ICAO APAC/MID ATFM-FF-ICE Seminar 2025
Dubai, UAE, 23 – 26 February 2025

Progress and Current Status of JCAB's ATFM Operations

Air Traffic Control Division JCAB
TAKAHIRO SHIBUTANI

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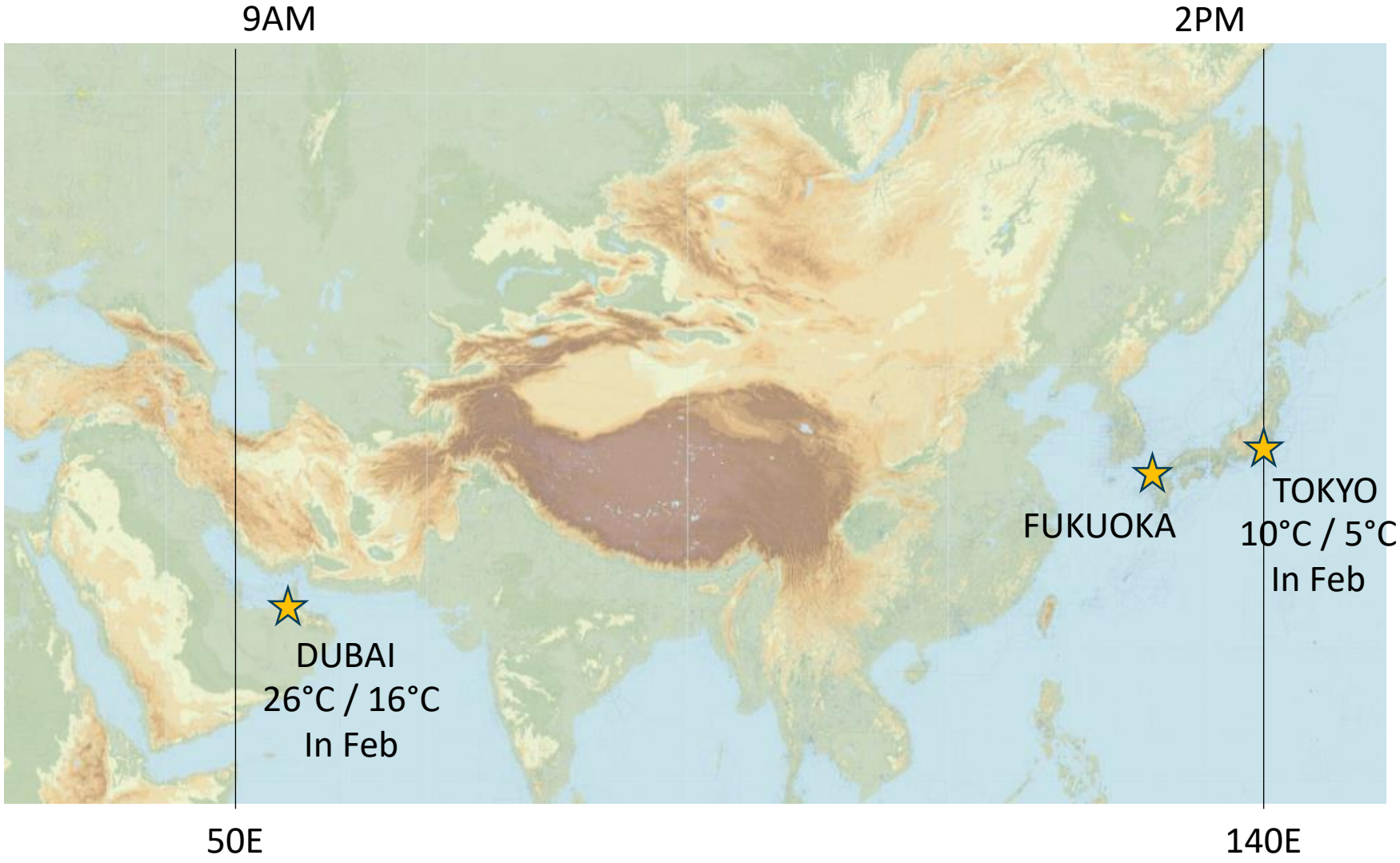
Overview

- Outline of Fukuoka FIR (RJJJ)
- ATM center and TMU (branch of ATMC)
- JCABs CDM

DUBAI, TOKYO, FUKUOKA Positional Relationship



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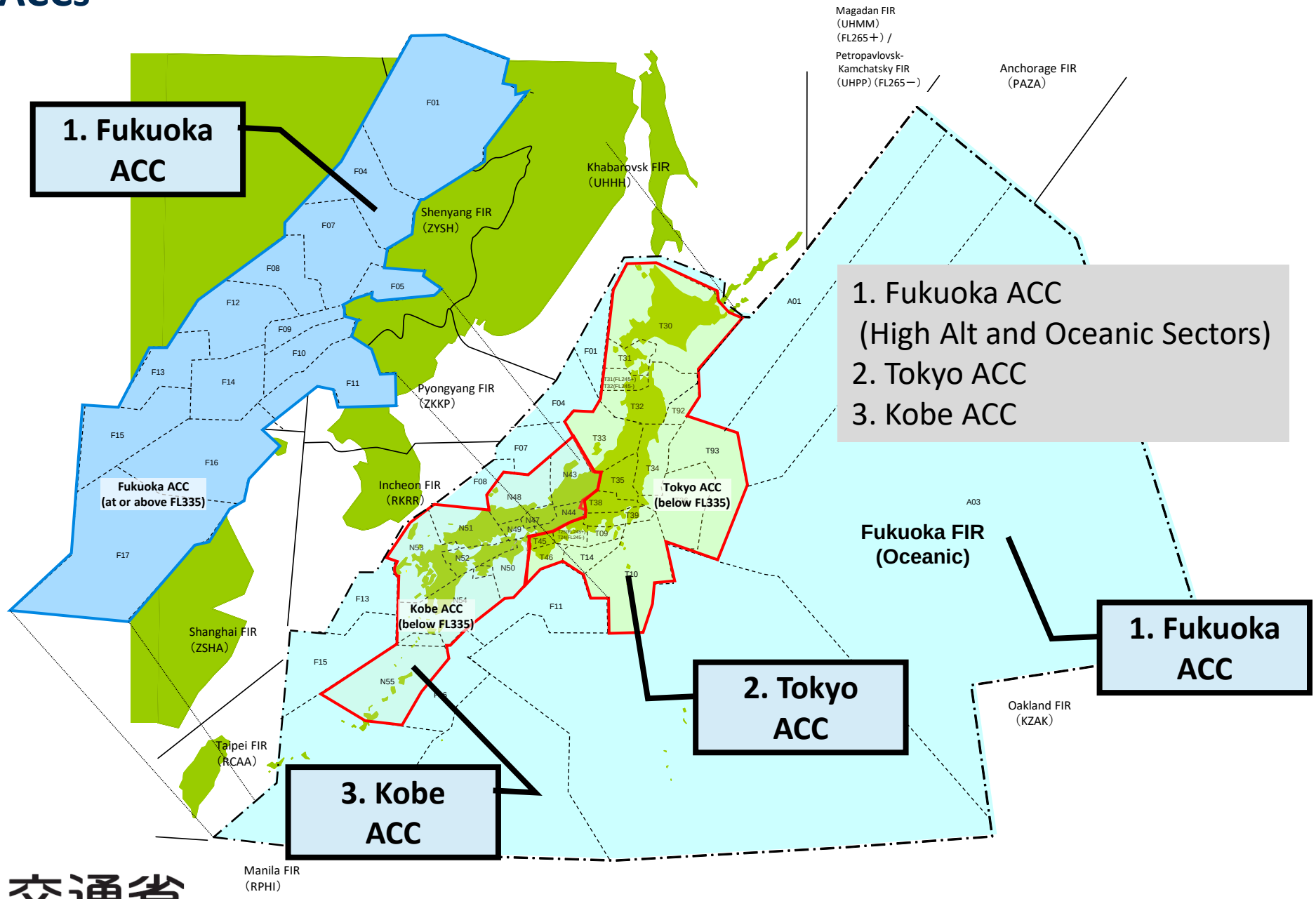
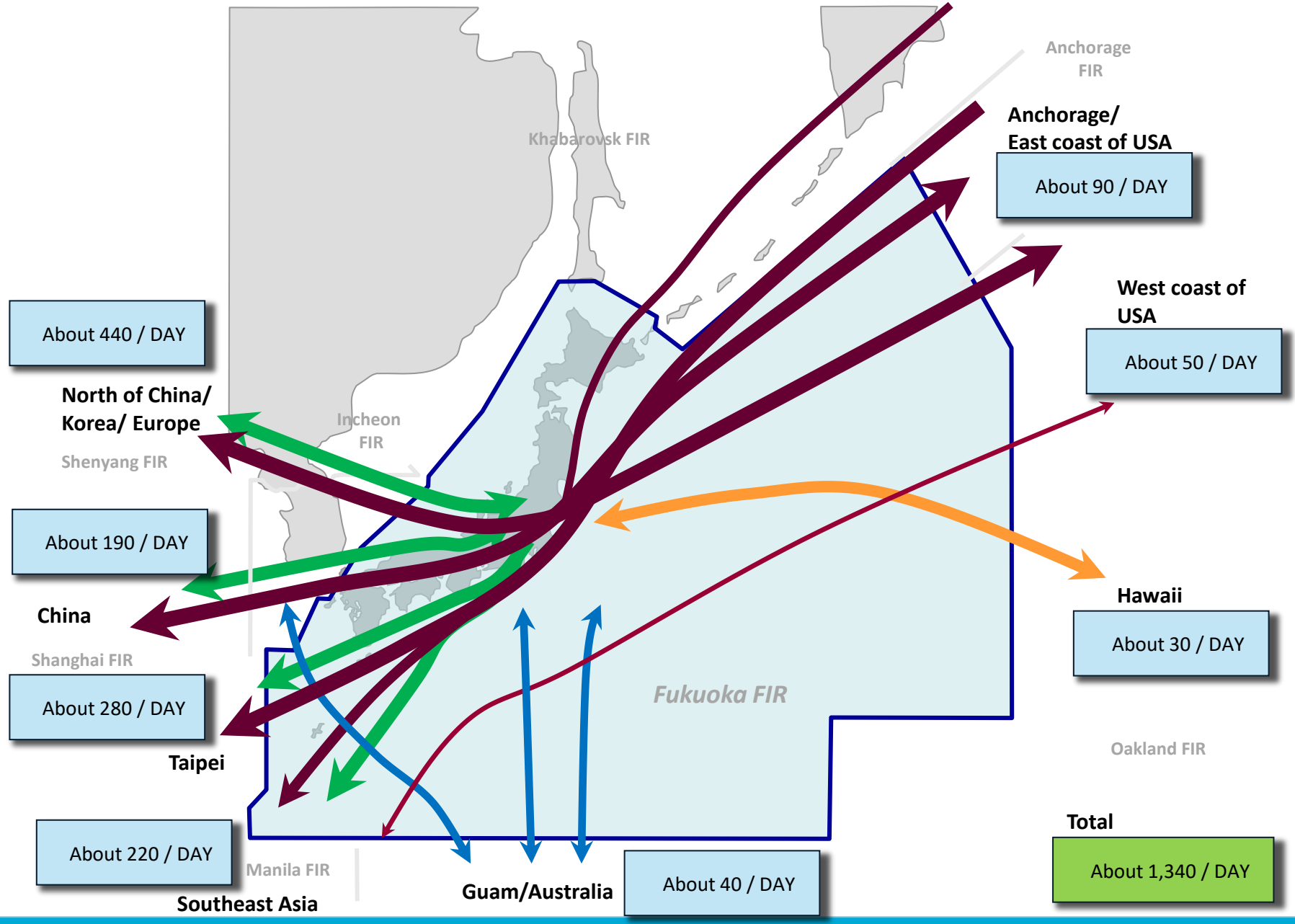
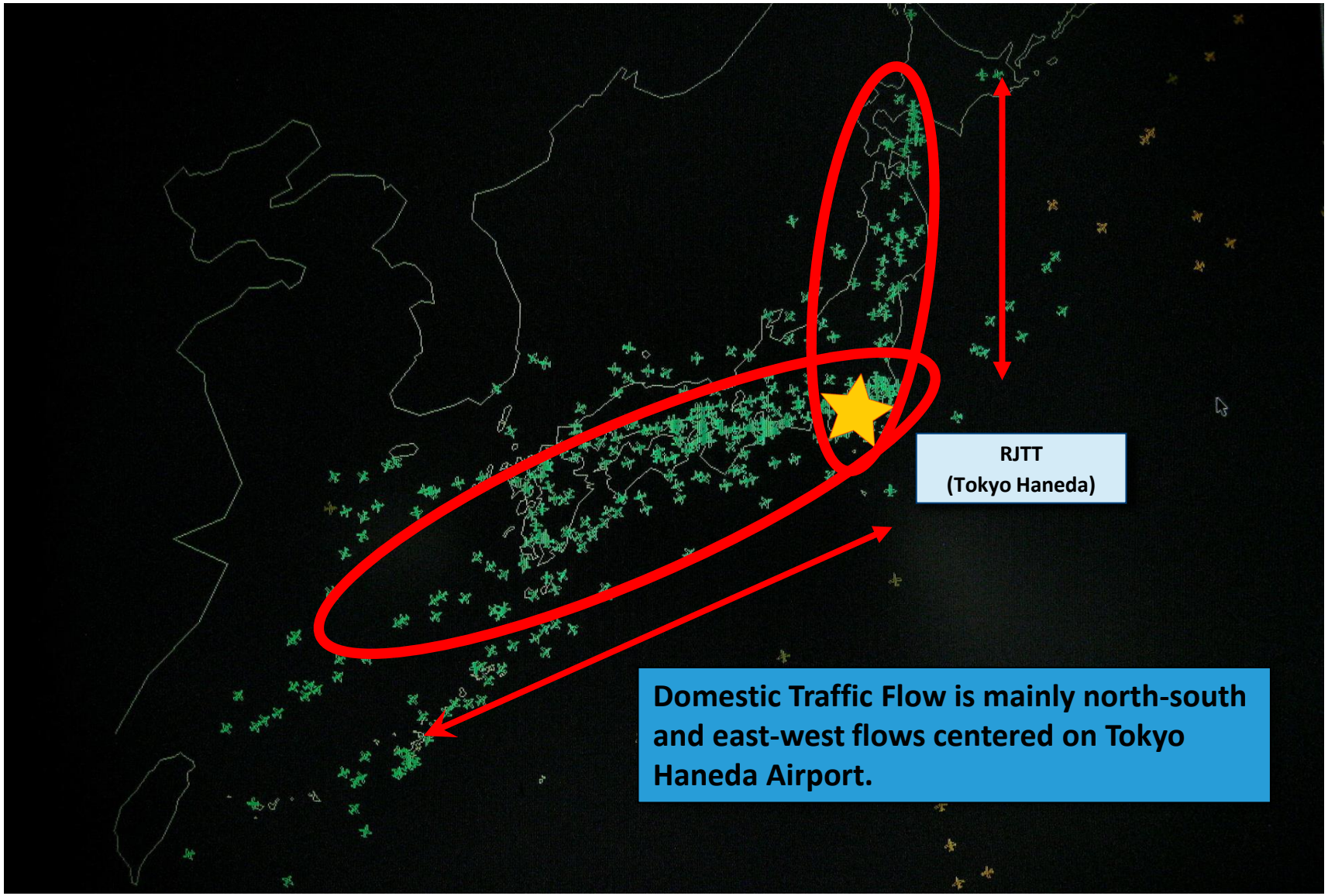
Fukuoka FIR and ACCs



International Traffic flow (Aug 2023)



Domestic Traffic flow



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Background of ATMC in JAPAN

- In 1991: The new CNS/ATM concept was approved at the 10th ICAO ANC.
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Role of Air Traffic Management Center (ATMC)

Air traffic management and control services

◆Air Traffic Flow Management (ATFM)

ATFM balances traffic demand with airspace/airport capacity by routing management and flow control with minimum impact on the flights while communicating with relevant participants.

