2025 ICAO Asia and Pacific (APAC) MET/R WG/14

THE DEVELOPMENT OF USER-CENTRIC ENGAGEMENGT STRATEGIES AND FIT-FOR-PURPOSE PRODUCTS IN SOUTH-WEST CHINA

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Introduction

User-Centric Engagement Strategies

Fit-For-Purpose Meteorological Products

Three Questions

Why we needed change

the challenges of weather impacts in high-density airspace.

How we did it

our strategies to bridge MET and ATM needs.

What we achieved

measurable improvements in safety and efficiency.

CONTENT

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PART-01

The Challenge and Vision

Part 1: The Challenge and Vision
——When Weather Meets High-Density Operations

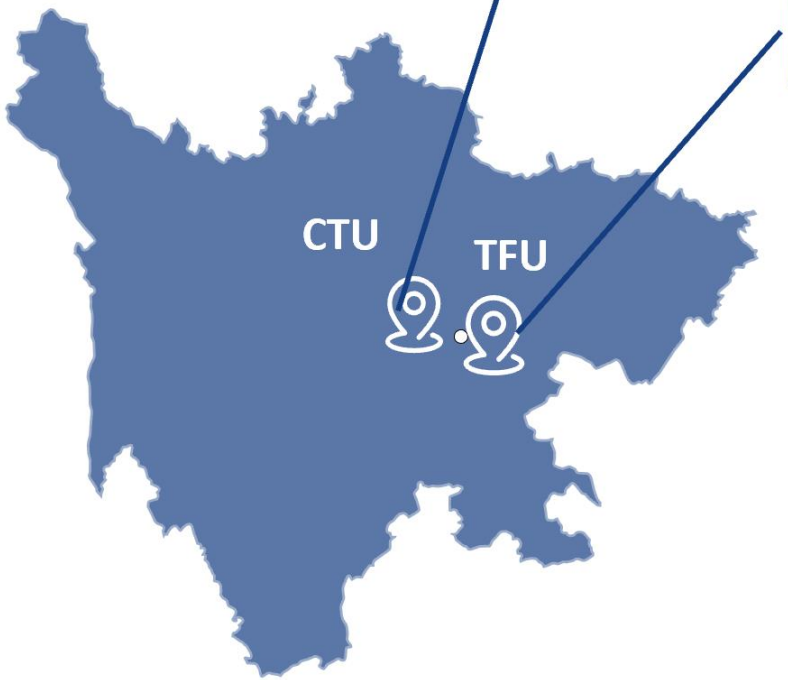
ZPKM FIR

- **2.44 million** square kilometers.
- **59 Airports**
- **5** International airports
- **54** medium or small transport airports

Part 1: The Challenge and Vision
——When Weather Meets High-Density Operations

Chengdu Shuangliu International Airport

Chengdu Tianfu International Airport



Top 20 Global Aviation Metropolises

Third-largest Aviation Hub in China

87 million passenger throughput

50 international routes

360 domestic routes

Part 1: The Challenge and Vision
——When Weather Meets High-Density Operations

01

Weather impacts

Severe convection, cold waves, and microclimates disrupt 25% of flights annually.

02

Human demand for normality

ATC , ATFM ,Airlines, and passengers expect minimal delays.

Part 1: The Vision——Transformation of MET Service

Value Latency

technology-driven

demand-technology symbiosis

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PART-02

The Practical Solution

Step 1: Demand Collection & Analysis
——Closed-loop User Demand Mechanism

01 Layered Management

02 Dynamic Capture

03 Collaborative Optimization

04 result feedback

1.Layered Management

Different requirements

- Temporal resolution
- Spatial coverage
- Service frequency

ATC Units

needing nowcasting updates

ATFM Teams

prioritizing strategic forecasts

Airlines

focused on route optimization

2.Dynamic Capture

“one-to-one” tailored working group

dedicated personnel assigned to Continuously collect and analyze user demands, Guide users in product application, and Deliver targeted knowledge training.

In 2024 alone, this system addressed 59 out of 63 user demands, achieving a 93% resolution rate.

3.Collaborative Optimization

User Demand Dashboard

used to track requests in real time, categorizing them by urgency.

