

# Introduction of Safety Standard Inspection for UAV Special Flight Authorization for Night and BVLOS Operation

KIAST Advanced Aviation Infra Department

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**KIAST**

**항공안전기술원**  
Korea Institute of Aviation Safety Technology

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# 1 Laws Regarding Special Flight Authorization

- ❖ The Minister of Land, Infrastructure and Transport shall **inspect the safety standards for special flight** of unmanned aerial vehicles for **night and beyond visual line of sight** (Aviation Safety Act Article 129 Paragraph 5)
- ❖ President of **KIAST** shall enact regulations necessary for the inspection of special flight safety standards pursuant to Article 15 of the Regulations on Delegation and Entrustment of Administrative Authority and obtain approval from the Minister of Land, Infrastructure and Transport (Safety Standards of special flight of UAV and criteria for approval procedure Article 5 Paragraph 5)

# 1 Laws Regarding Special Flight Authorization

❖ Aviation Safety Act Enforcement Rules Article 312-2

## 1. Documents needed for application Article 129 Paragraph 5 of the Act. <Revised 2020. 5. 27.>

1. Kind, type, specification
  2. Performance and operation limits
  3. Operations manual
  4. Flight plan including flight procedures, areas, personnel, etc
  5. Safety Certificate (MTOW 25Kg over)
  6. Proof of relevant experience
  7. Insurance(commercial / public organization)
  8. UAV Flight Authorization application (Attached form # 122 )
  9. ETC
2. Director of Regional Aviation Administration replies to applications with a **result in 30 days upon receiving the application (90 days for special occasions such as adoption of new technology)**, and can limit flight duration, place, and method in consideration with the local area environment such as population density, privacy.
3. Minister can ask for other documents aside from 1,2.

# 1 Laws Regarding Special Flight Authorization

## 1-4 MOLIT NOTICE 2021-1264

Category		Major Point
Basic		<ul style="list-style-type: none"> <li>▪ Fly at or below 150 m in Class G airspace if there is no special approval</li> <li>▪ Obstacles near takeoff/land area and flight path should not affect flight safety</li> <li>▪ Equipped with Fail-Safe(Lost com, low battery, motor and system malfunction, etc) and (Return To Home, Parachute, Airbag)</li> <li>▪ Equipped with collision avoidance functionality</li> <li>▪ Equipped with GPS Location transmitter in case of an accidental fall</li> <li>▪ Emergency Manual and all participating personnel should be trained on it</li> </ul>
Specific	Night	<ul style="list-style-type: none"> <li>▪ At least one visual observer must be placed to identify the UAV</li> <li>▪ Equipped with a collision light recognizable from 5km away</li> <li>▪ Collision lights should be mounted in a position that identifies front, rear, left, and right direction and of blinking type</li> <li>▪ Equipped with Auto-flight mode</li> <li>▪ Equipped with a visual aid (FPV) using an infrared camera</li> <li>▪ Ground lighting facilities and searchlights should be installed at the takeoff/landing sight.</li> </ul>
	BVLOS	<ul style="list-style-type: none"> <li>▪ At least one visual observer must be placed to identify the UAV when flying BVLOS</li> <li>▪ Continuous Communication should be possible between the pilot and the Visual observer</li> <li>▪ The pilot must check the pre-planned flight and route and the relevant UAV must be capable of manual/automatic/semi-automatic flight</li> <li>▪ The pilot must ensure that C3 (Command, control, and communication) equipment is available within the planned flight range</li> <li>▪ The UAV must be programmed for flight planning and emergency situation</li> <li>▪ The UAV should be able to notify the pilot in the event of a system failure</li> <li>▪ Communication should be redundant (RF Com and LTE communication)</li> <li>▪ Equipped with GCS(Ground Control System) that displays the status of UAV and alarms the pilot in case of abnormalities</li> <li>▪ Equipped with a visual aid (FPV)</li> </ul>

# 1 Laws Regarding Special Flight Authorization

## 1-5 Penalty Regulation for Illegal Drone Flight

Drone Pilot Checklist

 <p>성명 : 000 연락처 : 010-XXXX-XXXX</p>		 <b>NO</b>
Tag your drone	Fly within VLOS	Fly during the day
 <b>NO</b>	 <b>NO</b>	 <b>NO</b>
Don't fly over the crowd	No Alcohol	Don't drop goods
		
