

Article

국가 비행종합성능시험장 운영절차 수립에 관한 연구

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A Study on the Establishment of Operation Procedures for Flight Test Aerodrome in KOREA

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ABSTRACT

고흥 항공센터에 2019년(예정) 신규 활주로가 설치되고, 비행시험 관련 시설, 장비들을 단계적으로 구축하여 국가 비행종합성능시험장으로 운영할 예정이다. 국가 비행종합시험장은 공항이 아닌 비행장으로 운영할 예정이다. 비행장에는 특별히 정하는 운영규정이 없는 실정이다. 그러나 특수한 목적으로 신설되는 국가 비행종합성능시험장을 보다 안전하고 효율적으로 운영할 수 있도록 관련법규와 국내 공항 및 비행장 운영관리 현황 조사, 해외의 비행장 운영관련 법규와 운영실태 조사, 해외 항공 전문가 자문 및 출장을 통하여 향후 국내 관련법규 제정 및 비행종합시험장 운영 시 활용할 수 있도록 지침을 제시하였다.

Key words : 시험비행장(Flight Test Aerodrome), 공항운영규정(Airport Operations Manual), 비행장운영규정(Aerodrome Operations Manual), 비행장 시설관리 및 운영기준(Aerodrome Facilities Management and Operation Standards), 공항안전운영기준(Airport Safety Operation Standards)

I. Introduction

1.1 Background

The new runway will be installed in the Goheung Aeronautical Center in 2019 and facilities and equipments related to the flight test will be constructed in stages to operate this runway as a flight test aerodrome.

Airport operation manuals are enacted and used solely for the operation of an airport, but there are no operating regulations

specially designated for an aerodrome. Therefore, this study intends to suggest guidelines in order to establish domestic related laws and regulations for the operation of a flight test aerodrome, which is newly established for a special purpose.

1.2 Scope of Research

The scope of this study is limited to the operation and management procedures of a flight test aerodrome. Other than the operation and management procedures of a flight test center, various flight test process and procedures are established separately.

1.3 Method of Research

In order to establish a flight test aerodrome

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operation manual, this research investigated the relevant laws and regulations, operation manuals of domestic airports and aerodrome, regulations and manuals of overseas flight test centers. Moreover, consultations from experts and field trip to overseas flight test centers have been made.

II. Flight Test Aerodrome

2.1 Definition

2.1.1 Aerodrome (by International Civil Aviation Organization)

A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

2.1.2 Aerodrome (by Ministry of Land, Infrastructure and Transport)

An aerodrome is a defined area on land or water intended to be used for the take-off (including take-off from water) and landing (including landing on water) of an aircraft, a light aircraft and a ultra light aircraft[1].

An aerodrome can be categorized as a land aerodrome, a land helipad, a water aerodrome, a water helipad, a rooftop helipad, a onboard helipad, and a marine structure helipad[2].

2.1.3 Aerodrome (by Transport Canada Civil Aviation)

aerodrome means any area of land, water (including the frozen surface thereof) or other supporting surface used, designed, prepared, equipped or set apart for use either in whole or in part for the arrival,

departure, movement or servicing of aircraft and includes any buildings, installations and equipment situated thereon or associated therewith.

2.1.4 Airport (by Ministry of Land, Infrastructure and Transport)

An airport means a public aerodrome with airport facilities, and the Minister of Land, Infrastructure and Transport has to designate the name, location and area of it[1].

2.1.5 Airport (by Federal Aviation Administration)

an area of land or water that is used or intended to be used for the landing and takeoff of aircraft, and includes its buildings and facilities, if any.

2.1.6 Airport (by Transport Canada Civil Aviation)

an aerodrome in respect of which a Canadian aviation document is in force.

According to ICAO Annex 14 Volume 1, an aerodrome is a defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft and any guideline for an airport is not available. In addition, it is recommended for an appropriate authority to determine whether the aerodrome certificate is necessary under applicable regulations for the operation of an aerodrome.

In the case of the United States, an airport means an area of land or water that is used or intended to be used for the landing and takeoff of aircraft, and includes its buildings and facilities, which is very similar to the ICAO definition of an aerodrome. In addition, airports are categorized as Class I, Class II, Class III and Class IV.

