

# Guidelines for obtaining Unmanned Aircraft System (UAS) Type Certificate, etc.

Note: It is noted that if there is a translation difference between English and Japanese, then Japanese should be the official language to refer to.

Issued on March 29, 2024

(translated on March 27, 2025)

# Structure of this guideline

Part I : Common

Part II : UAS Type Certification Process

Part III : Guideline for Safety Standards

Part IV : Guideline for Uniformity Standards

Part I

Common

# Purpose

This guideline summarizes procedures for Unmanned Aircraft System (UAS) Type Certification providing examples of methods showing compliance to safety standards and uniformity standards to carry out UAS Type Certification under Article 132-16 of the Civil Aeronautics Act appropriately and smoothly.

The content of this guideline should be referred to as a “reference” only. For an individual UAS Type Certification, consulting with Airworthiness Division, Aviation Safety and Security Department, Japan Civil Aviation Bureau Ministry of Land, Infrastructure, Transport and Tourism (hereinafter referred to as “JCAB”) with jurisdiction over UAS Type Certification or the Registered Unmanned Aircraft Inspection Organization under Article 132-26 of the Act (hereinafter collectively referred to as “Inspection Body”) and showing the appropriateness of compliance with the standards according to the UAS design is necessary.

## 1. Overview

This guideline has prepared to promote understanding of the legal standards such as the Civil Aeronautics Act (hereinafter referred to as "Act"), Enforcement of the Civil Aeronautics Act (hereinafter referred to as "Regulation"), Circulars, etc. related to UAS Type Certification, concerning UAS manufacturers considering to obtain UAS Type Certificate, and Inspection Body as well. This guideline consists of "Part 1 Common," "Part 2 UAS Type Certification Process," "Part 3 Safety Standards," and "Part 4 Uniformity Standards."

The scope of UAS Type Certification includes:

- (1) Drawings, specifications and lists of them necessary to define the form and design of the UAS that have been shown to comply with certification bases.
- (2) Materials, processing/manufacturing processes and inspection procedures necessary to achieve conformity to the defined UAS form.
- (3) All other matters necessary to ensure safety and uniformity.

## 2. Related documents

No. 8-001 "The Inspection Manual of Safety and Uniformity Standards for Unmanned Aircraft Systems (UAS) Type Certificate, etc."

(March 27, 2024 KOKU-KU-KI-724)

No. 8-002 "Procedures for Unmanned Aircraft Systems (UAS) Type Certificate, etc."

(March 27, 2024 KOKU-KU-KI-725)

## 3. Terms and abbreviations

The terms and abbreviations used in this guideline is shown in the table below.

Table. Description of terms and abbreviations

terms and abbreviations	Description
AC 20-136B	Advisory Circulars (AC) issued by the Federal Aviation Administration (FAA) that describe advisory requirements regarding lightning protection titled "Aircraft Electrical and Electronic System Lightning Protection".
ARP5416	These are guidelines issued by the Society of Automotive Engineers (SAE) and describe advisory requirements

	regarding lightning protection titled “Aircraft Lightning Test Methods”.
ASTM	Officially called ASTM International, formerly the acronym for American Society for Testing and Materials, which is the U.S. private non-profit standardization organization that sets and publishes industry-related standards.
CIR	Conformity Inspection Record.
CIT	Conformity Inspection Tag.
CP	Certification Plan.
D&R	Durability and Reliability. A method showing durability and reliability of UAS through demonstration tests.
DAL	Development Assurance Level.
Deviation	A condition in any deviation from the design data (including Test Plans, etc.), or problematic conditions that test specimens or test equipment is damaged during tests, or tests cannot be conducted under specified conditions required by the test plans, etc.
Deviation sheet	A form used for reaching consensus with the Inspection Body to continue the test in case of any deviation from the design data (including Test Plans, etc) or necessary to clarify matters that is not described in the design data, clarify the content of the difference and indicate the judgment on feasibility by the applicant 's department in duty.
DIPS	Drone/UAS Information Platform System. An application should be made through the function of this system.
DO-160	Environmental test method for equipment published by RTCA, titled “Environmental Conditions and Test Procedures for Airborne Equipment.”
DO-178	Guidelines for software certification issued by RTCA, titled “Software Considerations in Airborne Systems and Equipment Certification.”
DOP	Dilution Of Precision.
EMI	Electromagnetic Interference.
FHA	Functional Hazard Analysis. One method of safety evaluation.

FMEA	Failure Mode and Effect Analysis. One method of safety evaluation.
ESC	Electric Speed Controller. A device that controls the rotation speed of the motor of UAS.
FTA	Fault Tree Analysis. One method of safety evaluation.
HIRF	High Intensity Radiated Field.
ICA	Instructions for Continued Airworthiness. A manual for inspection and maintenance of the UAS, etc.
IP	Issue Paper.
LiDAR	Light Detection And Ranging. System, equipment or method which measures variable distances with a laser by targeting an object or surface and measuring the time it takes for the reflected laser to return to the receiver.
LOI	Level Of Involvement. A degree of involvement of the Inspection Body in the review of finding compliance.
MoC	Means of Compliance.
RFC/W	Request for Conformity/Test Witnessing.
RTCA	The acronym for Radio Technical Commission for Aeronautics, the U.S. private non-profit standardization organization in the United States that investigates and consider requirements or technical concepts related to aviation to make recommendations.
RTH	Return To Home. A function for the UA automatically returns to the designated point when a malfunction occurs or upon instructions from the pilot.
SAE	The acronym for Society of Automotive Engineers, the U.S. private non-profit standardization organization that develops automotive and aerospace-related standards and hosts expert meetings.
SOC	State of Charge. An indicator of charging rates or states of battery charge.
SOC (document name)	Statement of Compliance/Conformity.

	The Statement of Compliance is a form of finding compliance, while the Statement of Conformity is a conformity report.
SOH	State of Health. An indicator that shows degrees of soundness and state of deterioration of a battery.
TCDS	Type Certificate Data Sheet. A data sheet that shows the status of compliance with the standards as a part of UAS Type Certificate.
TWR	Test Witness Record.
safety standards	Standards concerning Strength, Structure and Performance to Ensure Safety specified by the Regulation.
safety	The degree to which risk is kept at an acceptable level.
number of items	Quantity. A term used when managing the equipment (including tools, etc.) used in UAS manufacturing.
inverter	A circuit or a device that converts DC current to AC current.
Operational envelope	The range of speed, load, or altitude in which the UA can operate. It is usually used (expressed) in relation to altitude and speed.
processing	Causing changes to basic materials, parts, etc.
UAS Type Certification test	A test conducted based on a Test Plan that has been approved by the Inspection Body in Statement of Compliance for the purpose of using test results to show compliance with UAS Type Certificate, etc. The test conducted for in-house design and development purposes whose results are not aimed to be used for showing compliance should be excluded even if the test is related to the UAS for which the application has been made.
controlled crash	A crash that has been anticipated in the design of the UA, considering the range of parts scattering after the crash, not only the UA itself. These crashes are based on the premise that specific instructions are given to the pilot and relevant persons in the UAS Flight Manuals. E.g., Instruction leading to crash the UA in order to prevent the parts scattering beyond the access control area.



functional inspection	Quantitative inspection using a method specified by a designer to determine whether a product of the manufacturing process has achieved the function intended by the designer. Synonymous with function test.
uniformity	Sameness of the design and manufacturing process of the UAS manufactured and the UAS which has obtained UAS Type Certificate.
Uniformity standards	Standards necessary to Ensure Uniformity specified by the regulation.
assembly	The process of manufacturing a product by combining several materials, parts, and equipment.
gauge marking	A linear, band-shaped, etc. marking on a gauge (meter, etc.) to indicate the upper limit, lower limit, tolerance range, etc.
Inspection Body	A body that conducts UAS Type Certification inspections. JCAB or Registered Unmanned Aircraft Inspection Organization collectively referred to as "Inspection Body".
component	The main structures, equipment, and parts that make up the UAS for which an application has been made.
process	The sequence and stages in which work is carried out to form basic materials, parts, or equipment into components.
Failure Mode	A summary of the conditions in which a system, component, or process failure occurs. E.g., disconnection, short circuit, breakage, wear, deterioration of characteristics, structural destruction, etc. of parts or components.
service life	Operational lifespan or durability timespan.
Geo-fence function	A function that limits the flight range of Unmanned Aircraft Systems. Also called geo-awareness function.
Principle subcontract manufacturers	A function that limits the flight range of the UA within the area intended to flight. It is also called as "Geo-awareness function".
Unusable amount	The amount of fuel or lubricant that cannot be consumed and remains in the tank due to the shape of the tank or the layout of the piping. The weight of such fuel or lubricant must considered included in the weight of an UA.
new technology	A technology that has not been certified in the past UAS Type Certification.

applicant	A person who coordinates with the Inspection Body to obtain UAS Type Certificate and undergoes inspection after the application. This includes prospective applicants who coordinate with the Inspection Body regarding their applications before the application is accepted by the JCAB.)
controlled emergency landing	Safe landing performed by controlling the UAS.
manufacturing process	The entire process of manufacturing an UAS, from receiving basic materials to processing, assembly, inspection and delivery.
Manufacture Management Guidelines	The guidelines prepared by the applicant to ensure that the management of quality control processes (processes, mechanisms) is organized and continuously function for the implementation of Manufacture and Other Activities in order to ensure that the requirements of the uniformity standards continue to be met.
manufacturing plan	A document that should be attached at the application of UAS Type Certification. It should contain the location of manufacture and the names of principle subcontract manufacturers which manufacture the UAS and its components, etc. pertaining to the application as well as the manufacturing schedule of the UAS and its components, etc.
Documents that set forth the manufacturing process	Working and inspection instructions and their records, such as PIR (Production Inspection Record) and worksheets, which are applied to the manufacturing process from receiving materials to processing, assembly, inspection and delivery.
product	Parts, equipment, UA or its system that are manufactured.
design data	Basic data such as drawings and specifications that determine the specifications of UA, etc. as indicated by the designer.
equipment	A finished product that consistent of parts whose purpose is to be used in UAS, and which itself has specific and independent functions.
basic material	Raw material in the state before processing, used as a base when making something.

Class I	Refers to Class I UAS Type Certification (Article 132-16, Paragraph 2, Item 1 of the Civil Aeronautics Act).
Class II	Abbreviated form of ClassII UAS Type Certification (Article 132-16, Paragraph 2, Item 2 of the Act).
certification basis	A set of requirements that must be met to receive certification. It includes procedure or method used to show compliance with certification bases, as well as requirements to apply, compliance showing methods, special conditions, exemptions, or equivalent level of safety.
conformity inspection	Inspection to confirm that test specimens, test setups, etc. conform to the approved Test Plan.
hardover	A condition in which the control surface or actuator has moved to its limit.
destruction mode	A summary of the conditions under which destruction occurs.
flight envelope	The range of speed, load, and altitude that the UA can fly. It is generally used (expressed) in relation to load and speed.
defects (manufacturing related)	A condition in which facilities, equipment, etc., or an UAS, etc. are not functioning as intended due to defects caused by the manufacturing process.
defects (design related)	A condition in which an UAS, etc. is not functioning as intended due to defects in its design.
non-conformity	Deviation from design data, document that specifies manufacturing processes, etc. or standards for quality control systems, etc.
part	The smallest unit making up an UAS or equipment that has no specific independent function itself.
flight mode	Operational conditions such as takeoff mode or cruise mode.
Placard (Marking)	A board-shaped notice in general placed on an UA to provide information.
black box test	A software testing method that checks an application software as a black box without understanding its internal structure.
storage	Storing and managing materials, parts, equipment, etc. in an appropriate manner.
white box test	A software testing method that checks an application software after understanding its internal structure (white box).

multipath	In wireless communication, a condition in which radio waves from the same source reach the receiving end via multiple routes due to the influence of buildings, terrain, etc.
millimeter wave radar	A radar that uses radio waves with a frequency in the millimeter wave band (millimeter waves) and performs sensing by irradiating the target with millimeter waves.
diffuse reflection	Reflection in random multiple directions when hitting an obstacle.
recovery zone	An area of the ground that is marked out in advance for the operation of an UAS, in order to retrieve the UAS without causing harm to third parties or third party properties.

#### 4. Significance of UAS Type Certification

Of the inspections on design, manufacturing process and current status required for UAS Certification, all or part of the design and manufacturing process inspections are omitted on the UAS model that have obtained UAS Type Certificate.

#### 5. Documents required for UAS Type Certification and outline of inspection

For the documents to be submitted and inspection required for UAS Type Certification, there is no distinction between domestic UAS and imported UAS.

##### (1) Documents to be submitted

For the content and details of the documents that should be attached to UAS Type Certification application, refer to Part II of this guideline, "UAS Type Certification Process."

##### (2) Overview of inspection, etc.

###### (a) Application

In accordance with Article 236-22, Paragraph 2 of the Regulations, applicants should electronically submit the specified attachments for the UAS Type Certification through DIPS by the specified deadline. If the Registered Unmanned Aircraft Inspection Organization is selected as the Inspection Body, the application will be accepted after the application form and attached documents submitted through DIPS and the fee for the UAS inspection specified in the Unmanned Aircraft System Inspection Administration Regulations are confirmed to be appropriately paid.

Note that the information submitted through DIPS will be shared with the Registered Unmanned Aircraft Inspection Organization selected at the time of application.

#### (b) Standards for UAS Type Certification

The standards applicable to the UAS Type Certification of the UAS for which the application has been made are stipulated in Circular No. 8-001 “The Inspection Manual of Safety and Uniformity Standards for Unmanned Aircraft Systems (UAS) Type Certificate, etc.”

Generally, the safety standards and uniformity standards that are in effect at the time the UAS Type Certification application is accepted are applied as the procedures or methods for showing compliance with the standards.

However, if a new technology or a special design is applied in the design of the UAS which makes it difficult or unreasonable to apply all or part of the safety standards, special conditions, exemptions, or equivalent level of safety may be set.

In addition, if it becomes necessary to apply the latest standard on the way showing compliance with the safety standards, the latest revised procedures or methods after receiving the application may apply.

#### 6. Changes to UAS Type Certification

When the UAS Type Certification holder intends to make a change to any part of the design or manufacturing process of the UAS for which the UAS Type Certificate has obtained, it is required to follow the procedures for the UAS type design change pursuant to Article 236-29 of the Regulations. For details, refer to item 2-3 of Part II of this guideline.

#### 7. Renewal of UAS Type Certification

TBD

#### 8. Other

Notwithstanding the provisions of this guideline, specific details may be handled by other methods if deemed necessary by JCAB or a Registered Unmanned Aircraft Inspection Organization.

## Part II

# UAS Type Certification Process

## Overall picture of obtaining UAS Type certificate

Certification procedures for obtaining UAS Type certificate are described in Circular No. 8-002 "Procedures for Unmanned Aircraft System (UAS) Type certificate, etc." While Circular No. 8-002 shows the outline of the procedure, this guideline describes more details, including what and by when an applicant should submit to obtain UAS Type certificate as well as what the Inspection Body should check, etc. This guideline first shows the overall and detailed flows up to obtaining UAS Type certificate and then describes how to proceed with the flows appropriately. Note that the said ways are mainly explained for items that Inspection Body (or an individual inspector of the Inspection Body) or applicants may confuse to judge.

### Items that are explained in detail in this guideline

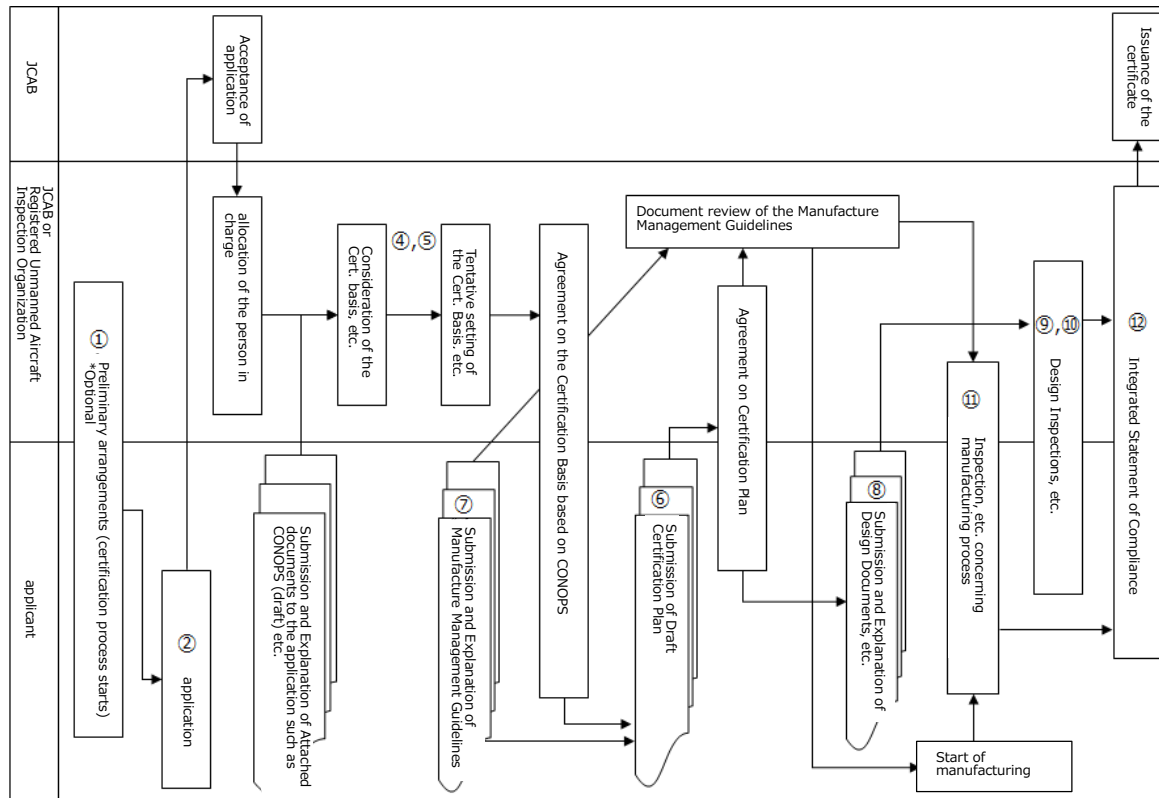
Item number※	Items explained	Page number
①	Preliminary arrangements	p.3
②	Application	p.10
③	UAS Type Certificate Review Board	p.22
④	Consideration, setting and agreement on certification basis, etc.	p.29
⑤	Adjustment of Special Conditions, etc.	p.31
⑥	Certification Plan	p.39
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⑧	Submission of certification documents, explanation and issuance Statement of Compliance	p.47
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⑩	Test report preparation	p.61
⑪	Inspection of process and actual product	p.64
⑫	Integrated Statement of Compliance	p.77
⑬	UAS Type certificate Data Sheet	p.79
Appendix 1	Samples of various forms (RFC/W, SOC, CIR, TWR)	p.82

※ The item numbers indicate the corresponding parts of the process shown in the overview diagram in Figure 1 below.

## Overall flow up to obtaining UAS Type certificate

Figure 1 below shows the overall flow up to obtaining UAS Type certificate.

Figure1 From preliminary arrangements to issuing the certificate



### 1. Preliminary arrangements (certification process starts)

#### 2-1 Preliminary Arrangements

2-1-1 UAS Type Certificate Inspection shall be started upon an application made by a person seeking UAS Type Certificate. A person planning to obtain class I UAS Type Certificate may notify the JCAB to request preliminary arrangements at a stage suitable for realization of the content of the relevant application. The purpose of the preliminary arrangements for class I UAS Type Certificate shall be to smoothly promote the inspection pertaining to UAS Type Certificate after the application, by arranging on general business matters in connection with implementation of the inspection and coordinating on the design concept of the unmanned aircraft, standards to be used, an outline of specifications of the UAS and policies for showing compliance to Safety and Uniformity Standards.

2-1-2 UAS type design changes The provisions of Section 2-1-1 shall apply also to a person planning to change the design or manufacturing process of an UAS for which UAS Type Certificate has already been obtained.



2-1-3 Procedures and content of preliminary arrangements For the purpose of preliminary arrangements, the applicant shall submit the following documents to the JCAB for explanation and adjustment. Documents may be added or omitted according to the nature of the case.

[1] Overview of the applicant

- i Experience related to UAS Type Certificate
- ii Scope and procedures for outsourcing operations
- iii The prospective applicant's systems for communicating with the Inspection Body and for solving any problem that may occur in the process of the inspection

[2] Overview of the assumed timeline up to acquisition of UAS Type Certificate

- i Timeline including milestones

[3] Concept of Operations (CONOPS)

- i A draft of 001 Concept of Operations (CONOPS) which includes information necessary to determine values and scopes of test and operational limits as set forth in Circular No.8-001 "The Inspection Manual of Safety and Uniformity Standards for Unmanned Aircraft Systems (UAS) Type Certificate, etc." (first issue on September 7, 2022: KOKU-KU-KI-456)

[4] Identification of critical problems Ex. Unprecedented design, recent technologies, special conditions, design requiring similar safety and exemption measures

[5] Plans for establishing certification basis Ex. Evidence of necessity and appropriateness in cases where special conditions and similar safety and exemption measures are needed

[6] Draft of certification basis and a certification plan

- i A list of applicability to Safety Standards set forth in Circular No.8-001 "The Inspection Manual of Safety and Uniformity Standards for Unmanned Aircraft Systems (UAS) Type Certificate, etc." (first issue on September 7, 2022: KOKU-KU-KI-456), and a draft of the certification plan, including options of analysis and demonstration relative to each standard set forth in paragraph 1) of Section 5-1-3 of this Circular

[7] Major issues (major challenges)

- i Issues that may affect the timeline overview in the application or hamper acquisition of certification are summarized.

[8] Draft of application for UAS Type Certificate

- i Entries in the application, payment of fees under Section 2-3 of this Circular, and matters to be determined for identification are planned.

[9] Records of coordination Minutes of the coordination, which include matters that are agreed on during the coordination and issues requiring

measures, are prepared, specifying persons involved.

If the prospect applicant anticipates the issues relevant to [4] Identification of critical problems and [7] Major issues (major challenges), consultation with the JCAB is necessary before making application regarding how to deal with them.

#### 1-1. Preliminary arrangements

Applicants planning to obtain Class I UAS Type Certificate must make preliminary arrangements with the JCAB. Applicants planning to obtain Class II UAS Type certificate can voluntarily make preliminary arrangements with the Inspection Body. Minimum preliminary arrangement can be carried out to determine whether inspection can be conducted in terms of schedule, fees, etc. based on “② Expected schedule towards UAS Type certificate acquisition” described in Section 2-1-3 of Circular No. 8-002 or the manpower of the Registered Unmanned Aircraft Inspection Organization.

Preliminary arrangement with the JCAB prior to the application for Class I UAS Type Certificate is as follows from items 1-2 to 1-5.

#### 【Preliminary arrangements with JCAB】

1-2. Matters confirmed in preliminary arrangements (matters ① to ⑨ listed in Section 2-1-3 of Circular No. 8-002)

Preliminary arrangements deepen mutual understanding from the following three aspects.

##### 【Aspect 1: Plan feasibility】

(related to items ①, ②, ③, ⑦ and ⑨)

An overview of the entire project, including an overview of the UAS, is provided and a common understanding is reached on the feasibility of the project based on the applicant's track record, experience, and the overall picture of the certification plan. Also, the communication system with the Inspection Body for the project will be mutually confirmed at this point.

##### 【Aspect 2: Consideration of certification basis】

(related to items ④, ⑤ and ⑥)

Common understanding of the feasibility is established based on such factors as “unprecedented designs,” “new technologies,” “new materials,” and/or “new manufacturing methods” used in the UAS, and certification basis to be applied are considered.

If Special Conditions, Equivalent Level of Safety and/or Exemptions are required, their necessity and appropriateness must also be considered.

##### 【Aspect 3: Close examination of application (draft)】

(related to item ⑧)

Details of applications (draft) are examined.

The main items that JCAB confirms from each perspective are as follows.

**【Aspect 1: Feasibility of the plan】**

(related to items ①, ②, ③, ⑦ and ⑨)

- Application schedule overview
  - ・ UAS overview
  - ・ Schedule and milestones towards to UAS Type certificate acquisition
  - ・ Preparation status towards UAS Type certificate acquisition (status of gathering several standards, etc.)
  - ・ Explanation of manufacture management system
  - ・ UAS Type certificate experience
  - ・ Communication system with the Inspection Body
  - ・ Important problems (issues) for smoothly promote UAS Type certification activity

- Record of arrangements

The applicant must prepare arrangement minutes regarding agreed matters and matters requiring action in arrangement, including the name of the person in charge, and must manage such minutes. As the arrangement minutes will be used in the same way in future coordination with JCAB or Registered Unmanned Aircraft Inspection Organizations, it is desirable to decide the format of arrangement minutes at this stage. For the format of the arrangement minutes, Circular No. 8-002 Attachment 3 can be referred to.

**【Aspect 2: Consideration of certification basis】**

(related to items ④, ⑤ and ⑥)

- Draft of certification basis setting plans, certification basis and Certification Plan :

- ・ Technical elements

Describe whether there are any technical elements that should be especially considered for the UAS the application to make. Aligning the understanding of technical elements between the applicant and the Inspection Body in advance helps inspections after application proceed efficiently. Below is one example of an item that should be stated as a technical element.

### Image of stating technical elements

Technical element※1	Explanation of technical element
XXX function (ex. Fully autonomous flight function)	The UAS to be applied for will have the ability to fly from take-off to a set route, all the way to landing, with only one touch of a button by the pilot.

※1. Other possible technical elements include functions such as engine, AI (Artificial Intelligence) and/or DAA (Detect and Avoid). Listing the possible technical elements of the UAS to be applied for is recommended.

#### • Applicability to standards

This is a list that shows whether each standard applies to the type of UAS to be applied for. In addition, providing a list of applicable and non-applicable items, and for non-applicable items, state the reason in the list so that it will help inspections proceed more efficiently. Below is one example of a list of applicability to safety standards. Note that examples of documents that must be certified are summarized in the form of a list of certification documents in Part III of the guideline. Refer to them as appropriate.

### Example of applicability list for existing standards

Section	Content	Applicable/ not applicable	Remarks
001	Concept of Operation (CONOPS) It shows that it is an appropriate operation method according to the UAS performance and functions.	Applicable	This standard is applied because it clarifies the Definition of the expected operation of UAS and is a prerequisite for UAS Type certificate testing.
～ (Omitted) ～			
140-4	Dangerous objects transportation UAS that transports dangerous objects must be equipped with equipment suitable for	Not applicable	This standard does not apply because the UAS does not transport dangerous objects.

	transporting dangerous objects.		
~ (hereinafter omitted) ~			

【Aspect 3: Close examination of application (draft)】 (related to item ⑧)

● Draft of UAS Type Certificate application

As those who wish to apply for UAS Type certificate are required to submit a UAS Type certificate application form to the Minister of Land, Infrastructure, Transport and Tourism under Article 236-22 of the Regulations, applicants need to create a draft of the content to be input DIPS for UAS Type certificate application. They also need to state the basis for calculating the fee.

1-3. Points to arrange

The policy for arrangement in each aspect is as follows.

• Feasibility of the plan

Review the content of the project overview materials presented by the applicant and check for the feasibility of the plan. As significant problems (significant issues) are believed likely to impede the acquisition of the UAS Type certificate, it is necessary to understand them and encourage applicants to resolve them as early as possible.

• Consideration of certification basis

Review details of the applicability of the standards presented by the applicant and confirm that there are no omissions as the certification basis. It is necessary to understand “unprecedented designs,” “new technologies,” “new materials,” “new manufacturing methods,” etc. and confirm the certification plan, etc.

Including the above, consider the need to establish Special Conditions, Equivalent Level of Safety and Exemptions.

• Examination of application form (draft)

Review the UAS Type certificate application form submitted by the applicant and check for any omissions or errors in the information provided. If there are no problems, proceed to the application information input on DIPS.

1-4 Reference materials

Reference materials for items 1-2 and 1-3 above are as follows.

Circular No.1-301 “Guidelines for implementing preliminary arrangements”

## 1-5 Other

In principle, the test data used to show compliance with standards should be tested and obtained based on the test plan issued with a Statement of Compliance by the Inspection Body. However, even the data obtained by tests in which the Inspection Body is not involved can be utilized as test data for UAS Type certification activity, if the data meet the specific conditions.

If there is test data that the applicant plans to utilize, they can consult with the Inspection Body during the preliminary arrangement phase regarding its utilization to use it as a reference for the schedule to obtain UAS Type Certificate.

If an applicant plans to obtain a Class I UAS Type Certificate wishes to utilize the test data described in section 9 of Circular No. 8-002, they can consult with the JCAB during the preliminary arrangement phase. An applicant planning to obtain a Class II UAS Type Certificate who wishes to utilize the test data described in section 9 of Circular No. 8-002 should explain to the Registered Unmanned Aircraft Inspection Organizations after submitting the application that they meet the conditions stipulated in both item (1) and (2) of section 9 of Circular No. 8-002. When conducting preliminary arrangements with the Registered Unmanned Aircraft Inspection Organizations, if the intention to utilize the test data is clearly indicated during the preliminary arrangement, it can facilitate smoother adjustments to the schedule and other arrangements.

For details, refer to Circular No. 8-002 section 9. Treatment of test data obtained without the involvement of the Inspection Body.

## 2. Application

### 2- 2 Application

2-2-1 UAS Type Certificate Pursuant to Article 236-22, paragraph (1) of the Regulation for Enforcement of the Civil Aeronautics Act (Order of the Ministry of Transport No. 56 of 1952) (hereinafter referred to as the "Regulation"), a person who intends to apply for UAS Type Certificate shall submit an application for UAS Type Certificate along with accompanying documents prior to the prescribed time set forth in paragraph (2) of the same Article. The accompanying documents shall be as follows.

Notwithstanding the provisions below, the documents pertaining to an UAS that has already been manufactured at the time of the application shall be submitted at the time of the application.

- (a) Design plan (submission time: at the early stage of design)
- (b) Design documents (submission time: before commencement of production)
- (c) Drawing list (submission time: before commencement of production)
- (d) Design drawing (submission time: before commencement of production)
- (e) Parts list (submission time: before commencement of production)
- (f) Manufacturing plan (submission time: before commencement of production)
- (g) A document showing that the uniformity of the type is ensured (submission time: before commencement of production)
- (h) Specifications (submission time: before implementation of an inspection of the current situation)
- (i) UAS Flight Manual (submission time: before implementation of an inspection of the current situation)
- (j) Maintenance Manual for the UAS (submission time: before implementation of an inspection of the current situation)
- (k) Documents describing matters necessary for calculating the weight and center of gravity of the Unmanned Aircraft (submission time: before implementation of an inspection of the current situation)
- (l) Other documents containing reference information (submission time: before implementation of an inspection of the current situation)

2-2-2 UAS type design changes A person who intends to change part of the design or manufacturing process of an UAS of a type that has obtained UAS Type Certificate (including the addition of an UAS of a type belonging to the same series as the type of an UAS that has obtained UAS Type Certificate) shall submit an application for change of the type design

and/or manufacture process and accompanying documents in a manner similar to the procedures for acquisition of UAS Type Certificate, in accordance with the provisions of Article 236-29 of the Regulation. Application for change of UAS Type Certificate may be submitted only by the UAS Type Certificate holder for the relevant type.

(The rest is omitted.)

## 2-1. Application overview

Applicants are required to submit a UAS Type certificate application and necessary attachments in accordance with Article 236-22 of the Regulations. Note that attachments must be submitted at the appropriate time depending on the document. It is not necessary to provide full information in all attachments by the time of application, but the applicant should provide as much information as possible and the Inspection Body should confirm that there are no problems in the information that provided at the time of application.

Reference: Attachments required under the Regulations and their submission timing

Attachments <sup>※1</sup>	Time of submission
I Design plan	Early stage of design <sup>※2</sup>
II Design documents	Before commencement of production <sup>※2</sup>
III Drawing list	
IV Design drawings	
V Parts List	
VI Manufacturing plan	
VII Documents showing that the uniformity of the Type is ensured	Before implementation of an inspection of the current status
VIII Specifications	
IX UAS Flight manuals	
X Maintenance Manual for the UAS	
XI Documents describing matters for calculating the weight and center of gravity of the UA	
XII Other documents containing reference information (in addition to those listed in the preceding items.)	

※1. Note that the timing of submission for the documents that the UAS being manufactured at the time of application will be the time of



application, regardless of the timing listed in the table above.

- ※2. The UAS that is subject to the “early stage of design” and “before commencement production” described here refers to the test specimens used for UAS Type certificate testing, not the mass-produced UAS.

## 2-2. Outline of information to be stated in application attachments

When submitting a UAS Type certificate application, the applicant must also submit the attachments in item 2-1. The description here provides an overview of the attachments. The following are examples of information to be stated in the attachments, but as the items that can be stated in different ways depending on the design of the UAS, such information may not be limited to these. State information to identify software in either the design documents, the design drawings, or the Parts List. If there are duplicate entries in multiple attachments, referring to another section for those duplicate entries are allowed.

Examples of entries to write on each attachment can be found on the following website.

<https://www.mlit.go.jp/koku/certification.html>

### (a) Design plan

State the following information.

- a. Outline of design (including a draft of the Concept of Operation (CONOPS))

This refers to section 001 of Circular 8-001 “The Inspection Manual of Safety Standards and Uniformity Standards Unmanned Aircraft System (UAS) Type Certificate, etc. (hereinafter referred to as “UAS AIM”).”

- b. Outline of the propulsion system
- c. Outline of performance (outline of estimated performance of takeoff/landing, ascent, descent, cruising, etc., stability, maneuverability, etc.)
- d. Outline of the structure
- e. Outline of major equipment (communication systems, propulsion systems, electrical power systems, automatic control systems)

### (b) Design documents

The following items should be included.

- a. Explanatory material on the function and performance of the propulsion system

- b. Explanatory material for flight performance (estimated performance, stability, maneuverability, etc. for takeoff, landing, climb, descent, cruising, etc.)
- c. Document that explains the aircraft structure
- d. Document that explains the functions and performance of the main equipment (communication system, power supply system, and automatic control system), including a major line diagram (block diagram)
- e. If special structures or equipment, etc. that differ from their general usage are used, explanatory materials regarding their functions and performance
- f. Other materials describing explanations, calculations, and others to demonstrate compliance with certification bases (it is not necessarily before the start of production, but shall be submitted at the appropriate time of the Type Certificate activity coordinated with the Inspection Body)

#### (c) Drawing list

The drawing list centrally manages drawings necessary to manage the type specifications of the UAS for which UAS Type Certificate is sought.

The list should include all drawing numbers, description and revision codes, etc., of the major drawings (external shape, internal structure, installation of the major equipment indicated in item (b), etc.) relating to the design of the type of UAS pertaining to the application. The purpose of the drawing list is to confirm the design of the type-certified UAS. If a record of this confirmation can be kept in the database of the drawing management system, it may be possible to use this as the drawing list with the approval of the Inspection Body.

#### (d) Design drawings

Although a three-view drawing is required at a minimum, submitting other set of drawings, not just a three-view drawing, is recommended to enhance mutual understanding between the applicant and the Inspection Body.

It is desirable that the drawings to provide information such as the dimensions, specifications, parts that are used, assembly methods, etc. of the UAS.

#### (e) Parts List

The Parts List should be created by the equipment/part level so that the type (components) of the UAS are identified. For all equipment and some parts that make up the type of UAS (parts that fall under 135 Flight Essential Parts as required by the Circular No.8-001), name of each part, part

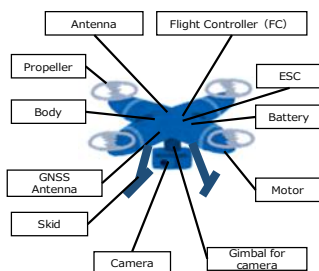
number, manufacturer's name, quantity, etc. of the equipment/part shall be listed.

The Part List should also include any equipment that the user of the UAS may optionally install depending on the operating method, etc. (hereinafter referred to as "optional equipment"). However, optional equipment may be managed in a list separate from the Part List only if it does not affect the flight characteristics of the Type-certified UAS. If managing in a list separate from the Parts List, it will not be included in the UAS Type certificate documents shown in item 2-3, so it is necessary to agree with the Inspection Body about managing in a separate list and on the information to be provided in those list. If a list separate from the Parts List is used, note that deviations from the range (the range for which UAS Type certificate was granted, including maximum takeoff weight, center of gravity position, speed, usage environment, etc. related to the performance and capabilities of the relevant Type of UAS) constitutes a UAS Type certificate change under item 2-3.

Note that the units of parts described are those requested by the designer in drawings, etc. For example, if a drawing requires the part number of a motor, there is no need to indicate the internal components of the motor.

See the list below to get the general idea of the degree of detail required for the Parts List.

<An Image of the Level of Detail in the Parts List>



Description	Parts number	Manufacturer name	Quantity	Flight Essential Parts
Body	1234-0001	Own Product	1	Not applicable
Skid	1234-0004	J Co.	1	Not applicable
Propeller	PM-2022	A Co.	4	Applicable
Motor	EM-R04	B Co.	4	Applicable
Battery	BA-20201825	Y Co.	1	Applicable
Antenna	AN-20514141	J Co.	1	Applicable
GNSS Antenna	G16-19	K Co.	1	Not applicable
ESC	5193	H Co.	1	Applicable
FC	6129203	R Co.	1	Applicable
<hr/>				
Camera	saos-c6	T Co.	1	Not applicable
Gimbal for camera	1234-0010	Q Co.	1	Not applicable

#### (f) Manufacturing plan

The following items should be stated.

- a. The place of manufacturing the UAS to which the application pertains and its components, and the names of main subcontractors.
- b. Written procedures to be used for the production process, inspection records, and other regulations related to manufacturing methods or management methods and systems that are applied to the production process and are not specified in drawings.

(g) Documents showing that the uniformity of the type is ensured

This is a document that confirms that the production quality control is appropriate and is maintained, managed, and operated in an organized manner as a way of confirming an appropriate system is in place to uniformly manufacture UAS that satisfy the design of the type (UAS that comply with safety standards), in addition to process inspections, with a purpose to confirm that the UAS comply with uniformity standards. The applicant must specify these matters in the Manufacture Management Guidelines.

