Ministry of Land Infrastructure, Transport and Tourism
CIVIL AVATION BUREAU OF JAPAN

From Domestic to Cross Border ATFM

Cross-Border ATFM Workshop
3rd – 4th September 2015

Japan Civil Aviation Bureau

国土交通省

History of Air Traffic Management in Japan

～1994 Tactical ATC

- Flow control restrictions as occasion demands were taken by ACCs to cope with air traffic congestion.
- No computer system to support proper judgment.
- Unnecessary delay and concentration of traffic in major airports.

1994 ～ ATFM Center

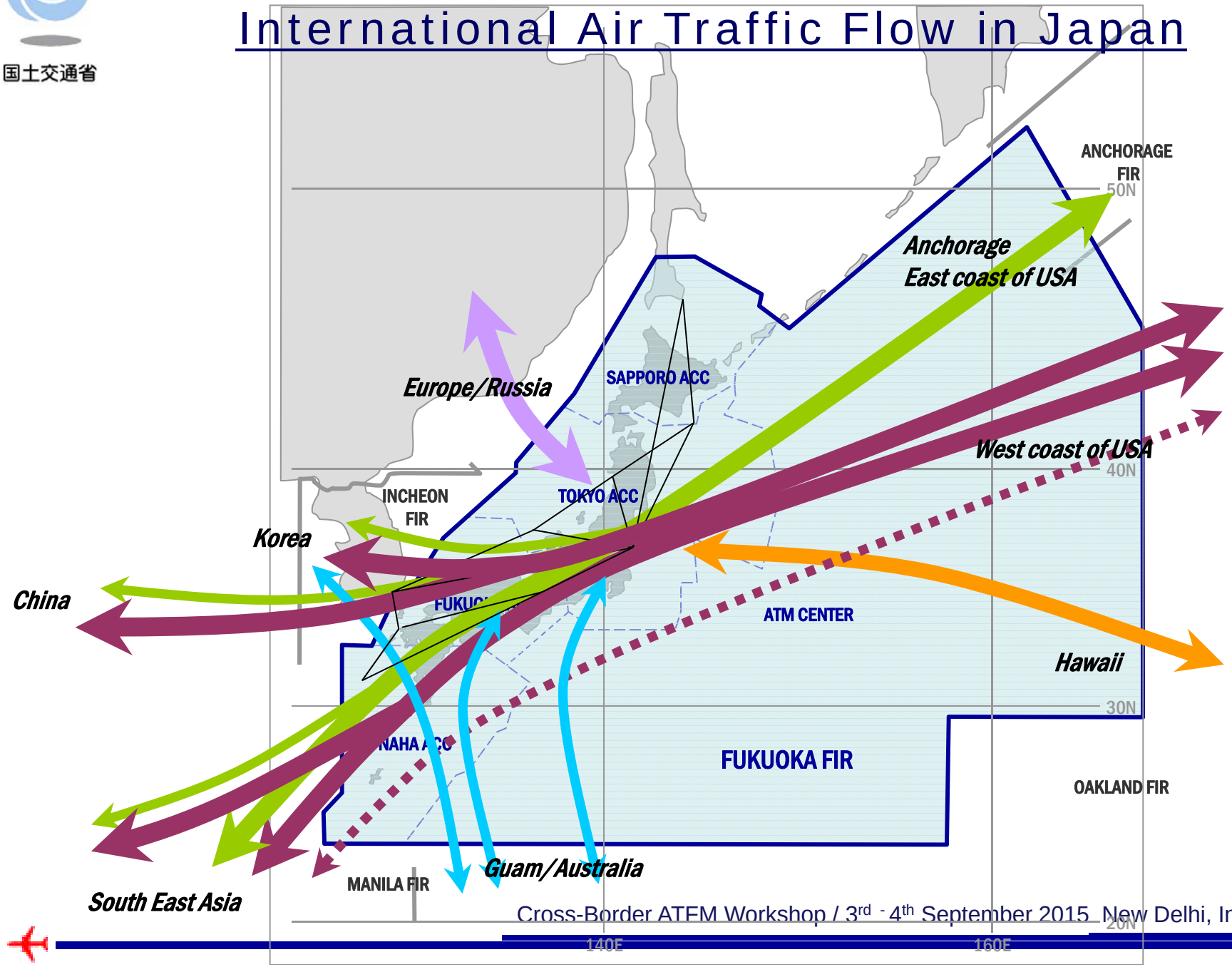
- The ATFMC was established and began modern operation by introducing computer system.

However, those function was quite limited. It was only providing air traffic flow management services.

2005 ～ ATM Center

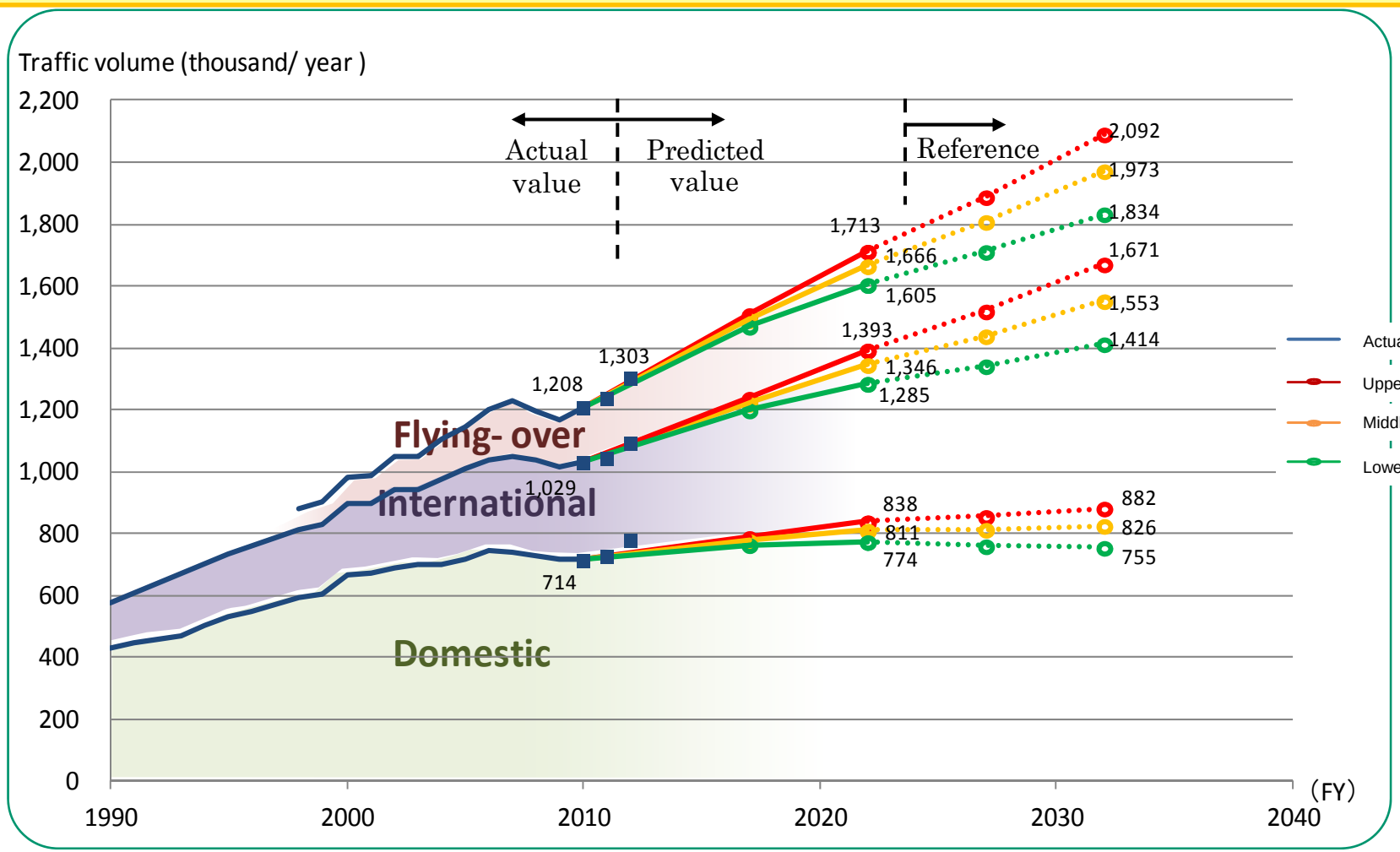
- In order to respond to a further increase in air traffic volume, the ATFMC was upgraded to the ATMC by adding a full-scale ASM function and the oceanic ATM function. By tightly linking these three functions based on the concept of CDM, the ATM center developed a comprehensive ATM service.
- Tokyo and Naha FIR were integrated into Fukuoka FIR.