In Canada, an aerodrome is defined as

any area of land, water (including the frozen surface thereof) or other supporting surface used, designed, prepared, equipped or set apart for use either in whole or in part for the arrival, departure movement or servicing thereon or associated therewith. There are three different categories of aerodromes, each presenting progressively different safety requirements. The categories are listed below:

- aerodromes (small airstrips located on private property that are neither registered nor certified),
- registered aerodromes, and
- certified aerodromes, referred to as airports.

The terms airport and aerodrome are often used interchangeably by the aviation industry. The term aerodrome is primarily used in European countries and the term airport is commonly used in the United States.

In Korea, the terms airport and aerodrome are clearly distinguishing and there is even a definition for an airstrip.

2.2 The review of domestic regulations on aerodrome and airport operations

2.2.1 Aviation Law

Article 80 of the Aviation Law and Article 260 of the Enforcement Regulations of the Aviation Law provide the grounds for management standards of the aerodrome and navigation facilities and the operation and maintenance of aerodrome facilities. Details of the criteria for use are to be determined and announced by the Minister of Land, Infrastructure and Transport[1][3].

In addition, according to Article 111-2 of the Aviation Law, the airport operator is required to establish a system (airport

operation certificate) that can safely operate the airport and according to Article 111-3 of the Aviation Law, an airport operator who wishes to obtain an airport operation certificate shall obtain the approval from the Minister of Land, Infrastructure and Transport by issuing the airport operations manual[1].

2.2.2 the Minister of Land, Infrastructure and Transport notification

According to Article 80 of the Aviation Law and Article 260 of the Enforcement Regulations of the Aviation Law, notices were made by the Minister of Land, Infrastructure and Transport, which are the Aerodrome Facilities Management and Operation Standards (the Minister of Land, Infrastructure and Transport Notice No. 2015-328) and the Airport Safety Operation Standards (the Minister of Land, Infrastructure and Transport Notice No. 2013-830)[4][5].

The Aerodrome Facilities Management and Operation Standards were established with an aim of efficient aerodrome management and facility safety, and the facility manager is required to establish the Airport Operations Manual(AOM) in accordance with the Airport Safety Operation Standards.

The Airport Safety Operation Standards were established on the basis of the Aerodrome Facilities Management and Operation Standards and specify the criteria to be included in the AOM in detail.

2.3 Domestic airport and flight test center operation status

2.3.1 Domestic airport

In the case of domestic airports, the AOM is established according to the Airport Operation Certificate and the Airport Safety



Fig. 1. Uljin Aerodrome

Operations Standards by considering the characteristics of each airport[6][7][8].

2.3.2 Domestic aerodrome

There are three civil land aerodromes including Uljin which is the only public aerodrome in Korea. Uljin aerodrome is not an airport, but it follows Airport Safety Operations Standards and is evaluated with regular inspections of airport level the airport level(see fig. 1).

2.3.3 Domestic flight test institutes

The Korea Aerospace Industries Co., Ltd. (KAI) and the Agency for Defence Development(ADD) are the domestic flight test institutes in Korea. Operational procedures of these flight test institutes are in accordance with the local flight procedures of the ROK Air Force because they are located on the Air Force airfield. And the various flight test techniques and procedures are established separately by each institutes.

Local flight procedures of the Air Force airfields are established and operated in consideration of the specificity of each tactical fighter wing, which includes the facilities management and operating

procedures, apron, taxiway and runway procedures, take-off procedures, traffic and landing procedures, traffic pattern procedures, local airspace operation procedures, radar service procedures for the Visual Flight Rule(VFR) flight, Airborne Collision Avoidance System(ACAS) alert prevention procedures, weather and fuel requirements, instrument flying procedures, night flying procedures, air to ground mission procedures, jettison procedures, emergency response procedures, flight training procedures, VIP aircraft handling procedures, airfield characteristics, and so on. The operation manuals other than the local flight procedures for airfields are established separately.

