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I. General Overview

Air Traffic for Incheon FIR

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<th>En-route</th>
<th>International</th>
<th>Domestic</th>
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</thead>
<tbody>
<tr>
<td>'14</td>
<td>'15</td>
<td>'14</td>
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<tr>
<td>626</td>
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<td>739</td>
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<tr>
<td>764</td>
<td>515</td>
<td>249</td>
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<tr>
<td>805</td>
<td>556</td>
<td>249</td>
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</tbody>
</table>

in thousand

5.7% 7.0% 3.4%
General Overview

World Record for Incheon Airport

1st
12 Year

Airport Quality

3rd
2018

Int’l Cargo
2.86 million tons

5th
2018

Int’l Passenger
67.8 million

17 Year
Non Stop Service

CNS Service
General Overview

Organization

MOLIT (Minister)

KOCA (Deputy Minister of Civil Aviation)

Aviation Policy Bureau
Aviation Safety Policy Bureau
Airport & ANF Bureau

Airport Policy Division
New Airport Planning Division
Airport Safety & Environment Division
ANF(CNS) Division

Seoul Regional Office of Aviation (Northern Part of ROK)
Busan Regional Office of Aviation (Southern Part of ROK)
Jeju Regional Office of Aviation (Jeju Island)

Air Traffic Management Office

Incheon ATC
Daegu ATC &CC
II. CNS Implementation

- **En-Route for Incheon FIR** (43,000km²)

- 2 ATC (Daegu, Incheon, 2018), Dual System
  - 15 RADAR (PSR/SSR)
  - 11 ADS-B GS for 1090ES (2019), 1 UAT GS
  - UHF 66/VHF 49 Ch (10 VOR/TACAN Site)
  - 1 GPS RAIM (5 Receivers)

[Incheon FIR] [En-Route ATC]

- Incheon 1 ATC (En-route)
- Daegu 2 ATC & CC (En-route)
II. CNS Implementation

Air Traffic Center (IC, DC)

- ATC System
  - SDP
  - FDP
  - EDP

Support System

- E-Interface
- FDI/MDI

Training Analysis

- TTS

Valuation/Analysis

- MMS
- GPS Time
- REC
- RM
- DBR
- E-Office
- Flight inform
- Control Office

AMO

AIDC

V/UHF

AFTN

ADS-B GS(11)

PSR/SSR(15)
CNS Implementation

- En-Route Surveillance sensor coverage

Incheon FIR

PSR/SSR/ADS-B

14,000ft

36,000ft
CNS Implementation

- All airway completed PBN

<table>
<thead>
<tr>
<th>Airways</th>
<th>Name of air routes</th>
</tr>
</thead>
</table>

Established new RNAV routes on the existing conventional air routes
CNS Implementation

**TCA (Terminal Control Area)**

- 14 TCA (2 Civil, 9 Military, Joint 3)
  - 17 RADAR (PSR/SSR)
  - 1 ADS-B (Seoul TCA)
  - UHF 153/VHF 110Ch (Include 15 Tower)

- 1 ETCAS (Emergency TCA System) (Chungju)
  - 6 RADAR (PSR/SSR)
  - 11 ADS-B (GS)
  - U/VHF 12Ch
CNS Implementation

Terminal Control Areas

<table>
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<tr>
<th>Organization</th>
<th>Name of CTA</th>
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<tbody>
<tr>
<td>CIVIL (2)</td>
<td>SEOUL, JEJU</td>
</tr>
<tr>
<td>JOINT CIVIL &amp; MIL (3)</td>
<td>GIMHAE, POHANG, SACHEON</td>
</tr>
<tr>
<td>MILITARY (9)</td>
<td>GANGNEUNG, GWANGJU, HAEMI, WONJU, YECEHON, DAEGU, POHANG, OSAN, GUNSAN</td>
</tr>
</tbody>
</table>
CNS Implementation

❖ ETCAS
❖ Emergency Terminal Control Area System (2019)
CNS Implementation

- **Airports**
  - 15 Airport
  - CATegory Status & Up-grade
    - 7 RW CAT-IIIb (Incheon, Gimpo)
    - 2 RW CAT-II (CAT-I → CAT-II, Gimhae/Jeju)
    - 15 RW CAT-I, 3 RW PAR
    - 15 Airport completed PBN (RANAV SID/RNAV STAR, LNAV/VNAV)

