



## THE OPERATION CONCEPT OF NTFM

- Presented by China

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**ATFMSG14**



## SUMMARY

### 11 operational concepts

The future of ATFM various ANSPs will not only gradually converge, but the connections will become increasingly close to form a large ATFM system composed of many subsystems from the perspective of Asia-Pacific region.

01

**Cognitive Consistency**

02

**System Interconnection**

03

**Network Interconnection**

04

**Cultural Integration**

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## DISCUSSION

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- ATFM Culture    ▪Elastic Network    ▪Unified ATFM System
    - The concept of Internet of Everything (IOE)
  - One CTOT Solution (OCS)    ▪Seeking a Near-Optimal Solution
    - The Close Relationship between ATFM and ATC
      - Support of Modern Technologies
        - Deep Data Mining
    - Cross-Border System Interconnection
      - Extensibility
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## ACTION BY THE MEETING

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# INTRODUCTION

/01

From finding ATFM solutions to finding the optimal solutions.

**After addressing the phase of “availability,” ATFM in APAC is moving towards the phase of “quality.”**

The choice in the early stage may affect the expansion of later functions.

## CTOT

- ✓ A more precise CTOT
- ✓ A predictive CTOT
- ✓ A more stable CTOT
- ✓ Meets multiple ATFM measures

## ATFM Tools

- ✓ Local actual conditions
- ✓ Achieve goals in one step
- ✓ Pursuing perfect functions
- ✓ No operation concept

## convergence

- ✓ Concept
- ✓ Method
- ✓ Principle
- ✓ Function

## ATMB

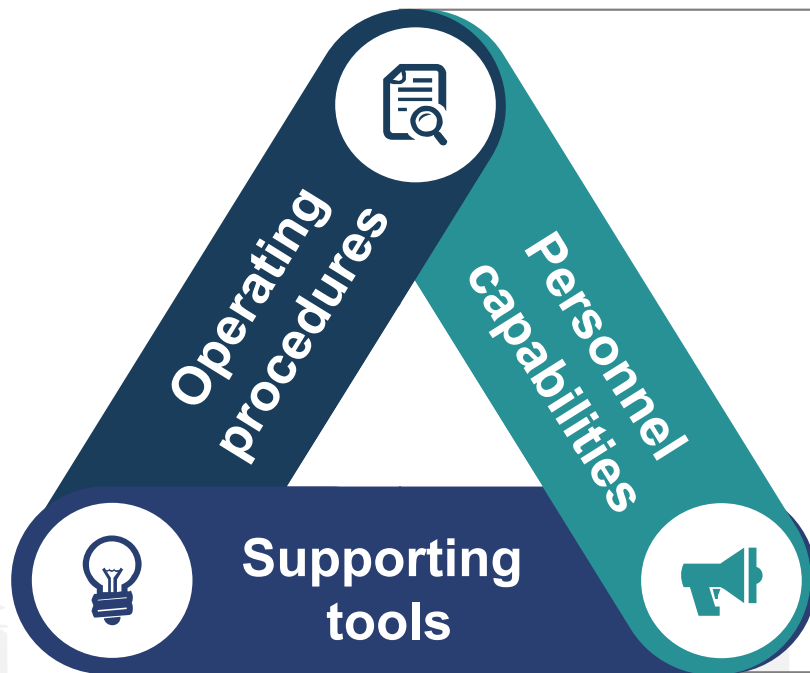
- ✓ No ATFM tools
- ✓ Scattered ATFM tools
- ✓ Unified national ATFM tool
- ✓ Upgrading ATFM tools

# DISCUSSION

- ATFM Culture    ▪Elastic Network    ▪Unified ATFM System
  - The concept of Internet of Everything (IOE)
- One CTOT Solution (OCS)    ▪Seeking a Near-Optimal Solution
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/02

# 1. ATFM Culture



ATFM culture is not only an environment that supports the ATFM operation, but also a multilateral consensus reached by various stakeholders based on their understanding of ATFM.

## 2. Elastic Network



### Complementarity

- The reason why the ATFM network needs to be elastic is because things that have not happened often have uncertainty.
- The complementarity of the network is a basic principle of the elastic ATFM network.
- Since it links all resources within the network, when a problem occurs at one point, the resources of the whole network will be used to supplement it.

