# *CMAC and FUA Implementation in ROK*

2024.11.20.| ATMO, MOLIT

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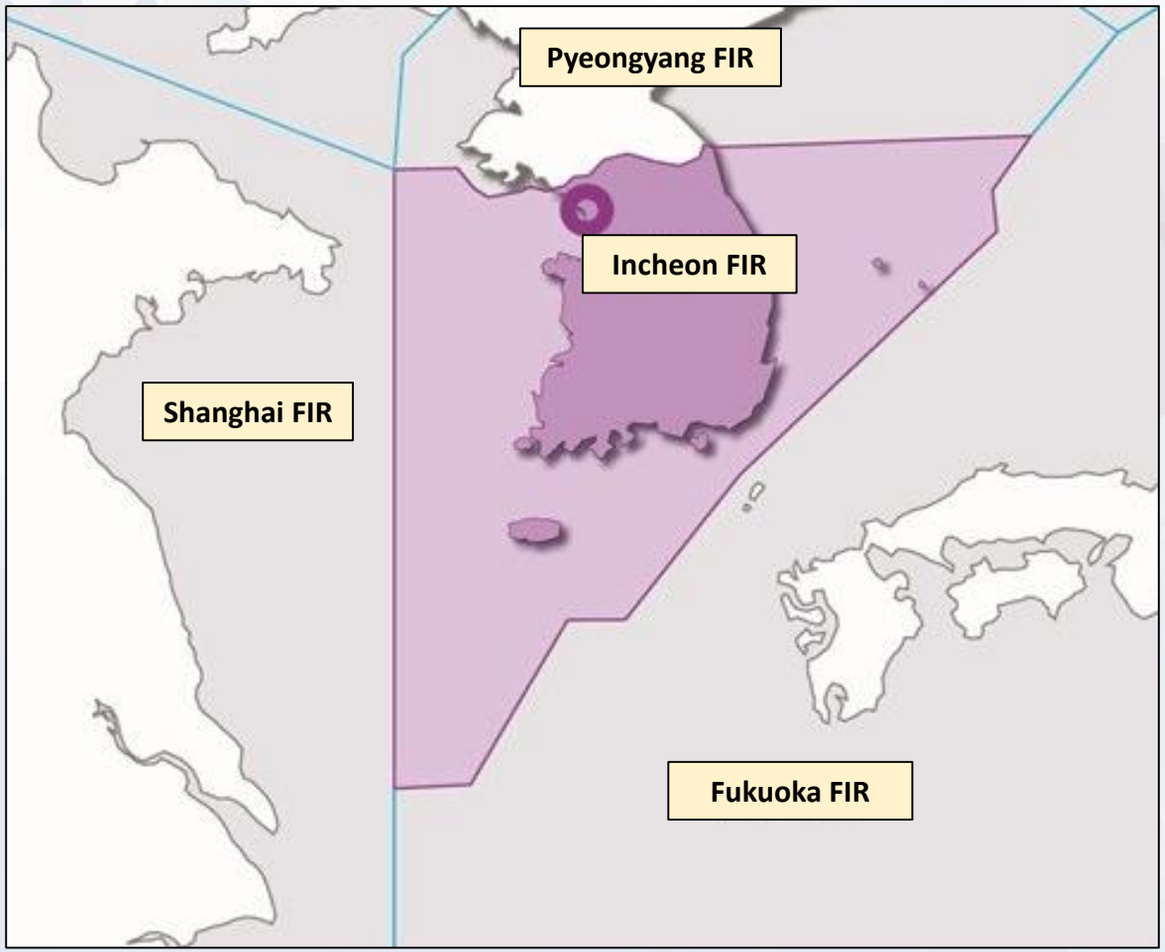
# CMAC and FUA implementation in ROK

## Introduction – Incheon FIR




- Incheon FIR is about 430,000km$^2$, and borders China and Japan.
- Compared to two countries, ROK's airspace is narrow.

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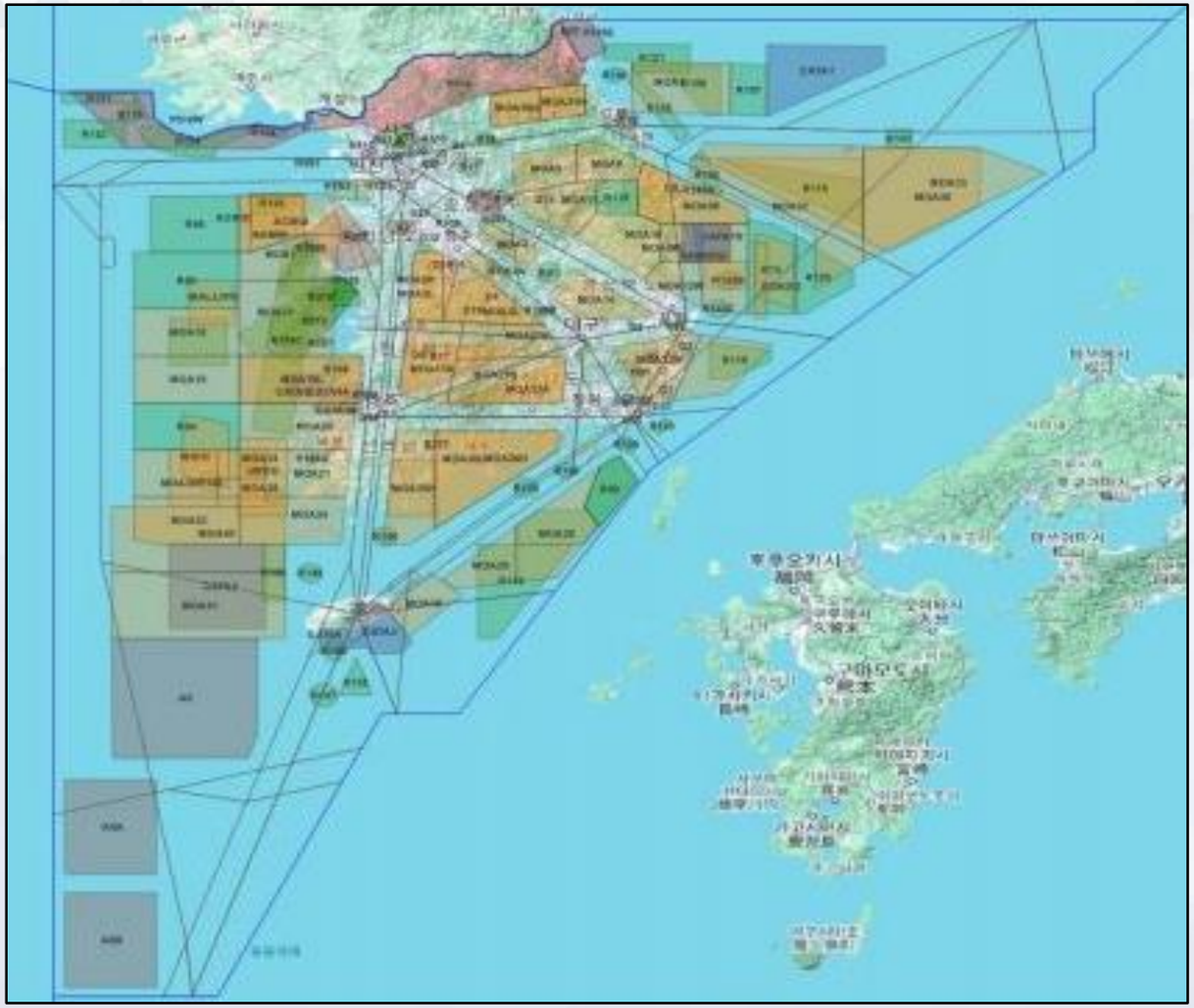
# CMAC and FUA implementation in ROK

## Introduction – Situation of SUA



- The airspace has jurisdiction over civil and military.
- ROK has 265 SUAs, which are controlled by military.
- Most of SUAs has exclusive authority.

