Ministry of Land, Infrastructure, Transport and Tourism

CIVIL AVIATION BUREAU OF JAPAN

Information Management at CARATS

CARATS
Collaborative Actions for Renovation of Air Traffic Systems

H i s t o r y

CARATS
Collaborative Actions for Renovation of Air Traffic Systems

✈ *2009 ~ 2010   Development of long-term vision*

- Establishment of

   "Study group for Promoting Renovation of the Air Traffic System"

- Development and promulgation of

   "Collaborative Actions for Renovation of Air Traffic Systems" (CARATS)

✈ *2010 ~ 2011 Development of roadmap for each measures*

- Establishment of

   "Committee for Promoting Renovation of the Air Traffic System"

- Consideration of concrete measures and development of roadmap

✈ *2011 ~   Implementation of the measures*

Working Framework

Committee for Promoting Renovation of the Air Traffic System

Planning and Coordination Meeting

Cost-effectiveness analysis / performance assessment Subgroup

Research and Development promoting Subgroup

ATM WG

PBN WG

MET WG

Information Management WG

Advance PBN SG

General Aviation PBN SG

+

TBO ad-hoc

Data COM ad-hoc

surveillances ad-hoc

GNSS ad-hoc

Industry
✈ **Operators**
✈ **Aviation-related manufacturers**

Academia
✈ **Research Institutes**
✈ **Universities**

Government
✈ **Civil Aviation Bureau**
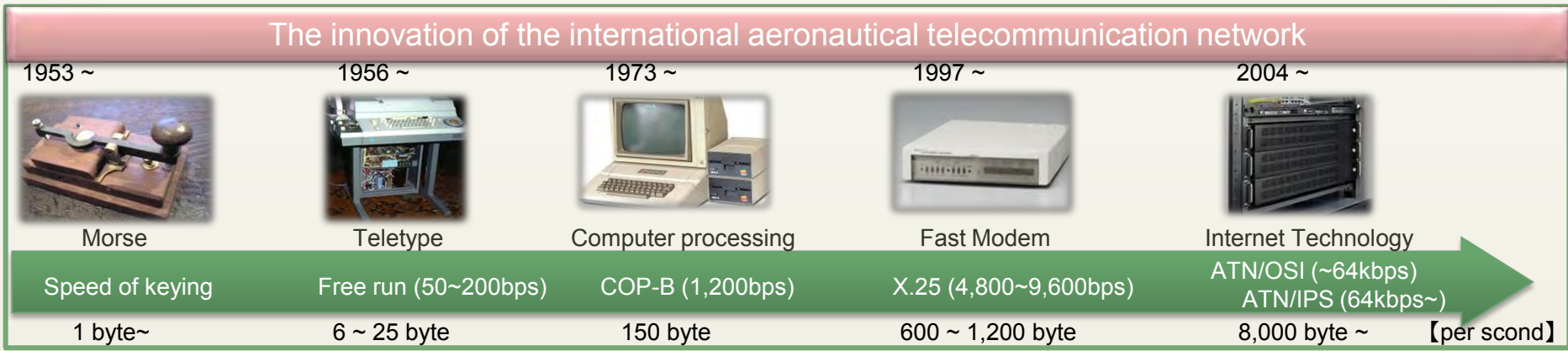✈ **Related government agencies**

What problem?

✈ The ATC and the neighborhood are exchanging information which are such as weather information, aeronautical information and flight plan required for the aircraft operation, through the international aeronautical fixed communication station.