2.4 Overseas flight test center operation status

2.4.1 International Civil Aviation Organization (ICAO)

Main contents of the Aerodrome Manual(see Table 1) of the ICAO for the aerodrome operation and management are similar to the contents of the Airport Safety Operations

Table 1. Contents of ICAO Aerodrome Manual

Part	Contents	Details(Summary)
1	General Information	General
2	Aerodrome Site Information	Aerodrome Plan, Aerodrome Land Titles
3	AIS Information	Aerodrome Dimensions, AIP Data
4	Aerodrome Operating Procedures	Aerodrome Reporting, Emergency Plan, Inspection, Apron Safety Management, Airside Vehicle Control, Wildlife Hazard Management, Disable Aircraft Removal, Aerodrome Works Safety, Low Visibility Operations
5	Aerodrome Administration	Organization contacts and structure, Non-Standard Items and Exemptions

Table 2. Contents of Airport Safety Operations Standards

Part	Contents	Details(Summary)
1	General	purpose, applicability, definition
2	Airport Data	General, airport status
3	Airport Operations Manual	AOM management
4	Airport Operating Procedures	Qualification management, Movement area maintenance, Apron Management, Visual aids for navigation, and so on
5	Airport Safety Management System	Airport SMS components and compliance procedures
6	Airport Facilities	various facilities installation requirements
7	Restrictions	Airport use restrictions and exceptions
8	AOM approval	AOM approval procedures

Standards of Korea(see Table 2).

As Airport Safety Operation Standards were first enacted on June 11, 2009, ICAO Aerodrome Manual was used as primary reference material in establishing relevant regulations in Korea.

2.4.2 United States of America

The regulation relating to the operation and management of airport in the United States is the Airport Compliance Manual(FAA Order 5190.6B)[10].

In the case of the flight test center, the procedures to cope with emergencies in consideration of the specificity of the flight test shall be established and operated in accordance with the flight test site environment.

However, they eager to contribute to development of the flight test center and promotion of flight test activities by advertising favorable conditions for flight tests instead of creating complicated restrictions about flight test. For reference, favorable

conditions for flight tests are non-populated areas (such as the desert), the research institutes in the flight test center, flight test facilities and equipments, and so on.

Table 3 shows the main contents of the Airport Compliance Manual, which is similar to the Airport Safety Operation Standards, but the contracts, responsibilities and obligations, administrative and management sections are more specific.

1) Edwards Air Force Base

Edwards Air Force Base in the U.S. is a representative Air Force flight test center with long flight test history and experience. It has the Flying and Airfield Operations(EDWARSAFBI13-100) regulation, which has provisions related to airfield operation and management[11]. This

Table 3. Contents of Airport Compliance Manual

Part	Chapter	Contents(Summary)
I:Background	1~2	Scope and Authority, Compliance Program
II:Types of Federal Agreements	3~4	Federal Obligation, Federal Grant Obligation and Responsibility
III:Compliant Resolution	5	Compliant Resolution
IV:Airports and Aeronautical Users	6~14	Airport Operations, Exclusive Rights, Reasonable Commercial Minimum Standards, Review of Aeronautical Lease Agreements, Airport Noise and Access Restrictions, Restrictions Based on Safety and Efficiency Procedures and Organization,
V:Financial Responsibilities	15~19	Permitted and Prohibited Users of Airport Revenue, Airport Rates and Charges
VI:Land Use	20~21	Compatible Land Use and Airspace Protection, Land Use Compliance Inspection
VII:Releases and property Reversions	22~23	Releases from Federal Obligation, Reversions of Airport Property



Fig. 2. Grant County International Airport(KMWH)

manual was designed to consider specificity of a flight test center in addition to those specified in the Airport Compliance Manual. For example, there are various specific emergency procedures such as UAS flight procedure, Hot Brake, UAS/Aircraft airspace operation procedure, role and procedures between working groups of the flight test organization.

2) Grant County International Airport(KMWH)

Grant County International Airport is located adjacent and north of the City of Moses Lake, Washington as shown on Fig. 2.

Central Washington, including Moses Lake, was a sparsely populated high desert area prior to the construction of the Grand Coulee Dam on the Columbia River in 1941 and the establishment of Moses Lake Army Air Base in 1942, later renamed Larson Air Force Base (present day Grant County International Airport).