Approval for filming	Know the manual	Radio wave Certification

# 1 Laws Regarding Special Flight Authorization

## 1-5 Penalty Regulation for Illegal Drone Flight

- ❖ Fly after **Alcohol/drug**, imprisonment for up to **3 years** or a fine of up to **KRW 30 million (\$22450)**
- ❖ Fly above 150m within the control airspace **without approval**,
  - 1<sup>st</sup> time KRW 500,000 (\$370)
  - 2<sup>nd</sup> KRW 750,000 (\$560)
  - 3<sup>RD</sup> **KRW 1 million (\$750)**
- ❖ Failure to report a drone accident or a false report,
  - 1<sup>st</sup> KRW 150,000 (\$110)
  - 2<sup>nd</sup> KRW 250,000 (\$190)
  - 3<sup>rd</sup> KRW 300,000 (\$225)
- ❖ Violation of pilot compliance
  - 1<sup>st</sup> KRW 1 million (\$750)
  - 2<sup>nd</sup> KRW 1.5 million (\$1120)
  - 3<sup>rd</sup> **KRW 2 million (\$1500)**



# 1 Laws Regarding Special Flight Authorization

## 1-6 Changes in the Remote Pilot License System

- ❖ On May 27, 2020, some amendments to the Enforcement Rules of the Aviation Safety Act (Article 306 Ultra-light flight device pilot license)
- ❖ Reporting drones with a MTOW over 2kg (**Legal Name Drone System**) : **Effective January 1, 2021** (Article of the Enforcement Decree of the Aviation Safety Act)
- ❖ Remote pilot license: **Effective March 1, 2021**

Pilot license Type	Drone Weight (MTOW)	Requirements
<b>Type 1</b>	Over 25kg ~ equal or less than 150kg	▪ 20 hours of flight record, written test, practical test
<b>Type 2</b>	Over 7kg ~ equal or less than 25kg	▪ 20 hours of flight record, written test, practical test (simplified)
<b>Type 3</b>	Over 2kg ~ equal or less than 7kg	▪ 6 hours of flight record, written test
<b>Type 4</b>	Over 250 g ~ equal or less than 2kg	▪ Online education training