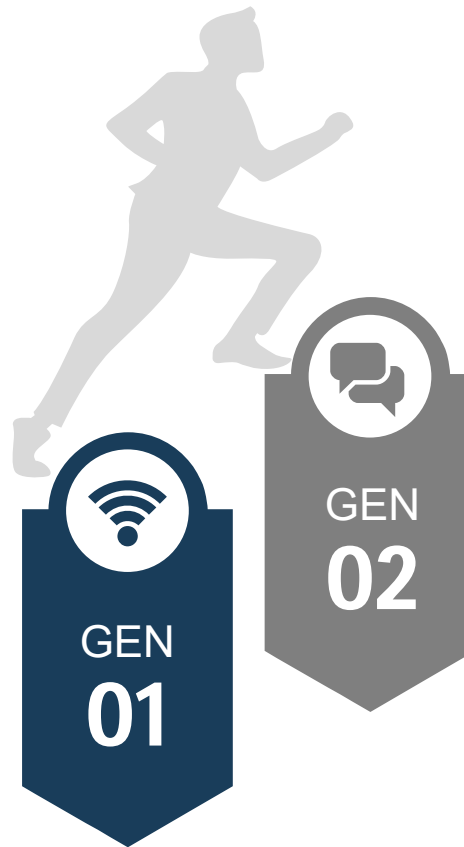


### 3. Unified ATFM System

Efforts should be made to  
reduce unnecessary differences  
between systems

**2013**

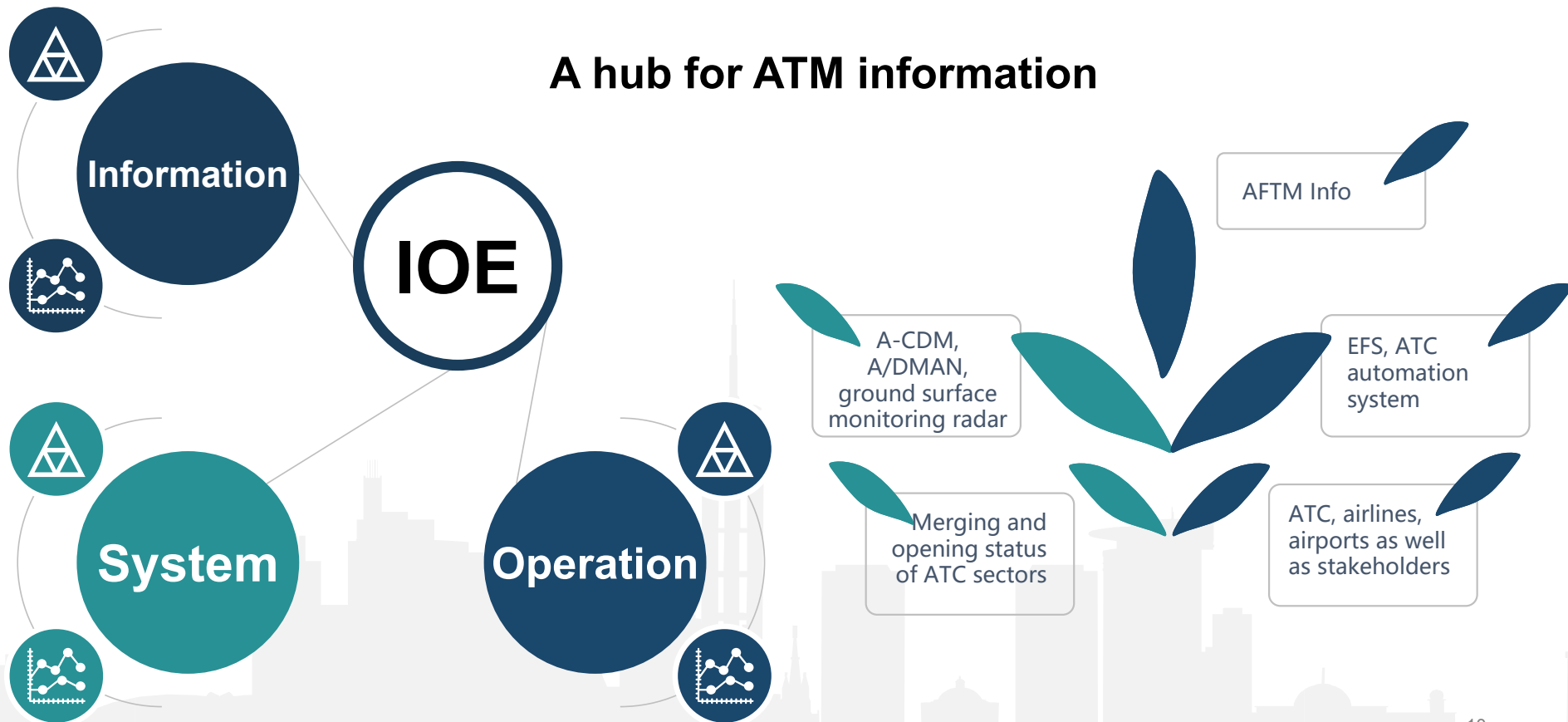
- Scattered and isolated ATFM system



**2020**

- Unified and unique second-generation ATFM system

## 4. The concept of Internet of Everything (IOE)



## 5. One CTOT Solution (OCS)

### Conflicting ATFM measures

If the supporting tool doesn't adopt the OCS in the early design stage, and then upgrades to the OCS after the system is officially used, this will cause changes in ATFM operation rules and algorithms.



