

Meteorological Services for the Terminal Area

Tokyo Metropolitan Area Team

ATMetC, JMA

ICAO ASIA/PACIFIC METEOROLOGY/AIR TRAFFIC MANAGEMENT (MET/ATM) SEMINAR

Tokyo, Japan, 29 June - 1 July 2015



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2. Operations of TMU and TMAT
3. Temporal and Spatial Scale required for TMAT services
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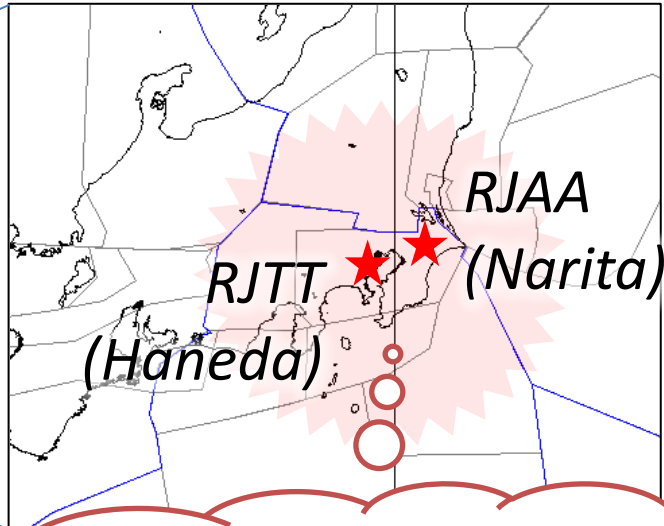
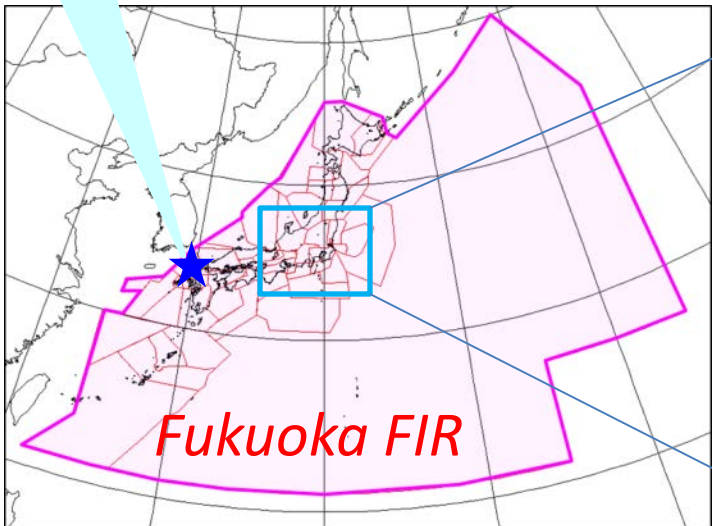
Establishment of ATMetC

At Fukuoka city

ATMC (2005~)
(Air Traffic Management Center)
JCAB (Japan Civil Aviation Bureau)

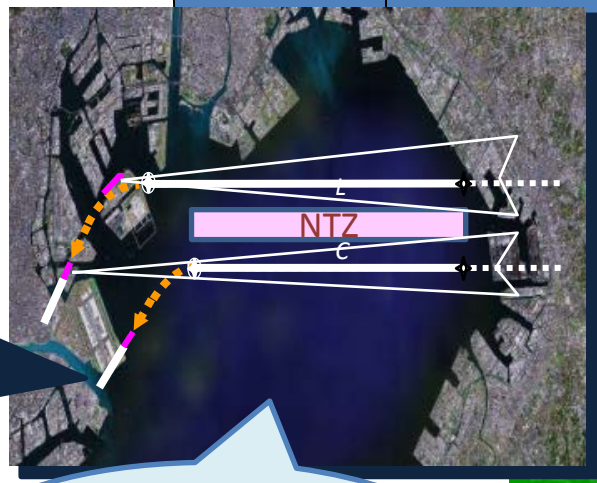
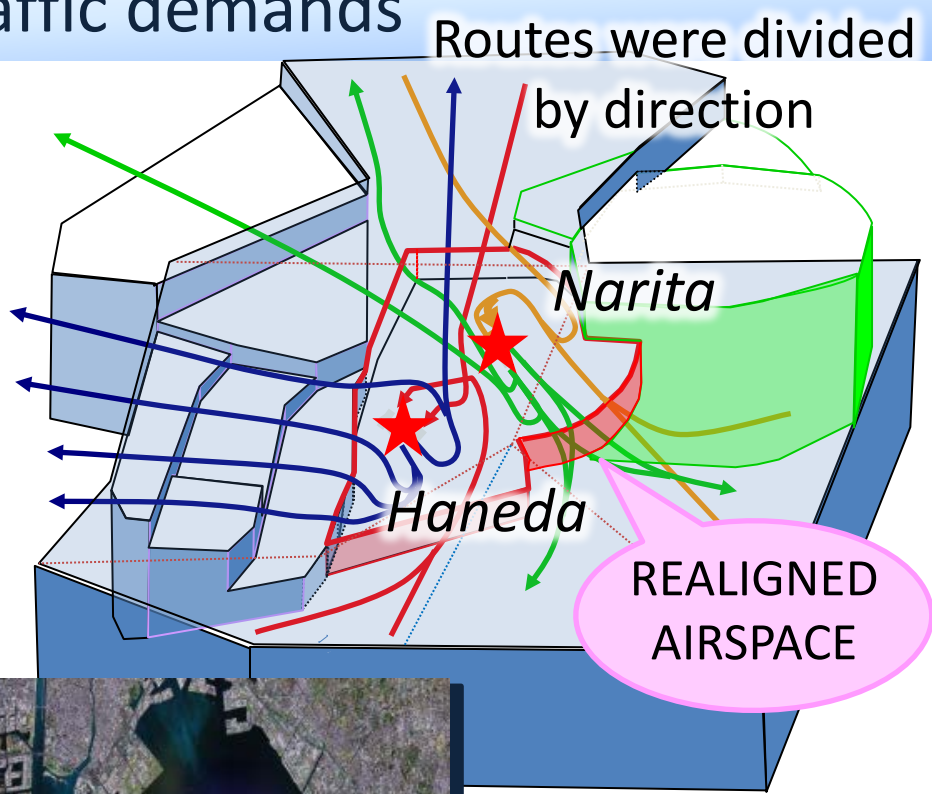
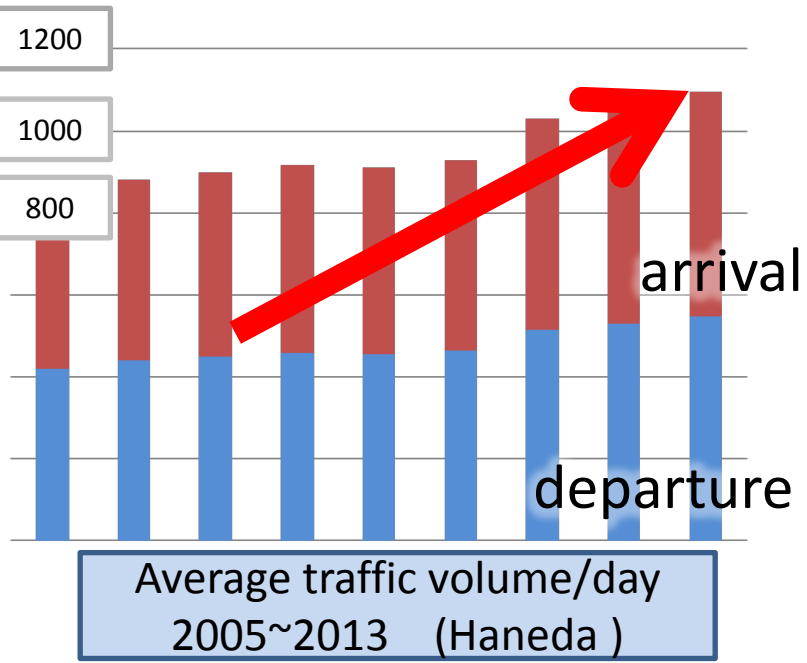


