CIVIL AVATION IN JAPAN

Development of Future Air Traffic Systems in Japan

5 March 2009
ATS Systems Planning Division
JCAB

MLIT 国土交通省

JCAB 航空局

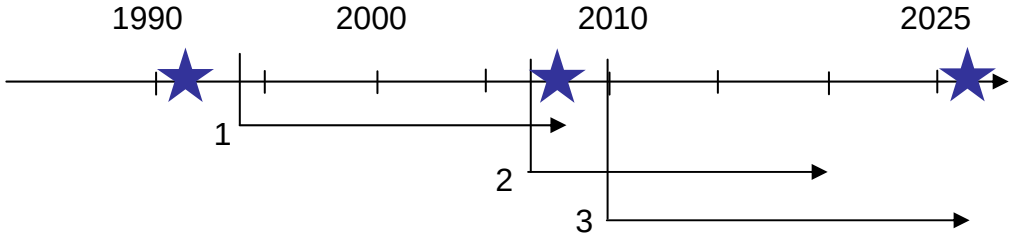
Out line

1. Policy Review
   ICAO/FANS Concept (1991) / Council Report No.23 (1994)

2. Aviation Council Report
   Aviation Council Report (2007)

3. Long-term Vision

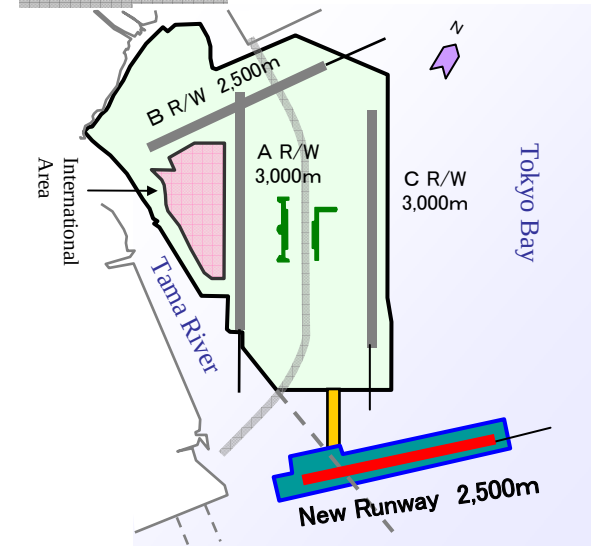
   3.1 Background
   3.2 Policy Targets
   3.3 Future Operational Concept and Programs in CNS/ATM



Issues for Metropolitan Airspace

Tokyo Airport

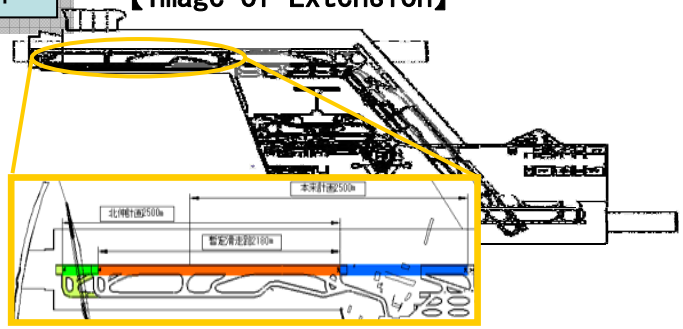
【Image of Re-expansion】



New 4th runway will increase slots from 296,000 to 407,000 (1.4 times)