However, if the items required by the uniformity standards are documented in company regulations, it is acceptable for the Manufacture Management Guidelines to refer to the relevant sections of the company regulations that contain item that handles each of the uniformity standards.

(h) Specifications

The following items should be stated in the written specifications. For items that have already been written in the design documents, design drawings, etc., it is possible to only write down the relevant document number and item number.

- a. Type of the UAS to which the application pertains
- b. Name and quantity of motors, Electric Speed Controller or engines and propellers (rotors)
- c. Name and address of the manufacturer of the UAS to which the application pertains (if the manufacturer is a juridical person, the name and the location of its principal office)
- d. The revision date and document number of compliance of the "The Inspection Manual of Safety and Uniformity Standards for Unmanned Aircraft Systems (UAS) Type Certificate, etc." (first issue on September 7, 2022: KOKU-KU-KI-456)
- e. Major specifications of the type of UAS to which the application pertains
- f. Explanation and necessary diagrams concerning the weight, the weight distribution, and the location of the center of gravity, such as the maximum takeoff weight and the allowable range of the center of gravity

- g. Operating limitations (ground speed limits/airspeed limits, wind speed limits, altitude limits, rainfall limits, and temperature limits, etc.)
- h. Power or thrust, the rotational speed of rotor blades in case of a rotary-wing type UAS, and specifications concerning the operation of the propulsion system such as outside temperature in which the engines can operate effectively in case of an UAS equipped with engines (excluding power generator)
- i. Fuel grade and standards for lubricating oil in case of an UAS equipped with engines (including power generators)
- j. Total capacity and unusable amount of fuel, lubricant, etc. in case of UAS equipped with engines (including power generators)
- k. Name, quantity, and usage method of optional equipment and various limits when it is mounted
- l. Types of equipment and parts (names and standards or specifications of standard equipment and optional equipment)
- m. Relevant serial number

(i) UAS Flight Manuals

Matters listed in paragraph 3, Article 236-12 of the Regulations should be stated.

- Prepare it in accordance with Section 200 Flight Manual of the UAS AIM for UAS Certification and UAS Type certificate.
- The comprehensive information that is necessary for a pilot to conduct safe flights should be included.

(j) Maintenance Manual for the UAS

Matters listed in paragraph 4, Article 236-12 of the Regulation should be stated. The applicant must prepare the manual for inspection and maintenance procedure for the UAS, etc. in accordance with Section 205 ICA of the UAS AIM. The procedure manual should be contained the information necessary for the user of UAS to properly inspect and maintain the UAS, as well as its equipment, parts, parachutes, etc., and AEs.

In addition, the applicant must also include in the Maintenance Manual for UAS documents that describe the methods, procedures, etc. for conducting ground-function test and flight tests needed for renewal inspections, etc. for UAS Certificate (hereinafter referred to as "on-site inspection procedure manual"). If the applicant seeking for Class II UAS Type certificate for an UAS that has a maximum takeoff weight of less than 25 kg, prepare an on-site inspection procedure manual in accordance with the UAS Safety Division Director's Notice (National Aircraft No. 237031) "Guidelines for preparing on-

site inspection procedure manual for UAS.” If the applicant seeking Class I, or Class II UAS Type certificate for an UAS that has a maximum takeoff weight of 25 kg or more, the applicant must establish necessary on-site inspection procedures in view of the fact that the UAs fly over third parties and/or that an UAS with a high maximum take-off weight. This can apply to procedures for checking the soundness of equipment for external monitoring and mitigation measures that are equipped in view of the fact that the UAs fly over third parties and/or that an UAS with a high maximum take-off weight, as well as various devices listed as options in the CONOPS, but is not limited to these.

(k) Documents describing matters necessary for calculating the weight and center of gravity of the UA

The following items should be stated unless they are already stated in the UAS Flight Manual.

- a. Weight and center of gravity of the UA
- b. Name, weight and location of the center of gravity of the equipment, etc.
- c. Usable volume and location of the center of gravity of the fuel tank in case of the UA equipped with engines (including electric power generators)
- d. Others

(l) Documents stating other reference information

a. Management plan to ensure safety

The applicant must prepare a “management plan to ensure safety” as shown in Section 8 of Circular No. 8-002. As JCAB confirms the “management plan to ensure safety,” it is recommended that applicants submit the document possibly soon after the application. The submission address is as indicated in Circular No. 8-002, item 2-5-1.

The “management plan to ensure safety” becomes effective at the same time as UAS Type certificate granted.

b. Other required materials deemed necessary by the Inspection Body

Documents that the Inspection Body deems necessary may be required to be submitted after consultation with the applicant.

## 2-3 UAS Type design changes

Applicants (limited to the UAS Type certificate, etc. holder), who intend to change part of the design or manufacturing process of the UAS of a Type that already has UAS Type certificate, need to undergo the procedures for UAS Type design change in accordance with the provisions of Article 236-29

of the Regulations. As UAS Type design changes is a procedure required when deviating from the UAS configuration of the Type already has UAS Type certificate, the applicant must specify the design, manufacturing procedures, and quality control system that apply to the UAS that has UAS Type certificate as the UAS Type certificate document when acquiring UAS Type certificate. Documents that may fall under UAS Type certificate documents are listed in Table 2-3 below, but are not limited to them. When undergoing inspections for UAS Type certificate, the applicant must specify the format of relevant documents using document numbers, revision codes, etc. and submit them to the Inspection Body.

Table 2-3. UAS Type certificate documents specified in design, manufacturing procedures, and quality control systems

Related details	Applicable document
Design	Design documents
	Drawing list
	Design drawings
	Parts List
	Specifications
	UAS Flight Manuals
	Maintenance Manual for the UAS
	Documents describing matters necessary for calculating the weight and center of gravity of the UA
Manufacturing procedures	Documentation of manufacturing processes (only those that affect compliance with uniformity standards)
Quality control systems	Manufacture Management Guidelines

If there are any changes to the UAS Type Certificate documents shown in Table 2-3 for a type-certified UAS, the UAS Type Certification holder must take the following measures. Note that Circular No. 8-002, item 6-1 can be referred to determine whether it is subject to UAS Type design change. If the UAS Type Certificate holder is unsure what to do, consult with the Inspection Body. For Class I UAS Type Certificate, consult with the JCAB. For Class II Type Certificate, consult with the Registered Unmanned Aircraft Inspection Organization that conducted the inspection related to the UAS Type Certificate most recently.

There are 3 scenarios in which UAS Type design change may or may not occur, as follows:

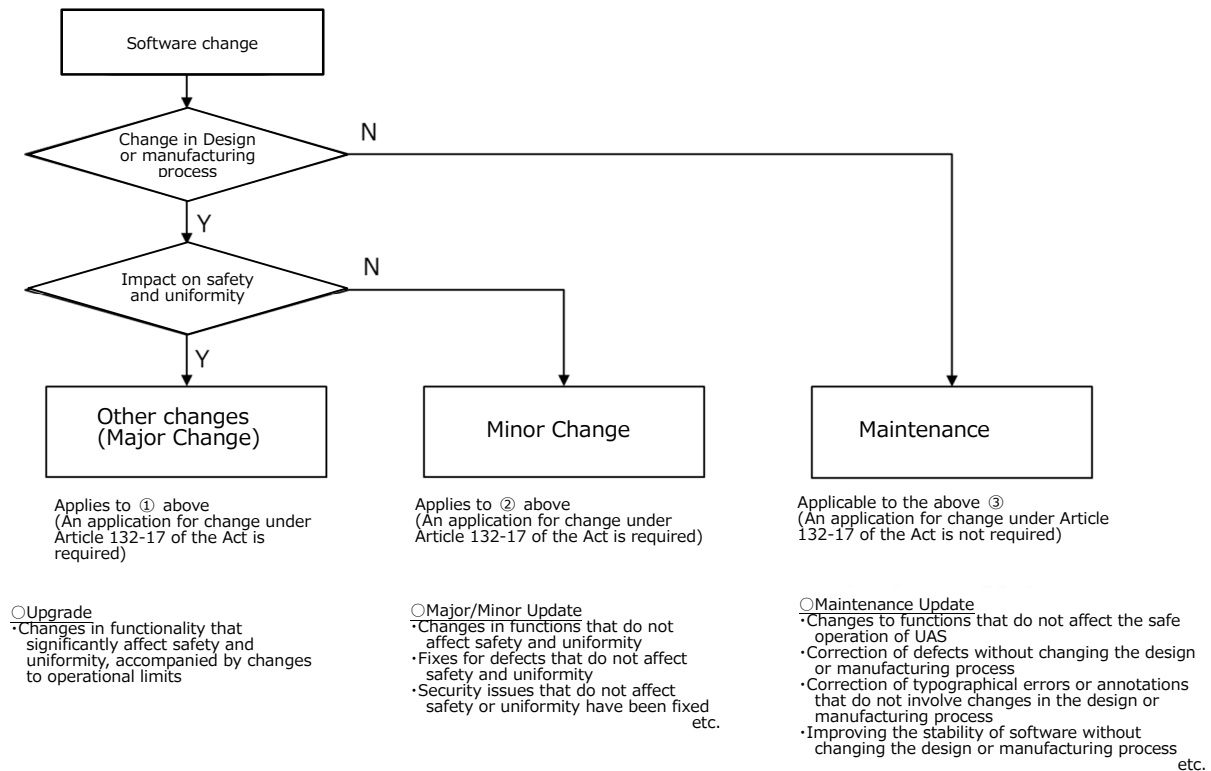
- ① When changing the UAS Type Certificate document and the changes are made to the design or manufacturing process (excluding those falling under ②)  
(Changes made under Article 132-17 of the Act that falls to Major change)
- ② When changing the UAS Type Certification documents, and changes are made to the design or manufacturing process, but the changes do not affect the safety and uniformity of the UAS (the changes do not affect the performance or capabilities of the UAS of that type, such as maximum takeoff weight, speed, or operating environment) (changes made under Article 132-17 of the Act that falls to minor change)
- ③ When changing the UAS Type Certificate documents, but without changing the design or manufacturing process (not falling under Article 132-17 of the Act)

For ① and ②, an application for the UAS Type design changes must be submitted to the JCAB in accordance with the provisions of Article 132-17 of the Act. For ③, no application is required, but the UAS Type Certificate holder must make the change appropriately and manage the records under holder's own responsibility. The JCAB may check these records at the UAS Type design changes, or at the UAS of the same Type re-certified, etc. when the validity period of said UAS Type Certificate expires. The place to apply for ① and ② is as stated in Circular No. 8-002, item 2-5-1.

For software changes in particular, refer to the following judgment flow and supplementary explanation.



【Reference: Judgment flow for software changes】



(Additional Explanation)

Any software change must be determined through a Change Impact Analysis to determine whether the change is an upgrade, a major/minor update, or a maintenance update.

Example of an upgrade:

- ・ Changing the software of a flight controller to extend its operating limits

Examples of major/minor updates:

- ・ When there is a major change to the verification method, configuration management method, or defect management method for the software.
- ・ When there is a change to the software due to a change in functionality that does not result in a change to the operational limitations, a correction of defects, or a correction of cybersecurity

issues, and there is a change to the UAS Flight Manual and/or the ICA of which approved by the JCAB.

Examples of maintenance updates:

- Software that does not affect the safe operation of the UAS, such as a camera, when changing the software installed in that camera
- Software changes that do not result in changes to the operational limitations, and involve changes other than those specified in the UAS Flight Manual and the ICA of which approved by the JCAB
- Improving the stability of the flight controller

#### 2-4 Handling of UAS that were manufactured before UAS Type Certificate granted

For UAS manufactured before UAS Type Certificate granted, only unused and unsold UAS of those that are in stock at the manufacturer can be included in the UAS eligible for UAS Type Certificate as long as the design, manufacturing procedure, and quality control systems used are the same as for the mass-produced UAS indicated in Table 2-3. If the applicant intend to including an UAS that has already been manufactured before the UAS Type Certificate granted, the applicant must explain that its design, manufacturing procedure, and quality control systems are the same as those for the UAS that will be manufactured after obtaining UAS Type Certificate granted and show compliance of the mass-produced Type with the UAS Type Certificate documents indicated in Table 2-3. In this case, the applicant must promptly notify the Inspection Body of this intention and undergo an inspection by the Inspection Body. In addition, in order to inform users of the serial number of the UAS subject to UAS Type certificate, the applicant must coordinate with the Inspection Body and, before the final screening or final coordination, must clearly indicate the serial number in all required documentation to be provided to users, including the UAS Flight Manuals, Maintenance Manuals for the UAS, and TCDS. In addition, it should be noted that the applicant must conduct inspections and create and preserve inspection records pursuant to Article 132-18, Paragraph 2 of the Act, and fulfill the obligations such as representations under Article 132-19 of the Act, which is required when manufacturing a UAS that has obtained UAS Type certificate.

## Flow from the initial UAS Type Certificate Review Board meeting to agreement on Certification Plan

Here describes the procedure after the application is accepted that the initial UAS Type Certificate Review Board meeting is held and the certification plan is agreed upon.

### 3. UAS Type Certificate Review Board

#### 4. UAS Type Certificate Review Board

##### 4-1 UAS Type Certificate Review Board

The UAS Type Certificate Review Board may be established as necessary by the Inspection Body to examine the overall status of certification activities for each UAS Type Certificate, etc. The UAS Type Certificate Review Board meetings may be held at important points during UAS Type Certificate, etc., such as the initial review meeting and the final review meeting.

The UAS Type Certificate Review Board is held when discussions on certification basis are necessary due to the complexity of the UAS pertaining the application, the novelty of the design, or other reasons. If the applicant wishes to, the UAS Type Certificate Review Board may be held after consultation with the Inspection Body.

4-2 Holding UAS Type Certificate Review Board meetings The objectives of review meetings and matters to be examined shall include, but are not limited to, the following items.

- (1) Initial review meeting (which shall be preferably held before commencement of production)
  - (a) Dissemination of the overall inspection plan pertaining to UAS Type Certificate
  - (b) Exchange of opinions on design details and technical issues or challenges
  - (c) Preparation of (draft) certification basis
  - (d) Discussion on how to deal with the technical issues or challenges
  - (e) Establishment of the schedule up to acquisition of UAS Type Certificate

(Omission)

4-3 Preparation of minutes Each Board shall prepare minutes for each review meeting. The prepared minutes shall be organized and stored, along with documents to be submitted, by the applicant.

### 3-1. UAS Type Certificate Review Board

A UAS Type Certificate Review Board is established by the Inspection Body as necessary to review the overall certification status of each UAS Type Certificate, etc. A UAS Type Certificate Review Board will be held when it is necessary to discuss the applicable standards due to the complexity of the UAS related to the application, the novelty of the design, etc. In addition, if the applicant wishes to hold a UAS Type Certificate Review Board, it may do so in consultation with the Inspection Body.

For reference, the UAS Type Certificate Review Board held when the JCAB conducts an inspection is described below.

【Reference: UAS Type Certificate Review Board conducted by the JCAB】

### 3-2. The initial UAS Type Certificate Review Board meeting

#### 3-2-1. Notification of the overall inspection plan for UAS Type Certificate

The applicant will explain to the Inspection Body the preparation status regarding the setting of milestones for obtaining UAS Type Certificate, and the Inspection Body will confirm whether the milestones are feasible based on the preparation status.

#### 3-2-2. Exchange of opinions on design details and technical matters or issues

Based on the preliminary arrangements in section 1 and the matters related to the application in section 2 in this part, the relevant parties will gather and exchange opinions on the design details and issues that need to be considered in the future.

#### 3-2-3. Preparation of draft of certification basis, etc.

The applicant and the Inspection Body will consider the certification basis before the initial UAS Type Certificate Review Board meeting, taking into account the design of the UAS applied for. At the initial UAS Type Review Board meeting, the relevant parties will agree to the draft of certification basis.

#### 3-2-4. Discussion on how to deal with technical matters or issues

Discuss solutions to the issues that the applicant has indicated as new technologies or issues compared to general UAS. If necessary, preparation of Issue Papers such as Special Conditions, etc. are to be considered. For the Issue Paper, the applicable candidate list are summarized in Part III of this guideline, but are not limited to.

### 3-2-5. Setting a schedule up to obtaining UAS Type Certificate

A more detailed schedule will be set than the schedule indicated in the preliminary arrangements. Mainly, check both the schedule from application up to obtaining the UAS Type Certificate submitted by the applicant and the schedule of the Inspection Body, and set a realistic inspection schedule.

### 3-3. Final UAS Type Certificate Review Board meeting

The following will be done at the final UAS Type Certificate review Board meeting.

- (a) Finalization of the certification basis applied
- (b) Final inspection of submitted documents, compliance with safety and uniformity standards, test results, etc.
- (c) Inspection of outstanding issues concerning the issuance of the UAS Type Certificate

The following provides supplementary information for (a), (b), and (c) above.

#### 3-3-1. Final determination of certification basis

As the design and testing of the UAS progress, the certification basis may change, so confirm that they have been finalized.

#### 3-3-2. Final inspection of submitted documents, compliance with safety and uniformity standards, test results, etc.

Confirm that all documents submitted to date to demonstrate compliance with safety and uniformity standards are complete and that the Inspection Body have been approved. Also, confirm that there are no ongoing discussions regarding the results of tests conducted to demonstrate compliance with safety standards.

#### 3-3-3. Inspection of unresolved issues related to the issuance of the UAS Type Certificate

Confirm that there are no remaining issues that have arisen during UAS Type Certification activities that may affect the issuance of the UAS Type Certificate.

### 3-4. Guidelines for the Type Certificate Review Board

#### 3-4-1. Purpose

This item provides details on the operation of the UAS Type Certification

Review Board (hereinafter referred to as the "Review Board" in item 3-4), which is established when conducting inspections for UAS Type certification and UAS Type design changes.

#### 3-4-2. Overview

The Review Board is held to inform the entire plan for the UAS Type certification, etc. activities, resolve important issues, setting milestones and schedules, inspect the draft of certification basis, and resolve all outstanding issues related to the UAS Type Certification, etc. activities.

#### 3-4-3. Review Board

##### 3-4-3-1. Composition of the Review Board

The Review Board is composed of the following parties. The Inspection Body may request other parties to attend and provide technical advice as necessary.

- (1) Inspection Body
- (2) Applicant

##### 3-4-3-2. Holding of Review Board

The chairperson of the Review Board is a person designated by the Inspection Body. The chairperson will organize the Review Board at an appropriate time before the start of each Review Board. When organizing the Review Board, sufficient coordination will be made in advance to ensure that the inspection is meaningful. The Review Board is usually held twice, the "initial" and "final". In addition, if the chairperson deems it necessary, the "preliminary" and "interim" Review Board may be held at an appropriate time.

Those involved must be familiar with the contents of the UAS Type Certificate etc. that are the subject of the inspection. Note that it is not necessarily required that all those involved attend the Review Board. In such cases, those who are absent may, with the prior consent of the chairperson, appoint a representative to attend.

The secretariat for holding the Review Board will be located within the Inspection Body and will assist the chairperson. The secretariat will be coordinated by the inspector in charge of inspection of the UAS Type Certificate, etc. that are the subject of the inspection. Review Board can also be established when inspecting important design changes etc. Examples of important design changes etc. are shown below.

- ① When Special Conditions, Exemptions or Equivalent Level of Safety apply

- ② When an unprecedented design or unconventional manufacturing method is used
- ③ When changes are involved in the movement, dynamics and configuration of the control or drive system.
- ④ If the flight characteristics of the UA change substantially
- ⑤ Cases in which the UAS seriously impedes flight operations or causes an accident
- ⑥ When there is a change to equipment directly related to thrust, such as engines, fuel systems, batteries, motors, propellers, etc.
- ⑦ When the configuration of basic loads necessary for continued flight safety or operation within approved limits is affected
- ⑧ When using new cutting-edge systems or equipment for which the standards have not yet been established
- ⑨ Any other case where the Inspection Body requires it

#### 3-4-3-3. Procedures for holding the Review Board

The Secretariat will grasp the preparation status of the matters that need to be considered for each Review Boards, and when it is deemed that the environment for holding each Review Board is ready, coordinate the date, time, and contents of the Review Board with the applicant, etc. The Secretariat shall, with the consent of the Chairperson, notify the scheduled attendees of the date, time, location, and contents of the examination. If there are attendees other than those related to the UAS, it is necessary to coordinate the matters for which technical advice is required and to inform those involved.

#### 3-4-3-4. Other Review Board

When it is deemed necessary for holding the Review Board to conduct an examination at an appropriate time other than the "initial" and "final" Review Board, an irregular (preliminary or intermediate) Review Board can be held.

##### ① Preliminary Review Board

Preliminary Review Board are held to build a cooperative relationship between the Inspection Body and the applicant from the application for UAS Type Certificate, etc. up to the environment for holding the initial Review Board is ready. The main purpose of the preliminary Review Board is to develop mutual understanding of the UAS Type certification process by examining the contents of the application.

## ② Interim Review Board

An interim Review Board may be held when a problem that requires inspection and resolution by the Review Board occurs during the inspection process for the UAS Type Certificate, etc., and when a regular Review Board is not scheduled to be held in the near future. Since the Review Board is held at an appropriate time to resolve the problem, it may be held by convening only those involved in the matter of the inspection.

### 3-4-4. Preparation of minutes

The Secretariat will prepare minutes for each Review Board, distribute them only to those involved after receiving confirmation from those in attendance, and securely store them as documents related to the UAS Type Certificate, etc. Note that minutes may contain matters related to the applicant's intellectual property rights, so they must be handled with care to avoid being accidentally exposed to the person note relate to. An example of minutes to be used at Review Board is shown on the next page.

- ① Type of Review Board(initial, interim, final, etc.)
- ② Name of Applicant
- ③ Name of UAS Type and Model
- ④ Location and date and time of Review Board
- ⑤ Attendees of Review Board
- ⑥ Purpose of Review Board
- ⑦ Agenda items
- ⑧ Review contents: Includes important issues and their solutions, and is divided into items of the Certification Basis by each to be referenced. Each item should be described briefly, including the contents of the discussion, schedule, and conclusion.

### 3-5. Reference materials

Reference materials for item 3-2 to 3-4 are as follows.

Circular No. 1-305 "Type Certification Review Board Operational Guidelines"



(Preliminary, Initial, Intermediate, Final) UAS Type Certificate Review Board Meeting Minutes
Applicant :
Type and Model :
Location and Date of the Review Board :
Attendees of the Review Board :
Purpose of the Review Board :
Agenda item :
Review Content :

#### 4. Consideration, setting and agreement on certification basis, etc.

3. Certification Basis 3-1 Certification Basis Standards that are applied to UAS Type Certificate to which application pertains shall be the following standards as set forth in Articles 236-15 and Article 236-24 of the Regulation.

(1) "Standards concerning Strength, Structure and Performance to Ensure Safety" (related to Article 236-15 of the Regulation)

(2) "Standards for Specifying as those Necessary to Ensure Uniformity" (related to Article 236-24 of the Regulation)

3-2 Manuals or methods for showing compliance with the certification basis

3-2-1 UAS Type Certificate Regarding the manuals and methods for showing compliance with the certification basis in UAS Type Certificate, Circular No.8-001 "The Inspection Manual of Safety and Uniformity Standards for Unmanned Aircraft Systems (UAS) Type Certificate, etc." current as of the date of receipt of application for the relevant UAS Type Certificate shall apply. Notwithstanding the foregoing, if it is difficult or unreasonable to apply all or part of the said UAS Airworthiness Inspection Manual due to adoption of new technologies or a new design in the design of the UAS, special conditions, exemptions or equivalent level of safety may be established. For the purpose of this Circular, the applicable inspection manuals in Circular No.8-001 "The Inspection Manual of Safety and Uniformity Standards for Unmanned Aircraft Systems (UAS) Type Certificate, etc.", special conditions, exemptions or equivalent level of safety shall be collectively referred to as "Inspection Manuals, etc.", as manuals and methods for showing compliance with the certification basis. If any special requirement, exemption or equivalent level of safety need be established, the applicant shall consult the JCAB (for applicants for class II UAS Type Certificate, the JCAB and the Inspection Body) to determine its details. In any of the following cases, the inspection manuals or methods revised after receipt of application shall apply:

(1) If the applicant wishes to apply the latest standards

(2) After three years have passed from the receipt of application (except if the applicant indicates at the time of application that a period of more than three years is required for design, development, testing, etc., and the JCAB accepted). However, in order to make a change under Article 132-17 of the Act, inspection manuals which were effective at any point (which the applicant may select) during the three years preceding the date of

issuance of the UAS Type Certificates shall apply.

3-2-2 UAS type design changes A person who intends to change UAS Type Certificate (including the addition of an UAS of a type belonging to the same series as the type of an UAS that has obtained UAS Type Certificate) shall conduct inspection on parts where the design or manufacturing process is changed and parts which are affected by such a change, in accordance with the manuals and methods which were applied when inspection was conducted to obtain the UAS Type Certificate. Alternatively, the latest inspection manuals current as of the date of application for the change may be applied.

#### 4-1. Notes on certification basis

- It is important to establish certification basis at the early stage of the project.
- The certification basis is the UAS AIM that stipulates the “Standards concerning Strength, Structure and Performance to Ensure Safety” (related to Article 236-15 of the Regulations) and “Standards for Specifying as those necessary to Ensure Uniformity” (related to Article 236-24 of the Regulations).
- Regarding this certification basis, the currently valid standards will be applied, and, if the standards are revised, the revised standards may also be applied to the UAS that have already obtained UAS Type certificate. (According to Article 132-17 of the Act.)
- Special Conditions, Equivalent Level of Safety and Exemptions may be established as necessary. (Details are shown in Section 5.)
- If a project proceeds without determining certification basis, there will be risks related to redesign, retesting, rescheduling, etc.

#### 4-2 Reference materials

The reference material for item 4-1 is as follows.

Circular No. 1-303 “Guidelines for handling special requirements, equivalent safety, and exclusion of application”

## 5. Arrangements of Special Conditions, etc.

3-2-3 Special conditions, exemptions and equivalent level of safety If a particular new technology is introduced into the design, or if new standards or methods to show compliance with the standards to ensure safety are necessary to be additionally applied, special conditions may be established as a standard for inspection relating to UAS Type Certificate, in addition to the inspection manuals. If application of part of the standards is considered unnecessary, or it is considered more appropriate to use another method, due to the unique design, such an unnecessary part may be omitted (exemption) or replaced (equivalent level of safety).

3-2-4 Determination and modification of standards, etc. Certification basis to be applied to UAS Type Certificate shall, as a usual procedure, be examined in the first UAS Type Certificate Review Board meeting and the JCAB prepares draft G-1 Issue Paper. However, if the applicant intends to obtain a class II UAS Type Certificate, and the latest Circular No. 8-001 in effect at the time the application is applied, the issuance of G-1 Issue Paper is not required. As for application of special conditions, exemptions and equivalent level of safety, the JCAB shall take similar procedures. Basically, similar procedures shall be taken in connection with determination and notification of certification basis to be applied to UAS type design changes, but all or part of the procedures may be omitted as appropriate, with the content and scope of the design (changes) taken into consideration.

### 3-3 Issue Paper

In terms of showing compliance with the certification basis, as for matters such as interpretation of certification basis, certification policies, and methods for setting up analysis and tests for which JCAB determined it necessary to clarify the contents to the applicant, the JCAB issues an Issue Paper in order to make clear its position on such matters. The form for Issue Paper shall be as shown in Attachment 1 (Form: JCAB FORM 8-002-1). There are no particular restrictions on subjects on which the JCAB is required to issue an Issue Paper, but the following items shall require issuance of an Issue Paper in principle, in connection with UAS Type Certificate, etc. Notwithstanding the foregoing, in cases where the applicant applies the latest inspection manuals in Circular No. 8-001 current as of the date of receipt of application to an UAS of a type seeking class II UAS Type Certificate, no G-1 Issue Paper needs to be issued. In addition, in the event of any change in UAS Type Certificate (regardless of

class), no G-1 Issue Paper needs to be issued, whether the latest inspection manuals current as of the date of receipt of application are applied or the inspection manuals applied when the UAS Type Certificate was obtained are applied. If the applicant proposes establishment of a special requirement, exemption or equivalent level of safety during certification activities after application for UAS Type Certificate or changes in UAS Type Certificate is received (regardless of class), the relevant Issue Paper shall be issued.

- [1] Certification basis (G-1)
- [2] Establishment of special conditions
- [3] Establishment of equivalent level of safety
- [4] Establishment of exemptions
- [5] When it is otherwise deemed necessary

#### 5-1. Special Conditions, Exemptions, Equivalent Level of Safety, and Issue Papers

As stated in item 3-3 of Circular No. 8-002, JCAB states which certification basis (UAS AIM) have been applied as the first stage (G-1) in JCAB's opinion section of the Issue Paper to notify the applicant of them (or notifies through Registered Unmanned Aircraft Inspection Organization in the case of Class II UAS Type certificate). If the applicant has no objections to the Issue Paper presented by JCAB, the applicant must state that they have no objections in the applicant's opinion section on the Issue Paper and send it back to JCAB, upon which JCAB closes the status. If it becomes necessary to add and apply new standards or methods, JCAB will establish "Special Conditions" in addition to the UAS AIMS. In addition, JCAB will set "Exemptions" if some of the standards shown in the UAS AIM are unnecessary. If other certification standards are deemed appropriate, "Equivalent Level of Safety" may set as well. When establishing "Special Conditions," "Exemptions," or "Equivalent Level of Safety," JCAB and the applicant need to have discussions using the Issue Paper. The format for the Issue Paper is shown in Attachment 1 of Circular No. 8-002 (Form: JCAB FORM 8-002-1). JCAB and the applicant will use this format to arrange. In case of Class II UAS Type Certificate, the JCAB and the applicant (including the Registered Unmanned Aircraft Inspection Organizations) will use this form to arrange.

For the UAS which is sought for Class II UAS Type certificate, if all standards in the latest UAS AIM in effect at the time of application are applied, the issuance procedure for an Issue Paper (G-1) can be omitted. In addition, in UAS Type design change, if the certification basis that were applied at the time of receiving UAS Type certificate continues to be applied,

the issuance procedure for an Issue Paper (G-1) can be omitted.

Note that, regardless of the class of UAS Type certificate or the classification of maximum takeoff weight, if the applicant proposes, in the certification activity after the application is accepted, to set standards that are not included in the UAS AIM (Special Conditions), clarify the standards that apply and those do not apply (Exemptions), or set a method to demonstrate safety equivalent to the standards in the UAS AIM (Equivalent Level of Safety), JCAB will need to issue a relevant Issue Paper (G-1) as it is necessary to clarify these.

Regarding Special Conditions, Exemptions, and Equivalent Level of Safety, in addition to clarifying their existence in an Issue Paper (G-1), an Issue Paper will be issued for each, and communication will be made between the applicant and JCAB.

For example, in the case of UAS using fuel cells, there are no standards in the current UAS AIM, so Special Conditions must be set. In this case, the existence of these Special Conditions must be made clear in the Issue Paper (G-1). Meanwhile, the specific content of the Special Conditions will be communicated and agreed upon between the applicant and the JCAB (including the Registered Unmanned Aircraft Inspection Organization in the case of Class II UAS Type certificate) in a separate Issue Paper.

Table 5-1: Issuance of the Issue Paper (G-1)

	Applicable UAS AIMS	Class I	Class II
UAS Type Certificate	Latest UAS AIM	Necessary	Unnecessary
UAS Ype design change	UAS AIM at Type certified	Unnecessary	
	Latest UAS AIM for Type design change applied		
* If you propose Special Conditions, Exemptions, or Equivalent Level of Safety after the application is accepted, Issue Paper(G-1) is required for all categories			

If you are unsure whether an Issue Paper is necessary, refer to the list of candidate Issue Papers in Part III of this guideline. If a Registered Unmanned Aircraft Inspection organization is unsure whether an Issue Paper is necessary, they may request the opinion of the JCAB. In this case, the Registered Unmanned Aircraft Inspection Organization can coordinate with the JCAB based on Form 3, the Registered Unmanned Aircraft Inspection Organization Business Contact Form, of the "Guidelines for the Preparation of Unmanned Aircraft Inspection Procedures" separately established by the Unmanned Aircraft Safety Division. For reference, the following is a list of

items to be coordinated with the applicant when the JCAB holds a consultation with the applicant.

【Reference: In case of JCAB discusses about Issue Paper with an applicant】

## 5-2. Overview of Special Conditions, Exemptions, and Equivalent Level of Safety

The necessity and application of Special Conditions are determined based on the design characteristics of the UAS. This provides guidelines and details of procedures for making a judgment on the application. Note that the application of the procedures in item 5-2 is related to the setting of the standards to be applied, so the applicant to carefully consider the procedure at the design stage and provide sufficient explanation and coordination to the JCAB before starting the procedure in order to avoid duplication, etc. is recommended.

### 5-2-1. Special Conditions

Special Conditions are set when the design features of the UAS for which UAS Type Certificate is sought are unprecedented or unusual, as adjusted in the preliminary arrangement under paragraph 1, and there are no appropriate standards to apply. Special Conditions are applied to the distinctive design of individual types of UAS, and that do not mean to revise the current standards, and cannot be applied to other types of UAS. If the JCAB determines that the requirements it has set are permanently necessary to improve safety, it will reflect to the " Standards concerning Strength, Structure and Performance to Ensure Safety " or " Standards for Specifying as those necessary to Ensure Uniformity " through the prescribed procedures.

### 5-2-2. Procedure for setting Special Conditions

Special Conditions are issued by the JCAB. When the JCAB intends to set Special Conditions, Issue Paper will be issued. When the JCAB determines that an unprecedented or unusual design is used for the UAS of application, Special Conditions are considered and the draft of Issue Paper will be prepared on the matter. After that, the Issue Paper will be closed when it is agreed with the applicant after consultation with the applicant and, if necessary, reviewed in the UAS Type Certificate Review Board. When applying Special Conditions, the JCAB will carry out the procedure to determine the proposed Special Conditions as part of the certification basis and notify them to the applicant (including the Registered Unmanned

Aircraft Inspection Organization in the case of Class II UAS Type Certificate).

#### 5-2-3. Procedure for changing Special Conditions

When it becomes necessary to change the proposed Special Conditions set during the UAS Type certification activities, it will be changed according to the procedure in the previous item.

#### 5-2-4. Equivalent Level of Safety

When it is extremely difficult to apply all or part of the latest standards exactly as they are written, and if it is possible to show the same level of safety as that of the latest standards by other methods, the application of Equivalent Level of Safety will be set for those methods.

#### 5-2-5. Procedure for Setting Equivalent Level of Safety

When the JCAB intends to set Equivalent level of Safety, Issue Paper will be issued. When it is necessary for the applicant to set equivalent safety, the applicant must evaluate and consider whether the safety is ensured and submit the results to the JCAB. The JCAB will inspect the applicant's evaluation and consideration, and if it determines that the application of Equivalent Level of Safety is appropriate, the draft Issue Paper will be set on the matter. After that, the Issue Paper will be closed when it is agreed with the applicant after consultation with the applicant and, if necessary, reviewed in the UAS Type Certificate Review Board. When applying Equivalent Level of Safety, the JCAB will carry out the procedure to determine the proposed Equivalent Level of Safety as part of the certification basis and notify them to the applicant (including the Registered Unmanned Aircraft Inspection Organization in the case of Class II UAS Type Certificate).

#### 5-2-6. Procedures for changing Equivalent Level of Safety

When it becomes necessary to change the Equivalent Level of Safety set during the UAS Type Certification activities, it will be changed according to the procedure in the previous item.

#### 5-2-7. Exemptions

Exemptions are exemptions from application when it is impossible or extremely difficult to apply all or part of the latest standards as specified, and when the safety required by the standards is ensured without showing compliance to the said standards. Such Exemptions can be applied



temporarily or permanently. The application of Exemptions should be considered when the method of showing compliance with the applicable standards cannot be demonstrated even by considering Equivalent Level of Safety, and safety is ensured, and thoughtless application must be avoided.

#### 5-2-8 Procedures for setting Exemptions

When the JCAB intends to set an Exemptions, Issue Paper will be issued. When it is necessary for the applicant to set Exemptions, the applicant must evaluate and consider the necessity of the exemptions and the safety assurance of the Exemption and submit the results to the JCAB. The JCAB will review the applicant's evaluation and consideration, and if it determines that an Exemption is appropriate, the draft Issue Paper will be set on the matter. After that, the Issue Paper will be closed when it is agreed with the applicant after consultation with the applicant and, if necessary, reviewed in the UAS Type Certificate Review Board. When applying Exemptions, the JCAB will carry out the procedure to determine the proposed Exemptions as part of the certification basis and notify them to the applicant (including the Registered Unmanned Aircraft Inspection Organization in the case of Class II UAS Type Certificate).

#### 5-2-9 Procedure for changing an Exemption

When it becomes necessary to change an Exemption set during the UAS Type certification activities, it will be changed according to the procedure in the previous item.

#### 5-2-10 Reference Materials

Reference materials for item 5-2-1 to 5-2-9 are as follows.

Circular No. 1-303 "Guidelines for handling special requirements, equivalent safety, and exclusion of application"

### 5-3. Determination and change of Certification Basis, etc.

Certification Basis, etc. to be applied to the UAS Type Certificate are determined at the initial UAS Type Certificate Review Board meeting for the type of UAS concerned, and a draft of Certification Basis will be prepared as a Issue Paper (G-1) as necessary. This item describes the handling guidelines for the Issue Paper.

#### 5-3-1. Overview

The UAS Type Certification activities are a wide-ranging and complex collection of tasks for determining Certification Basis and showing

compliance with those standards, so that methods of showing compliance for all situations are not necessarily prepared prior to application. Particularly for the UAS that incorporates new technologies, it should be considered that a new method of showing compliance with the technology in concern will be required. To deal with such situations, the Issue Paper will be prepared by the JCAB. For matters that the JCAB consider necessary to establish the certification plan and Certification Basis, the JCAB will clearly state the situation, the process of consideration leading to a solution, and the conclusion in the Issue Paper, and use it as a guideline for the certification activities.

#### 5-3-2. Subject of the Issue Paper

There are no particular restrictions on the subjects for which the JCAB issues an Issue Paper, but when carrying out the UAS Type Certificate, etc., an Issue Paper will be issued for the following items.