ATMetC (2005~)
(Air Traffic Meteorology Center)
JMA (Japan Meteorological Agency)



Concentration of traffic volume

Correspond to increasing air traffic demands



IMPLEMENTATION OF NEW PROCEDURES



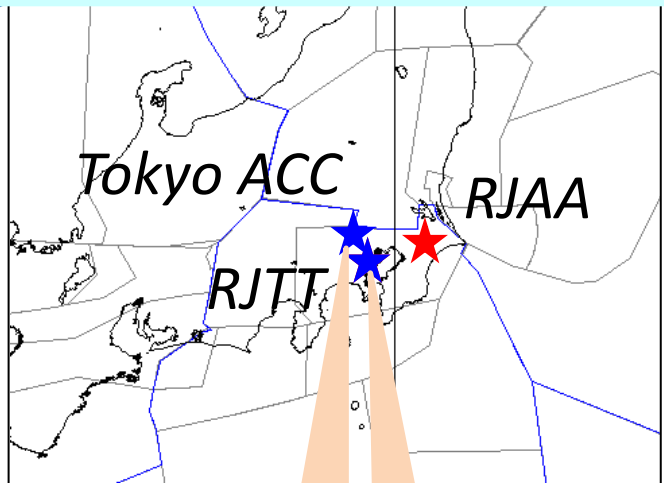
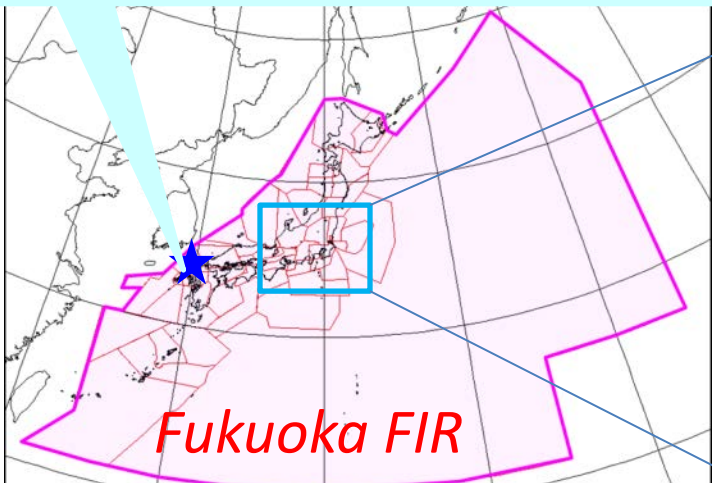
Organization of TMAP

At Fukuoka city

ATMC (2005~)
(Air Traffic Management Center)
JCAB (Japan Civil Aviation Bureau)



ATMetC (2005~)
(Air Traffic Meteorology Center)
JMA (Japan Meteorological Agency)