International Air Traffic Flow in Japan



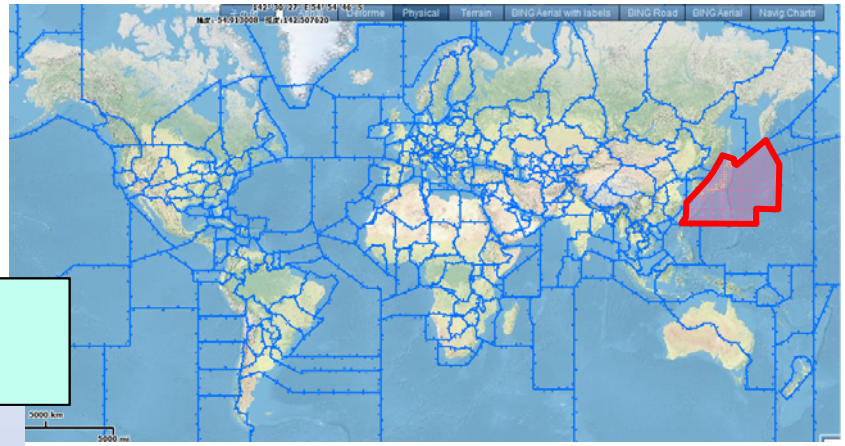
Traffic growth in Japan

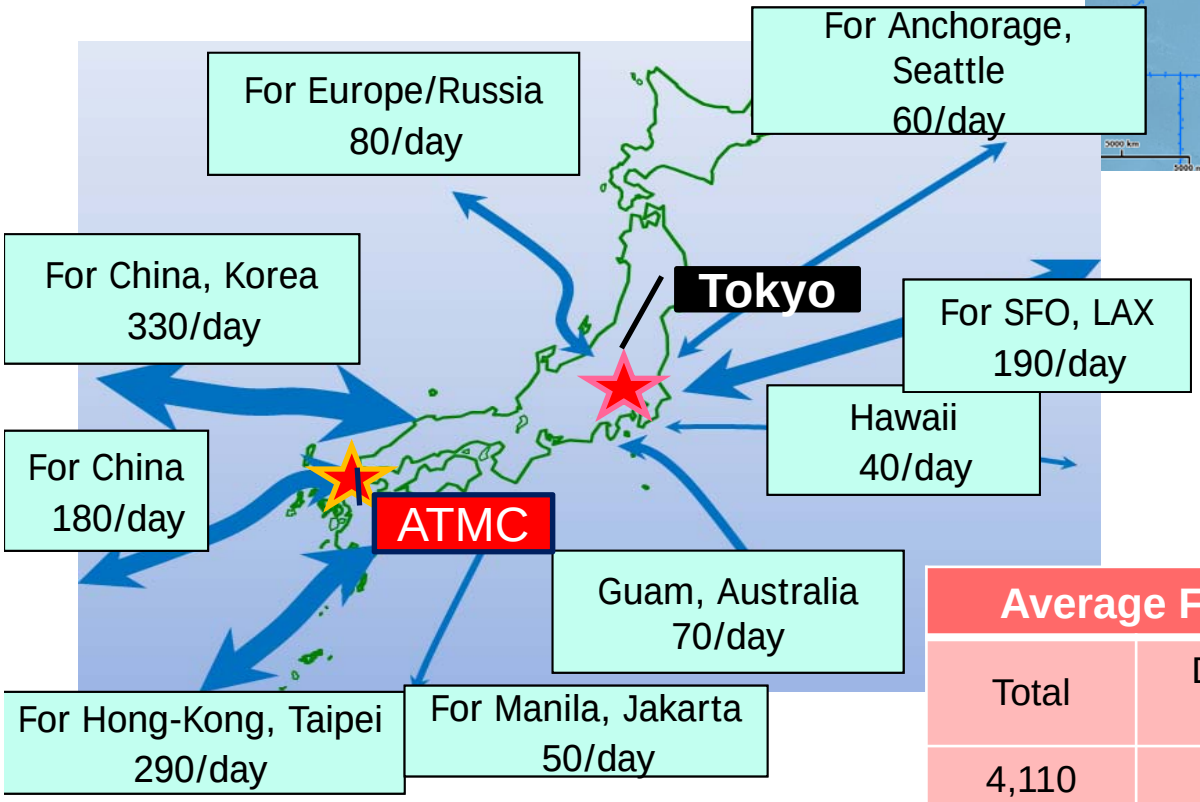
- International flight and flying-over are increased. Domestic flight is dependent on the case of GDP.
- Even if GDP is estimated low, the number of aircrafts will exceed the limit of air traffic control capacity around 2025.
- The demand may go up rather than this forecast by further promotion of inbound tourism and the growth of LCC.



ATM and Traffic volume in Japan

- ✈ Location and Traffic Flow
- ✈ 1 FIR, 1 ATMC, 4 ACCs,

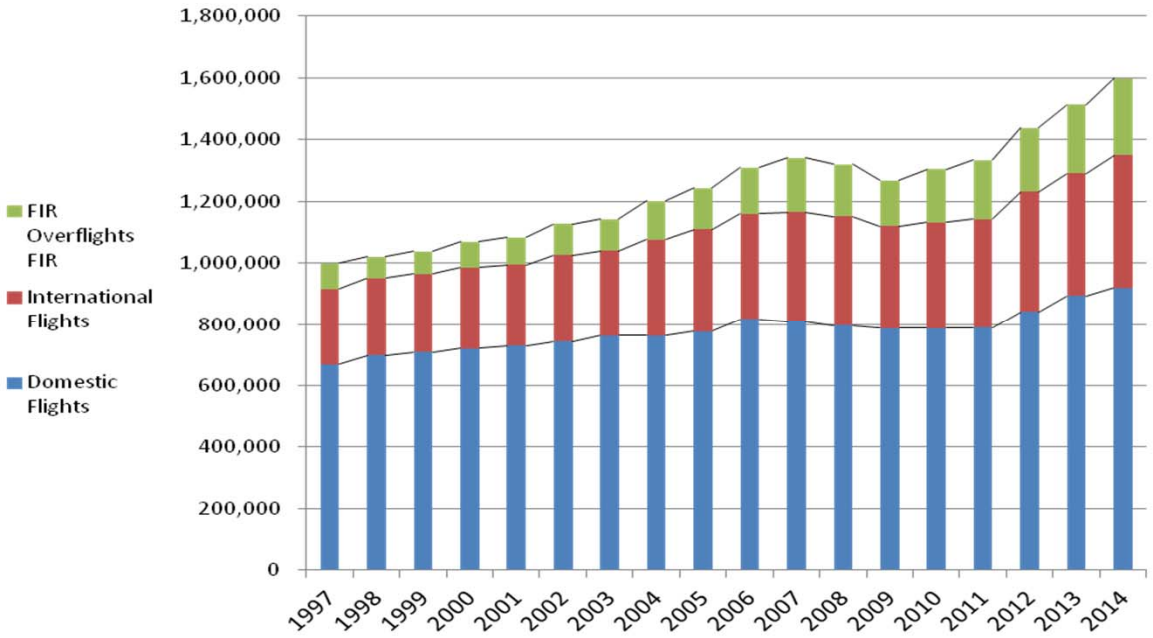




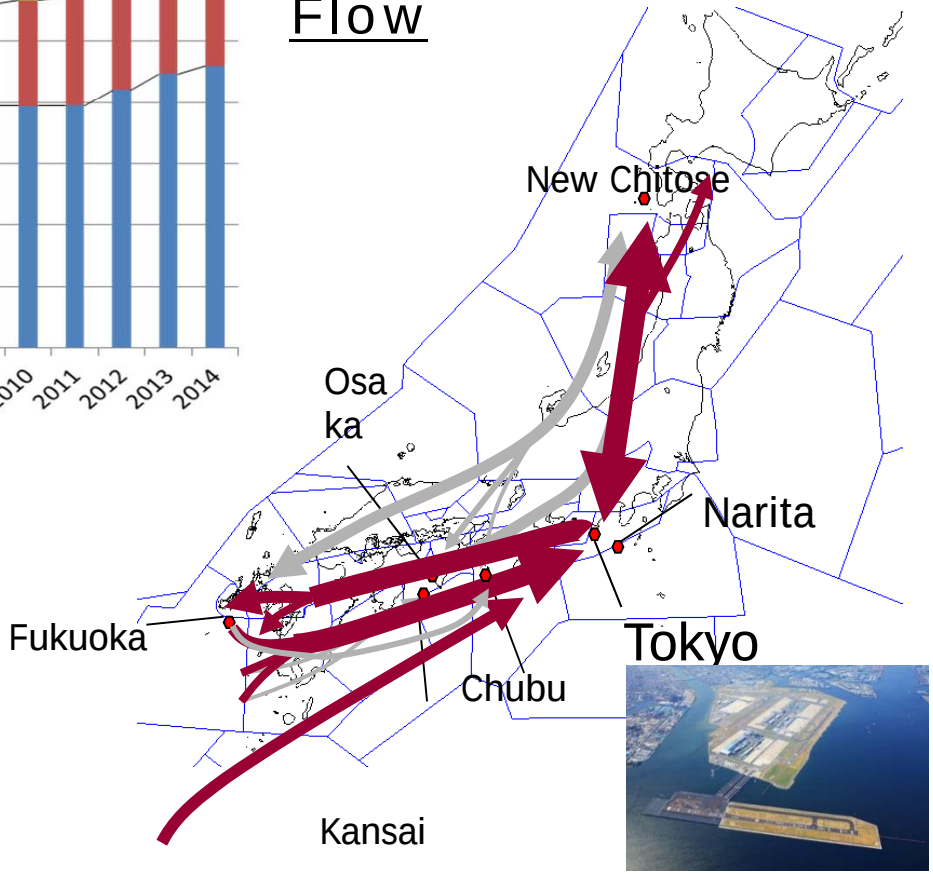
Average Flight counts per day	
RJTT (Haneda) airport	1060 (ARR & DEP)
RJAA (Narita) airport	570 (ARR & DEP)

Average Flight counts per day (IFR only)			
Total	Domestic flight	International flight	Over flight
4,110	2,300	1290	520

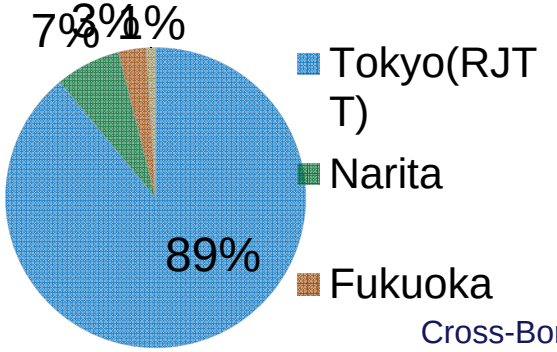
Air Traffic Volume Trend



Domestic Air Traffic Flow

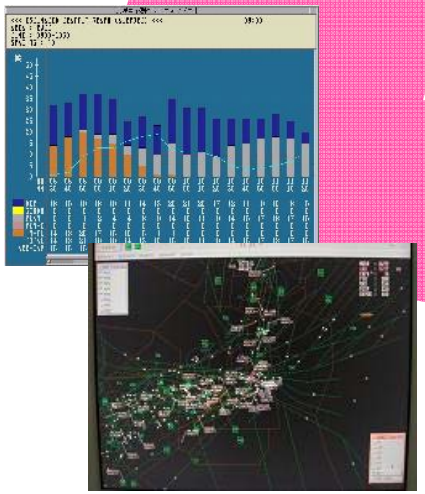


flow control initiatives for airports



ATFM and ASM

- Monitor of air traffic flow and volume
- Route coordination with aircraft operators
- Flow control