Set KPI

“demand transformation speed” was set,(e.g., key demands ≤72hr response time)

Embedded Collaboration

During severe weather, meteorologists join ATC and airline teams

4.Result Feedback

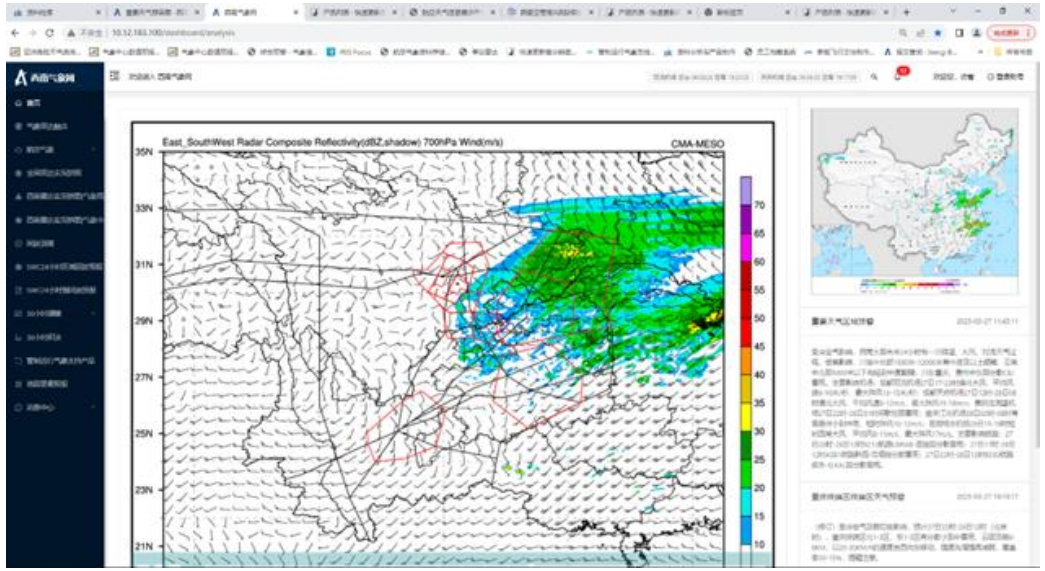
Post-storm review

What worked → **What didn’t**

Step 2: The Co-Design Platform
—— Turning Data into Decisions

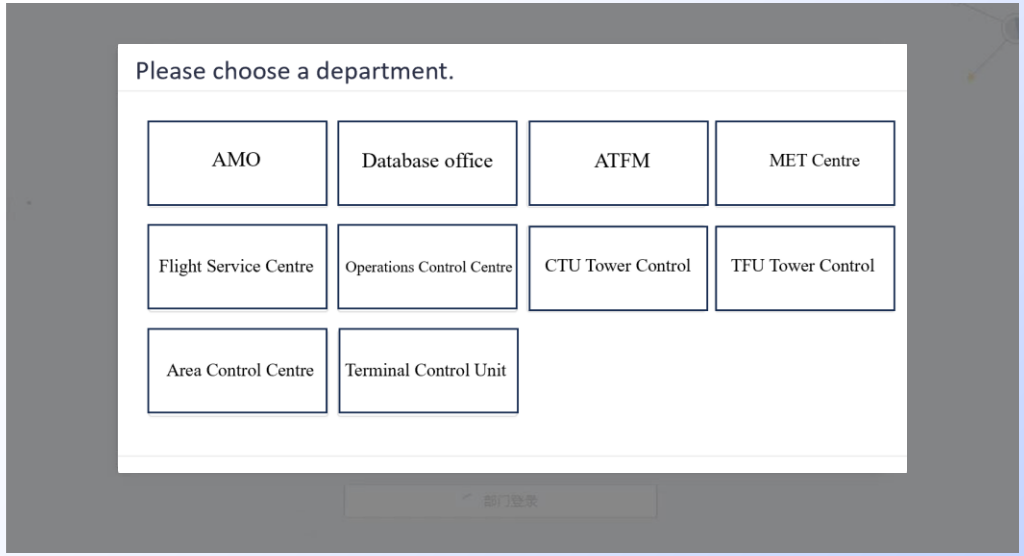
Southwest Aviation MET Web Platform

- Serving the Southwest China region
- 150 active user accounts



1. Scenario-Based Access

One-click selection



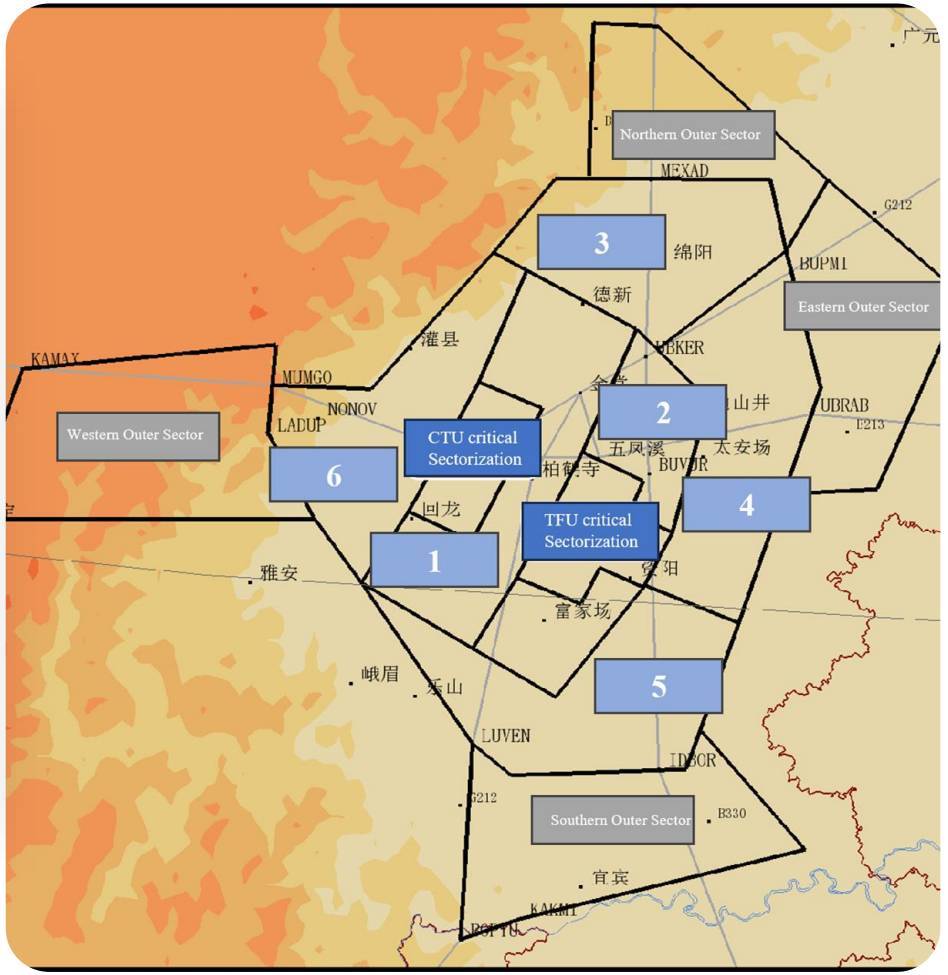
Access and retrieve customized products

2. Terminal Service Sectorization

- Aligns meteorological services with **airport critical zones** and **control sectors**
- using **jointly-defined digital identifiers**

Three key improvements:

- Shared Situational Awareness
- Precision Forecasting
- Enhanced Coordination



3.Phased Support Products

01

Strategic Stage

A month to 2 days

1

02

Pre-tactical Stage

1 day

2

03

Tactical Stage

1 day to 6 hours

3

04

Command Stage

6 hours to real time

4

05

Post-operation Stage

5

3.Phased Support Products

For Strategic Stage (3-7 days ahead)