- **GBAS system**
  - 1 GBAS Test bed (Passed CAT-I Flight Inspection, 2014)
CNS Implementation

❖ GBAS (Test bed system)

- Gimpo airport (Oct. 2014)
  - 4 RSMU (Reference Receivers system)
  - 1 VDB (VHF Data Broadcast)
  - 32R Runway Passed CAT-I Flight Inspection (Aug. 2014)
**CNS Implementation**

- **Airports**
  - **Communication**
    - 2 AFTN/AMHS (Gimpo), 92 Clients locations
    - 11 PDC/D-ATIS, 13 ATIS
    - 11 VDL
  - **Surface Movement**
    - 4 ASDE & MLAT/ADS-B (Incheon, Gimpo, Gimhae, Jeju)
    - 2 MLAT (Yangyang, Pohang)
SBAS(KASS) Development

- National Air Space long-Tem Master Plan
- Establishment KASS Program office(KARI)
- Program Planning and Proposal Preparation
- Joint Development Cooperation(THALES)

Timeline:
- 2005
- 2014
- 2016
- 2018
- 2019
- 2020
- 2022

- #1 Satellite Contract
- System Detailed Design(Positioning)
- #1 ST, PRN Number(US AF)
- System Design & Certification
CNS Implementation

❖ SBAS(KASS) Development

- 7 Reference
- 2 Navigation Up-Link Station (Yeongju, Geumsan)
- 2 Central Processing Center (Cheongju, Incheon)

※ APV (APproach with Vertical guidance), DH (Decision Height)
CNS Implementation

- **National Transportation Aircraft**
  - 56 GBAS (GLS), 13.9% (2019, for 404 Aircraft)
  - 20 SBAS Receiver, 5%
  - 398 ADS-B (OUT), 98.5%
  - 386 ACARS, 95.5%
  - 190 CPDLC, 47%
III. CNS Managements

❖ Flight Inspection

☑ 2 Aircraft, 2 AFIS (Automatic Flight Inspection System)
☑ 3 Flight Inspector, 4 Pilot

2 Aircraft
- challenger-601 (8 per)
- H자-750 (6 per)

2 AFIS
- AD-AFIS-355 (SBAS, GLS)
CNS Managements

❖ CNS Facility Inspection

✓ 3 FICS (Facility Inspect Car System)
✓ 17 CNS Facility Inspector
* Inspect Key parameters one or more times year

Facility Inspect Car System

- CNS FICS Car 3 (Seoul, Busan, Incheon)

Mounted Receiver

- Digital Receiver System
CNS Managements

❖ Drone Flight Check

✓ 9 Drone Flight Check Systems
  * Compactness of ILS/VOR Receiver
✓ 4 Drone Pilot (license)

- ILS Flight Check
  - ILS Radio wave check

- VOR Site Check
  - Use for VOR site simulation

- Radio Wave Analysis
  - Use for VOR/ILS Failure Recovery
## IV. Future Plan

### 2013 Master plan for CNS, the 3rd Amendment

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<th>Strategies</th>
<th>Key Focusing Areas</th>
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<th>'20</th>
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<tr>
<td>I. Airport Infra.</td>
<td><strong>ASDE-X</strong> (MLAT/ADS-B/A-SMGCS) Management</td>
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<td>Aero-MACS, Data-Link Communication (AVS &gt; VDL)</td>
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<td>GNSS(S/GBAS) Air Navigation Infra</td>
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<td>II. Air Traffic Man.</td>
<td>A/DMAN Management</td>
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<td>Enhanced <strong>GNSS-based</strong> Approach Procedure</td>
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<td>SWIM, Aeronautical Data Exchange &amp; Sharing</td>
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<td>III. Enhanced Aviation Infra.</td>
<td><strong>ADS-B</strong>, Use to SBAS-based location</td>
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<td>Enhanced <strong>Surveillance Sensor</strong> System</td>
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<td>Enhanced <strong>Meteorological Info</strong> Management</td>
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