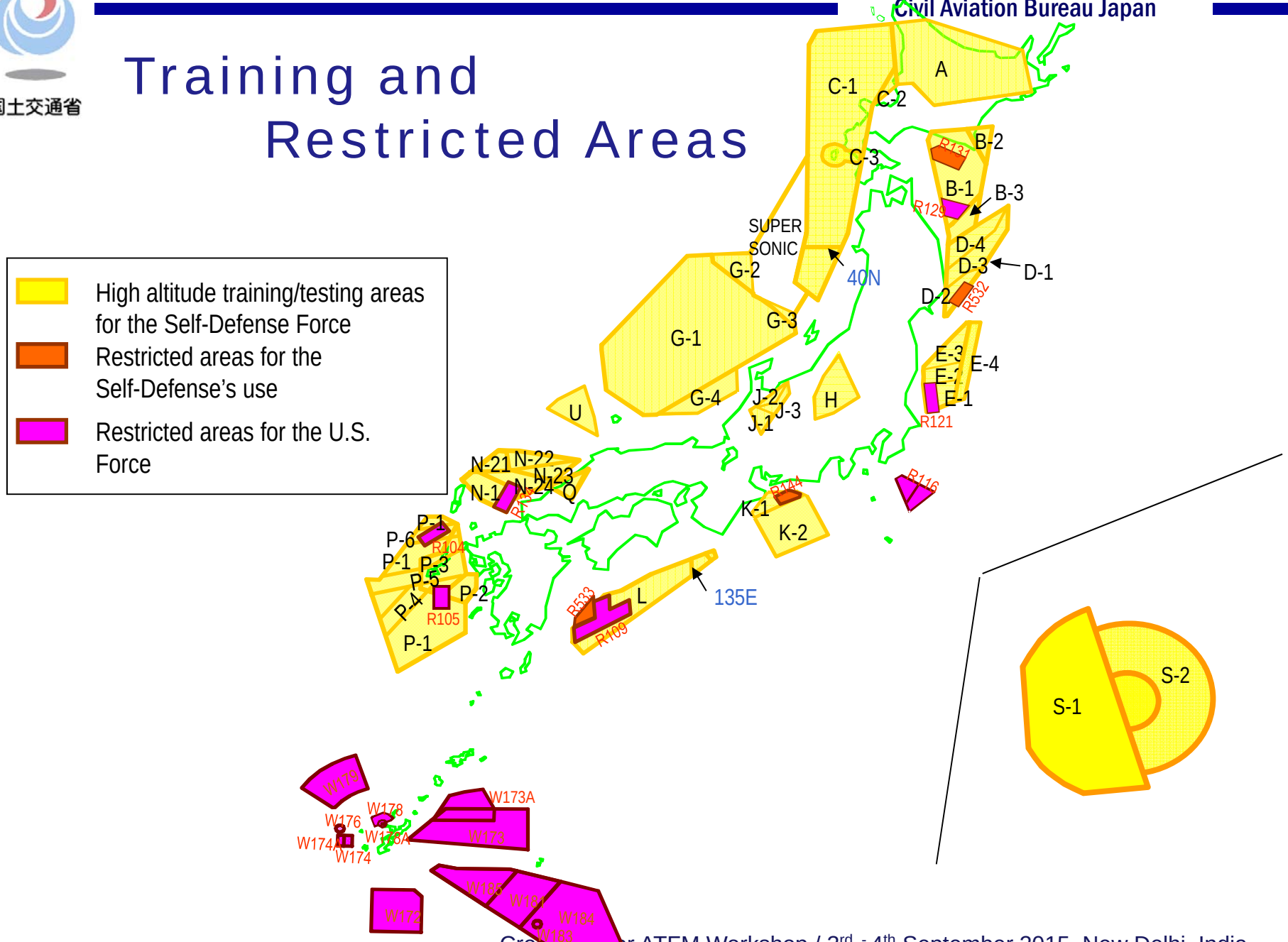


ATFM

ASM

- Designing of airspace and airways
- Management of civil training and testing airspace
- Coordination with military for flexible use of airspace

Training and Restricted Areas



Capacity Management

✈ ATMC set Capacity-value by considering ATC workload.

- **SECTOR :**

  Direct assessment of ATC Workload

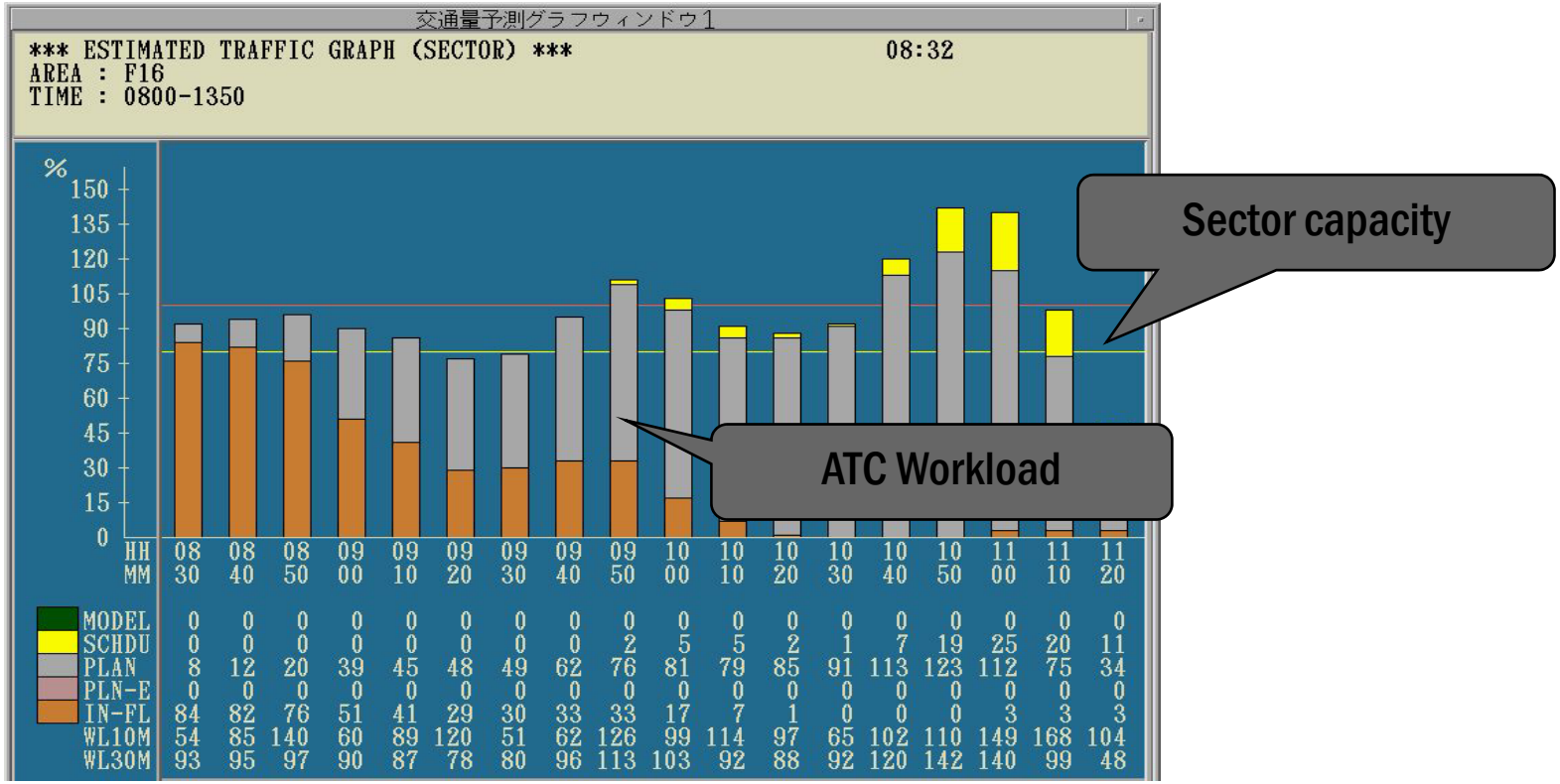
  (“Time Summation” of ATC tasks)

- **AIRPORT :**

  Direct assessment of Runway & Airspace capacity

Capacity Management
- Sector -

■ Acceptable Controllers work loads per 30min.



