Case Studies on applying Flow Rate to ATFM Measures

ATFM/SG/15

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Air Traffic Management Office
MOLIT, Republic of Korea

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Why "Flow Rate"

① Neighboring countries perspective

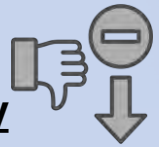
MIT/MINIT

During immediate situation, We often use MIT/MINIT for neighboring countries

Issued especially to China and Japan

(in the case of Korea)

But, Increases workload for neighboring(adjacent) country



Flow Rate

If the goal is **simply to reduce demand** ?

(e.g. RKSI Snowfall)

Just departing from neighboring countries

Flow Rate is an excellent choice

Reduce the workload for **neighboring countries** by using **Flow Rate**

Why "Flow Rate"

① Neighboring countries perspective - Examples

ROK used a lot of Flow Rate, especially with its **neighboring countries China and Japan.**
(excluding overflights)

No.	Event	Date
1	RKSI SNOW	November 27, 2024
2	RKSI SNOW	December 20, 2024
3	RKSI SNOW	January 26, 2025
4	RKSI SNOW	January 27, 2025
5	RKSI SNOW	January 30, 2025
6	RKSI SNOW	February 11, 2025
7	RKSI SNOW	March 2, 2025
8	RKSI SNOW	March 17, 2025

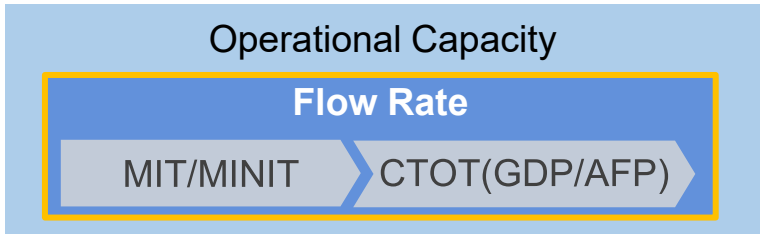
Why "Flow Rate"

② Versatile Perspective

Transitional concept

- To countries that need demand reduction but lack CTOT generation capability
- Between MIT/MINIT → CTOT(GDP/AFP)
- Like MIT, Flow rate also causes knock-on effects (so just neighboring countries, excluding overflights)