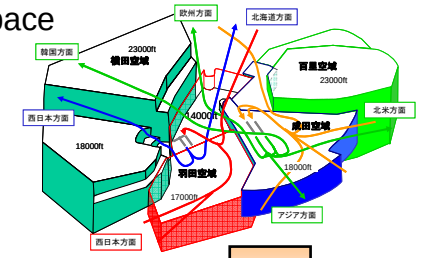
Narita Airport

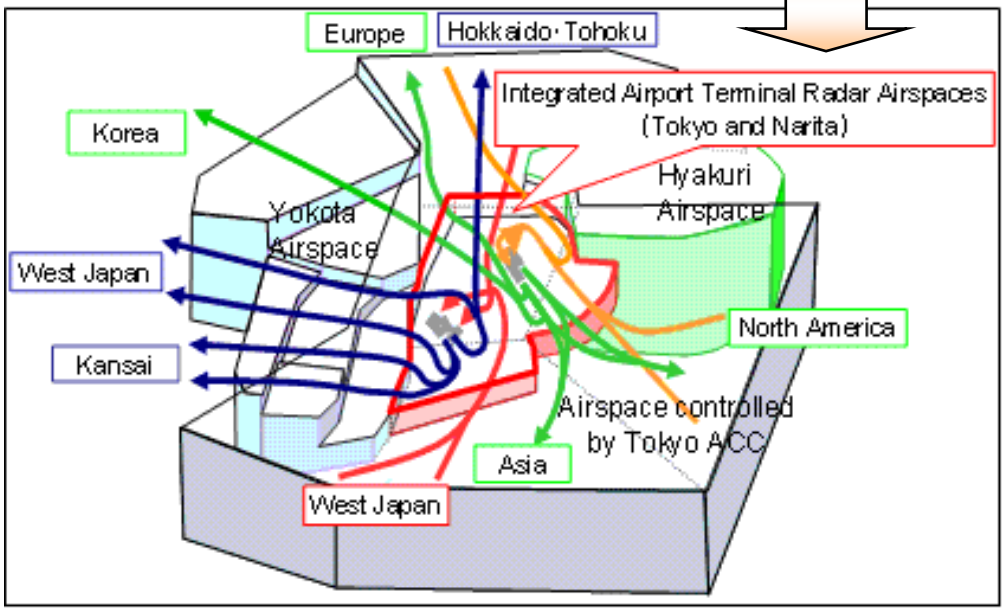
【Image of Extension】



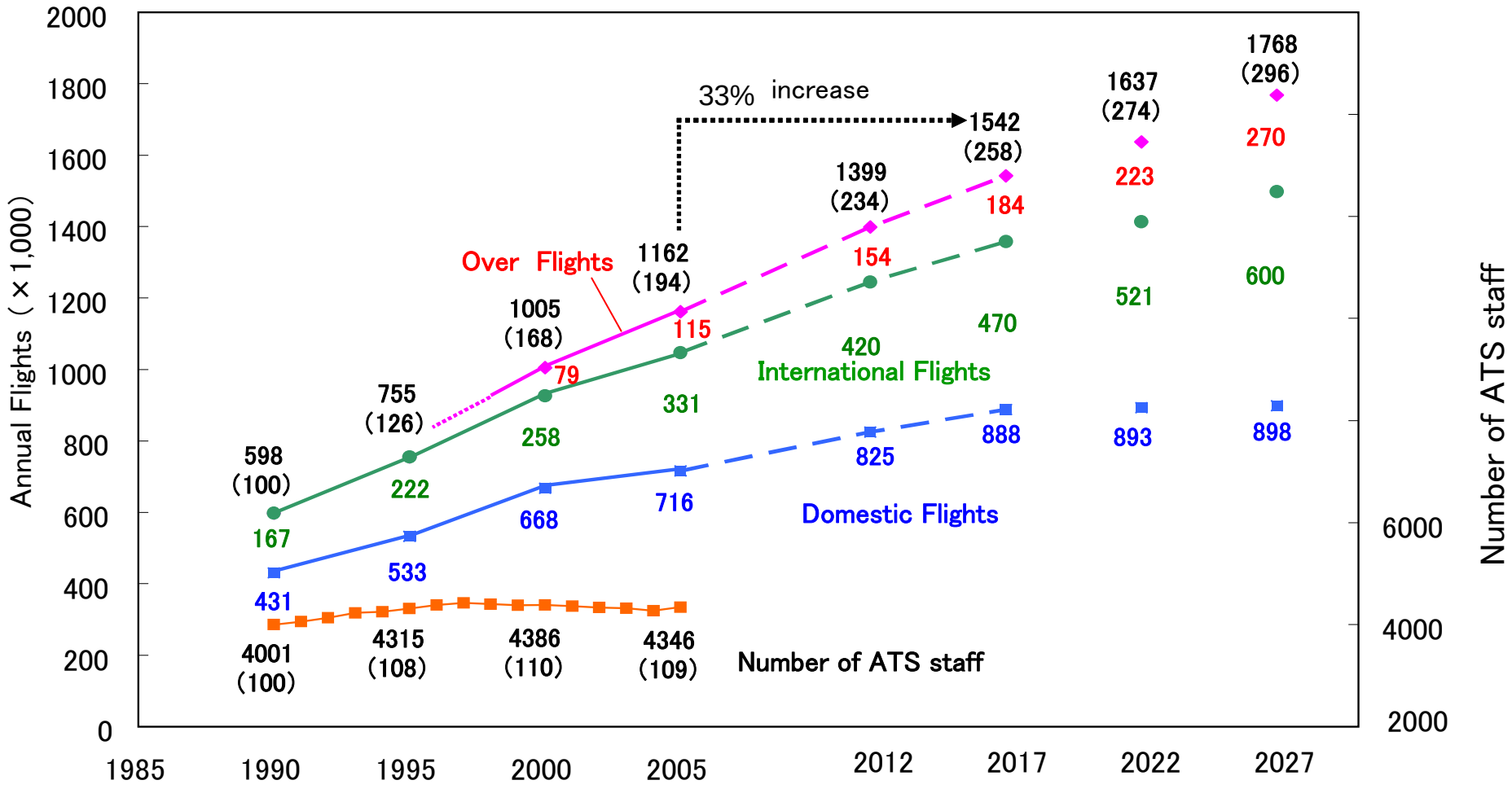
Extension to 2,500m toward North will increase slots from 200,000 to 220,000

Image of Current Metropolitan Airspace



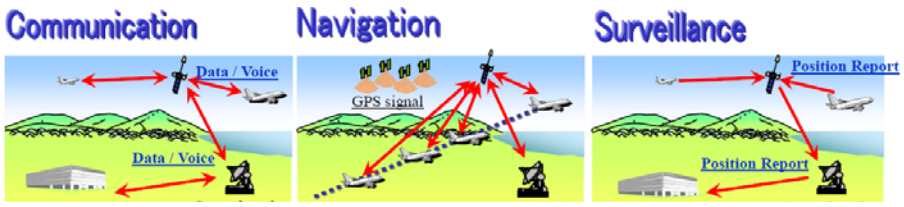


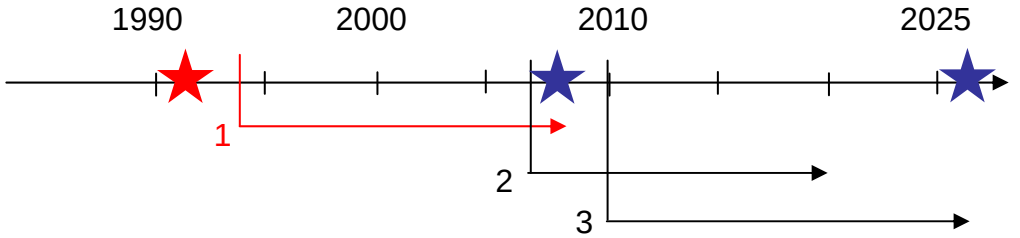
Trend and Forecast of Air Traffic Demand in Japan



1. Policy Review
ICAO/FANS Concept (1991) / Council Report No.23 (1994)

To date, JCAB has proactively implemented various systems and procedures in accordance with the ICAO FANS (CNS/ATM) concept. For examples, the ATM Center was commissioned first in Asia/Pacific in 2005, and RNAV and aeronautical satellite communications/navigation systems became operational in 2007, and consequently airspace capacity enhancement and significant reduction of ATC separation were realized. As the first step of future air traffic systems development, JCAB has reviewed relevant policies and programs in light of achievements and outstanding issues.