# 2 Introduction of UAV SPECIAL FLIGHT AUTHORIZATION

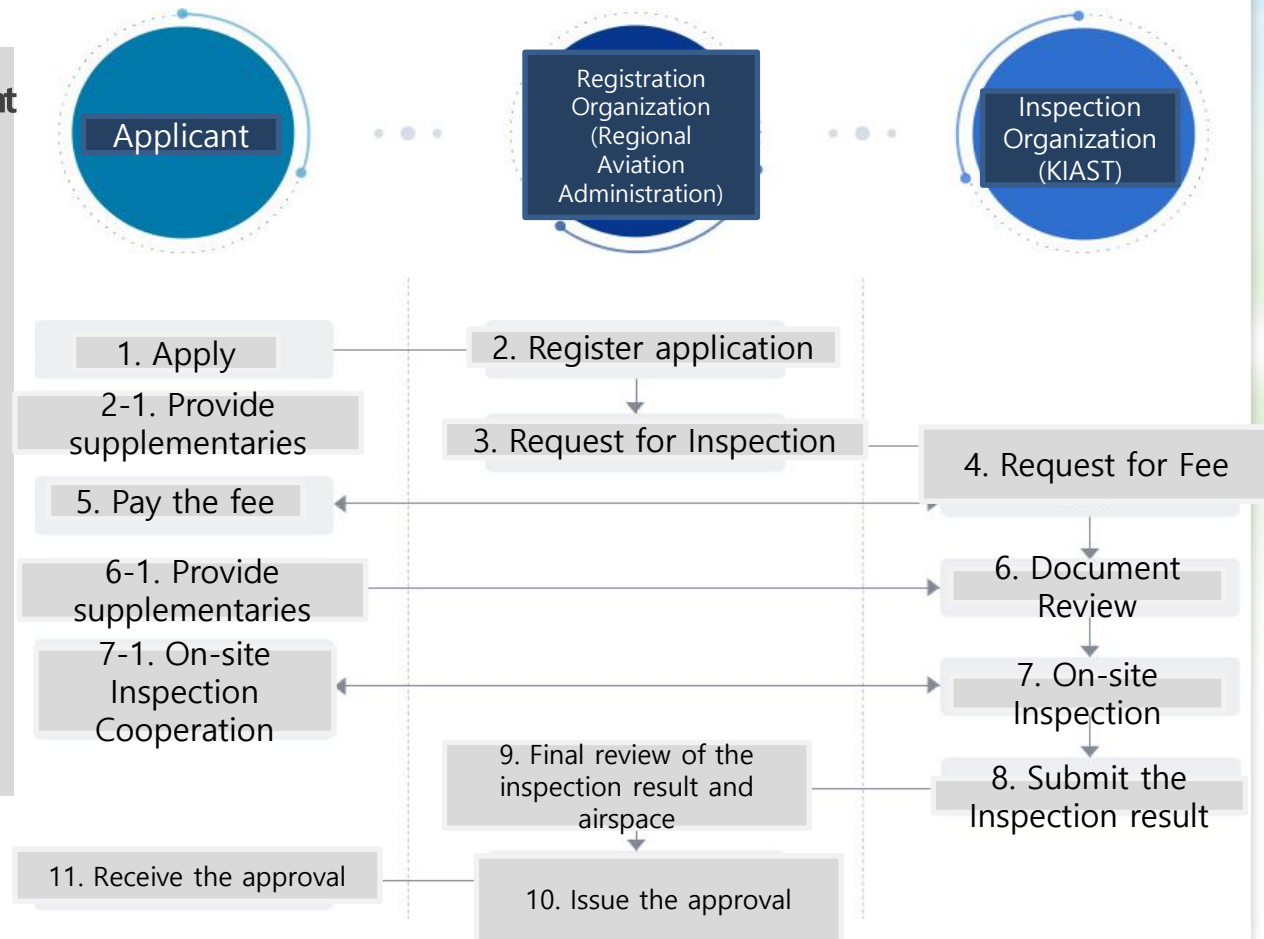
## General Introduction and Process

### < What is UAV special flight authorization >

❖ A system that allows limited night and BVLOS operation by reviewing cases when flying at night with UAV OR flying BVLOS

\* In accordance with Act No. 16643 of the Aviation Safety Act, fees will be incurred from the enforcement date (20.5.27.), and special flight application reception and approval tasks will be transferred from **MOLIT to regional aviation administration**)

### < Overall Process >



# 3 How to apply for Special Flight Authorization

## Application Method and Document Guideline

(Applicant) Use the portal service "Drone One-stop"  
 (<https://drone.onestop.go.kr/>) and fill out an application

### < Drone One-stop Website >

### < Application >

Apply for Special Flight

Processing time: 30 days

Retrieve Info Regional Aviation Administration contact numbers

Applicant <span style="float: right;">최근 입력정보</span>			
Name	손명재	Date of Birth	
Organization		Secondary Contact	
Contact Number	032-727-5756		
Fax Number			
Address	주소검색		

Flight plan

Period	※ 기간은 6개월을 초과할 수 없습니다. (군공역은 주말에만 사용 가능)		
Flight Type	<input checked="" type="radio"/> 야간 <input type="radio"/> 가시권밖	상세설명	
Flight Purpose	레저비행	비행방식	
Flight Area	주소		
	좌표		
	반경(m) / 고도(m)		
Notice			

UAV

※ 최대이륙중량 2Kg 미만 비영리 용도는 신고번호를 입력안하셔도 됩니다.  
 ※ 장치 정보를 입력하고 반드시 "추가"를 해야 합니다.

Kind	무인비행기	Registration Number	신고번호
Type, Model		Purpose	<input checked="" type="radio"/> 비영리 <input type="radio"/> 영리
Manufacturer		Operation Purpose	<input checked="" type="radio"/> 비연구용 <input type="radio"/> 연구용
Dimension		WEIGHT	최대이륙중량 2kg 미만
Owner		NUMBER	
Safety Certification info		인증번호 불러오기	
Insurance	<input checked="" type="radio"/> 미가입 <input type="radio"/> 가입	상세설명	

※ 장치 정보를 수정하려면, 목록에서 삭제하고 다시 "추가"하시면 됩니다

No.	신고번호	형식-모델	제작사	삭제
데이터가 없습니다.				