Time Summation

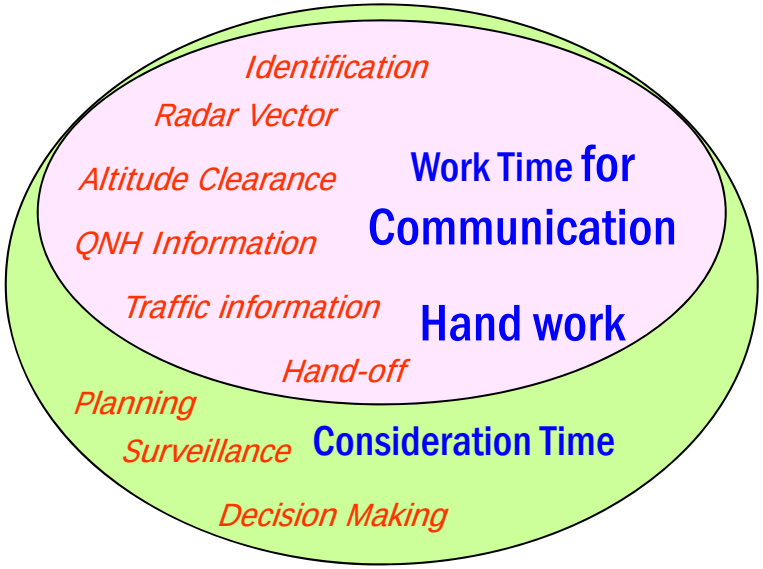
Controller's Workload vs. Time Frame of reference

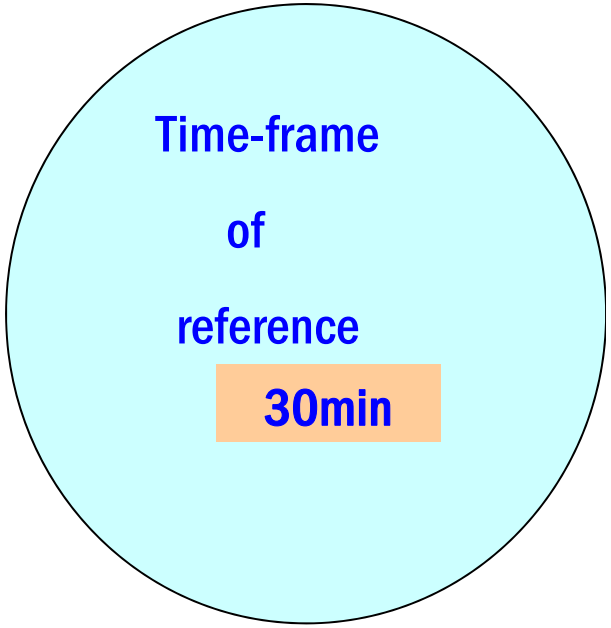
Task analysis on each sector

- required time for each separate task
- frequency of occurrence regarding each task
- aircraft's flight time of the sector

Definition of Workload Value

Adaptation to actual flight plan





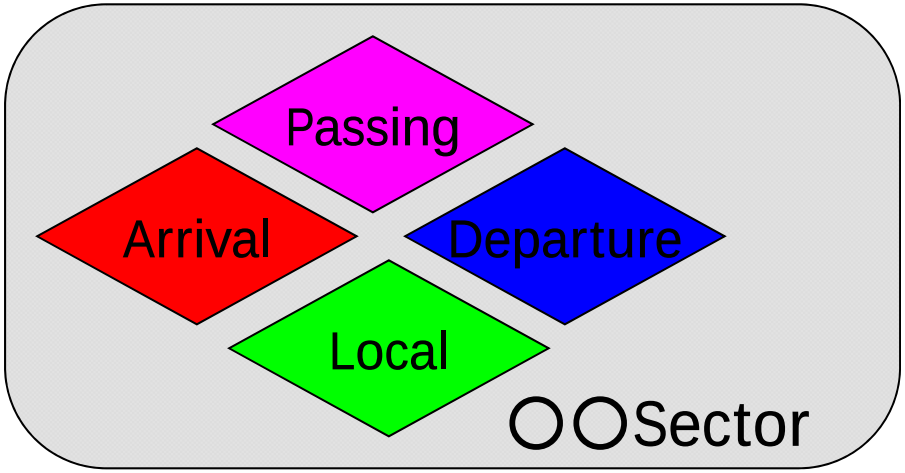
Coefficient of Controller's Workload

✈ Calculation of Coefficient

Coefficient of Controller's Workload = Average Controller's Workload / Average Staying Time

(A unit value per minute)

Established on every flight type in each sector



Operationally weighted workload

- Workload is valued according to:
  - Sector Characteristics
  - Flight Type Characteristics

Factors of Sector Characteristics

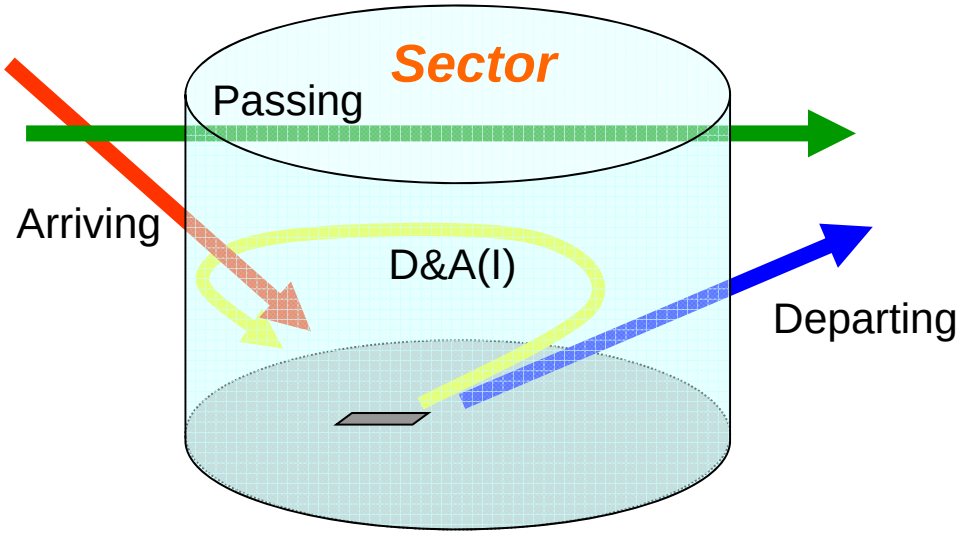
Airspace Structure
-Size
-Form (Relation to other airspace)

Airspace Complexity
-Airways, Routes, Intersections
-Traffic Flow concerning Airports

Ratio of Flight Types

etc.