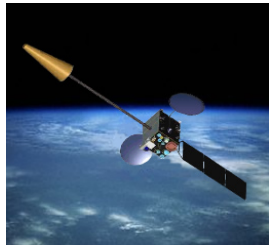




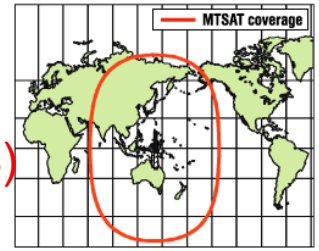
ICAO/FANS Concept (1991) / Council Report No.23 (1994)

【Example】

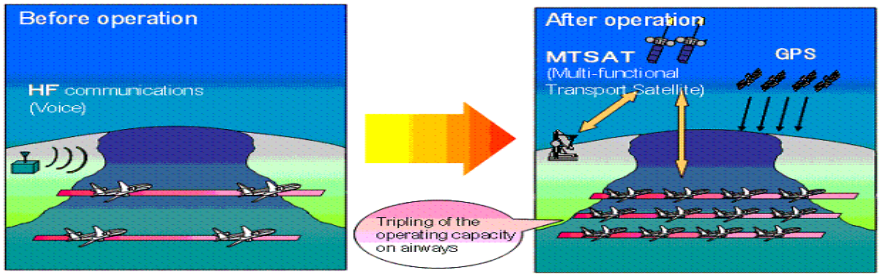
Aeronautical Satellite System

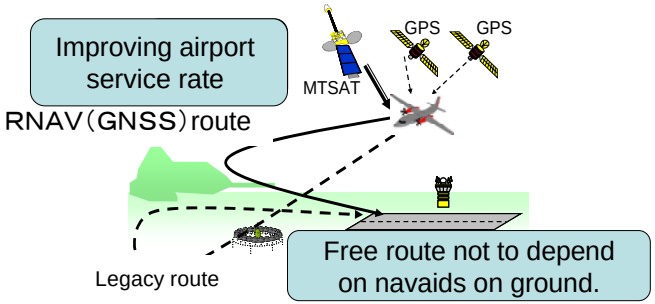


AMSS/ADS
GNSS(MSAS)



Oceanic separation minimum	Before operation		After operation
Longitudinal separation	120NM	Reduction 50NM	30NM
Lateral separation	50NM	Reduction 50NM	(30NM)

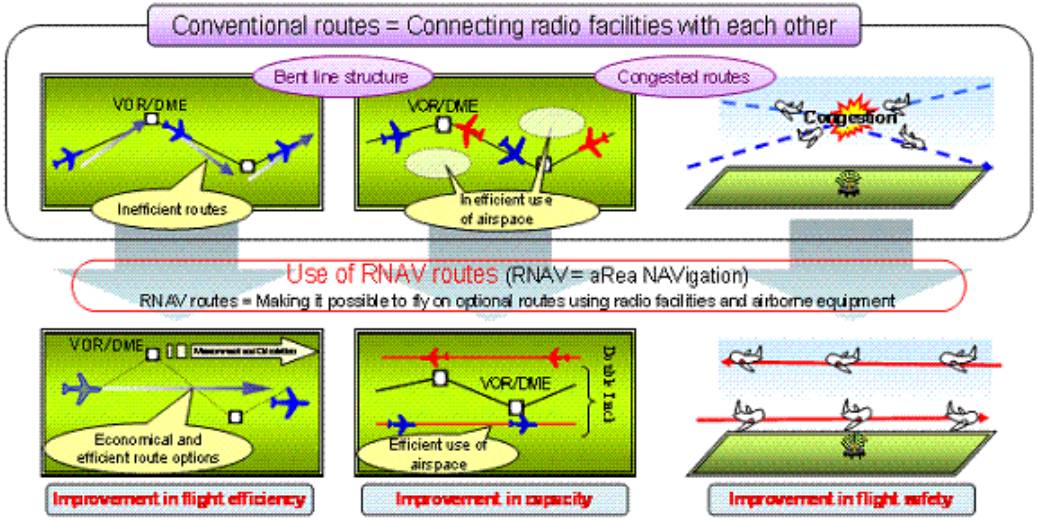




Air Traffic Management (ATM)

Airspace Management
Air Traffic Flow Management
Oceanic Control

RNAV

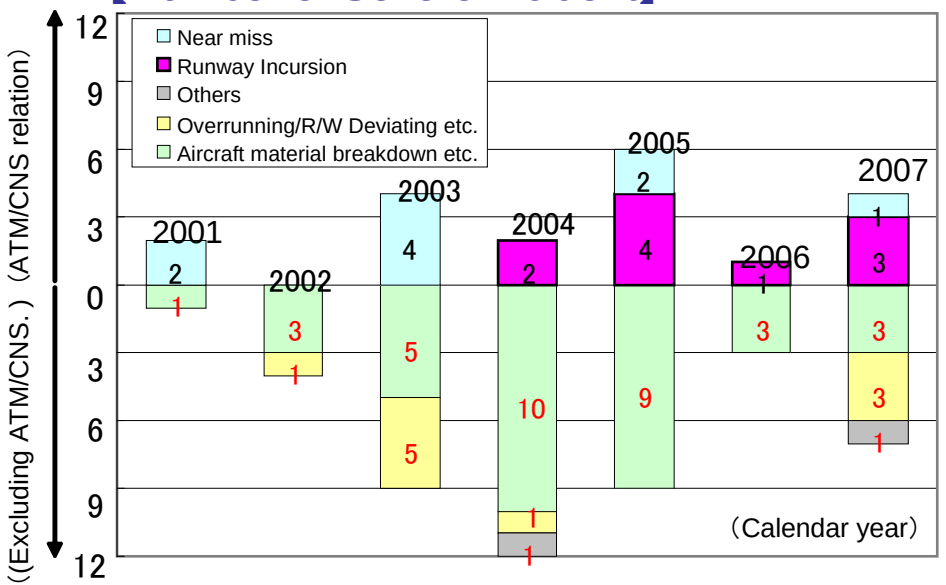


Review (Draft)