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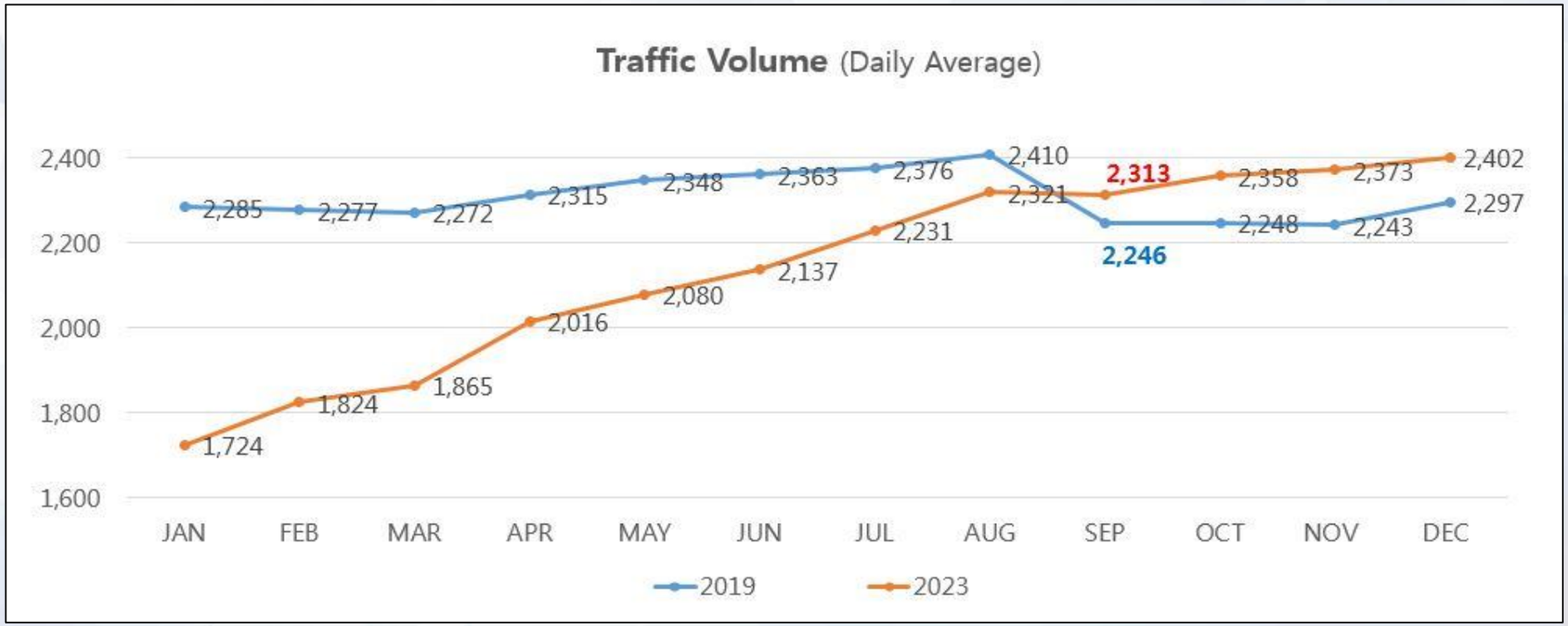
## Introduction




- Air traffic volume is recovering and increasing.
- The new type of vehicle appears.
- UAM(Urban air mobility) is about to be commercialized.

☞ **Improvement measures for increasing airspace demand are needed.**

# CMAC and FUA implementation in ROK

## Task Force Team

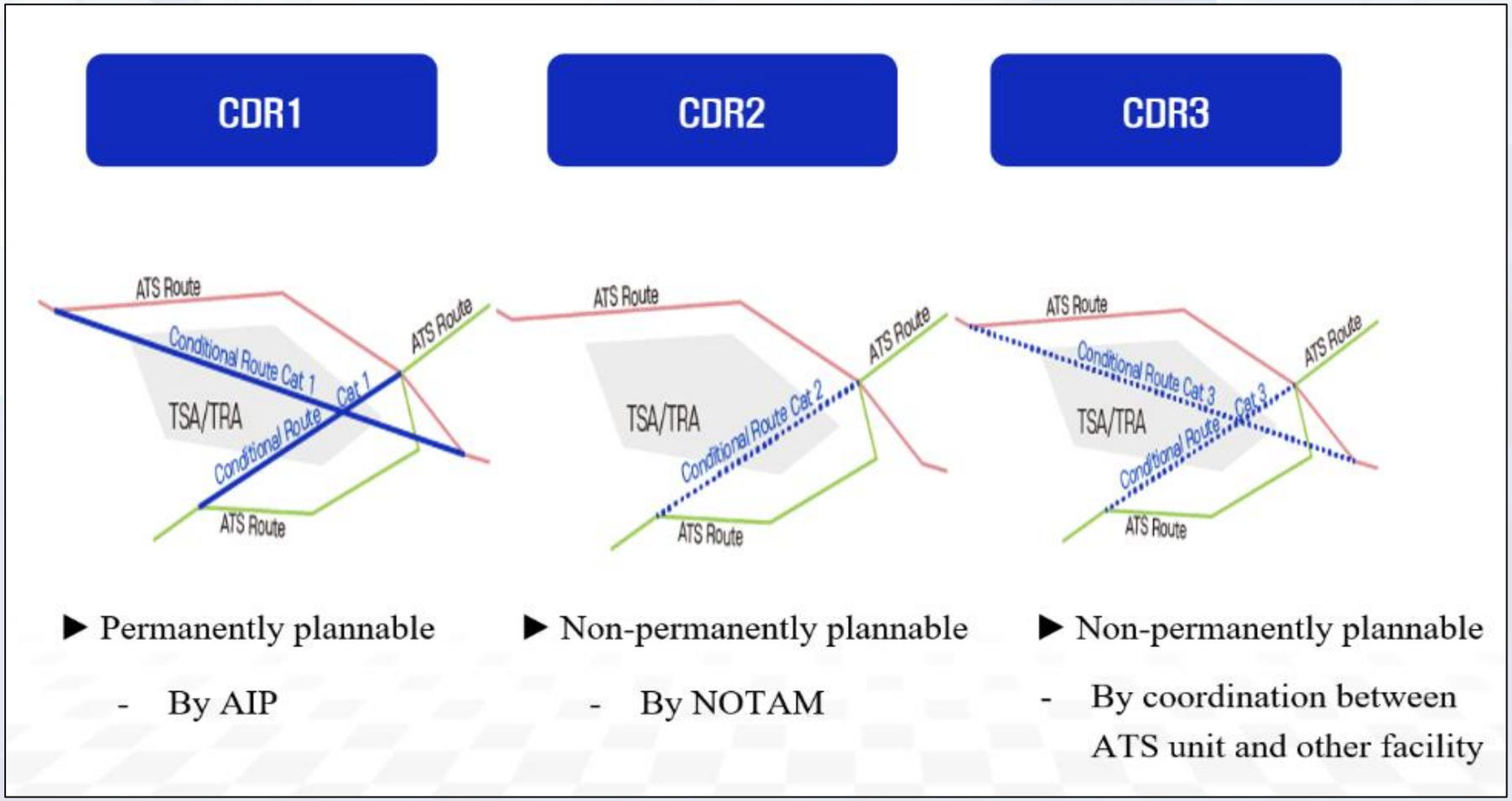
- (**Purpose**) The Ministry of Land, Infrastructure, and Transport has formed and operated the Task Force team for research and improvement.
- (**Member**) The Ministry of Land, Infrastructure, and Transport, The Ministry of National Defense, Researcher, Air carrier(involved pilot)

- (**Agenda**)
  - Adjusting airspace
  - Intergated management of national airspace
  - Flexible airspace operation
  - Management plans for the new vehicles

# CMAC and FUA implementation in ROK

## Implementation of FUA

- Operation of Conditional Route(CDR)