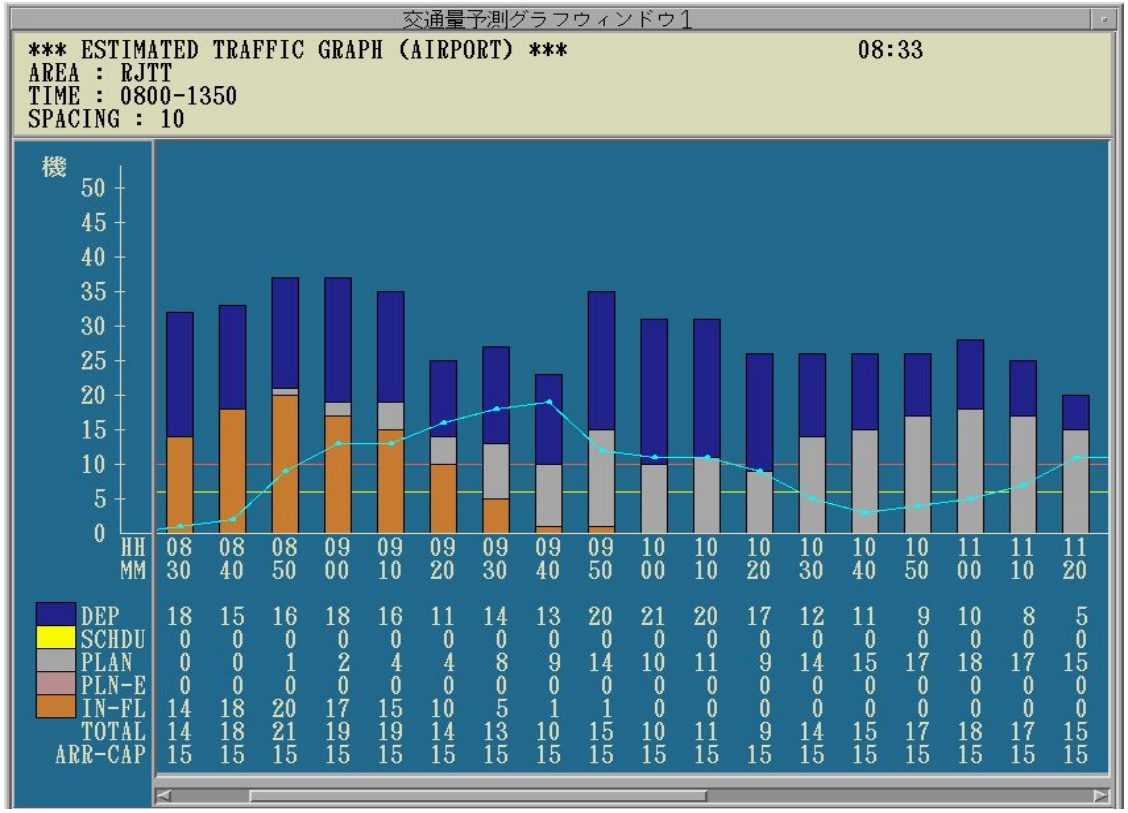
Flight Type Characteristics



Workload not equal to the number of traffic

Capacity Management
- Airport -

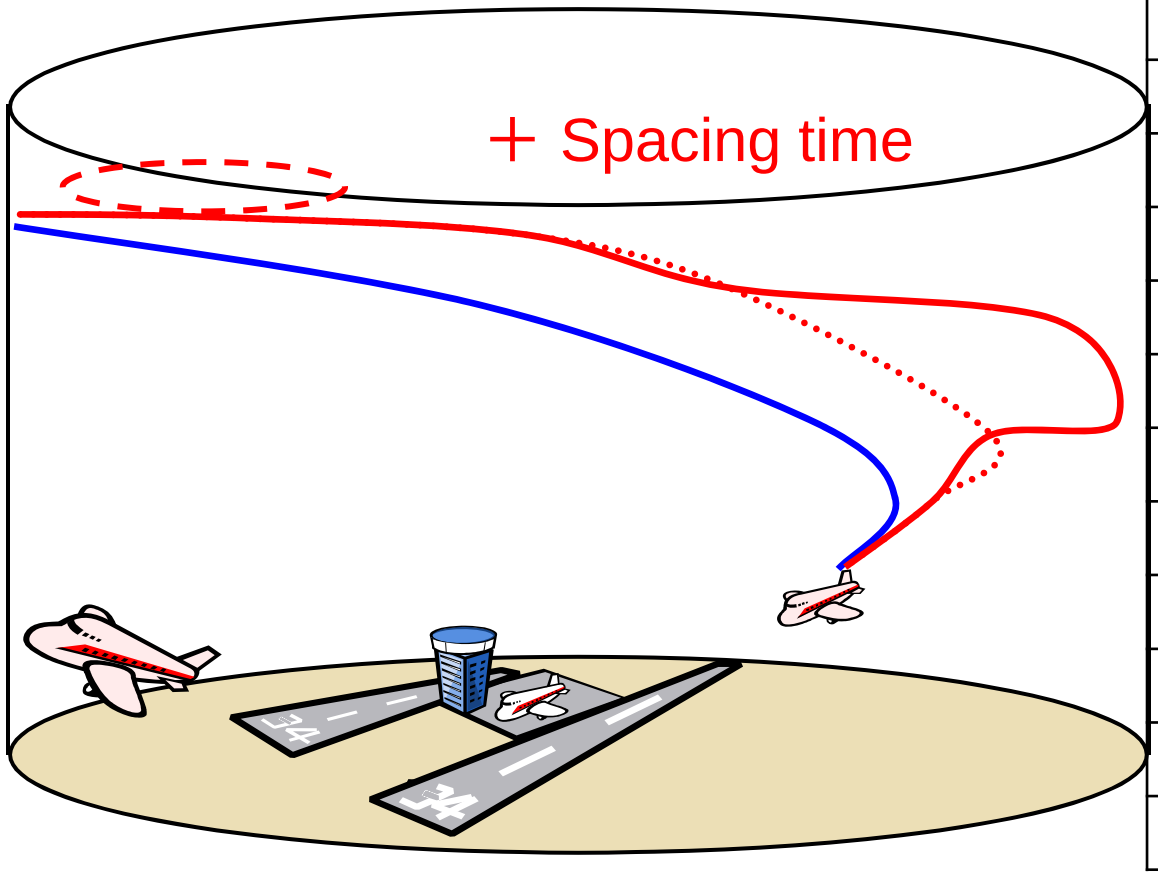
- Acceptable Number of aircraft per 30min, and
- Acceptable spacing time in ACA per 10min.



Capacity Management
- Airport -

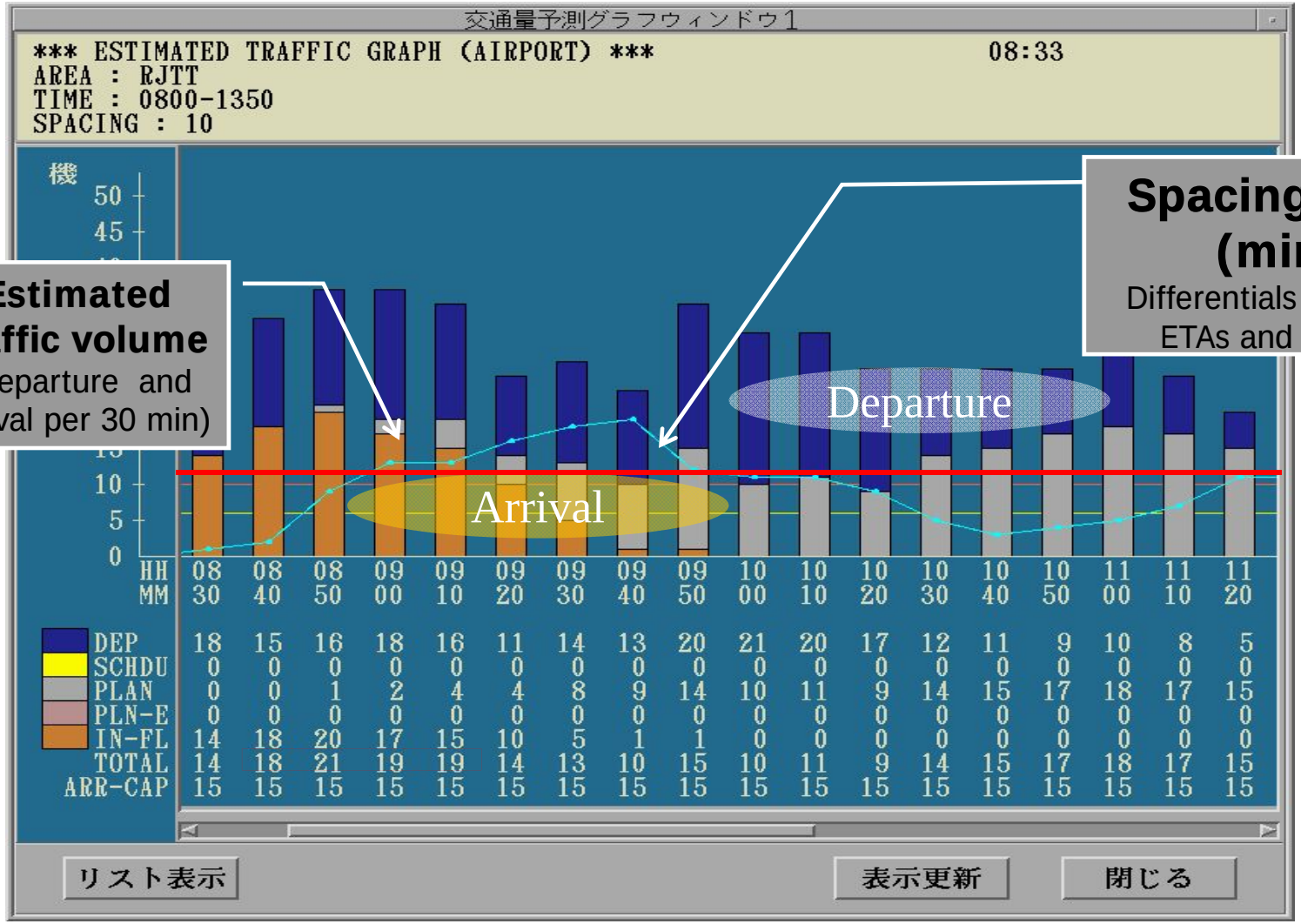
Runway Cap : 15 per 30min
Airspace Cap: 10min

Airport Capacity evaluation



	ETA	ELDG	SPCE
1	1200	1200	**0**
2	1200	1202	**2**
3	1201	1204	**3**
4	1201	1206	**5**
5	1202	1208	**6**
6	1202	1210	**8**
7	1202	1212	**10**
8	1203	1214	**11**
9	1204	1216	**12**
10	1204	1218	**14**
11	1214	1220	**6**

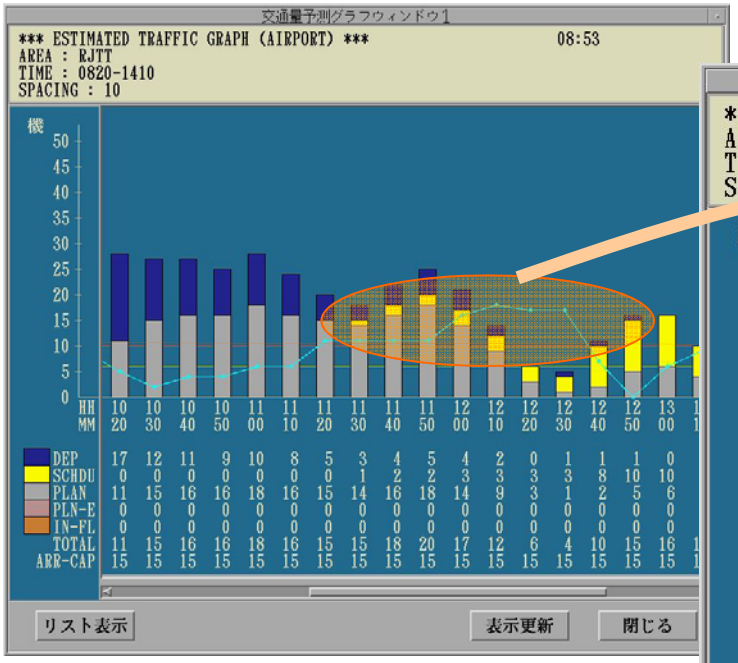
Flow Control - Airport -



Estimated traffic volume
(Departure and Arrival per 30 min)

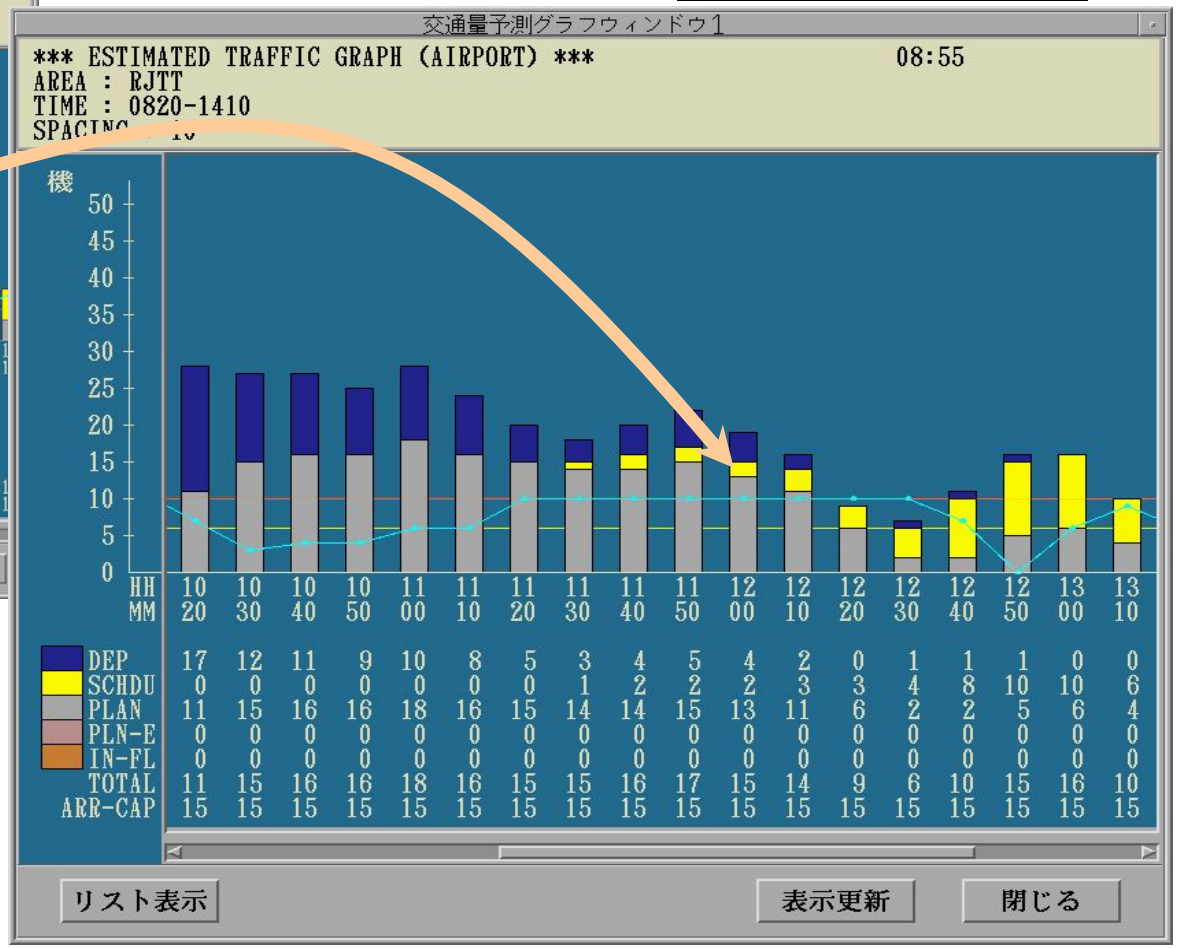
Spacing time (min)
Differentials between ETAs and ELDGs