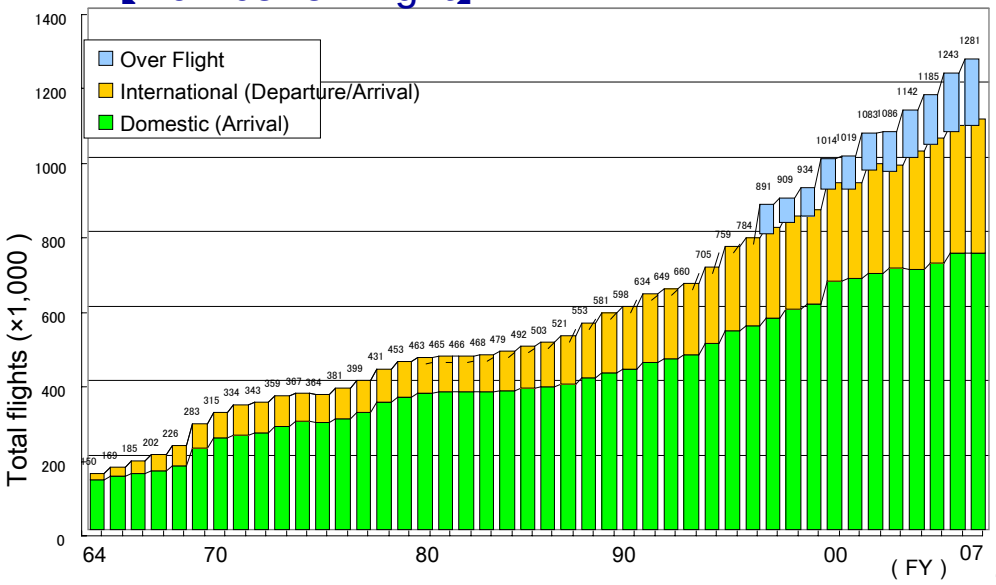
Viewpoint（Target）	Indicator
1. Usage of air transportation safely（Enhancement of safety ）	
Prevention measures for accidents	①Number of Accident
	②Number of Severe Incident
	③Datalink utilization
2. Operation of aircraft any time efficiently （Increase of capacity to meet air traffic growth）	
Correspondence to the increasing service frequency in the expansion of capacity	④Number of Flight
	⑤Capacity in congested airspace
Contribution to the reduction of operational cost	⑥Shortening of flight route
	⑦Desired height level in the oceanic airspace
3. Arrival on schedule（Improvement of convenience）	
Secure the punctuality	⑧On Time flight
Flight without flight cancelation	⑨Airport access rate
4. Improve the efficiency of the ATS （Improvement of ATS efficiency）	
Progress of efficiency improvement of ATS	⑩ Number of Flight / a controller
	⑪Construction cost / a flight
5. Environment friendly（Consideration of environment）	
Reduction of CO2	⑫Reduction of CO2 by shortening of flight route
	⑬Number of ATFM
6. International contribution and cooperation (Common item)	

【Example】

【Number of Severe Incident】



【Number of Flight】



Future Air Traffic Systems in JAPAN (Short Term)

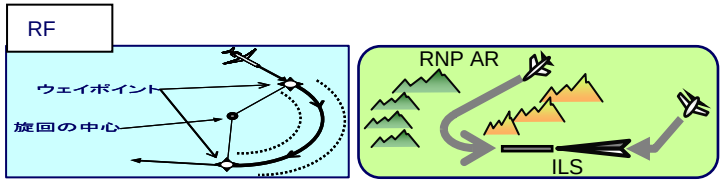
Enhance Safety | Increase Capacity | Increase Efficiency | Environmentally Friendly

【Example】

Implementation of RNAV

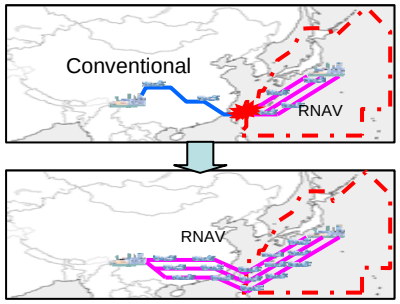
RNAV will be implemented in most of domestic route in Japan by 2011, 2% reduction of total flight distance ⇒155,000 ton CO2 reduction

Introduction of Advanced RNAV (RNP-AR)



⇒Increase Capacity, Reduction of Noise

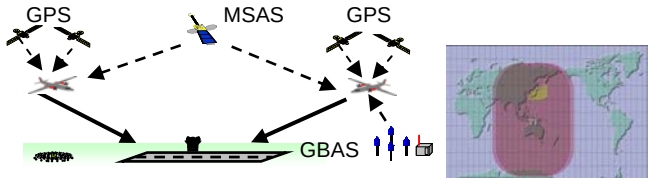
Facilitate of Implementation of RNAV in Asia



Achieve the smooth air traffic by same level RANV across adjacent FIRs

⇒Increase Capacity, Reduction of CO2 in Asia

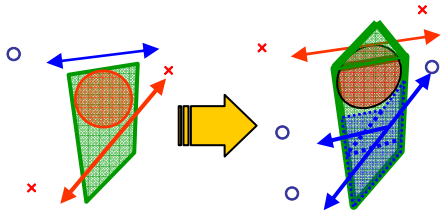
Satellite based Navigation



⇒Reduction of Cancel, Diversion

Enhancement of ATM

Flexible air space management



⇒Increase air space capacity, Reduction of CO2

Enhance Safety

【Airport

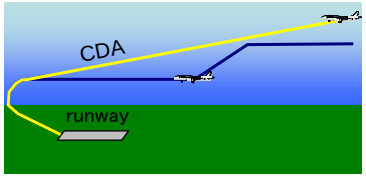
Introduction of RWSL, etc.