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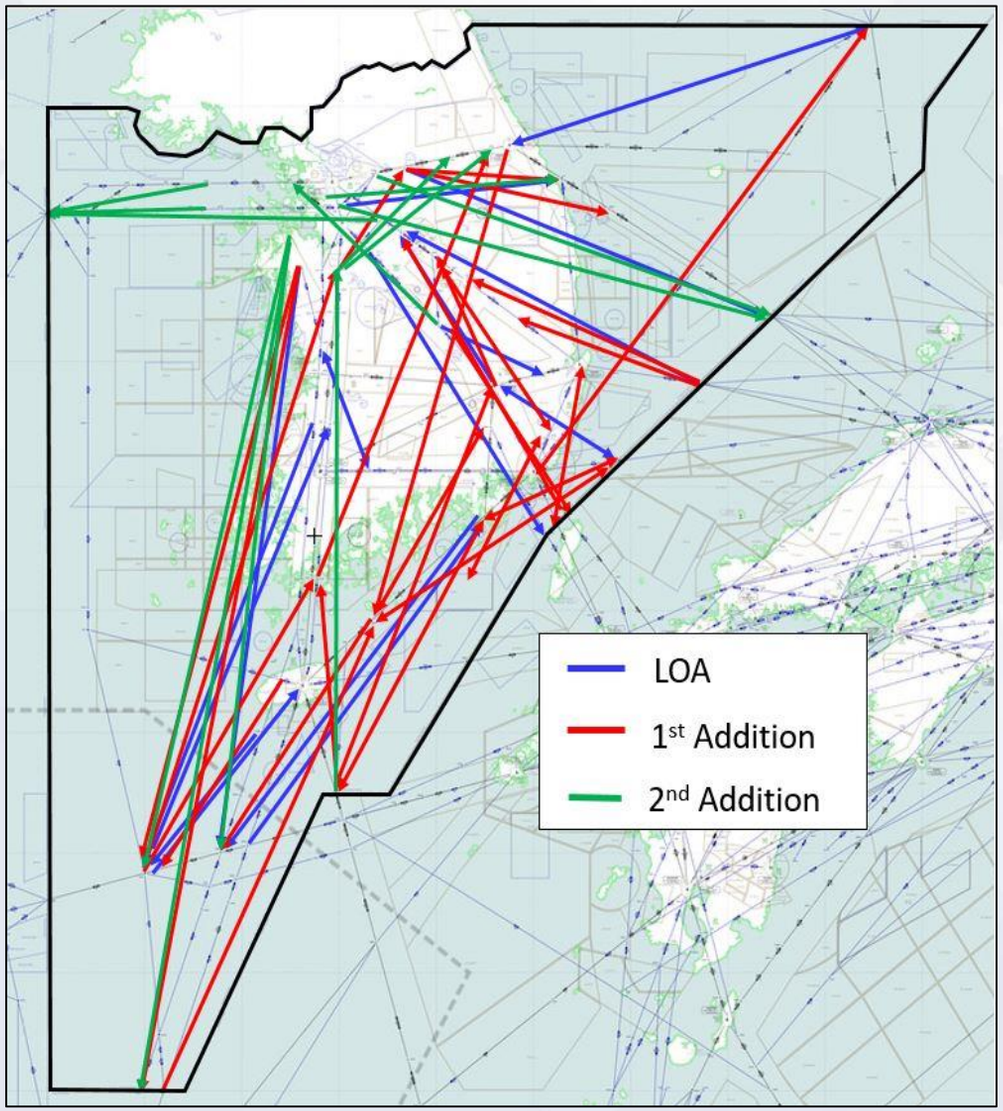
# CMAC and FUA implementation in ROK

## Implementation of FUA – CDR3




- Through ACC and MCRC had lots of dicussions, 17 CDR3s routes are agreed at first time.
- After continuous discussions, 56 CDR3 routes were agreed.
- Nowadays, both have been discussing the implementation of CDR3 for the entire airspace.

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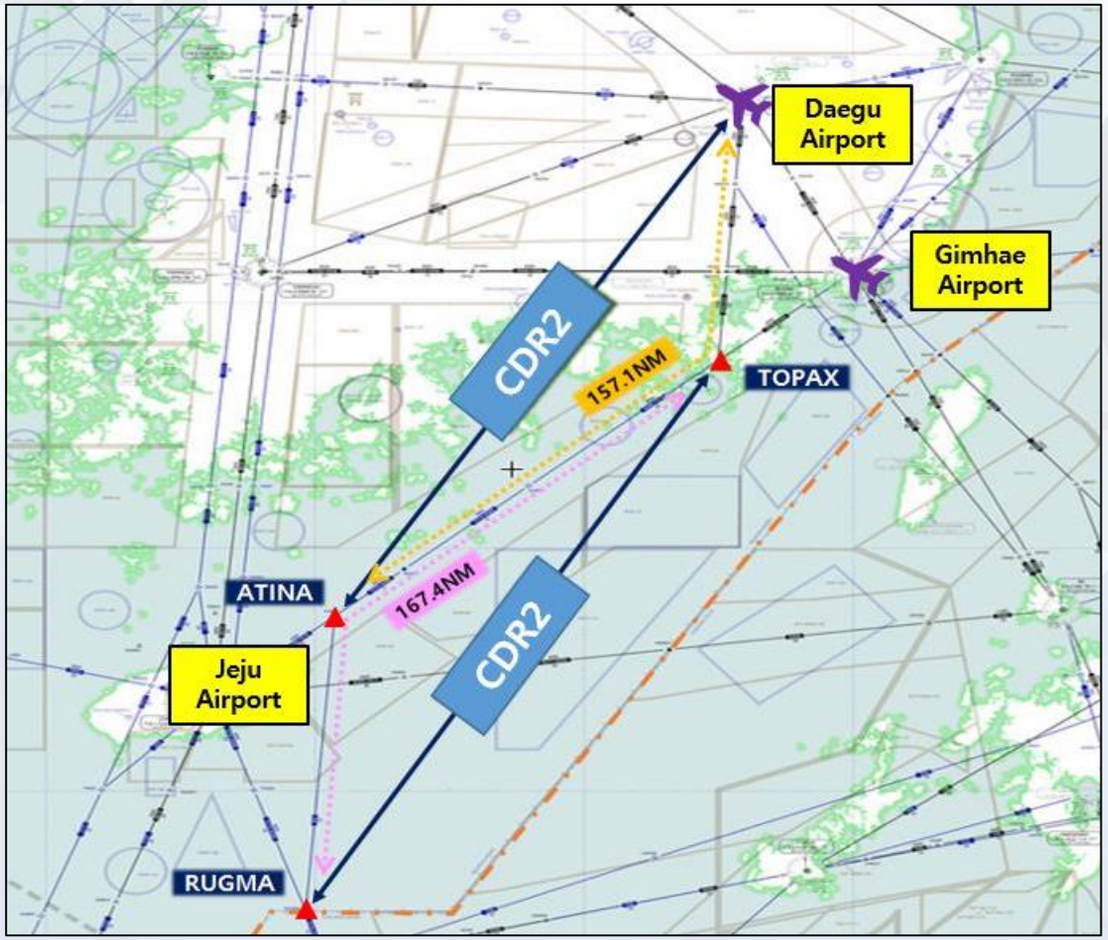
# CMAC and FUA implementation in ROK

## Implementation of FUA – CDR2

### ▶ 1st Trial Operation('21.6.~'22.4.)




- Daegu Airport – Jeju Airport
  - Reduced fuel cost by $ 620,000 and 1,566 tons of carbon emission
  - ☞ **transit the official operation route**('22)
- Gimhae Airport – Japan(Fukuoka FIR)
  - There is no demand because of COVID-19
  - Extending the trial operation('22.6~'23.5.)
  - ☞ **transit the official operation route**('23)