Flow Control - Airport -

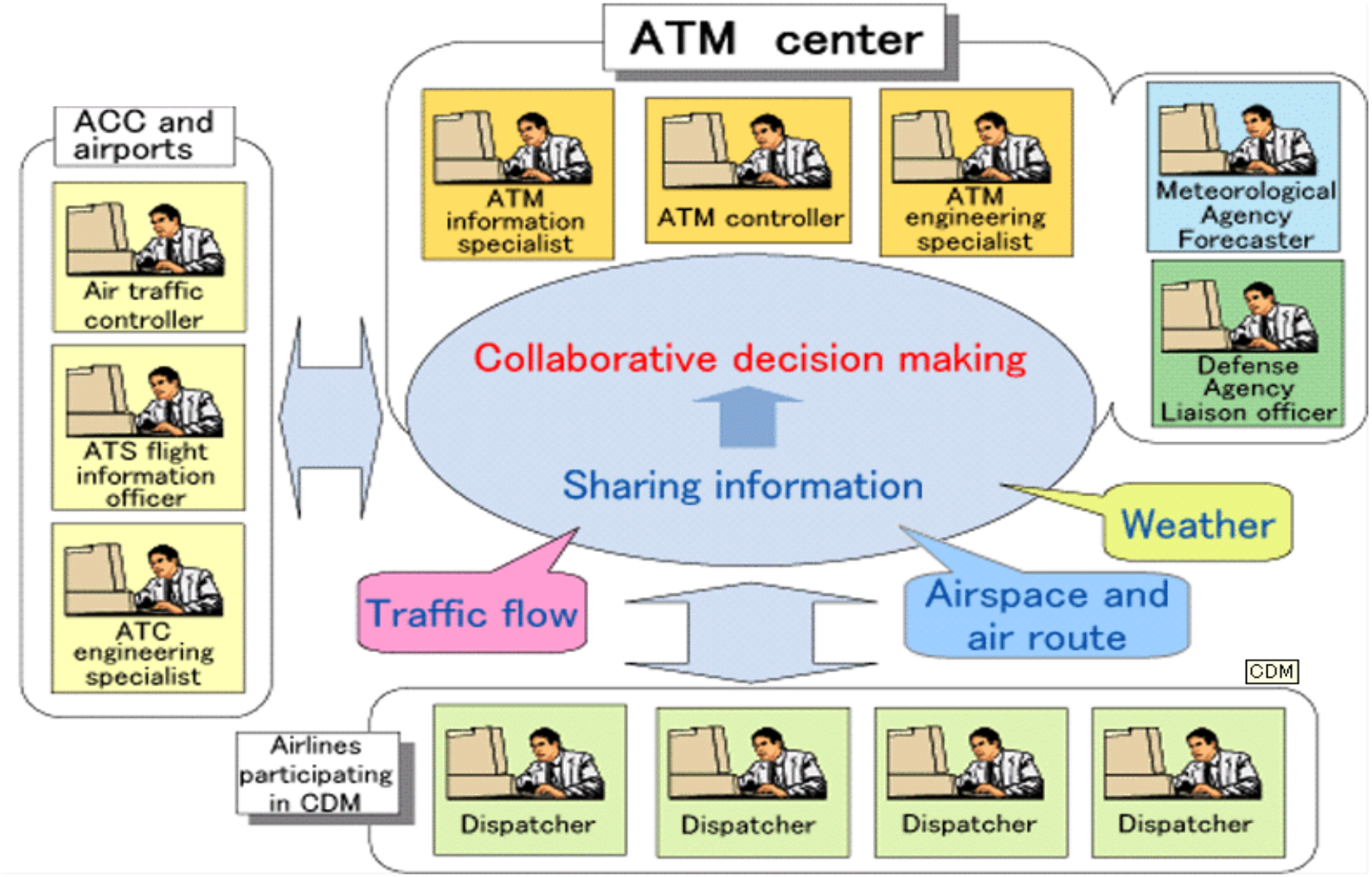


Before flow control

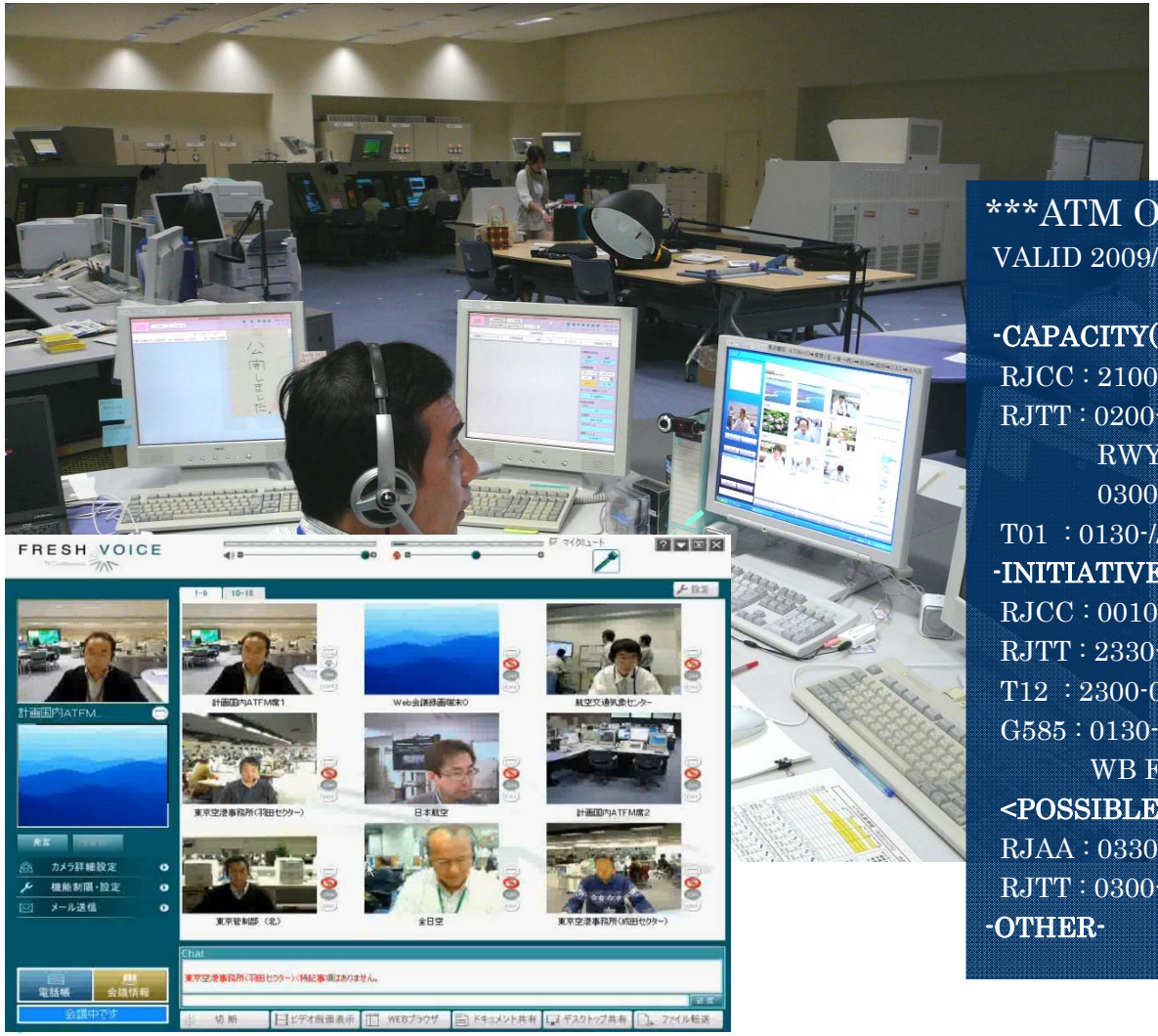
After flow control



Collaborative Decision Making



CDM Web Conference



【ATFM DAILY PLAN】

ATM OPERATIONS PLAN
VALID 2009/0701/2345 THRU 0545

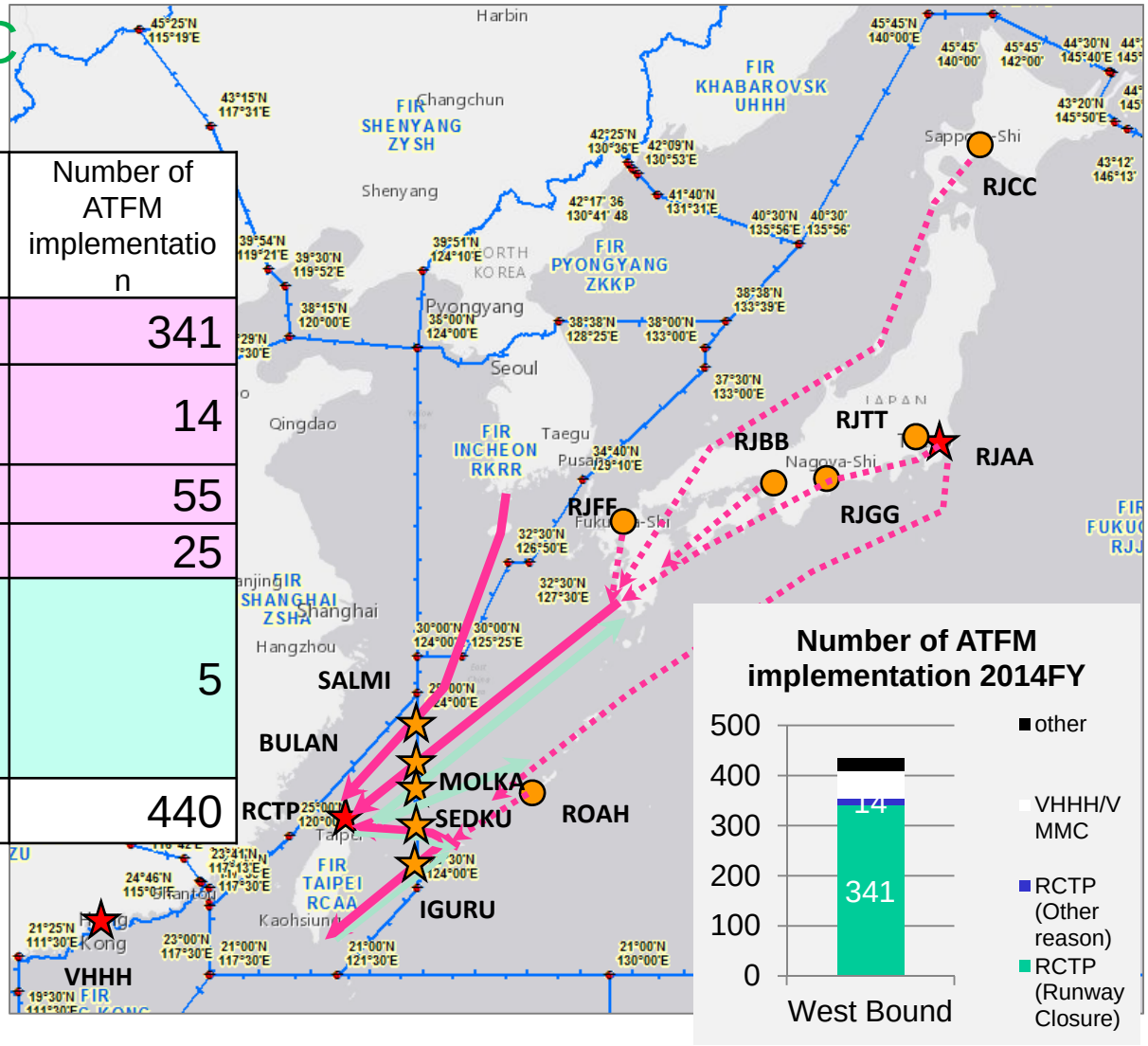
-CAPACITY(CAPA) & CONSTRAINTS-
RJCC : 2100-0300 CAPA=04-06△ LOW VIS
RJTT : 0200-0300 CAPA=10
RWY 34L/16R CLSD (0200-0245 CONST)
0300-//// CAPA=14 FLTCK (ILS RWY22)
T01 : 0130-//// CAPA=92-97 DEV (CB)
-INITIATIVE-
RJCC : 0010-0150 5MINIT DEP FM RJTT
RJTT : 2330-0140 EDCT
T12 : 2300-0005 3MINIT DEP FM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