- Routing management
- Flow control
- CDM

◆Airspace Management (ASM)

- Airspace/Airway designing
- Civil - Military coordination for flexible use of airspace
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ASM increases airspace capacity and improves efficient use of airspace to accommodate user needs by designing efficient route-networks, optimizing airspace configurations and making flexible use of airspace.

Role of TMU (Traffic Management Unit)

- Monitor traffic volume and situation

  *high density ACC and Airports

- Coordination with TMU in other facilities
- Coordination with ATMC
- Conduct flow control initiatives

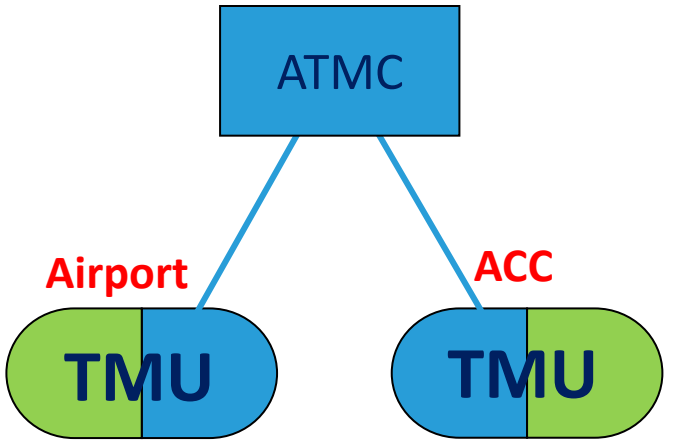
  ALTITUDE RESTRICTIONS / REROUTES

  MILES-IN-TRAIL

  SPEED CONTROL

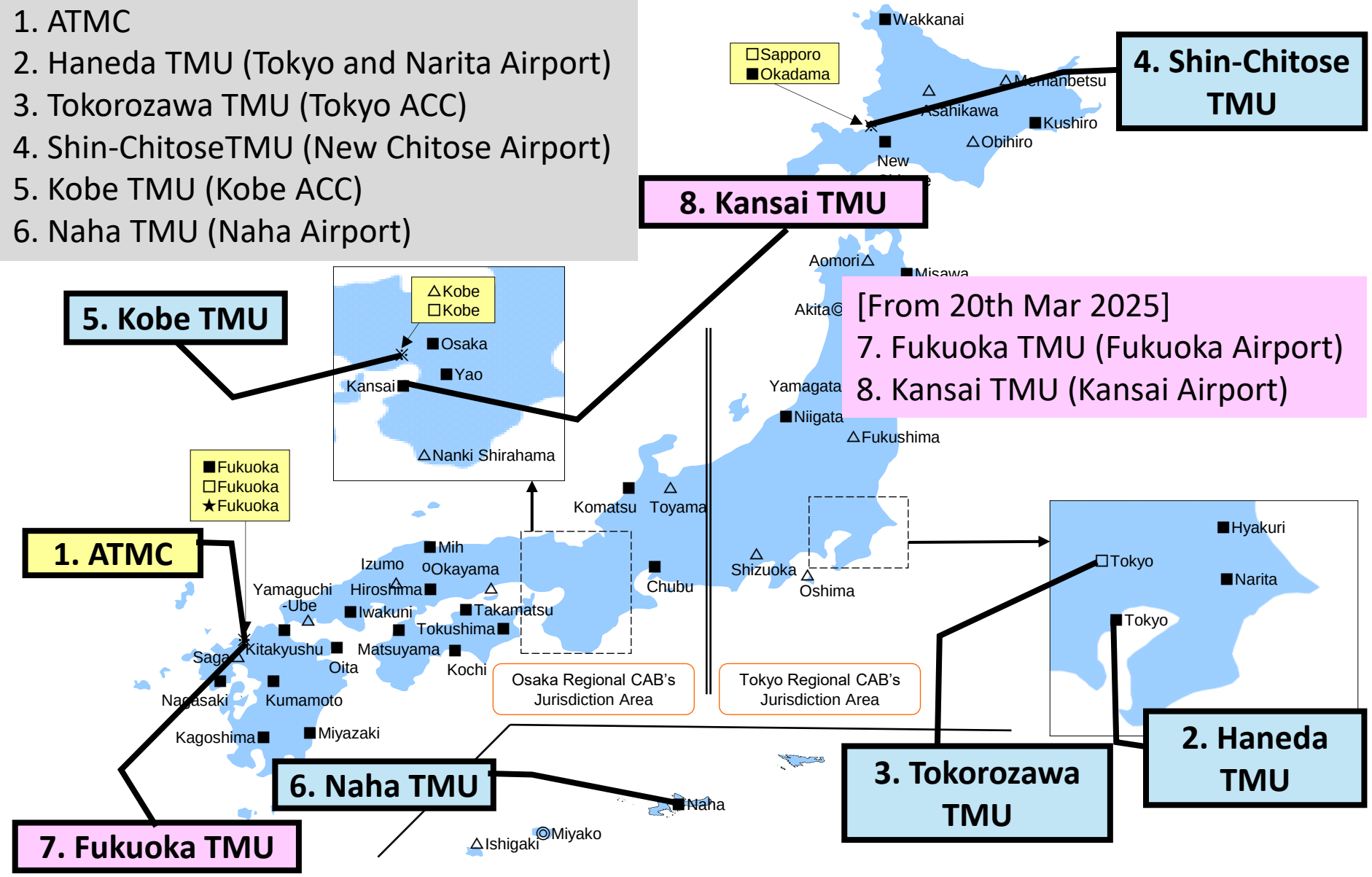
  AIRBORNE HOLDING

  GROUND STOP



Location of ATMC and TMUs

1. ATMC
2. Haneda TMU (Tokyo and Narita Airport)
3. Tokorozawa TMU (Tokyo ACC)
4. Shin-ChitoseTMU (New Chitose Airport)
5. Kobe TMU (Kobe ACC)
6. Naha TMU (Naha Airport)



ATFM Measures

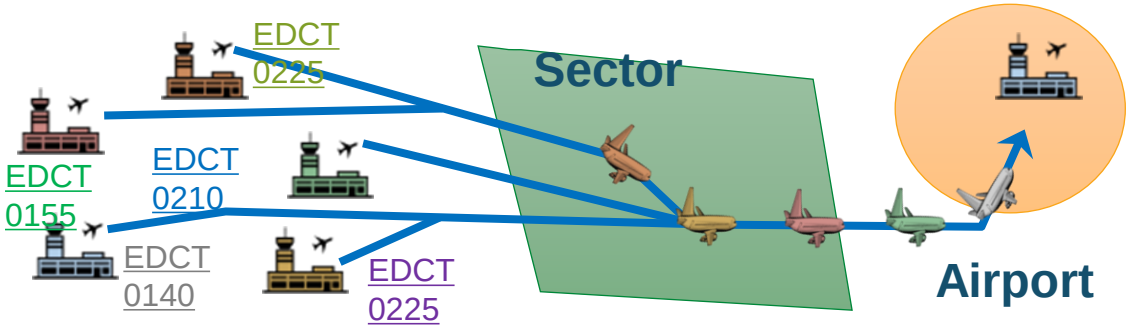
Ground Delay Program

Departure aircraft are assigned EDCT(Expected Departure Clearance Time)=CTOT by ATFM system.

On the Ground

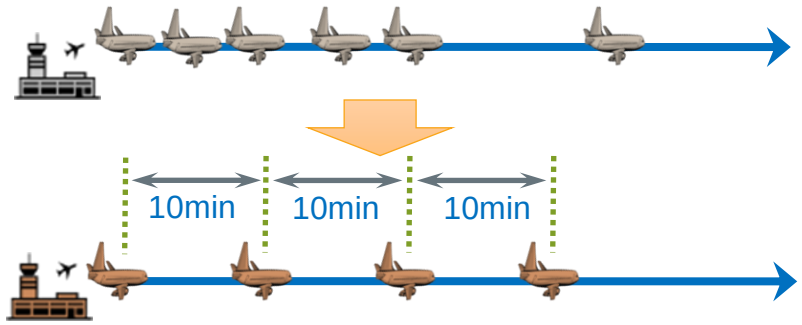
Departure aircraft which bound for congested airport or are going to pass the crowded sectors, are assigned ground delay if necessary.

Flow control initiatives ①



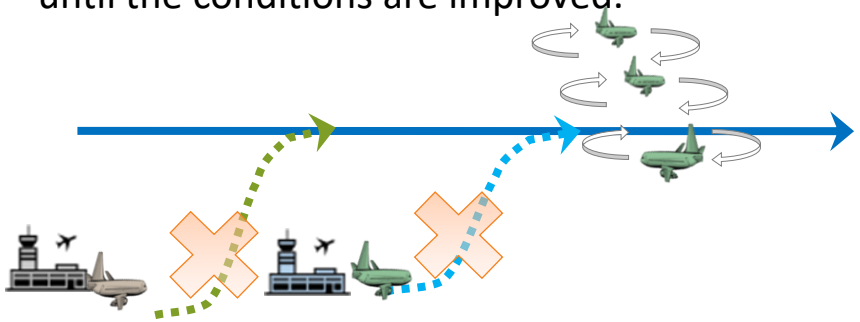
Departure Interval

ATM officer instructs airport controller to keep departure interval (minutes or miles).



Ground Stop

If the heavy congestion is expected (e.g. sever WX, airport closure, ATC system failure), departure aircraft are grounded until the conditions are improved.



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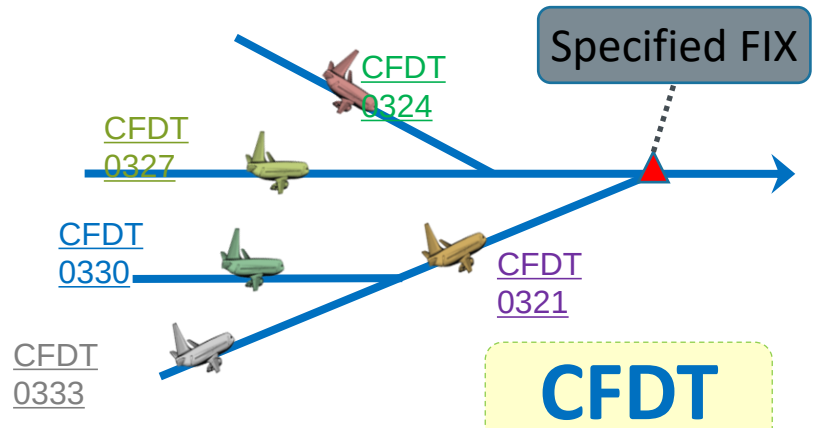
ATFM Measures

Flow control initiatives ②

In-Flight

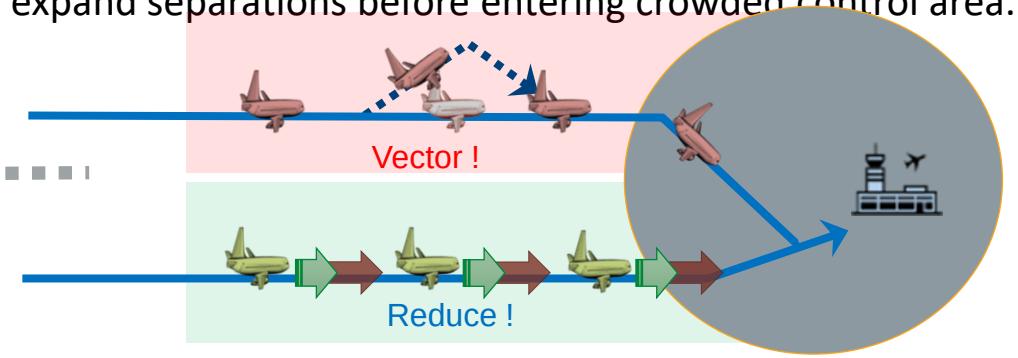
Specifying CFDT for Arrival Spacing Program

ATFM system calculates CFDTs (Calculated Fix Departure Time), and ACC issues CFDTs to aircraft so that they pass the specified fix at assigned time.



Expanded Miles in-trail

To expand separations before entering crowded control area.

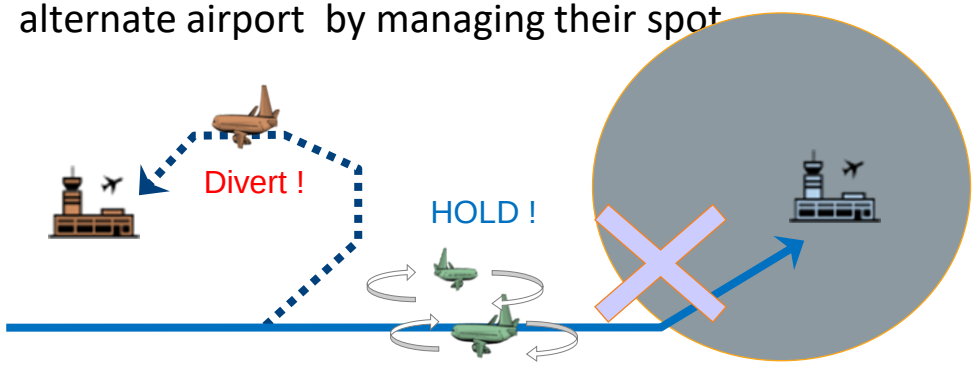


Speed Adjustment

To reduce and align aircraft speed at entry fix.