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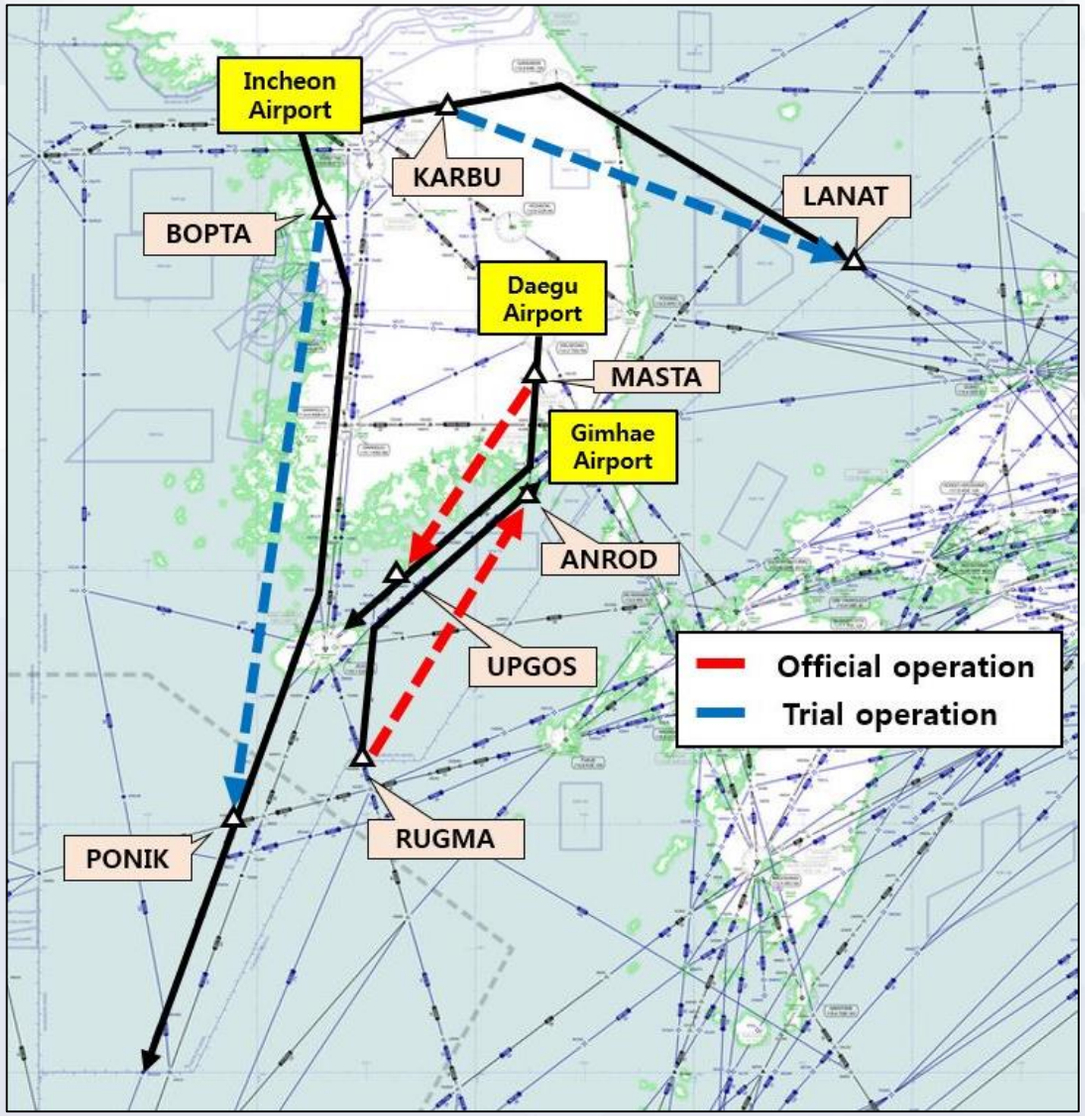
# CMAC and FUA implementation in ROK

## Implementation of FUA – CDR2




▶ **2nd Trial Operation**(‘23.10.~’24.9.)

- Incheon Airport → PONIK
  (outbound for China/Japan)
- Incheon Airport → LANAT
  (outbound for Japan)

- Reduced fuel cost by $ 11.37 million and 17,633 tons of carbon emission

☞ **to be transit the official operation route**

**Operation of 4 CDR routes**

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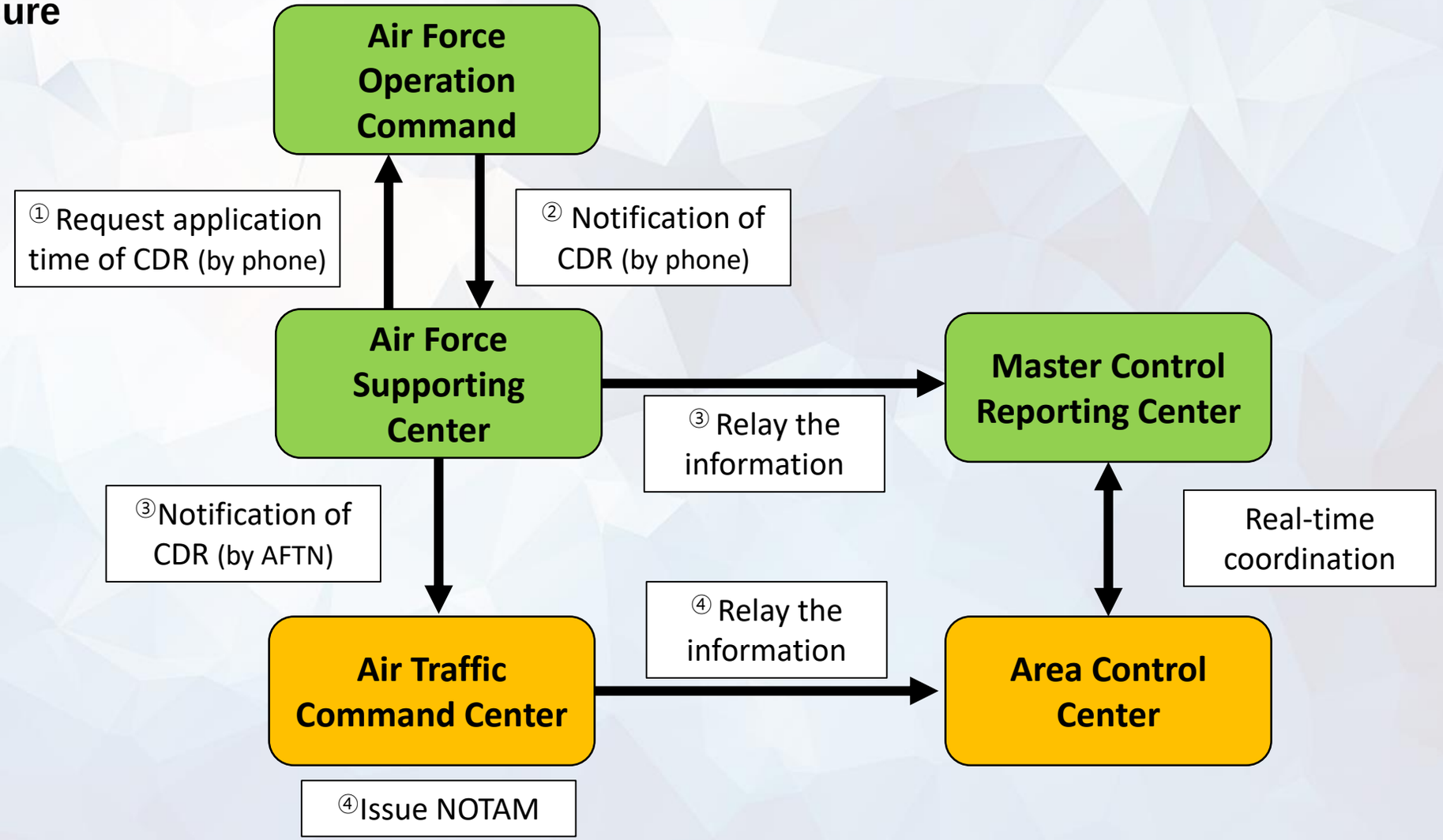
## Implementation of FUA – CDR2