Engage airline meteorologists in joint weather consultation

Special Forecast for Cold Wave in the Southwest Region from Jan 31 to Feb 5

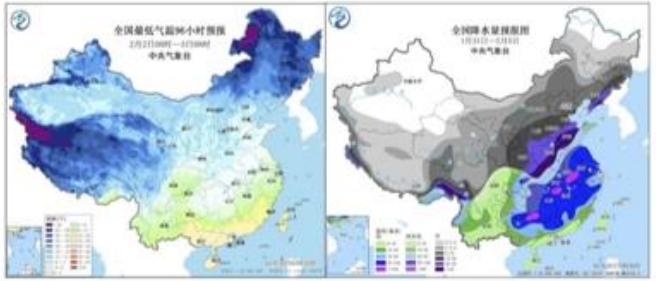
预报周期：2024 年 1 月 31 日至 2024 年 2 月 5 日　　发布单位：西南空管局气象中心

一、重要天气趋势

1 月 31 日至 2 月 5 日，我国中东部地区将出现一次大范围持续性雨雪冰冻天气过程。陕西北部、山西南部、河北南部、河南北部、山东中南部等地部分地区有大到暴雪（10～11 毫米）；江淮东部、江汉东部、江南北部、广西北部等地部分地区有中到大雨，安徽西南部、江西北部、湖南东北部等地部分地区有暴雨（50～70 毫米）。2 月 1 日至 4 日，河南南部、湖北、安徽北部、湖南中北部、贵州东部等地的部分地区有冻雨。

2 月 2 日至 5 日，川渝黔地区降温在 4~6℃，以降水天气为主。

重点关注：冷空气带来的中到严重积冰；2 月 1 日夜间至 3 日，贵州地区的强对流天气影响。



二、主要航路天气预报

1 月 31 日至 2 月 5 日，川渝黔大部 1000-5000 米中到严重颠簸；青藏高原中东部、川渝、云南中北部 5000 米以上中到严重颠簸；川渝黔、云南东部 1200-5400 米中到严重积冰。