✈ In the case of Japan, we are exchanging information within the Fukuoka FIR that is our responsibility area.
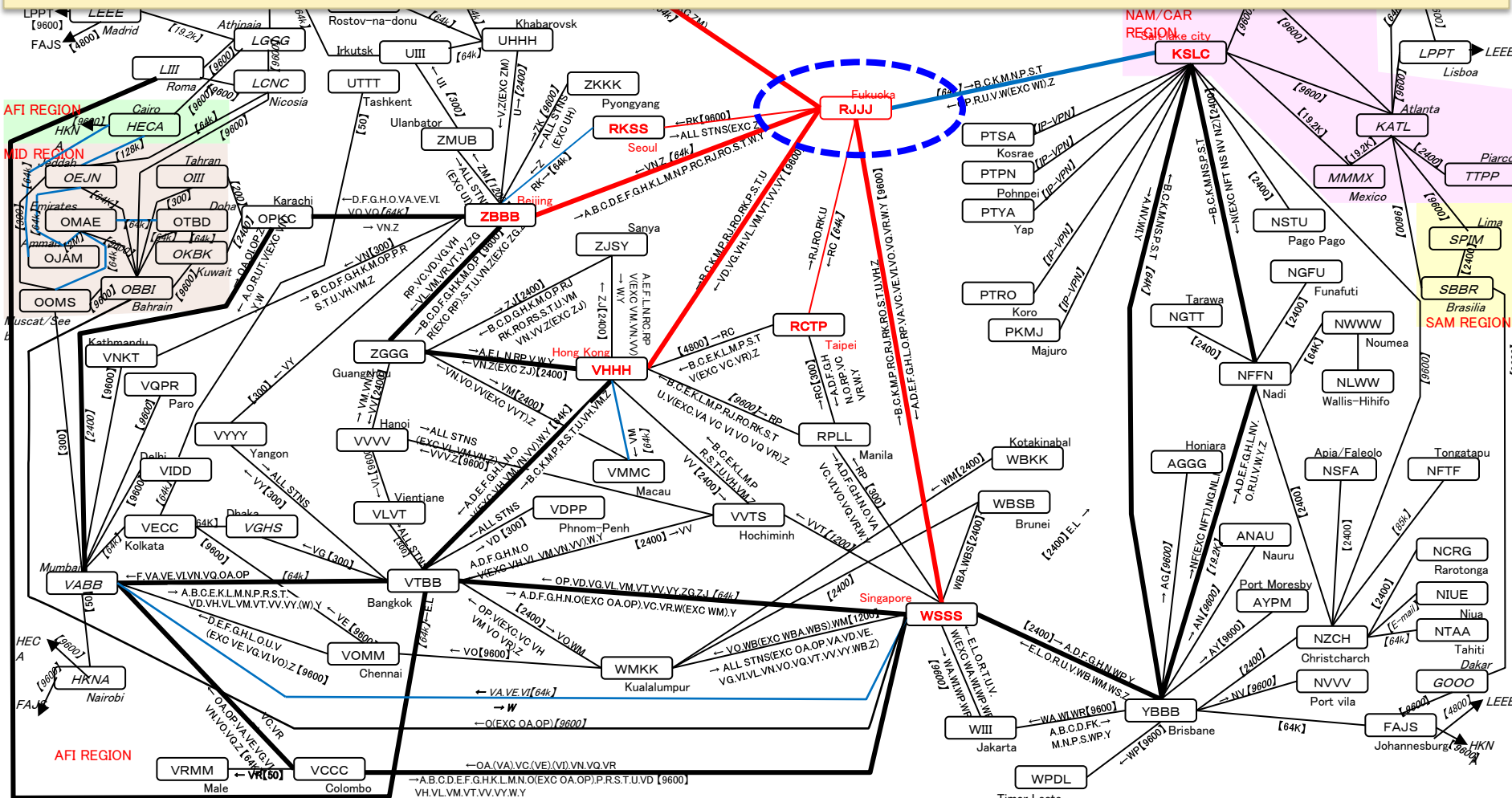
Current issues - 2

Information exchange with ANSP overseas

- With the introduction of development and computer processing for the communication technology, the communication speed is improved, and the amount of data handled is increasing.