### ▶ Procedure



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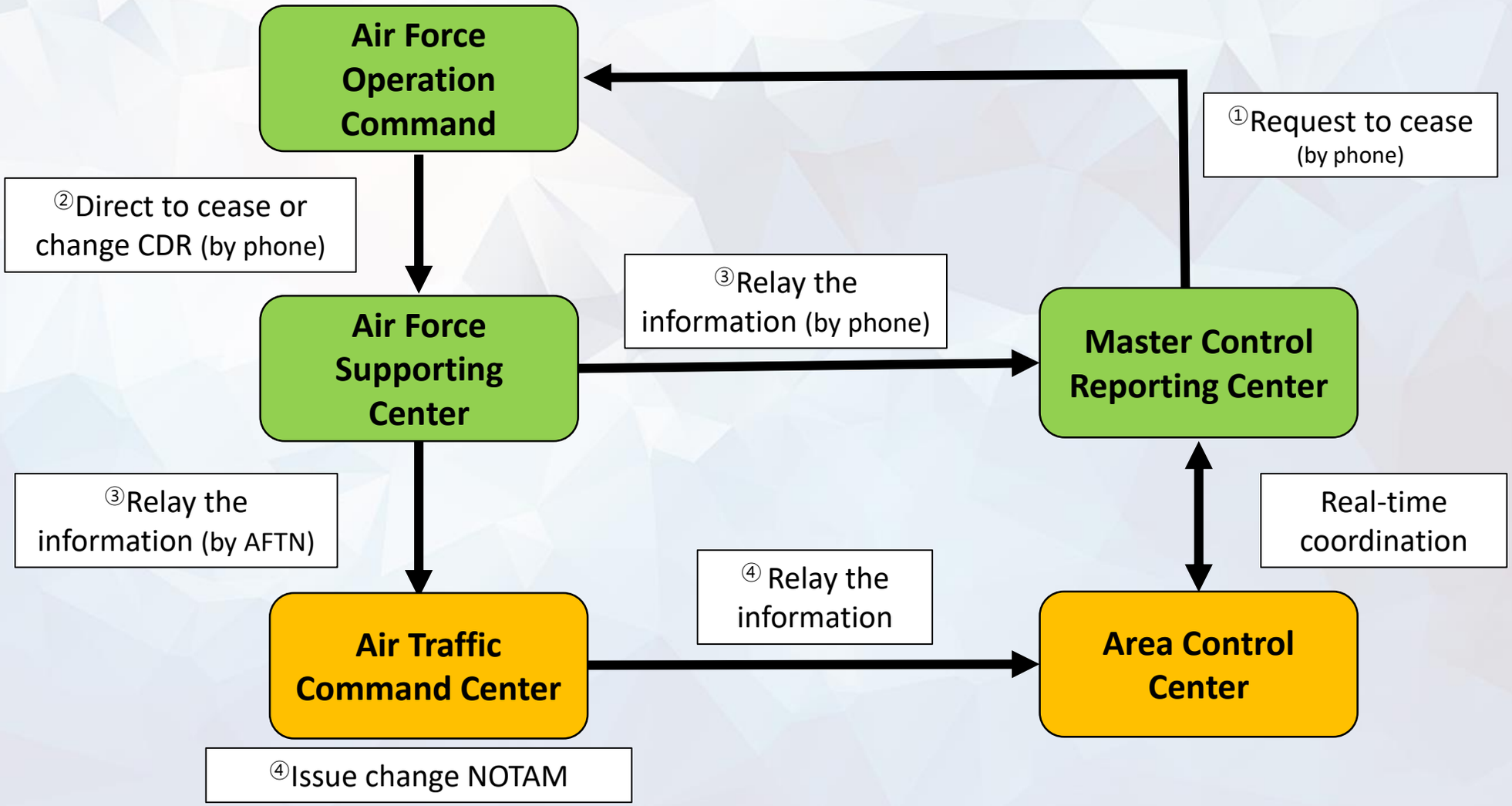
## Implementation of FUA – CDR2

### ▶ Procedure (if CDRs change or Cease)



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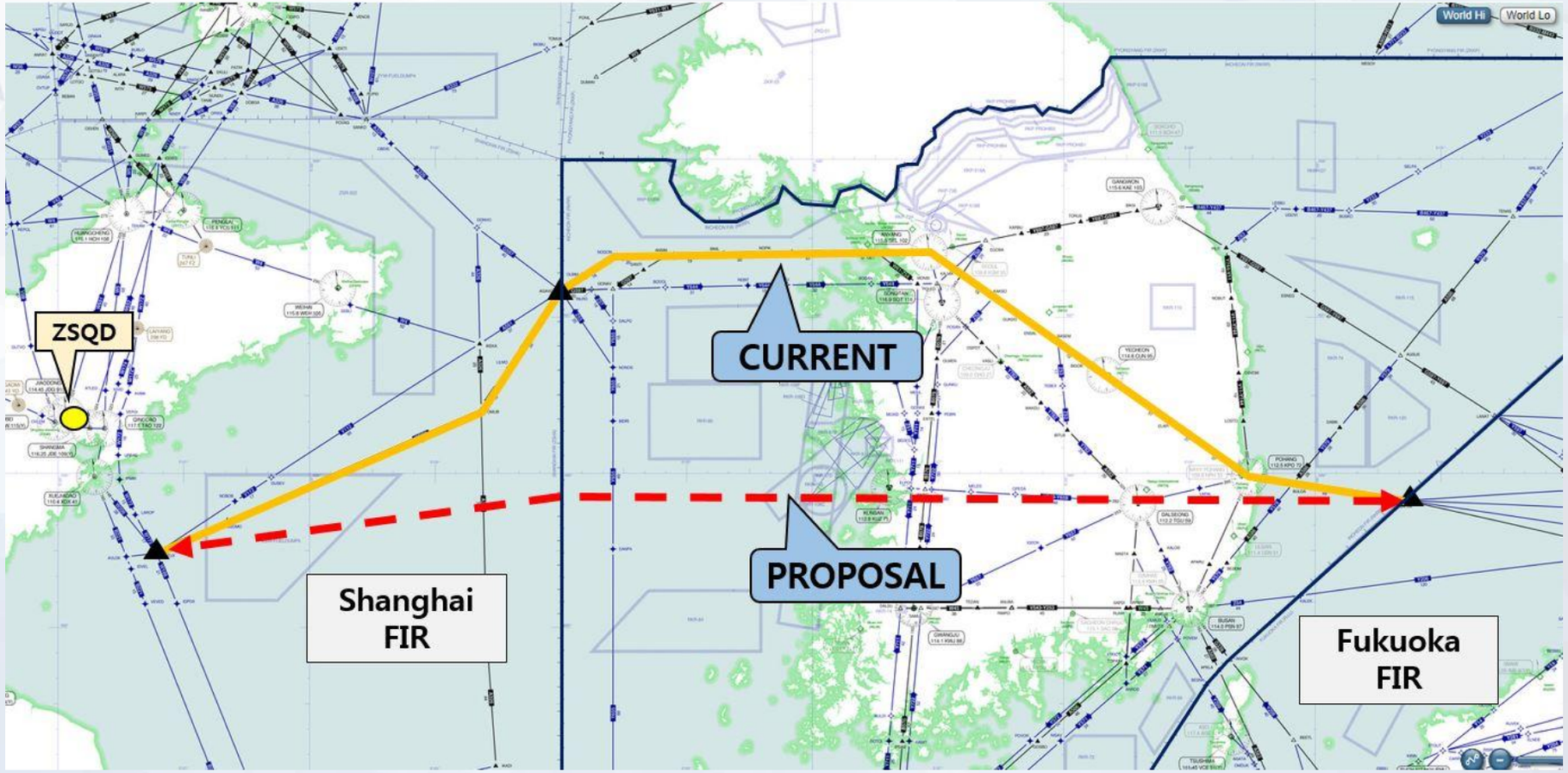
# CMAC and FUA implementation in ROK

## Challenge of FUA




- ROK proposed the shortest route for over flights via Incheon FIR through the 10th ROK-China ATM/CNS Coordination Meeting.