三、主要机场天气预报

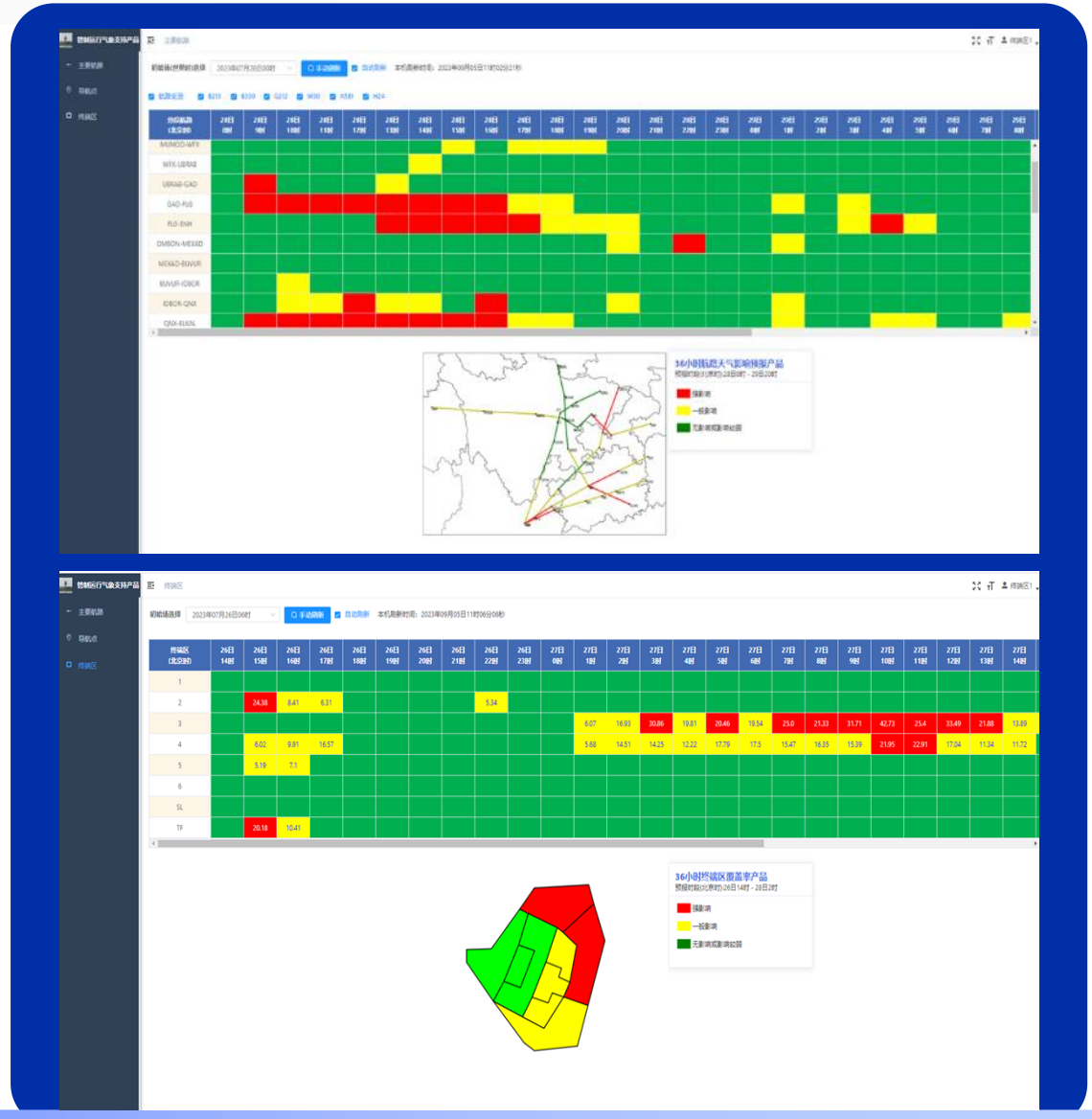
成都双流机场

日期	天空状况	重要天气	出现时段	温度	备注
1 月 31 日	阴，夜间零星小雨	-	-	5-11℃	-
2 月 1 日	阴间多云	-	-	6-13℃	-
2 月 2 日	阴有小阵雨	-	-	6-9℃	-

3.Phased Support Products

For Pre-Tactical Stage (6-24 hours ahead)

- **The ATC Meteorological Support Product: Traffic-light alerts**
- highlights weather impacts at navigation points, key routes, and terminal areas.
- Controllers gain a bird’s-eye view of risks, enabling them to optimize traffic flow proactively



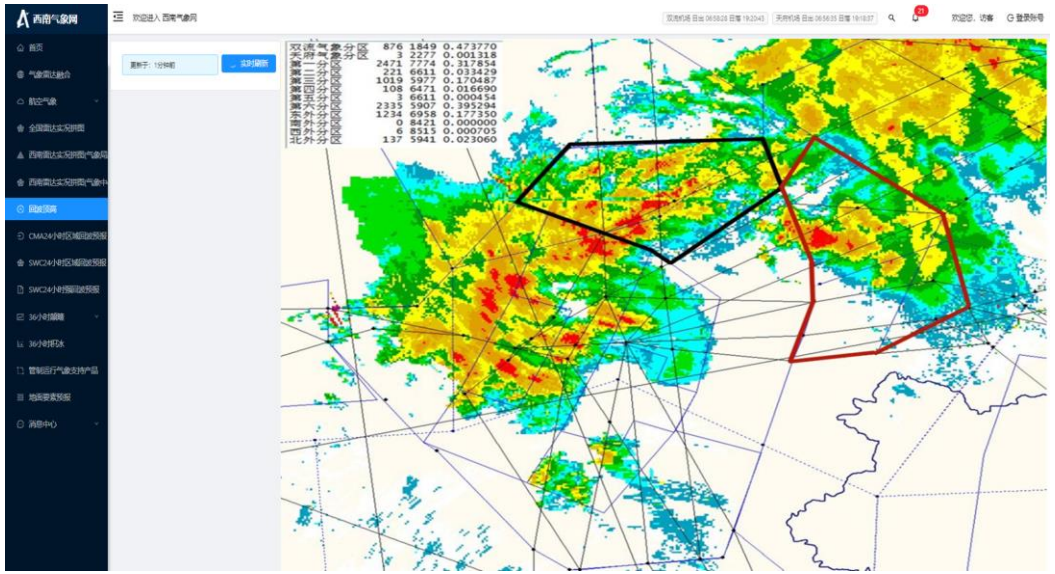
3.Phased Support Products

For Tactical Stage (2-6 hours ahead)