##### ① Certification Basis (G-1)

The Issue Paper will consider the basic Certification Basis ("Standards concerning Strength, Structure and Performance to Ensure Safety " and " Standards for Specifying as those necessary to Ensure Uniformity "), and will be prepared (draft) at the very early stage of the UAS Type Certification activities and will be the basis for the Certification Basis(towards the final one). However, there are cases where the issuance of an Issue Paper (G-1) is not required according to Table 5-1. The issuance of an Issue Paper (G-1) is also not required if the Certification Basis applied at the time of the UAS Type Certificate are applied in the UAS Type design change.

##### ② Setting Special Conditions

##### ③ Setting Equivalent Level of Safety

##### ④ Setting Exemptions

##### ⑤ Other cases deemed necessary

#### 5-3-3. Procedure for issuing an Issue Paper

Draft Issue Paper (status open) is prepared for important issues that the JCAB consider to be a prerequisite for resolving when a problem occurs during the implementation process of the UAS Type Certification activities. The JCAB considers the relevant draft Issue Paper at each stage and issues provisionally as a draft. After that, after going through the necessary

procedures internally in JCAB, the JCAB officially issues it (status closed) and notifies the applicant (including the Registered Unmanned Aircraft Inspection Organization in the case of Class II Type certificate).

#### 5-3-4. Format

Issue Paper will be prepared as per Appendix 1 of Circular No. 8-002.

#### 5-3-5 Reference materials

Reference materials for item 5-3-1 to 5-3-4 are as follows.

Circular No. 1-304 "Guidelines for Usage of Issue Papers"

## 6. Certification Plan

5. Inspections Inspections pertaining to UAS Type Certificate shall include the inspection of the design, the inspection of the manufacturing process, the inspection of the current state, and the inspection of quality control and the quality control system. Their outline shall be as follows. The method of confirmation by the Inspection Body in these inspections should preferably be accomplished directly at the place where the test to be conducted, but if the Inspection Body finds that the criteria in Section 5-4 are met, the use of a video device, etc. (hereinafter referred to as "remote technology") may be deemed to be an on-site inspection. Note that the confirmation by the remote technology requires a real time situation monitoring using remote technology, and confirmation by means of recorded voices or videos are not deemed as the confirmation using the remote technology.

### 5-1 Inspection of the design

The inspection of the design shall take the form of an inspection of analysis documents or an inspection of verification. Its outline shall be as follows. The applicant shall conduct an analysis or test based on the certification plan approved by the Inspection Body, and shall be inspected by the Inspection Body for finding compliance with the certification basis. Regarding the treatment of test data obtained without the involvement of the Inspection Body, refer to Section 9. If materials related to the design are found to indicate compliance with the standards as a result of the inspection, the Inspection Body shall issue a Statement of Compliance to confirm the status of compliance with the certification basis.

#### 5-1-1 Records of inspections

(Omission)

#### 5-1-2 Implementation of inspections

(Omission)

#### 5-1-3 Inspection of compliance methods

##### 1) Certification plan

The applicant for UAS Type Certificate, etc. shall prepare a certification plan specifying the timing of implementation of inspection as well as means of compliance, including design drawings, analysis and evaluation,

and selection of flight tests (for example, compliance is shown through “analysis and evaluation” for 110 Software, through “design drawings” for 200 Flight Manual, and through “flight tests” for 300 Durability and Reliability in the inspection manuals of Circular No. 8-001) and obtain an agreement of the Inspection Body. The Inspection Body shall start inspections after agreeing to said plan in principle. The agreed certification plan may be revised as the project progresses. If the plan agreed to by the Inspection Body needs to be changed, the consent of the Inspection Body shall be obtained for the change.

## 2) Compliance Check List

The Compliance Check List shows the status of compliance showing for each item of the certification basis. The Inspection Body shall use the Compliance Check List to manage the status of compliance showing with the certification basis in accordance with the certification plan prepared by the applicant.

### 6-1. Certification Plan

The Certification Plan is a document that shows plans on whether to show compliance with all certification basis, etc. stated in the UAS AIMS by the applicant (safety and uniformity standards, as well as Special Conditions, Equivalent Level of Safety and Exemptions, if these are established) through testing or analysis. The applicant must prepare a Certification Plan (draft) and the inspections by the Inspection Body may start after obtaining consent from the Inspection Body. As the Certification Plan is a document that shows the applicant's plan, it may be revised during the subsequent UAS Type Certification activities.

If the plan needs to be revised, the applicant must make changes to the plan and obtain consent from the Inspection Body again. The documents to be prepared by the applicant are listed below, but the documents to be submitted are not limited to these.

#### 【Certification Plan (draft)】

- ① Matters related to Certification Basis, etc. (including matters related to Special Conditions, etc.)

State whether there is a need to show compliance, the method of demonstrating compliance, including the selection of analysis or demonstration, the implementation timing, etc. regarding the Certification Basis, etc. that are expected to be applied and all requirements stated therein. If there are Special Conditions etc. in the Certification Basis,

include such details in item 6-4.

- ② Matters related to personnel involved in UAS Type certificate, etc.

Clarify the responsibility and authority of each personnel involved in the UAS Type certificate, etc.

- ③ Matters related to the outline of changes to basic design or changes to the UAS Type Certificate

Prepare a document that allows an understanding of the outline of changes to the UAS specifications or the changes to the UAS Type Certificate. This can be replaced by submitting the CONOPS that has been finalized at this point.

- ④ Outline of the schedule related to design and manufacturing

Enter information related to the outline of the schedule desired by the applicant from the submission of the application to obtain UAS Type Certificate. The schedule can be rough, such as on a quarterly basis, as shown in Attachment 1 below. Note that if there is a document that manages the schedule separately from the Certification Plan, taking into account the frequency of revisions to the Certification Plan, it is also possible to refer them.

- ⑤ Other documents that may be required

If the applicant adopts new designs, technologies, materials, and manufacturing methods that are not considered in conventional UAS designs, summarize the outline of the new designs, as well as the issues to be considered and the solutions to those issues. In addition, if there is a co-manufacturer, provide information on the name of the co-manufacturer, the division of production responsibilities, and the location. If part of the design or manufacturing is outsourced, provide information on the name, details of the outsourcee, and the location of the outsourcee.

It is recommended that the items related to ① to ⑤ above be compiled in one document and approved by the Inspection Body. For UAS for which a Class II Type Certificate is being sought, it is not necessary to provide all of ① to ⑤, but as a minimum, provide ① which relate to Certification Basis (including items related to Special Conditions, etc.) and ④ which outlines the schedule for design and manufacturing.

## 6-2. Minutes

When explaining and adjusting a Certification Plan, clarify the content of the explanation, matters pointed out and improvements on them, investigation items, problems, etc. in the minutes prepared by the applicant.

This is to promote understanding of both sides of the item discussed, and the content of minutes must be checked by both sides as well. Although there is no specified format for minutes, the format in Attachment 3 of Circular No. 8-002 (JCAB FORM 8-002-3) can be used.

#### 6-3. Reference materials

Reference material for item 6-1 and 6-2 is as follows.

Circular No. 1-307 "Certification Plan"

#### 6-4. Compliance Check List

The Compliance Check List must contain at least the following important items to show the certification status for each item of Certification Basis, etc. The Compliance Check List must include not only the safety standards of Part III, but also the items related to the uniformity standards of Part IV.

- ①: Indicate an item number for each minimum unit for all requirements stated in the Certification Basis, etc. If the contents from ② onward are the same, aggregate them by indicating the higher unit can be allowed.
- ②: Indicate the item name that corresponds to the item number in ①.
- ③: If showing compliance with the standard is required, indicate "applicable"; if showing compliance with the standard is not required due to such as lack of equipment, etc., indicate "not applicable."
- ④: If "applicable" is selected under ③, indicate the means of compliance, such as drawings, analysis, or testing. (Alternatively, indicating MOC numbers described in Part III of this guideline is allowed.)
- ⑤, ⑥: Indicate the numbers of documents or drawings prepared according to the means of compliance proposed under ④, and their names.
- ⑦: Enter the correction number of the documents under ⑤ and ⑥.
- ⑧: If "applicable" is selected under ③, provide the summary of how to show compliance with; if "not applicable" is selected, provide the reason.
- ⑨: Clarify here whether the inspector of the Inspection Body witnessing or only the applicant will conduct. It is assumed that the inspector of the Inspection Body will be witnessing for particular important test items and is not required to be witnessing for all tests. If it is unsure about which tests to request the inspector of the Inspection Body to witnessing, refer to "The Inspection Body's Level of Involvement (LOI)" indicated in each section in Part III of this guideline to determine which test to request the inspector of the Inspection Body to witnessing.

For UAS which sought to be obtain Class II UAS Type Certificate, conformity inspection and test witnessing based on the safety standards

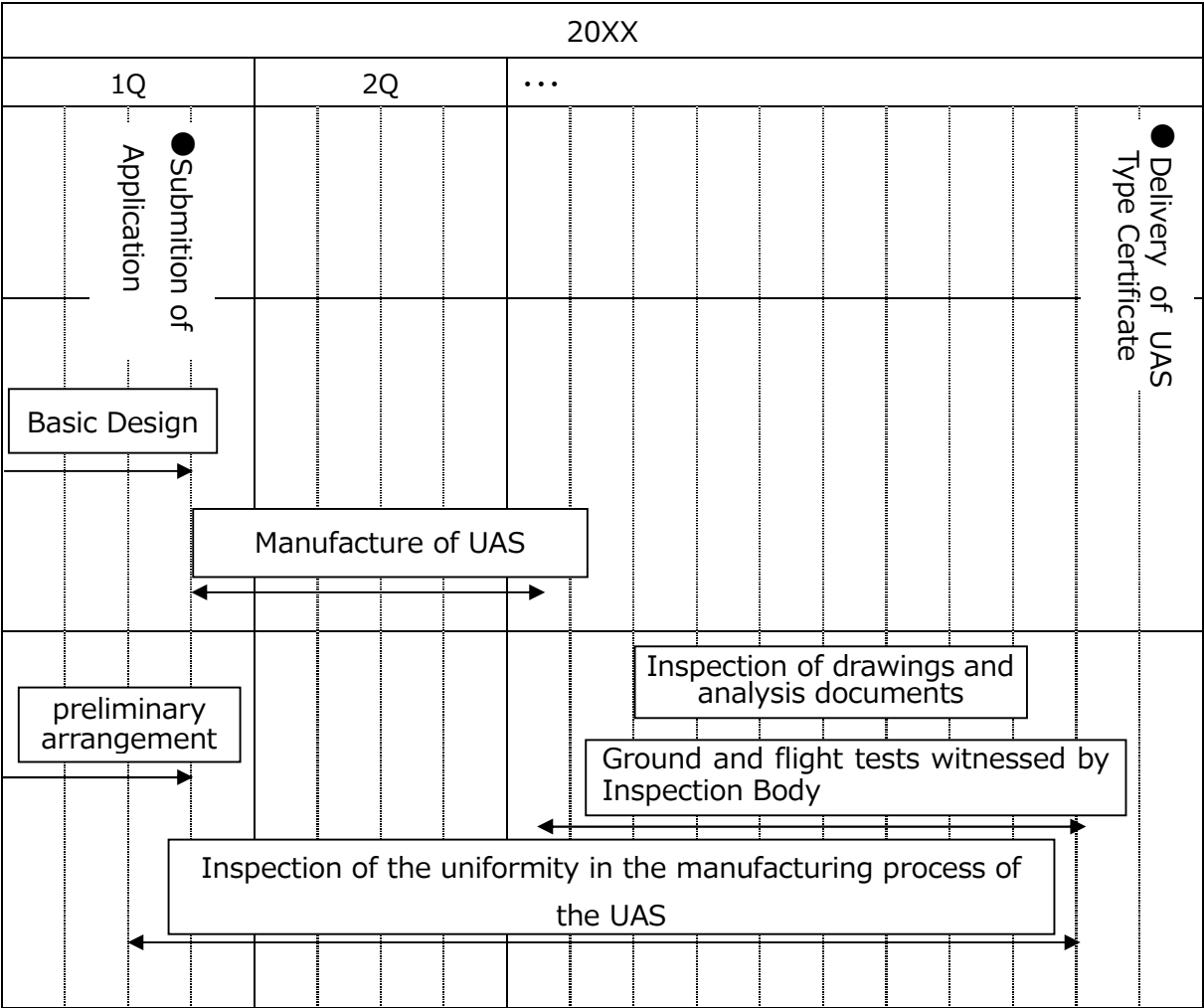
once each, and manufacturing process inspection based on the uniformity standards once are to be conducted in principle. However, depending on the complexity of the UAS and the novelty of the design, multiple conformity inspections and test witnessing as well as manufacturing process inspections may be required. The subject and number of inspections and witnessing should be decided in coordination with the Inspection Body during the discussion of the Certification Plan.

In addition, based on item 2-2-1 of Circular No. 8-002, remote technology may be used for inspection if the conditions are met. If remote technology is to be used, coordination should be made with the Inspection Body at the stage of preparing the Certification Plan proposal, and it should be made clear that a remote inspection (as an alternate to the on-site inspection) will be conducted when the Certification Plan to be agreed with the Inspection Body.

certification basis	Item Name	Y N	MOC	Certification Documents			Remarks	Witness Supervisor
			Method	Document number	Document Title	Correction number		
①	②	③	④	⑤	⑥	⑦	⑧	⑨
<Example of Description>								
~ (First part omitted) ~								
140-3	Autopilot system, cameras, etc.	Y	1,7	ABC123	Autopilot and Camera Design Summary	NC	Equip the autopilot system and the external environment can be monitored by the UA-mounted cameras will be shown using diagrams and the actual equipment inspection. Also, flight tests will be conducted to verify that the autopilot system and cameras are functioning properly.	—
			6	DEF123	Autopilot system, cameras, etc. Flight Test Plan	A		Applicant inspection
			6	DEF456	Autopilot system, cameras, etc. Flight Test Report	A		—
140-4	Transport of hazardous objects	N	—	—	—	—	Since the transportation of hazardous objects is not assumed, this section is not applicable.	—



~ (Omitted) ~								
Uniformity Standards	Manufacture Management Guidelines	Y	—	XYX123	Manufacture Management Guidelines of ○○ Type UAS	B	Create a Manufacture Management Guideline as a document to certify the conformity of the corresponding model.	On-site inspection with the witness of inspectors of the Inspection Body or remote inspection (as an alternative to the on-site inspection)



## 7. Manufacture Management Guidelines

### 5-2-5 Submission of Manufacture Management Guidelines and quality control system

The applicant shall prepare the Manufacture Management Guidelines based on the inspection manuals according to Circular No. 8-001 and submit it to the Inspection Body. The Manufacture Management Guidelines shall be prepared on the basis of the Uniformity Standards. If the items required by the Uniformity Standards are documented in company regulations, the Manufacture Management Guidelines may refer to the relevant sections of the company regulations that describe each item of the Uniformity Standards. The applicant shall submit Attachment 12 “Material Explaining the Quality Control System” (Form: JCAB FORM 8-002-12) (“Quality Control Material”), which is required for inspection of the quality control system, to the Inspection Body with enough time before commencement of manufacture and explain the contents of the Material.

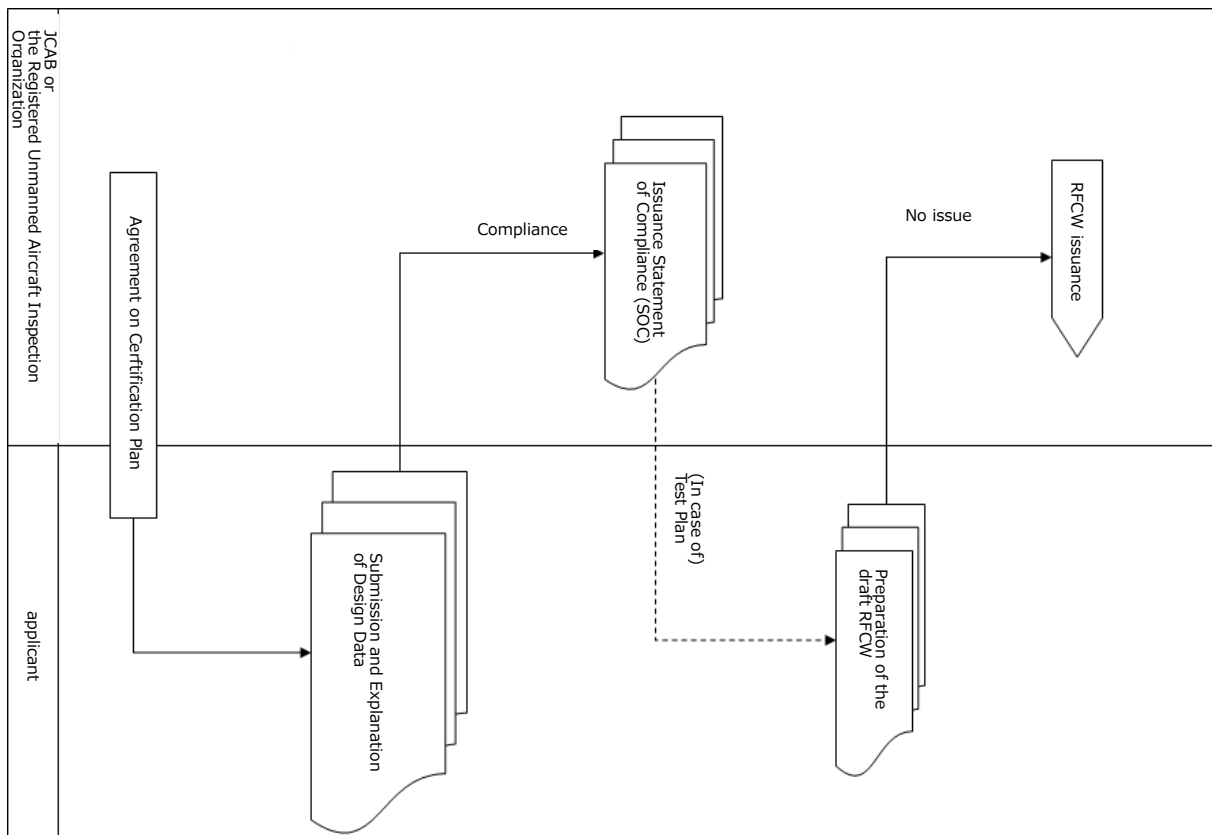
### 7-1. Overview of Manufacture Management Guidelines

After the applicant starts manufacturing the UAS (test specimen), the Inspection Body will inspect the process, quality control, and quality control system. However, the applicant must prepare a draft of the Manufacture Management Guidelines and obtain the Inspection Body’s consent before starting manufacturing. For the Manufacture Management Guidelines, refer to Part IV of this guideline. If the matters required by the uniformity standards are documented in the company regulations, the Manufacture Management Guidelines can simply refer to the relevant parts of the company regulations that describe each item of the uniformity standards. For UAS which Class II UAS Type Certificate is being sought, a document describing the reference items (Manufacturing Management Guidelines) can be used as described in item 2-2(g).

## Flow from certification document submission and briefing to RFC/W issue

Figure 2 below shows the flow from the agreement on a Certification Plan up to preparations for conformity inspection (RFC/W issuance), in between submission and explanation of certification document, issuance of a Statement of Compliance.

Figure 2 From Agreement on Approved Compliance Plan to Issuance of RFC/W



## 8. Submission of certification documents, explanation and issuance Statement of Compliance

### 5-1 Inspection of the design

The inspection of the design shall take the form of an inspection of analysis documents or an inspection of verification. Its outline shall be as follows. The applicant shall conduct an analysis or test based on the certification plan approved by the Inspection Body, and shall be inspected by the Inspection Body for finding compliance with the certification basis. Regarding the treatment of test data obtained without the involvement of

the Inspection Body, refer to Section 9. If materials related to the design are found to indicate compliance with the standards as a result of the inspection, the Inspection Body shall issue a Statement of Compliance to confirm the status of compliance with the certification basis.

5-1-1 Records of inspections Records of inspections related to UAS Type Certificate shall be as follows.

1) Statement of Compliance Compliance with the certification basis shall be checked through inspections of documents related to certification, such as drawings, specifications, analysis documents, calculations, test plans, test reports, a draft of the UAS Flight Manual and ICA, and inspections by a ground test, a flight test, etc. When compliance with the certification basis is confirmed through the inspections, a Statement of Compliance shall be issued as a material indicating the status of compliance demonstration. The form for Statements of Compliance shall be as shown in Attachment 2 (Form: JCAB FORM 8-002-2). If a Statement of Compliance is required, the applicant shall submit a draft statement of compliance to the Inspection Body by the end of examination of the applicable certification documents.

2) Minutes If an inspection is conducted, the applicant shall prepare minutes and both parties shall examine their contents, for the purpose of clarifying details of the inspection, what is pointed out in the inspection and corrective measures therefor, matters to investigate and problems and share the understanding. Although there is no specific form for the minutes, an example of the form for minutes is provided in Attachment 3 (Form: JCAB FORM 8-002-3).

#### 8-1. Submission and explanation of certification documents, and issuance Statement of Compliance

The applicant must submit to the Inspection Body a certification document (test plan, analysis report, etc.) for each certification document described in the Certification Plan agreed with the Inspection Body. In particular, the test plan should include, as a minimum, the standards to be shown compliance with by the test, the design data of the test specimen, the test setup/testing procedure (including test conditions and test environment), pass/fail criteria, the equipment to be used for the test and its specifications, and the data to be acquired. If a test is to be witnessed using remote technology, the test plan must include the test setup and test procedure for the imaging device, the pass/fail judgment when the imaging device is used, and the imaging

device to be used for the test and its specifications. The Inspection Body will receive an explanation of the certification document submitted by the applicant, and if there are no problems with the contents, will issue a Statement of Conformity based on Appendix 2 of Circular No. 8-002. For reference, the following items listed are items in case of the JCAB receiving a certification document with an explanation from the applicant and issues a Statement of Conformity (inspects the design data).

【Reference: In case of JCAB inspects design data】

#### 8-2. Matters to note

- The applicant must prepare certification documents that have been agreed upon in the Agreed Compliance Plan.
- As the Inspection Body will not be able to judge compliance with the standards if only drawings, test data, etc. are provided, the applicant must also provide the details of the review.
- The applicant must also fully explain in the documents/materials that the content satisfies the Certification Basis regarding Test Plans, etc.

#### 8-3. Statement of Compliance

The Inspection Body checks whether each document shows compliance with the standards and indicates to the applicant the status of compliance with each Certification Basis in the form of a Statement of Compliance. The "Statement of Compliance" is a document that indicates compliance with each Certification Basis (equal to the Inspection Body's inspection result for compliance) required by the " Standards concerning Strength, Structure and Performance to Ensure Safety " and the " Standards for Specifying as those necessary to Ensure Uniformity ". One Statement of Compliance is required for one certification document. After inspecting the certification document, the Inspection Body will enter the judgment results in the Statement of Conformity and issue it. Therefore, the applicant must prepare a draft of Statement of Conformity based on Appendix 2 of Circular No. 8-002 (JCAB FORM 8-002-2) and submit it to the Inspection Body before the Inspection Body completes the inspection of the document. It is desirable to submit both the certification document and the draft of Statement of Conformity to the Inspection Body at the same time. After the inspection, the Inspection Body will sign and date in the Statement of Conformity and return it to the applicant.

#### 8-4. Test Plans

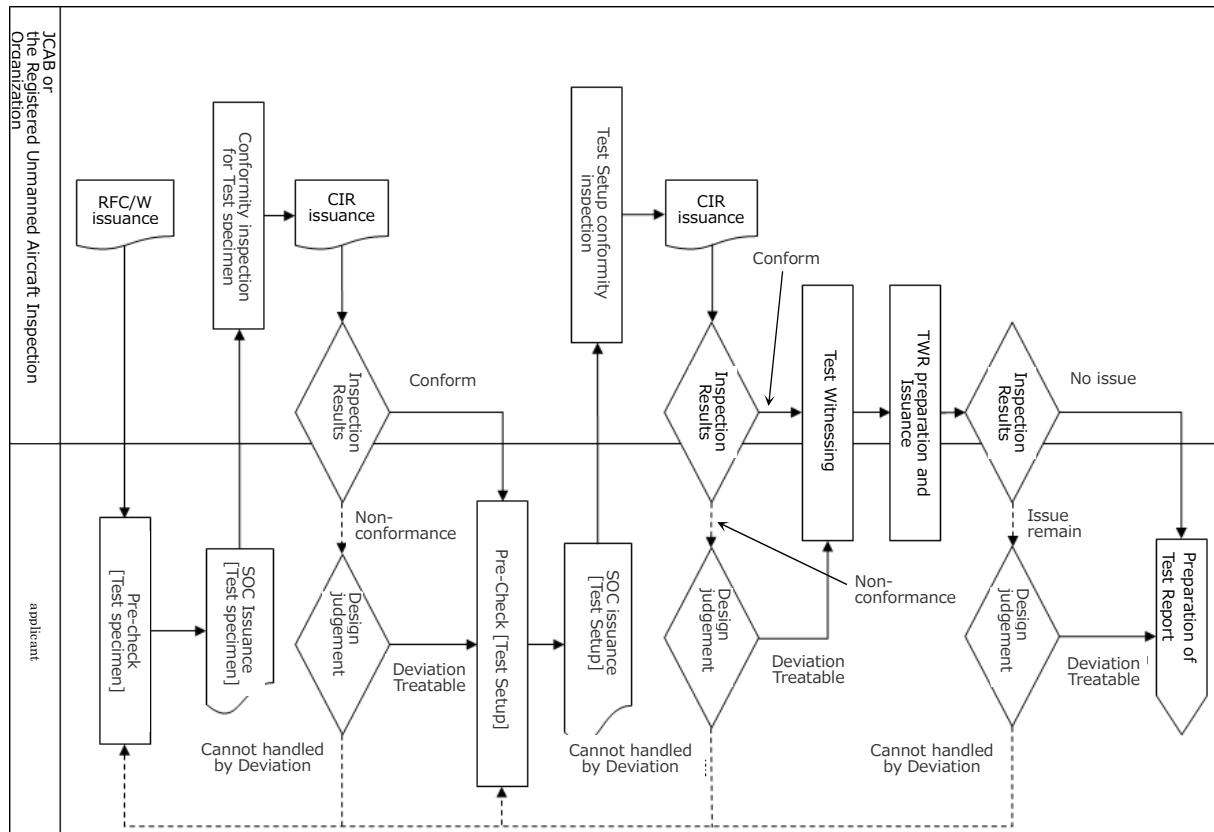
If the applicant intends to demonstrate certification based on the standards through testing, they must obtain approval from the Inspection Body in advance for the Test Plan showing the method of conducting the test in the Statement of Compliance set forth in the preceding item. Here, more specific information on what to include in the Test Plan will be described. The applicant must change or add content to the Test Plan as necessary.

- ① Test Plan control number and revision number
- ② The standard that the target exam seeks to show compliance with
- ③ Control numbers and revision numbers of reference materials
- ④ Preventive measures against risks (identify operations that may affect safety when conducting tests, and indicate preventive measures against them)
- ⑤ Equipment used in testing and its specifications
- ⑥ Specimen design data (information used in specimen Conformity Inspection)
  - Hardware: Part name, part number, diagram showing part installation position, etc.
  - Software: Software name, software version, etc.
- ⑦ Test setup procedures, drawings, etc. (information used in test setup Conformity Inspection)
- ⑧ Pass/Fail Criteria (Avoid ambiguous Pass/Fail Criteria that make it difficult to make judgment)
- ⑨ Test procedure (avoid ambiguity)
- ⑩ If there are any additional sensors, etc. installed on the UAS for testing, their descriptions and identification numbers, etc.

## Flow from issuing RFC/W to test report preparation

From the time RFC/W is issued up to the test report preparation, “test specimen Conformity Inspection,” “test setup Conformity Inspection,” “Test Witnessing,” and “confirmation that there are no problems with the test results” are conducted. A flow including these is shown in Figure 3.

Fig. 3 From issuance of RFC/W to test report preparation



## 9. Implementation of Conformity Inspection and Test Witnessing

### 5-1-5 Inspection of demonstration

#### 1) Approval of test plan and test report

Tests for UAS Type Certificate shall be mainly conducted to directly show compliance with the applicable items.

Test results to be used for compliance showing certification shall be obtained on the basis of a test plan approved by the Inspection Body in principle (the existence of such approval shall be demonstrated in the Statement of Compliance). For this reason, the test plan shall include all the information, conditions and specifications necessary for implementation of tests, which shall include test specimen drawings, test



set-up drawings, etc. Similarly, the test report to be used for showing compliance shall also be approved by the Inspection Body. In the report, the Inspection Body shall inspect the conformity of test specimens, test set-up, etc. to the approved test plan.

2) Confirmation of test specimens, test equipment, and test records  
(including jigs, tools, test set-up, etc.)

Test specimens, test set-up, etc. for UAS Type Certificate tests shall be in principle inspected by the Inspection Body for conformance to the test plan that is approved in advance ("conformity inspection"). The applicant shall be notified of test specimens, test equipment and test set-up that require inspection by the Inspection Body. Inspection are not conducted for all tests. The Inspection Body shall consult the applicant and consider the content of tests to conduct inspections for tests to be witnessed by the Inspection Body. While being witness to a test, the Inspection Body shall confirm that test specimens and test set-up whose conformity is to be confirmed by the conformity inspection are used in the test to produce procedures set forth in the test plan and the data to be obtained without any defects or damage that may deviate from the test plan.

The notification mentioned above shall be made by the Inspection Body through the issuance of a Request for Conformity/Test Witnessing ("RFC/W") (Form: JCAB FORM 8-002-5). The applicant shall prepare a draft of RFC/W and submit it to the Inspection Body for consent, with enough time before implementation of conformity inspections. The RFC/W form and instructions for filling in the form are shown in Attachment 5. In the case of an UAS seeking class II UAS Type Certificate with maximum take-off weight less than 25 kg, the procedure for issuing an RFC/W may be omitted only if the inspection and test witnessing by the Inspection Body are clearly specified in the approved certification plan, etc.

The applicant who intends to undergo said inspection shall check the conformity of the relevant test specimens, test equipment and test set-up to the test plan in advance, and issue the Statement of Conformity ("SOC") (Form: JCAB FORM 8-002-6) to prove the conformity. The SOC form and instructions for filling in the form are shown in Attachment 6.

After confirming the contents of said Statement, the Inspection Body shall confirm that the status of production and preparation of the test specimens, etc. is compliant with specifications specified in the test plan. The Inspection Body shall record results of said inspection in the Conformity Inspection Record ("CIR") (Form: FORM 8-002-7), keep the

original of CIR and deliver a copy of CIR to the applicant. The CIR form and instructions for filling in the form are shown in Attachment 7. In the case of an UAS seeking class II UAS Type Certificate with maximum take-off weight less than 25 kg, the procedure for issuing a CIR may be omitted only if inspection results can be summarized in a Test Witnessing Record (TWR) as a final record.

In particular, with regard to test specimens, considering that the specimens may be transferred after confirmation (in the event of a remote test site) or that it may take time for the test to take place, issuance of a Conformity Inspection Tag ("CIT") (Form: JCAB FORM 8-002-8) and attachment thereof to the actual specimens under instructions by the Inspection Body may prove that a conformity inspection has already been conducted on the relevant specimens by the Inspection Body, if the applicant so desires. The CIT form and instructions for filling in the form are shown in Attachment 8.

In principle, if there is any deviation from the test plan, or if a failure occurs, such as damage to the test specimen or test equipment, or inability to perform the test under the conditions set forth in the test plan, the test shall be suspended immediately. If there is failure, it shall be corrected or an approval of modification of the test plan shall be sought in principle. However, if it is difficult to conduct the test again or to suspend the test during the formal procedure for obtaining the approval, the applicant may resume the test under its responsibility without an approval for correction or modification of the test plan and evaluate the validity of the test afterwards, by notifying a person responsible for said correction or modification of the test plan. In this case, the applicant may resume the test by preparing a Deviation Sheet which specifies details of deviation and includes the applicant's judgment of validity and obtaining the consent of the Inspection Body. In the case of an UAS seeking class II UAS Type Certificate with maximum take-off weight less than 25 kg, the applicant may resume the test under its responsibility, and subsequently prepare the Deviation Sheet and obtain the consent of the Inspection Body. For Deviation Sheets, the provisions of 4) of this Section shall apply.

### 3) Test witnessing

Tests related to UAS Type Certificate shall be conducted in the presence of the Inspection Body if necessary. When witnessing a test, the Inspection Body shall confirm that the test is conducted in accordance with the test plan and that the data obtained from the test is properly recorded, and

issue a Test Witnessing Record ("TWR") (Form: JCAB FORM 8-002-9). In this case, the original TWR shall be attached to a report of the test, and a copy of TWR shall be retained by the Inspection Body. The TWR form and instructions for filling in the form are shown in Attachment 9.

The test witnessing by the Inspection Body may be conducted following the conformity inspection in accordance with Section 5-1-5, 2).

In the inspection of an UAS seeking class II UAS Type Certificate, a conformity inspection and a test witnessing are to be conducted once each in principle, but multiple time conformity inspections and test witnessing may be required depending on the complexity and novelty of the UAS design.

#### 4) Deviation Sheets

Any form selected by the applicant may be used for Deviation Sheets, but the following items shall be included.

- i ) Deviation Sheet control number (including revision number)
- ii ) Control number (including revision number) of the corresponding design data, test plan, etc.
- iii ) Overview of the relevant deviation
- iv ) Impact of the relevant deviation on the design data
- v ) Any other information deemed necessary
- vi ) Date of issuance of the Deviation Sheet
- vii ) Signature of the person responsible for issuing the Deviation Sheet
- viii ) Fields for the consent of the Inspection Body and the date of the consent

5) Inspections and tests by the applicant only When test results are used for compliance showing, the applicant shall confirm that the test is conducted in accordance with the test plan and that data obtained from the test is properly recorded, and prepare inspection and test records for all the tests, even if the Inspection Body does not witness the test. Such records may be prepared in any format, but shall include the same contents as TWR.

### 9-1. Conformity Inspection (test specimen and test setup)

#### (1) Request for Conformity Inspection/Test Witnessing (RFC/W)

Request for Conformity Inspection/ Test Witnessing (RFC/W) is created, issued, and notified as a result of coordination and agreement between the applicant and the Inspection Body regarding what the Inspection Body will conduct an on-site inspection or Test Witnessing for. Therefore, the

applicant will create a draft RFC/W and coordinate with the Inspection Body. The Inspection Body will check the draft RFC/W created by the applicant, and if they can agree, issue the RFC/W and notify the applicant. The applicant and Inspection Body will conduct on-site inspection or Test Witnessing based on RFC/W. Since it is necessary to make arrangements for on-site inspection or Test Witnessing before issuing the RFC/W and make a notification, applicants are requested to submit the draft RFC/W well in advance of Conformity Inspection.

A sample for issuing an RFC/W is shown in Appendix 1 (attached later) of Part II of this guideline.

(2) Coordination for inspection schedule

The applicant must take into account the content of the Conformity Inspection, be mindful of securing sufficient time for explanations and confirmations related to the inspection, and coordinate on the inspection schedule with the Inspection Body.

(3) Confirmation of design data

In order to conduct a smooth inspection, the applicant must explain the design data provided in the Test Plan to the Inspection Body, and the Inspection Body must make efforts to understand the design data.

(4) Prior confirmation and records by the applicant

The applicant will perform preliminary confirmation based on the RFC/W notified by the Inspection Body. The results of the preliminary confirmation will be explained and reported to the Inspection Body using the Statement for Conformity (SOC; Attachment 6 of Circular No. 8-002). The applicants also need to provide a copy of the SOC to the Inspection Body. The Inspection Body will begin Conformity Inspection after confirming that the applicant's preliminary confirmation has been completed using a copy of the SOC.

When undergoing a Conformity Inspection, the applicant in principle needs to have a person responsible for issuing the SOC present in order to respond to questions from the inspector of the Inspection Body.

A sample of when issuing an SOC is shown in Appendix 1 (attached) of Part II of this guideline.

(5) Conformity Inspection and records

The specimen will be confirmed to conform to the design data through documentation and on-site verification, and inspection results will be

recorded in the Conformity Inspection Record (CIR; Attachment 7 of Circular No. 8-002). The CIR will be kept by the Inspection Body and a copy will be given to the applicant.

(6) Conformity Inspection Tag (CIT)

CIT (Attachment 8 of Circular No. 8-002) is issued to preserve the status in which the specimen Conformity Inspection and test setup Conformity Inspection have been completed, and conformity has been confirmed when the Conformity Inspection and Test Witnessing are performed on separate days or at separate locations. If the issuance of a CIT is required by RFC/W, the Inspection Body can issue a CIT by signing in the signature field of either the JCAB or a Registered Unmanned Aircraft Inspection Organization after conducting a specimen Conformity Inspection and a test setup Conformity Inspection and confirming conformity to the design data, etc. Even if the specimen is moved after the Conformity Inspection, a CIT can be issued as long as conformity is confirmed in the Conformity Inspection.

(7) Conformity Inspection Record (CIR)

The Inspection Body can issue a CIR by recording the matters confirmed through the specimen Conformity Inspection and test setup Conformity Inspection (including a statement that a Deviation sheet has been issued, if a Deviation sheet has been issued) and signing in the signature field of either the JCAB or a Registered Unmanned Aircraft Inspection Organization. A sample of how to issue a CIR is shown in Appendix 1 (attached) of Part II of this guideline.

9-2. Test Witnessing

(1) Request for Conformity Inspection/Test Witnessing (RFC/W)

Refer to item 9-1. (1) regarding RFC/W. Note that it is assumed the Inspection Body will be witnessing for particular important test items and not needs to be witnessing for all tests. If it is unsure about which test to request the Inspection Body to witnessing, refer to “The Inspection Body’s Level of Involvement (LOI)”, indicated in each section of Part III of this guideline to determine which test to request the Inspection Body to witnessing.

(2) Arranging for Test Witnessing schedule

The applicant must take into consideration the content of the Conformity Inspection, take care to ensure sufficient time for explanations and

confirmations related to the test, and coordinate with the Inspection Body about the Test Witnessing schedule.

(3) Confirmation of Test Plans, etc.