Organized branch facilities in Tokyo metropolitan area

TMUs (2011~)
(Traffic Management Unit)
JCAB



TMAT (2014~)
(Tokyo Metropolitan Area Team)
JMA

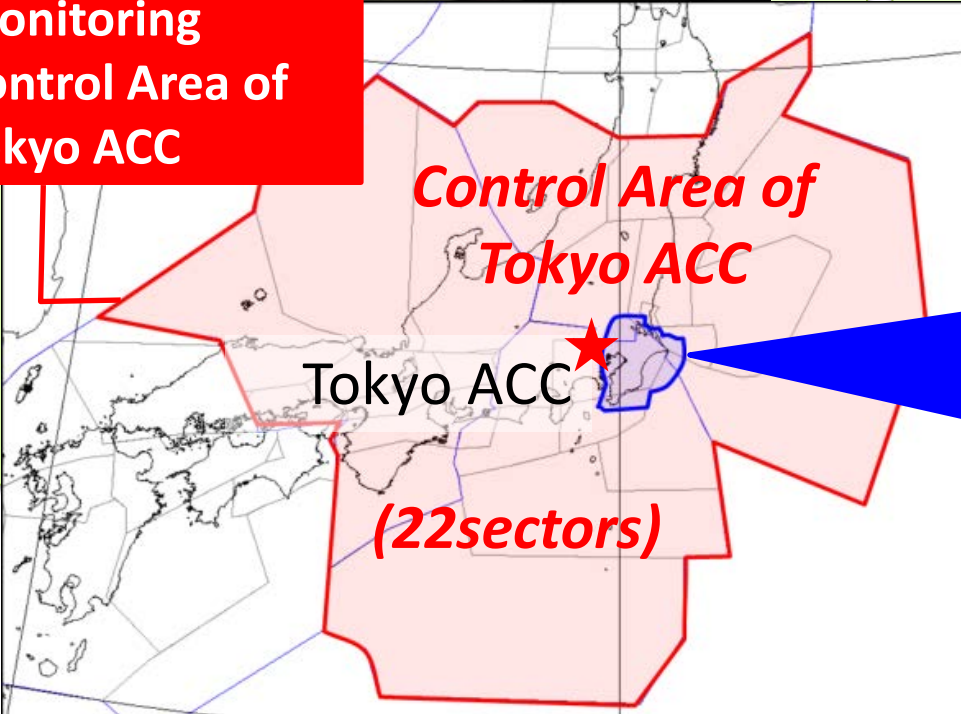
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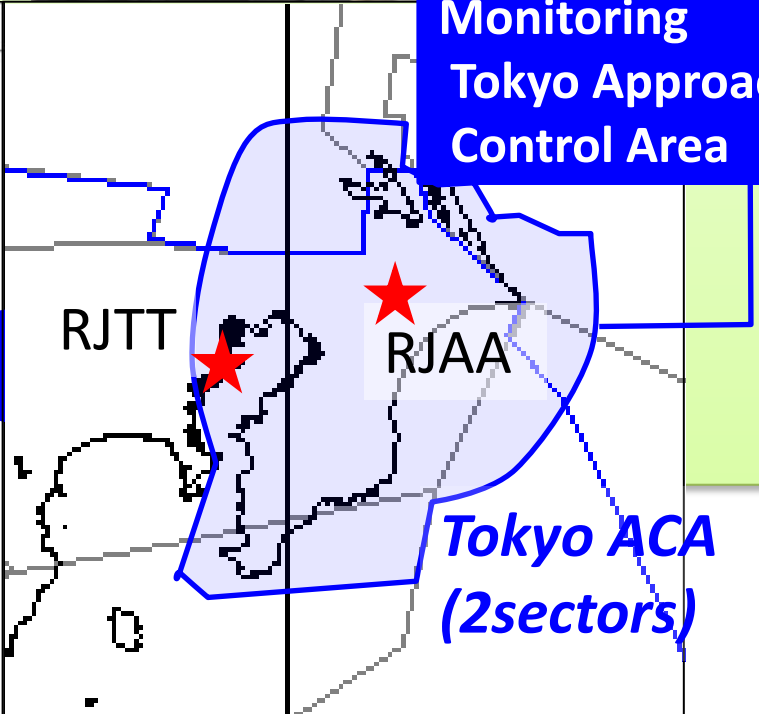
Operations of TMU



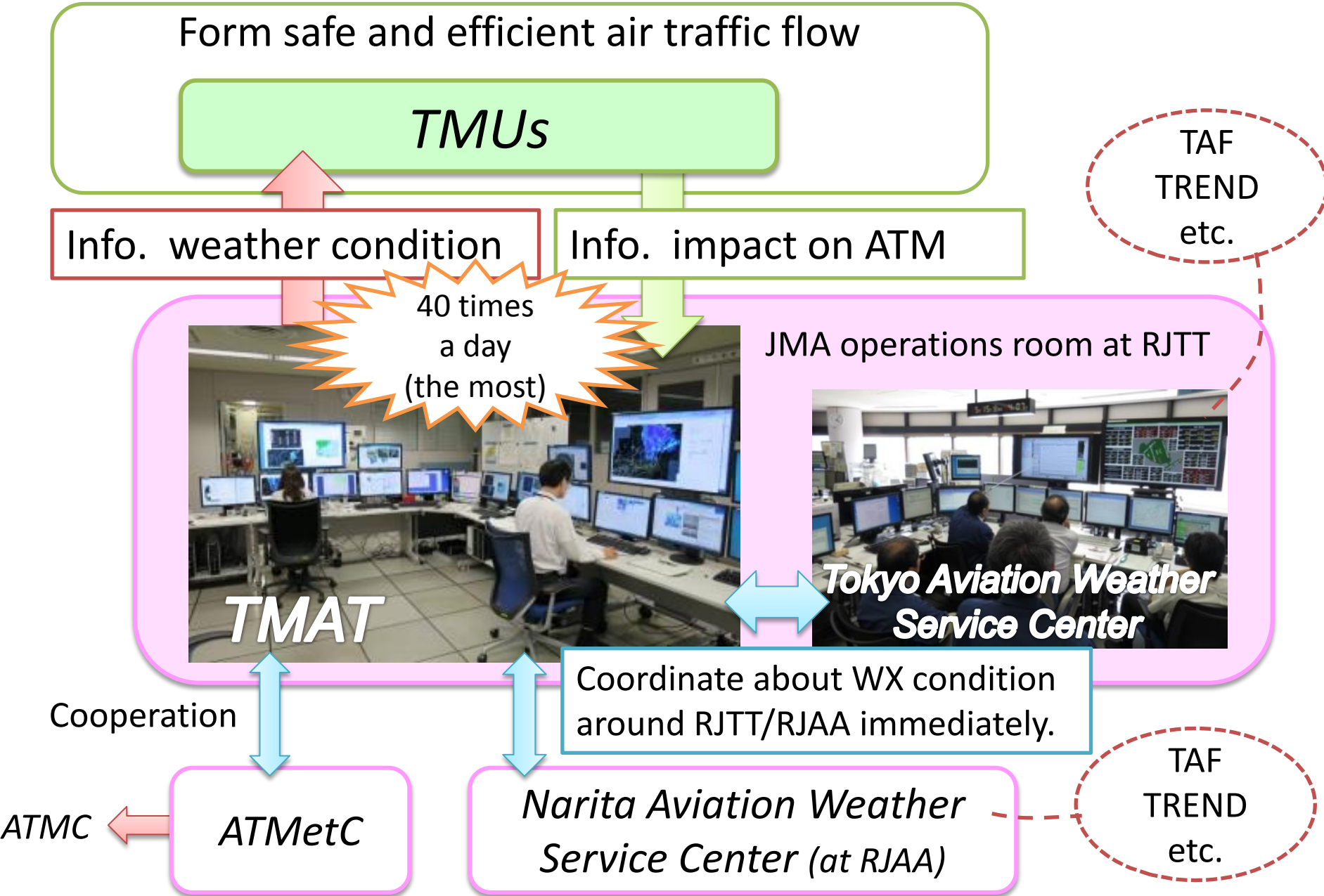
Monitoring Control Area of Tokyo ACC



Monitoring Tokyo Approach Control Area



Operations of TMAP



Operations of TMAP



ATM Categorized Impact of weather Element prediction

Issued at 1930UTC 20 May 2015
ATMetC Tokyo Metropolitan Area TEAM, JMA

Sector/Time(UTC)	19			20			21			22			23			00				
	30	40	50	0	10	20	30	40	50	0	10	20	30	40	50	0	10	20	30	40
T03 ▲	CB			CONV																
T03_W_NW Conv																				
T03_W_NE Conv																				
T03_W_SW Conv																				
T03_W_SE Conv																				
T07 ▲	CB			CONV			CONV													
T07_NW Conv																				
T07_SW Conv																				
T07_EAST Conv																				
RJAA ▲	TS			TS CONV			CONV													
RJAA-1 Conv																				
Wind																				
Cross																				
Gust																				
VIS																				
CIG																				
TS																				
SN																				
blw3000 Wind																				
RJAA-2 Conv																				
RJTT ▲	BD-CROSS			TS			CONV													
RJTT-1 Conv																				
Wind																				
AC_Cross																				
BD_Cross																				
VIS																				
CIG																				
TS																				
SN																				
blw5000 Wind																				
RJTT-2 Conv																				
RJTT-3 Conv																				
T14 ▼				CONV																
T09 ▼				CONV																
T12 ▼																				
T13 ▲																				
T13_NW Conv																				
T13_NE Conv																				
T13_SW Conv																				
T13_SE Conv																				