Participants: ATMC, ATC facilities, Airlines, Meteorological agency

Recent achievements of International ATFM

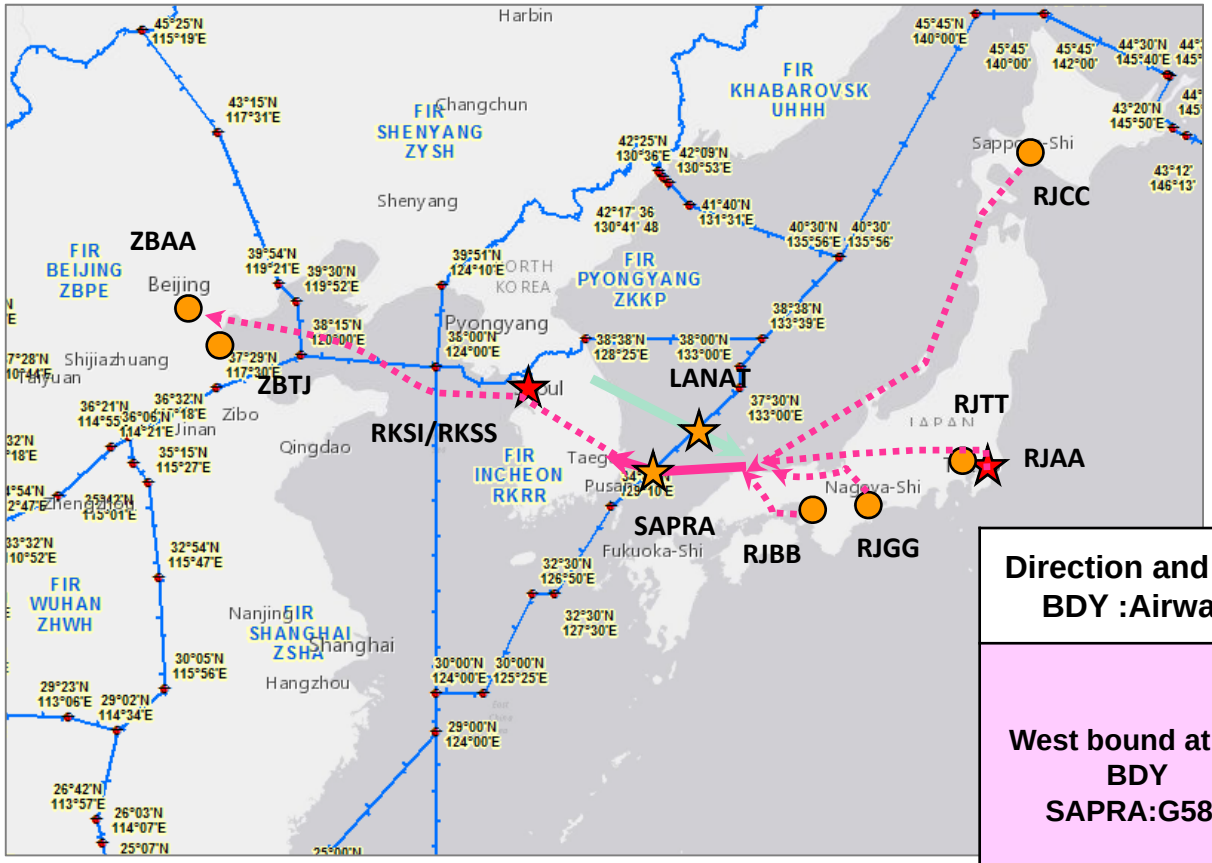
Japan – Taipei ACC (2014 FY)

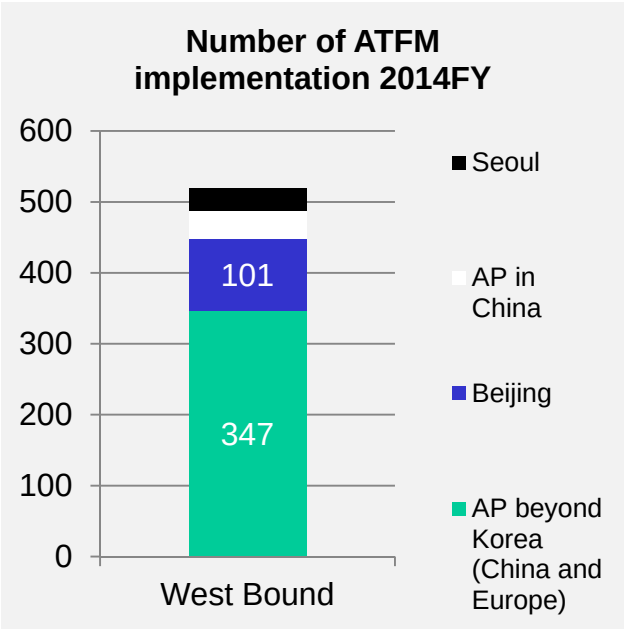
Direction and FIR BDY :Airway	Target	Number of ATFM implementation
West bound at FIR BDY BULAN:A1, SALMI: B576 IGURU:G581 SEDKU:R595	For RCTP (RWY construction)	341
	For RCTP (WX and other reason)	14
	For VHHH/VMMC	55
	For RPLL VTBS etc.	25
East bound at FIR BDY MOLKA :M750 IGURU :G581 BORDO :R583 SEDKU:R595	For RJAA/RJTT	5
Total		440



Recent achievements of International ATFM

Japan – Republic of Korea (2014 FY)