【Datalink】

Introduction of DCL from 2012 at Haneda and Narita

⇒Enhance Safety

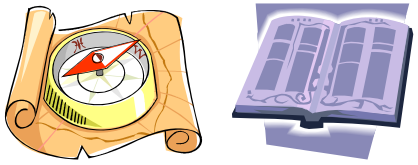
Introduction of CDA

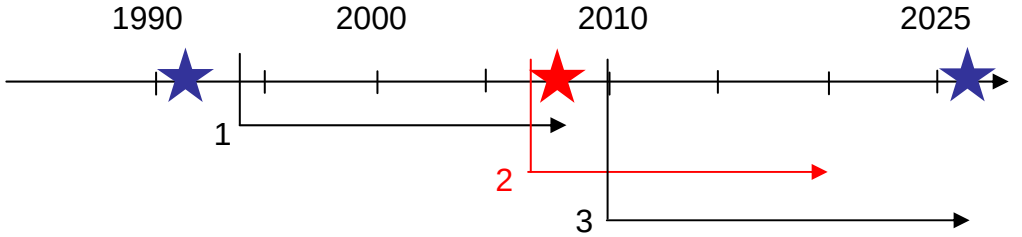


⇒Reduction of CO2, Noise

2. Aviation Council Report
Aviation Council Report (2007)

In 2007, The Civil Aviation Council analyzed problems that the present ATS systems were facing, and examined future needs in CNS/ATM. The Council, in its report, formed various recommendations aimed at enhancing safety, capacity, efficiency, human resource development and R&D. These recommendations in the Council report are incorporated into the 5-Year National Plan of Social Infrastructure Construction from 2008 to 2012.





Points of Argument for Future System

1 How to prevent accidents and major incidents
2 How to strengthen contingency management against natural disaster etc.
3 How to cope with high traffic volume due to re-expansion of Tokyo airport and Narita and downsizing of fuselage
4 How to improve flight efficiency such as reduction of flight hour and fuel consumption
5 How to harmonize international and domestic traffic in accordance with increase of international flights and over-flights
6 How to strengthen irregular situation such as bad weather etc.
7 How to improve usefulness of air transportation such as reduction of cancellation rate

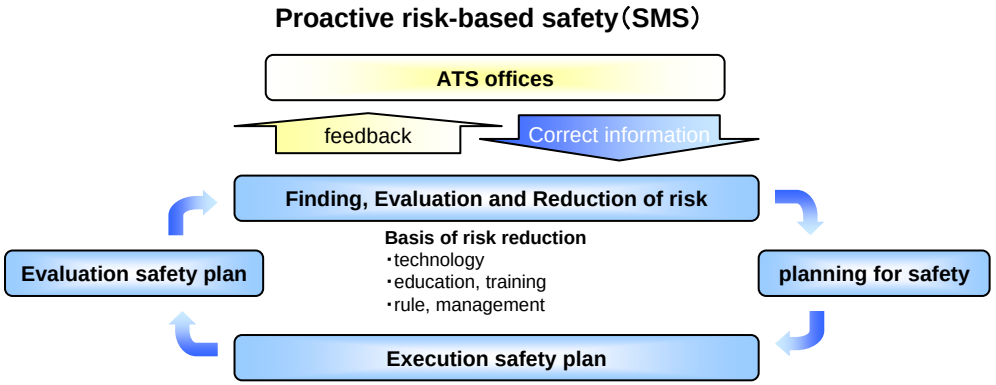
Summary of Future System

○Strengthen systematic safety measures via introduction of Safety Management System etc.
○In order to handle increasing air traffic, Reorganize airspace and airways, and Strengthen Air Traffic Management.
○Provide safer and more efficient ATC services using RNAV and other new technology such as satellite based navigation etc.
○Secure necessary personnel, and further improve skill in addition to efficient operation.
○Promote industry-academia-government partnership for future issues.

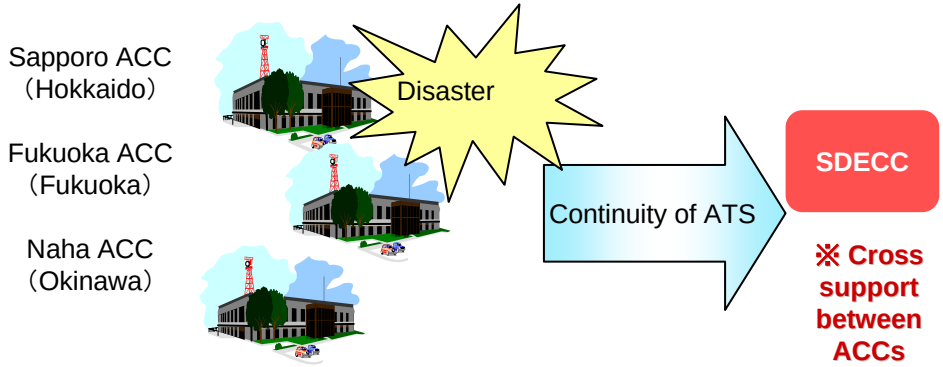
Maintaining High Safety Level including Disaster Risk Management

【Example】

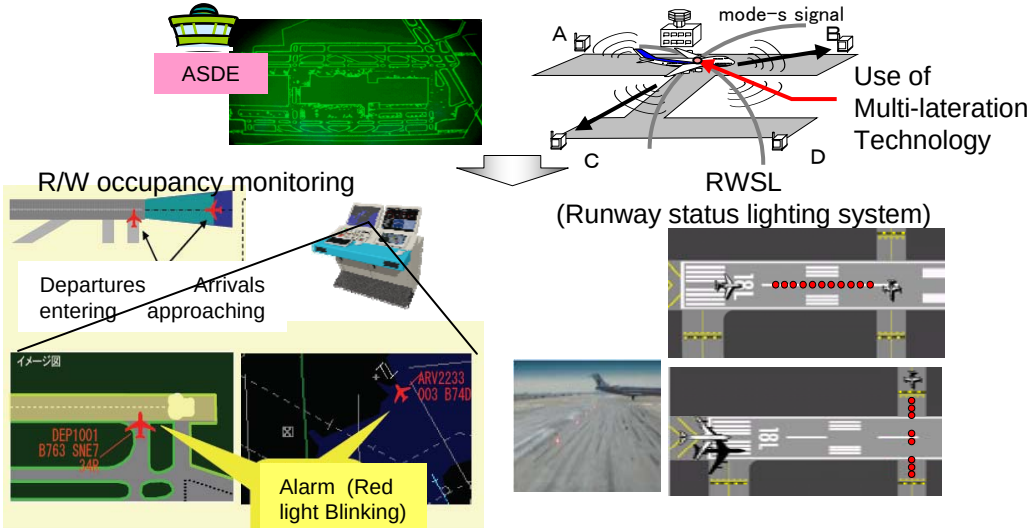
Introduction of Safety Management System (SMS)