Tokyo Metropolitan Area Weather Bulletin for ATM

Issued at 0000UTC 06 Oct 2014
ATMetC Tokyo Metropolitan Area TEAM, JMA

[Keywords]
Tropical Cyclone, Strong Wind, Convection

[RJAA]
Wind, Convection in APCH area

[sectors]
Convection

UTC	0000	0100	0200	0300	0400	0500	0600
RJTT	→	→	→	→	→	→	→
T09	→	→	→	→	→	→	→
T12	→	→	→	→	→	→	→
T13	→	→	→	→	→	→	→
T14	→	→	→	→	→	→	→

Tokyo Metropolitan Area
Weather Bulletin for ATM

ATM CIEL
ATM Categorized Impact of
weather Element prediction

CIEL means SKY in French



Viewing Mt. Fuji from Tokyo Int'l Airport

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 - Merit of Using ATM CIEL
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Overview of ATM CIEL (ATM Categorized Impact of weather ELeMent prediction)

- Contents

The degree to which weather conditions affect **ATC capacity**

It's considered TMU's operation.

High

Need to *reduce CAPA* significantly

Medium

Need to *reduce CAPA*

Slight

Need to *reduce CAPA* slightly

None

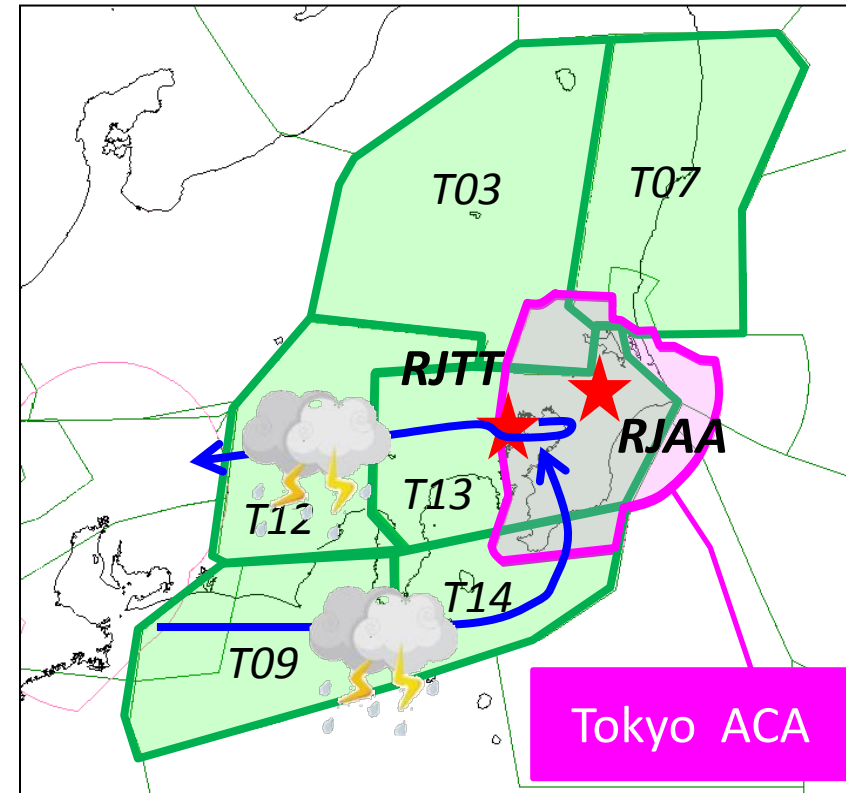
Not need to *reduce CAPA*

ATM Categorized Impact of weather ELeMent prediction

Sector/Time(UTC)	19			20					21					
	30	40	50	0	10	20	30	40	50	0	10	20	30	40
T03 ▲	CB			CONV										
T03_W_NW Conv														
T03_W_NE Conv														
T03_W_SW Conv														
T03_W_SE Conv														
T07 ▲				CB					CONV					
T07_NW Conv														
T07_SW Conv														
T07_EAST Conv														
RJAA ▲	TS			TS CONV										
RJAA-1 Conv														
Wind														
Cross														
Gust														
VIS														
CIG														
TS														
SN														
blw3000 Wind														
RJAA-2 Conv														
RJTT ▲	BD-CROSS			TS					CONV					
RJTT-1 Conv														
Wind														
AC_Cross														

Overview of ATM CIEL (ATM Categorized Impact of weather ELeMent prediction)

- Time Frame
 - Issuance time : every hour
(except 14 - 16UTC)
 - Forecast time : up to 6 hours
(resolution : **10 min** - 1 hour)
- Target area
 - Haneda / Narita Airport
 - Tokyo approach control area
and its surrounding ATC sectors
- Targeted phenomena
 - In and around Tokyo ACA :
convective clouds
 - RJTT/RJAA : Wind, VIS, CEIL, etc.



Some ATC sectors are also targeted because of impact on ATM for RJTT/RJAA.

Impact of convective clouds – Tokyo Approach Control Area

Convective clouds on the arrival route disturb air traffic flow.