Under the Federal Aviation Regulations Title 14 CFR Part 139, Grant County International Airport operates as a Class IV airport that currently holds Airport Operating Certificate. It is owned and operated by The Port of Moses Lake, Grant County Port District #10.

2.5 Discussion

The Airport Safety Operations Standards are applied only to airports, and the AOM is established and operated for each airports. But it is not appropriate to apply same regulations to an aerodrome in Korea.

It should be noted that domestic aviation law clearly distinguishes between airports and aerodromes and aerodromes are divided into six categories. Even airstrips for a light aircraft and a ultra light aircraft are clearly separated from airports and aerodromes.

For reference, there are only three aerodromes in Uljin, Jeongseok and Taean. Jeongseok and Taean aerodromes are private and Uljin aerodrome is the only public aerodrome. Since Uljin aerodrome is not an airport, it is not required to be operated according to official AOM but it is evaluated with regular inspections by government agencies.

As we have seen in the definition of terms, the difference between an airport and an aerodrome is the presence or absence of airport facilities (passenger and cargo management terminals, etc.). Therefore, it is considered desirable to have the Aerodrome Operations Manual other than the Airport Operations Manual for the operation and management of an aerodrome. And it is recommended to establish the Aerodrome Operations Manual by referring to the necessary parts of the Airport Operations Manual excluding the contents related to airport facilities.

a flight test aerodrome perform special flight tests unlike an ordinary aerodrome. So it is necessary to include the contents of consideration for the specificity of flight tests separate from the Aerodrome Operations Manual. It is desirable to extract relevant contents of Edwards Air Force manuals and

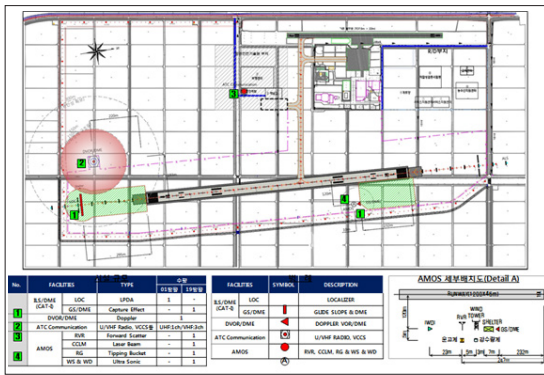


Fig. 3. Goheung Flight Test Aerodrome

complement and set up in accordance with domestic circumstances.

On the other hand, the Airport Operation Certificate(AOC) referred in Article 111-2 of the Aviation Law is not required to be applied since a flight test aerodrome is going to be operated as an aerodrome not an airport. According to expert consultation and research, it is not desirable to strengthen the regulations to invigorate a flight test aerodrome.

III. Conclusion

a flight test aerodrome planned in Goheung is going to be the first flight test center in Korea. And the operational manuals to operate the Goheung Flight Test Aerodrome safely and efficiently have been set up in accordance with the project progress(see fig. 3).

In order to establish such operational manuals for the Goheung Flight Test Aerodrome, relevant laws and regulations on the operation and management of airports and aerodromes in Korea, regulations and manuals on overseas flight test center had to be reviewed. As a result of reviewing available information, even if the Goheung Flight Test Aerodrome is established as an aerodrome, it shall be established in accordance with the

Airport Safety Operation Standards. Also an aerodrome operations manual, not an airport Operations Manual, shall be enacted except for the operation of airport facilities, such as boarding passenger and cargo loading facilities, and it is considered desirable to complement contents considering the specificity of flight test such as operation of UAVs individually.

Considering the specificity of a flight test, it is advisable to benchmark relevant contents of the Edwards Air Force manuals and to supplement it in accordance with domestic circumstances.

Also, it is desirable that Airport Operation Certificate does not apply to the Goheung Flight Test Aerodrome because it is going to be operated as an aerodrome rather than an airport.

Given that it is an infrastructure construction project for a public test aerodrome in accordance with the aviation safety technology development project, it is expected that it will help to manage and operate the flight test aerodrome safely and efficiently by developing an aerodrome operation manuals and refining the matters on a flight test.

Review

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