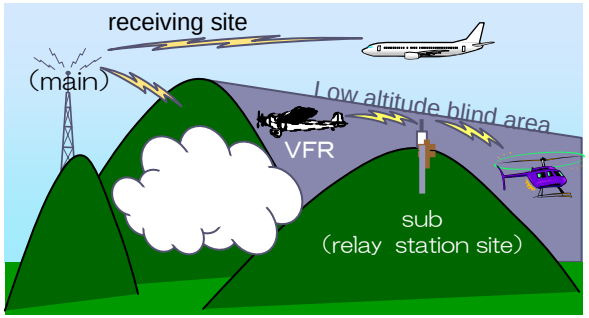
Enhancement of ATC Contingency Management



Safety Measure for Airport Surface Operation



Safety improvement of General aviation



【Example】

Handle Increasing Volume of Air Traffic

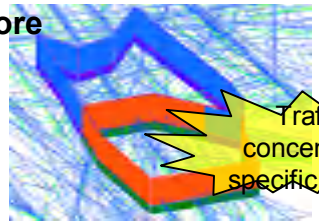
Advanced Airspace Management

Coordination to utilize airspace

Flexible operation in accordance with traffic volume

Optimum Design of Airspace Configuration and route

Before

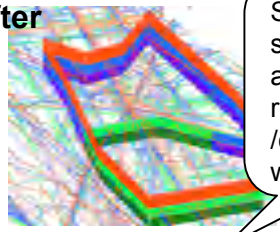


Traffic concentrate specific sector

(2008～)
Airlines

Quantity analysis vis simulation tool

After



Separate sector with altitude and reduce pilot /controller workload

Based on safety verification, to resolve bottleneck through optimum design of airspace and route

Introduction of Next Generation ATC System

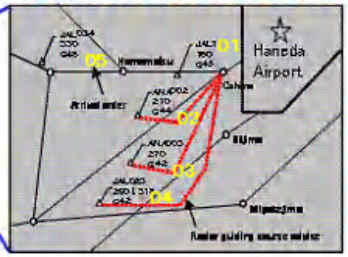
Electronic strips

・Diversification of information indication by a window display

(Image)

Airtraffic controler support functions

・Advice courses function on radar control
・Arrival order function, etc.



Advanced Air Traffic Flow Management

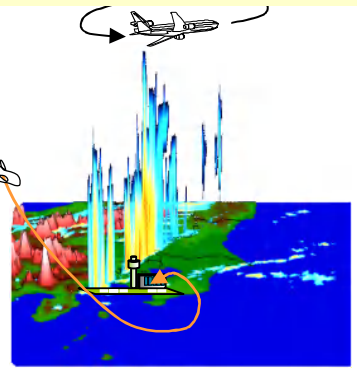
Improvement of Air Traffic Flow Prediction

Strengthen irregular situation

Strategic Avoidance with bad weather

Detouring

Provide more chance for landing with use of high accurate weather information



Short term forecast for blast and thunderstorm

Reduce waiting time by improving forecast accuracy of bad weather etc

airlines

CDM

Collaboration

ATMC

Air Traffic Metrological Center

Advanced Oceanic Control

Introduction of height allocation program for oceanic operation

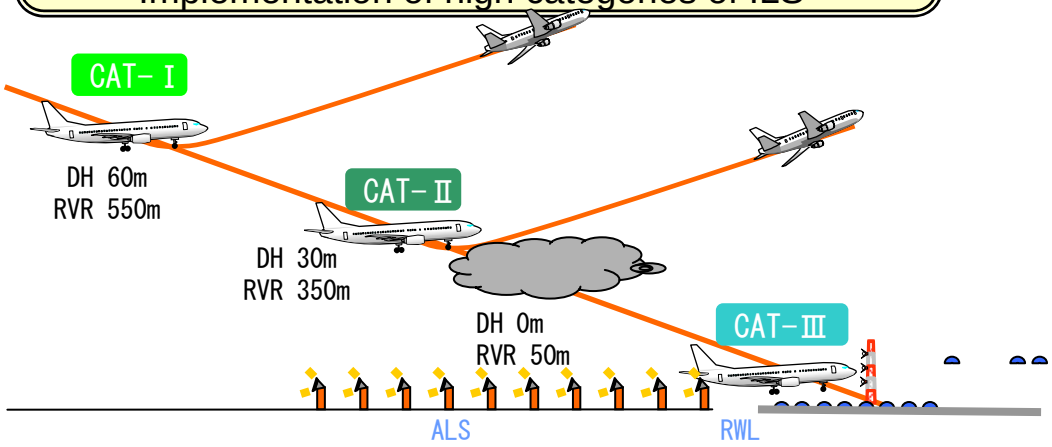
International Data exchange

Improve Usefulness of Air Transportation System

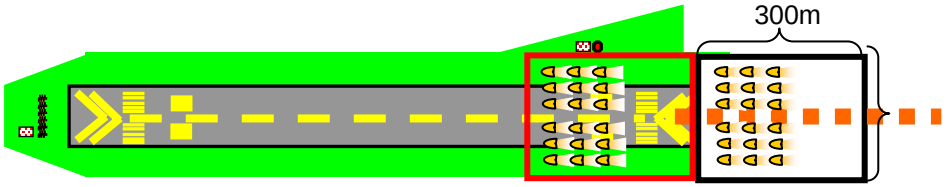
【Example】

Improve Airport Access Rate

Implementation of high categories of ILS



Shortening CAT-Ⅲ



Introduction of RNAV (GNSS)

