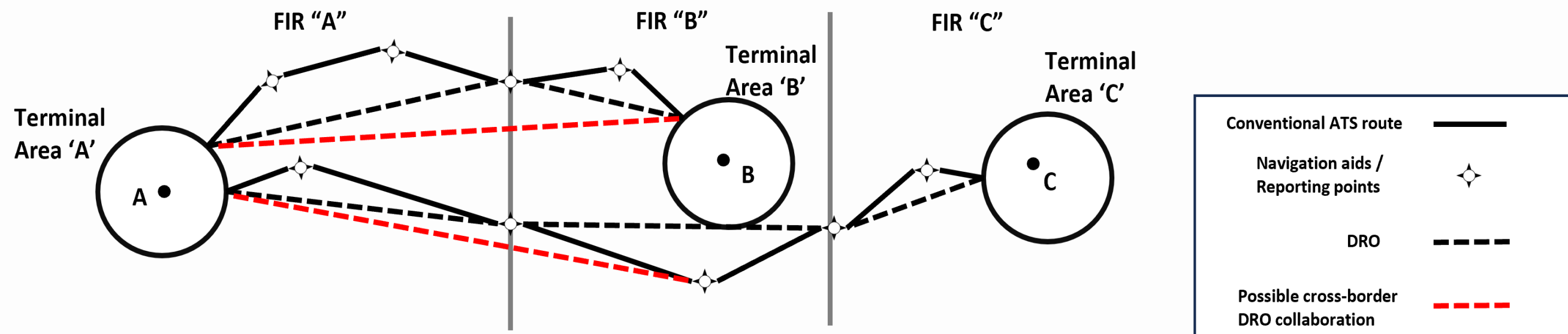
DRO as a progressive step towards FRA

- Singapore implemented DRO as a first and progressive step towards FRA
    - Get insights on potential complexities of FRA operations and system requirements to support FRA
    - Ability to provide benefits to airspace users and reduce carbon emissions
        - Prior to DRO, direct routes were only given on a tactical basis by ATC and there is no flexibility for airlines to file their flight plan for these direct routes

- From an operational perspective, DRO will provide controllers an opportunity to:
    - Be familiarised with "new" traffic conflict hotspots in a gradual and phased approach
    - Move away from using electronic flight strips and reporting point bays as supporting tools for traffic management

- From a ATM system perspective, DRO will help to identify system requirements for tools to support FRA implementation
    - For example: HMI improvements, Mid-Term Conflict Detection

Singapore's phased implementation for DRO

Phase 1A
- Trial with Changi arrivals on ATS routes L642 and N892
- Low traffic period