Comprehensive concept

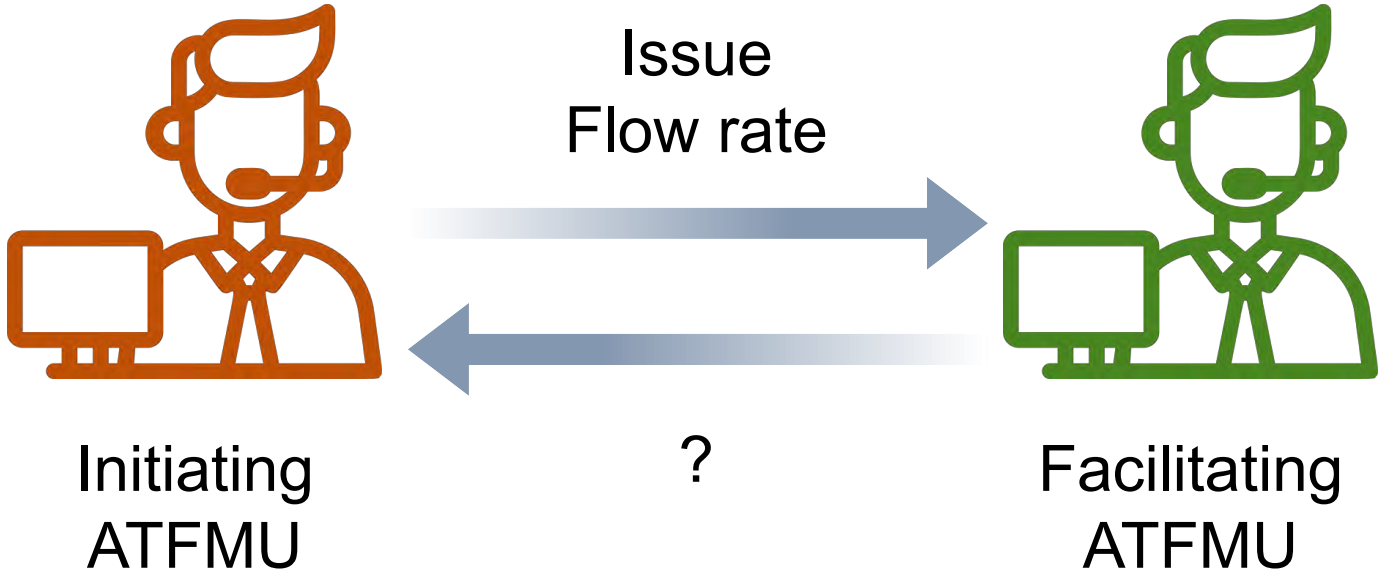


- Understand it as a type of Operational capacity
- Normally Initiating ATFMU Set Operational Capacity & ATFM Measure, But Flow Rate…

The facilitator **freely** determines the **measures** (Workload ↓)

How does Initiating ATFMU check the Flow Rate?

Post-Operation Perspective



Facilitating ATFMU

Free to select Measures

Initiating ATFMU

No correlation with Facilitating ATFMU's measures

<u>The initiating ATFMU</u> has **no standard** or **method** to verify the **Flow Rate**.

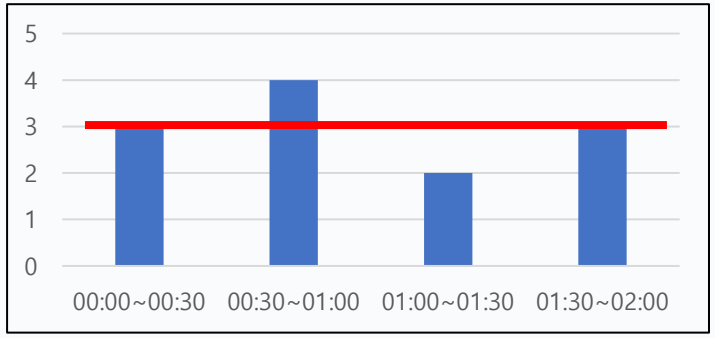
How does Initiating ATFMU check the Flow Rate?

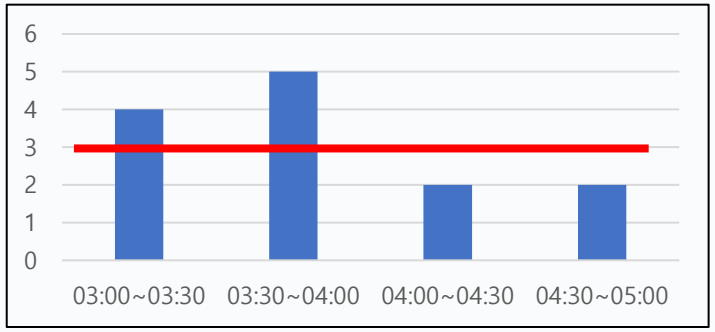
Post-Operation Perspective - Examples

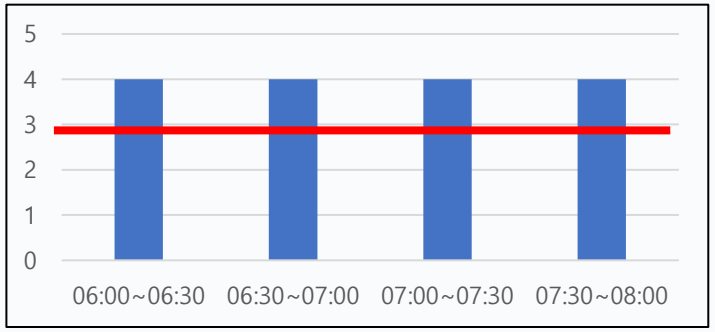
The initiating ATFMU has **no standard** or **method** to verify the **Flow Rate**.