# 4 Special Flight Safety Standards Inspection

## Inspection Process

### Document Review

#### 5 Documents should be checked

- Pilot License
- Insurance (Commercial)
  - Individuals are recommended depending on the location
- Safety Certification (over 25kg)
- UAV fact sheet (specifications)
- Flight plan
  - Adequacy Review
  - Flight area check using electronic map (Check safety hazards in the area)
  - Airspace check(prohibited/dangerous etc)

→ Determine whether an on-site inspection is needed and notify the applicant

### On-site Inspection

- Check the UAV (align with the fact sheet)
- Discuss the flight paths and flight methods
- Identify safety hazards near the flight path
- Provide flight safety consulting
- Monitor flight status
- Check communication status with a visual observer
- Simulate emergency situation (lost com, etc)
- Check collision avoidance functionality

# 4 Special Flight Safety Standards Inspection

## On-site Inspection Standards

### On-site Inspection Checklists

[Form 4-2]

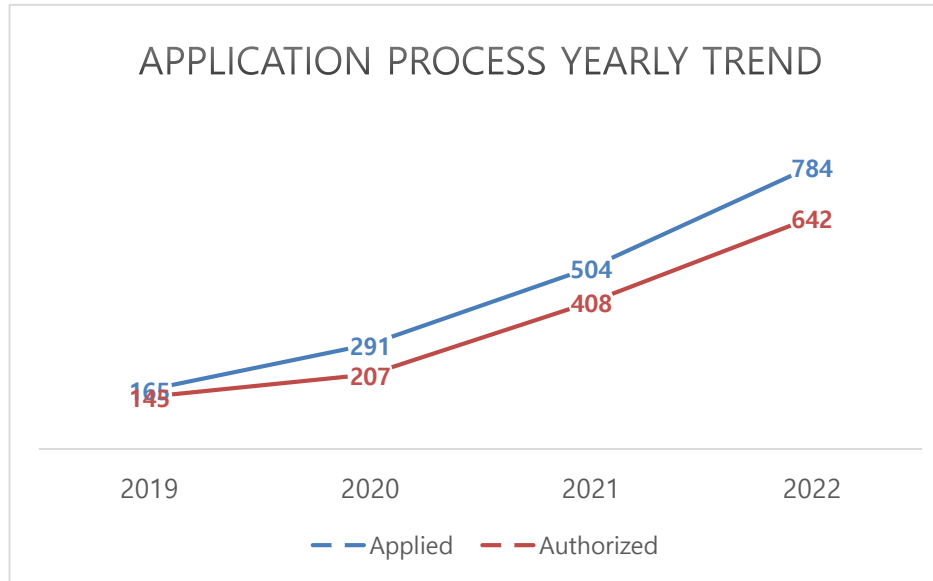
Special Flight Safety Standards Checklist (BVLOS)			
( <input type="checkbox"/> Multicopter · <input type="checkbox"/> Helicopter · <input type="checkbox"/> Airplane )			
1. Pre-flight Inspection			
구분	Checklist	Normal	ETC.
1	Model names and specifications for the key parts	☑	☑
	Main body and landing gear	☑	☑
	Transmitter (firmware · Software Versions)	☑	☑
	Receiver	☑	☑
	Propeller (or Rotor Blade)	☑	☑
	Motor (or Engine)	☑	☑
	ECS (Motor Control)	☑	☑
	FCC (Flight Control)	☑	☑
	GPS	☑	☑
Battery	☑	☑	
2	Propeller (or Rotor blade) condition	☑	☑
3	Battery charge condition	☑	☑
4	Camera Setting and function Check (Including FPV)	☑	☑
5	GCS and manual flight control function check	☑	☑
6	Manual · Auto controller distance check (VL0S)	☑	☑
7	Communication Device · Frequency channels check	☑	☑
8	Obstacles and terrain around takeoff/landing spot and flight route	☑	☑
9	Emergency landing spot check	☑	☑
10	Emergency manual check	☑	☑
11	Familiarity with emergency manual check	☑	☑
12	Wind speed direction (m/s)	Maximum Allowable Wind Speed (m/s)	☑
13	Temperature (°C)	Operation Temperature (°C)	☑
14	Magnetic field index (Kp)		☑

### On-site Inspection



# 5 Special Flight Statistical Status

## Application Trend



Increasing by 1.6 times every year

Year	Application	Authorized	Unauthorized	Cancel
2019	165	145	1	19
2020	291	207	2	82
2021	504	408	7	89
2022	784	642	4	138
<b>Total</b>	1744	1402	14	328

\* Reason for cancel : Processing time, weather

\* Reason for unauthorization : Applicant not submitting relevant documents, refusal to submit supplementary data