Phase 1B
- Include flights that are not arriving in or departing from Singapore
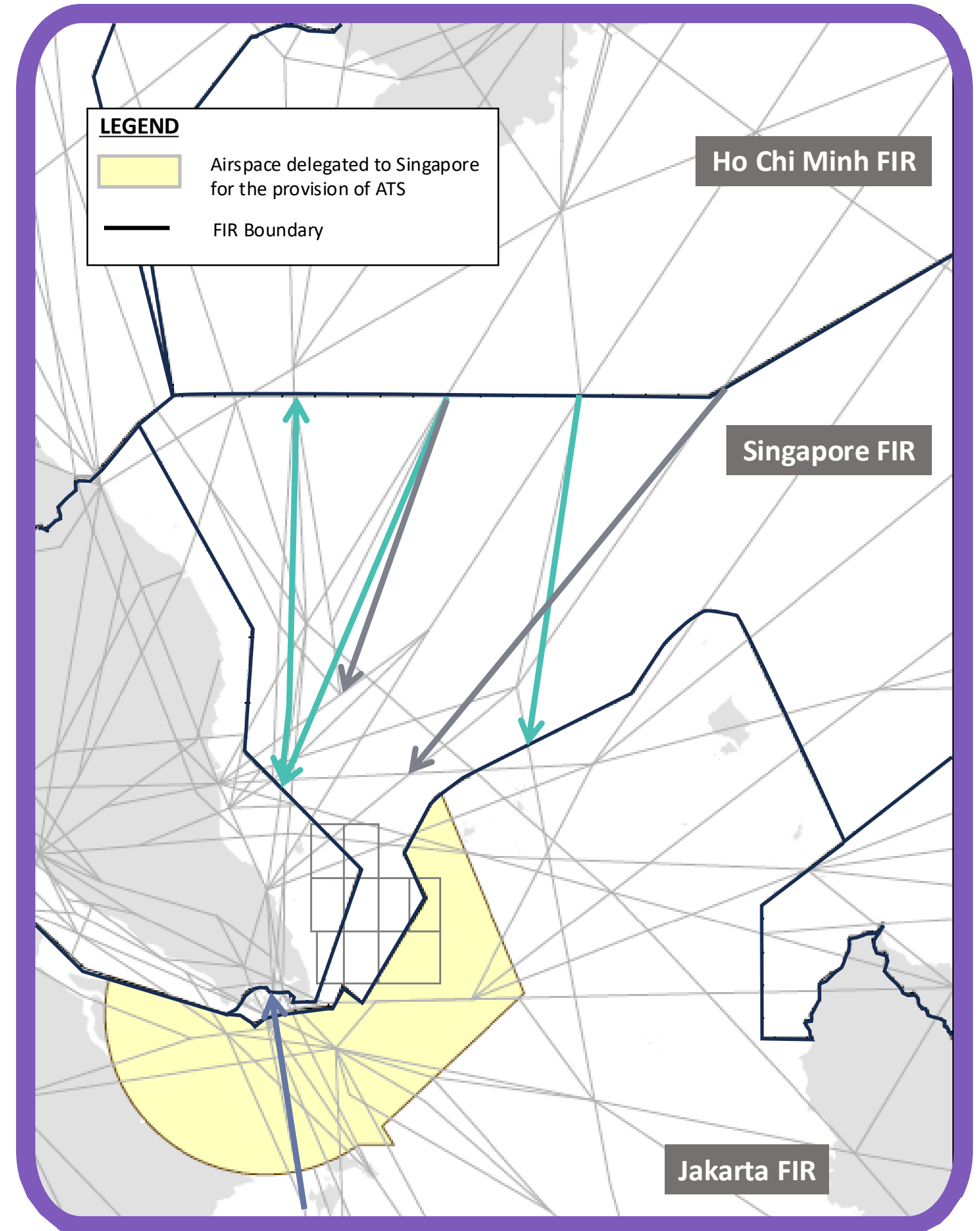- Low traffic period

Phase 2
- Extension of Phase 1A and 1B to include high traffic period (24/7)

Phase 3
- Cross-border DRO opportunities in collaboration with AirNav Indonesia

LEGEND

Airspace delegated to Singapore for the provision of ATS

FIR Boundary

Ho Chi Minh FIR

Singapore FIR

Jakarta FIR

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Considerations when implementing DRO

Identification of suitable routes

- Phased introduction of routes to avoid "big bang"

- Routes from different traffic flows to identify potential issues in different areas

- Every NM reduction counts

Managing workload and traffic complexity

- Limit initial implementation to hours where traffic demand is lower

- Begin with less complex routes

- No change to team structure and current work processes
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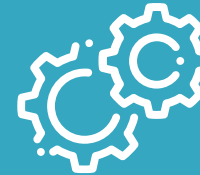
System Tools

- Use of existing ATM system functionalities and alerts

- Minor changes to Electronic Flight Strip (EFS) display

Administrative tasks

- Safety assessment and post-implementation review

- Publications to inform airspace users (under AIP ENR 1.3 or 1.8)

- Training and briefing to controllers

Cross-border DRO with adjacent FIRs

- Collaboration with neighbouring ANSPs for cross-border DRO as a next step when implementation has stabilised

Next Steps

Next Steps

- Reach out to neighboring FIRs to explore more cross-border DRO routes

- Identify airspaces suitable for FRA operations

- Transition from Electronic Flight Strips (EFS) to "Strip-less operations"

- Development of conflict detection tools as additional safety nets

- Training for controllers on the use of ASD for traffic management and conflict detection

- Engagement with stakeholders

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Thank you