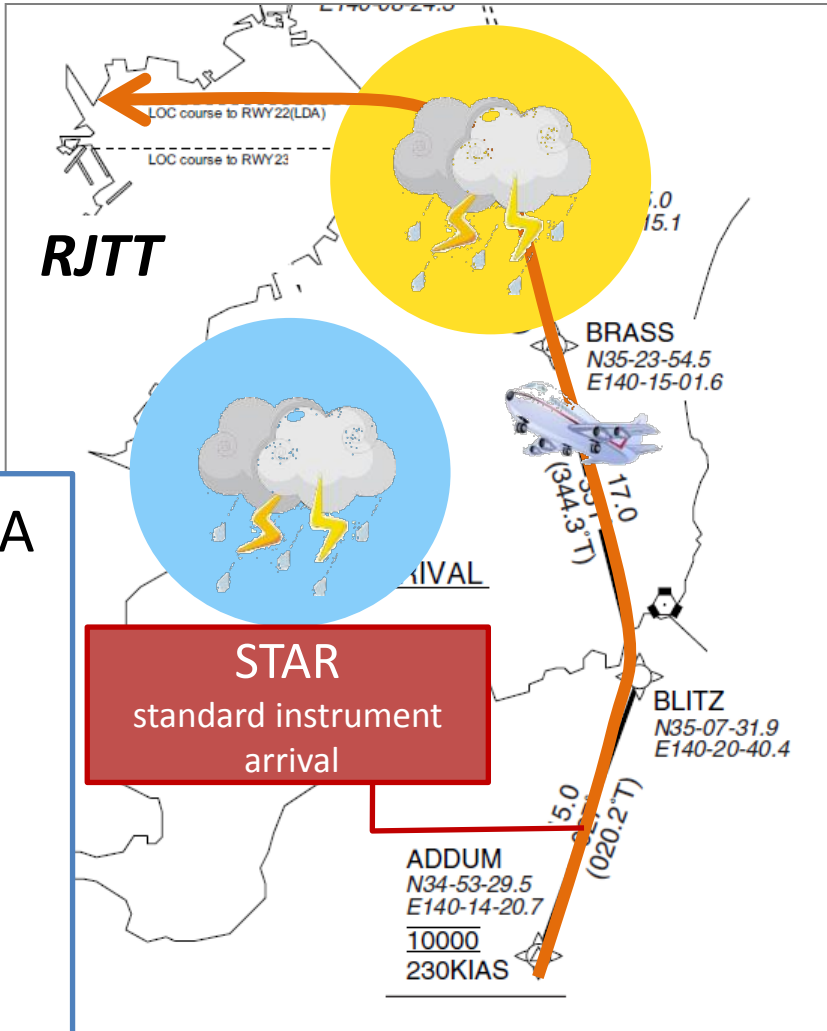
(See MET/ATM Seminar 2013 IP/6)

TMU requires

- detailed information (altitude, covered area)

“Convective clouds (even if not CBs) are on the STAR?”

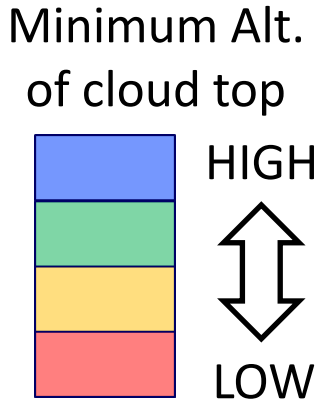
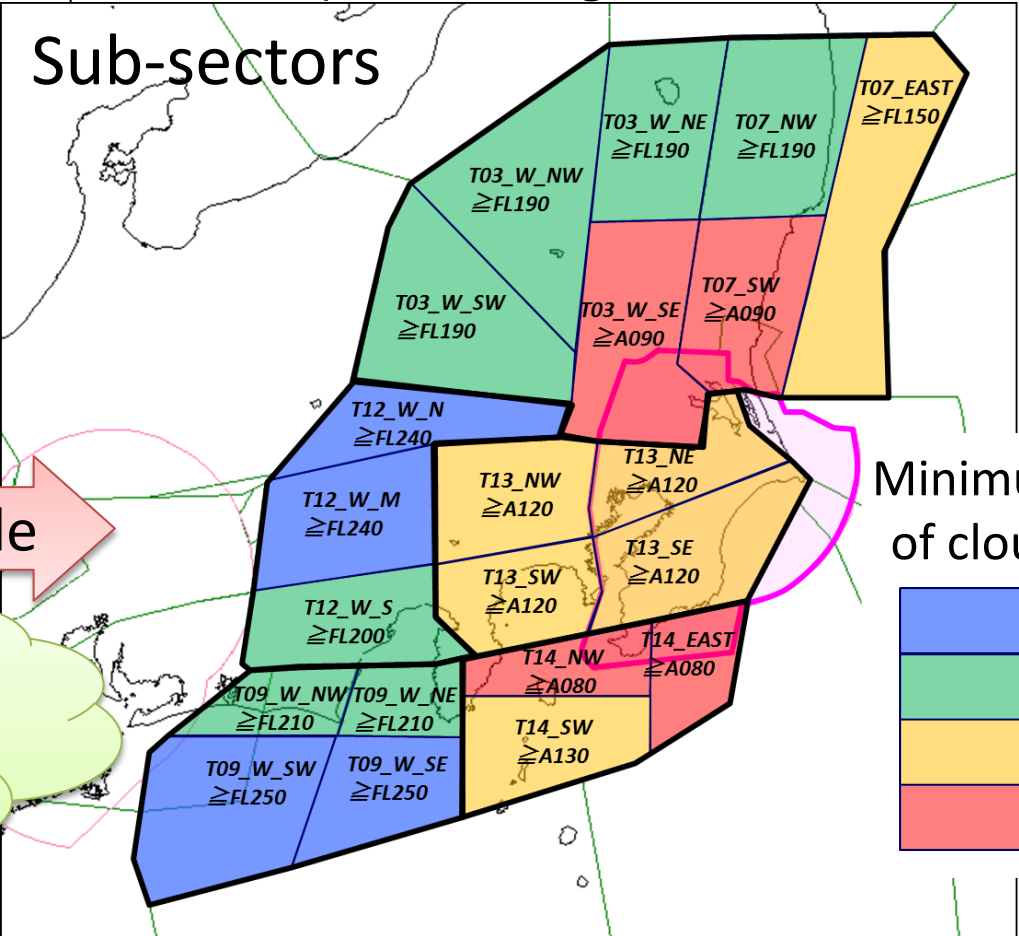
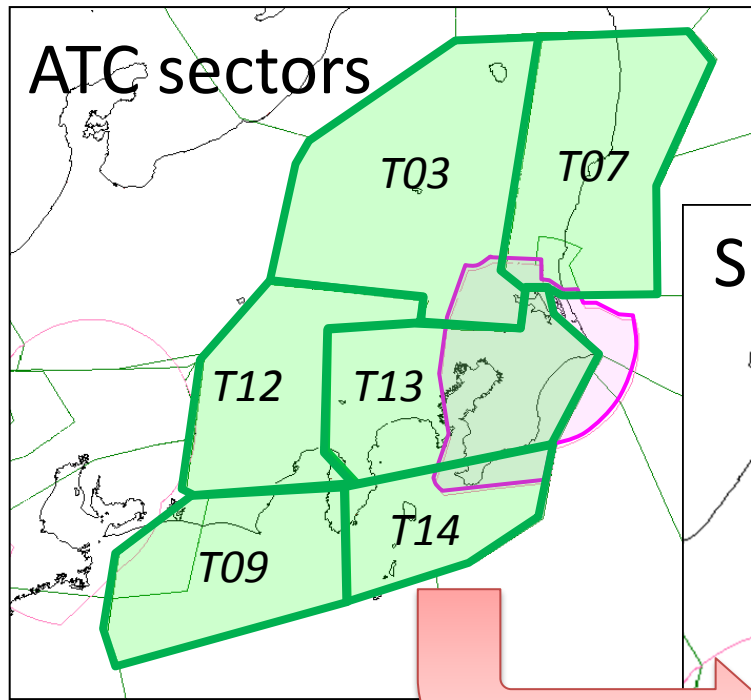
level of impact in ATM CIEL	Convective clouds in ACA (consider altitude) on the STARs
Medium	on the STARs
Slight	out of the STARs
None	no exist