The innovation of the international aeronautical telecommunication network

1953 ~	1956 ~	1973 ~	1997 ~	2004 ~
Morse	Teletype	Computer processing	Fast Modem	Internet Technology
Speed of keying	Free run (50~200bps)	COP-B (1,200bps)	X.25 (4,800~9,600bps)	ATN/OSI (~64kbps) ATN/IPS (64kbps~)
1 byte~	6 ~ 25 byte	150 byte	600 ~ 1,200 byte	8,000 byte ~ 【per scond】

- Mechanism of information exchange has not changed since the communication by Morse and teletype. (Use of abbreviations, such as character limit)

```
NNNNZCZC LXA836 031027
FF LPPTSLOT
FF LPPTZTZX LPPCZQZX LPPTTAPO LPAMYWYA LECMZQZX LFFZQZX LSAGZQZX
   LSAZZQZX EDZZZQZX LOVVZQZX LOWWZTZX
031030 LPPTZPZX
(FPL-TAP564-IS
-EA32/M-SR/C
-N0433F310 CARMI 3S CARMI UG52 TBO/N0428F350 UG5 GAI UG57 HUPAR
 UG52 SPR UG60 FRI/N0426F330 UG60 WIL/N0428F310 UG60 ZUE/N0427F330
 UG60 KPT UG4 SBG UR23 STO STAR
-LOWW0309 LOWL
-EET/LECM0025 LFFF0106 LSAG0154 LSAZ0204 EDDU0217 LOYY0238
 REG/CSTNB SEL/BSAJ
 RMK/AIRPORTUGAL564
 DOF/980803)
```

- Performs system processing by analyzing the received text

- For other States, distribute it as simplified text file

- On Flight of the same aircraft, lose the connectivity on the system processing

When each ANSP implementing with advanced systems attempts to cooperate, it become a major barrier

Current issues - 3

Each ANSP is in advanced systems processing only the information within the responsibility of the Flight Information Region (FIR). However, it is not possible to achieve seamless information sharing with other States.