In order to conduct a smooth inspection, the applicant must explain the Test Plan, etc. to the Inspection Body, and the Inspection Body must make effort to understand the Test Plans, etc.

(4) Test Witnessing

The Inspection Body uses CIR to confirm that the specimen Conformity Inspection and test setup Conformity Inspection have been completed. For specimens that have been moved from remote manufacturing locations, etc., check the CIT attached to the specimens. Note that the presence of a person responsible for test conformity of the applicant in tests is required.

(5) Checking conditions of the specimen and setup at the end of test

For the test specimen and setup (test equipments, etc.), confirmation of no malfunction or damage, etc. that deviate from test plan is required before conducting the test. If any malfunction or damage, etc. is confirmed, record the situation, etc. in the Test Witnessing Record (TWR; Attachment 9 of Circular No. 8-002). For specimens that have undergone tests for strength certification, etc. in which their limit load is exceeded, the applicant must clearly identify them or make them unusable to prevent them from being used in mass-produced UAS.

(6) Issuance of Test Witnessing Record (TWR)

A TWR is issued after the Inspection Body confirms through TWR, etc. that the test witnessed was completed in accordance with the Test Plan and that the test records are properly recorded, and signing in the signature field of either JCAB or the Registered Unmanned Aircraft Inspection Organization that applies on the TWR prepared by the applicant.

A sample of how to issue a TWR is shown in Appendix 1 (attached) of Part II of this guideline.

### 9-3. Deviation Sheet

(1) Basic policy for issuing deviation sheets

The Deviation Sheet is applied for the cases listed in ① through ④ below. If any of these is applicable, consult with the Inspection Body to

decide whether it is applicable.

- ① When the specimen and the setup differ from the design data but the difference is clearly defined and it is clear that it will not affect the performance of the test.
- ② Testing equipment, measuring equipment, etc. other than those specified in the design data are used but it is confirmed that the specifications of the measuring equipment, etc. do not affect the test results and such equipment is properly managed in accordance with the regulations established by the applicant.
- ③ If there is a problem with the specimen, setup, test equipment, etc., but the details of the problem are made clear and it is clear that the problem will not affect the test results.
- ④ When an attempt is made to carry out the Test Plan accurately, but detailed provisions are not indicated in the Test Plan, etc., making it necessary to add detailed provisions (Additional detailed provisions must be clearly defined and clearly have no impact on test results or safety.)

## (2) Deviation sheet issuance

If a deviation occurs, the applicant can issue a Deviation Sheet by doing the following:

- ① Clarify the content of deviation (difference between design data and specimen, etc.)
- ② Reflect ① in the design data or confirm that ① does not affect the certification of the design data.

After obtaining the Inspection Body's consent and signature on the Deviation Sheet, the target test and inspection can be continued. Note that the management number of the Deviation Sheet that occurred during the inspection must be recorded in the SOC in Appendix 6 of Circular No. 8-002. The Deviation Sheet will be managed and operated by the applicant.

## (3) Approving deviation sheet

If the Inspection Body receives a Deviation Sheet from the applicant and acknowledges that the influence will be reflected in the design data or will not affect the way the design data is shown compliance with the standard after receiving an explanation from the applicant, sign the Deviation Sheet to indicate their approval and return it to the applicant. The Deviation Sheet procedure (approval and signature) may be followed after the Conformity Inspection and tests are completed only if it is clear that there will be no impact on the design data and the applicant determines that it is

inappropriate to interrupt the tests from the perspective of continuity. Note that in such cases, it is the applicant's responsibility to continue the tests.

(4) Adjustment and publication timing of deviation sheet

If a deviation is discovered before the Conformity Inspection or tests, it is generally recommended to obtain the Inspection Body's approval on the Deviation Sheet by the day before the inspection.

If a deviation occurs on the day, the inspection or tests to be canceled is recommended.

9-4. Handling of tests in which the Inspection Body does not conduct inspection and/or is not witnessing

For UAS Type certificate-related inspections and tests in which the Inspection Body does not conduct inspections and/or is not witnessing during the test, preparation of records containing the following information by the applicant will be required regarding all inspections and tests. If the Inspection Body is not involved, records alone will be used to demonstrate the validity of the test. Therefore, if the objectivity of inspections and tests cannot be ensured, or if omissions or falsification of records are found, the inspections and/or tests related to the records cannot be used as results related to UAS Type certificate. From this perspective, it is necessary to conduct the tests by more than one person to ensure objectivity. On the other hand, if there is no choice but to have one person to conduct tests, measures to ensure the objectivity of the tests (such as filming with a video camera) must be taken.

- ① Control numbers of records
- ② Control numbers (including revision numbers) of the corresponding design data, Test Plans
- ③ Details and results of the conducted inspection (specimen and/or test setup)【Intended to be the same content as CIR】  
※Includes a brief description any defect and results of addressing it.
- ④ Belonging and name of the person who conducted the inspection of the specimen and/or test the setup, and the date on which the inspection was conducted.
- ⑤ In the case of a test, in addition to ③ above, the following items【intended to be the same content as TWR】
  - ・ Test location
  - ・ Details of any notable events (mainly defects, etc.) that were found or occurred during the tests.



- Test results
- Belonging and name of the person in charge
- Belonging and name of the witnessing person
- Date the tests were conducted

9-5. Flow to be applied for UAS which Class II UAS Type certificate is sought and whose maximum takeoff weight is less than 25 kg

For UAS which Class II UAS Type certificate is sought and whose maximum takeoff weight is less than 25 kg, the process related to RFC/W and CIR issuance and prior approval of deviation in Figure 4 is not required if specified conditions are met. In such a case, the conditions that must be met are as follows.

- Cases in which issuance of RFC/W may be omitted  
They may be omitted if the inspection and Test Witnessing to be conducted by the Inspection Body is made clear in a formal document other than RFC/W (for example, a Certification Plan)
- Cases in which issuance of CIR may be omitted  
They may be omitted for inspections and Test Witnessing conducted by the same inspector of the Inspection Body on the same day as this can be compiled into TWR as the final record.
- Cases in which it is not necessary to obtain prior approval on deviations  
The applicant may determine, at its discretion and responsibility, that obtaining the Inspection Body's prior approval on a deviation is unnecessary only if the applicant determines that doing so will have no impact on the design data and that it is inappropriate to interrupt the tests from the perspective of continuity of the tests, etc. Note that in case of proceeding without obtaining prior consent on a deviation, retrospectively obtain the Inspection Body's approval and signature after the test is complete is still necessary.

## 10. Test report preparation

### 5-1-5 Inspection of demonstration

#### 1) Approval of test plan and test report

Tests for UAS Type Certificate shall be mainly conducted to directly show compliance with the applicable items. Test results to be used for compliance showing certification shall be obtained on the basis of a test plan approved by the Inspection Body in principle (the existence of such approval shall be demonstrated in the Statement of Compliance). For this reason, the test plan shall include all the information, conditions and specifications necessary for implementation of tests, which shall include test specimen drawings, test set-up drawings, etc. Similarly, the test report to be used for showing compliance shall also be approved by the Inspection Body. In the report, the Inspection Body shall inspect the conformity of test specimens, test set-up, etc. to the approved test plan.

### 10-1. Overview of test report preparation

After tests are conducted under the Test Plan, it is necessary to summarize the test results in a report and have it inspected and approved by the Inspection Body. The report must include the following:

- Supplementary explanation about "10. Test Report preparation"
- Procedures for preparing a test report
- Inspection points of test report

### 10-2. Supplementary explanation for "10. Test Report preparation"

#### (1) Statement of Compliance

The applicant must also obtain a Statement of Compliance for the test report. For the procedure for obtaining a Statement of Compliance, refer to item 8-3.

#### (2) Test plan

The applicant must conduct the test according to the test plan for which the Inspection Body issued a Statement of Compliance in item 8-3, and obtain the necessary confirmation from the Inspection Body. in section 9. After that, the applicant will prepare the test report, so the items that must be included in the test report are summarized in item 10-3 and after.

### 10-3. Instructions for preparing the test report

#### (1) Contents to be included in the test report

The following is a guideline for the contents to be included in the test report. The applicant must change or add the contents to be included in the

test report as necessary.

- ① Test report control number and revision number
- ② The standard that the target exam seeks to show compliance with
- ③ Control number and revision number of the Test Plan used in the target test
- ④ Detailed information on the specimen used in the test (such as a mark that can be used to identify the form of the specimen)
- ⑤ Control numbers and revision numbers of reference materials
- ⑥ Test data
- ⑦ Test results
- ⑧ All Deviation Sheets, RFC/W, SOC, CIR, CIT and TWR issued for the target specimen Conformity Inspection, test setup Conformity Inspection and testing
- ⑨ Minutes of meetings on adjustments made before and after the target tests

#### 10-4. Inspection points of test report

The following items should be noted when inspecting a test report.

##### (1) Specimen Conformity Inspection Record and test setup Conformity Inspection Record

Make sure that the following documents demonstrating that these conformity tests have been properly conducted are included in the test report. Additionally, these documents must contain the necessary signatures of the relevant parties.

- RFC/W (Check that there are no omissions in the RFC/W for Test Witnessing)
- SOC
- CIR (If the applicant requests the Inspection Body to provide a copy of it, the applicant is recommended to include it in applicant' test report to enhance its completeness.)
- CIT (if the specimen was moved after the specimen Conformity Inspection or test setup Conformity Inspection)
- TWR
- Deviation Sheet for information related to Conformity Inspection

Confirm that there are no inconsistencies between the Test Plan and the above documents.

##### (2) Test procedure

Confirm the following regarding the test procedure.

- If a Deviation Sheet has been issued, check the Deviation Sheet to see if the test procedure has been changed from the one in the Test Plan.
- Confirm that the test was performed according to the test procedure

### (3) Test data

Confirm the following about the test data.

- Test data that can be used to confirm whether the Pass/Fail Criteria are satisfied are included.
- Detailed information on the specimen used in the test, especially the form for which UAS Type certificate is to be obtained, is provided.
- (If verification is performed using remote technology, as necessary) data such as images captured by imaging equipment during the test

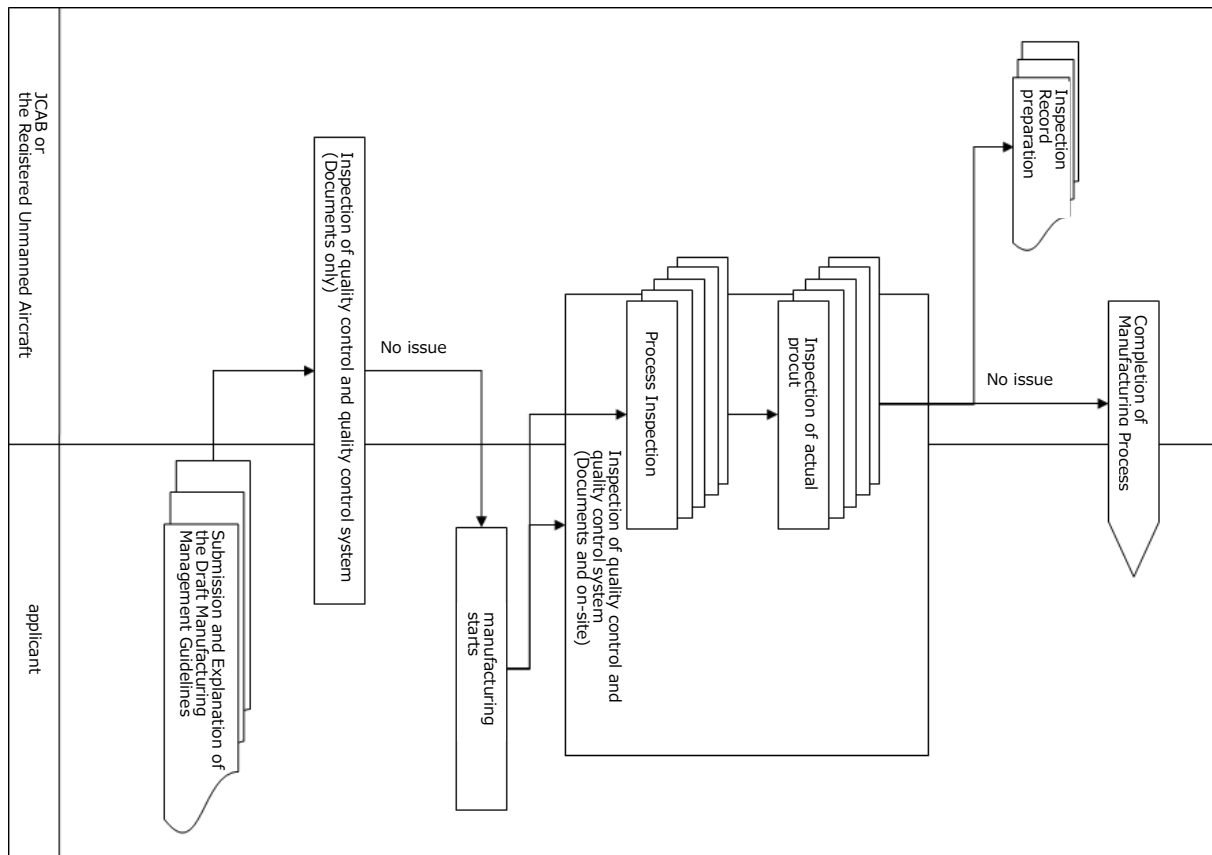
### (4) Test results

For items for which Pass/Fail Criteria are set in (3), check if the Pass Criteria are met. The information to be provided in a test report must basically be the test results based on the latest Test Plan, but, if a Test Plan for which Statement of Compliance has been issued in the past is to be used as certification data, test results based on the past Test Plan should also be included in the report.

## Flow up to completion of manufacturing process inspections

After the Manufacturing management Guidelines are submitted, a manufacturing process inspection will be conducted. The flow of the manufacturing process inspection is as shown in Figure 4.

Fig. 4 Submission of Manufacture Management Guidelines until Completion of Manufacturing Process Inspection



## 11. Inspection of process and actual product

5-2 Inspection of the manufacturing process The purpose for inspecting the manufacturing process is to check whether each step in the manufacturing process is intelligently designed to embody the design. For inspection of the manufacturing process, any one of the unmanned aircraft or multiple unmanned aircrafts manufactured before issuance of the Type Certificate may be inspected. The scope of said inspection shall include all the stages from the level of components constituting an unmanned aircraft to the completed unmanned aircraft, and shall cover all the manufacturing methods applied to the manufacturing process of the unmanned aircraft (including each step), inspection methods (including special processes),

and systems for managing jigs and tools and for assuring/controlling quality (including worker/inspector education and outsourcing management). Said scope shall cover subcontractors if all or part of manufacture is subcontracted to personnel, facilities or equipment controlled by any external entity.

#### 5-2-1 Inspection of the manufacturing steps

The inspection of steps shall cover the entire manufacturing process. In the inspection of steps, document inspection shall be conducted to confirm the status of setup of documents for stipulating methods for implementation of work ("work instructions, etc.") and documents such as inspection records shall be inspected to confirm that all the steps from acceptance of parts, processing, assembly, inspection to delivery and products to which said steps apply are implemented in accordance with processing methods specified by design drawings associated with UAS Type Certificate and that the assembly step is implemented in accordance with the work instructions, etc. In addition, on-site inspections shall be conducted to confirm that said steps are implemented in accordance with the procedure set forth in the work instructions, etc. at actual manufacturing sites. Documents, etc. stipulating manufacturing steps shall be inspected.

##### - Document inspection

1. Confirmation of the appropriateness of worksheets, etc. that are set
2. Review of manufacturing records after production

- Method for conducting attendance confirmation (including inspection to confirm the current status of UAS through operation tests, etc.)

5-2-2 Notification to the applicant When the inspection of the manufacturing process includes attendance, the Inspection Body shall prepare and issue a Notice for Witnessing Inspection of Manufacturing Process (Form: JCAB FORM 8-002-10) and notify the applicant. The form for the Notice for Witnessing Inspection of Manufacturing Process is shown in Attachment 10.

#### 5-2-3 Record of the inspection of manufacturing steps

The Inspection Body shall record items on which inspection is conducted in a Record of Witnessing Inspection of Manufacturing Process (Form: JCAB FORM 8-002-11) and keep it. The form for the Record of Witnessing Inspection of Manufacturing Process is shown in Attachment 11. If any deviation from the design data is detected (such as processing of defects in

the manufacturing process), its correction shall be requested in principle. However, a change of the test plan may be also possible if personnel of the applicant responsible for correction of the deviation or the change of the test plan is notified. In this case, a Deviation Sheet which specifies details of deviation and includes the judgment of validity by the applicant's personnel responsible for the correction or changes of the test plan shall be prepared, and shall be agreed to or confirmed by the Inspection Body before resumption. If a modification method that exceeds the scope of design data for UAS Type Certificate is applied, compliance shall be shown again by using the design data, or procedures for changing the UAS Type Certificate shall be taken. For Deviation Sheets, the provisions of 4) of Section 5-1-5 shall apply.

#### 5-2-4 Inspection of quality control and quality control system

Compliance with "Standards for Specifying as those Necessary to Ensure Uniformity" (Article 236-24 of the Regulation) (the "Uniformity Standards") shall be confirmed as a confirmation of establishment of manufacture and inspection systems suitable for manufacturing UAS satisfying the design for the type (UAS compliant with Safety Standards) in a uniform manner.

#### 5-2-5 Submission of Manufacture Management Guidelines and quality control system

The applicant shall prepare the Manufacture Management Guidelines based on the inspection manuals according to Circular No. 8-001 and submit it to the Inspection Body. The Manufacture Management Guidelines shall be prepared on the basis of the Uniformity Standards. If the items required by the Uniformity Standards are documented in company regulations, the Manufacture Management Guidelines may refer to the relevant sections of the company regulations that describe each item of the Uniformity Standards. The applicant shall submit Attachment 12 "Material Explaining the Quality Control System" (Form: JCAB FORM 8-002-12) ("Quality Control Material"), which is required for inspection of the quality control system, to the Inspection Body with enough time before commencement of manufacture and explain the contents of the Material.

#### 5-2-6 Inspection methods for quality control and quality control system

The inspection of the quality control system shall take the following procedure to confirm that manufactured products subject to the inspection of the manufacturing process have a system for assuring compliance with design drawings and specifications which comply with the Safety Standards

and satisfy the Uniformity Standards.

- a. The Inspection Body shall check an outline of the applicant's quality control system on the basis of the Quality Management Material required in Attachment 12 of this Circular to confirm that the system can satisfy the Uniformity Standards.
- b. The Inspection Body shall inspect the Manufacture Management Guidelines submitted as a separate volume of Attachment 12-8 of this Circular to confirm that the applicant's quality control system satisfies the Uniformity Standards. As specific measure for said inspection, document inspection and on-site inspection shall be conducted to confirm that systems for maintaining and managing equipment, workplaces, facilities, organization and personnel to be used for Manufacture and Other Activities, and methods for performing operation are properly documented, and that the systems stipulated in said documents are applied to manufactured products. (For example, the statuses of defect handling, management of work cards, implementation of education and training, and implementation of qualification management shall be inspected to determine whether they are appropriate in accordance with the prescribed procedures and methods.) If the applicant for class II UAS Type Certificate has obtained certification equivalent to JIS Q 9001, the Inspection Body shall confirm that the "appointment of a chief administrator for "and" inspection based on Article 132-18 of the Act" described in the Manufacture Management Guidelines are properly set. The applicant must verify whether its quality control system satisfies the Uniformity Standards and submit the results to the Inspection Body. The Inspection Body will verify that all items have been checked. The inspection of quality control and quality control system may be conducted in conjunction with the inspection of manufacturing steps during the inspection of the manufacturing process under Section 5-2. In the inspection of an UAS seeking class II UAS Type Certificate, in principle, one time on-site inspection is required, but depending on the novelty or complexity of the manufacturing process, multiple time on-site inspections may be required.

5-2-7 Record of quality control and quality control system Inspection results shall be announced through Attachment 13 "Notice of Confirmation of Quality Management System" (Form: JCAB FORM 8-002-13) and a report of corrective measures shall be requested through Attachment 14



“Report on Details of Measures” (Form: JCAB FORM 8-002-14) if any default is detected.

#### 11-1. Overview of manufacturing process inspections

Manufacturing process inspections mainly consist of the following two inspections. However, there is a lot of duplication in the content of these tests, and sometimes both aspects are checked at once.

- ① Process inspection
- ② Quality control and quality control system inspection

#### 11-2. Inspection plans

The applicant must submit a manufacturing plan to JCAB in accordance with item 2-2-1 of Circular No. 8-002, provide sufficient explanation and coordination to the Inspection Body, and obtain consent. The Inspection Body will design a plan for the inspection of the manufacturing process in accordance with the manufacturing plan.

#### 11-3. Notice for Witnessing Inspection of Manufacturing Process

If the inspection of the manufacturing process includes witnessing inspection, the Inspection Body must prepare a “Notice for Witnessing Inspection of Manufacturing Process (Form: JCAB FORM 8-002-10)” under Attachment 10 of Circular No. 8-002 for the relevant item and notify the applicant.

#### 11-4. Inspection schedule

When the applicant receives the notification, the applicant need to explain the necessary documents, management methods, etc. to the Inspection Body well ahead of the date of the on-site inspection.

#### 11-5. Records of manufacturing process inspections

The Inspection Body must record the items inspected in the “Record of Witnessing Inspection of Manufacturing Process Report (Form: JCAB FORM 8-002-11)” under Appendix 11 of Circular No. 8-002.

#### 11-6. Process inspections

Process inspections are conducted through documentation and/or Witnessing Inspection on all processes of the Type of UAS for which the application has been made with the purpose of confirming that the Type complies with safety standards. The purpose of process inspections is to ensure that all processes from receiving materials to processing, assembly,

inspection, and delivery conform to the design data of the UAS and that, when these processes are applied, no deviation from the design data is tolerated in the manufactured products.

The process inspections for UAS Type certificate have the same purpose as those for UAS Certificate.

#### 11-6-1. Process inspection method

The methods of inspection are "inspection of documents," "witnessing at the work process," and "inspection of the actual item." In the case of UAS which Class II UAS Type Certificate is being sought, "witnessing at the work process" and "inspection of the actual item" are to be carried out once in principle, together with the "inspection of quality control and quality control system" in item 11-7. However, depending on the complexity of the UAS and the novelty of its design, multiple inspections may be required. The subject and number of inspections should be decided in coordination with the Inspection Body during the discussion of the certification plan in Section 6.

##### (1) Inspection of documents

Whether the requirements of the design data are appropriately reflected in the documents that specify the process are checked by the Inspection Body. All documents that specify the process are subject to inspection. Typical examples of documents that are subject to inspection are documents that instruct and record the processing and assembly of parts and UA (PIRs (Production Inspection Records), worksheets, work processes, etc.). Document inspections are carried out by checking the setting status of these documents and records related to the manufactured products being inspected.

Note that if a manufacturer with Class II UAS Type Certificate who has obtained third-party certification equivalent to JIS Q 9001, document inspections will not be carried out during process inspections in principle. However, if there are any doubts in Inspection Body about the contents of a document when witnessing a work process, the appropriateness of the document will be checked.

##### (2) Inspection of actual products

Inspection of actual items verifies that the manufacturing process being inspected is appropriate by confirming that the product produced by the manufacturing process matches the design data. Inspection of actual items verifies whether the product has the shape, structure, performance, function, etc. specified in the design data. Note that although the contents

to be confirmed are similar between inspection of actual items in process inspections and inspection of the current state in safety standard inspections, they have different purposes.

### (3) Witnessing to work process

If it is not possible to confirm the appropriateness of the content confirmed by document inspection only by checking records after work or unless witnessing the actual work process, conduct confirmation by witnessing the actual work process. For example, work that ensures the realization of the design in the work process (special processes, etc.) may fall under the scope of such cases.

### 11-6-2. Inspection items, targets, inspection methods for each content, etc.

Table 11-6-2 shows the process inspection items, targets, and inspection methods for each content when carried out by the JCAB. These are just examples and there may be other ways to verify.

Table 11-6-2 Inspection of the Process (1/2)

Inspection items	Inspection target	Inspection content	Inspection Method (Reference)
1	Materials (such as raw materials, components, and equipment) match those specified in the design data	Materials	Inspect that the materials used in the manufacture of UAS (including auxiliary materials such as adhesives) match the design data of the UAS.
		Parts	The applicant confirms that the materials (substrates) match the design data with documents such as receipt/acceptance inspections conducted by the applicant.
		Equipment	It will be confirmed that the parts match the design data through documents such as manufacturing records of the parts or certificates issued by the parts manufacturer.
		Others	Confirm that the equipment matches the design data through the manufacturing record or the pre-shipment functional test record conducted by the equipment manufacturer, as well as the certificate.
2	When the working method is specified in the design data, ensure that the working method matches the design data	Work methods	In addition to the above, if there are any materials used in the manufacturing of UAS, these materials will be inspected to ensure they match the design data of the UAS.
			If the manufacturing method of materials, parts, equipment, etc. used for UAS is specified in the design data of the UAS (basic data such as drawings that determine the specifications of the aircraft, etc., and specs, etc.), the manufacturing method specified in the
			If work methods (processing conditions, special processes, etc.) are required by the design data, processes are set to ensure that the methods are carried out reliably, and it is recorded or verified on-site that these processes are being applied.

			design data will be inspected.	
3	That the machine tools and measuring instruments used in the work are appropriate	Machine tools	When specified or required machining tools are indicated in the design data of UAS, the appropriate machining tools that meet the design data requirements are inspected.	If a machine tool is specified in the design data, it is confirmed through records that the machine tool was used for the work.
		Measuring equipment	In case where specific numerical values (dimensions, torque values, etc.) are required in the design data of UAS, inspect to ensure that appropriate measuring equipment with guaranteed accuracy is used to measure those required values.	When specific numerical values (dimensions, torque values, etc.) are required in the design data, it is confirmed through records that the measuring instruments with appropriate accuracy have been used. In cases where measuring instruments that require calibration are used, it is also confirmed that these instruments are calibrated at appropriate intervals and that the traceability related to the calibration is verified. Moreover, if the calibration of the measuring instruments is conducted internally, the traceability related to the calibration of standard equipment, reference equipment, and original equipment (hereinafter referred to as "standard equipment, etc.") may also be subject to inspection. However, if the management of standard instruments, etc. is to be carried out based on Manufacture Management Guidelines, the confirmation of the appropriateness of the respective standard instruments may also be conducted as an inspection for showing compliance with uniform standards.
4	The manufacturing process must be able to perform appropriate work	Appropriateness of the process	Inspect whether an appropriate machining and assembly process that can materialize the design data has been established. In addition, also inspect whether the said process is feasible.	Confirm that there are facilities or workshops capable of performing the necessary processing to realize the design data. Additionally, if work instructions are created and used, verify through records that the necessary information, including design data, is reflected and that feasible work instructions are provided. In the event that the manufacturer does not possess the facilities necessary for the manufacturing process, it will be confirmed through records such as contracts that the facilities are being rented as needed.

Table 11-6-2 Inspection of the Process (2/2)

Inspection items		Inspection target	Inspection content	Inspection Method (Reference)
5	The inspection process must not allow any deviation from the design data.	Inspection settings	For the processing, assembly, adjustment, and other necessary work and processes for UAS, inspections will be carried out to ensure that inspections required to verify conformity with the design data of the UAS are appropriately set.	Verify through records that inspections are scheduled to be conducted at appropriate times when compliance with design data can be confirmed.
		Inspection results	Inspection will be conducted to ensure that the measurement data and other test results do not deviate from the design data of the UAS (basic data such as drawings that determine the specifications of the airframe and other specifications).	Confirm through records that the inspection results do not deviate from the design data.
		Inspector	Check that the personnel suitable for the inspection are conducting the inspection.	Confirm through records that personnel with appropriate knowledge and experience of the design data and process, and who are capable of making appropriate Finds, are conducting the inspections.
6	The above items are properly documented as manufacturing records	Work Record	Table 11-6-2 The manufacturer will be confirmed that the results of inspection items 1 to 4 match the design data and that the results are recorded.	Table 11-6-2 The manufacturer will be confirmed that the results of test items 1 to 4 match the design data, and ensure that all necessary records are kept.
		Inspection Record	Table 11-6-2 The manufacturer will be checked that the results of Inspection Item 5 match the design data and that these results are recorded.	Table 11-6-2 The manufacturer will be confirmed that the results of Inspection Item 5 match the design data and that all necessary records have been made.
7	Management of materials, parts, and equipment	Management method Management status	It will be inspected whether the materials, parts, equipment, etc. of UAS are properly stored and maintained based on the requirements of the design data.	Records will be checked to confirm that UAS designs/manufacturers or designs/manufacturers of materials, parts, equipment, etc., are properly stored and maintained according to the specified environments/methods.
8	Inspection of acceptance of raw materials, components, and equipment, intermediate inspections and final inspections as well as inspections under Article 132-18, Paragraph 2 of the Act	Acceptance Inspection	Inspect that acceptance inspections are established and conducted to confirm that the materials, parts, and equipment of the UAS correctly match the design data and that the UAS manufacturer can properly confirm this.	The manufacturer of UAS will be confirmed in documentation that the materials, parts, equipment, etc. match the design data through proper content and methods at the acceptance/delivery inspection.
		Interim inspection and final inspection as well as inspection in accordance with the provisions of Article 132-18, Paragraph 2 of the Act	Inspect that the materials, parts, equipment, etc. of the UAS match the design data and that the manufacturer of the materials, parts, equipment, etc. has verified this through appropriate inspections such as intermediate inspections and final inspections.	It will be confirmed in the documents that the materials, components, and equipment, etc. match their design data and that the manufacturer of the materials, components, equipment, etc. has verified this through appropriate inspections such as intermediate inspections and final inspections.

#### 11-7. Inspection of quality control and quality control system

The following inspections are conducted to confirm that the quality control and quality control system applied to the manufacturing process that is the subject of UAS Type Certification complies with the uniformity criteria.

1) Inspection to see if the quality control and quality control system are sufficient to ensure that the manufactured product that is the subject of the manufacturing process inspection conforms to the design data with compliance shown.

2) Inspection to see if the quality control and quality control system are applied reliably to the process.

For the uniformity standards, refer to Part IV of this guideline.

In addition, if the applicant for UAS which Class II Type Certificate are sought to has obtained third-party certification equivalent to JIS Q 9001, the applicant can confirm that the requirements of the uniformity standards are met and submit the results to the Inspection Body to demonstrate compliance with the standards. In this case, the image of the applicant's summary of the results of their own confirmation is as shown below. The Inspection Body will only confirm that the applicant (manufacturer) has obtained third-party certification equivalent to JIS Q 9001 and will not review the appropriateness of the confirmation. However, the Inspection Body will check that the main differences between the uniformity standards and JIS Q 9001, namely "appointment of the Chief administrator of Manufacturing and Other Activities" and "inspection pursuant to Article 132-18 of the Act" described in the Manufacturing Management Guidelines, are set appropriately.

Image of confirmation results by the Inspection Body when the applicant of the Class II UAS Type Certificate is sought has obtained JIS Q 9001

Uniformity Standards	Confirmation Results for Compliance with Uniformity Standards
1 facility	
1-1 Equipment	It was confirmed that the equipment required by the uniformity standards is appropriate based on the requirements of JIS Q 9001.
1-2 Workshop	It was confirmed that the workplace required for uniformity standards is appropriate based on the requirements of JIS Q 9001.
~(Omitted)~	
2 Organization	It has been confirmed that the organization required by uniformity standards is appropriate based on the requirements of JIS Q 9001. Although JIS Q 9001 does not have direct requirements regarding the appointment of the chief administrator for Manufacturing and Other Activities as required by the uniformity standards, it was confirmed that the chief administrator for Manufacturing and Other Activities is appropriately stated in the internal document ○○.
~(abbreviation below)~	

#### 11-7-1. Manufacture Management Guidelines

The applicant must specify in the Manufacture Management Guidelines matters related to the implementation of the Manufacturing and Other Activities of the UAS of which the application was made in accordance with the UAS AIMS.

See Part IV of this guideline for Manufacture Management Guidelines.

#### 11-7-2. Submission of quality control system

The applicant needs to prepare "Document describing the quality control system (Form: JCAB FORM 8-002-12)" specified in Attachment 12 of Circular No. 8-002 (hereinafter referred to as the "quality control materials"), which are required for the Inspection Body to understand the applicant's quality control system, etc. and smoothly conduct inspections on quality control and quality control systems, and submit the materials to the Inspection Body and explain them well in advance of the start of production.

#### 11-7-3. Inspection of quality control and quality control systems

The inspection of quality control and quality control systems must be conducted as follows.

- a. The Inspection Body will inspect the submitted documents regarding the Manufacture Management Guidelines.
- b. The Inspection Body must conduct on-site or remote inspections if those are deemed necessary, in appropriate manner.
- c. The Inspection Body must notify the inspection results using the "Notice of Confirmation of Quality Management System (Form: JCAB FORM 8-002-13)" specified in Attachment 13 of Circular No. 8-002 and, if any defects are found, request the applicant to report on corrective actions using the "Report on Details of Measures (Form: JCAB FORM 8-002-14)" specified in Attachment 14 of Circular No. 8-002.
- d. The Inspection Body may request the applicant to submit company regulations related to quality control and quality control systems confirmed in the inspection as part of inspection materials.

#### 11-7-4. If Manufacture Management Guidelines or submitted quality control systems are changed

If there are any changes to quality control or quality control systems that have been received after the inspection is completed, it is necessary to apply for a UAS Type design change. The Inspection Body must conduct an inspection of the changes in accordance with item 11-7.

#### 11-8. Handling of defects found in manufacturing process inspections

- a. No deviation from design data, etc. is tolerated for products undergoing manufacturing process inspection.
- b. If a deviation from the design data at that point is observed during the process, the inspection will be suspended in principle, and after the changes to the design data have been inspected and approved, be resumed.
- c. However, if there is no impact on compliance with the standards, the certification results are deemed acceptable, and there is a particular need to continue the inspection, the inspection may be continued by issuing a Deviation Sheet. (See Section 9 for instructions on how to use the Deviation Sheet.)



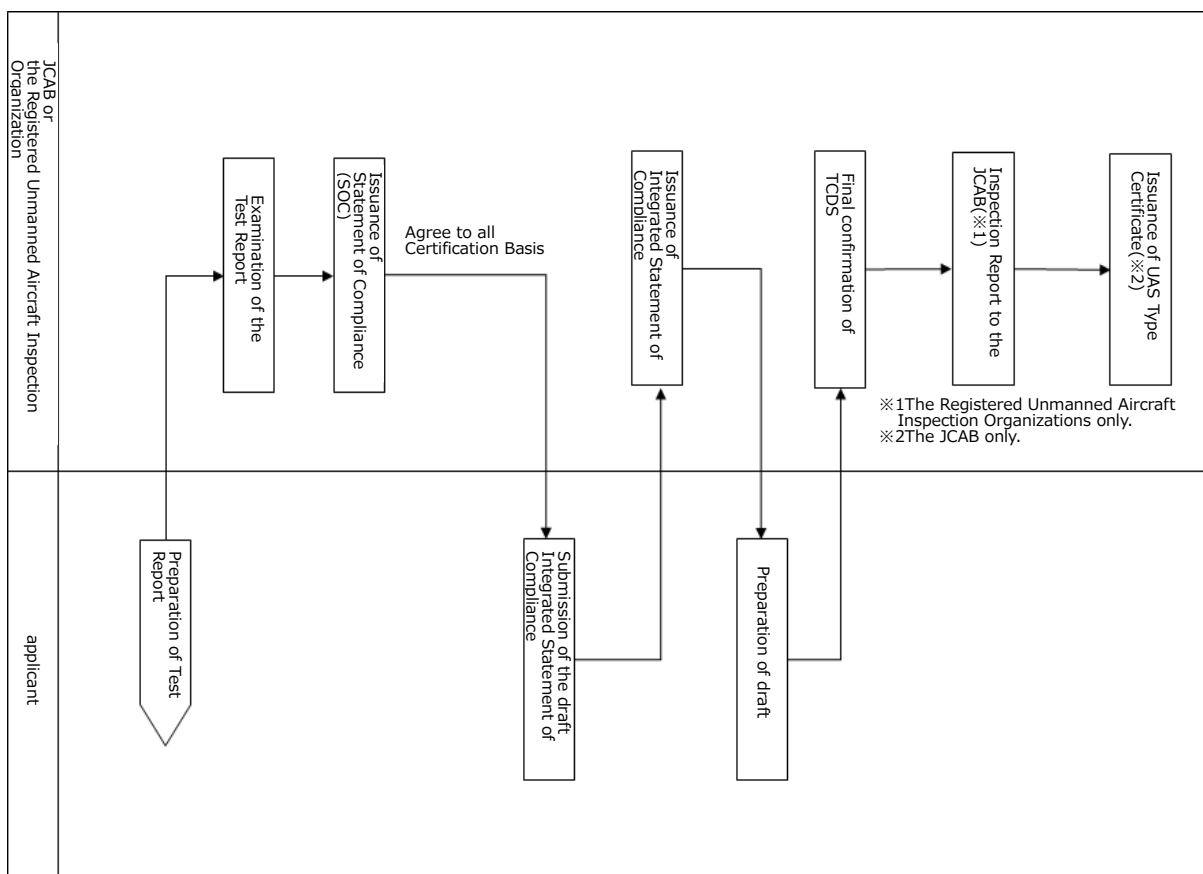
#### 11-9. Records of manufacturing process inspections

The Inspection Body must record the inspection items in the Record of Witnessing Inspection of Manufacturing Process Report (Form: JCAB FORM 8-002-11) specified in Attachment 11 of Circular No. 8-002.

## Flow from test report preparation to UAS Type certificate issuance

Figure 5 below shows the flow from “Issuance of Integrated Statement of Compliance” to “TCDS,” “Final UAS Type Certificate Review Board Meeting,” and “Issuance of UAS Type Certificate,” which are carried out after the completion of test report preparation.

Figure 5: From the preparation of the Test Report to the Issuance of the Certificate



## 12. Integrated Statement of Compliance

### 5-1-1 Records of inspections

Records of inspections related to UAS Type Certificate shall be as follows.