Was the Flow Rate complied with?

When Initiating ATFMU issued “3 Flights per 30Minutes”
Unlike MIT, Flow Rate requires post-analysis because it's hard for controllers to monitor real-time traffic.
And Post-Ops…







- Exceeding by one or two flights might be okay… but no clear deviation standards exist

Flow Rate Post-Ops Criteria: ROK's Case

1 **Reference Index**

- **ATO(Actual Time Over)**

2 **'Unit time' Throughput Calculation Method**

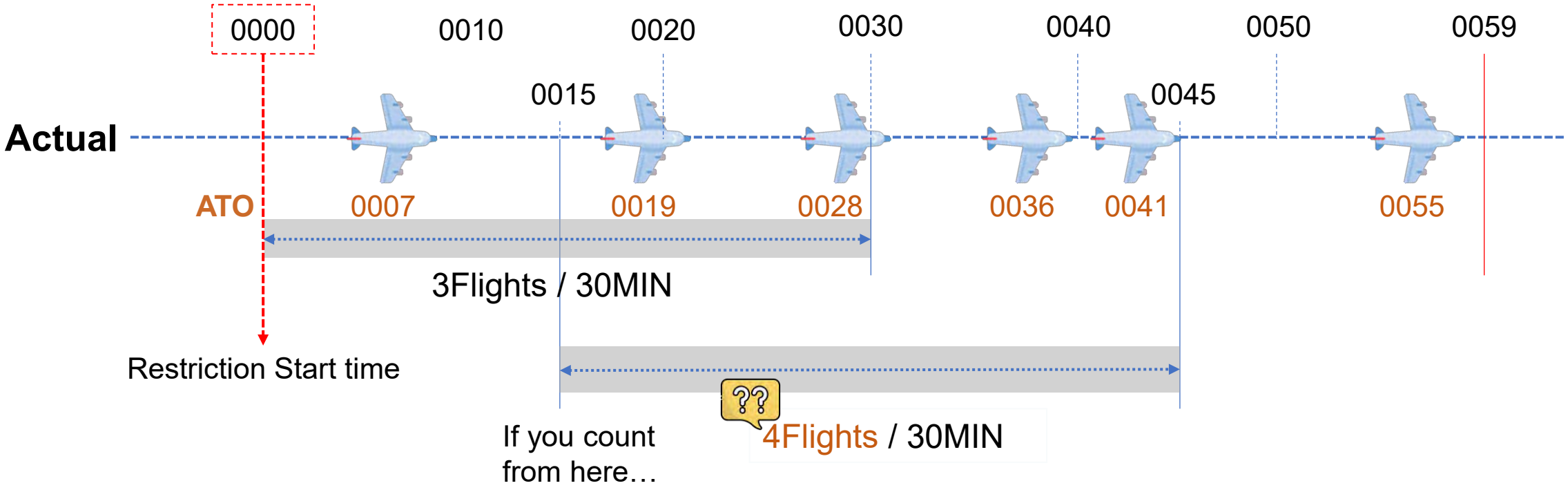
- Calculate 'Unit time' throughput based on the **restriction start time** to minimize compliance rate variation according to the observation time

3 **Comparison of Planned vs. Actual Traffic Volume**

- Due to various variables in actual aircraft operation, **Flow Rate** also need a **buffer**.