From take-off to landing of aircraft, it can not be managed as a series of information in the Gate to Gate.
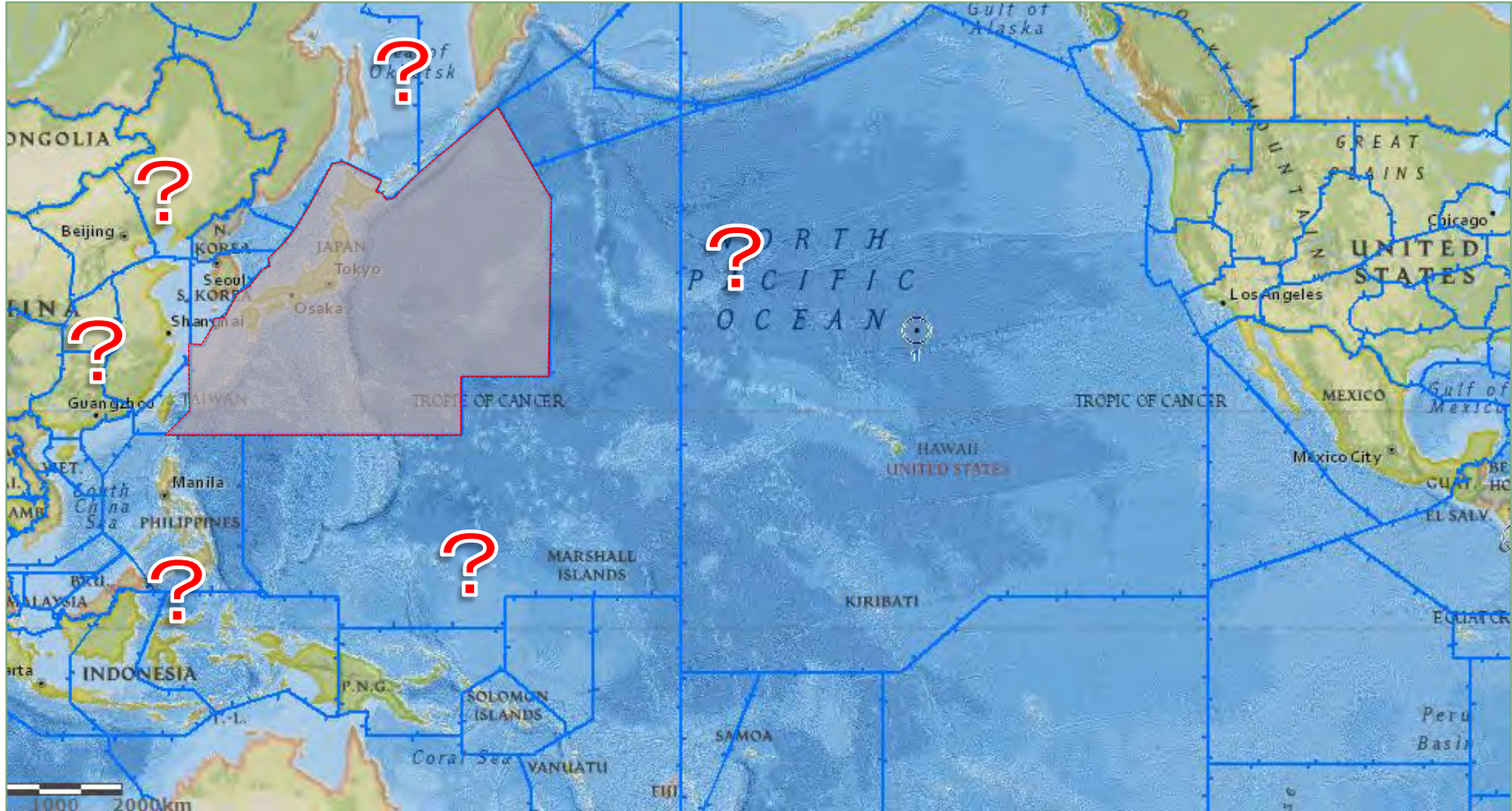
Origin of SWIM

What is SWIM (System-Wide Information Management) ?

The SWIM Concept initially appeared in the ICAO document which is described the concept of the future vision of ICAO, "The Global Air Traffic Management Operational Concept (Doc 9854)". It is stated as follows.

"the migration from the one-to-one message exchange concept of the past to the many-to-many information distribution model of the future, that is, many geographically dispersed sources collaboratively updating the same piece of information, with many geographically dispersed destinations needing to maintain situational awareness with regard to changes in that piece of information"

In addition, we can find the phrase of SWIM in the "Manual on Flight and Flow Information for a Collaborative Environment (FF-ICE) (Doc 9965)" for the first time, and it is stated as follows.

❖ **SWIM** − integrating all relevant ATM data -

FF-ICE relies on a supporting SWIM environment. SWIM - integrating all relevant ATM data – will form the technical basis for information management of the entire ATM system and be essential for its efficient operation. The corresponding information management solution will be defined at the overall system level rather than individually at each major subsystem and interface level. SWIM aims at integrating the ATM network in the information sense, not just in the system sense.
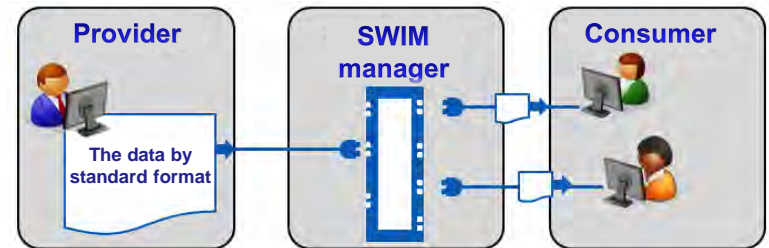
Further more, ICAO are currently planning to issue the document "SWIM Concept" for the realization of SWIM which is described by general requirements.