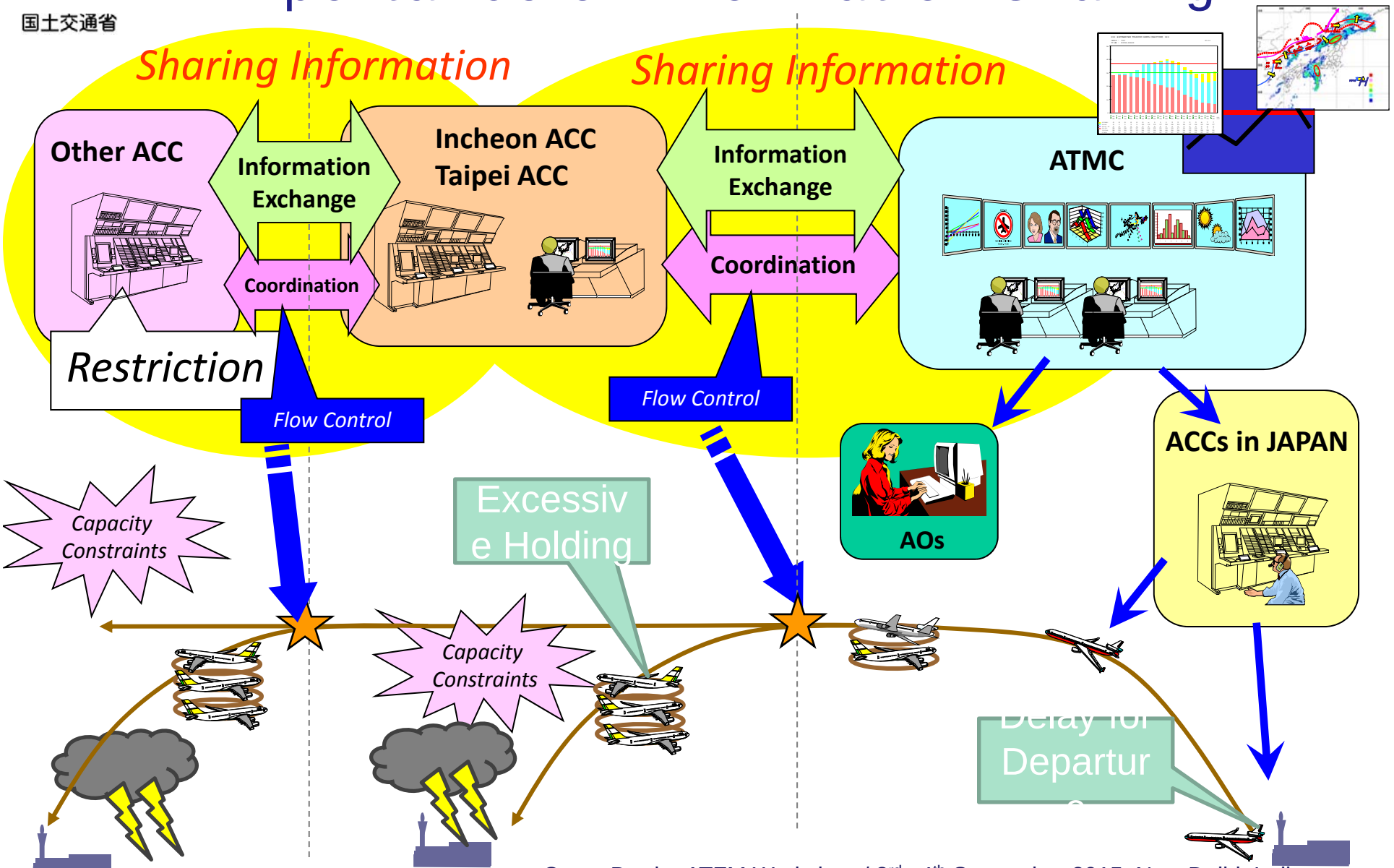




Direction and FIR BDY :Airway	Target	Number of ATFM implementation
West bound at FIR BDY SAPRA:G585	For RKSI/RKSS	31
	For AP beyond Korea	347
	For ZBAA	101
	For AP in China	40
East bound at FIR BDY LANAT:G597	For RJAA/RJTT	2
Total		521

Cross-Border ATF

Importance of information sharing



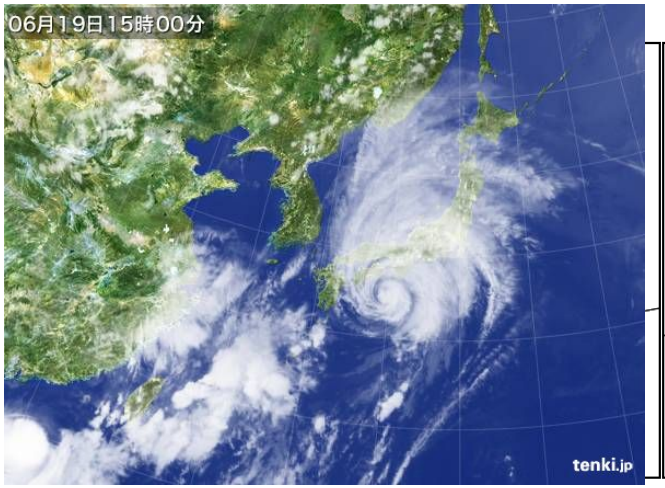
For the future Multi-nodal Flow Management

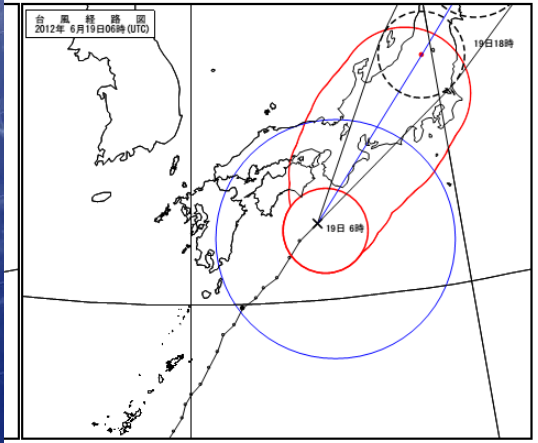
Cross Border ATFM needs,

Reason of constrains

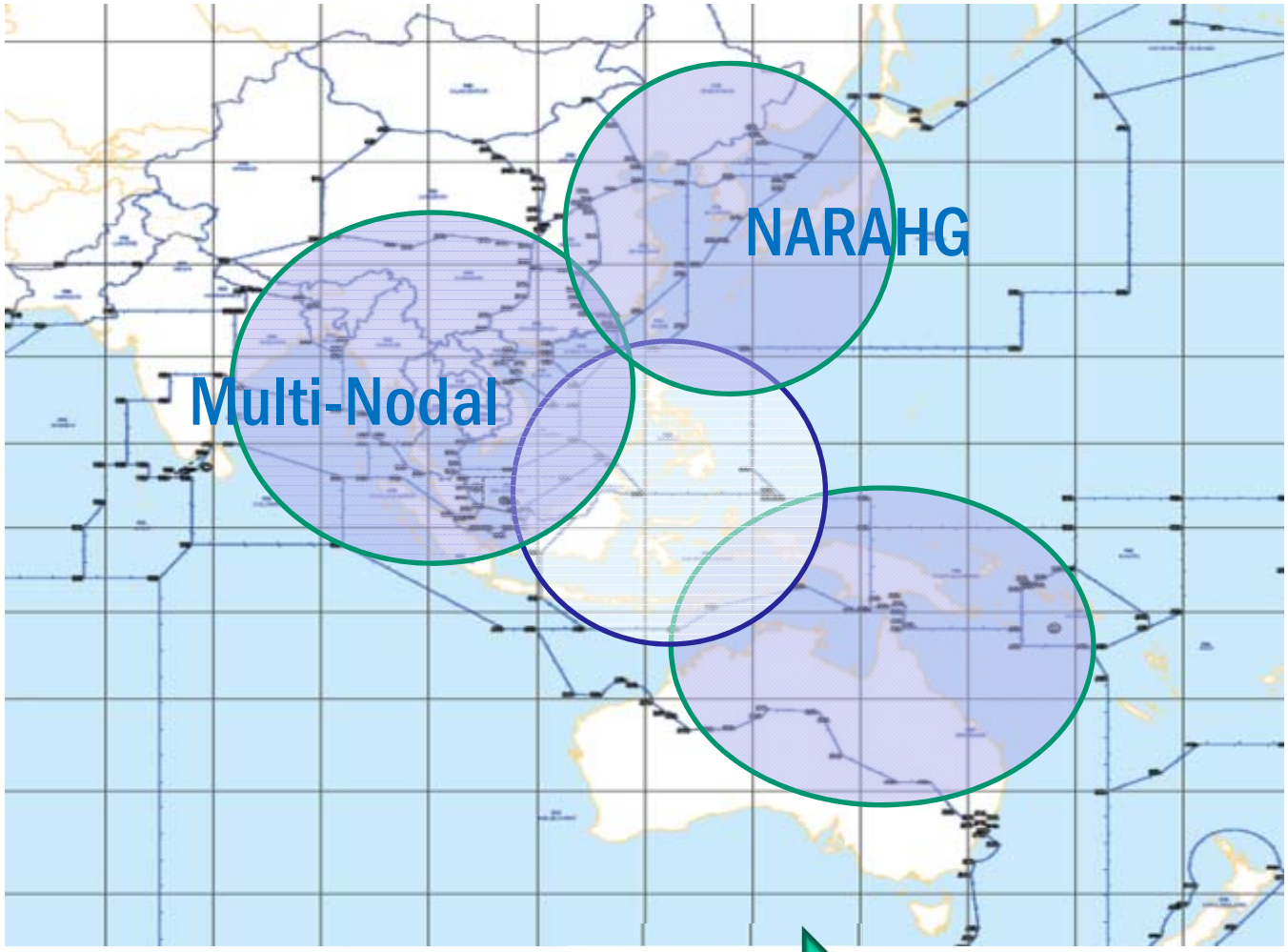
- ✓ *How long does it continue?*
- ✓ *How much does it affect on air traffic?*

Advanced Information exchange among ANSPs





Sub-Regional ATFM Coordination in APAC



Sub-Regional ATFM → Regional ATFM


Thank you