Impact of convective clouds (location/altitude) – ATC sectors

The degree of influence to air traffic is different by the location and altitude of convective clouds .

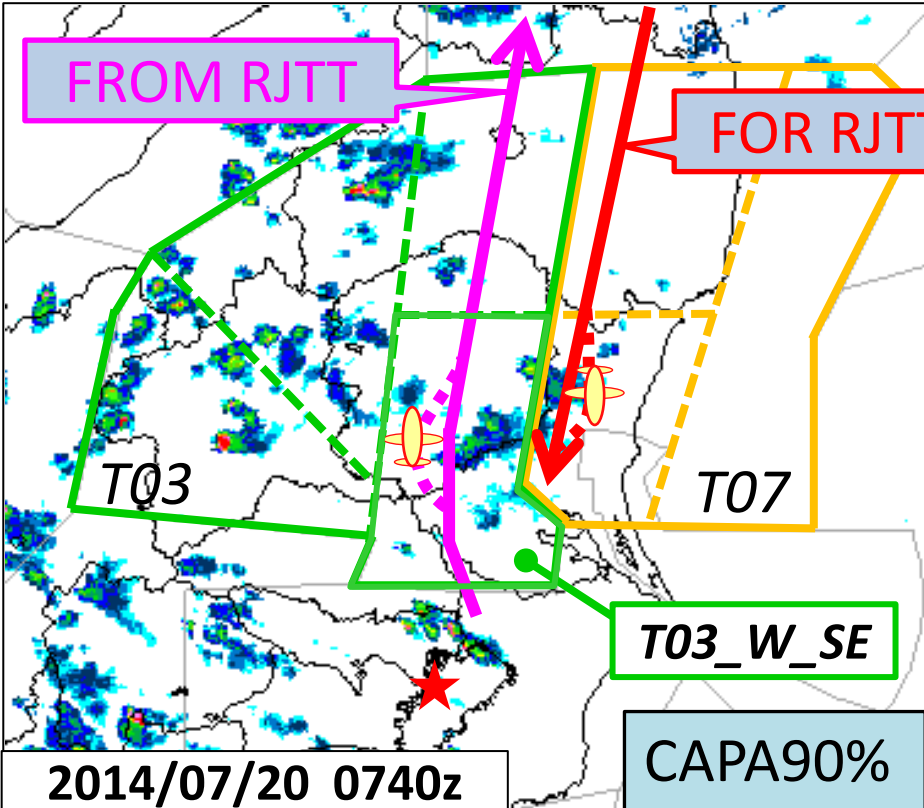
criteria for cloud top altitude is different in each sub-sector (considering altitude aircraft flying)



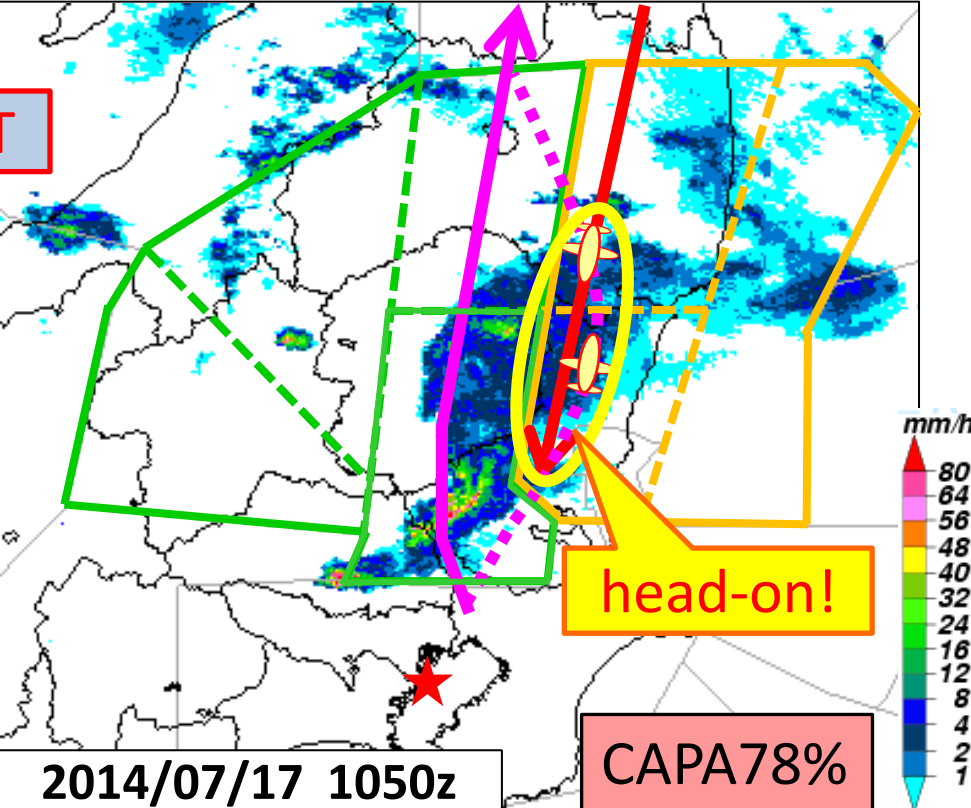
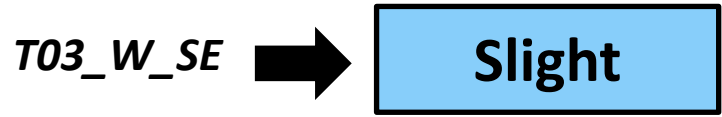
decide criteria in coordinate with TMU

Impact of convective clouds (scale) – ATC sectors

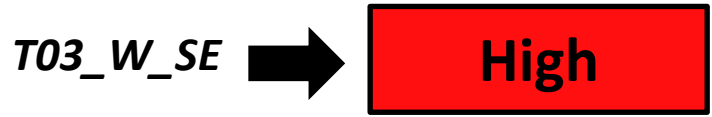
The degree of influence to air traffic is different by *the scale of coverage area by convective clouds*.