Entry Suspension

In case of happening at the airport, ATMC stops the inflow of aircraft , and helps them to divert to the alternate airport by managing their spot.



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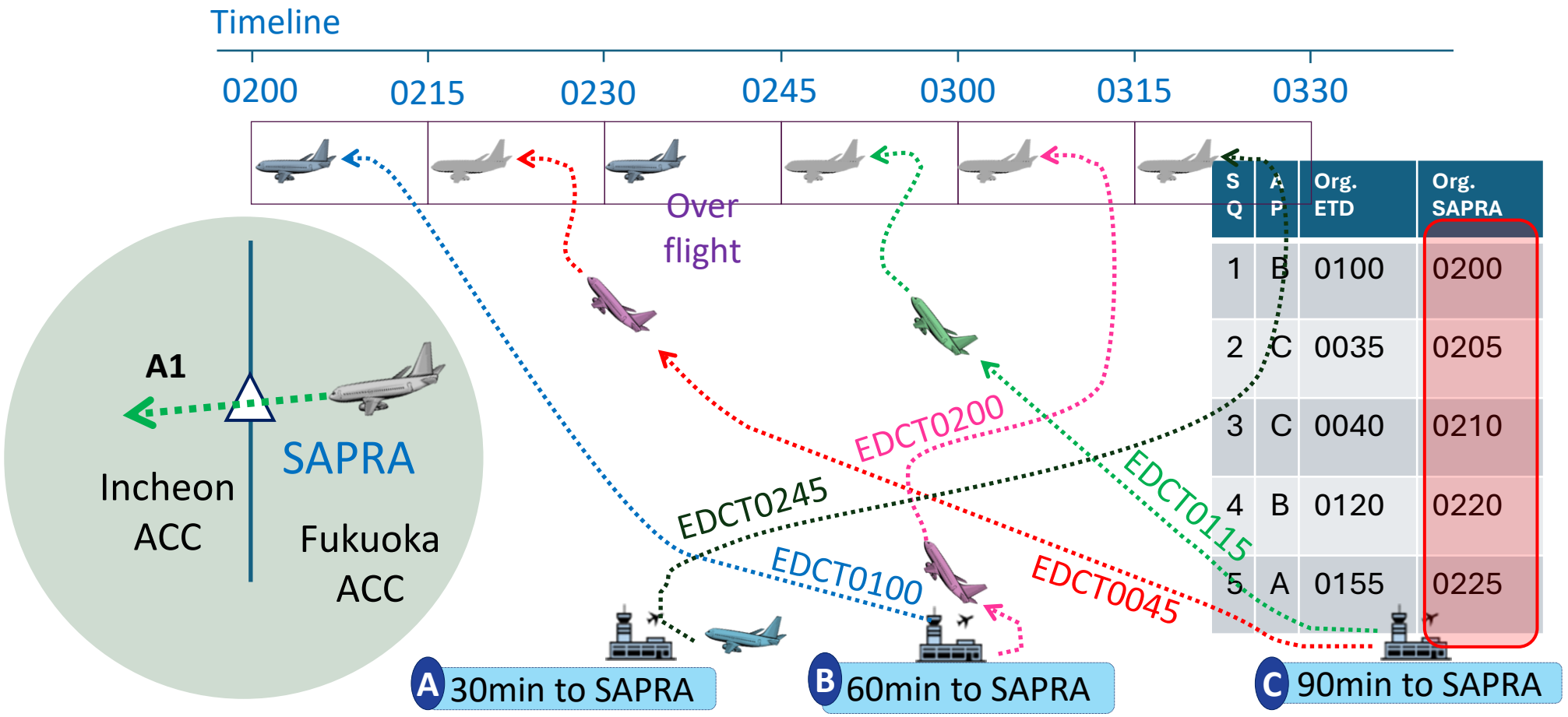
Separation management of FIR boundary

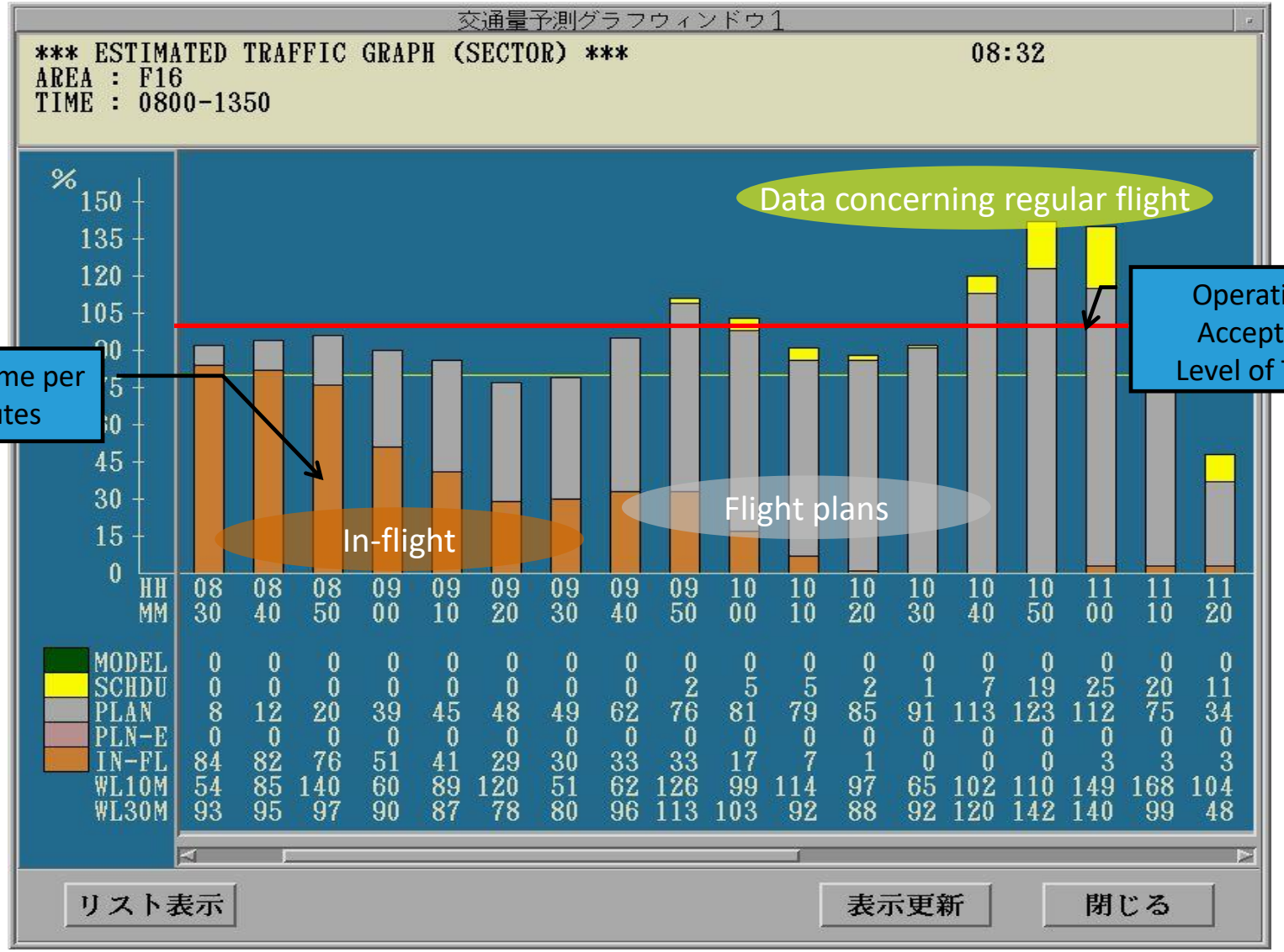
In case of airway G585 between Incheon and Fukuoka

Incheon ACC requires **15min interval** regardless altitude from 0200z. (at 2340z)



SQ	AP	Org. ETD	Org. SAPRA
1	B	0100	0200
2	C	0035	0205
3	C	0040	0210
4	B	0120	0220
5	A	0155	0225

Workload Monitoring (Sample Screen)



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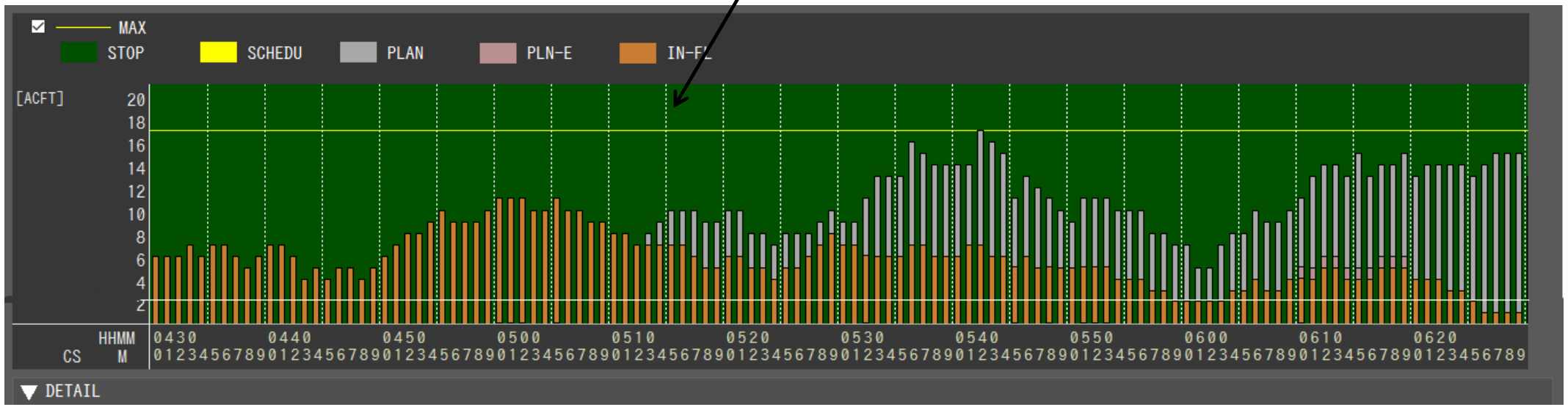
Number of Aircraft Monitoring (Sample Screen)

8-hour forecast of the maximum number of aircraft simultaneously present in a sector



Number of aircraft simultaneously present at each minute

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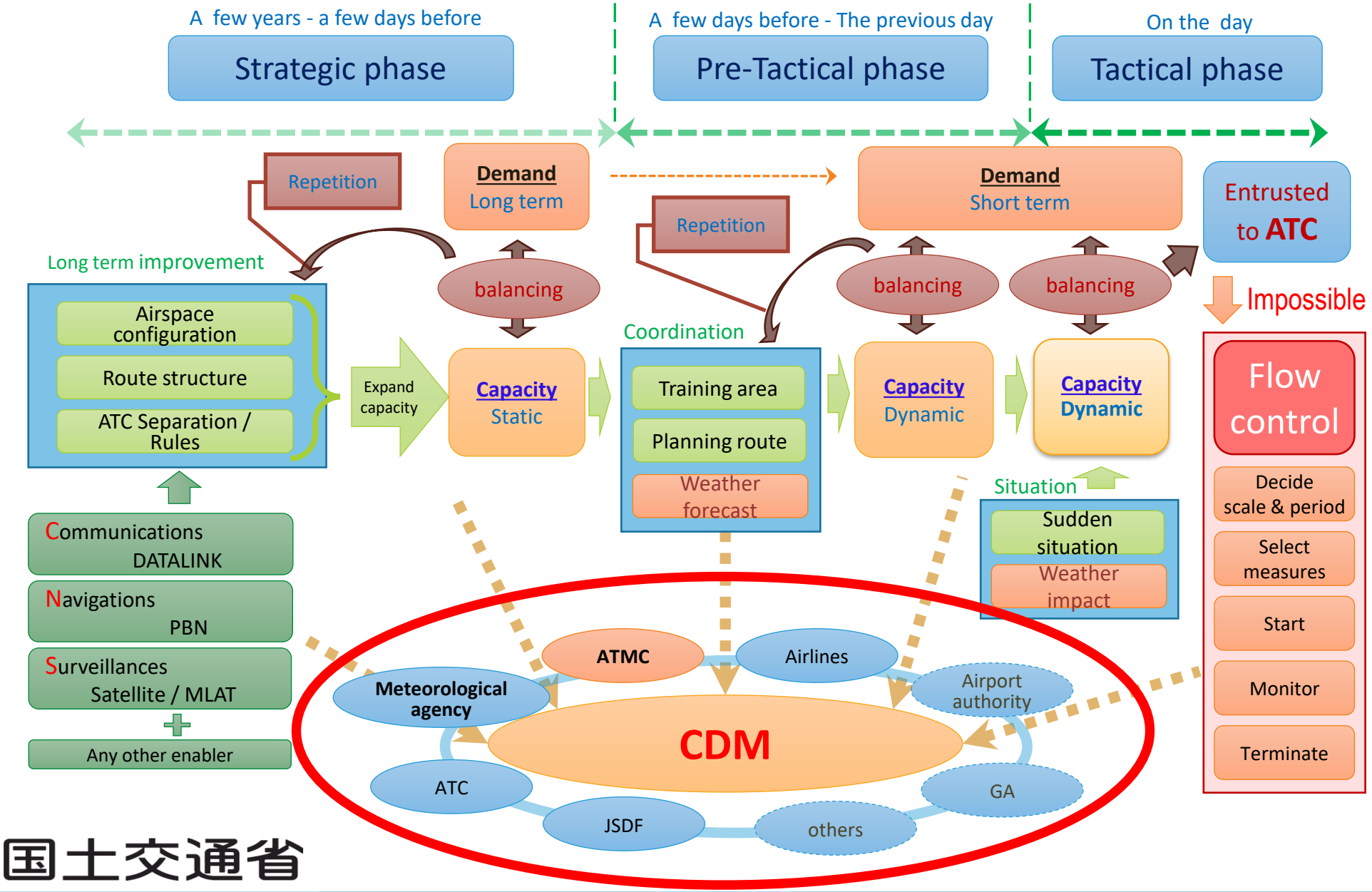
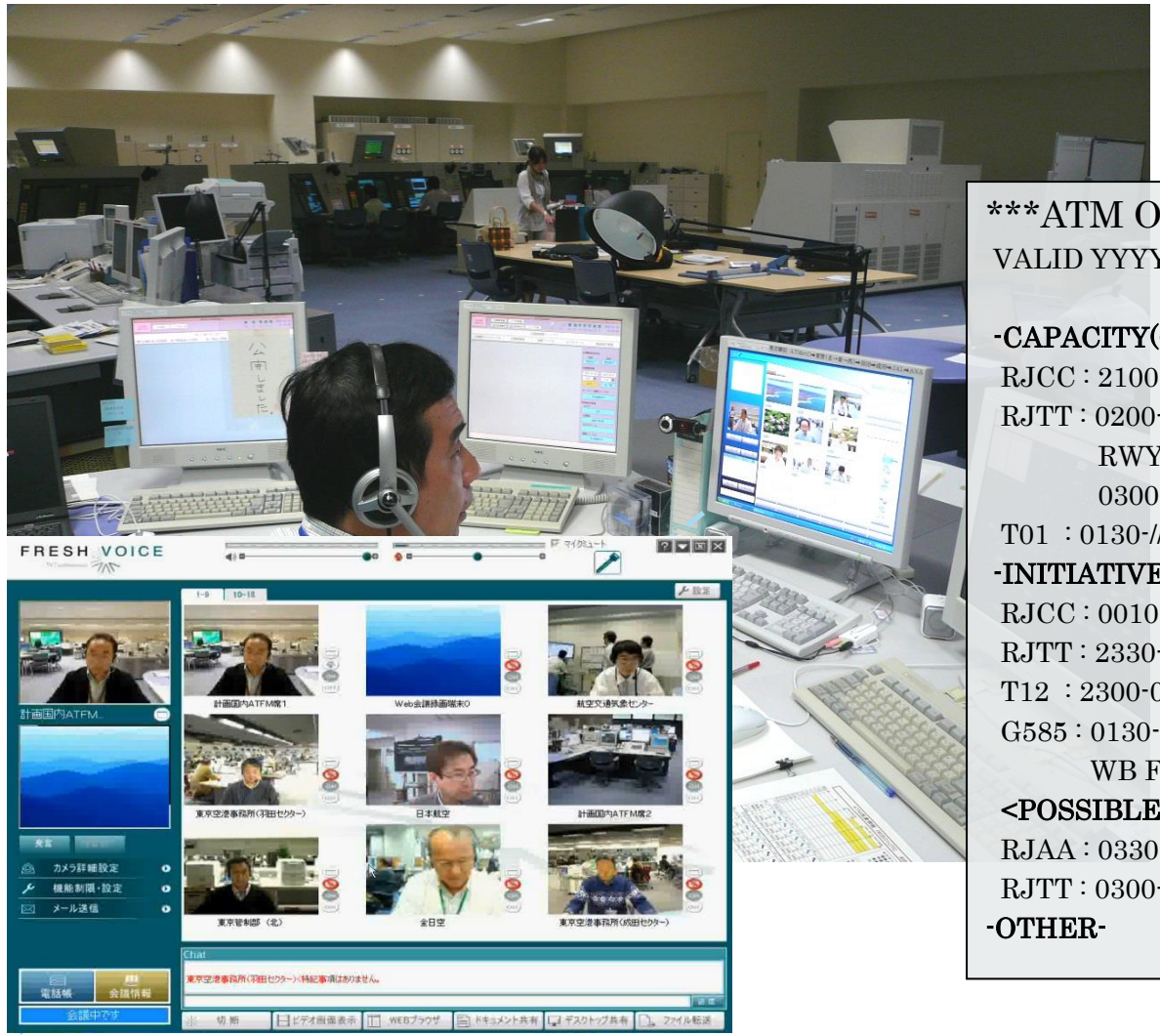
Collaborative Decision Making