- **The ATC Meteorological Support Product:**

  Radar Echo Coverage Product

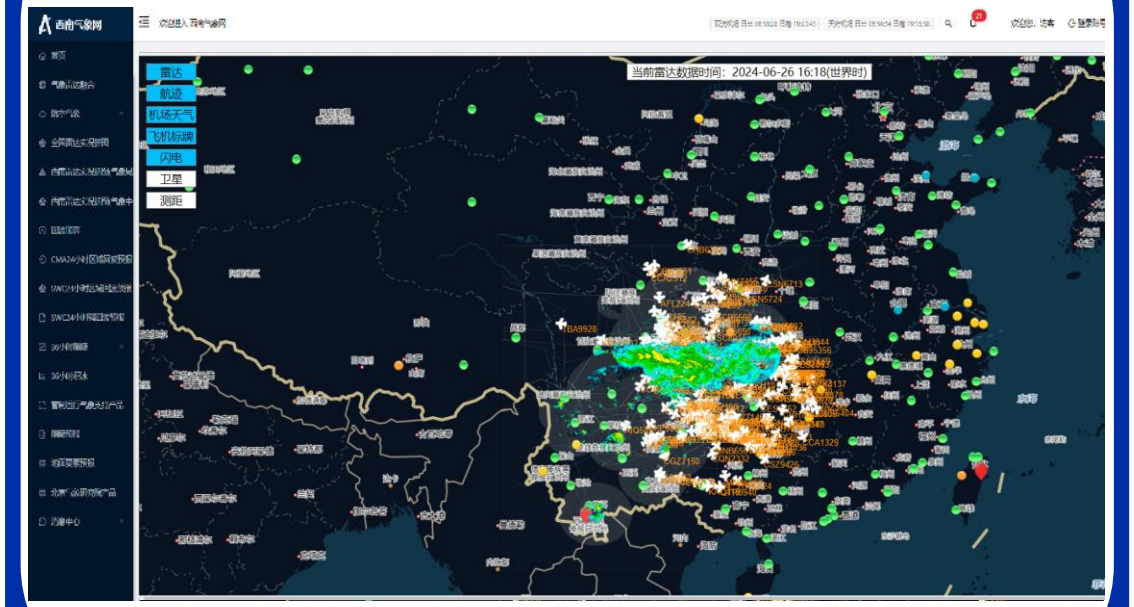
- Radar-Track Fusion overlays live flights with real-time weather.



3.Phased Support Products

For Command Stage (0-2 hours ahead)

- **the Radar-Track Fusion Products**
- tailored to user-specific spatial scales
- national, regional, terminal control area, airport critical zone
- 3D Radar-Track Display provides real-time 3D visualization of ATC tracks