**Hotspots are relatively concentrated**

**How to deal with complex ATFM issues**

**Different architectures of ATFM tools**

## 6. Seeking a Near-Optimal Solution



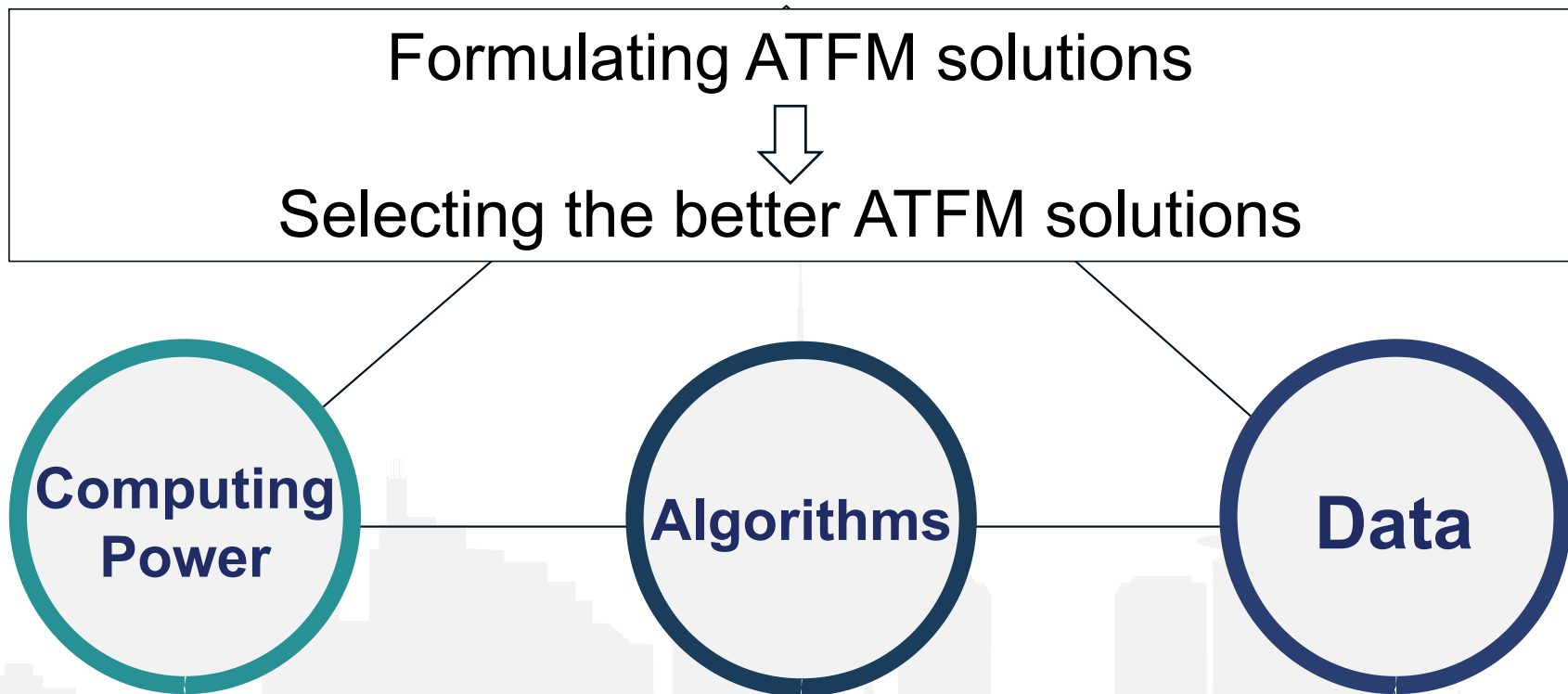
- ◆ The same scenario, same ATFM measure, if the algorithm is different, the CTOT may also be different, which will directly affect whether the ATFM measure can achieve the expected performance.
- ◆ ATFM personnel will face balance and choice. The system can provide multiple optional solutions for the same ATFM event, as well as the comparison of each set of solutions on various indicators.