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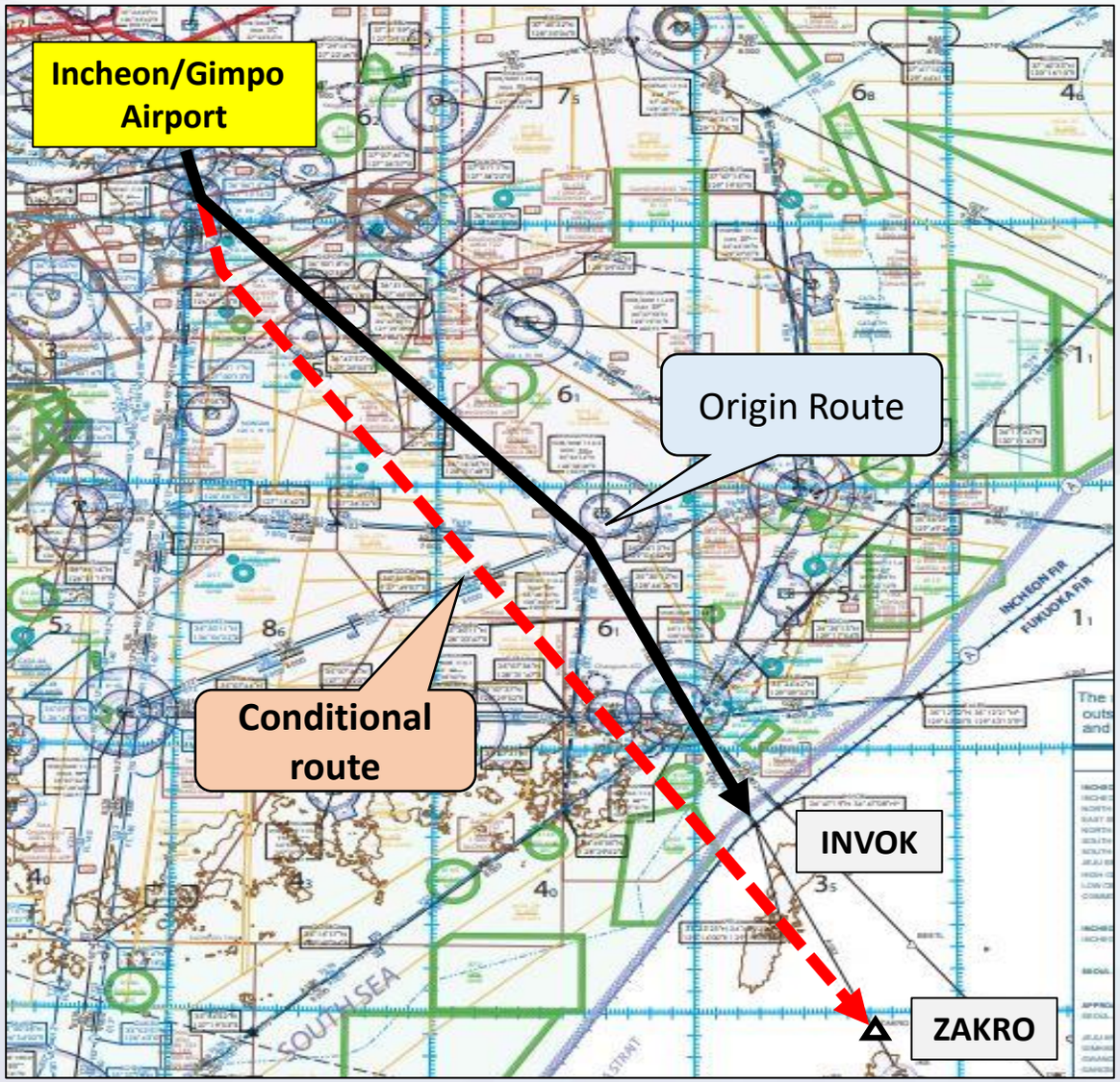
# CMAC and FUA implementation in ROK

## Challenge of FUA – Past case




- In 2015, ROK and Japan agree
- the Conditional route not to a point the FIR boundary.

☞ For efficient airspace operation, Cooperation between neighboring states is needed beyond the one state.

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# CMAC and FUA implementation in ROK

## Civil-Military Coopertaion



- Air Force Supporting Center is resident within the ATCC, providing support for 24hours.

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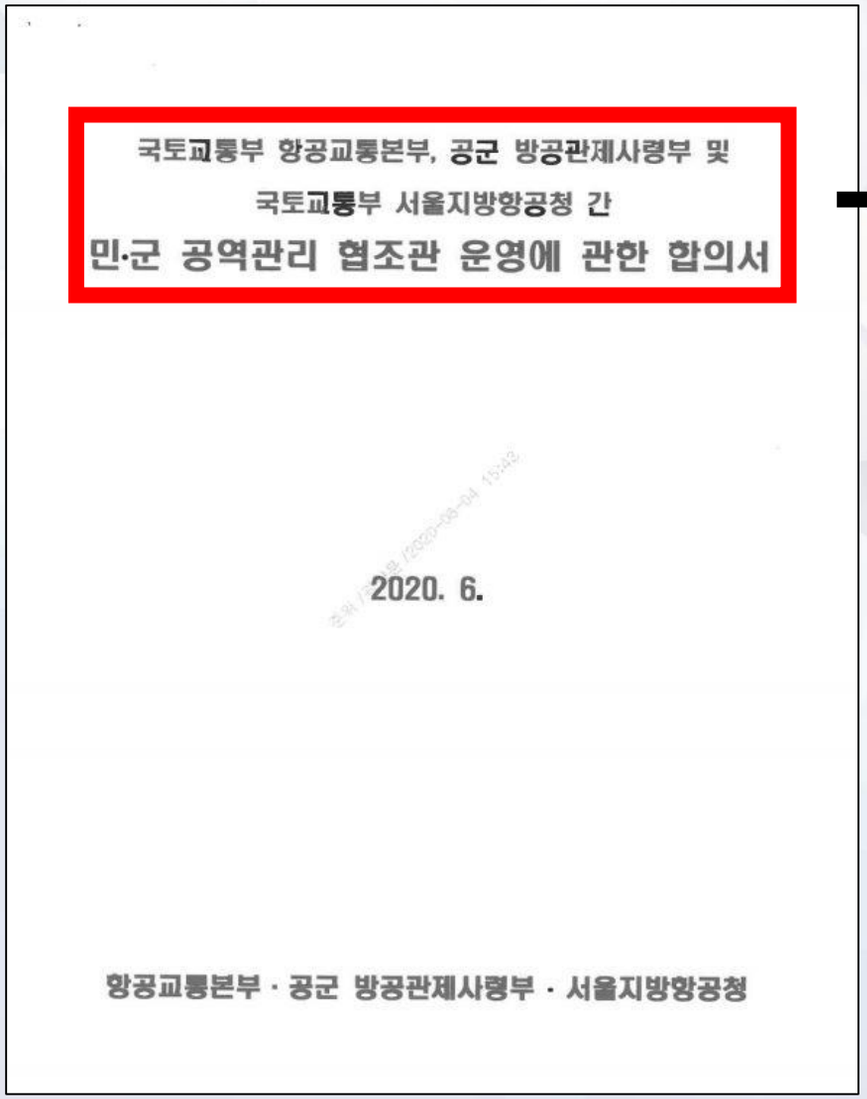
# CMAC and FUA implementation in ROK

## Civil-Military Coopertaion


국토교통부 항공교통본부, 공군 방공관제사령부 및
국토교통부 서울지방항공청 간
민·군 공역관리 협조관 운영에 관한 합의서

2020. 6.