#### 1) Statement of Compliance

(Omission)

#### 2) Minutes

(Omission)

### 3) Integrated Statement of Compliance

The Integrated Statement of Compliance shall be issued to confirm compliance with all the certification basis, and summarize all the past documents including the Statement of Compliance. The form for Integrated Statement of Compliance shall be as shown in Attachment 4 (Form: JCAB FORM 8-002-4).

#### 12-1. Overview of Integrated Statement of Compliance

The Integrated Statement of Compliance, which is issued when all Certification Basis is confirmed to have been met, summarizes the Statement of Compliance issued to date. The applicant must prepare a draft Integrated Statement of Compliance using the Integrated Statement of Compliance (Form: JCAB FORM8-002-4) format specified in Attachment 4 of Circular No. 8-002 and submit it to the Inspection Body. If the draft Integrated Statement of Compliance submitted by the applicant shows the results of the inspection without errors, the Inspection Body will sign. After signing the Integrated Statement of Compliance, the Inspection Body will issue the original one to the applicant.

#### 12-2. Report to the JCAB after completion of inspection by a Registered Unmanned Aircraft Inspection Organization

After completing the inspection, the Registered Unmanned Aircraft Inspection Organization should submit the UAS Type Certificate-related documents in Table 2-3 to the JCAB. If necessary, the JCAB may request other documents submitted by the applicant to the Registered Unmanned Aircraft Inspection organization (such as agreed certification plan, approved certification document, etc.) in addition to these documents. In this case, if there are unavoidable reasons such as difficulty in submitting the documents to the JCAB due to the contract between the applicant and the Registered Unmanned Aircraft Inspection Organization, an explanation to that effect should be provided. If the Registered Unmanned Aircraft Inspection Organization is unable to submit the documents, the applicant must directly submit the documents requested by the JCAB, such as the agreed certification plan, approved certification document, etc. to the JCAB.

## 13. UAS Type Certificate Data Sheet

### 6-2 UAS Type Certificate Data Sheet

6-2-1 Outline of UAS Type Certificate Data Sheets UAS Type Certificate Data Sheets (hereinafter referred to as "TCDS") indicates the status of compliance with the inspection manuals, as part of UAS Type Certificate. The applicant shall prepare a TCDS on the basis of the UAS Type Certificate Data Sheet of Attachment 15 (Form: JCAB FORM 8-002-15). In principle, the TCDS is only issued and revised when a Type Certificate is issued.

### 13-1. Overview of TCDS

The Type Certificate Data Sheet (hereinafter referred to as "TCDS") is a document that, as part of the UAS Type Certificate, indicates the status of compliance with the technical standards related to safety stipulated in the regulations. The instructions for establishing a TCDS are shown below.

### 13-2. Submission of documents associated with issuance of TCDS

The applicant must submit one copy of the draft of the TCDS to the Inspection Body before all the necessary agreements for the issuance of the UAS Type Certificate (before the final UAS Type Certificate Review Board, if one is to be held), together with the specifications showing the matters to be described in each item and the relevant chapters of the UAS Flight Manual, etc. The draft should be submitted as an electronic file (Microsoft Word or equivalent for editing).

### 13-3. TCDS format

The paper size of the TCDS should be Japanese Industrial Standard A4 portrait, 40 characters by 40 lines, with appropriate margins on the left and right edges to allow for easy binding, etc. Prepare the TCDS using the form in Attachment 15 of Circular No. 8-002 (Form: JCAB FORM 8-002-15).

#### (1) Title box

Enter the title box below in the top right corner of the first page as the heading of applicant's TCDS.

– Title box –

- |   |
|---|
| <ul style="list-style-type: none"><li>① TCDS number (designated by JCAB)</li><li>② TCDS revision number</li><li>③ Name of the person or entity of UAS Type certificate holder</li></ul> |
|---|

④ Name of certified Type of UAS (in ascending order)
⑤ TCDS issue date

(2) Title

Indicate the title of the TCDS in the center of the first page.

【Example】

UAS Type Certificate Data Sheet No. ○○

(3) Name and address of UAS Type Certificate holder

This must match exactly what is stated in the application for UAS Type Certificate.

(4) History

Indicate the Type and certification date indicated on the UAS Type Certificate. Note that the date of certification will be blank at the time of draft submission.

13-4. Items to be listed for each type of UAS

The following items should be entered in the TCDS under their respective item names. If there are multiple type names for the same UAS Type Certificate, enter each item corresponding to the type by said UAS type.

(1) Airspace that can be flown and flight method

For UAS that can fly in the airspace specified in Article 132-85 of the Act and UAS that can fly without using the method specified in Article 132-86-2 of the Act, enter the applicable airspace that can be flown and flight method.

(2) Maximum takeoff weight

Enter the maximum takeoff weight of the UA.

(3) Maximum payload weight

Enter the maximum payload weight of the UA.

(4) Type Certification basis

Enter the revision dates of the "Standards concerning Strength, Structure and Performance to Ensure Safety" (related to Article 236-15 of the Regulations) and the "Standards for Specifying as those necessary to Ensure Uniformity" (related to Article 236-24 of the Regulations) that were applied

at the time of UAS Type Certificate. Also, state any Exemptions, Equivalent Level of Safety, and/or Special Conditions. If different standards are applied to the derivatives, state the differences of UAS Type Certificate standards correspond to each type of UAS.

#### 13-5. Revision of TCDS

##### (1) Time of Revision

In principle, TCDS is issued and revised only when a UAS Type Certificate is issued. If an application for a change to the UAS Type Certificate in item 2-3 is required, the TCDS will be revised through the prescribed procedures.

##### (2) Revision Procedures

The procedures for revising TCDS should follow those in items 13-2 to 13-4 above. If the UAS Type Certificate holder changes, the new holder should prepare the original draft.

##### (3) Other

Add a black vertical line to the right edge to identify the revised section (line).

## Part II Appendix 1

Samples of various forms  
(RFC/W, SOC, CIR, TWR)

## Request for Conformity/Test Witnessing



適合検査／試験立会要求書（続き）

Request for Conformity/Test Witnessing (Continuation sheet)

2. 発行番号 Tracking No. : AECC-RFC/W-2022-9999	Rev. NC	4. ページ Page : 2 of 2
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10. 検査対象品 Type Installation（続き）及び13. 設計データ Design Data（続き）

10. Type Installation (Con't) and 13. Design Data (Con't)

設計データに対する検査対象品は以下のとおり

Type Installation to Design Data is as followings:

No.	13. 設計データ (改訂符号/日付を含む) Design Data (with Revision / Date)				10. 検査対象品 Type Installation		
	文書名 Name of Doc.	文書番号 No. of Doc.	改訂 符号 Rev.	日付 Date	試験 供試体 Test Specimen	試験 セットアップ Test Setup	試験立会 Test Witnessing
1	セクション100地上/飛行試験方案 Section 100 Ground/Flight Test Plan	SH0001	NC	2022/12/1 1 <sup>st</sup> Dec. 2022	■	■	■
2	セクション105飛行試験方案 Section 105 Flight Plan	SH0002	A	2022/12/5 5 <sup>th</sup> Dec. 2022	□	■	■
3	セクション120飛行試験方案 Section 120 Flight Plan	SH0003	B	2022/12/12 12 <sup>th</sup> Dec. 2022	□	□	■

14. 特記事項 Special Instructions（続き）

14. Special Instruction (Con't)

航空局による試験供試体適合検査、試験セットアップ適合検査及び試験立会の実施項目は以下のとおりとする。

航空局が実施しない項目は、申請者が各検査対象品について適合報告書（JCAB FORM 8-002-6）を発行していることを確認する。

Items to conduct for the test specimen conformity inspection, test setup inspection and test witnessing by the JCAB are as follows:

Items for which the JCAB will not conduct, JCAB will check each Conformity Inspection Report (JCAB FORM 8-002-6) that are appropriately issued by the applicant.

No.	実施項目 Items to conduct		
	試験供試体 Test specimen	試験セットアップ Test setup	試験立会 Test witnessing
1	完成検査 Final inspection	2.5 項のみ Only item 2.5	2.6 項のみ Only item 2.6
2	実施しない N/A	2.2 項のみ Only item 2.2	3.1 項のみ Only item 3.1
3	実施しない N/A	実施しない N/A	2.1 ~2.4 項のみ Item 2.1 to 2.4

16. 備考 Remarks（続き）

16. Remarks (Con't)

航空局の同一の検査者が、同日に適合検査及び試験立会を実施した場合は、適合検査記録書（ JCAB FORM 8-002-7 ）ではなく、試験立会記録書（ JCAB FORM 8-002-9 ）に検査結果を記載しても良い。

In case of conformity test and test witnessing are conducted at same day by same inspector of the JCAB, recording the result using Test Witnessing Record(JCAB FORM 8-002-9) instead of using Conformity Inspection Record(JCAB FORM 8-002-7) can be accepted.

<div>適合報告書</div> <div>Statement of Conformity</div>		1.発行番号 Issue No.: 9999SOC-0001	
		2.適合検査依頼書番号 RFC No.: AECC-RFC/W-2022-9999	Rev. A
3. ■ 無人航空機 Unmanned Aircraft			
1.製造者 Manufacturer : 株式会社〇〇 (Name of the applicant)		2.型式 Model : 〇〇式 D-01型 (Name of Type/Model of UAS)	
3.製造番号 Serial No. : 0001、0002、0003		4.無人航空機登録番号 Registration No. : NA	
4. □ 発動機又はモーター Engine or Motor			
1.製造者 Manufacturer :		2.名称 Name :	
3.製造番号 Serial No. :			
5. □ プロペラ又はローター Propeller or Rotor			
1.製造者 Manufacturer :		2.名称 Name :	
3.ブレード及びハブの名称 Blade and Hub Name :		4.ブレード及びハブの製造番号 Blade and Hub Serial No. :	
Blade :	Hub :	Blade :	Hub :
6. □ 部品 Part			
1.製造者 Manufacturer :		2.名称 Name :	
3.部品等の番号 Part(s) No. :		4.部品等の製造番号 Serial No. :	
7. □ 供試体 Article		8. □ 試験セットアップ Test Set-up	
1.製造者 Manufacturer _____		9. □ その他 Other	
2.部品等の番号 Part(s) No. _____		(	
3.部品等の製造番号 Serial No. _____		)	
10.設計データ (図面及び試験方案等 (改訂符号、発行日を含む。))			
Design data (Drawing, Test Plan, etc) (with Revision / Date)			
1234-56789 Rev. A 2022/12/1			
上記対象供試体等は、10. 項の設計データに適合するものであることを確認した。			
This conforms that the specimen etc above conform(s) to the applicable design data in block 12.			
11.Deviation :			
なし			
N/A			
12.確認日 Date 2022/12/21 21 <sup>st</sup> Dec. 2022	13.確認者署名 Signature of Certifier 検査 慎太郎 KENSA Shintaro	14.所属 Organization 株式会社〇〇 無人航空機事業部 品質保証課 (Name of applicant in formal, division/unit)	

JCAB FORM 8-002-6(2212-ORG.)

<div>適合検査記録書</div> <div>Conformity Inspection Record</div>		1.発行番号 Issue No. : AECC-CIR-2022-0001		3.シート Sheet of sheets 1 of 1		
		2.適合検査依頼書番号 RFC No. : AECC-RFC/W-2022-9999				
4.型式 Model AECC式 D-01型 (Name of Type/Model of UAS)						
5.申請者Applicant		6.製造者 Manufacturer		7.検査期間 Period covered by this inspection		
株式会社 ○○ (Name of Applicant in formal)		申請者と同じ Same as item 5.		検査開始日 Beginning Date 2022/12/22 22 <sup>nd</sup> Dec. 2022	検査完了日 Ending Date 2022/12/22 22 <sup>nd</sup> Dec. 2022	
8.航空局 JCAB				9.登録検査機関 Registered Inspection Agency		
所属 Organization : 安全部 航空機安全課 航空機技術審査センター Aircraft Engineering and Certification Center, JCAB 担当官署名 Signature of JCAB : 大空 三郎 OHSORA Saburo				登録検査機関番号 Registered Inspection Agency No. : _____ 検査者署名 Signature of Inspector : _____		
10.項番 Item No.	11.検査項目 Nomenclature of Item Inspected	12.設計データ Design Data	13.改訂符号 及び日付 Revision and Date	14.判定数量 No. of Item Determined		15.備考 Comments
				適合 SAT.	不適合 UNSAT.	
1	適合報告書 Conformity Inspection Report	JCAB Form xxx		1		申請者から受領 Received from the applicant
2	試験供試体 Test specimen	1234-56789	A 2022/12/1 1 <sup>st</sup> Dec. 2022	3		試験に使用する供試機が設計データに適合していることを記録及び実機にて確認した。 製造番号 : 001、002、003 Test specimen for test confirmed to meet design data by, records and actual specimen. S/N:001, 002, 003
3	試験セットアップ Test setup	SH0001	NC 2022/12/1 1 <sup>st</sup> Dec. 2022	1		試験セットアップが設計データの2.5項どおりであることを書類及び実機にて確認した。 The test setup confirmed as it is in item 2.5 of the design data, by documents and actual setup.
	以下余白 Intentional blank from here.					

JCAB FORM 8-002-7(2212-ORG.)

試験立会記録書 TEST WITNESSING RECORD		1.発行番号 Issue No. 9999TWR-0001	
プロジェクトの情報 Project Information			
2.申請者 Applicant 株式会社〇〇 (Name of Applicant in formal)		3.試験立会要求書番号 RFC/W No. AECC-RFC/W-2022-9999	
無人航空機の詳細 Unmanned Aircraft Identification			
4. 製造者 Manufacture 申請者と同じ Same as item 2.	5.型式 Model 〇〇式 D-01 型 (Name of Type/Model of UAS)	6.部品番号 Part No. NA	7.製造番号 Serial No. 0001
LIST OF DATA			
8.試験名称 Test Title セクション 120 飛行試験方案 Section 120 Flight test plan			
9.試験方案番号 Test Plan No. SH0003			
10.試験期間 Period covered by this testing ・ 開始日 Beginning Date 2023/3/30 ~ 完了日 Ending Date 2023/3/31 From 30 <sup>th</sup> Mar. 2023 to 31 <sup>st</sup> Mar. 2023			
11.試験実施場所 Location of Testing ××試験場 xx test field			
12.検査者コメント等 JCAB/ Registered Inspection Agency Approved Organization Comment etc. 試験供試体及び試験セットアップが試験方案に適合していることを申請者が確認していることを申請者が発行した記録にて確認した。 2.1 項~2.4 項が試験方案どおりに試験が実施されたことを立ち合いにて確認した。 なお、2.3 項にて C2 リンク喪失後に自動的にロイター飛行に移行するまでに約 10 秒を要した。 The test specimen and test setup are confirmed that is met to the test plan by the applicant through the record established by the applicant. Items 2.1 to 2.4 are confirmed by test witnessing that the test was conducted as is set in Test Plan. Note: At item 2.3, it took 10 seconds from the time the C2 link was lost to transit to the Reuters flight.			
13.責任者の署名 Signature of responsible person		14.立会者の署名 Signature of witness	
所属名 Organization 株式会社〇〇 無人航空機事業部 設計課 (Name of applicant in formal, division/unit) 日付 Date 2023/3/31 31 <sup>st</sup> Mar. 2023 氏名 Signature 航空 太郎 KOKU Taro		所属名 Organization 株式会社〇〇 無人航空機事業部 品質保証課 (Name of applicant in formal, division/unit) 日付 Date 2023/3/31 31 <sup>st</sup> Mar. 2023 氏名 Signature 検査 慎太郎 KENSA Shintaro	
15.航空局 JCAB		16.登録検査機関 Registered Inspection Agency	
所属名 Organization 安全部 航空機安全課 航空機技術審査センター Aircraft Engineering and Certification Center, JCAB 発行日付 Issue Date 2023/3/31 31 <sup>st</sup> Mar. 2023 担当官署名 Signature of JCAB 青空 花子 AOZORA Hanako		登録検査機関番号 Registered Inspection Agency No. : 発行日付 Issue Date : 検査者署名 Signature of Inspector	

## Part III

# Guideline for Safety Standards

## 1 . Applicability

The examples of safety standards and Means of Compliance (hereinafter referred to as "MoC") explained here are based on those stipulated in Part II of Circular No. 8-001, "The Inspection Manual of Safety and Uniformity Standards for Unmanned Aircraft Systems (UAS) Type Certificate, etc." (September 7, 2022 First Issue (KOKU-KU-KI-456)).

This safety standard, based on D&R (Durability & Reliability), applies to UAS that fall under the following specifications and CONOPS. For UAS that do not fall under the following, additional coordination with JCAB or the Registered Unmanned Aircraft Inspection Organization (hereinafter collectively referred to as "Inspection Body") is required regarding the necessity of Special Conditions, etc.

- The UAS that has a C2 link, allowing the pilot to act in the event of an emergency.
- The UAS that will not operate in icing weather conditions
- The UAS that the ratio of pilots to UAs is 1:20 or less.
- The UAS that is equipped with a piston-engine or electric propulsion (excluding fuel cells)

The following is a list of technical elements that may require Issue Paper (for Special Conditions) for UAS Type Certificate. This list is periodically reviewed by the Inspection Body, so for the latest version, ask and check to the Inspection Body.

### List of candidates for Issue Paper (For Special Conditions)

Category	overview
Autonomous Flight	<p>Since D&amp;R is a standard that assumes pilot intervention, if the flight is autonomous and can continue to operate automatically while ensuring safety in any situation encountered during flight, without instructions from the ground, it may be necessary to show equivalent level of safety to each standard.</p> <p>Note that "Autonomous flight" is flight that can continue to operate automatically while ensuring</p>

	safety in any situation encountered during flight, without instructions from the ground. (JIS W 0141)
Fuel Cells	Since the crash area, which is one of the parameters used to calculate the flight hours required for the demonstration flight test, may differ from piston-engine or electric propulsion equipped UAS, additional flight hours may be required. Furthermore, additional standards may be required for the unique safety impacts of the associated fuel system, intake and exhaust system, etc.
Operating in icing conditions	When showing through the design that operation in icing weather conditions will not affect safety, it may be necessary to clarify the test conditions required for such showing.
Lightning resistance characteristics	When showing through the design that operation in a lightning environment will not affect safety, it may be necessary to clarify the test conditions required for such showing.
Electro-Magnetic Interference (EMI) and High Intensity Radiated Fields (HIRF)	When showing through the design that operation in EMI and HIRF environments will not affect safety, it may be necessary to clarify the test conditions required for such showing.
Artificial Intelligence (AI)	It may become necessary to show that AI does not affect safety. AI here includes not only autonomous flight, but also limited uses of such as image recognition and anomaly detection.
Detect and Avoid (DAA)	It may be necessary to clarify the performance standards for DAA (cooperative and non-cooperative) and the test conditions required for certification.
Harm prevention function, etc.	Additional standards may be required for safety features such as airbags.

### The applicant's own confirmation of the compliance to the standards

If the standard states such as "the applicant must submit the results of applicant's own confirmation of the compliance to the standards," the applicant must submit a compliance checklist that applicant has established,



with the results of applicant's own confirmation of the compliance to the standards. The Inspection Body will not conduct a technical confirmation of the compliance to the standards, but will determine compliance by confirming that the applicant has confirmed the necessary items from the applicant's checklist.

## 2. Structure of this part

Regarding the UAS subject to application, the guidelines for class I UAS Type Certificate are described in Section 3 below, and the guidelines for class II UAS Type Certificate are described in Section 4 below.

• Description of each section in Circular No. 8-001

### Overview of the Standard

This item provides an Overview of the Standard and their purpose (why these standards must be met, and what kind of safety is guaranteed by showing compliance with the standards).

### Means of Compliance (MoC) : x, x, x

(a): xx Test Plan (MoC x)

This item provides Means of Compliance: MoC and the kind of document for showing compliance needs to be prepared for. When there are multiple standards such as items (a) to (c), each is explained separately. In a simple explanation, MoC is a method (means) for showing compliance with the standards. For example, if the standards in Section 100 are to be showing compliance through ground tests and flight tests, this is expressed as showing compliance under MoC items "5" and "6". There are various definitions of MoC, but in this guideline they are classified using the following numbers. :

- 0: Compliance Statement
- 1: Design/Data Review
- 2: Calculation/Analysis
- 3: Safety Assessment
- 4: Laboratory Test (※Tests not falling under MoC 5, 6 or 9)
- 5: Ground Test on UA
- 6: Flight Test
- 7: Physical Inspection
- 8: Simulation Test
- 9: Equipment Qualification

Simulation tests use equipment that comprehensively simulates the operational environment (computer-based simulation and hardware-in-the-loop simulation). The equipment must be able to simulate the flight of the UA with response characteristics that reproduce to some extent the response of the UA and related systems including associated elements. The use of

simulation tests must be thoroughly discussed with the Inspection Body.

### Points of inspection

This item provides what the Inspection Body should check at what point of view.

### The Inspection Body's Level Of Involvement (LOI)

This item provides the Inspection Body's level of involvement at each inspection.

### Other useful information

This item provides information that can be used as a reference as necessary.

### 3. Class I UAS Type Certificate

- 001 Concept of Operations (CONOPS)
- 005 Definitions
- 100 UA Signal Monitoring and Transmission
- 105 UAS AE Required for Safe UA Operations
- 110 Software
- 115 Cybersecurity
- 120 Contingency Planning
- 125 Lightning
- 130 Adverse Weather Conditions
- 135 Flight Essential Parts
- 140 Other Necessary Design and Configurations
  - 140-1 Structures
  - 140-2 Lights, marks, etc.
  - 140-3 Autopilot system, cameras, etc.
  - 140-4 Transportation of dangerous objects
  - 140-5 Recording flight characteristics
  - 140-6 Reciprocating Engine and Fuel Carriage
- 200 UAS Flight Manual
- 205 ICA
- 300 Durability and Reliability
- 305 Probable Failures
- 310 Capabilities and Functions
- 315 Fatigue
- 320 Verification of Limits

•001 Concept of Operations (CONOPS)

The applicant must define and submit to the Japan Civil Aviation Bureau a concept of operations (CONOPS) proposal describing the unmanned aircraft system (UAS) operation in the national airspace system for which UAS type certification is requested. The CONOPS proposal must describe, at a minimum, a description of the following information in sufficient detail to determine the parameters and extent of testing and operational limitations:

- (a) The intended type of operations;
- (b) specifications of the Unmanned Aircraft (UA);
- (c) Meteorological conditions;
- (d) Operators, remote pilots, and related personnel responsibilities;
- (e) Specification of associated elements ("AE") required to comply with safety standards (including control station ("CS"), auxiliary equipment and other necessary systems)
- (f) Command, control, and communication functions to be used for safe UA operations;
- (g) Operational parameters (such as population density, geographic operating boundaries, airspace classes, launch and recovery area, congestion of proposed operating area, communications with air traffic control, line of sight (maximum communication distance in the event of visual line of sight operations, type of radio system to be used and maximum communication distance in the event of beyond visual line of sight operations), and aircraft separation); and
- (h) Specification of collision avoidance equipment, if certification is requested.

### Overview of the Standard

This standard summarizes the items that should be included in the appropriate preparation of Concept of Operations (CONOPS).

Unlike manned aircraft, which operate in a routine manner from airport to airport and are supported by traditional ground facilities and procedures, there are various possible operational forms for UAs. Since the foundation of the UAS Type Certificate system is to certify that the UAS is appropriate for the operational form, CONOPS must be properly set as the first step of certification activities. In addition, CONOPS must be described in sufficient

detail to determine the conditions and scope of each test.

(Reference : JIS W 0141)

- ◆ Operational limitations: The limitation of flying capability of UA such as the maximum speed, maximum altitude, wind speed, maximum payload, radio wave range, maximum operating time, etc. This also includes information other than flight performance, such as prohibited maneuvers and the minimum number of operators.
- ◆ Detect And Avoid (DAA): Ability to detect potential collisions or other flight impediments and take appropriate action, including avoidance. Other flight impediments include ground and airborne objects (aircraft, UAs, terrain, trees, buildings, etc.).

## MoC : 1

(a)~(h): Section 001 CONOPS (MoC 1)

Create a CONOPS that includes the following information:

(a) The intended type of operations

Compliance with Article 132-85, paragraph 1 (prohibited airspace) and Article 132-86, paragraph 2 (method of flight) of the act

(b) Specifications of the Unmanned Aircraft (UA)

- Basic specifications of the UA itself (physical characteristics such as UA size and materials used, performance characteristics such as the UA's maximum speed and payload, and operating environment)
- Specifications of optional equipment that can be installed (e.g. cameras, survey equipment)
- Performance characteristics  
Flight distance, flight time, route complexity, weight, center of gravity, density altitude, speed, energy storage system capacity, pilot to UA ratio (number of UAs that one pilot can control simultaneously), automatic/autonomous state for each flight phase, propulsion system (principle, type, number, capabilities, etc.), navigation sensor, flight control system, deviation prevention system (geo fence, geo awareness, etc.)
- Operating environment  
Outside temperature, wind speed, nighttime operation, Electromagnetic Interference (EMI) and High Intensity Radiated Field (HIRF) environments

(c) Meteorological conditions

Describe the weather conditions under which the UA can operate, such as lightning, rain, snow, and icing conditions.

If necessary, describe the weather conditions under which the UA can operate for special weather phenomena (such as when visibility is not ensured due to fog or smoke, or when fog or volcanic ash enters the UA and affects safe flight, etc.)

- (d) Operators, remote pilots, and related personnel responsibility
- (e) Specification of Associated Elements ("AE") required to comply with safety standards (including Control Station ("CS"), auxiliary equipment and other necessary systems)
  - At present, the most typical AE that fall under this category are the CS, "Propo", launch and recovery equipment, and C2 link (ground side). Enter the specifications for these.  
Generally, the "Propo" is included in the CS, but if the use is limited such as the case the "Propo" is only used for development of UAS, then that fact is also required to be stated.
    - ◆ "Propo" is an abbreviation for "Proportional System". It is a device for controlling the UA using a stick, etc. (JIS W 0141)
  - If the design of UAS is novel, and other AEs besides the four listed above are required to comply with safety standards, they should be added as AEs.
  - If we see more varieties of AEs as technology advances, systems other than the four listed above may be added to this guideline.
- (f) Radio communication functions (command, control, and communication) to be used for UA operations
- (g) Operational parameters (such as population density, geographic operating boundaries, airspace classes, launch and recovery area, congestion of proposed operating area, communications with air traffic control, line of sight (maximum communication distance in the event of visual line of sight operations, type of radio system to be used and maximum communication distance in the event of beyond visual line of sight operations), and aircraft separation)
- (g) Operational parameters such as population density, geographic operating boundaries, airspace classes, launch and recovery area, congestion of proposed operating area, communications with air traffic control (ATC), categorized between visual line of sight or beyond visual line of sight (maximum communication distance in the event of visual line of sight operations, type of radio system to be used and maximum communication distance in the event of beyond visual line of sight operations), and separation from aircraft.
- (h) Specification of Detect And Avoid equipment, if certification is requested

### Points of inspection

Verify that items (a) through (h) are fully described and are in sufficient detail to determine the test content and operational limitations.

### The Inspection Body's Level Of Involvement (LOI)

CONOPS is the backbone of certification activities and is constantly referred to from before application and throughout the entire certification period. Since the contents are ultimately included in the UAS Flight Manual, involvement of Inspection Body is necessary depending on the timing and content of each activity.

### Other useful information

none



#### •005 Definitions

- (a) Loss of Control: Loss of control means an unintended departure of an aircraft from controlled flight. It includes control reversal or an undue loss of longitudinal, lateral, and directional stability and control. It also includes an upset or entry into an unscheduled or uncommanded attitude with high potential for uncontrolled impact with terrain. A loss of control means a spin, loss of control authority, loss of aerodynamic stability, divergent flight characteristics, or similar occurrence, which could generally lead to crash.
- (b) Loss of Flight: Loss of flight means a UA's inability to complete its flight as planned, up to and through its originally planned landing. It includes scenarios where the UA experiences a controlled flight into terrain, obstacles, or any other collision, or a loss of altitude that is severe or non-reversible. Loss of flight also includes deploying a parachute or ballistic recovery system that leads to an unplanned landing outside the operator's designated recovery zone.

### Overview of the Standard

This standard defines the terms used in safety standards. There are no certification documents for this standard. This item describes the details of Loss of Control and Loss of Flight, which are often used as Pass/Fail Criteria in each standard.

"Control" has a definition that states, "To apply required operations to a controlled object so as to conform to a certain purpose (JIS Z 8116)." This standard states that "loss of control means an unintended deviation from the controlled flight state of the UA," so the controlled object refers to the entire flight of the UA. Therefore, control does not refer to a narrow range such as the control logic of the software that performs flight control but rather refers to all the controls necessary for the UA to receive instructions from the CS, etc. and fly in a controlled state.

### MoC : Not applicable

Not applicable

### Points of inspection

Not applicable

## The Inspection Body's Level Of Involvement (LOI)

Not applicable

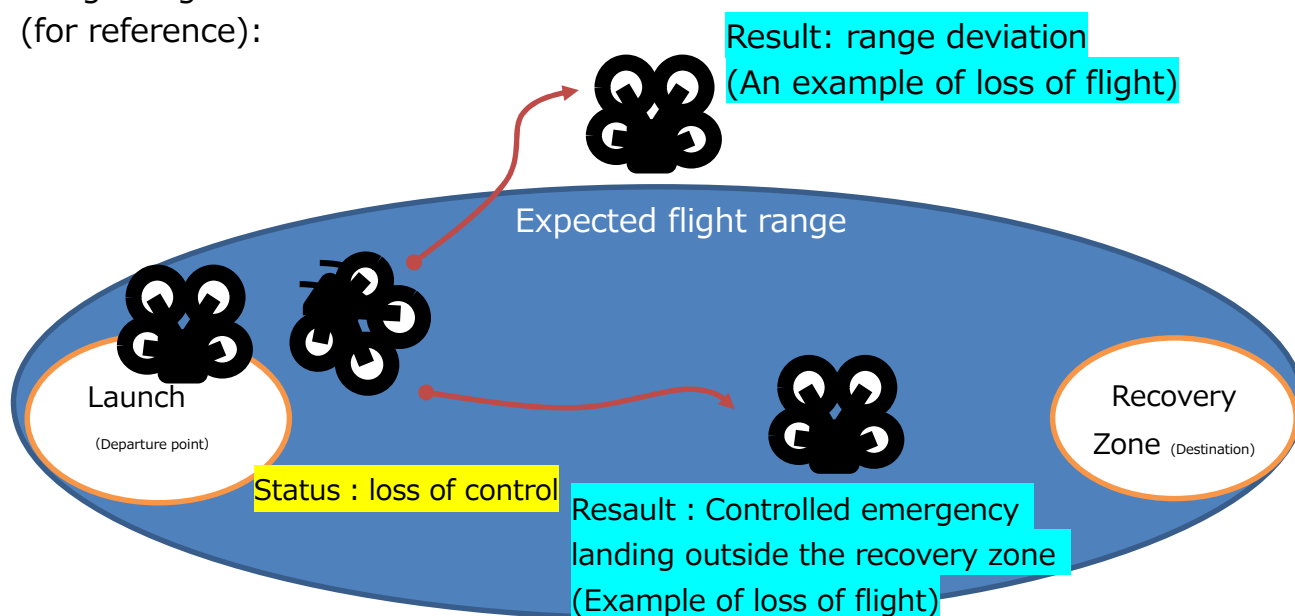
### Other useful information

The terms used for the Pass/Fail Criteria in each standard are summarized as below.

(Status) Includes temporary flight status
loss of control

(Result) The result of some cause
Controlled emergency landing outside the recovery zone (loss of flight)
Deviation from expected flight range (range deviation) (loss of flight)

Image diagram of each term  
(for reference):



It should be noted that these definitions are used for example in the Pass/Fail Criteria for tests related to Section 300 Durability and Reliability and are not the allowable values (conditions and results) for actual operation in the Class I UAS Type Certificate. For example, even if it is assumed that the UA will be intentionally landed in an area where there are no objects and third-party access control measures are implemented, it will be treated as a loss of flight if it is not set in the test plan and the purpose of the test not to confirm such operation. Similarly, if a momentary loss of control occurs

during a test related to Section 300 Durability and Reliability for example, the pass/fail judgment of the test must be made after evaluating whether the loss of control is due to the design.

A recovery zone is a place where recovery (landing) is anticipated.

#### •100 UA Signal Monitoring and Transmission

The UA must be designed to monitor and transmit to the AE all information required for continued safe flight and operation. This information includes, at a minimum, the following:

- (a) Status of all critical parameters for all energy storage systems;
- (b) Status of all critical parameters for all propulsion systems;
- (c) Flight and navigation information as appropriate, such as speed, heading, altitude, and location; and
- (d) Communication and navigation signal strength and quality, including contingency information or status.

### Overview of the Standard

This standard requires that the UA transmits information (critical parameters) necessary for safe flight and continued operation to AEs.

AEs come in various forms, such as CS, “Propo”, and flight control apps installed on smartphones, but in any case, they must be designed to provide the information necessary for safe flight and continued operation to AEs. Then, it is confirmed that each critical parameter is monitored and transmitted to AEs as designed, and that the accuracy of each transmitted critical parameter is as designed.

A safe flight is a flight that does not cause harm to third parties or third-party property. “Continuation of operation” is the UA continues operation as planned. It includes loss of control and loss of flight, which are often used as pass/fail criteria in each standard in Section 005.

Critical parameters are information that needs to be communicated to the pilot for safe flight and continued operation.

### MoC : 1, 5, 6

(a)~(d): Section 100 Design drawings (MoC 1)

Section 100 Design drawings should include the UA design specifications and their details for (a) to (d) above. Examples of items to be included in the design drawings are shown in the table below.

Examples of items to be included in Section 100 Design drawings

	Items to be listed
(a)	(1) Energy storage system monitoring targets (e.g. voltage, current, temperature, remaining capacity, BMS health) (2) Monitoring methods for the energy storage system (e.g., monitoring methods using each sensor)

	Items to be listed
	(3) Accuracy of transmitted parameters (e.g., resolution and update period, etc.)
(b)	(1) Propulsion system monitoring targets (e.g. RPM, temperature, voltage, current, ESC and ECU (Engine Control Unit) health) (2) Propulsion system monitoring method (e.g., monitoring method using each sensor) (3) Accuracy of transmitted parameters (e.g., resolution and update period, etc.)
(c)	(1) Flight and navigation information required for safe flight and continued operations (e.g., speed, heading, altitude, position, attitude, control modes, flight controller health) (2) How to monitor the information shown in (1) (3) Accuracy of the information shown in (1) (e.g., resolution and update period, etc.)
(d)	(1) Monitoring of communication and navigation signal strength and quality, including emergency information and status (e.g., reception level, line margin, catch-up/frame lock status, number of GNSS satellites received, DOP, navigation mode) (2) How to monitor the information shown in (1) (3) Accuracy of the information shown in (1) (e.g., resolution and update period, etc.)

(a)~(d): Section 100 Ground/Flight Test Plan (MoC 5/6)

Ground and flight tests will verify that the UA is in accordance with the design specifications shown in Section 100 Design drawings of the MoC 1. Examples of verification items for (a) to (d) above are shown in the table below.

Examples of ground/flight test verification items for each	
	Verification items for Ground/Flight Test
(a)	(1) All critical parameters of the energy storage system are monitored as designed and transmitted to AEs. (2) The accuracy of the transmitted critical parameters is as designed.
(b)	(1) All critical parameters of all propulsion systems are monitored as designed and transmitted to AEs. (2) The accuracy of the transmitted critical parameters is as designed.
(c)	(1) Flight and navigation information necessary for safe flight and continued operations (e.g., speed, heading, altitude, and position) is monitored and transmitted to AEs as designed. (2) The accuracy of the information transmitted is as designed
(d)	(1) The strength and quality of communication and navigation signals, including emergency information and status, are monitored as designed and transmitted to AEs. (2) The accuracy of the information transmitted is as designed

In addition, the flight test plan must be prepared taking into consideration each of the critical operational environments (a) to (d) above.

(a)~(d): Section 100 Ground/Flight test report (MoC 5/6)

The test results will be compiled into a report.

### Points of inspection

For each certification document, verify that :

- (1) Section 100 Design drawings to demonstrate the validity of the design
- (2) Section 100 Ground/Flight Test Plan
  - Pass/Fail Criteria is set appropriately.
  - Validity, feasibility and reproducibility of the test
  - The information and data to be recorded are specified.
- (3) Section 100 Ground/Flight test report
  - The test was conducted appropriately according to the test plan.

- Test results and evaluation for Pass/Fail Criteria
- All information and data that should be recorded is included without omission.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

Test witnessing will be determined based on the importance of the test.

### Other useful information

none.

- 105 UAS AE Required for Safe UA Operations
  - (a) The applicant must identify and submit to the Japan Civil Aviation Bureau all AE and interface conditions of the UAS that affect the safety of the UA or are otherwise necessary for the UA to meet these Safety Standards. As part of this requirement—
    - (1) The applicant may identify either specific AE or minimum specifications for the AE.
      - (i) If minimum specifications are identified, they must include the critical requirements of the AE, including performance, compatibility, function, reliability, interface, pilot alerting, and environmental requirements.
      - (ii) Critical requirements are those that if not met would impact the ability to operate the UA safely and efficiently.
    - (2) The applicant may use an interface control drawing, a requirements document, or other reference, titled so that it is clearly designated as AE interfaces to the UA.
  - (b) The applicant must show that the AE or minimum specifications identified in paragraph (a) of this Section meet the following:
    - (1) The AE provide the functionality, performance, reliability, and information to assure UA safety in conjunction with the rest of the design;
    - (2) The AE are compatible with the UA capabilities and interfaces;
    - (3) The AE must monitor and transmit to the pilot all information required for safe flight and operation, including but not limited to those identified in Section 100; and
    - (4) The minimum specifications, if identified, are correct, complete, consistent, and verifiable to assure UA safety.
  - (c) The minimum specifications for the AE, established by the applicant as operational limitations and approved by the Japan Civil Aviation Bureau, must be included in the UAS Flight Manual.
  - (d) The applicant must develop maintenance instructions necessary to address implications from the AE on the Safety of the UA. Those instructions must be described in the



instructions for check and maintenance of the UAS (hereinafter referred to as "ICA" in this chapter) required by Section 205.