## 7. The Close Relationship between ATFM and ATC



ATFM and ATC in the process of NTFM construction, the two are not isolated or opposed, but coordinated, complementary, and integrated. Research has found that when the flight volume reaches a certain level and ATFM develops to a certain stage, the close combination of ATFM and ATC will play a greater overall efficiency and benefit.

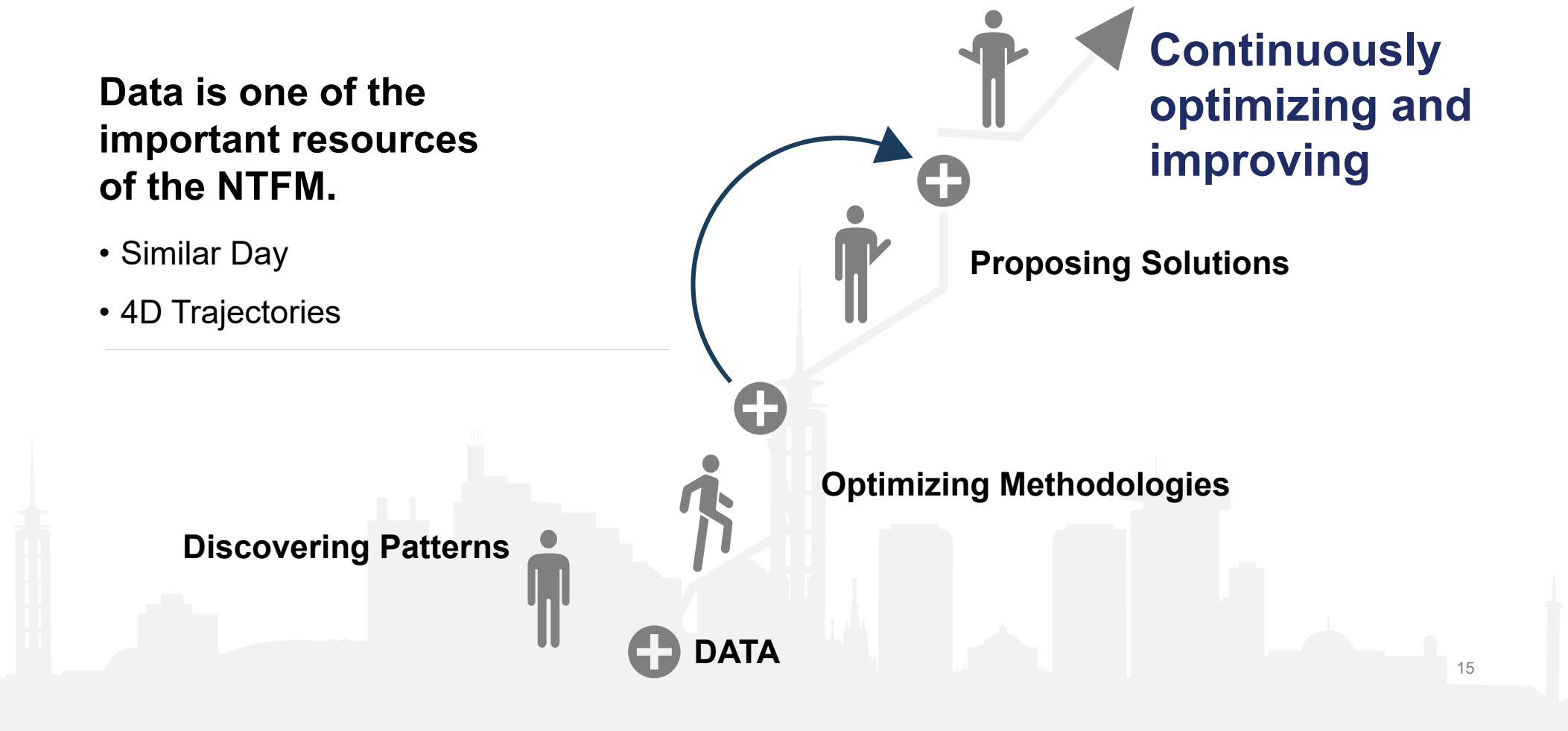
## 8. Support of Modern Technologies



## 9. Deep Data Mining

**Data is one of the important resources of the NTFM.**

- Similar Day
- 4D Trajectories



## 10. Cross-Border System Interconnection

### Interconnection tests with ATMB

NTFM, which integrates a large amount of ATFM information, is not isolated. It is also a part of the ATFM network in Asia-Pacific region and even the world.

**Interconnection  
between ATFM  
systems**

**Interconnection of  
ATFM networks and  
environments**

**Integration of  
ATFM culture**