항공교통본부 · 공군 방공관제사령부 · 서울지방항공청

LOA on Civil-Military **dispatch** of airspace management **coordinator** between ATMO and MCRC

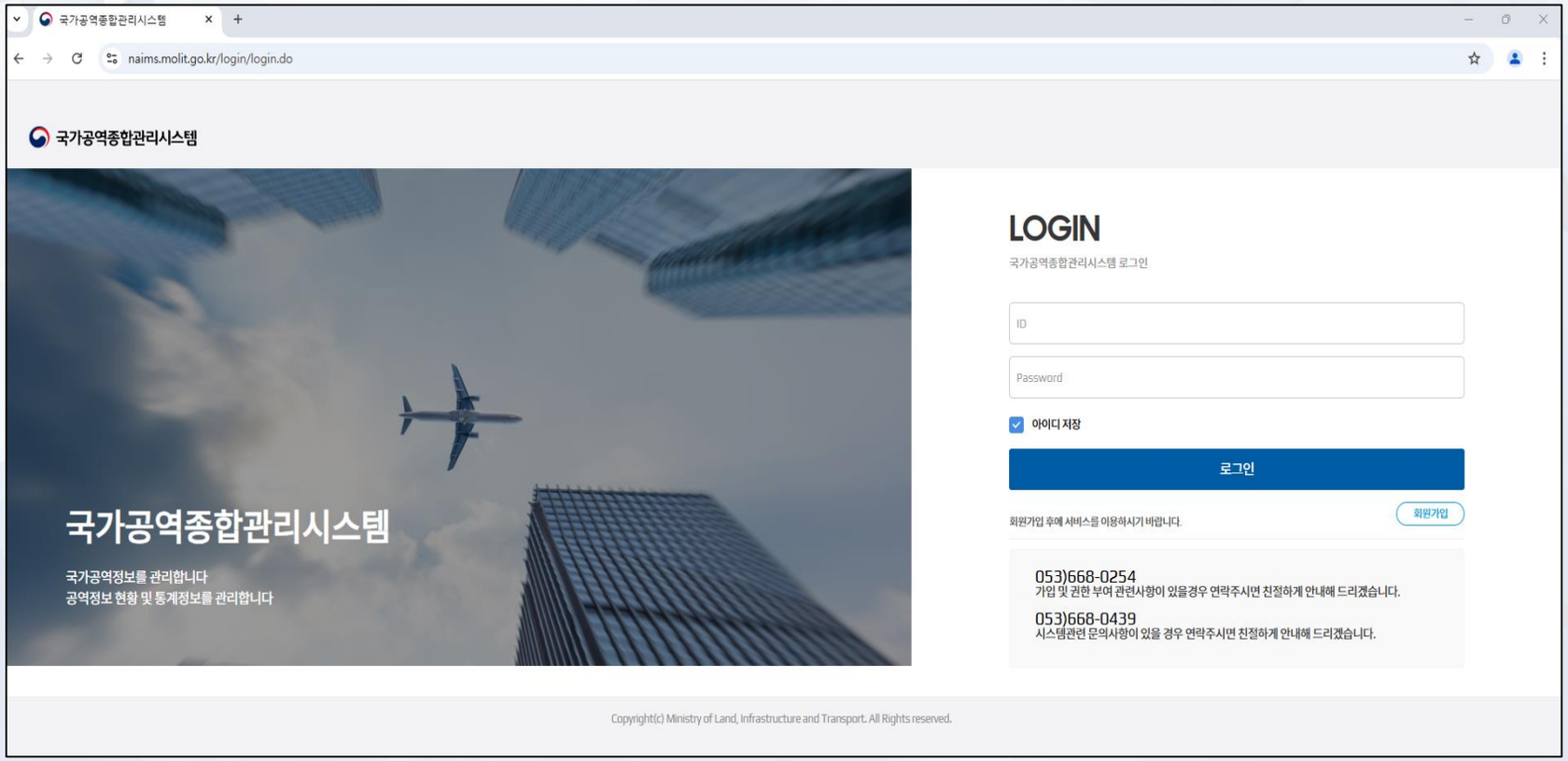
- ACC and MCRC signed the LOA, on the dispatch of mutual airspace management coordinator.

☞ **It helps to coordinate airspace smooth.**

# CMAC and FUA implementation in ROK

## SYSTEM INTERGRATION

▶ **NAIMS** (National Airspace Integrated Management System)




- ROK has established the system called by ‘NAIMS’, that can comprehensively manage the entire airspace.

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## SYSTEM INTERGRATION

### ▶ History of NAIMS

- Developement of NAIMS(’05)
- Establishment of Database(’08)
- Maintenance(’09~)
- Connect the AIM(Aeronautical Information Management) System(’22)
- Establishment NAIMS based on Website(’22)
- Improve the environment to be accessble from mobile(’23)

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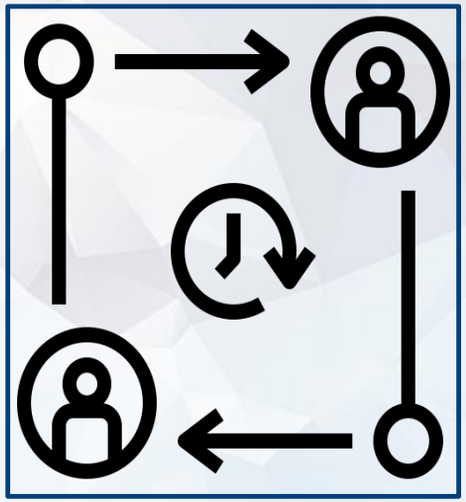
## SYSTEM INTERGRATION

### ▶ Function of NAIMS


Planning



Real-time

Post-analysis

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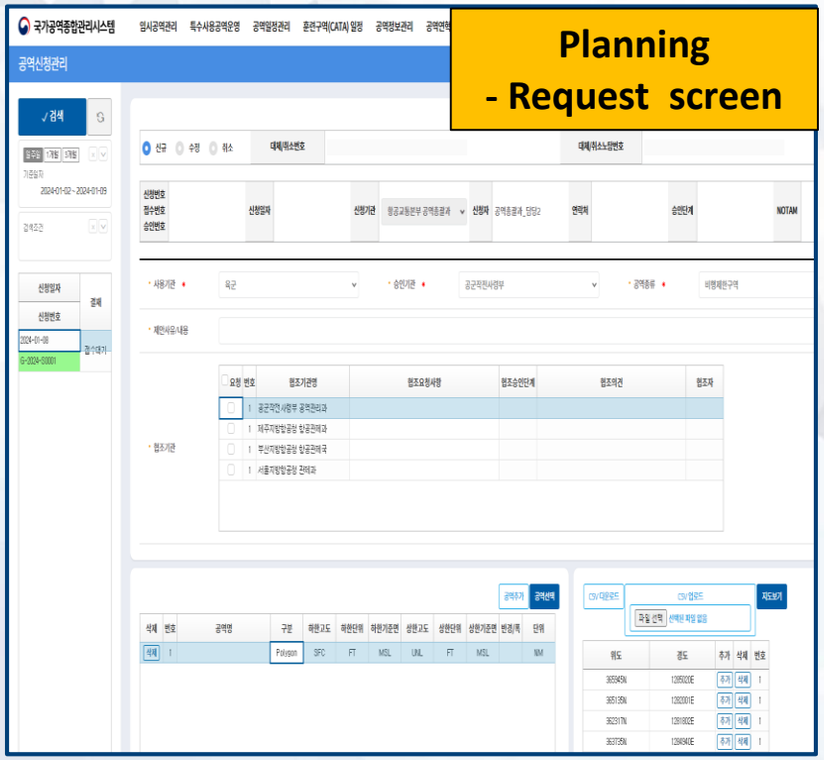
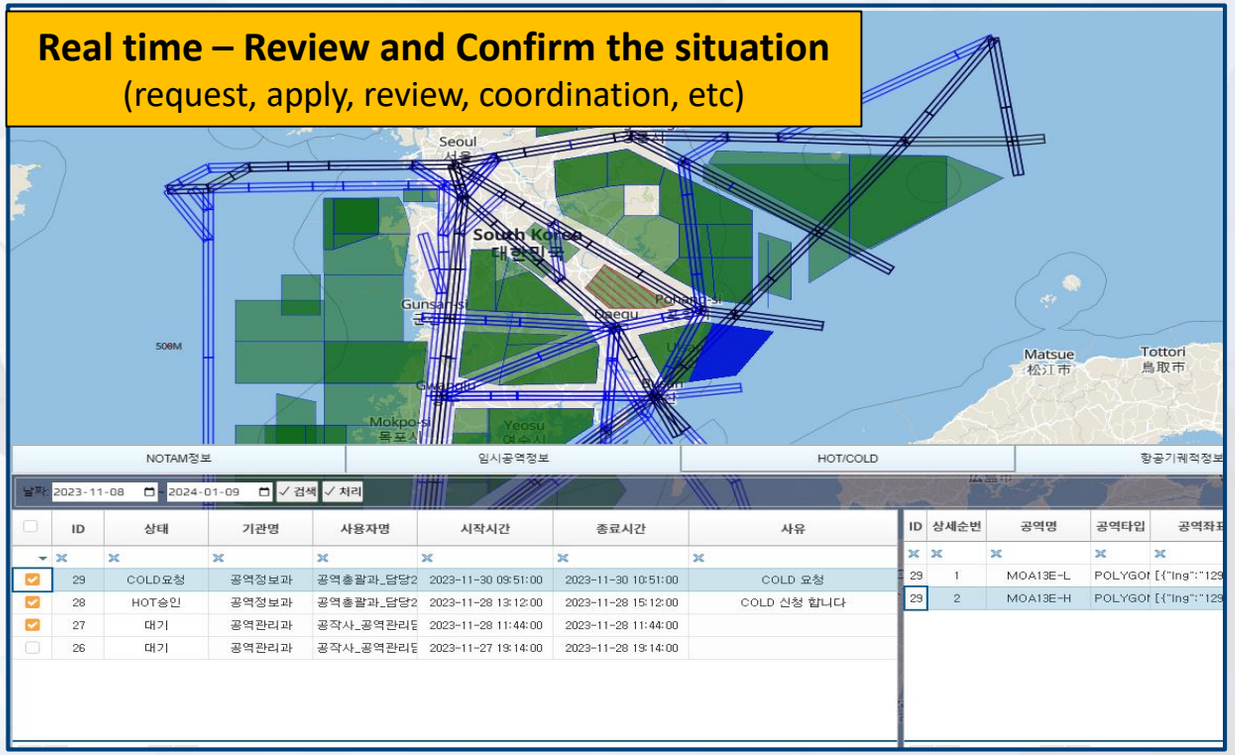
## SYSTEM INTERGRATION