### Overview of the Standard

This standard requires that all AEs and interface conditions that affect the safety of the UA be identified, appropriate and reflected in the relevant documentation to demonstrate their suitability.

Specifically, the following are necessary :

- Identification of AEs and interface conditions requirements
- Verify that AEs are adequate for the secure operation of the UA.
- Setting operational limits for AEs
- Setting maintenance procedures for AEs

### MoC : 1, 6

(a),(b)(4): Section 105 AE design document (MoC 1)

The design document indicates the AEs and interface conditions that satisfy the above criteria (a) and (b)(4). Details of the above criteria (a) and (b)(4) that must be satisfied are shown in the table below.

Details of (a), (b)(4) to be satisfied

	AE	Interface Conditions
(a)	<ul style="list-style-type: none"> <li>● Indicate the model number or other information that can identify the AE or indicate the minimum specifications that can identify the AE.</li> <li>● Minimum specifications should include critical items such as performance, compatibility, functionality, reliability, interfaces, pilot alerts, and environmental requirements. (A critical item is one that, if not met, will affect the UA's ability to operate safely and efficiently.)</li> </ul>	<ul style="list-style-type: none"> <li>● Use interface control drawings, interface requirements documents, or other reference materials to indicate Interface Conditions that affect the secure operation of the UA.</li> </ul>
(b)(4)	<ul style="list-style-type: none"> <li>● If minimum specifications are identified, they must be shown to be correct, complete, consistent, and verifiable to ensure the safety of the UA.</li> </ul>	N/A

(b)(1), (b)(2): Section 300 Flight test plan (MoC 6)

Through Section 300 flight testing to verify the reliability of the UA, verify that each AE is providing the appropriate information to ensure reliability and safety, and demonstrate that the AE is compatible with the capabilities and interfaces of the UA.

(b)(1), (b)(2): Section 300 Flight Test report (MoC 6)

The test results will be compiled into a report.

(b)(1), (b)(2): Section 310 Flight test plan (MoC 6)

Through Section 310 flight testing to verify the performance and functionality of the UA, verify that each AE is providing the appropriate information to ensure performance, functionality, and safety, and demonstrate that the AE is compatible with the capabilities and interfaces of the UA.

(b)(1), (b)(2): Section 310 Flight Test report (MoC 6)

The test results will be compiled into a report.

(b)(3): Section 100 Flight test plan (MoC 6)

This is a flight test to verify that the AEs identified for the above criteria (a) and (b)(4) monitor and transmit to the pilot all information necessary for safe flight and operation, including but not limited to that specified in Section 100. There is a degree of freedom to include it in the Section 100 Flight test plan or to set it separately as a Section 105 Flight test plan. In addition, the flight test plan must be prepared considering the critical operating environment of each AE within the operational envelope and operational limitations.

(b)(3): Section 100 Flight Test report (MoC 6)

The test results will be compiled into a report.

(c): UAS Flight Manual (MoC 1)

The applicant sets the approved AE's model number (if the AE is specified) or minimum specifications as the operational limitations and include the operational limitations in the UAS Flight Manual.

The UAS Flight Manual is prepared in accordance with Section 200.

(d): ICA (MoC 1)

Reflect AE maintenance procedures in the ICA that affect UA safety.

### Points of inspection

For each certification document, verify that :

- (1) Section 105AE design document
  - AE and Interface Conditions must be specified.
  - If the AE is specified with minimum specifications, check whether it is possible to identify the AE.
- (2) Section 300/Section 310 Flight test plan
  - Pass/Fail Criteria is set appropriately.
  - Safety, validity, feasibility, and reproducibility of the test
  - The information and data to be recorded are specified.
- (3) Section 300/Section 310 Flight test report
  - The test was conducted appropriately according to the test plan.
  - Test results and evaluation for Pass/Fail Criteria.
  - All information and data that should be recorded is available.

- (4) Section 100 Flight test plan
  - Pass/Fail Criteria is set appropriately.
  - Test validity, feasibility and reproducibility.
  - The information or data to be recorded is specified.
- (5) Section 100 Flight Test report
  - The test was conducted appropriately according to the test plan.
  - Test results and evaluation for Pass/Fail Criteria.
  - All information and data that should be recorded is available.
- (6) UAS Flight Manual
  - The UAS Flight Manual includes the operational limits of the AE, and the contents are clear.
- (7) ICA
  - AE maintenance procedures are included.
  - Maintenance procedures are clear.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

Test witnessing will be determined based on the importance of the test.

### Other useful information

AE refers to peripheral devices, etc., that are necessary to operate the UA, separate from the UA itself. The applicant must carry out certification activities for all AEs of the UAS that affect the safety of the UAS or are necessary for the UAS to meet the safety standards. Basically, each safety standard is a requirement for matters that affect the safety of the UAS, so matters that affect the safety of the UAS and matters necessary for the UAS to meet the safety standards are synonymous. On the other hand, safety standards require a necessary margin in the design, such as the occurrence of probable failures and demonstration under conditions exceeding the maximum total weight by 5%, so if a design requires a dedicated AE to accommodate that margin, it falls under the matters necessary for the UAS to meet the safety standards. Therefore, both perspectives must be considered. At present, typical AEs include the CS, the "Propo" system, the launch and recovery device, and the C2 link.

In the FAA, AEs are approved with Operational Approval, not UAS Type Certificate (but is also confirmed whether it is safe during the UAS Type Certificate review). Meanwhile, in Japan, AEs are subject to UAS Type Certificates. The safety standards are basically aimed at the safety of UAs, but AEs are usually required to ensure that safety. Therefore, certification

activities are required for all AEs of UAS required to meet the safety standards.

For example, in the case of “Propo”, there are also forms in which the service is provided as an app installed on smartphones. In such cases, the specification of the operating environment for the app for proper functioning is subject to the UAS Type Certificate, but the operating environment itself is not. For example, it is necessary to specify the smartphone and OS for the app to function properly, but the smartphone and OS themselves are not subject to the UAS Type Certificate.

#### •110 Software

To minimize the existence of software errors, the applicant must:

- (a) Verify by test all software that may impact the safe operation of the UA;
- (b) Utilize a configuration management system that tracks, controls, and preserves changes made to software throughout the entire life cycle; and
- (c) Implement a problem reporting ("PR") system that captures and records defects and modifications to the software.

### Overview of the Standard

This standard requires activities necessary to minimize the residual software errors.

Section 110 first requires that the software be tested to confirm that requirements are properly implemented. This testing is performed for system-level requirements. Next, since configuration management is important for software whose versions are likely to change from moment to moment, it is required to be able to maintain and manage throughout the lifecycle what software is installed on each model (tracking) and whether the software is appropriate (management and storage). Finally, a PR system is necessary to understand and record problems found in the software and make corrections as necessary.

This activity can be performed according to the guidelines of ASTM F3153-22. In manned aircraft, activities based on RTCA DO-178 are often required as development assurance for software. DO-178 (DAL D) can also be used as a showing compliance with the standards. Similar activities are also expected for airborne electronic hardware (AEH).

- ◆ Software errors : A discrepancy between a calculation, observation, or measurement or condition and a specified or inferentially correct condition, including human error (JIS Z 8115). In other words, it refers to a situation in which the software in the UA or CS behaves incorrectly or an error that leads to this is included in the software.

### MoC : 1, 2

(a),(b),(c): Section 110 Software Certification Plan/Completion report (MoC

1, 2)

Create a Section 110 Software Certification Plan that summarizes the plan for demonstrating compliance with Section 110. The plan will ultimately become an accomplishment summary report that records that the plan was completed as planned (two documents are required: the plan and the accomplishment summary report).

The UAS Software Certification Plan includes:

First, for item (a), it is necessary to extract from all software used in the UAS what constitutes "software that affects safe operation." There are several methods for extraction, including assessing the extent of the impact the software behaves incorrectly by applying the method of identifying Flight Essential Parts in Section 135, and using safety analysis methods such as FHA (Functional Hazard Analysis), SSA (System Safety Assessment), and FMEA (Failure Mode and Effect Analysis).

The table below is an example of how the Flight Essential Parts Specific Analysis Report, which is provided as a reference for evaluating using the simplified FMEA, would look like when applied to software.

S/W Specific Analysis Report (image)

No.	P/N	Name	Ver	Will a software error result in loss of flight? ①	Reason for ① being No	Section 110 applicable software
1	980-XXX	ZZZ	A	No	Compliance demonstration by S/W No. 2 in this table	No
2	980-XXX	YYY	B	Yes	-	Yes
3						

Another method is to conduct testing on all software used in the UAS without extracting the target software.

Next, the operation of "software that affects safe operation" must be confirmed by "system-level testing". Therefore, "system-level requirements" must be defined. Although the word "system" can be translated as "keitou" in Japanese, UAS is composed of various systems. For example, there is the GNSS system that determines the UA's position, and the flight control system that controls the flight. System-level requirements are the individual requirements that each system must satisfy. For example, for a GNSS system, one requirement is to

correctly output position information. There are many types of software testing, including white box testing, black box testing, unit testing, integration testing, and other classifications, but requirement-based testing is testing that verifies that system-level requirements are correctly implemented in the software. Therefore, black box testing generally applies, and testing using test equipment (bench testing) and ground testing at the UA level are the mainly focused. In addition, there are also requirements that can be confirmed by combining flight tests performed in Section 300, bench tests, and ground tests.

System-level requirements are generally decomposed into software and hardware and allocated to each. In this case, DO-178 (DAL D) can be used to show compliance of the software, as described in this Overview of this Standard.

While all requirements must be verified basically through testing, methods such as analysis and inspection are also acceptable for requirements that are difficult to verify through testing.

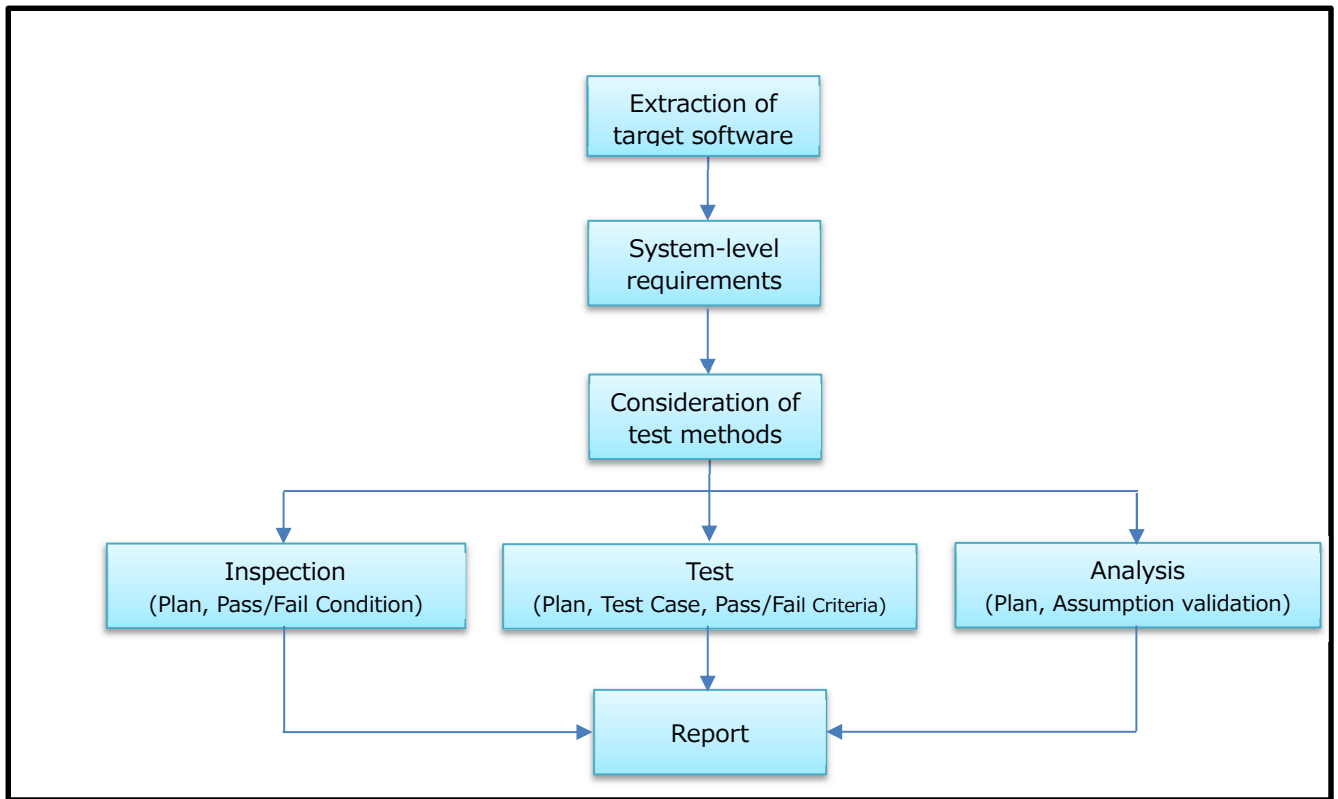
For example, non-functional requirements (allowable memory amount, CPU load, etc.) are requirements that are verified through analysis. Inspection is generally a non-destructive evaluation carried out using the senses such as visual, auditorial and tactile, and includes physical measurements and operations.

Traceability must be ensured from requirements to test cases and procedures.

For system-level testing, ASTM F3153-22 “Standard Specification for Verification of Avionics Systems and Equipment” can be referred.



The above activities are illustrated below :



Based on the above activities, the UAS Software Certification Plan/Completion report will include the following (the results of the certification activities will be included only in the accomplishment summary report) :

- UAS system overview (other documents may be cited)
- Software list (installed/not installed)
- Explanation of how to extract software that adversely affects safe operation and the results
- Explain (plan) how to conduct system-level requirements-based testing

- Summary of System-Level Requirement-Based Test Results

In addition, the following documents are required to supplement the accomplishment summary report:

- System-level requirements list
- System-level requirement-based test related documents and test results

Next, in paragraph (b), show that a configuration management system to track, manage and store of changes to the Software throughout its lifecycle is applied.

The software covered here is software that affects the safe operation, similar to that covered under (a).

To satisfy this item, provide an overview of how configuration management will be performed and explain that the following items will be configuration managed:

- i. Requirements
- ii. System and, *if applicable*, software test environment descriptions
- iii. Test procedures, and results with requirements traceability to test cases and procedures
- iv. Source code and development environment/tools
- v. Build and load procedures for replication of the executable object code

Configuration management should be started no later than the start of testing under (a), to establish a baseline for configuration management.

Finally, for (c), state that a PR (Problem Report) system will be applied to capture and record software corrections and defects.

The software covered here is software that affects safe operation, like the software covered by (a).

In order to satisfy this item, explanation of how problem management will be carried out is necessary.

When using COTS products, if there is assurance from the manufacturer, the verification of the software in (a) may not be necessary. When there is no guarantee from a reliable manufacturer, such as open source, the certification in (a) is required, just like with software created by the applicant itself. Note that (b) and (c) are required in any case.

In addition, system verification in ground tests and flight tests can also be used as software verification. Even in this case, it is necessary to clarify which requirements were shown compliance by which tests.

### Points of inspection

Check the following :

- Are the results of software extraction that adversely affect safe operation valid?
- Is the method for verifying system-level requirements appropriate?
- Are the results of system-level requirement-based testing valid?
- Are the configuration management and PR systems appropriate?

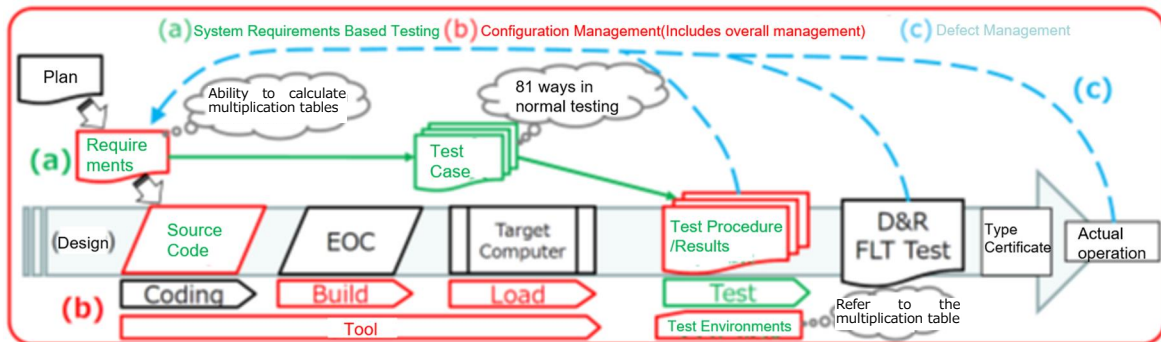
Note that, since the data obtained for certification activities, such as the results of system requirement-based testing, is of a nature that should be properly managed by the applicant itself, it does not necessarily have to be submitted, and will be checked at the applicant's facility if necessary.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

### Other useful information

The following is a reference diagram for items (a), (b), and (c).  
Green relates to item (a), red to item (b), and blue to item (c).



### Industry Standards

- RTCA DO-178C, Software Considerations in Airborne Systems and Equipment Certification
- ASTM F3153-22, Standard Specification for Verification of Avionics Systems and Equipment

•115 Cybersecurity

- (a) UA equipment, systems, and networks, addressed separately and in relation to other systems, must be protected from intentional unauthorized electronic interactions that may result in an adverse effect on the security or safety of the UA. Protection must be ensured by showing that the security risks have been identified, assessed, and mitigated as necessary.
- (b) When required by paragraph (a) of this Section, procedures and instructions to ensure security protections are maintained must be described in the ICA.

### Overview of the Standard

This standard requires that UAS be protected from intentional and unauthorized electronic interference that could adversely affect its safety.

"Adversely affecting safety" means that UA causes harm to third parties and third party property.

### MoC : 1, 2

(a): Section 115 Security Certification Plan (MoC 1, 2)

To demonstrate that the UAS is protected from intentional and unauthorized electronic interference that adversely affects safety, a risk assessment is conducted to identify and evaluate security risks and, if necessary, present a plan to implement mitigation measures.

To satisfy this section, first define the threat condition that affects the safety of the UAS due to intentional and unauthorized electronic interference. For example, "deviation from the expected flight range" is an example of a threat condition.

Next, extract the systems that may cause the threat condition. There is not always only one system. For example, if there is a deviation from the expected flight range, the flight management system and the flight control system are generally considered to be the causes. AE also needs to be considered.

Next, extract the Assets that may cause a Threat Condition within the extracted system. For example, in the case of the flight management system and flight control system mentioned above, if tampering with the flight plan data and flight control program within them is thought to cause a Threat Condition, then the flight plan data and flight control

program would be the Assets. At the same time as extracting the Assets, it is necessary to clarify the Perimeter that is the entry point to the Asset, and what the external Environment is like.

Next, a security risk assessment is performed to identify the risks, and to present their impact assessment and mitigation measures as necessary. There are various methods for risk assessment, but as an example, it is effective to assume a scenario (Threat Scenarios) that will have a negative impact on each of the extracted Assets in terms of confidentiality, integrity, and availability, and to assess the impact. In addition, known vulnerabilities must be considered in the scenario. It is recommended that the assessment be performed for each flight phase and the affected objects (UAS, pilots, third parties, etc.). For example, if the integrity of flight plan data is lost due to tampering, consider the Threat Scenario and the frequency of occurrence (how likely it is to occur). The frequency of occurrence of the Threat Scenario and the impact of the Threat Condition are evaluated, and if necessary, security measures must be considered.

Finally, the items that operators must comply with to maintain the security level are compiled into security guidelines.

At this stage, if new vulnerabilities are discovered and there are changes to the Threat Scenarios considered in the risk assessment, additional assessment will be required.

(a), (b): Section 115 Security compliance completion report document (MoC 1, 2)

The results of (a) shall be compiled as a completion reporting document. If security measures are required as a result of (a), the maintenance procedures and instructions for such security measures shall be included in the completion report.

(b): ICA (MoC 1)

The matters that must be observed to maintain the security level should be described in the chapter of the instruction for mandatory check and maintenance in the ICA. ICA will be shown compliance in accordance with Section 205.

### Points of inspection

For each certification document, verify that :

In item (a), in addition to physical Assets such as systems and items, reviews are conducted from the perspective of whether logical Assets such

as functions and data are comprehensively extracted, whether all interfaces that may affect Assets are considered as Perimeters, and whether all people, organizations, systems, etc. that affect UA as Environment are considered. In risk assessment, reviews are conducted from the perspective of whether impact evaluation is performed appropriately. Particularly, confirm that security risks are reduced to an acceptable level by security measures.

Item (b) reviews whether the results of item (a) have been compiled as a completion report, and whether the matters that operators must comply with, as set out in the ICA, have been compiled into security guidelines and whether they are appropriate.

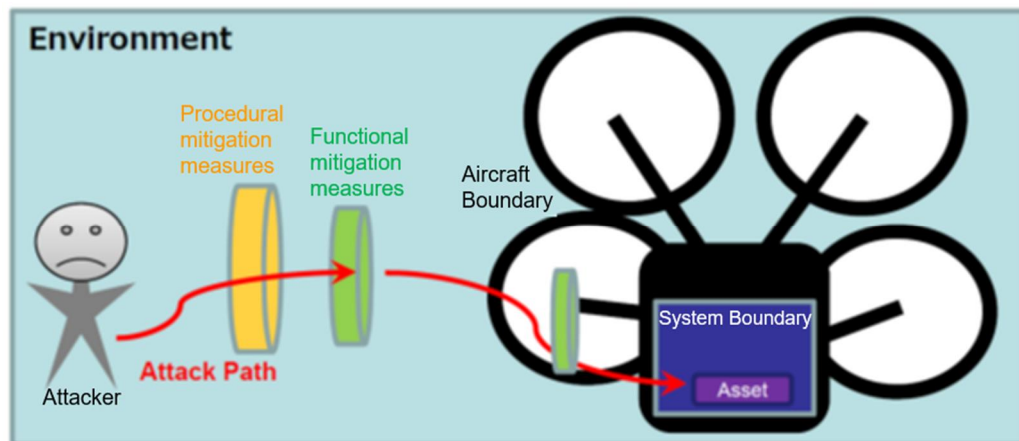
### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

### Other useful information

Below is a conceptual diagram of Environment, Perimeter and Assets.

Security risk assessments for manned aircraft are conducted based on RTCA DO-326 or ASTM F3532-22. Referring to these standards as necessary is recommended.



## •120 Contingency Planning

- (a) The UA must be designed so that, in the event of a loss of the command and control link (hereinafter referred to as "C2 link" in this chapter), the UA will automatically and immediately execute a safe predetermined flight, loiter, landing, or termination.
- (b) The applicant must establish the predetermined action in the event of a loss of the C2 link and describe it in the UAS Flight Manual.
- (c) The applicant must establish in the UAS Flight Manual the minimum performance requirements for the C2 link, which will not be able to guarantee remote control due to performance degradation. Takeoff when the C2 link is degraded below the minimum link performance requirements must be prevented by design or prohibited by operational limitations in the UAS Flight Manual.

## Overview of the Standard

This standard specifies the requirement regarding Loss or performance degradation of C2 link. Since the C2 link is an important factor from the viewpoint of safety in remotely operated UA, this standard aims to prevent accidents related to the C2 link by the following :

Design and verification considering C2 link loss

Setting the response when C2 link is lost

Abort takeoff due to design or operational limitations when minimum performance requirements (reception level, line margin, bit error rate, etc.) are not met due to degradation of C2 link performance (if takeoff is aborted by design, verification of this is also included).

## MoC : 1, 6

(a)、(c): Section 001 CONOPS (MoC 1)

Section 001 CONOPS includes:

- UA specifications for each flight phase when C2 link is lost
- UA specifications at takeoff when minimum performance requirements are not met due to degradation of the C2 link performance

(a): Section 310 Flight test plan (MoC 6)

The Section 310 Flight Test will be conducted to see the ability to restore command and control functions after the loss of the C2 link. Therefore, the test plan must include automatic and instantaneous safe flight, loiter flight, landing, or flight abort in a predetermined manner when the C2 link is lost.

Note that a flight test plan must be established taking into account

critical operating environments within the operational envelope and operational limitations.

(a): Section 310 Flight Test report (MoC 6)

The test results will be compiled into a report.

(b): UAS Flight Manual (MoC 1)

The response to loss of C2 link must be established and included in the UAS Flight Manual.

The UAS Flight Manual is prepared in accordance with Section 200.

(c): UAS Flight Manual (MoC 1)

The UAS Flight Manual must include minimum performance requirements for the C2 link, which can cause remote operation to be unable to be guaranteed due to a degradation in performance.

If operational limitations prohibit takeoff when the minimum performance requirements for the C2 link are not met, which can cause remote operation to be unable to be guaranteed due to a degradation in C2 link performance, the operational limitations, including the response of pilots and operations managers, must be set and included in the UAS Flight Manual.

The UAS Flight Manual should be prepared in accordance with Section 200.

(c): Section 120 Flight test plan (MoC 6)

If the design prohibits takeoff when the minimum performance requirements of the C2 link are not met, which would make remote operation impossible to guarantee due to degradation of the C2 link performance, it is necessary to verify through flight tests that the functions are implemented as designed (e.g., providing an alert to the pilot) work.

Note that a flight test plan must be established taking into account critical operating environments within the operational envelope and operational limitations.

(c): Section 120 Flight Test report (MoC 6)

The test results will be compiled into a report.

### Points of inspection

For each certification document, verify that :



- (1) Section 001 CONOPS
  - The specifications of the UA during each flight phase when the C2 link is lost must be clearly stated.
  - The specifications of the UA at takeoff when the minimum performance requirements are not met due to degradation of the C2 link performance are clearly stated.
- (2) Section 310 Flight test plan
  - Pass/Fail Criteria is set appropriately
  - Test validity, feasibility and reproducibility
  - The information or data to be recorded is specified.
- (3) Section 310 Flight Test report
  - The test was conducted appropriately according to the test plan.
  - Test results and evaluation for Pass/Fail Criteria
  - All information and data that should be recorded is available
- (4) UAS Flight Manual

The UAS Flight Manual includes the following information and its contents are clear:

  - Setting the response to be taken when the C2 link is lost
  - Minimum performance requirements for the C2 link, where remote operation cannot be guaranteed due to performance degradation
  - When the remote control cannot be guaranteed due to a deterioration in the performance of the C2 link, if the minimum performance requirements of the C2 link are not met, takeoff is prohibited due to operational limitations, including the response of pilots and operations managers
- (5) Section 120 Flight test plan
  - Pass/Fail Criteria is set appropriately
  - Test validity, feasibility and reproducibility
  - The information or data to be recorded is specified.
- (6) Section 120 Flight Test report
  - The test was conducted appropriately according to the test plan.
  - Test results and evaluation for Pass/Fail Criteria
  - All information and data that should be recorded is available

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

•Sections 120(a) and (c) are candidates for witnessing by the Inspection Body.

※This may increase or decrease depending on CONOPS, design specifics, and applicant experience.

#### Other useful information

- RTCA DO-362, Command and Control (C2) Data Link Minimum Operational Performance Standards (MOPS)
- RTCA DO-377, Minimum Aviation System Performance Standards for C2 Link Systems Supporting Operations of Unmanned Aircraft Systems

•125 Lightning

- (a) Except as provided in paragraph (b) of this Section, the UA must have design characteristics that will protect the UA from loss of flight or loss of control due to lightning.
- (b) If the UA has not been shown to protect against lightning, the UAS Flight Manual must include operational limitations to prohibit flight into weather conditions conducive to lightning activity.

### Overview of the Standard

This standard specifies the requirements for UA regarding lightning protection.

UA with lightning protection characteristics that fall under criterion (a) above must be designed with Lightning strikes in mind. On the other hand, UA that do not have lightning protection characteristics that fall under criterion (b) above must be prohibited from operating in weather conditions where lightning activity is possible as an operational limitation.

As the method of compliance with standard (a) has not yet been determined, the following sections describe the "MoC," "Points of inspection," "The Inspection Body's Level Of Involvement (LOI)," and "Other useful information" for standard (b). For Standard (a), it will be reflected as soon as the MoC is clarified.

### MoC : 1

(a): TBD

To certify lightning protection characteristics for manned aircraft, DO-160 is used at the equipment level, and Federal Aviation Administration (FAA) Advisory Circulars (AC) AC 20-136B and SAE ARP5416A are used at the aircraft level, and certification activities will combine these standards, but the certification method for UA has not yet been decided.

(b): UAS Flight Manual (MoC 1)

For UA that do not have lightning protection characteristics that fall under standard (b), it must be stated in the UAS Flight Manual that they are prohibited from operating in weather conditions where lightning activity is possible (for detailed examples of prohibited operations, see the design standard in Section 300).

The UAS Flight Manual is prepared in accordance with Section 200.

### Points of inspection

For each certification document, verify that :

UAS Flight Manual

- Based on the examples given in the design standard of Section 300, it is stated that operation is prohibited in weather conditions where there is a possibility of lightning activity.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

### Other useful information

none.

•130 Adverse Weather Conditions

- (a) For purposes of this Section, “adverse weather conditions” means rain, snow, and icing.
- (b) Except as provided in paragraph (c) of this Section, the UA must have design characteristics that will allow the UA to operate within the adverse weather conditions specified in the CONOPS without loss of flight or loss of control.
- (c) For adverse weather conditions for which the UA is not approved to operate, the applicant must develop operational limitations to prohibit flight into known adverse weather conditions and either:
- (1) Develop operational limitations to prevent inadvertent flight into adverse weather conditions; or
  - (2) Provide a means to detect any adverse weather conditions for which the UA is not certificated to operate and show the UA’s ability to avoid or exit those conditions.

### Overview of the Standard

This standard requires the design and operational limits of UA for adverse weather conditions.

Even if adverse weather conditions occur, the safety of the UA must be ensured by designing it to allow operation without loss of flight or loss of control, or by setting operational limits to prohibit the flight.

Here, either (b) or (c) must be satisfied for each adverse weather condition (rain, snow, and weather that causes icing on the aircraft). Because the content of (c) is complicated, a supplementary explanation and notes on (c)(2) are provided below.

Note that adverse weather conditions include rain, snow, and icing weather conditions, but for icing weather conditions, Issue Paper (for Special Conditions) may be required to clarify the test conditions required for certification. When certifying design characteristics for icing weather conditions, coordination with the Inspection Body in early stage is recommended.

### Supplementary explanation

To satisfy standard (c)(1), the following is required:

- Setting operational limits to prevent unintentional flight into adverse weather conditions where operations are not authorized.

To satisfy standard (c)(2), the following must be satisfied:

- Setting operational limitations that prohibit flying in adverse weather conditions where operations are not permitted.
- Detect adverse weather conditions in which operation is not authorized and enable the UA to avoid or escape those adverse weather conditions without being exposed to those conditions.

Note regarding standard (c)(2)

For example, if the UA is equipped with an adverse weather conditions detection function and is already exposed to adverse weather conditions at the time of detection, it will be necessary to satisfy (b) to prevent loss of flight or loss of control during departure. However, if the time of exposure to adverse weather conditions or the UA operation after the detection of adverse weather conditions is limited, these will be explained to the Inspection Body and measures such as limiting the scope of certification under (b) will be considered.

MoC : 1, 4, 6

(a)、(b): Section 001 CONOPS (MoC 1)

CONOPS will include definitions of operational Adverse Weather Conditions. CONOPS will be prepared based on Section 001.

(b)、(c)(2): Section 130 design drawings (MoC 1)

The design drawings should include either ① or ② below.

- ① UA that shows compliance with the standard (b): Design specifications and details taking into account the adverse weather conditions in which the UA is approved for operation
- ② UA that shows compliance with the standard (c)(2): Design specifications and details for detecting an adverse weather conditions in which operations are not permitted and for avoiding or escaping without exposure to an adverse weather conditions.

(b)、(c)(2): Section 130 Adverse Weather Conditions Simulated test plan (MoC 4)

The test will simulate rain, snow and icing weather conditions to verify either ① or ② below.

- ① UA that shows compliance with the standard (b): The UA is authorized to operate in simulated adverse weather conditions without suffering loss of flight or loss of control.
- ② UA that shows compliance with the standard (c)(2): The UA is able to detect simulated adverse weather conditions for which operation is not

authorized and is able to avoid or escape from such conditions without being exposed to them.

The test plan must be established taking into account critical operations within the operational envelope and operational limits. As mentioned above, the handling of icing weather conditions requires separate coordination with the Inspection Body.

(b)、(c)(2): Section 130 Adverse Weather Conditions Simulated test report (MoC 4)

The test results will be compiled into a report.

(b)、(c)(2): Section 130 Adverse Weather Conditions Flight test plan (MoC 6)

In this test, either ① or ② below will be verified under rainy, snowy, and icy weather conditions.

- ① UA that shows compliance with the standard (b): The UA is authorized to operate in adverse weather conditions without suffering loss of flight or loss of control.
- ② UA that shows compliance with the standard (c)(2): The UA is able to detect adverse weather conditions for which operation is not authorized and is able to avoid or escape such conditions without being exposed to them.

Note that the flight test plan must be established taking into consideration the critical operations within the operational envelope and operational limits. As for the handling of icing weather conditions, it is necessary to make separate coordination with the Inspection Body as mentioned above.

(b)、(c)(2): Section 130 Adverse Weather Conditions Flight Test report (MoC 6)

The test results will be compiled into a report.

(a)、(c): UAS Flight Manual (MoC 1)

The UAS Flight Manual must clearly state that operation of the UA in adverse weather conditions where operation is not permitted is prohibited.

The UAS Flight Manual is prepared in accordance with Section 200.

### Points of inspection

For each certification document, verify that :

- Section 001 CONOPS

- Definitions of operational adverse weather conditions must be clearly stated.
- Section 130 design drawings
  - The design specifications and details considering the adverse weather conditions in which operation is permitted must be clearly stated.
  - The design specifications and details for detecting adverse weather conditions in which operation is not permitted and for avoiding or escaping from such conditions without being exposed to them must be clearly stated.
- Section 130 Adverse Weather Conditions Simulated test plan
  - Pass/Fail Criteria is set appropriately
  - Test validity, feasibility and reproducibility
  - The information or data to be recorded is specified.
- Section 130 Adverse Weather Conditions Simulated test report
  - The test was conducted appropriately according to the test plan.
  - Test results and evaluation for Pass/Fail Criteria
  - All information and data that should be recorded is available
- Section 130 Adverse Weather Conditions Flight test plan
  - Pass/Fail Criteria is set appropriately
  - Feasibility, validity and reproducibility of the study
  - The information or data to be recorded is specified.
- Section 130 Adverse Weather Conditions Flight Test report
  - The test was conducted appropriately according to the test plan.
  - Test results and evaluation for Pass/Fail Criteria
  - All information and data that should be recorded is available
- UAS Flight Manual
  - Prohibition of operation of the UA in adverse weather conditions where operation is not permitted is properly set.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

•Section 130(b),(c)(2) is a candidate for witnessing by the Inspection Body.

※This may increase or decrease depending on CONOPS, design specifics, and applicant experience.

### Other useful information

none.



•135 Flight Essential Parts

- (a) A flight essential part is a part, the failure of which could result in a loss of flight or unrecoverable loss of UA control.
- (b) If the type design includes flight essential parts, the applicant must establish a flight essential parts list, the applicant must develop and define mandatory maintenance instructions or life limits, or a combination of both, to prevent failures of flight essential parts. Each of these mandatory actions must be included in the Chapter of the instructions for mandatory check and maintenance in the ICA.

### Overview of the Standard

This standard specifies the parts that are important for the safe flight of UA and requires the establishment of maintenance procedures for them. Note that "the malfunction" here refers to a single failure, not a multiple failure. Flight Essential Parts include all parts that make up UA, such as electronic parts, structure parts, equipment including software, and accessories, as well as all parts of AE.

### MoC : 0, 1, 3

(a): Section 135 Flight Essential Parts Specific Analysis Report (MoC 3)

A safety assessment is carried out to identify the essential parts and establish a Flight Essential Parts Specific Analysis Report. Safety assessment analysis methods such as FHA (Functional Hazard Analysis), FTA (Fault Tree Analysis), and FMEA (Failure Mode and Effect Analysis) are effective for identifying Flight Essential Parts. If it is difficult to carry out FHA, FTA, FMEA, etc., a simplified FMEA can be used to list the possible failure modes that may cause the loss or malfunction of each part, evaluate their impact, and extract parts that cause loss of flight or unrecoverable loss of control. The Flight Essential Parts Specific Analysis Report (image) is shown below as a reference for evaluation using a simplified FMEA. Note that the following is an image, and if an analysis using FMEA, etc. has already been carried out, the analysis result table can be used as the Specific Analysis Report as is.

Flight Essential Parts Specific Analysis Report (image)

No.	P/N	Name	loss of flight①	Reason for ① being No		loss of control ②	Reason for ① being No		Flight Essential Parts
				Failure Mode	countermeasure		Failure Mode	countermeasure	

1	01 2- xxx x	Cowl (case )	No	Break	It is a part for appearance purposes and has no performance requirements. Ref. Doc xxx	No	Break	It is a part for appearance purposes and has no performance requirements. Ref. Doc xxx	NA
2	01 2- xxx x	BBB	Yes	-	-	Yes	-	-	Yes
3									
4									

The purpose of this standard is to identify parts that are important for the safe flight of UA and set maintenance measures for them, so it is not intended to perform rigorous analyses such as FHA, FTA, FMEA, and simplified FMEA. If rigorous analysis of whether a failure that leads to loss of flight or loss of control will be omitted and maintenance measures are set on the safe side, it is not necessary to perform these analyses, and Flight Essential Parts can be identified in an even simpler way.

Also, if COTS products are used on a module-by-module basis, it is acceptable to set the "essential parts" on that module-by-module basis.

(b): Flight Essential Parts List (MoC 0, 1)

Based on the results extracted in (a), establish a Flight Essential Parts List. Then, for Flight Essential Parts, maintenance procedures such as inspection methods, repair and replacement methods, or limited life spans, or both, are set. For limited life spans, if the life span of an individual part, such as a battery, is determined, that life span is entered. For Structures parts, the time proven in Section 315 Fatigue is set. For parts without a life span, maintenance procedures such as pre-use inspection and periodic inspection are considered.