Influence was small.
CAPA was reduced.



Influence was large.
CAPA was *significantly* reduced.

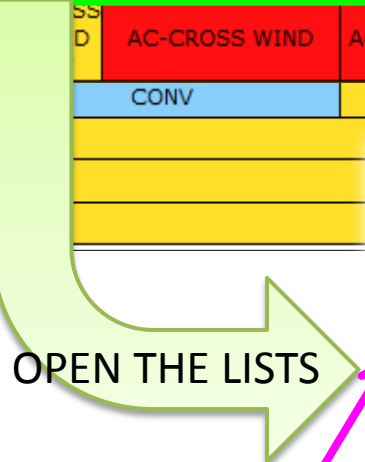


Merit of using ATM CIEL

Estimated level of impact (indicated by color) helps TMUs to consider changing CAPA.

- necessity
- timing (by 10 min.)
- **the degree**

Sector/Time(UTC)	00			01				02				03			
	30	40	50	0	10	20	30	40	50	0	10	20	30	40	50
T03 ▲	CONV												CONV		
T07 ▲	CONV														
RJAA ▲	GUST WIND			GUST				GUST WIND				GUST			
RJTT ▲	SS D			AC-CROSS WIND				AC-CROSS TS WIND							
T14 ▼	CONV														
T09 ▼	CONV														
T12 ▼	CONV														
T13 ▼	CONV														



Whether convective clouds affect **important areas** in each ATC sector /ACA

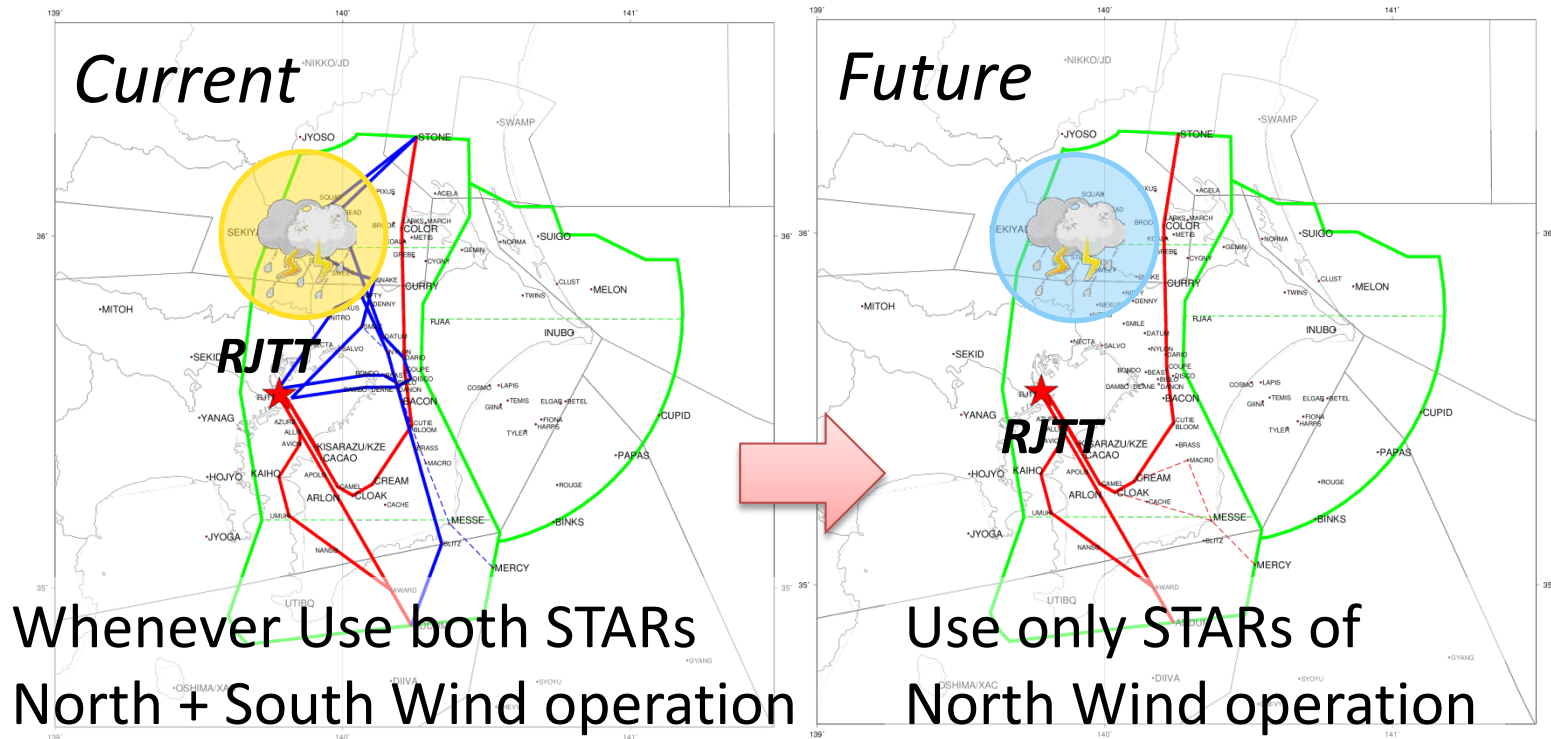
T03 ▲	CONV														
T03_W_NW Conv	CONV														
T03_W_NE Conv	CONV														
T03_W_SW Conv	CONV														
T03_W_SE Conv	CONV														
T07 ▲	CONV														
RJAA ▲	GUST WIND			GUST				GUST WIND							
RJAA-1 Conv	CONV														
Wind															
Cross															
Gust	CONV			GUST											
VIS															
CIG															
TS	CONV														
SN															
blw3000 Wind	CONV			GUST				GUST WIND							
RJAA-2 Conv	CONV														



Next steps for the future of ATM CIEL

– Narrow the target area

→ Apply the STARs by the approach procedure.



– Make the verification of the current criteria.

– Review the criteria to match the feature of each sub-sectors. (current: unified in all sub-sectors)

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Where is the Terminal Area?