Flow Rate Post-Ops Criteria: ROK's Case

1. **Reference Index:** ATO(Actual Time Over)
2. **'Unit-Time' Throughput Calculation Method:** Restriction Start Time Should be **Starting Point of Compliance Standard**

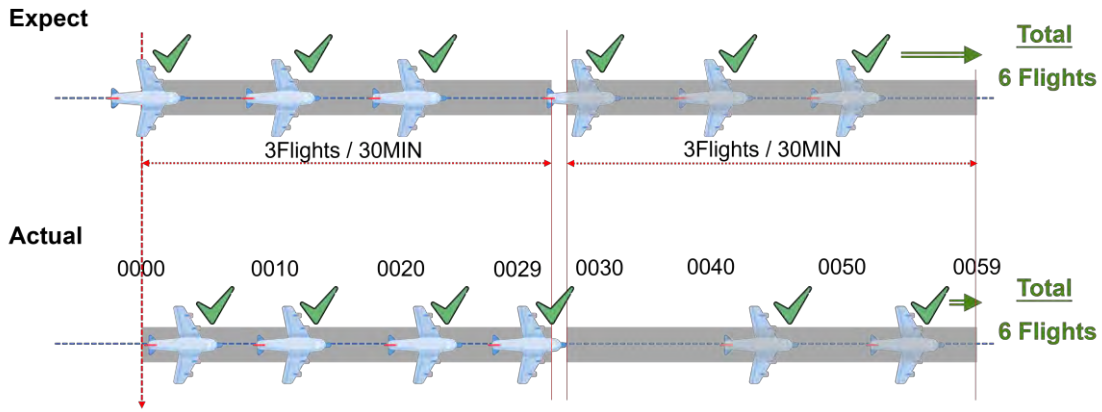


To requirement a perfect match of 3 Flights within any 30min period, from any starting moment, is the **same as MIT/MINIT.**

Flow Rate Post-Ops Criteria: ROK's Case

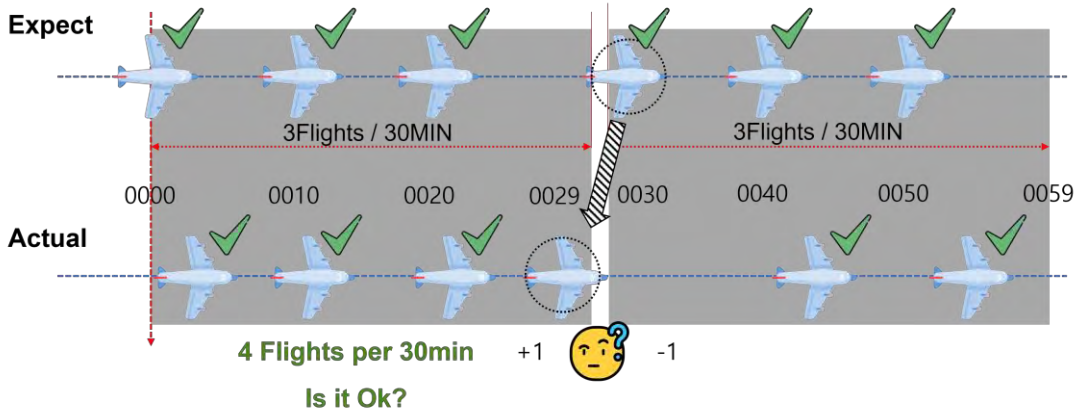
3 Comparison of Planned vs. Actual Traffic Volume: Both methods must be satisfied

Overall Traffic Check:
Total Expect vs. Total Actual



ATFM Effectiveness

Traffic per 'Unit time':
Evenly Spread Over Time?



Compliance Assessment

Concept : **Buffer applied for traffic per 'unit time'**

- Basis: Referencing the AMNAC Airspace CTOT window (±5 min) **which serves a similar function."**
- How to Calculate the Buffer: Airspace CTOT Window(10min) / unit time

※ Example: 3 flights per 30 min + 33% buffer (10 min / 30 min) = up to 3.9 flights (rounded) → 4 flights

Balance of Safety and Efficiency

At least 2 or more

- Controllers prioritize safety, set Flow Rate conservatively
- Too low = like MIT/MINIT
- 1 Flight/30min ≈ 30min MINIT

Use short unit times

- Short unit time prevents immediate congestion & aids variable response
- Same total volume, different impact: shorter time spreads & eases overload

When setting the flow rate,
Initiating ATFMU needs to balance safety and efficiency.

Thank you!

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