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PART-03

Outcomes and Value

1.Faster Warnings——Increase in lead time

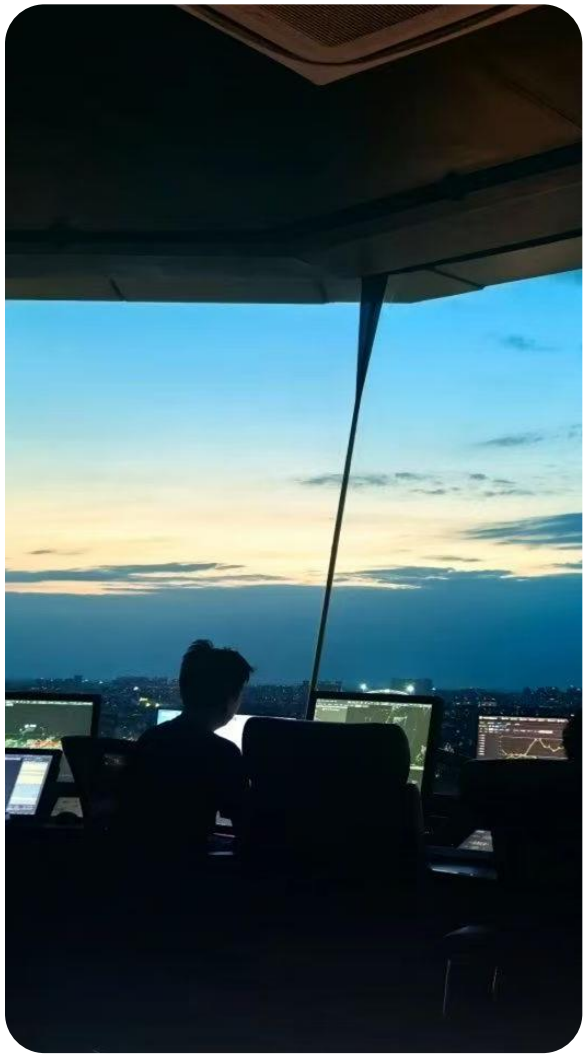
Convective Warning

increased by **49%**

CTU

increased by **41%**

TFU



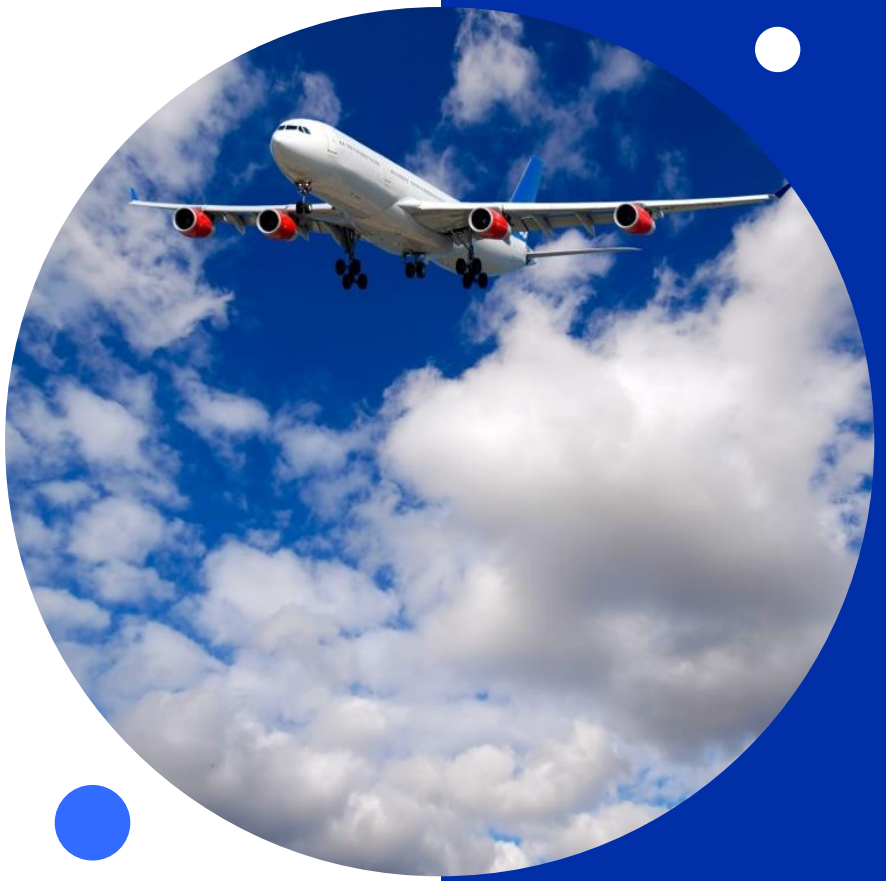
Terminal Warnings

increased by **61%**

2.Stronger Operations

Higher Flight normality rate

- CTU maintained 82.33% flight normality (+3.27% vs. 2023);
- TFU maintained 78.42% flight normality (+6.58% vs. 2023)



Convection-induced flight diversions

reduced weather-related diversions by 46.4% (135 vs. 252 flights).

Conclusion

Collaboration is key

MET services must be built with users, not just for them.

Agility matters

a closed-loop demand system ensures we adapt as needs evolve.

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Thanks