- JCABs Collaborative Decision Making
  - ○CDM counterparts at ATM center
    - * Weather specialists (ATMetC)
    - * Military liaison officers
  - ○CDM Members
    - *ATMC
    - *ATMetC
    - *Air Traffic Controller
    - *Airline Operators

CDM process for ATM in Japan



CDM web conference / twice a day + α



*α : whenever required

【OP: ATFM daily plan 】

ATM OPERATIONS PLAN
VALID YYYY/MMDD/2345 THRU 0545

-CAPACITY(CAPA) & CONSTRAINTS-
RJCC : 2100-0300 CAPA=04-06△ LOW VIS
RJTT : 0200-0300 CAPA=10
RWY 34L/16R CLSD (0200-0245 CONST)
0300-//// CAPA=14 FLTCK (ILS RWY22)
T01 : 0130-//// CAPA=92-97 DEV (CB)
-INITIATIVE-
RJCC : 0010-0150 5MINIT DEP FM RJTT
RJTT : 2330-0140 EDCT
T12 : 2300-0005 3MINIT DEP FM RJAA/RJTT
G585 : 0130-UFN 8MINIT @ SAPRA RGDLS OF ALT
WB FOR MONGOLIA, RUSSIA, EUROPE
<POSSIBLE>
RJAA : 0330-0500 15MIT, 250KT @ MAMAS
RJTT : 0300-//// EDCT
-OTHER-

Participants: ATMC, ATC facilities, Airlines, Meteorological agency

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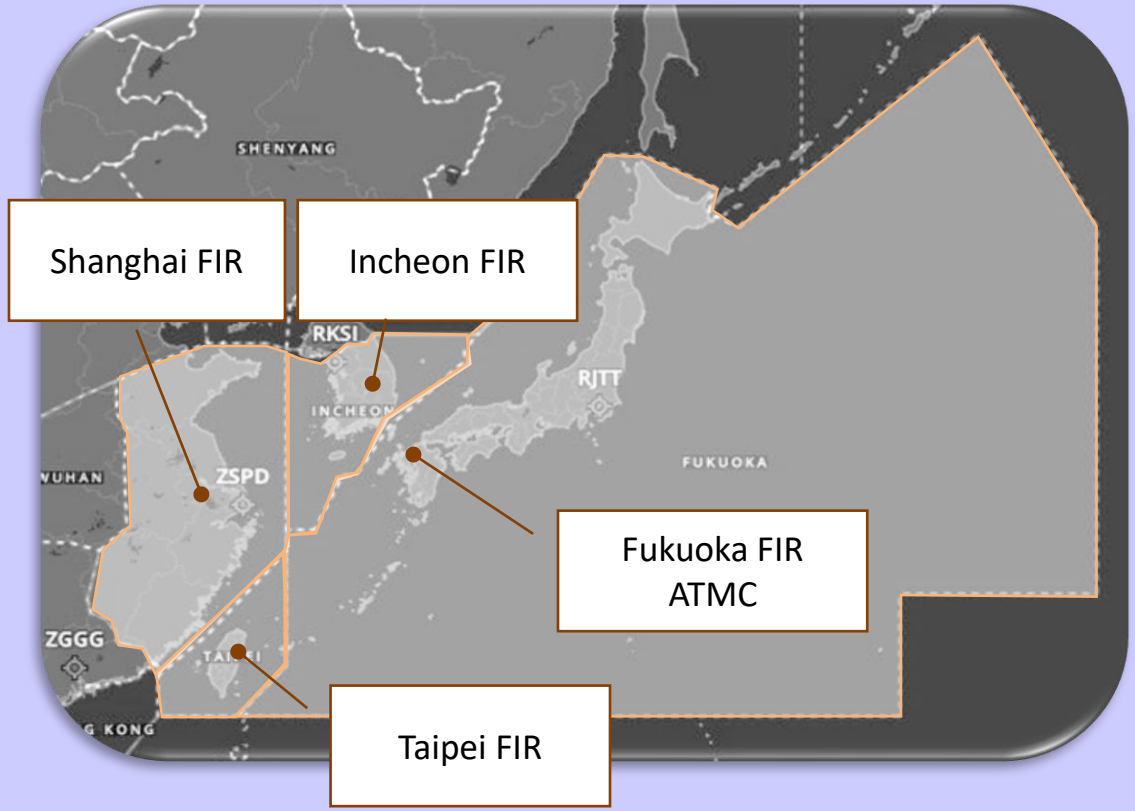
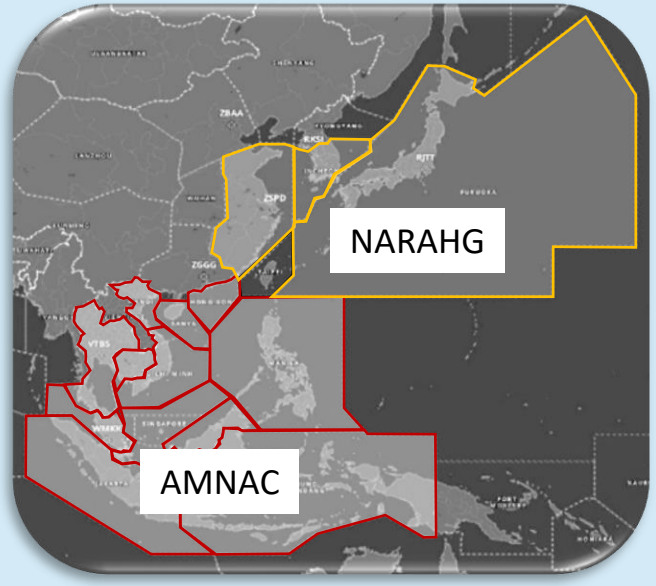
Collaborative regional ATFM

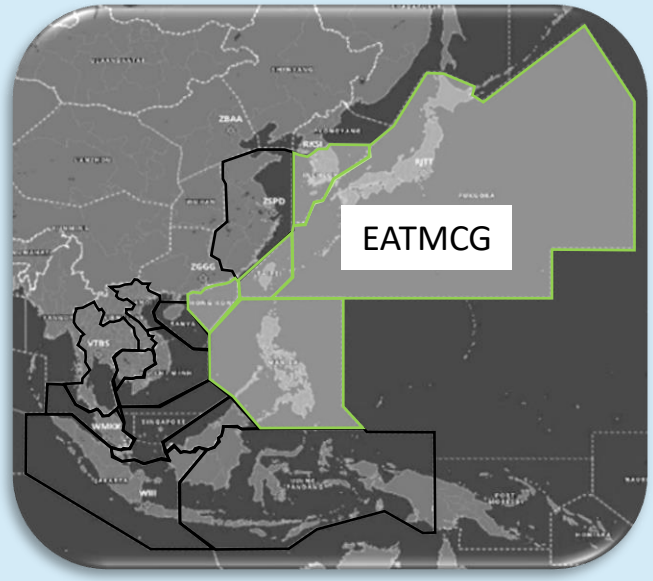
Collaborative regional ATFM



JCAB has been participating these sub regional small groups to discuss about collaborative regional ATFM framework

Sub Regional ATFM Small Group





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Summarize

- 30yrs+ of history in Japan
- Importance of Collaborative Decision Making
  * Military, Weather Specialist, Airline and more
- 3 Phases of CDM Process
  * Strategic/ Pre-tactical/ Tactical
    …and Statistical Review/ Feed back

Thank you!

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Sharing insights from Japan's experience with ATFM

JAPAN CIVIL AVIATION BUREAU

TAKAYUKI HARADA

FEBRUARY 2025

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Contents

- Start with
- Effectiveness of ATFM
- Human Emotional Considerations in ATFM/CDM
- Regional ATFM
- ATFM next step

1. Start with

- Doc9971-Manual on Collaborative Air Traffic Flow Management
- That has since been revised and is now in its third edition, 2018.
- Insights from many experiences were inserted.
- Doc9971 is a very well-performed document.
- Thanks ICAO and colleagues involved in the editing who led this work.
- All you need to do is reading this document, however…
- Since Japan also has 30 years of history for ATFM, Japan shares insights from our experiences.

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2-1. Effectiveness of ATFM

- Haneda is the busiest airport in Japan with many airlines wishing to fly to.
- With four runways, as basic operations, two runways are used for arrivals. Currently, runway capacity is 62 aircrafts/hour for arrivals, and almost all of these slots are utilized.
- The one reason why all slots are utilized is because ATMC monitors daily traffic forecasts and runway capacities which related meteorological conditions and various kinds of airport constraints.
- ATFM is an important function of ATM as it enables control/regulation of the flow of traffic to/from the airport even when airline schedules are disrupted for a variety of reasons.

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2-2. Effectiveness of ATFM

- Without the support of ATFM, there is a risk in using the full handling capacity of the airport. It depends on how we think about margins.
- Prior to the introduction of ATFM, used firebreaks for scheduled slot, which temporarily reduce traffic volume in case something goes wrong.
- This would be a waste of runway capacity. This was one of the old ways.
- In addition, once the number of aircraft on airborne holding increased, it was difficult to predict when it would end.
- In such a chaotic situation, ATC tends to create enough margins to ensure safety: margins for TWR, TMA, and ACC respectively.

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2-3. Effectiveness of ATFM

- ATFM is essential for high-density air traffic flow. It is especially essential to maximize the use of existing runway capacity.
- To minimize margins in both normal and disruptive situations is a major advantage of ATFM.
- ATFM is one way to guarantee safety even if something goes wrong with the situation and can be linked to airport crisis management.
- Most importantly, it contributes to safety.
- And it contributes to CO2 emissions reduction too.

3-1. Human Emotional Considerations in ATFM/CDM

- Doc9971 is an excellent document and beautiful. In reality, it encountered many difficulties. It was human emotion.
- Management is the job of distributing unbalanced tasks.
- ATFM balances demand and capacity, which means that difficult situations are resolved with the cooperation of other stakeholders.
- Cooperation results in delays or detours, which aircraft operators and pilots do not want. Those who are given more work or delay are unhappy.
- Only those who have had only one reduced task will thank you.
- This is why those of us involved in ATFM have a tough time.

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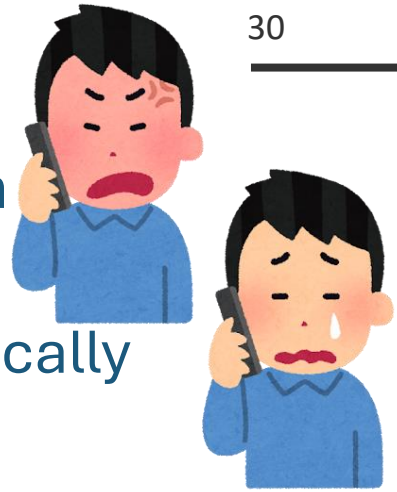
3-2. Human Emotional Considerations in ATFM/CDM

- In general, managers have a tough job.
- The same is true when it comes to ATFM implementation.
- ATFM manager must manage conflicting opinions from all stakeholders with complaints.
  - airlines -No delay
  - Pilots -No delay, No detour, No altitude restriction
  - Airport managers -No long use of aircraft stand
  - ATC -No Miles In Trail, No free of ATFM

3-3. Human Emotional Considerations in ATFM/CDM



- More the situation worsens, the more the emotional side of human tends to come out.
- Communication skills are also important to explain a situation logically and gain consensus.
- In order to make rational decisions and obtain the agreement of all stakeholders.
- It needs:
  - A system that can share the correct situation in real for all stakeholders
  - Share the situation with data
  - A scheme to share post annalistic reports with data

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3-4. Human Emotional Considerations in ATFM/CDM

- Personnel engaged in ATFM need to have a lot of knowledge about aircraft operations and air traffic control, as well as ability for quick situational awareness and a strong decision-making.
- Since coordination with many stakeholders is necessary, communication skills are important, whether the means of communication is voice or e-mail.