The fruits of Mini-Global

Demonstration of constructing technology for SWIM

   In particular, it was demonstrated the effectiveness that the essential information for the aircraft operation was standardized to XML / GML data format(flight information, aeronautical information, weather information, etc.) .

   For information on aircraft international flight, it was clarified that the stakeholders can monitor seamlessly from the departure point to the destination.
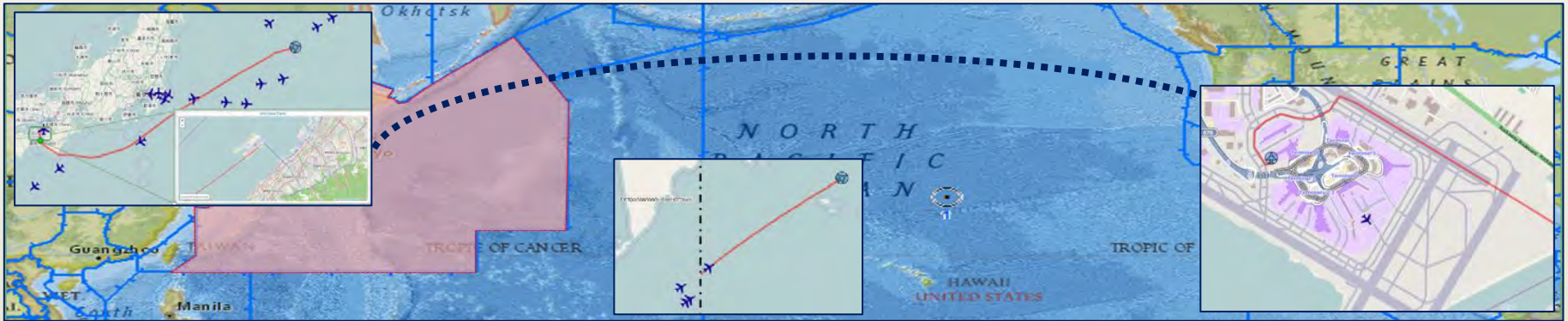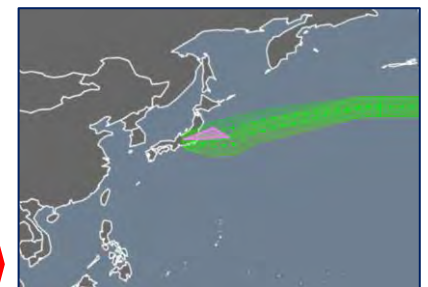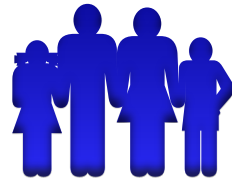

Aeronautical Information

Flight Information

Weather Information

Standardizing

AIXM
Aeronautical Information Exchange Model

FIXM
Flight Information Exchange Model
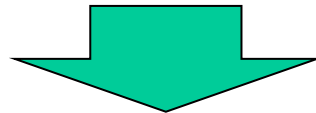
WXXM
Weather Information Exchange Model

Integrated Information

The need for re-confirmation of SWIM and international demonstration

Why need re-confirmation of SWIM?

➢ **The image of SWIM varies depending on the stakeholders.**

➢ **There are some methods or how to approach to implement SWIM.**

➢ **Important thing to understand ICAO SWIM concept and implement SWIM is to increase common awareness of all members through active discussion.**

➢ **Active discussion is necessary to match the high level of common awareness of all members and to make their awareness mature regarding making their owning data loosely-coupled. Such awareness cannot be obtained by swallowing the concept.**

Benefits of visualization by conducting international demonstration

- **Confirm the benefits that can not be adequately represented in the domestic demonstration.**

- **Verify the optimal technology that can withstand the operation of a global scale.**

- **Through the experience of the demonstration, prompt the judgement to introduce SWIM.**