**ATFM**



## 11. Extensibility

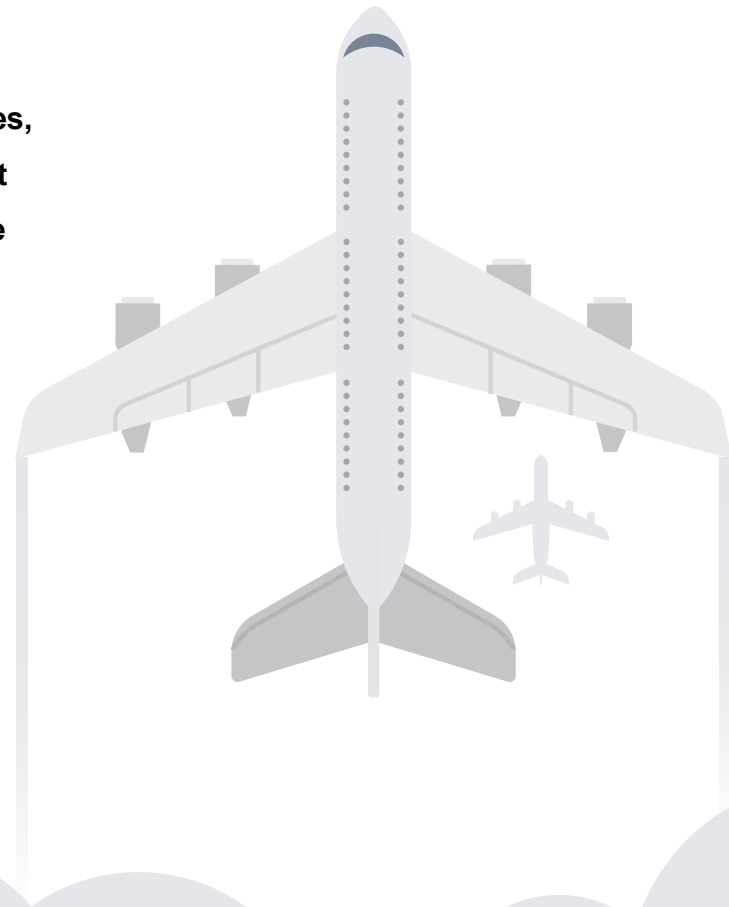
With the further upgrade of global AI and other auxiliary technologies, ATFM is also continuously researching new technologies to support the NTFM, so that the development of the NTFM keeps pace with the progress of various industries in society.

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### **NTFM**

- Compatibility
- Interoperability
- Extensibility





**ACTION BY THE MEETING**

**/03**

## **ACTION BY THE MEETING**

- a) Note the information contained in this paper;
- b) Jointly research and improve the operation concept of ATFM system tools construction in Asia-Pacific region;
- c) Suggest strengthening the sharing and guidance of the construction and improvement of ATFM system tools;
- d) Welcome stakeholders to carry out interconnection tests between systems with NTFM;
- e) Discuss any relevant matters as appropriate.

**Thanks For Your Time**