4-1. Regional ATFM

- Doc 9971 mentions that ATFM is effective when there are more than 70% of aircraft to be controlled. To meet this, it is likely that it is not efficient to conduct ATFM in only one FIR. Therefore, it states that regional ATFM is preferred.
- Japan implemented ATFM for only domestic flight when it started, This is because of the high ratio of domestic flights in Fukuoka FIR.
- Since Tokyo/Narita(RJAA) was an airport that mainly handled international flights, ATFM for only domestic flights was not effective.

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4-2. Regional ATFM

- Many airports in the Middle East and Asian region have international flights, the establishment of regional ATFM is desirable from the beginning.
- Currently, Japan is also working on regional ATFM, but a multilateral effort include some difficulties.
- It is a challenge, but there are things to be done for this goal.

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4-3. Regional ATFM

- Establishing an organization like EUROCONTROL in Europe would be politically and financially difficult in other regions.
- However, we believe that with the information sharing mechanisms we now have in place, such as SWIM, plus current technology, we can have a virtual ATFM center or even a multinodal ATFM.
- Communication with neighboring states is important.
- Sharing information about ATFM at regional meetings like this one.
- Creating a coordination group to discuss ATFM would be a first step.

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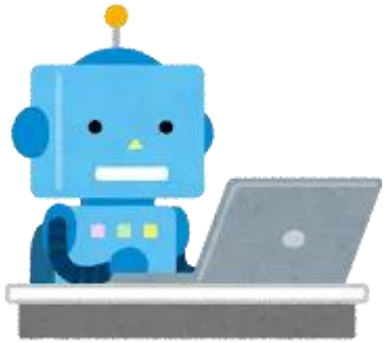
5-1. ATFM NEXT STEP

- The strategic part of the airport and ACC capacity assessment will take time. In many cases, fast-time or real-time simulators are used.
- The tactical part of that capacity assessment and determination is based on a variety of information gathering, including today's weather.
- In Japan, the ATFM officer collects information that affects capacity, and although there are some guiding documents, the final decisions are made by humans.
- Weather information related to airspace and airport operations is also being partially digitized.

5-2. ATFM NEXT STEP

- Many experiential factors are also taken into account for ATFM process.
- The process is extremely compatible with AI.
- Monitoring of changing situations/elements and providing information to stakeholders, etc., will all be made easier with AI.
- Cooperation with industry is critical
- There is great potential for AI to handle many parts of ATFM in the future.
- AI will contribute significantly to the realization of regional ATFM.



6. Conclusion

- ATFM is essential for high-density air traffic flow, and it contributes to safety and environment.
- Dialogue/conversation is necessary to achieve CDM/ATFM with many stakeholders who have different objectives and roles.
- Regional ATFM is the key to effective ATFM. To achieve this, a forum is needed to synchronize the awareness of all parties involved.
- Challenges in implementing AI in ATFM with industry.

Thank you

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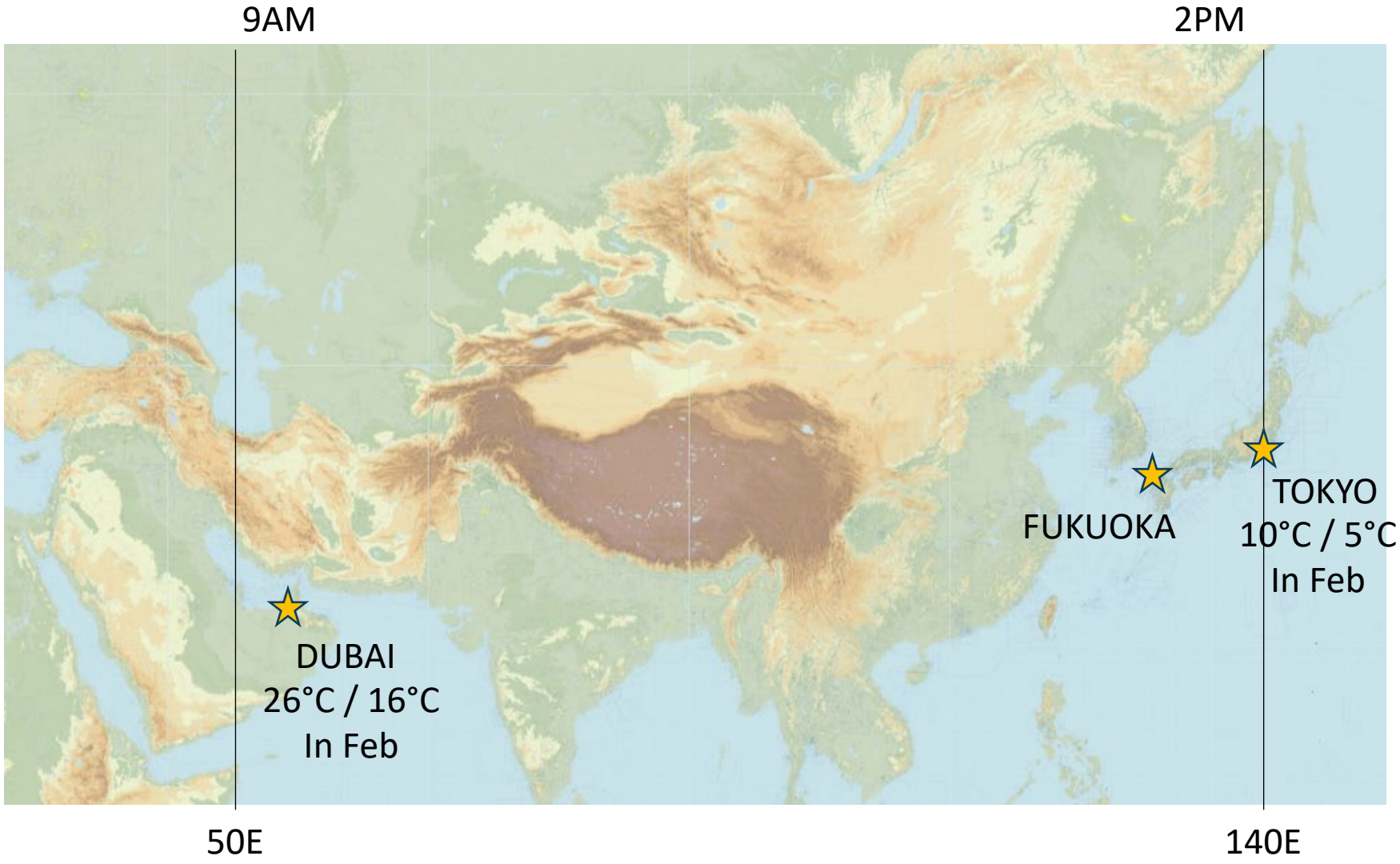

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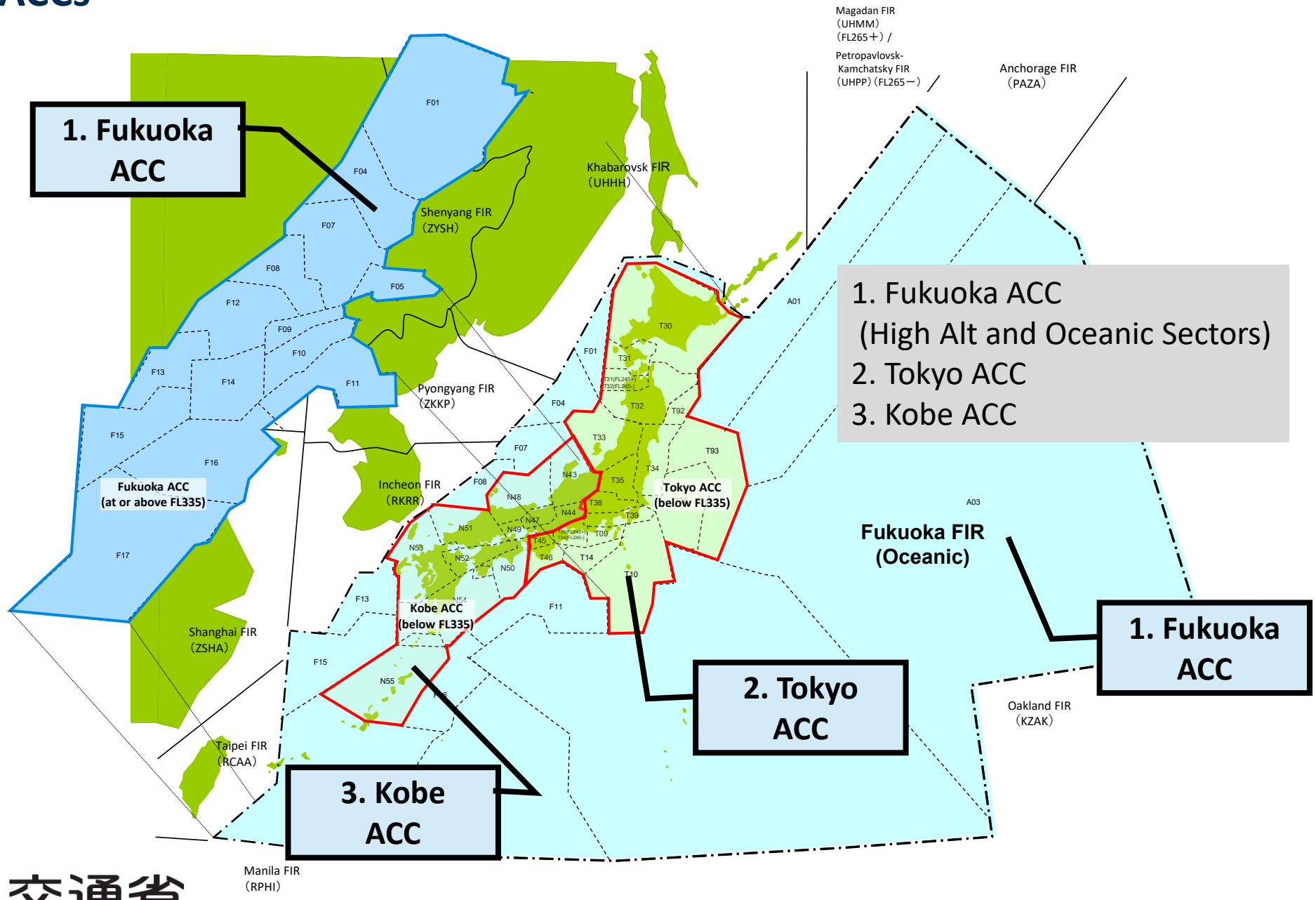

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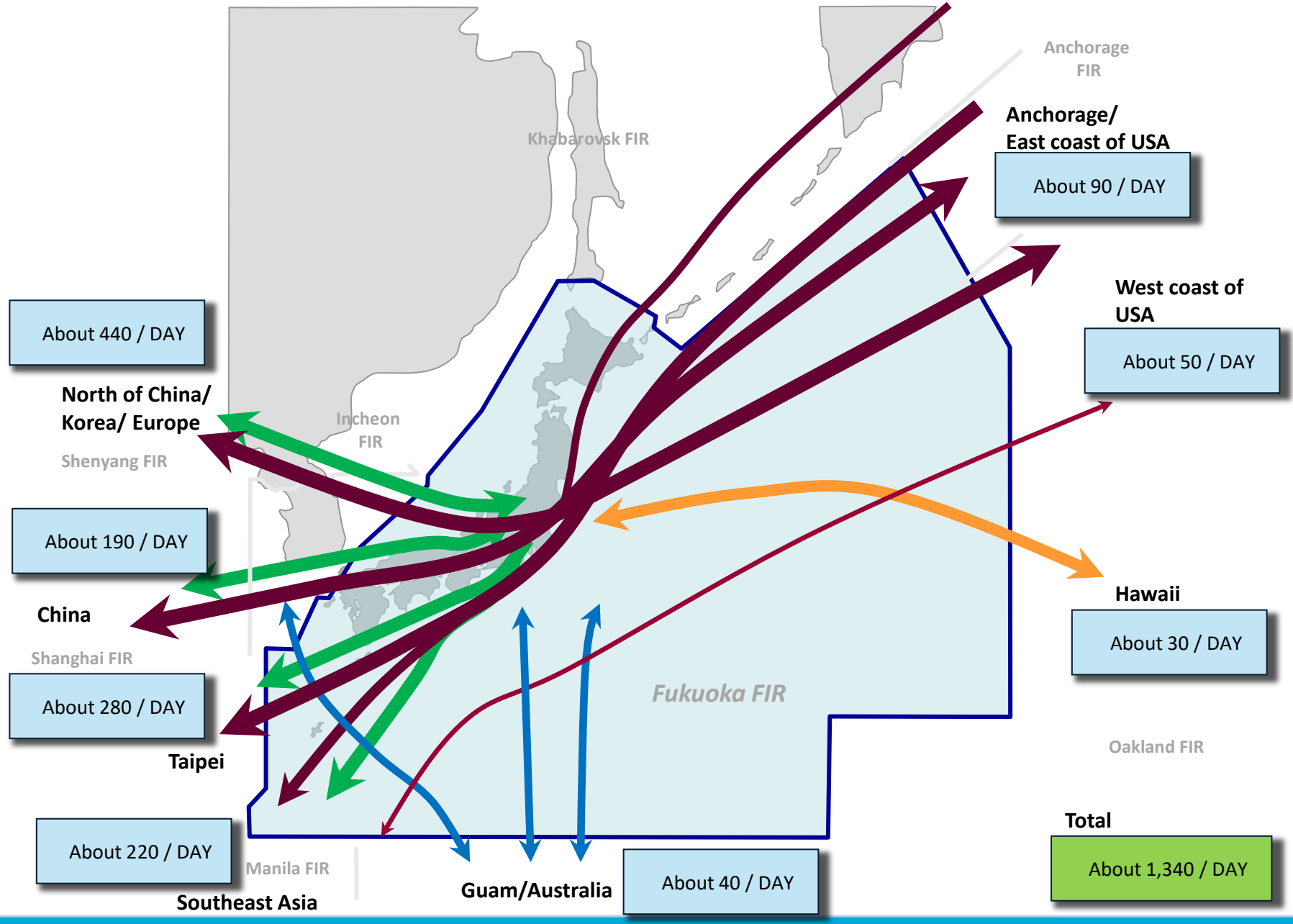