### ▶ Planning & Real time stage



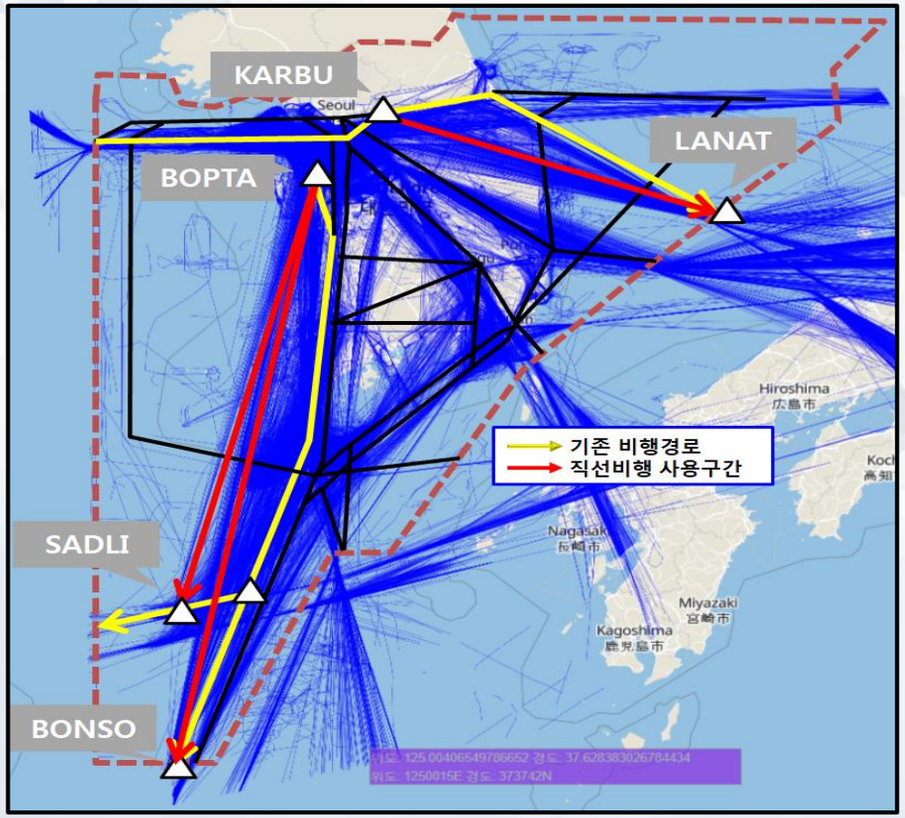




- Airspace users request to use of airspace and operators review and notify airspace permission.
- Nowadays, the airspace authorized by civil is being appled for, reviewed and designated through the system.

# CMAC and FUA implementation in ROK

## SYSTEM INTERGRATION

### ▶ Post analysis stage





| 날짜 | 공역명 | 00시 | 01시 | 02시 | 03시 | 04시 | 05시 | 06시 | 07시 | 08시 | 09시 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2024-11-0 | BOLOD-DOHAE | 540 | 756 | 637 | 564 | 685 | 619 | 651 | 527 | 553 | 61 |
| 2024-11-0 | DAEGU_SECTOR | 89 | 80 | 116 | 69 | 117 | 122 | 211 | 143 | 70 | 5 |
| 2024-11-0 | DOHAE-DONVO | 14 | 19 | 10 | 11 | 11 | 7 | 10 | 11 | 6 | 5 |
| 2024-11-0 | DONAVO-SADLI | 72 | 69 | 74 | 73 | 72 | 62 | 86 | 59 | 57 | 3 |
| 2024-11-0 | EAST_SEA_1_SECTOR | 316 | 227 | 160 | 59 | 121 | 87 | 42 | 66 | 43 | 4 |
| 2024-11-0 | EAST_SEA_2_SECTOR | 62 | 42 | 56 | 46 | 27 | 42 | 46 | 56 | 40 | 3 |
| 2024-11-0 | EAST_SEA_LOW_SECTOR | 572 | 521 | 359 | 512 | 442 | 450 | 260 | 232 | 129 | 17 |
| 2024-11-0 | GIMHAE_TMA_ALL | 78 | 67 | 51 | 48 | 41 | 45 | 40 | 53 | 52 | 4 |
| 2024-11-0 | GUNSAN_HIGH_SECTOR | 58 | 55 | 43 | 58 | 56 | 64 | 60 | 61 | 67 | 7 |
| 2024-11-0 | GUNSAN_LOW_SECTOR | 153 | 162 | 188 | 216 | 356 | 251 | 330 | 165 | 127 | 10 |
| 2024-11-0 | GWANGJU_HIGH_SECTOR | 61 | 50 | 45 | 50 | 50 | 63 | 59 | 69 | 66 | 7 |
| 2024-11-0 | GWANGJU_LOW_SECTOR | 82 | 63 | 53 | 48 | 53 | 56 | 57 | 59 | 58 | 4 |
| 2024-11-0 | JEJU_NORTH | 89 | 67 | 63 | 62 | 53 | 70 | 75 | 68 | 93 | 7 |
| 2024-11-0 | JEJU_SOUTH_HIGH | 27 | 29 | 68 | 49 | 49 | 38 | 52 | 68 | 45 | 3 |
| 2024-11-0 | JEJU_SOUTH_LOW | 57 | 54 | 71 | 55 | 45 | 37 | 50 | 34 | 67 | 8 |
| 2024-11-0 | JEJU_TMA_ALL | 74 | 69 | 64 | 64 | 82 | 81 | 72 | 80 | 84 | 6 |
| 2024-11-0 | POHANG_SECTOR | 68 | 98 | 146 | 126 | 160 | 113 | 126 | 123 | 61 | 8 |
| 2024-11-0 | SADLI-ZAKRO | 45 | 70 | 77 | 47 | 70 | 44 | 50 | 46 | 67 | 6 |
| 2024-11-0 | SEOUL_TMA_ALL | 450 | 424 | 343 | 316 | 373 | 393 | 312 | 309 | 273 | 20 |
| 2024-11-0 | SOUTH_SEA_SECTOR | 52 | 54 | 53 | 51 | 48 | 39 | 43 | 59 | 43 | 6 |

- For research the use of airspace, anaylsis the flight pah of the trajectory and manage airspace usage performance.

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# CMAC and FUA implementation in ROK

## Challenges

- Continous coordination between Civil and Military.
  - Establishment of AMC for exchanging AUP.
  - Paricipation in NAIMS system for integrated airspace management.
- Recognition that airspace is a common asset must be formed.
- Expanding Flexible use of airspace beyond ROK.

# *THANK YOU!!*

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