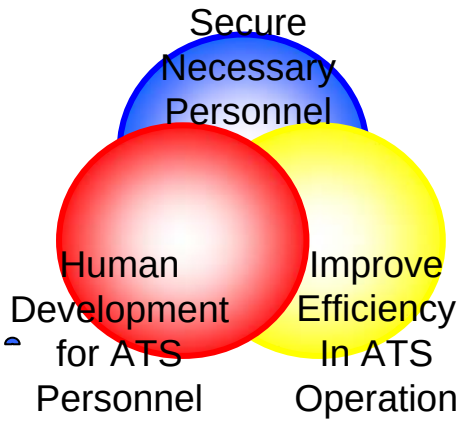
Snow Removal

Runway Improve

High Quality of Service

【Example】

Architect Safe and Efficient Operative Organization



Ex.） Air Safety Academy

Ex.） System Operation

Human Development for ATS Personnel

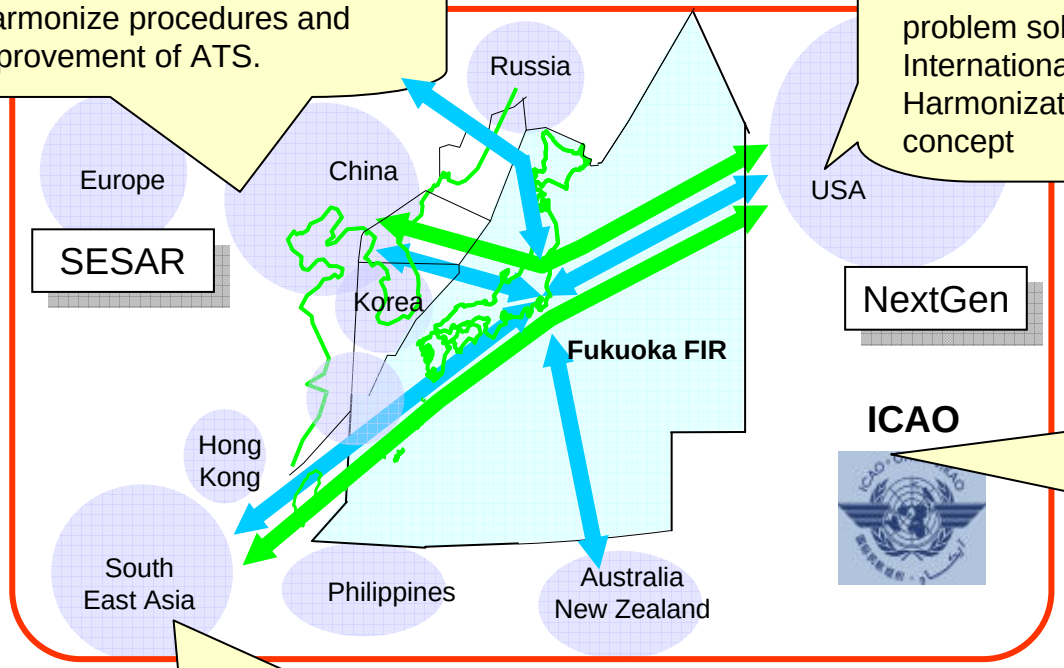
Training at Airport offices etc

Strengthen International Partnership & Cooperation

【Example】

Regular bi-lateral/multi-lateral meetings with China and Korea to harmonize procedures and systems for further improvement of ATS.

IPACG for short/mid-term planning and problem solving
International ATFM between Japan and US
Harmonization of future air traffic systems concept



Develops Global ATM Concept and leads globally harmonized and seamless air transportation system.

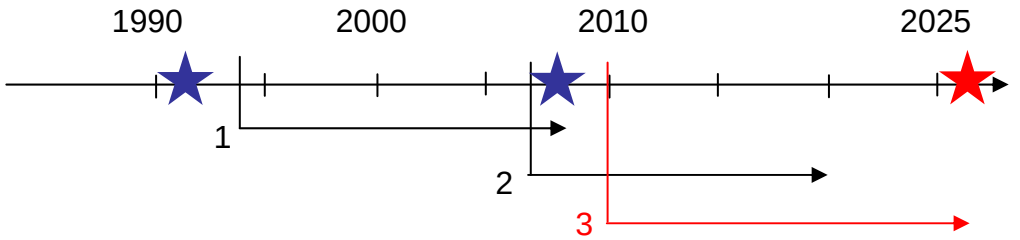
Support to implement new technologies and provide training and assistance.
・ASEAN-Japan Project
・Human Resource Development

Civil Aviation Safety College will accept Asian countries' ATS personnel training

3. Long-term Vision

JCAB plans to develop a long-term vision of future air traffic systems in Japan around 2025.

3.1 Background
3.2 Policy Targets
3.3 Future Operational Concept and Programs in CNS/ATM



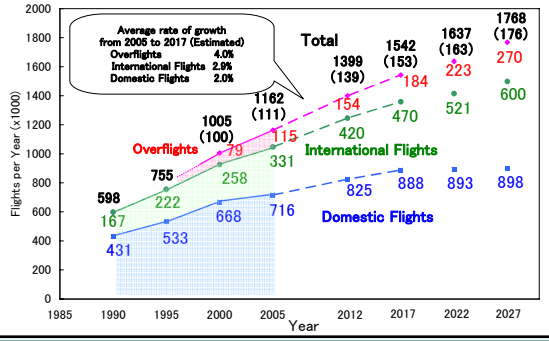
3.1 Background

As air transport demands increase, airspace congestion has become more serious concern. For example, JCAB expects the air traffic demand in Japan around 2025 to be approximately 1.5 times of 2005, and IATA also anticipates a rapid growth in the East Asia region in their “IATA Vision in 2015”. This situation requires JCAB to make our continuous efforts to change ourselves for the purpose of ensuring safety and capacity.

Diversified needs of operators and users

such as operational efficiency, on-time operation, global environmental issue, etc.