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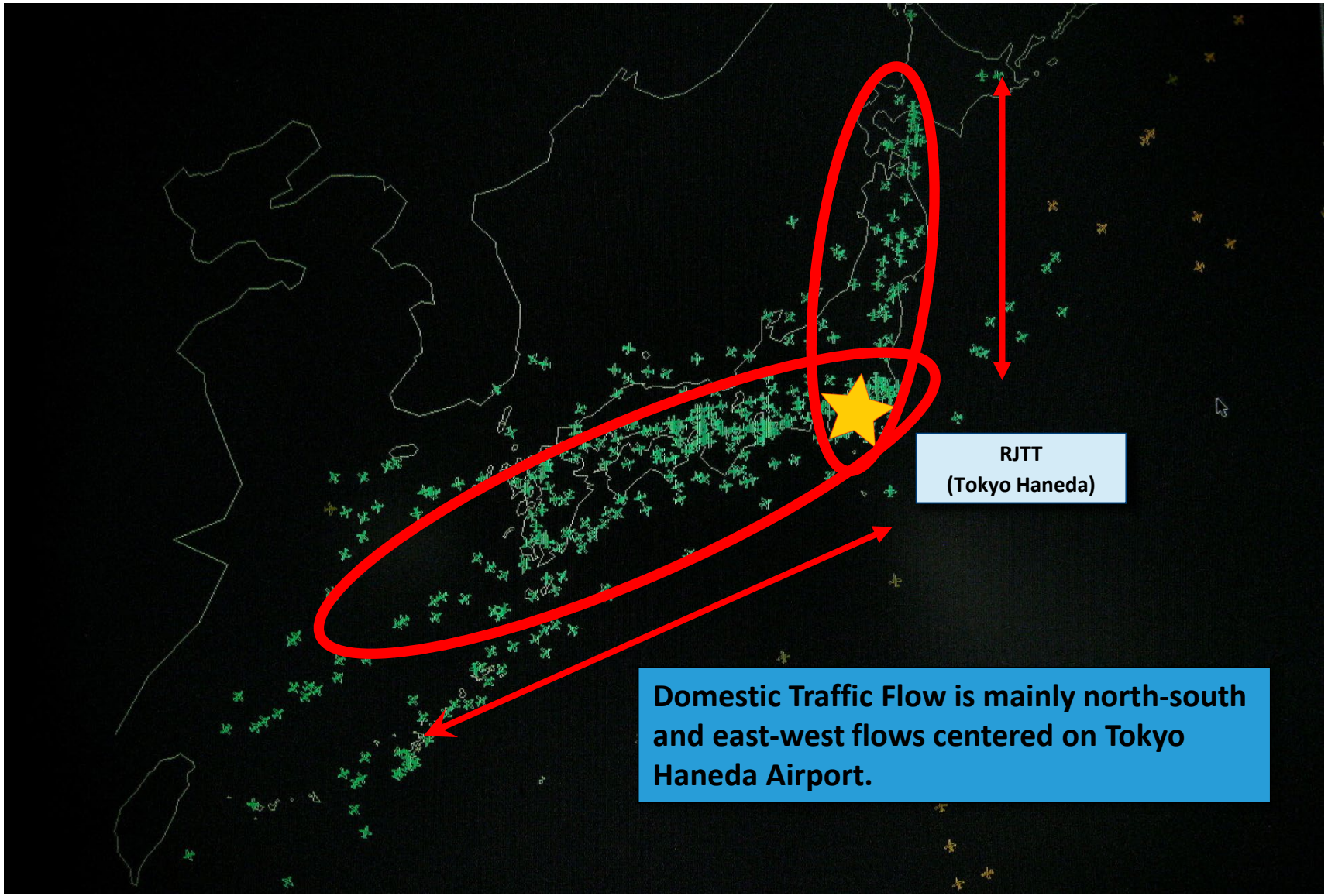

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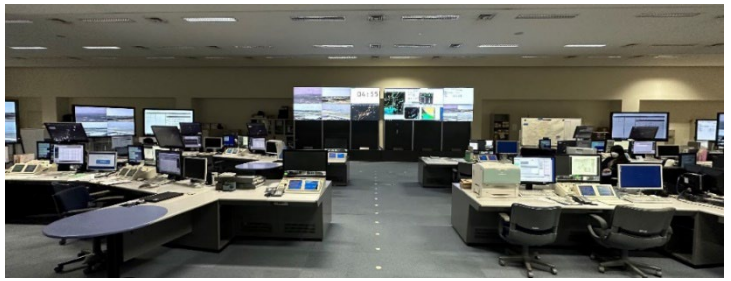

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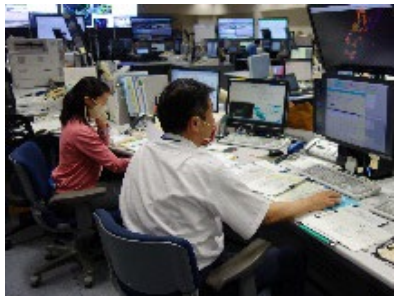

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- Civil - Military coordination for flexible use of airspace
- Pacific Organized Track System

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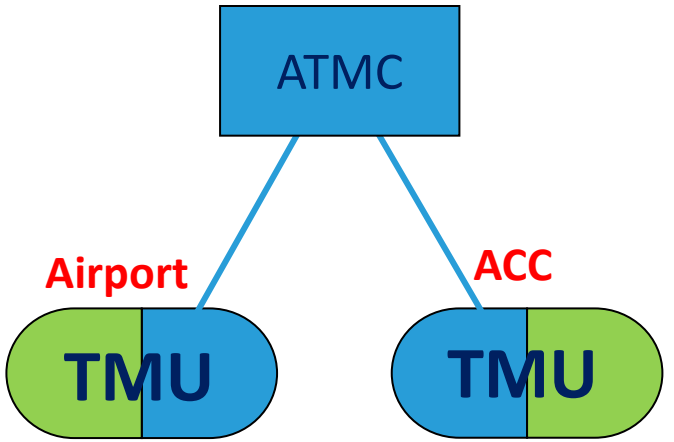

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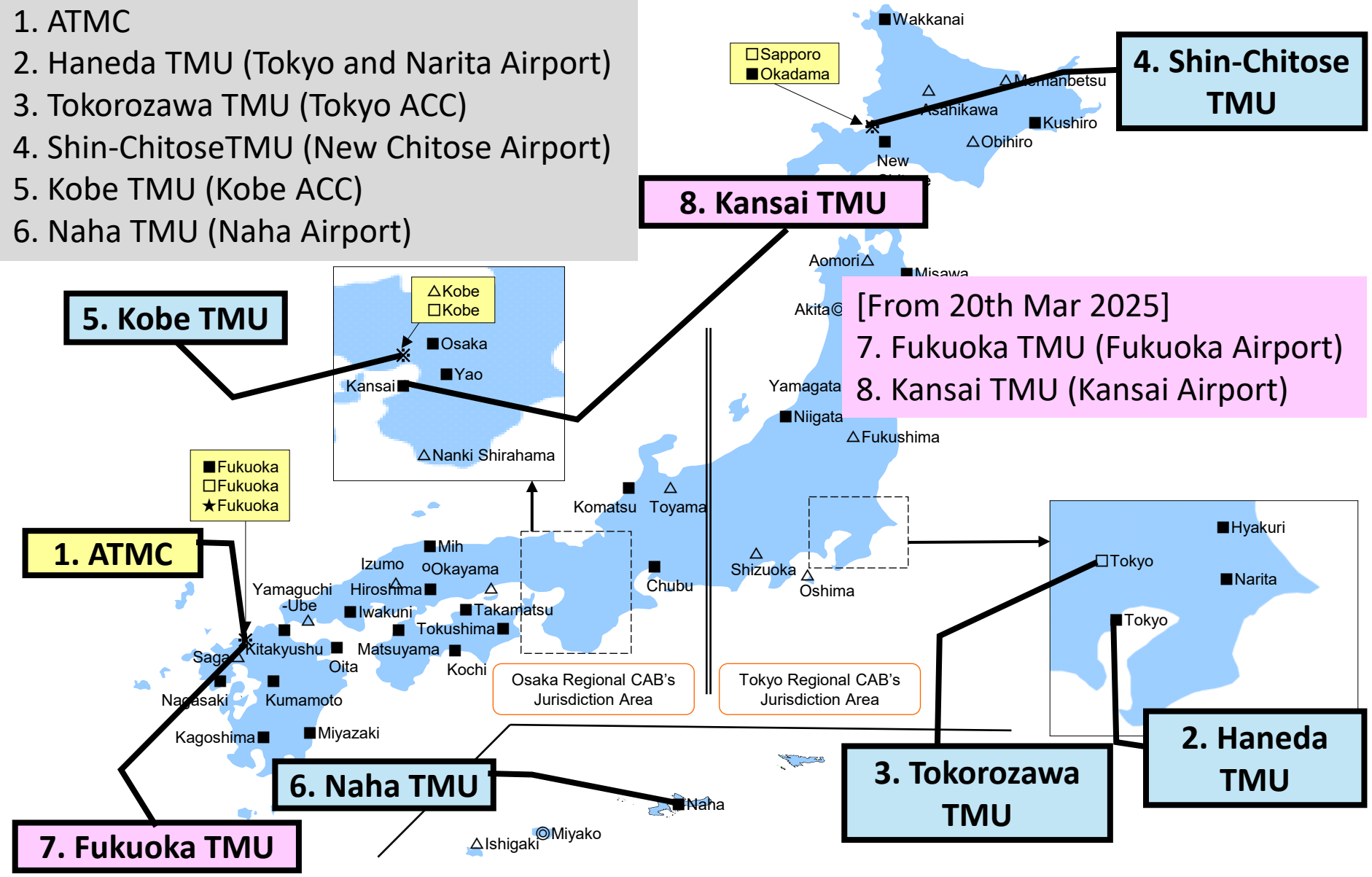
5. Kobe TMU (Kobe ACC)
6. Naha TMU (Naha Airport)



ATFM Measures

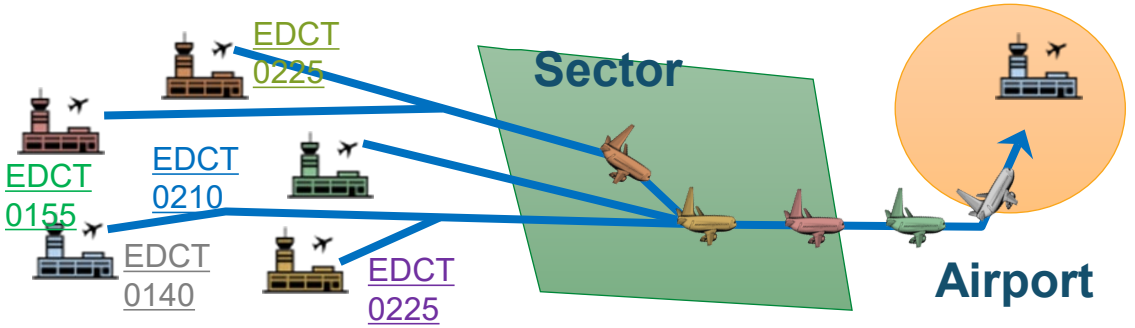
Ground Delay Program

Departure aircraft are assigned EDCT(Expected Departure Clearance Time)=CTOT by ATFM system.

On the Ground

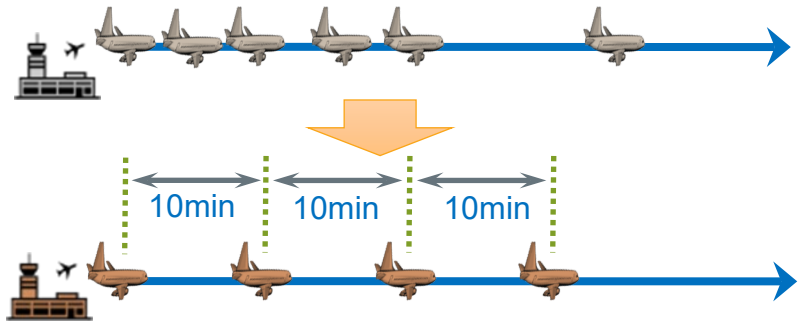
Departure aircraft which bound for congested airport or are going to pass the crowded sectors, are assigned ground delay if necessary.

Flow control initiatives ①



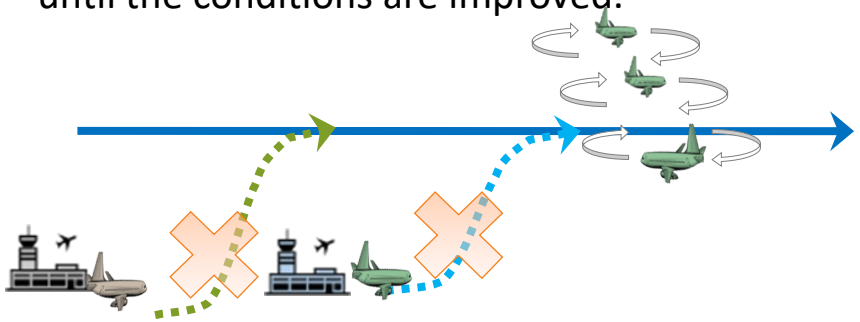
Departure Interval

ATM officer instructs airport controller to keep departure interval (minutes or miles).



Ground Stop

If the heavy congestion is expected (e.g. sever WX, airport closure, ATC system failure), departure aircraft are grounded until the conditions are improved.