# 5 Special Flight Statistical Status

## Primary Purpose (Night)



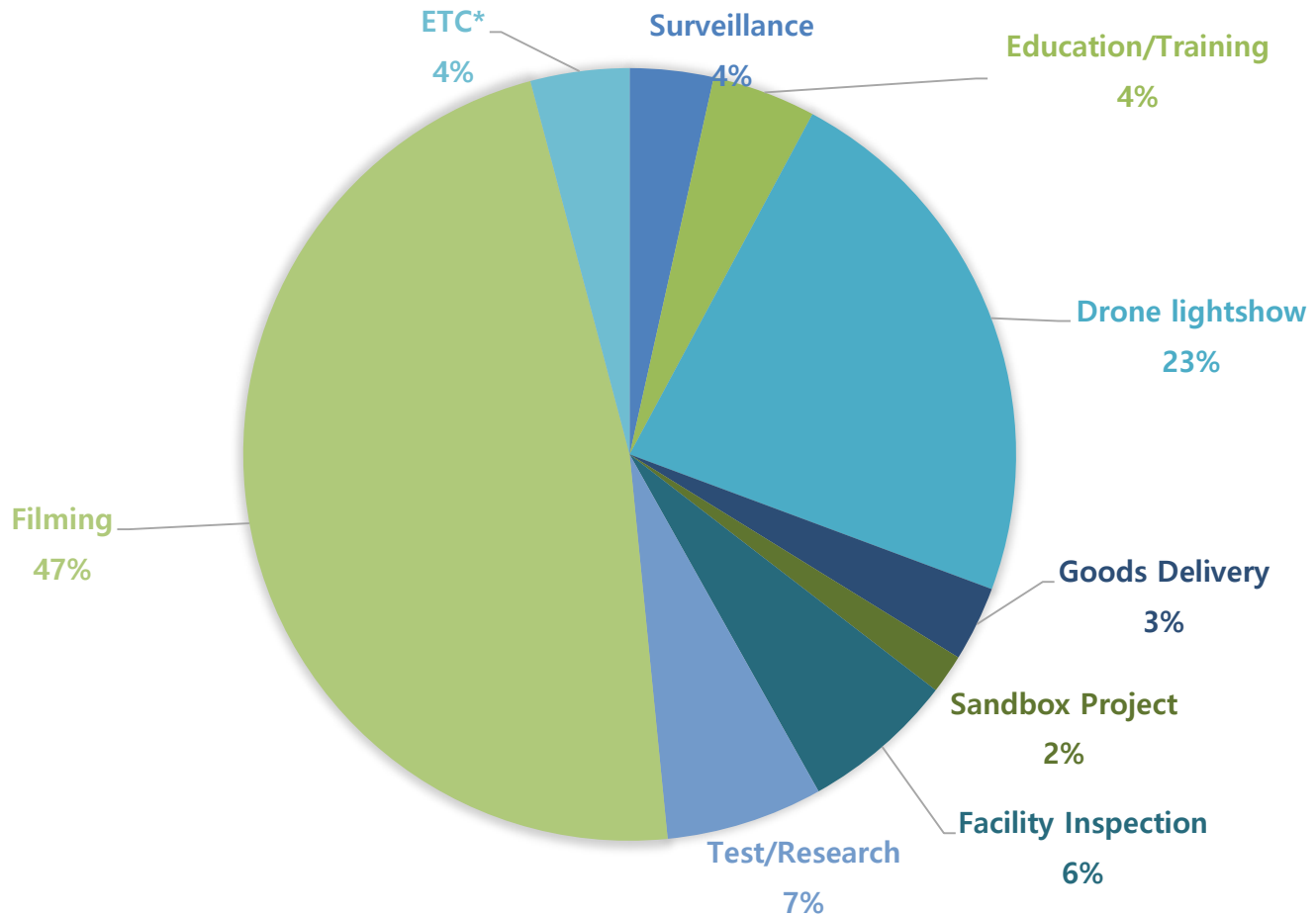
# 5 Special Flight Statistical Status

## Primary Purpose (BVLOS)



# 5 Special Flight Statistics

## Primary Purpose Status



# 6 Challenges In Inspection

## ❖ Processing time

- Flexible event schedule, urgent request

## ❖ Difference in the **understanding of regulation** between applicants and regulators

- Finding the balance between safety and industry growth

- Provide guidance and consulting

## ❖ **Difficult to perfectly simulate** the real flight during inspection e.g.) Drone light show, film

- In case of drone lightshow, it is physically difficult to simulate the flight using all drones

- Security environment is different in real settings

# 7 We are working on

- ❖ Constantly **revising the laws and regulations** with accumulated data to reflect the industry development
  - Plan to revise later this year
- ❖ Developing a **highly digitalized system**
  - UTM, mobile application etc.
- ❖ Improving the **flight safety** of drone
  - Developing K-SORA technology

# Q & A