For parts whose life span is much longer than the service life of the UAS, it is not necessary to set a life span, but it is necessary to consider whether pre-use inspection and periodic inspection are necessary. For Flight Essential Parts that have no life span and do not require maintenance procedures, an explanation of the reason is required.

(b): ICA (MoC 1)

The established maintenance procedures and/or life limits are described in the chapter of the instruction for mandatory check and maintenance in the ICA. The ICA will be showed compliance in accordance with Section 205.

### Points of inspection

For each certification document, verify that :

In item (a), we check whether all parts are considered, whether there are any failure modes missing, and whether the impact assessment is appropriate. If there are any doubts about the analysis content, they must be checked and resolved each time. Some applicants are not familiar with FMEA. If all failure modes are not considered and omitted, check whether the impact assessment is not optimistic or the worst-case scenario is assumed appropriately.

In item (b), check whether the maintenance procedures or limited lifespans or both set for Flight Essential Parts are appropriate. For maintenance procedures, check whether they are too difficult or complicated for UAS users to inspect, or too simple to overlook defects. For lifespans, check the appropriateness of the calculation method.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

### Other useful information

none.

- 140 Other Necessary Design and Configurations
- 140-1 Structures
  - (a) Materials and procedures to be used for the UA must be appropriately defined.
  - (b) The UA must be of a structure free of sharp protrusions, except as structurally necessary.
  - (c) UA with the maximum takeoff weight of 25 kg or more must be so structured that, in the case of failure of the engine, motor, propeller, or rotor, the possibility of scattering of damaged parts of such components is kept as low as possible. (d) UA supposed to fly over a third party or areas with a dense population of people or houses, less than 30 meters above a person or object on the ground or water, or over an event venue where many people gather, must have a function to reduce the risk of harm to third parties or objects such as the following examples.
    - (1) Propeller guard
    - (2) Material for mitigating impact of collisions
    - (3) Cover for mitigating impact of collisions
    - (4) Parachute for mitigating impact of collisions

### Overview of the Standard

This standard requires that the UA Structures are appropriate for the weight and operation.

- (a) Proper definitions of materials and procedures
- (b) No sharp protrusions
- (c) Minimize scattering of broken parts (for maximum takeoff weight of 25kg or more)
- (d) Equipped with structures or functions to reduce the risk of injury in the event of contact with a third party or property (for example, propeller guards, use of impact-absorbing materials/covers, parachutes, airbags, etc.)

Note that showing the kinetic energy of the UA is sufficiently reduced before it collides with a third party or object is required. The degree of reduction must be determined comprehensively, including operation, and must be thoroughly discussed with the Inspection Body.

### MoC : 1, 2, 7

- (a): Section 140-1 Structures•Function design drawings and design

document (MoC 1)

Appropriate materials will be selected taking into consideration the environment to which the Structures will be exposed.

Explain which parts of the Structures use the materials selected above.

It is also required to explain if processing is required depending on the area of use, etc.

Describe the assembly procedure.

(b): Section 140-1 Structures•Function design drawings and design document (MoC 1)

Specifies and describes any sharp protrusions that are necessary for the Structure and cannot be avoided.

This section describes that there are no sharp protrusions in any other places other than those mentioned above.

(c): Section 140-1 Structures•Function design drawings and design document (MoC 1)

Explains that the design is such that after the failure of an engine, motor or propeller (rotor), the scattering of broken parts is minimized.

(d): Section 140-1 Structures•Function design drawings and design document (MoC 1)

Explain that the UA has structures or functions that reduce the risk of injury in the event of contact with a third party or property. If propeller guards are installed, state in the design document that the design minimizes the risk of the propeller encountering a human body even if the aircraft collides with the human body.

(b): Section 140-1 Physical inspection method•report (MoC 7)

Section 140-1 Check the sharp protrusions identified in the Structures and Function design drawings to confirm that they are necessary for the Structures and that measures have been taken to prevent injury when touched as much as possible. Also, confirm that there are no sharp protrusions other than those mentioned above.

(d): Section 140-1 Physical inspection method•report (MoC 7)

Ensure that the device has structures or functions to reduce the risk of injury in the event of contact with a third party or property.

Regarding parachutes, there is the ASTM F3322-22 Standard Specification for Small Unmanned Aircraft System (sUAS) Parachutes as an industry standard.

It is advisable to consider this as one method of showing compliance, but it depends greatly on the weight of the UA, how it is operated, and how the parachute is used.

(c)(d): Section 140-1 Scatter•risk of injury reduction analysis report (MoC 2)

Items (c) and (d) will be shown compliance by analysis. When conducting tests to obtain data for analysis, the destruction mode of the broken parts will be reproduced, and tests will be conducted to verify that the structures have minimal scattering and that the structures or functions have the ability to reduce the risk of injury upon contact.

### Points of inspection

For each certification document, verify that :

- (1) Section 140-1 Structures•Function design drawings
  - Materials are selected by appropriately evaluating the type of forces (tension, compression, torsion, shear, etc.) that will be applied to the area where the material will be used, as well as the usage environment (temperature, humidity, vibration, etc.).
  - Ensuring that the appropriate materials are used for each part of the Structures
  - If processing is required depending on the location of use, etc., check that appropriate measures have been taken.
  - Ensure proper procedures are followed for assembling the Structures.
- (2) Section 140-1 Structures•Function design drawings
  - Identify sharp protrusions that are necessary and unavoidable for the Structures.
  - There are no sharp protrusions in any other places than those mentioned above.
- (3) Section 140-1 Structures•Function design drawings
  - Parts that may scatter if broken are identified.
  - Explain that the design is such that the scattering of these broken parts is minimized.
- (4) Section 140-1 Structures•Function design drawings
  - Explain that the structure or function reduces the risk of injury when it comes into contact with a third party or property.
- (5) Section 140-1 Physical inspection method•report
  - Section 140-1 Check for sharp protrusions identified in the Structures and Function design drawings and ensure that measures to prevent injury are taken as much as possible.

- There are no sharp protrusions in any other places than those mentioned above.
- (6) Section 140-1 Physical inspection method·report
- Ensure that it has structures or functions that reduce the risk of injury.
- (7) Section 140-1 Scatter·risk of injury reduction analysis report
- Check that the expected failure mode of each component is appropriate.
  - Ensure that scattering of broken parts is minimized.
  - Ensure that it has structures or functions that mitigate the risk of injury.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

Test witnessing will be determined based on the importance of the test.

### Other useful information

References: ASTM F3322-22 Standard Specification for Small Unmanned Aircraft System (sUAS) Parachutes

• 140-2 Lights, marks, etc.

- (a) The UA must have lights, markings, etc. which make the position and orientation of the aircraft accurately visible.
- (b) UA supposed to fly in the vicinity of an airport or in air space 150 meters or more above the ground, or to perform beyond visual line of sight operations must be equipped with lights so as to be recognized by another aircraft as easily as possible, or must be painted in a manner that makes the aircraft easy to recognize during the flights.
- (c) UA supposed to fly at night must be equipped with lights so that its attitude and orientation can be accurately seen.

### Overview of the Standard

This standard requires anti-collision lights and aviation lights to be visible to the position and direction of the UA. The possible visual observers are the pilot, assistants, third parties on the ground, and aircraft in flight. (a) applies to pilots, assistants, third parties on the ground, and aircraft in flight, while (b) applies to aircraft in flight mainly, and (c) applies to pilots, assistants, third parties on the ground, and aircraft in flight in night flights. Therefore, it is necessary to consider the intended audience and make the lights visible to them.

However, other means such as marks may be used in place of lights.

### MoC : 1, 7

Currently, there are no clear standards, including those in other sates, regarding the specific brightness, illumination range, and color of these lights. Therefore, decisions will be made based on the type of operation each time.

There is an industry standard, ASTM F3298-19 Standard Spec. for Design, Construction, and Verification of Lightweight UAS, so it is advisable to consider this as one of the methods of showing compliance.

(a),(b),(c): Section 140-2 Light design drawings (MoC 1)

To certify that a light complies with ASTM F3298-19, :

Anti-collision lights : Visible from 1.609 km (1 mile) during the day, and 4.828 km (3 miles) at night and beyond visual line of sight

Air traffic lights : When operating at night, beyond visual line of sight, or in conditions where visibility is reduced due to rain or fog, the UAs must be visible from a distance of 4.828



km (3 miles). The left side (left light) must be red, the right side (right light) must be green, and the rear (tail light) must be white.

If ASTM is not used, provide a design outline to demonstrate that the UA is a light or indication that can be accurately seen in terms of its position and orientation.

(a), (b), (c): Section 140-2 Light Physical inspection method•report (MoC 7)

Test the actual product to ensure that the light is visible from a distance.

### Points of inspection

For each certification document, verify that :

Section 140-2 Light design drawings ensure that the design outline required for showing compliance with standard is properly described.

The Section 140-2 Light physical inspection method verifies the validity, feasibility, and reproducibility of the test, while the Section 140-2 Light physical inspection report verifies the appropriateness and recordability of the test being conducted according to the method.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

Test witnessing will be determined based on the importance of the test.

### Other useful information

- ASTM F3298-19 Standard Spec. for Design, Construction, and Verification of Lightweight UAS
- FAA AC20-74 Aircraft Position and Anticollision Light Measurements

- 140-3 Autopilot system, cameras, etc.
  - (a) UA supposed to perform beyond visual line of sight operations must be equipped with an autopilot system so that conditions outside the airframe can be monitored through cameras, etc. installed on the airframe.
  - (b) UA supposed to perform beyond visual line of sight operations must be so equipped that its status, as well as conditions of other aircraft in the vicinity of its flight path, can be continuously monitored on the ground by cameras, etc. installed on the airframe. If this requirement is not met, the UAS Flight Manual must provide methods for continuously monitoring conditions of the unmanned aircraft, as well as those of other aircraft in the vicinity of the flight path, as operational limitations.

### Overview of the Standard

This is the standard for UAs flying beyond visual line of sight.

(a) :

UAs flying beyond visual line of sight must have an autopilot function as well as a function that can monitor the situation outside the aircraft.

(b) :

It is required that the status of other aircraft and UAs around the flight route can be continuously confirmed from the ground using cameras or other devices installed on the UA. If this requirement is not met, the operational limitations of the UAS Flight Manual must state a method for continuously confirming the status of other aircraft and UAs around the flight route.

The following provides additional information regarding autopilot definitions and requirements (which are the same as the review guidelines for permission and approval for UA flights) :

- ◆ Autopilot : The function of automatically operating rotors, control surfaces, etc. by a built-in program in response to changes in the attitude of the UA during flight or the set flight conditions to control the movement (direction, altitude, speed, etc.) and attitude of the UA, or the function (JIS W 0141) (Guidelines for reviewing permission and approval for UA flights)
- Capable of stable takeoff and landing.
- Capable of stable flight (ascent, forward and backward movement, horizontal flight, hovering (rotorcraft only), descent, etc.).
- Regardless of the pre-programmed flight program, the design must allow for compulsory operational intervention at all times, such as in the event

of a malfunction, to enable the person flying the UA to land the UA safely.

### MoC : 1, 6

(a): Section 140-3 Design drawings for autopilot, camera, etc. (MoC 1)

Show that the aircraft is equipped with an autopilot system and has a built-in Function that can monitor what is happening outside the UA.

(b): UAS Flight Manual (MoC 1)

If item (b) cannot be satisfied by using cameras or other devices installed on the UA, the operational limitations of the UAS Flight Manual must specify a method for continuously monitoring the status of other aircraft and UAs around the flight path.

(b): Section 140-3 Flight test plan (MoC 6)

It is necessary to establish a test plan taking into consideration the following:

- Set the expected flight (taking into account speed, altitude, UA attitude, weather conditions, backlight, etc.)
- Appropriate test conditions will be set so that pilots on the ground can confirm whether the requirements for installing cameras on the UA are met.
- Even if 140-3(a) requires that the UA is equipped with a camera to monitor the outside of the UA, 140-3(b) requires that the camera's capabilities are such that it can detect the presence or absence of people. It is also possible to show the capability of visibility through analysis. The required camera capabilities must be thoroughly discussed with the Inspection Body.

In 140-3(b), when using DAA to continuously monitor the status of other aircraft and UAs around the flight path, ASTM F3442/F3442M-20 is a useful reference, but Issue Paper (for Special Conditions) are required.

(b): Section 140-3 Flight Test report (MoC 6)

The test results will be compiled into a report.

### Points of inspection

For each certification document, verify that :

- (1) Section 140-3 Design drawings for autopilot, camera, etc.
  - The autopilot device referred to in item (a) is properly installed.
  - Item (a) function that can monitor the situation outside the UA is

built in and functions correctly.

- Item (b) cameras etc. installed on the UA function correctly and have the required performance.

(2) UAS Flight Manual

- Regarding the methods and measures that can be used as alternatives to the cameras, etc. installed on the UA in item (b), not only should they be specified in the UAS Flight Manual, but their feasibility should also be properly evaluated.

(3) Section 140-3 Flight test plan•report

Representative test cases should be set for the flights set up in the Flight Test, taking into consideration the following:

- Flight path
- Speed
- Altitude
- UA attitude
- Weather conditions (rain, snow, etc.)
- Direction of sunlight (backlight, shadow, etc.)
- Time of flight

It is necessary to set up test cases by appropriately arranging the situation of other aircraft and UAs on the flight route, as well as the presence of third parties, etc.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

Test witnessing will be determined based on the importance of the test.

### Other useful information

For cameras, etc. visible light/infrared cameras, millimeter wave radar, LIDAR, and DAA are considered.

Not limited to the camera itself, any function that can continuously monitor the situation outside the UA requesting surveillance (people and objects on the ground, as well as other aircraft and UA around the flight path) is acceptable.

References: ASTM F3442/F3442M–20 Standard Specification for Detect and Avoid System Performance Requirements

- 140-4 Transportation of dangerous objects  
UA supposed to transport dangerous objects must have equipment suitable for that purpose.

### Overview of the Standard

This is a requirement that UA is equipped with equipment suitable for transporting dangerous objects and can transport dangerous objects safely. Dangerous objects are those specified in the Public Notice (Ministry of Land, Infrastructure, Transport and Tourism Notice No. 1142 of 2015) that are prohibited from being transported by UA.

### MoC : 1, 6

#### Section 140-4 Transportation of dangerous objects design drawings (MoC 1)

Show that the design of equipment suitable for the transportation of dangerous objects is appropriate.

#### Section 140-4 Flight test plan (MoC 6)

Flight tests will show that dangerous objects can be transported properly. The necessary conditions for transportation of dangerous objects must be properly set in the test plan.

#### Section 140-4 Flight Test report (MoC 6)

The test results will be compiled into a report.

### Points of inspection

For each certification document, verify that :

- (1) Section 140-4 Transportation of dangerous objects design drawings
  - The design of equipment suitable for the transportation of dangerous objects is appropriate.
- (2) Section 140-4 Flight test plan
  - Pass/Fail Criteria is set appropriately
  - Feasibility, validity and reproducibility of the study
  - The information or data to be recorded is specified.
- (3) Section 140-4 Flight Test report
  - The test was conducted appropriately according to the test plan.
  - Test results and evaluation for Pass/Fail Criteria
  - All information and data that should be recorded is available

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

Test witnessing will be determined based on the importance of the test.

### Other useful information

none.

- 140-5 Recording flight characteristics

UA with maximum takeoff weight of 25 kg or more must have functions that enable the UAS Type Certificate holder to record flight characteristics (such as flight path (aircraft position, altitude, speed and time), airframe attitude, power supply voltage, remaining battery level, and global navigation satellite system (hereinafter referred to as "GNSS" in this chapter) positioning) to contribute to improvement of performance of the type and cause analysis of defects and to utilize the data to determine causes of accidents.

### Overview of the Standard

This standard requires that UA with a maximum takeoff weight of 25 kg or more have a function that can record flight parameters to help UAS Type Certificates holders improve the performance of said type of UAS, analyze the causes of malfunctions, and identify the cause of accidents.

### MoC : 1, 6

Parameters that need to be recorded as flight parameters are flight parameters (flight route (UA position, altitude, speed, time), UA attitude, power supply voltage, remaining battery power, and GNSS positioning status) as types of data required for performance improvement, analysis of the cause of malfunctions, and investigation of the cause of accidents. For UA with engines, the remaining fuel is treated like the remaining battery power of battery-powered UA. The flight parameters that are actually required must be determined on an individual basis. Time is also required when checking chronologically as part of flight route information. It is also desirable to consider the update rate and recording time (the period until it is overwritten). The recordable time is expected to be equal to or greater than the total expected flight time per day, and the update rate is expected to be 30 Hz or more.

Furthermore, when recording flight parameters in a UA, it is advisable to consider the possibility of losing the recorded data in the event of an accident. Note that verifying compliance through a Flight Test is optional and is not mandatory.

ASTM F3228 - 17 Standard Specification for Flight Data and Voice Recording in Small Aircraft is an industry standard for manned aircraft, and this can be used as a one method of showing compliance.

### Section 140-5 Recording flight characteristics design drawings (MoC 1)

Explain the equipment that records flight characteristics. The recording method of flight characteristics, update rate, and recording time, and how they can be used to improve performance, analyze the causes of malfunctions, and analyze the causes of accidents are also to be explained.

The following aspects can also be considered :

- \* Data required for flight records must be entered into the device intended.
- \* Wiring diagrams, block diagrams, and drawings must be used.
- \* If data is recorded on the UA, as much design consideration as possible must be given to preventing data loss due to impact during a crash, subsequent fire, submersion in water, etc.
- \* If data is recorded on the CS side, a sufficient amount of data must be recorded so that there is no hindrance to identifying the cause of an accident, etc., even if the C2 link is lost (however, due to restrictions on communication data volume, etc., data is often recorded primarily on the UA side).

### Section 140-5 Flight test plan (MoC 6)

If compliance is to be demonstrated by conducting a Flight Test, it is necessary to prepare a test plan taking into consideration the following:

- Select a scenario where the flight is likely to occur (preferably a simulated crash).
- After the flight, ensure that all necessary data is recorded.
- Ensure that the recorded data is sufficient to analyze the flight situation.

### Section 140-5 Flight Test report (MoC 6)

The test results will be compiled into a report.

### Points of inspection

For each certification document, verify that :

- (1) Section 140-5 Recording flight characteristics design drawings
  - Understand the system of the device and check its operating conditions.
  - Ensure that required data is saved.
- (2) Section 140-5 Flight test plan•report
  - Ensure that the expected flight is included in the test plan.
  - It is necessary to make sure that the recorded data allows for analysis of the flight situation.



### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

Test witnessing will be determined based on the importance of the test.

### Other useful information

ASTM F3228 - 17 Standard Specification for Flight Data and Voice Recording in Small Aircraft

#### •140-6 Reciprocating Engine and Fuel Carriage

The applicant must show that the engine meets the following requirements.

- (a) Lines containing or conveying flammable fluids subject to high temperatures must be fire resistant.
- (b) Components must be shielded or located to safeguard against the ignition of leaking flammable fluid.
- (c) Compartments, including fuel tanks, where flammable fluid or vapor may exist must have adequate and effective ventilation and drainage.
- (d) The powerplant installation must be designed to prevent hazardous amounts of contamination of the fuel supplied to the engine.
- (e) The fuel system must protect the UA from damage that could result in spillage of enough fuel to constitute a fire hazard as a result of a reasonably foreseeable UA accident, based on the operating environment documented in the CONOPS.

### Overview of the Standard

This is a requirement for the Reciprocating Engine and Fuel Carriage to be installed in the UA. Note that the contamination in (d) refers to contamination caused by water, rust, sand, dust, microbial growth, and the effects of fuel, fuel system materials, and fuel additives that are incompatible with the engine.

### MoC : 1

TBD

### Points of inspection

TBD

### The Inspection Body's Level Of Involvement (LOI)

TBD

### Other useful information

TBD

#### •200 UAS Flight Manual

The applicant must provide an UAS Flight Manual with each UA.

(a) The UAS Flight Manual must contain the following information:

- (1) UA operational limitations;
- (2) UA operating procedures;
- (3) Performance information;
- (4) Loading information; and
- (5) Other information that is necessary for safe operation because of design, operating, or handling characteristics.

(b) Those portions of the UAS Flight Manual containing the information specified in paragraph (a)(1) of this Section must be approved by the Japan Civil Aviation Bureau.

### Overview of the Standard

This standard is a requirement for the UAS Flight Manual that must be provided for each UA. The purpose of this standard is to establish a UAS Flight Manual to enable pilots to operate the UA safely. The information in item (a) must be included in the items listed in Article 236-12, paragraph 3 of the Regulations. The operating procedures in item (a) (2) include both emergency operating procedures and normal operating procedures.

### MoC : 1

(a)、(b): UAS Flight Manual (MoC 1)

The example“ UAS Flight Manual” posted on the JCAB website can also be utilized.

### Points of inspection

For each certification document, verify that :

- Covers all the items listed in the example posted on the JCAB website
- There are no ambiguous or confusing descriptions.

### The Inspection Body’s Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

### Other useful information

References: ASTM F2908-18 Standard Specification for Unmanned Aircraft Flight Manual (UFM) for an Unmanned Aircraft System (UAS)

#### •205 ICA

The applicant must create an ICA acceptable to the Japan Civil Aviation Bureau. For the purpose of this Chapter, ICA shall refer to written procedures with which the user can appropriately inspect and maintain the UA, its equipment, components, parachutes and AE. It is recommendable to refer to Appendix A (Instructions for Maintaining Airworthiness), Part II of the Airworthiness Inspection Manual when creating the ICA. The Chapter of the instructions for mandatory check and maintenance in the ICA must be approved by the Japan Civil Aviation Bureau.

### Overview of the Standard

This standard is a requirement to properly reflect in the ICA the procedures for inspecting and maintaining UAS, etc.

The purpose of this standard is to establish an ICA that specifies the inspection and maintenance required to keep an UAS in a condition for safe operation. The ICA will be established with separate chapters: "The Chapter of the instructions for mandatory check and maintenance in the ICA" which are essential to maintain the type design, and chapters other than this. "The Chapter of the instructions for mandatory check and maintenance in the ICA" will list the items required for Section 135's Flight Essential Parts and Section 115's cybersecurity required items, etc. For example, the following must be listed for the Flight Essential Parts extracted in Section 135 :

- Flight Essential Parts List
- Inspection procedures and corrective procedures to prevent failures of Flight Essential Parts
- Inspection intervals and replacement times for Flight Essential Parts

### MoC : 1

#### ICA (MoC 1)

The example "ICA" posted on the JCAB website can also be utilized.

### Points of inspection

For each certification document, verify that :

- All Flight Essential Parts are included in the list.
- All items required by safety standards are included without exception.
- There are no ambiguous or confusing descriptions.
- Replacement times and inspection intervals for parts and equipment must be clearly defined numerically.

## The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

### Other useful information

- References 1: Federal Aviation Administration (FAA) Title 14 CFR (Code of Federal Regulations) Part 23 Appendix A  
(Available on the FAA's online website under "Regulations & Policies")
- References 2: JCAB Airworthiness Inspection Manual Part II Airplane Appendix A  
(The information can be viewed online at the Ministry of Land, Infrastructure, Transport and Tourism's "Aviation Safety Information Management and Sharing: ASIMS"- Japanese)
- References 3: FAA Order 8110.54A, Instructions for Continued Airworthiness Responsibilities, Requirements, and Contents  
(Available on the FAA's online website under "Regulations & Policies")

### Relationship between Maintenance Manual and ICA

The Maintenance Manual consists of two documents: one that describes the methods for ICA and the other that describes the methods for renewal inspection.

Contents of ICA :

- Explanation of UA structures, equipment, and systems
- Methods for regular inspection of UA, methods for correcting defects that occur in UA, and other matters related to the maintenance of UA
- Other necessary matters

Among the above, the matters that are essential to ensure safety will be set out as the "The Chapter of the instructions for mandatory check and maintenance in the ICA"

Methods of renewal inspection, etc. :

- Methods and procedures for ground function and flight tests required for UAS certificate renewal inspections, etc. (field inspection procedure manual)

At the applicant's discretion, the applicant may also include the "method of renewal inspection, etc." in the ICA.

•300 Durability and Reliability

The UA must be designed to be durable and reliable when operated under the limitations prescribed for its operating environment, as documented in its CONOPS and included as operational limitations in the UAS Flight Manual. The durability and reliability must be demonstrated by flight test in accordance with the requirements of this Section and completed with no failures that result in a loss of flight, loss of control, loss of containment, or emergency landing outside the operator's recovery area.

- (a) Once a UA has begun testing to show compliance with this Section, all flights for that UA must be described in the flight test report.
- (b) Tests must include an evaluation of the entire flight envelope across all phases of operation and must address, at a minimum, the following:
  - (1) Flight distances;
  - (2) Flight durations;
  - (3) Route complexity;
  - (4) Weight;
  - (5) Center of gravity;
  - (6) Density altitude;
  - (7) Outside air temperature;
  - (8) Airspeed;
  - (9) Wind;
  - (10) Weather;
  - (11) Operation at night, if requested;
  - (12) Energy storage system capacity; and
  - (13) Aircraft to pilot ratio (1:1, 1:multiple, etc.).
- (c) Tests must include the most adverse combinations of the conditions and configurations in paragraph (b) of this Section.
- (d) Tests must show a distribution of the different flight profiles and routes representative of the type of operations identified in the CONOPS.
- (e) Tests must be conducted in conditions consistent with the expected environmental conditions identified in the CONOPS, including electromagnetic interference (EMI) and high intensity radiated fields (HIRF).
- (f) Tests must not require exceptional piloting skill or

alertness.

- (g) Any UAS used for testing must be subject to the same worst-case ground handling, shipping, and transportation loads as those allowed in service.
- (h) Any UA used for testing must use AE that meet, but do not exceed, the minimum specifications identified under Section 105. If multiple AE are identified, the applicant must demonstrate each configuration.
- (i) Any UAS used for testing must be maintained and operated in accordance with the ICA and UAS Flight Manual. No maintenance beyond the intervals established in the ICA will be allowed to show compliance with this Section.
- (j) If cargo operations or external-load operations are requested, tests must show, throughout the flight envelope and with the cargo or external-load at the most critical combinations of weight and center of gravity, that—
  - (1) The UA is safely controllable and maneuverable; and
  - (2) The cargo or external load are retainable and transportable.

### Overview of the Standard

This standard is the design basis and test verification that are the core of D&R. Section 300 requires that the design be made durable and reliable for the intended operation and that this be verified. It is recommended to use the design basis checklist to confirm that the design is appropriate. Verification is also performed in a flight test. The primary purpose of Section 300 is to verify the reliability of the entire UA at the aircraft level. In addition, the UAS Flight Manual and ICA are also evaluated in the Section 300 test. In addition, the flight verification also evaluates that the UA structures have sufficient strength and durability. The design basis evaluation document accumulates data necessary for calculating the safe limited life of the UA. By accumulating Section 300 flight hours and using them to calculate the limited life, certification activities may proceed smoothly.

Although it is desirable to conduct this test in an actual operating environment whenever possible, if it is not reasonable to conduct the flight test in an actual environment, such as the lowest temperature environment in summer, it is acceptable to conduct the flight test in a simulated environment, such as a temperature-controlled room. It is recommended to consult with the Inspection Body in advance regarding the appropriateness of the simulated environment.

Note that, if the UA has a chance less than 30% of causing an AIS Level 3 or higher injury, the applicant may reduce the calculated test time.

(Note) AIS is an abbreviation for Abbreviated Injury Scale, an anatomical severity assessment index for traffic injury patients created by the American Medical Association's Committee on medical aspects of automotive safety.

※Calculation formula :

$$\begin{aligned} \text{Safety target(5E-7)} = & \text{Lethality} \times \text{Shelter Factor (\%)} \times \text{Crash Area (m}^2\text{)} \\ & \times (\text{Population Density (Number of people /km}^2\text{)} \\ & \div 1,000,000) \div \text{Required flight time} \times 3 (\text{Statistical Processing}) \end{aligned}$$

(Reference) Example of test time calculation results

Population Density Number per square kilometer	Estimated location of operation(Example from the United States)	Basic Configuration (FLT HR)	When to reduce risk of injury (FLT HR)
390以下	Rural	375	150
1,159	Suburban	1,100	540
2,703	95% of the United States	2,500	1,30 0
3,863	Washington DC	3,600	1,80 0
5,408	Boston	5,000	2,50 0
7,725	Cities other than New York	7,200	3,60 0

(Note)Prerequisites :

- Lathality = 1
- Shelter Factor = 9%
- Crash Area = 1.72m<sup>2</sup>



## MoC : 6

### (a)~(j): Section 300 Flight test plan (MoC 6)

In order to demonstrate the durability and reliability of the UA, it is necessary to complete the necessary tests without any loss of control or loss of flight, taking into account the entire range of the operational envelope and operational limitations, including flight phases (takeoff, cruise, landing, etc.). Note that the terms recovery area and recovery zone are treated as the same.

- (1) Fly as many representative operational missions and routes as possible, taking into account maximum flight distance, time and complexity. If the distance between the C2 link transmitter and receiver is a critical factor, demonstrate it at the maximum possible distance.

The parameters that need to be demonstrated over the full range are :

- ① Weight (maximum and minimum)
- ② Center of gravity (severe longitudinal and transverse directions at the most severe center of gravity)
- ③ Density altitude (maximum and minimum)
- ④ Temperature (maximum and minimum)
- ⑤ Speed (values for each flight phase)
- ⑥ Wind speed (maximum, most severe direction, most severe flight phase and mode, and gusts)
- ⑦ Weather conditions (all anticipated operations)
- ⑧ Day and night
- ⑨ Battery capacity (the most severe SOC (state of charge), SOH (state of health), and depth of discharge at the highest and lowest temperatures)
- ⑩ Pilot to UA ratio (the maximum number of UAs operated simultaneously by one pilot)
- ⑪ Flight modes, UA settings, and automatic/autonomous status, if the version or UA capabilities change depending on the operation
- ⑫ Terrain, location, environment, obstacles, radio wave reflections, noise, and traffic conditions (for example, it is expected that verification activities will be more difficult in the valleys of high-rise buildings and urban environments due to radio wave multipath and diffuse reflections, as well as local wind and weather changes.)
- ⑬ Maneuverability and operational evaluation in the following combinations:
  - a. Minimum weight, most severe center of gravity, maximum wind speed (including maximum gusts and crosswind conditions)

- b. Maximum weight, most severe center of gravity, maximum temperature and density altitude, maximum flight distance and time
- c. Maximum weight, most severe center of gravity, maximum temperature and density altitude, maximum energy consumption rate (possible operational waiting or ascent, etc.)
- d. Maximum temperature and maximum ground operation before flight

(2) When transporting cargo

Demonstrate that the UA and cargo can be safely controlled, operated, transported and stowed at the most severe center of gravity (CG) considering the cargo in the operational envelope (including lateral changes and sudden stops, if envisaged). Demonstrate that the UA can withstand rotation, twist or other reactions of the cargo during flight. Consider all combinations of critical loads and speeds. Also evaluate the effects of lateral shifts of the cargo, etc.

(a)~(j): Section 300 Flight Test report (MoC 6)

The test results will be compiled into a report.

### Points of inspection

For each certification document, verify the followings.

The flight test plan and report will be checked for validity, feasibility, and reproducibility of the test plan, and the report will be checked for appropriateness of testing according to the plan and recordability.

Also, ensure that the test is assessed by pilots who meet the minimum requirements, not by experienced pilots such as expert pilots.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

•Section 300(c), item (e) is a candidate for witnessing by the Inspection Body.

※This may increase or decrease depending on CONOPS, design specifics, and applicant experience.

## Other useful information

- Regarding the items to be included in the test plan

The test plan should include all the information, conditions, specifications, etc. required to conduct the test, and should be written with enough precision so that it is clear when viewed later what tests were performed, and so that the same tests can be reproduced exactly in the future, if necessary.

The following are the minimum items that should be included in the test plan :

- Test specimen description
- List of measuring instruments required for testing
- Calibration of required measuring instruments
- How to check the calibration status
- Items to check before testing (specimen and setup)
- A list of certification standards (e.g., Section 300(b)(1)) and an explanation of how to show compliance with them
- Step-by-step test procedures and pass/fail criteria for each test

In addition to the above, the information should include the date, test location, test start time, test end time, test duration, take-off time, landing time, flight time, test control number, test specimen model, part number (P/N), serial number (S/N), weather, visibility, temperature, humidity, altitude, speed, wind direction, wind speed, distance, settings or records of the test executor, test manager, test director, etc.

- Test conditions

To start testing, the configuration of the UA (including software, hardware, structures, and propulsion system) must be sufficiently matured to be equivalent to the final configuration for obtaining the UAS Type Certificate, and the configuration must be confirmed and the suitability of the test specimen and setup must be reported. Changing the configuration after the start of testing may require resetting the Flight Test time in Section 300 to 0 hours and re-running all tests. The UA must be maintained in operation by performing only the inspection, maintenance, and replacement work performed in actual operation. Inspection, maintenance, and replacement work not specified in the UAS Flight Manual or ICA are not permitted under any circumstances.

In addition, the worst-case loads anticipated during operation when handling the UA on the ground (including loading of cargo) and during transportation must be taken into consideration and imposed on the UA.

Furthermore, the pilots and maintainers conducting the tests must have

received the minimum training required for operation but must not be expert.

The purpose of Section 300 testing is to allow for a reasonable sample date to help detect early failures and wear-out failures. Therefore, demonstrations should not be conducted with a huge number of UA flying at the same time, or with too few UA (for example, only one aircraft). The minimum number of UA required to conduct a Section 300 demonstration is three(3) UA in principle.

- How to handle malfunctions

If a loss of flight, loss of control, deviation from the expected flight envelope, or emergency landing outside the recovery zone occurs during Section 300 testing, a root cause analysis will be conducted and, if necessary, design or operating procedure changes will be required to prevent recurrence. Additional Section 300 flight tests will then be required. The amount of additional flight hours will depend on the type and severity of the failure and the accuracy and comprehensiveness of the root cause analysis and corrective actions. Other factors will affect the scope and rigor of the corrective actions, the depth of testing or analysis used to evaluate the change, and the degree of confidence that the change will not adversely affect other items. If the root cause is not clearly identified or in the worst case scenario, the Section 300 flight hours will be reset to zero and all tests will need to be rerun. On the other hand, if the testing and analysis are complete, the change will be prevented from adversely affecting the aircraft, the failure itself is benign, containment is sufficient, the cause is clear, and the corrective actions are comprehensive, the retest flight hours may be less. If a failure occurs, the applicant should thoroughly discuss the retest with the Inspection Body.

- Section 300 Design Basis Evaluation Report

In contrast to the "shall be designed" in the Section 300 criteria, using the Design Basis Evaluation Report is recommended. This design standard is useful for confirming that the UA is appropriately designed and that a minimum level of safety is ensured. The appropriateness of the UA design is confirmed against the Design Basis Evaluation Report, and the results are presented to the Inspection Body along with the Certification Plan. This Design Basis Evaluation Report is extracted from safety standards related to the UA, taking into consideration the operational risks of the UA, and includes standards other than Section 300, but all of them are necessary requirements for starting Section 300 testing. If this checklist cannot be met,

there is a possibility that the safety standards are not met, so if there are any standards that cannot be met, it is necessary to review the design or consider alternative measures that ensure equivalent level of safety. If a review of the design or consideration of alternative measures is required, consulting with the Inspection Body is recommended.