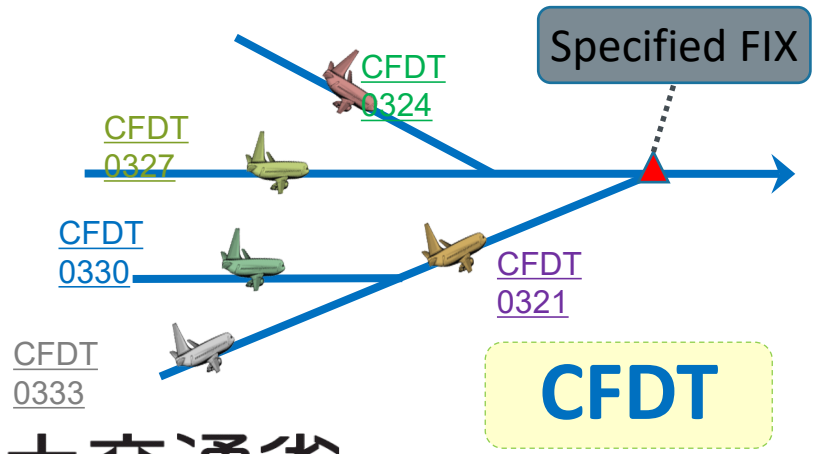
ATFM Measures

Flow control initiatives ②

In-Flight

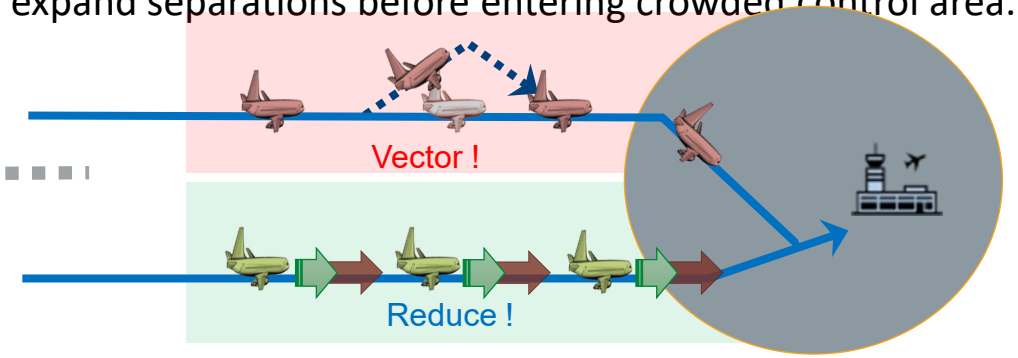
Specifying CFDT for Arrival Spacing Program

ATFM system calculates CFDTs (Calculated Fix Departure Time), and ACC issues CFDTs to aircraft so that they pass the specified fix at assigned time.



Expanded Miles in-trail

To expand separations before entering crowded control area.

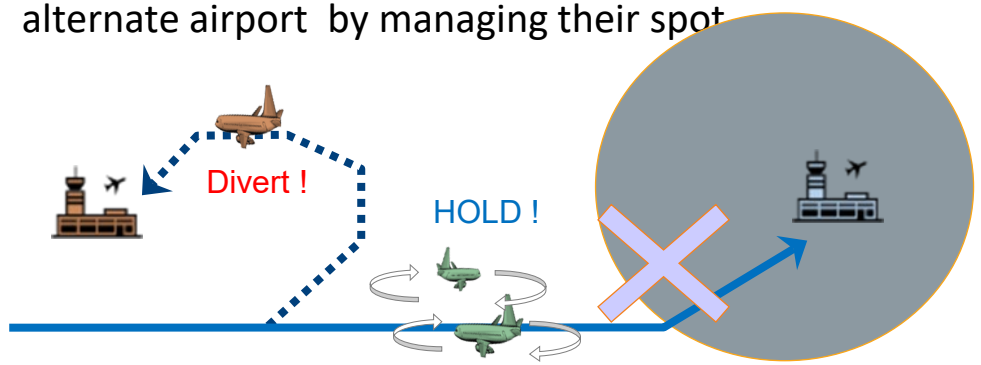


Speed Adjustment

To reduce and align aircraft speed at entry fix.

Entry Suspension

In case of happening at the airport, ATMC stops the inflow of aircraft , and helps them to divert to the alternate airport by managing their spot.



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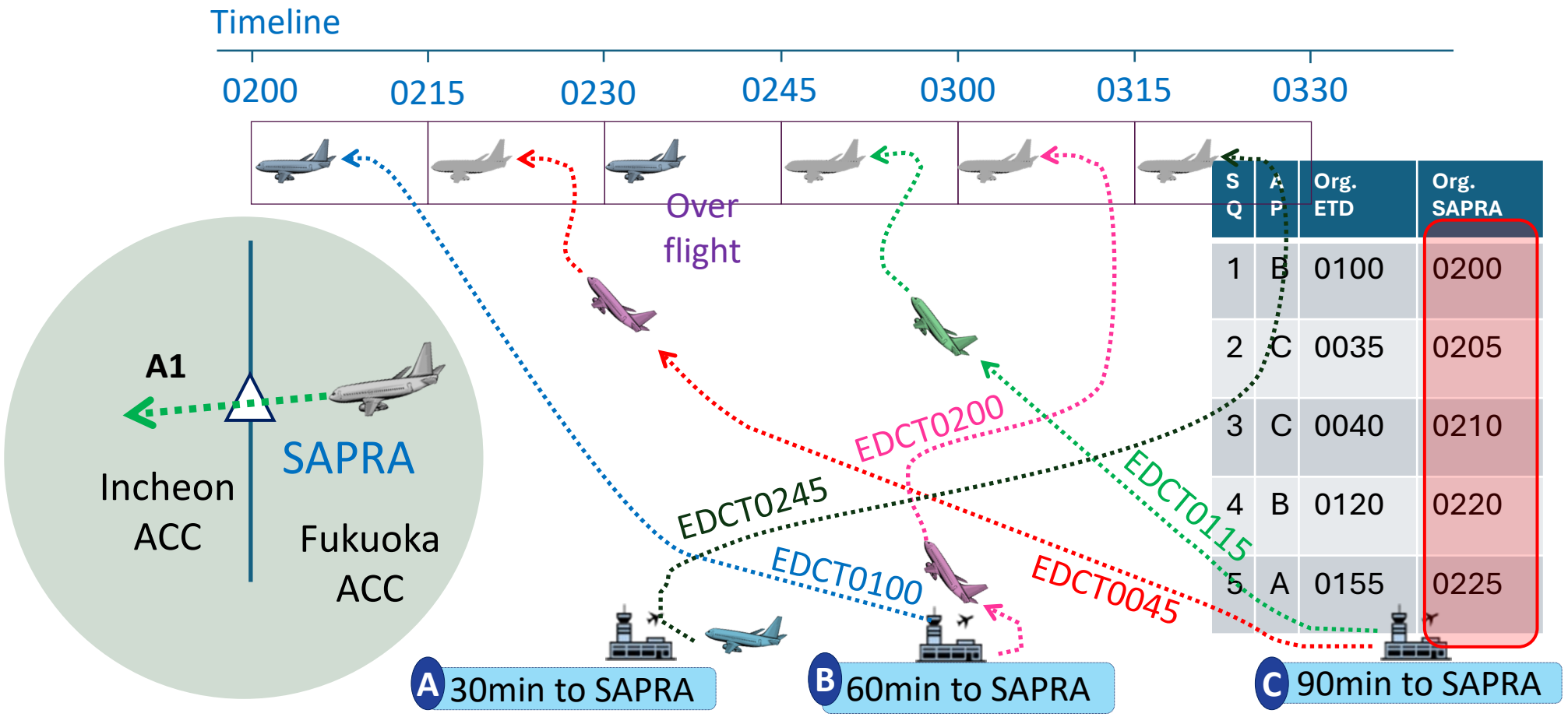
Separation management of FIR boundary

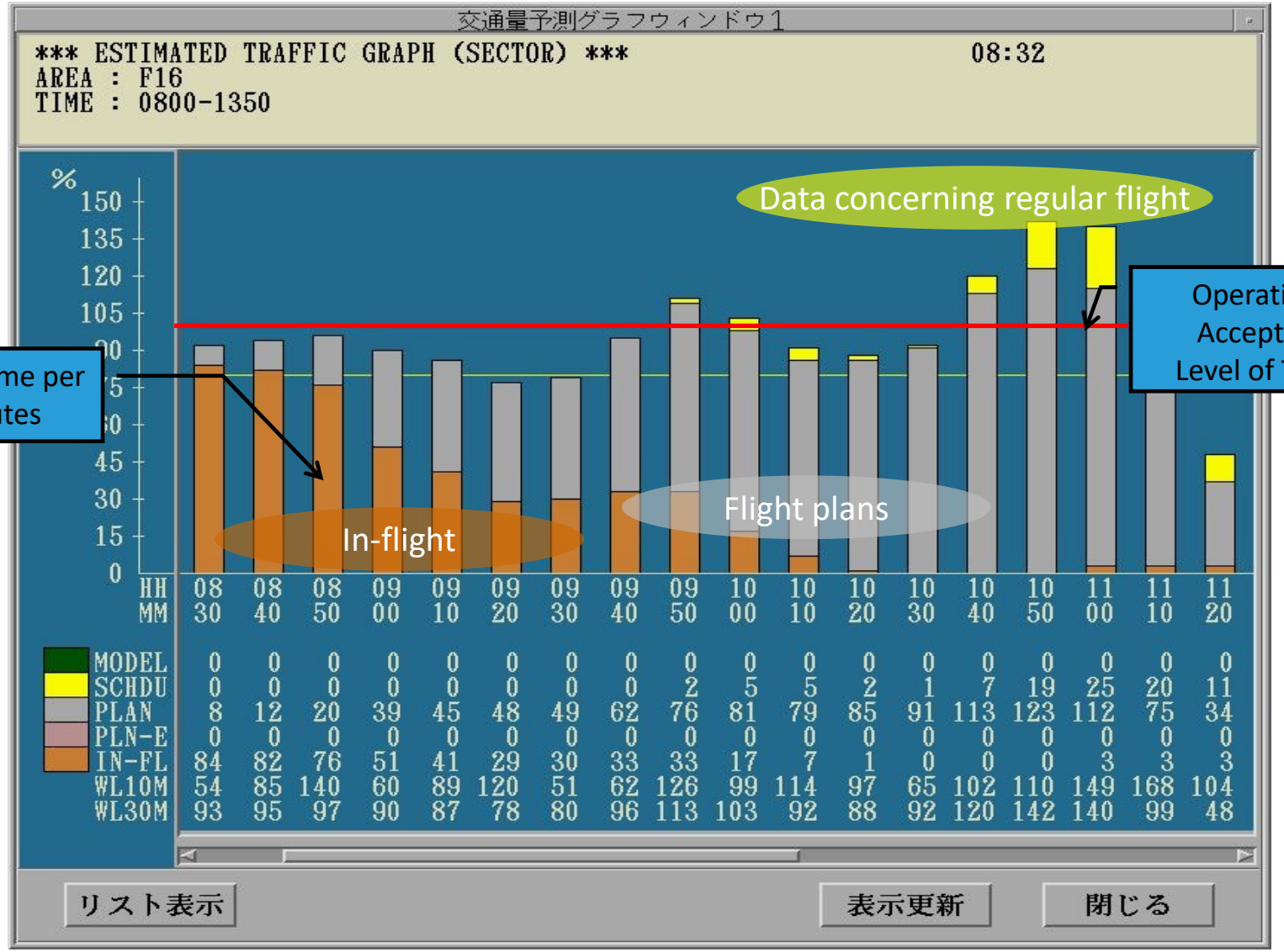
In case of airway G585 between Incheon and Fukuoka

Incheon ACC requires **15min interval** regardless altitude from 0200z. (at 2340z)



SQ	AP	Org. ETD	Org. SAPRA
1	B	0100	0200
2	C	0035	0205
3	C	0040	0210
4	B	0120	0220
5	A	0155	0225

Workload Monitoring (Sample Screen)



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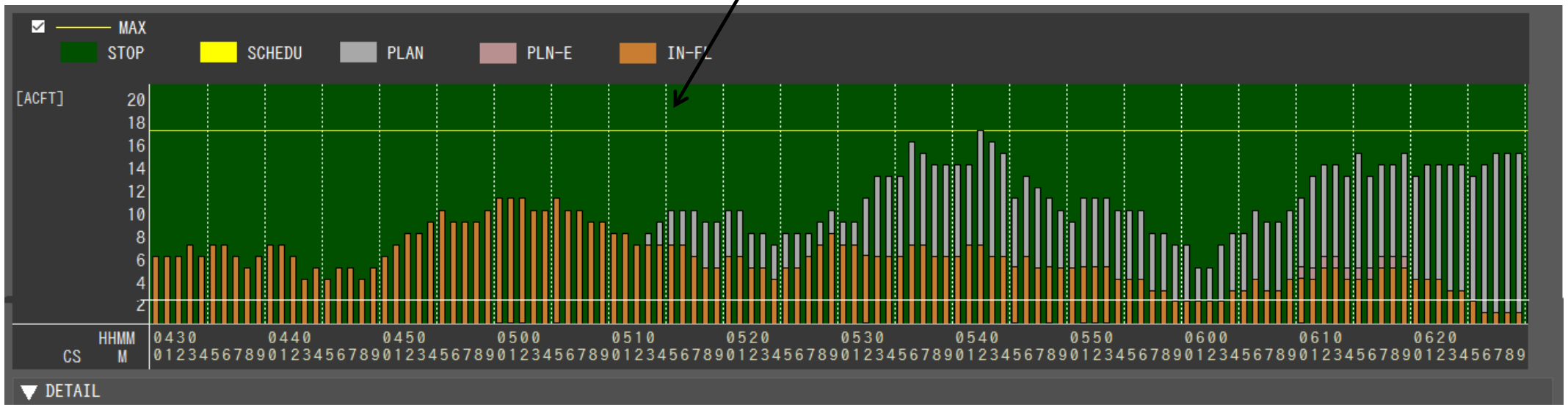
Number of Aircraft Monitoring (Sample Screen)

8-hour forecast of the maximum number of aircraft simultaneously present in a sector