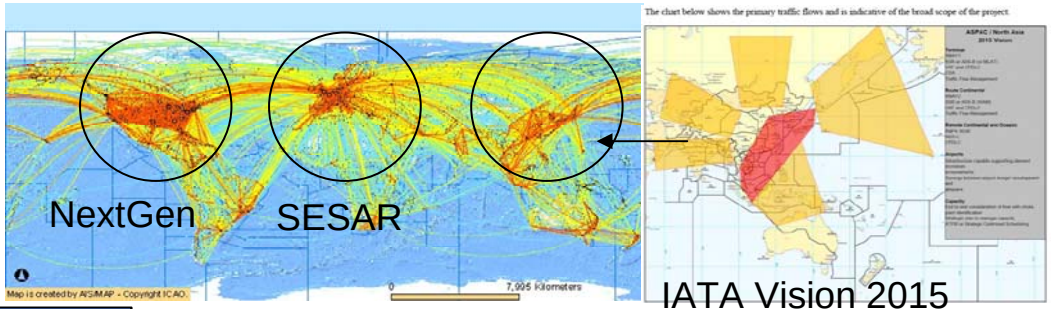
Increased future demand



New operational concept with technical revolution

Such as Information sharing, responsibility sharing, decision support, etc.

International trend



Need to establish the future air traffic system with long term vision

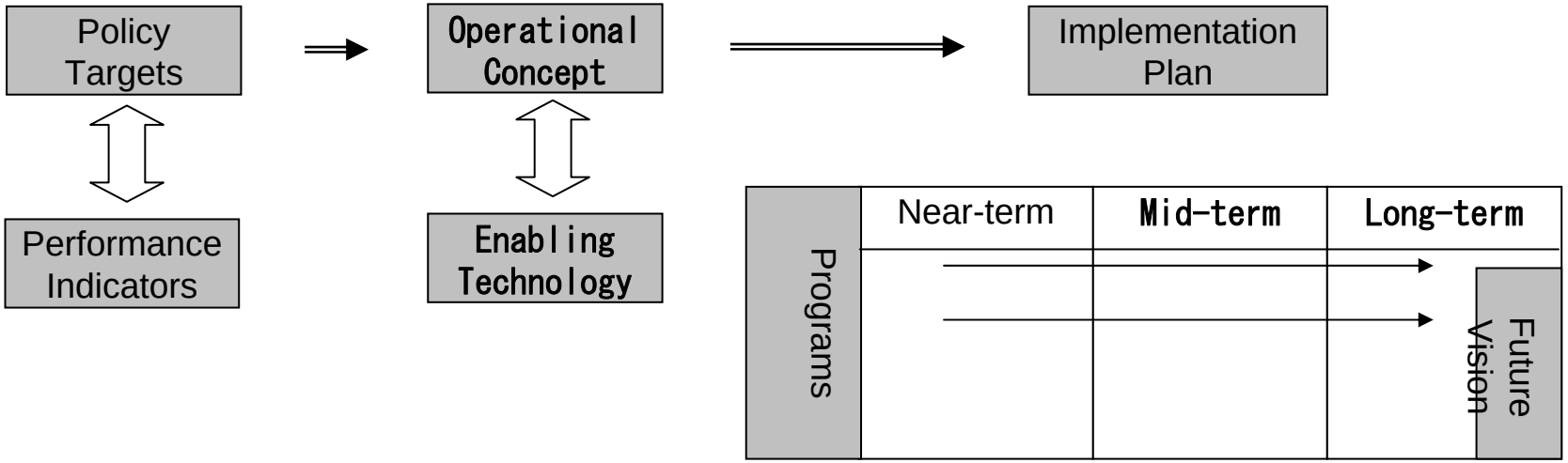
Conceptual out line

・Set up the Policy Targets around 2025, which is also the target year of ICAO ATM concept, based on international trend and social needs.

・Organize ATM Operational concept and Enabling Technology in order to achieve the goals.

・Based on the operational concept and enabling technology, sketch the Future Vision of Air Traffic Systems around 2025 and build up the Implementation Plan, in view of technical feasibility and cost-benefit efficiency.

・Set up the Performance Indicators to measure the achievement.



3.2 Policy Targets

The following areas are identified as policy targets of future air traffic systems around 2025:

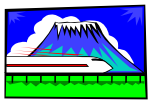
(1) Enhancement of safety

①accidents ②service continuity ③security

(2) Increase of capacity to meet air traffic growth

①capacity ②operational cost

(3) Improvement of convenience



①punctuality ②airport access rate ③fast arrival

(4) Improvement of ATS efficiency

①service productivity

(5) Consideration of environment

①CO2 ②noise

(6) Strengthening of the presence in the international aviation

①int'l contribution ②int'l competitiveness

Performance indicators

will be developed for respective areas because it is considered essential for JCAB to continuously monitor the progress and assess outcomes in order to maximize benefits.

3. 3 Future Operational Concept and Programs in CNS/ATM

JCAB has been developing a future operational concept and detailed programs in CNS/ATM, taking into account development of relevant operations and technologies in other countries as well as ICAO.

Key Areas:

(1) Air Space Management (ASM)

ASM for 4DT, int'l CDR & RNAV route, training airspace, low altitude

(2) Air Traffic Flow Management (ATFM) and Capacity

design / evaluation / calculation, prediction, optimization, planned formation

(3) Air Traffic Control (ATC)・・・Oceanic, En-route

automation / remote, intent / maneuver / met information, ASAS / TIS

(4) Airport Operation

position / foreign objection debris detection, airport CDM

(5) Information Services

information sharing, monitoring / analysis / evaluation, visualization, common infrastructure

Common issues:

(1) Technology

com datalink
nav satnav
sur grand / air to air
data continuity / extensibility / sustainability

(2) Human Factor

human / machine, human resource

(3) Safety Management

evaluation, monitoring, natural disaster / jamming / accident prevention, crisis management

(4) Environment

RNAV / RNP / VNAV / CDA, ACFT renewal

Partners:

(1) A/Ls

(2) R&D Institutes

(3) Industries

etc.

Others:

(1) Business case (B/C)

(2) Financial resources

(3) Institutional issues (Regulation)

etc.

Key words:

- Trajectory / performance - Based Operation (TBO / PBO)
- Ability of prediction (met / ops / traffic flow / capacity)
- SATNAV / SWIM
- Real time situational awareness between ACFTs
- Automated support system
- Collaborative Decision Making (CDM) / Capacity (Congested / HD)

Safety is at the core of our mission

We promote the collaborative actions for renovation of ATS

JCAB will continue the development of the vision and its implementation, in concert with relevant parties.

Thank you for your attention !!