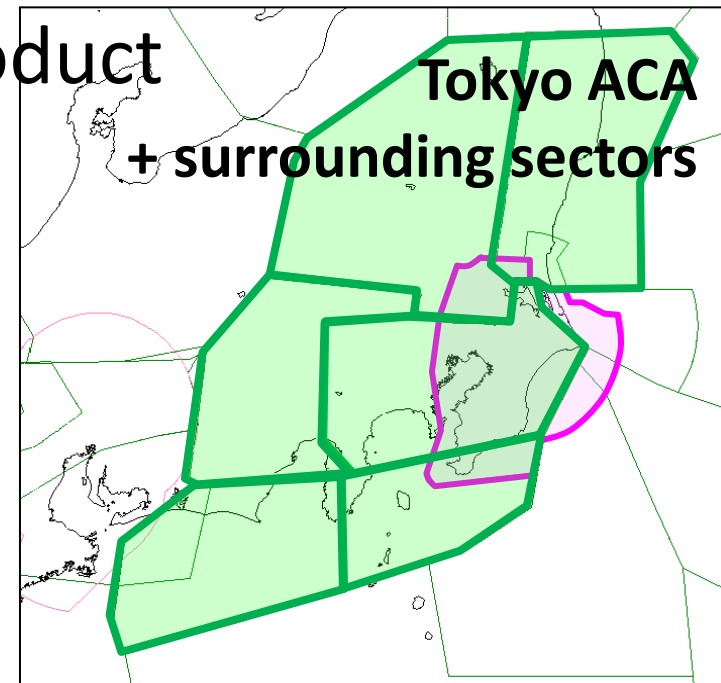
– MET DIV/14 agreed to develop Meteorological Service for “the Terminal Area”

in ASBU Block1

(Aviation System Block Upgrades)

Not maturely specified

– In considering the area as target, the target area of TMAT’s product should be good reference



Requirements for Meteorological Services for Terminal Area

- Coordinate with ATM parties in determining the target area for prediction
- target phenomena for prediction are
 - ✓ at the airport

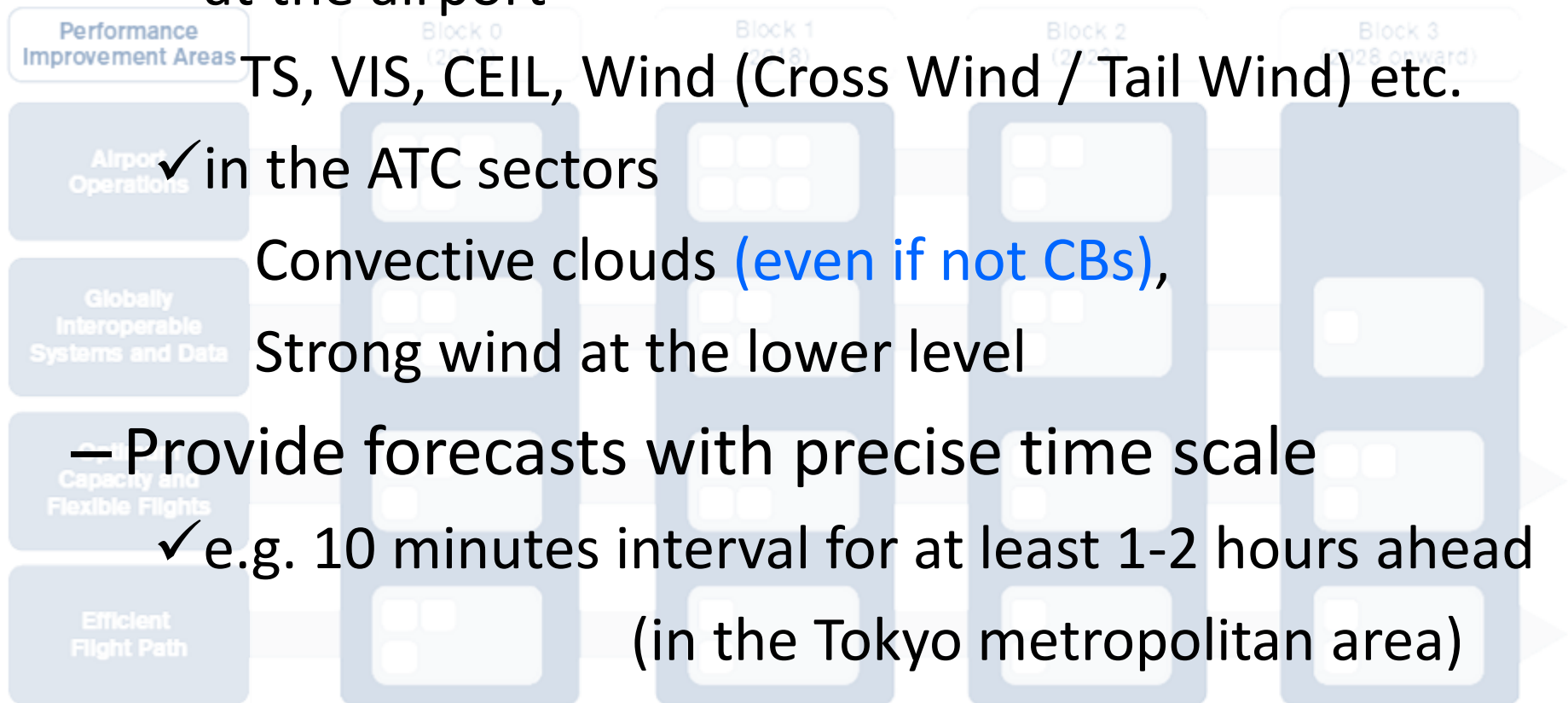
TS, VIS, CEIL, Wind (Cross Wind / Tail Wind) etc.

- ✓ in the ATC sectors

Convective clouds (even if not CBs),
Strong wind at the lower level

- Provide forecasts with precise time scale

- ✓ e.g. 10 minutes interval for at least 1-2 hours ahead
(in the Tokyo metropolitan area)



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5. Summary

- TMAT provides TMUs tailored information specialized in the Tokyo metropolitan area.
 - contribute to effective ATM operations
- Requirements for Meteorological Services for Terminal Area (through the experience of TMAT)
 - ✓ coordinate with ATM service provider in determining the suitable target area and criteria
 - ✓ predict phenomena with consideration for the characteristics of ATC operations
 - ✓ provide meteorological information with precise time scale



THANK YOU FOR YOUR ATTENTION.

ICAO ASIA/PACIFIC METEOROLOGY/AIR TRAFFIC MANAGEMENT (MET/ATM) SEMINAR
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