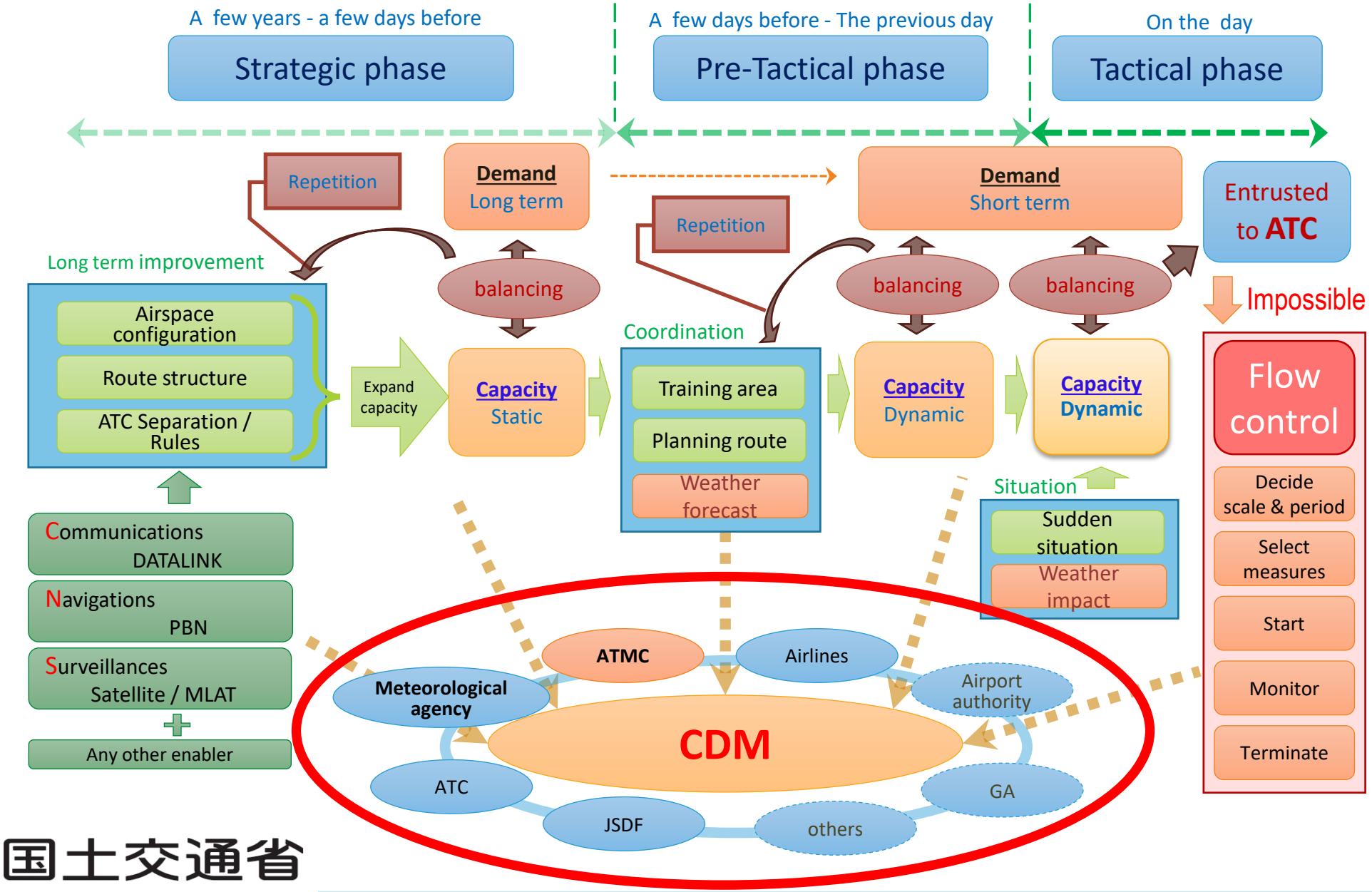


Number of aircraft simultaneously present at each minute

Collaborative Decision Making

- JCABs Collaborative Decision Making
  - ○CDM counterparts at ATM center
    - * Weather specialists (ATMetC)
    - * Military liaison officers
  - ○CDM Members
    - *ATMC
    - *ATMetC
    - *Air Traffic Controller
    - *Airline Operators

CDM process for ATM in Japan



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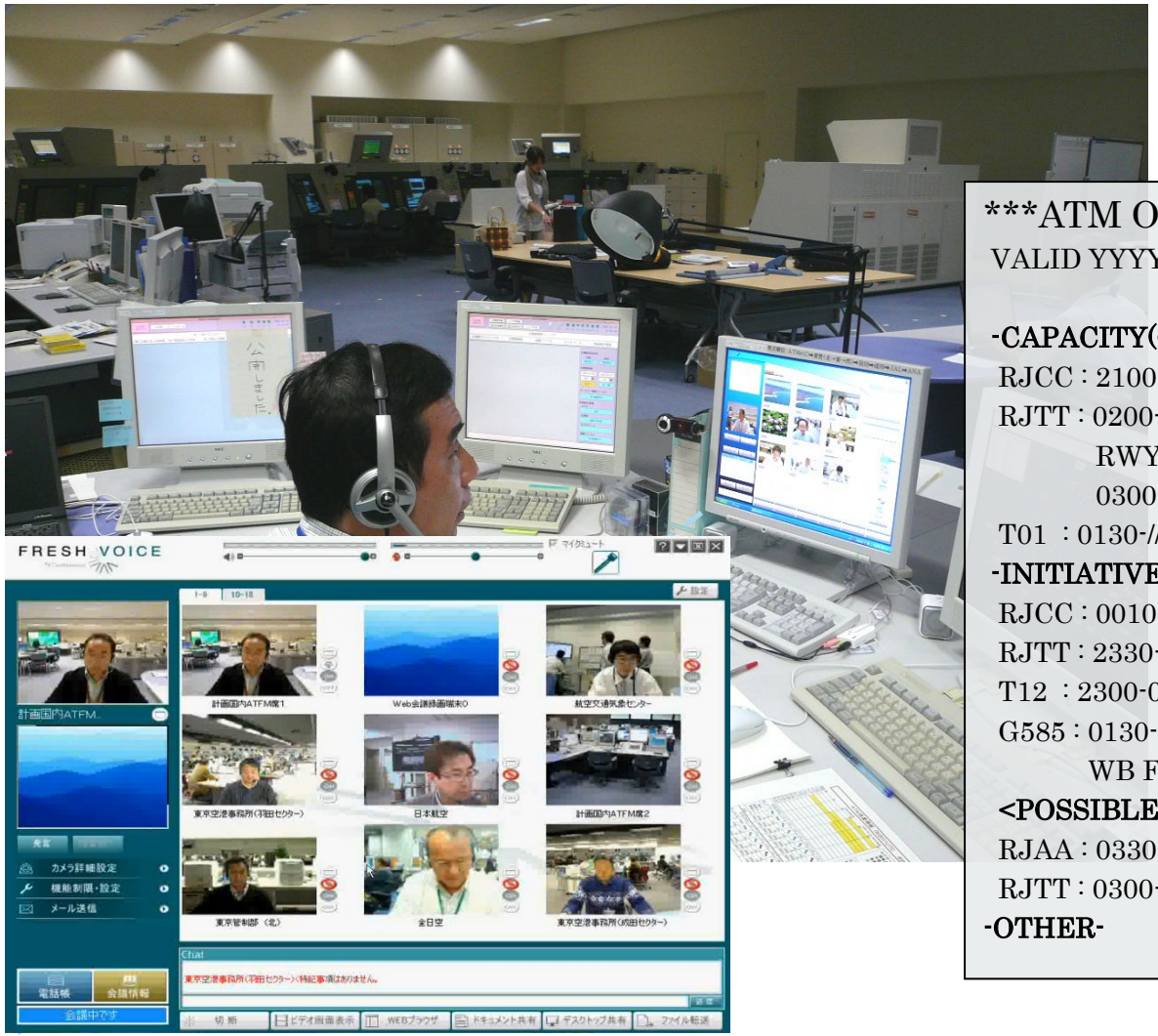
CDM web conference / twice a day + α



*α：whenever required

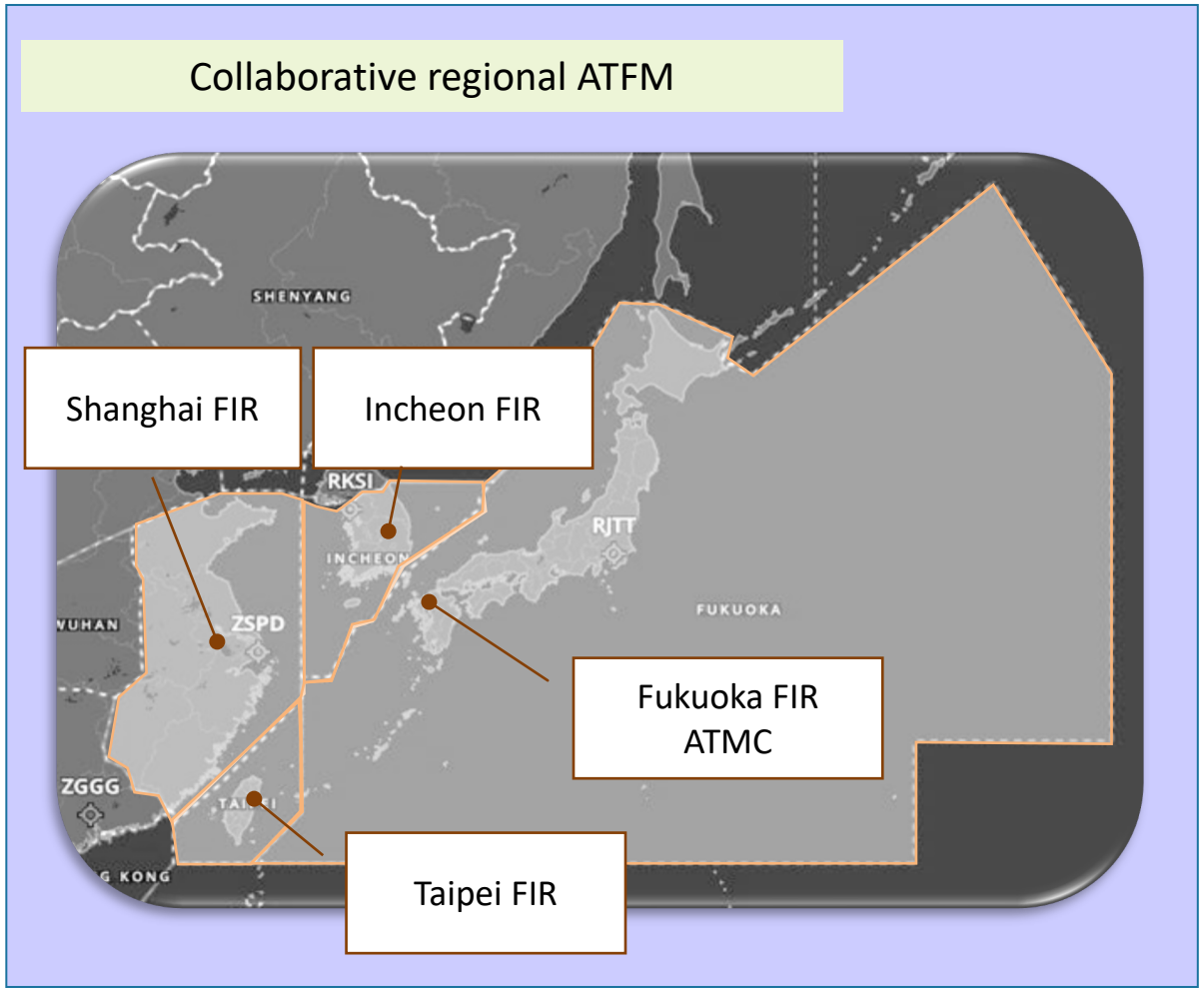
【OP: ATFM daily plan 】

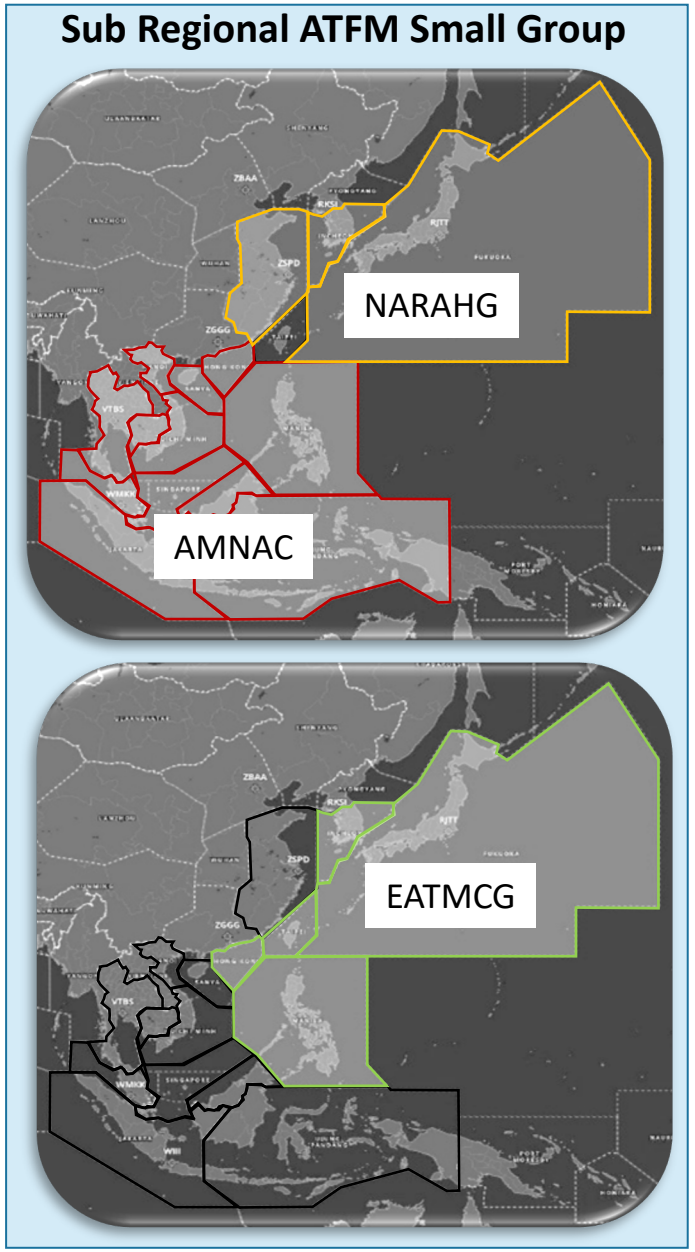
ATM OPERATIONS PLAN
VALID YYYY/MMDD/2345 THRU 0545

-CAPACITY(CAPA) & CONSTRAINTS-
RJCC：2100-0300 CAPA=04-06△ LOW VIS
RJTT：0200-0300 CAPA=10
RWY 34L/16R CLSD (0200-0245 CONST)
0300-//// CAPA=14 FLTCK (ILS RWY22)
T01 ：0130-//// CAPA=92-97 DEV (CB)
-INITIATIVE-
RJCC：0010-0150 5MINIT DEP FM RJTT
RJTT：2330-0140 EDCT
T12 ：2300-0005 3MINIT DEP FM RJAA/RJTT
G585：0130-UFN 8MINIT @ SAPRA RGDLS OF ALT
WB FOR MONGOLIA, RUSSIA, EUROPE
<POSSIBLE>
RJAA：0330-0500 15MIT, 250KT @ MAMAS
RJTT：0300-//// EDCT
-OTHER-

Participants: ATMC, ATC facilities, Airlines, Meteorological agency

Collaborative regional ATFM





JCAB has been participating these sub regional small groups to discuss about collaborative regional ATFM framework

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Summarize

- 30yrs+ of history in Japan
- Importance of Collaborative Decision Making
  * Military, Weather Specialist, Airline and more
- 3 Phases of CDM Process
  * Strategic/ Pre-tactical/ Tactical
  …and Statistical Review/ Feed back

Thank you!