Design Basis Evaluation Report			
UAS Type Certification procedures			
Type design data, test results and analysis results are required to show that the UAS complies with standards for certification. Type design data are drawings and specifications that define the form and design features, including dimensions, materials, construction methods for structural strength, ICA limitations, and other necessary data.			<input type="checkbox"/>
Matters related to safety standards			
	Hazard	Expected mitigation measures	✓
1	Without proper design characteristics or operational limitations, severe environmental or rain conditions can cause Loss of Flight.	Restrictions and appropriate procedures required by the UAS Flight Manual are established.* <sup>1</sup>	<input type="checkbox"/>
2	Vibration and repeated loads cause fatigue failure.	Strictly maintained in accordance with the ICA, the life limits of the structure are set based on actual operation or flight results simulating the most severe environment and conditions.* <sup>2</sup>	<input type="checkbox"/>
3	An UA may enter an unexpected or unsafe area. The flight abort function may work unintentionally.	An UAS must have flight interruption, emergency landing, or emergency return functions. If an UAS has the flight interruption function, it must not function unintentionally.	<input type="checkbox"/>
4	If the pilot does not know the location and path of the UA, the UA may enter an unexpected or unsafe area.	The speed, course, bearing, direction, altitude, and position information of the UA are provided to the pilot.	<input type="checkbox"/>
5	If the pilot is not provided with the necessary information, the UA may enter an unsafe area or Loss of Control may occur.	The CS must provide the pilot with all the information necessary for continuous safe flight and operation within limitations. Quantities including remaining flight durations, SOC (State Of Charge), remaining capacity, or similar information as required on all essential power systems	<input type="checkbox"/>

		or battery management systems are provided to the pilot. Introduce in-flight monitoring and/or battery and motor fault sensing.	
6	Software error causes Loss of Flight.	The software is tested and demonstrates an acceptable level of confidence (Section 110)	<input type="checkbox"/>
7	An accident may occur due to unexpected or unfavorable performance/behavior of an UAS. Loss of communication may create an unsafe situation resulting in loss of situational awareness. The root cause of the problem may be unknown. As a result, there is a possibility that UAS Type Certificate holders may not be able to maintain compliance with safety standards.	If the UAS Type Certificate holder needs to satisfy the reporting requirements of compliance with the safety standards, the UAS /CS should have the ability to store retrievable UA telemetry data as log file. Data log file should contain sufficient parameters to analyze system performance and root causes of failure/abnormality.	<input type="checkbox"/>
8	If the communication quality of the C2 link deteriorates and the pilot is not informed, the UAS may become unsafe.	Provide a means for the UAS to inform the pilot of the communication strength, quality, or status of the C2 link.	<input type="checkbox"/>
9	If the C2 link is lost or command and control are lost and the pilot is not informed, the UAS may become unsafe.	An alert must be provided to the pilot in the event of a complete loss of command and control performance or if the performance of the C2 link deteriorates such that immediate remote control of the UAS cannot be guaranteed.	<input type="checkbox"/>
10	If there is no contingency plan for an anticipated link failure, the link failure may cause unsafe or unexpected UAS behavior.	An UAS has a contingency plan in place for anticipated link failure, including re-establishing the link, flying in designated areas/loiter flight according to pattern, returning to the base and landing, and returning to alternate landing site, or flight interruption in a safe manner.	<input type="checkbox"/>
11	An UA may depart and operate without the ability to recall or reroute to avoid unintended or unsafe areas.	The UAS Flight Manual must include minimum requirements for the C2 link usage status or service quality, and procedures for determining whether usage	<input type="checkbox"/>

		<p>or service quality is sufficient for planned operations must be established.</p> <p>Takeoff/launch will not be permitted when the C2 link is unavailable due to the provisions of the UAS Flight Manual or the design of the UAS.</p>	
12	An UAS may be subject to unintended effects from EMI/HIRF that can lead to system and equipment failure.	<p>The EMI/HIRF environment in which an UAS was evaluated (demonstrated) must be explained in the UAS Flight Manual. If an UAS is not evaluated for compliance with EMI/HIRF requirements, the following should be indicated in the UAS Flight Manual to alert:</p> <p><i>This UAS has not undergone sufficient testing to obtain full environmental qualification for RF susceptibility Therefore, the UAS may not operate reliably when exposed to RF power."</i></p>	<input type="checkbox"/>
13	An UAS may be lost to lightning strikes.	<p>Appropriate restrictions should be established in the UAS Flight Manual to avoid thundercloud. If an UAS does not have lightning performance, the UAS Flight Manual should include the following limitations:</p> <p><i>Operation of the UA into areas of lightning activity is prohibited. A lightning strike could cause loss of UA.</i></p>	<input type="checkbox"/>
14	If an UAS is operated without documented procedures, it may cause operational errors leading to Loss of	Develop an UAS Flight Manual in accordance with Section 200. The UAS Flight Manual must be verified/checked to	<input type="checkbox"/>

	Flight.	the maximum extent possible.	
15	If an UAS is maintained without documented procedures, it may be maintained incorrectly leading to Loss of Flight.	Create an ICA in accordance with Section 205. and ensure that the ICA contains the necessary and sufficient information for procedures for properly performing inspection and maintenance of an UAS, equipment, parts, parachutes, etc., and the AEs.	<input type="checkbox"/>
16	Wireless equipment may emit radio waves that may cause harmful interference, violate laws and regulations, or exceed the limits for human exposure.	The spectrum of radiated radio waves must be within the permissible range.	<input type="checkbox"/>
17	Electronic cyber-attacks may affect safe flight.	The possibility that electronic cyber-attacks may affect safe flight must be considered and UAS must be protected to the maximum extent possible. The CS, Global Navigation Satellite System (GNSS), and the C2 link must be resistant to unauthorized access, intrusion, data exfiltration, or other attacks.	<input type="checkbox"/>
18	Insecure IT systems create vulnerabilities to electronic cyber-attacks.	Implement security measures for UAS and AEs that at least comply with standards. For example, using isolated networks, firewall, antivirus software, maintaining and updating the operating system, and selecting appropriate settings or features according to the platform.	<input type="checkbox"/>
19	Insecure IT systems create vulnerabilities to electronic cyber-attacks.	Use specialized platforms/equipment for UAS operations. Smartphone, tablet, computer, etc. used for the operation of uUAS must not be used for other unrelated purpose such as general office work (in the case of the class I UAS Type Certification ).	<input type="checkbox"/>



20	Unencrypted data and the C2 link are prone to exploitation.	Encrypt anything that is feasible, such as the C2 link and data stored or transmitted.	<input type="checkbox"/>

\*1 Matters to be recorded in UAS are as follows:

*Takeoff is prohibited with any frost, snow, or ice on any surface of the UAS, including rotors and propellers.*

*Operations, including takeoff and landing, are prohibited in:*

- *Any precipitation (including drizzle, rain, snow, ice pellets); and*
- *Potential icing conditions (any moisture including clouds, precipitation, mist, fog, below an ambient temperature of +5°C)*

\*2 How to set the life limits of structure is as follows:

The structural life limits are based on the maximum cycle and time demonstrated in long-flight by one or multiple UAS. Applicants should set life limits at or below the value demonstrated by a typical UAS flying a typical mission. An UAS that flies for long periods of time should undergo only ICA-based maintenance and accumulate typical mission time in typical or the worst-case environment and conditions.

The life limits of structure may be a value obtained by dividing the flight durations of an UAS that has flown the longest time by 2 (knockdown factor 2). If an applicant does not wish to use a knockdown factor, the applicant must use three or more UAS for test separately to confirm that each UA reaches its life limits.

#### •305 Probable Failures

The UA must be designed such that a probable failure will not result in a loss of containment or control of the UA. This must be demonstrated by test.

(a) Probable failures related to the following equipment, depending on the design of the UA, at a minimum, must be addressed:

- (1) Propulsion systems;
- (2) C2 link;
- (3) Global Navigation Satellite System ("GNSS");
- (4) Flight control components with a single point of failure;
- (5) Control station; and
- (6) Any other AE identified by the applicant.

(b) Any UA used for testing must be operated in accordance with the UAS Flight Manual.

(c) Each test must occur at the critical phase and mode of flight, and at the highest aircraft-to-pilot ratio.

### Overview of the Standard

This standard tests for probable failures. This is the additional tests to that in Section 300, and is needed because of the evaluation of the UA from a different perspective than Section 300 is necessary. Specifically, it evaluates the degraded function/performance of a UA when a single probable failure (a probable failure) occurs.

The Pass/Fail Criteria differ from Section 300, and only loss of control of the UA or deviation from the expected flight envelope due to probable failures is not permitted.

Regarding deviations from the expected flight range, deviations from obvious flight paths or operational areas are considered from the perspective of the space and time that the UA flies. In principle, this standard allows parachutes and controlled emergency landings other than the landing site, but crashes other than the landing site are considered uncontrollable.

Adjustments to the Pass/Fail Criteria are required depending on the CONOPS, so discuss this thoroughly with the Inspection Body is required.

It is preferable to perform the test as a flight test whenever possible, but in that case, it may be necessary to use dedicated software or hardware to simulate failures. On the other hand, if a flight test is not reasonable or there is a possibility of an impact on safety, ground tests, laboratory tests, or simulation tests are also acceptable.

In addition to item (a)(1) to (6), if other failure modes are possible

depending on the design of the UAS, it is necessary to demonstrate that they do not lead to loss of control or deviation from the expected flight range. However, if it is expected that the UA design does not include any equipment that falls under (a)(1) to (6), it is recommended to consult with the Inspection Body in advance.

This test must be evaluated by a pilot who meets the minimum requirements, not an experienced pilot such as an expert pilot. A minimum-qualified pilot is someone who holds a pilot qualification for said type of UAS Type Certificate or an equivalent competency and meets the minimum piloting requirements for the UAS.

#### MoC : 4, 5, 6, 8

(a),(b),(c): Section 305 Test Plan (MoC 4, 5, 6, 8)

The following failure conditions are intentionally generated to evaluate whether the UA does not become uncontrollable or deviate from the intended flight envelope. Establish a Test Plan by considering the following as test cases. If there are other possible failures that may occur depending on the UAS design, add and set up the test cases.

- (1) Demonstrate loss of at least one propulsion system (e.g., motor), or multiple propulsion systems if simultaneous loss is possible. This test should be performed in the most severe flight phase, mode, maximum weight and most unfavorable weight and balance position. During the severe flight phase, at least one motor should be remotely disabled while on autopilot. If the UA can fly with one motor disabled without losing control, the test should demonstrate that it will return to the takeoff point or to a designated alternate recovery zone. If it is not possible to fly with one motor disabled, demonstrate that it is possible to descend safely, for example by deploying a parachute.
- (2) Demonstrate degradation of the C2 link quality (reduced availability, worsening service quality, reduced signal-noise ratio (S/N), intermittent connection and latency, etc.). This test will be performed under severe flight phases and modes. Record the performance of each element of the C2 link that degrades during the demonstration. This will demonstrate that the system behaves as specified when the signal quality of each element falls below the threshold.
- (2) This test will demonstrate a state in which the C2 link is completely lost and not restored. This test will be performed in severe flight phases and modes. Specifically, the C2 link from the ground will be completely disabled at least once in each of the four severe flight phases: takeoff, transition to forward flight, transition from forward

flight, and landing. At this time, the test will demonstrate that the UA will automatically activate the fail-safe state and perform fail-safe behavior (e.g., returning to the take-off point after a specified delay time to attempt to re-establish the C2 link).

- (3) Demonstrate GNSS quality degradation. This test is performed under severe flight phases and modes. Demonstrate that the system behaves as specified when GNSS quality falls below defined thresholds.
- (3) This test will demonstrate a state in which GNSS is completely lost and does not recover. This test will be conducted in severe flight phases and modes. Specifically, the GNSS link will be remotely disabled from the ground at least once in each of five severe flight phases: takeoff, transition to forward flight, transition from forward flight, landing, and approaching a geo-fence. The test will demonstrate that the UA will automatically activate the fail-safe state and perform fail-safe behavior.
- (4) This section regards to single point of failure on flight control devices, and is primarily relevant for UAs with aerodynamic control surfaces. Demonstrate loss of flight control mechanisms that could be single points of failure. For example, for UAs with single string servos, hard over should be demonstrated. Demonstrate that when each control surface (aileron, elevator, rudder, etc.) is fully stuck, the system can continue in controlled flight or initiate a hazardous failure descent mode such as a parachute drop.
- (4) This test will demonstrate the loss of CS power, display, and operator control interface, or a combination of these. Specifically, all power to the CS power supply will be lost while on autopilot. The test will demonstrate that the UA will automatically activate the fail-safe state and execute the fail-safe behavior.
- (5) Demonstrate fault conditions depending on the AEs. Demonstrate by testing that AEs other than the CS and C2 link, where applicable, perform recovery actions or fail-safe behavior as per specification.
- (c) When multiple UAs are controlled by a single pilot, the system will demonstrate its management capabilities by simulating the maximum number of failures that can occur simultaneously. Specifically, when two or more UAs are permitted to fly simultaneously, multiple UAs will experience probable failures modes at the same time, with one of them being an event that requires pilot action (e.g., loss of GNSS). The system will demonstrate that it can accurately notify the operator of the failure and identify which of these UA requires manual action.

(a),(b),(c): Section 305 Test report (MoC 4, 5, 6, 8)

The test results will be compiled into a report.

### Points of inspection

For each certification document, verify the followings.

Regarding the flight test plan and report, check the test plan from the perspective of the feasibility, validity, and reproducibility of the test, and the report from the perspective of the appropriateness of the test being conducted according to the plan and the recordability.

I should be also confirmed that the test is being evaluated not by experienced pilots such as expert pilots, but by pilots who meet the minimum requirements.

### The Inspection Body's Level Of Involvement (LOI)

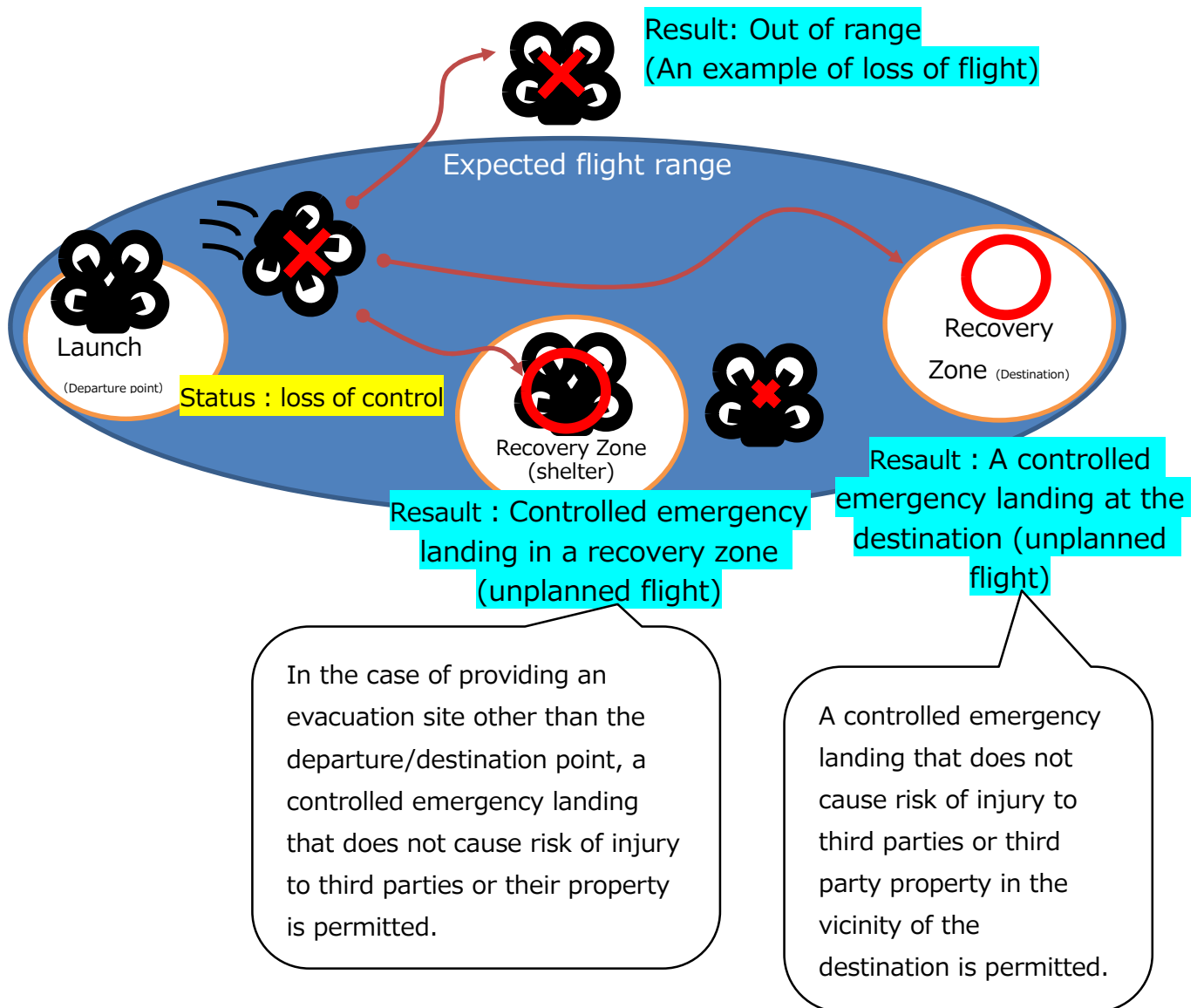
The examination is based on document inspection of certification documents.

- Sections 305(a)(1) through (6) are candidates for witnessing by the Inspection Body.

- ※ This may increase or decrease depending on CONOPS, design specifics, and applicant experience.

## Other useful information

The Pass/Fail Criteria for Section 305 are illustrated below.



### •310 Capabilities and Functions

- (a) All of the following required UAS capabilities and functions must be demonstrated by test:
  - (1) Capability to regain command and control of the UA after the C2 link has been lost.
  - (2) Capability of the electrical system to power all UA systems and payloads.
  - (3) Ability for the pilot to safely discontinue the flight.
  - (4) Ability for the pilot to dynamically re-route the UA.
  - (5) Ability to safely abort a takeoff.
  - (6) Ability to safely abort a landing and initiate a go-around.
- (b) The following UAS capabilities and functions, if requested for approval, must be demonstrated by test:
  - (1) Continued flight after degradation of the propulsion system.
  - (2) Geo-fencing that contains the UA within a designated area, in all operating conditions.
  - (3) Positive transfer of the UA between control stations that ensures only one control station can control the UA at a time.
  - (4) Capability to release an external cargo load to prevent loss of control of the UA.
  - (5) Capability to detect and avoid other aircraft and obstacles.
- (c) The UA must be designed to safeguard against inadvertent discontinuation of the flight and inadvertent release of cargo or external load.

### Overview of the Standard

This standard requires the test regarding Capabilities and Functions of the UAS. This is in addition to tests in the Section 300, and is based on the need to evaluate UAS at a more detailed level. Specifically, it demonstrates that the UA has the appropriate capabilities and functions to ensure safety. In other words, it shows that the tests will not result in an unsafe state.

It is preferable to conduct this test as a flight test whenever possible, however, if conducting a flight test is not reasonable or if there is a risk of affecting safety, ground tests, laboratory tests or simulation tests are also acceptable.

## MoC : 4, 5, 6, 8

(a),(b),(c): Section 310 Test Plan (MoC 4, 5, 6, 8)

Consider the following as test cases and establish a Test Plan :

- (1) (a)(1) : The UAS's capability is to recover the C2 link after it is completely lost. Specifically, the C2 link from the ground will be completely disabled at least once in each of the four severe flight phases: takeoff, transition to forward flight, transition from forward flight, and landing. At this time, the test will demonstrate that the C2 link function is restored and the C2 link is re-established before the UA automatically starts to transition to the fail-safe state (before the timeout occurs).
- (2) (b)(1) : If the UAS Flight Manual allows continued flight after the loss of the propulsion system, the UA must be able to safely ascend, fly, and land at maximum weight and in the most unfavorable center of gravity even in the maximum allowable degraded state of the propulsion system. Specifically, the UA must be able to continue autopilot flight, including ascend, fly, and land, without transitioning to a fail-safe procedure by creating the maximum allowable degraded state of the propulsion system during severe flight phases.
- (3) (b)(2) : If a geo-fence function is required for safe operation, the logic must ensure that the UA stays within the designated area, taking into account adverse operating conditions such as maximum wind speed or after probable failures. Specifically, the following three test cases are included:
  - (a) Establish an autopilot flight plan that will involve a fixed Geo-Fence boundary incursion or an active Geo-Fence during flight and demonstrate through testing that the autopilot will detect a potential Geo-Fence incursion prior to crossing the Geo-Fence boundary and initiate behaviors to prevent the Geo-Fence incursion as specified prior to crossing the Geo-Fence boundary.
  - (b) Repeated testing at the maximum wind speeds likely to be encountered during testing demonstrates no intrusion into the downwind geo-fence boundary.
  - (c) In a typical flight plan, construct a geo-fence boundary so that a straight line from any waypoint to the recovery zone cannot be moved in a straight line from the point where a failure occurs to the recovery zone if that line exceeds the geo-fence boundary. Then, demonstrate through testing that the UA will behave in such a way that it does not exceed the geo-fence boundary on the route



to return automatically from the point where the UA fails.

- (4) (a)(2) : The power system must be able to provide sufficient power to all systems and payloads and function safely even under maximum load and maximum wiring load. Flight tests must be conducted to demonstrate that the UA can be powered by the UA's power system at the maximum current specified in the UAS Flight Manual when the payload is loaded and maximum output is required.
- (5) (a)(3) : UAS Return to Home (RTH) Function. During autopilot flight, the pilot issues a command to the UA to return. The test will demonstrate that the return procedure can be executed without deviating from operational limits or crossing the geo-fence boundary.
- (6) (a)(4) : UAS Dynamic re-routing: During an autopilot flight, the pilot modifies the flight plan by uplink new waypoints. The test will demonstrate that the UA will abort the current flight mission and begin a new mission without invading the geo-fence boundary.
- (7) (a)(5) : Safe takeoff abort capability: The pilot performs an autopilot takeoff and then aborts the takeoff before reaching the commanded altitude. Tests demonstrate that the UA can terminate the climb or land without losing control.
- (8) (a)(6) : Ability to safely abort and go-around. For example, in a multirotor UA, the pilot commands an automatic landing while the UA is hovering. During descent, the pilot commands an abort or pause. The UA is tested to demonstrate that it will hover near the altitude reached when commanded.
- (9) (b)(3) : If control transfer between CS is permitted, there must be a safe procedure for proper control transfer. The implementation must be such that only one CS can control at a time or an unsafe condition is avoided. The test must demonstrate the UAS Flight Manual procedure for transferring control of the UA from one CS to another. This demonstration must include communication between both pilots, confirmation that control is transferred and there is no point in time when both CSs have control of the UA simultaneously. Examples of how this can be verified include 1) both pilots attempting manual control after the transfer, and 2) both pilots issuing different automatic control commands after the transfer. In either case, the UA must execute only the commands of the (second) pilot who received the transfer.
- (10) (b)(4) : When cargo is transported without being securely fastened to the exterior of the UA, the maximum and minimum loads of cargo

must be capable of being quickly detached in response to an emergency/emergency condition encountered or upon command by the pilot. Tests must demonstrate that the cargo can be detached in an emergency situation before the UA becomes uncontrollable. This demonstration must be performed in forward flight at minimum and maximum speeds, e.g., hovering for a multi-rotor UA.

- (11) (c) : Preventive measures to prevent unintended flight interruptions and unintended release of cargo from inside or outside the UA must be installed and functioning through all flight tests. In particular, conditions in which cargo is transported without being securely fastened to the outside of the UA may be verified simultaneously with the test cases in (b)(4).

In addition, when demonstrating "(5) the ability to detect and avoid other aircraft and obstacles" , sufficient consultation with the Inspection Body is required, referring to ASTM F3442/F3442M-23.

(a),(b),(c): Section 310 Test report (MoC 4, 5, 6, 8)

The test results will be compiled into a report.

### Points of inspection

For each certification document, verify the followings.  
The flight test plan and report will be checked for validity, feasibility, and reproducibility of the test plan, and the report will be checked for appropriateness of testing according to the plan and recordability.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

### Other useful information

none.

### •315 Fatigue

The structure of the UA must be shown to withstand the repeated loads expected during its service life without failure. The applicant must establish a life limit for the airframe, demonstrate by test, and described in the ICA.

### Overview of the Standard

This standard is to show that the UA Structures can withstand the expected repeated loads throughout the service life of the UA without failure. It is also necessary to set a life limit and include it in the ICA.

### MoC : 1, 2, 5, 6

This standard requires that the life limit be set by ground tests or flight tests. Life limit can be set in the following three ways:

○Method1【When conducting demonstration based on Flight Test】

#### Section 315 Flight test plan (MoC 6)

The applicant will prove the life limit based on flight tests of the actual UA. In this case, the life limit of the target UA will be the maximum life confirmed in the demonstration of one UA divided by two (knockdown factor 2 will be adopted), or if a knockdown factor is not used, three or more individual UA will be used to confirm that each UA reaches its life limit.

Whether a demonstration of one UA or three UAs is adopted, the applicant must conduct the test demonstration taking into account representative missions, the expected worst-case environment and operating conditions (flight time and number of cycles). In addition, these test conditions must be considered for each UA. For example, it is important to note that it is not permitted to set test conditions that are lighter than the expected operating conditions for only one of the three UA, and then adopt knockdown factor 2 for the UA that was demonstrated under the light operating conditions after the fact.

The applicant will verify that the UA does not suffer any deformation, damage, cracks, etc. that would hinder safe operation during flight tests until the life limit is reached. In addition, when conducting the fatigue test, it is possible to utilize the flight test data from Section 300 (conducted at the same time as the Section 300 flight test). In this case, however, it is necessary to ensure that representative missions, worst-case anticipated environmental and operating conditions (flight time and number of cycles) are taken into consideration in the Section 300 test, and that the Inspection Body's consent is obtained for the test plan before the test begins.

#### Section 315 Flight Test report (MoC 6)

The results of the flight test plan will be compiled into a report.

#### ICA (MoC 1)

The limited life span identified in the Flight Test Plan and Flight Test Report will be reflected in the ICA.

○Method2【When conducting demonstration (ground testing) based on analysis】

If the applicant selects the analysis-based verification method, it will be required to set a life limit based on ground tests.

#### Lifetime limit setting analysis report (MoC 2)

The applicant will prepare a load set analysis report that considers representative missions, worst case environments and operational conditions (flight duration and number of cycles).

#### Section 315 Ground Test Plan (MoC 5)

Based on the life limit setting analysis report, the applicant will apply fatigue loads equal to or greater than the load analysis set for the UA in ground tests. The applicant will verify in the ground tests that the UA will not develop deformations, damage, cracks, etc. that would impede safe operation, even if the load is repeatedly applied up to the life limit.

#### Section 315 Ground Test report (MoC 5)

The results of the Ground Test Plan will be compiled into a report.

#### ICA (MoC 1)

The life limit confirmed in the life limit setting analysis report, ground test plan and ground test report will be reflected in the ICA.

○Method3【Combining analysis with ground and flight tests】

The applicant can also show the UA's service life by combining ground tests and flight tests based on the analysis. In this case, the UA will first set a service life limit based on the flight time performed in Section 300, but will then use strain gauges and other measuring equipment during the flight demonstration in Session 300 to calculate the flight load from the measured strain-data, set the fatigue load using the calculated values, and then conduct the required number of cycles for the service life in the ground test.

#### Instrumentation validity analysis report for Fatigue (MoC 2)

During the flight test in Session 300, data such as strain will be obtained to show compliance with Section 315. Therefore, before conducting Session 300, the applicant will explain to the Inspection Body the appropriateness of which flight test will be used to obtain data such as strain, and where to install measuring devices such as strain gauges.

#### Section 300 Flight test plan (MoC 6)

#### Section 300 Flight Test report (MoC 6)

Session 300 related documents will include the contents of Session 315 Fatigue Instrumentation Adequacy Analysis (MoC 2).

#### Fatigue Load setting analysis report (MoC 2)

The applicant will calculate the flight loads based on the strain-data measured during the Session 300 flight demonstration.

#### Section 315 Ground Test Plan (MoC 5)

Based on the fatigue load setting analysis report, the applicant will apply fatigue loads equal to or greater than the load analysis set for the UA in ground tests. The applicant will verify in the ground tests that the UA will not develop deformations, damage, cracks, etc. that would impede safe operation, even if the load is repeatedly applied up to the limited lifespan.

#### Section 315 Ground Test report (MoC 5)

The results of the Ground Test Plan will be compiled into a report.

#### ICA (MoC 1)

The flight test and ground test plans and the life limit confirmed in the report will be reflected in the ICA.

### Points of inspection

OMethod1【When conducting demonstration based on Flight Test】

#### (1) Section 315 Flight test plan

- It is clearly indicated whether the demonstration will be conducted using one aircraft or three or more separate aircraft, and the Pass/Fail Criteria is set appropriately for each.
- The Test Plan takes into account representative missions, worst case environments and operational conditions (flight hours and number of cycles).

- Pass/Fail criteria (e.g., criteria such as no cracks or deformations) are set appropriately.
  - The information or data to be recorded is specified.
- (2) Section 315 Flight Test reporting document
- The test was conducted appropriately according to the test plan.
  - Test results and evaluation for Pass/Fail Criteria
  - All information and data that should be recorded is available
- (3) ICA
- The life expectancy confirmed in the flight test plan and flight test reporting document is reflected in the ICA.

○Method2【When conducting demonstration (ground testing) based on analysis】

- (1) Life limit setting analysis report
- The analysis takes into account representative missions, worst case environments and operational conditions (flight duration and number of cycles).
- (2) Section 315 Ground Test Plan
- A load greater than that set in the life limit analysis report is applied during the test.
  - Pass/Fail criteria (e.g., criteria for no cracks or deformation) are set appropriately.
  - The information or data to be recorded is specified.
- (3) Section 315 Ground reporting document
- The test was conducted appropriately according to the test plan.
  - Test results and evaluation for Pass/Fail Criteria
  - All information and data that should be recorded is available
- (4) ICA
- Ensure that the life limit confirmed in the life limit setting analysis report, ground test plan and ground test reporting document is reflected in the ICA.

○Method3【Combining analysis with ground and flight tests】

- (1) Instrumentation validity analysis report for Fatigue
- The measurement position of the strain gauge is appropriate.
  - A flight test that can obtain accurate distortion data must be selected.
- (2) Fatigue load setting analysis report
- The analysis takes into account representative missions, worst case environments and operational conditions (flight duration and number

- of cycles).
- (3) Section 315 Ground Test Plan
    - Same as (5)
  - (4) Section 315 Ground test reporting document
    - Same as (6)
  - (5) ICA
    - Same as (7)

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

Test witnessing will be determined based on the importance of the test. However, since Fatigue requires a lot of time, it is not necessary to witness all tests.

It makes sense to be present at two critical times (for example, the test set-up when fatigue begins and the final time when the limit life is reached).

•When the ground test of 315 begins, it can be a candidate for witnessing by the Inspection Body.

to witness the test.

※This may increase or decrease depending on CONOPS, design specifics, and applicant experience.

### Other useful information

none.

### •320 Verification of Limits

The performance, maneuverability, stability, and control of the UA within the flight envelope described in the UAS Flight Manual must be demonstrated at a minimum of 5% over maximum gross weight with no loss of control or loss of flight.

## Overview of the Standard

This standard requires to verify that there are no occurrence of problems with the performance, maneuverability, stability, and control of the UA when flying at 5% more than the maximum total weight. Specifically, the verification is performed at 5% more than the maximum total weight to confirm that the UA structures do not undergo harmful deformation or malfunction. The maximum total weight here means that it is necessary to consider the maximum total weight expected in each flight phase.

## MoC : 6

### Section 320 Flight test plan (MoC 6)

Demonstrate performance, maneuverability, stability, and control during the most aggressive maneuvers at the upper end of procedure or software limits in the most adverse flight conditions and configurations. Maximum bank turns, climb turns, nose up maneuvers, nose down maneuvers, and rapid maneuvers (such as turns) at maximum airspeed or ground speed if the system allows. These demonstrations are performed at 5% above maximum gross weight to ensure that the UA Structures do not deform or fail.

Specifically, the flight test will demonstrate that no loss of flight or loss of control occurs by executing the following commands using an aUA at 5% or more of its maximum total weight, with reference to the ASTM F3478-20 guidelines. In the following procedures, the terms "left," "right," "forward," and "reverse" refer to the UA direction, not the direction of the stick on the ground controls. "Left yaw" refers to counterclockwise UA movement, and "right yaw" refers to clockwise UA movement. If the UA has a stick to control altitude, the input direction refers to ascent and descent. The term full limit refers to the mechanical limit of the control stick at maximum gain.

1) Full limit left stick for 5 seconds. This is followed by full limit right stick for 5 seconds.

2) Full limit forward stick for 5 seconds. This is followed by full limit reverse stick for 5 seconds.

3) Full limit left yaw stick for 5 seconds. This is followed by full limit right



yaw stick for 5 seconds.

4) Descend for 5 seconds, followed by 5 seconds of ascent at full limit.

Section 320 Flight Test report (MoC 6)

The test results will be compiled into a report.

### Points of inspection

For each certification document, verify the following.

The flight test plan and report will be checked for validity, feasibility, and reproducibility of the test plan, and the report will be checked for appropriateness of testing according to the plan and recordability.

### The Inspection Body's Level Of Involvement (LOI)

The examination is based on document inspection of certification documents.

Test witnessing will be determined based on the importance of the test.

### Other useful information

none.

#### 4. Class 2 UAS Type Certificate (To Be Translated.)

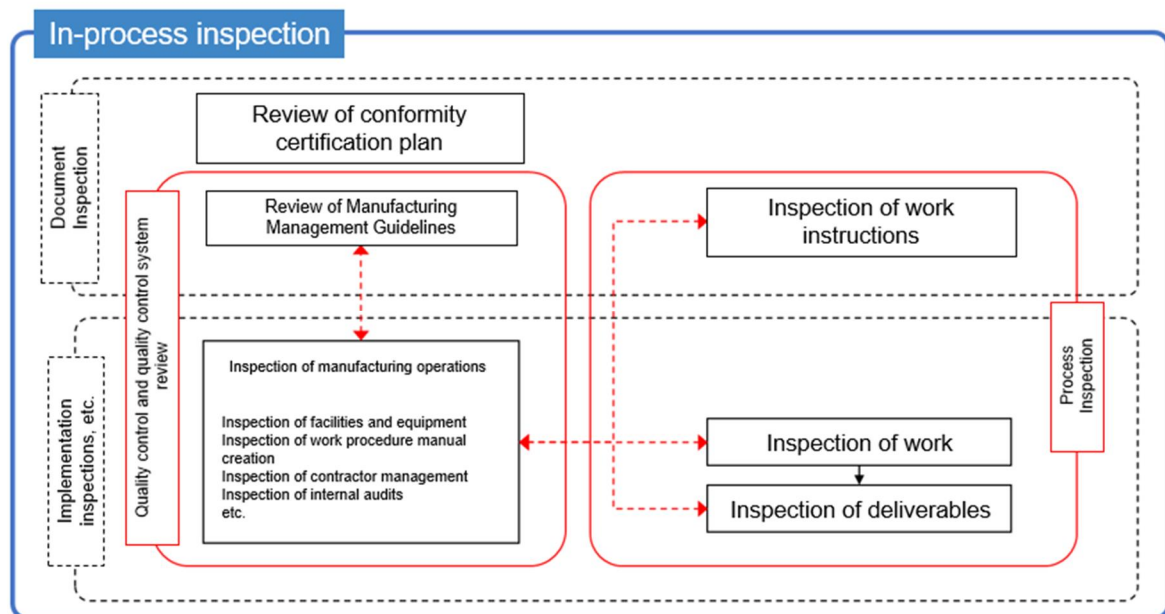
- 001 Concept of Operations (CONOPS)
- 005 Definitions
- 100 UA SIGNAL MONITORING AND TRANSMISSION
- 105 UAS AE REQUIRED FOR SAFE UA OPERATIONS
- 110 Software
- 115 Cybersecurity
- 120 Contingency Planning
- 125 Lightning
- 130 Adverse Weather Conditions
- 135 Flight Essential Parts
- 140 Other Necessary Design and Configurations
  - 140-1 Structures
  - 140-2 Lights, marks, etc.
  - 140-3 Autopilot system, cameras, etc.
  - 140-4 Transportation of dangerous objects
  - 140-5 Recording flight characteristics
  - 140-6 Reciprocating Engine and Fuel Carriage
- 200 UAS FLIGHT MANUAL
- 205 ICA
- 302 Operational Proof
- 305 Probable Failures
- 310 Capabilities and Functions
- 317 Fatigue
- 322 Flight envelope safety margin

## Part IV

# Guideline for Uniformity Standards

## 1.1 Overview of quality control inspection and quality control system inspection

In manufacturing process inspections for UAS Type Certification, in order to confirm that an UAS, which is applied for UAS Type Certification, complies with the Uniformity Standards, quality control over manufacturing is appropriate in addition to the process inspections stipulated in Paragraph 11 of Part II of this guideline to confirm that an appropriate system, etc. has been established to uniformly manufacture UAS that satisfy the design of the type (UAS that comply with safety standards). The Inspection Body will confirmed that quality control and quality control system is maintained, managed, and operated organizationally.



## 1.2 Composition of materials

From the next page onwards, for each standard listed in the Uniformity Standards (Circular No. 8-001 Part III), an Overview of each Standard, key points of inspection, level of involvement of the Inspection Body, and other useful information will be provided.

The overview of each content is as follows.

### 1.2.1 Overview of the standard

Provides an overview of the standard.

### 1.2.2 Points of inspection

Provides what the Inspection Body should check at what point of view.

#### 1.2.3 The Inspection Body's Level of Involvement

Provides the Inspection Body's level of involvement at each inspection, etc. by each standard.

#### 1.2.4 Other information for reference

Provides information that can be used as a reference as necessary.

## 2 . Manufacturing Management Guidelines

### 2- 1 About Manufacturing Management Guidelines

A document showing that uniformity of the UAS type is ensured, describing the quality control and quality control system for the Manufacturing and Other Activities of the UAS for which UAS Type Certificate ion is sought to be obtained. This document is required to submit as a separate volume to paragraph 8 of Attachment 12 in Circular No. 8-002 "Procedures for UAS Type Certificate, etc."

The quality control and quality control system applied to Manufacturing and Other Activities are required to comply with the uniformity standards. Therefore, the contents of Manufacturing Management Guidelines must satisfy the uniformity standards.

### 2-2 Points of note when preparing

#### ( 1 ) Procedures that suit the business reality

Quality control and quality control systems for Manufacturing and Other Activities may differ depending on the size and organizational structure of the applicant's company, so they still have to comply with to the uniformity standards, but in order to prevent the Manufacturing Management Guidelines becoming a mere formality, it must be prepared to suit the actual business reality.

To prepare Manufacturing Management Guidelines, an accurate understanding of the current condition of the Manufacturing and Other Activities process is the first step. It is useful to create a chronological workflow as a diagram at first. After that, comparing the Manufacturing and Other Activities process with legal requirement and amending the process as needed. Basically, document preparation of the current condition of the Manufacturing and Other Activities process comply with the standards in conjunction with business compliance matter are recommended.

Each item in the Manufacturing Management Guidelines must include the following:

- The person responsible for the item and the details of their responsibilities
- Target policy

("Quality policy" is the direction that serves as the standard for all decisions made in the quality management system\*)

- \* JIS Q 9001 5.2 "Policy" can be referred.
- Methods to be taken to realize the policy
- Names and provision numbers of specific implementation procedures
- Major formats

## (2) Easy to understand instructions

The person who prepares the guidelines must consider easy-to-understand guidelines that can be correctly understood by all those who work according to the guidelines and that do not lead to differences in interpretation depending on the reader. The key points are ① to ③.

### ① Clarify the 5W1H etc.

Clarify WHO, WHEN, WHERE, WHAT, WHY, HOW, etc.

(example)

WHO	The inspector
WHEN	At the acceptance inspection
WHERE	At the acceptance inspection site
WHAT	If you find a defective product
WHY	To prevent mixing with serviceable products
HOW	Attach a "prohibited for use" tag to the item and isolate it.

### ② Clarify collaboration between departments/units

For tasks that require collaboration between departments/units, such as "department/unit "A" plans, department/unit "B" approves and department/unit "C" carries out," the responsibilities and jurisdiction of each department/unit as well as the collaboration between those departments/units must be clearly described.

### ③ Clarify the recording format

To ensure that records are kept guaranteeing that the Manufacturing and Other Activities have been carried out appropriately, the appropriate record format for each work must be clearly set in the Manufacturing Management Guidelines. If an appropriate format is specified in the company's internal regulations, this can also be utilized.

## (3) Verification by Checklist

The Manufacturing Management Guidelines must be checked whether it meets the uniformity standard by the applicant, and the results must be submitted and explained to the Inspection Body. If a checklist or other tool is used to organize and confirm that the contents of the Manufacturing

Management Guidelines meet the uniformity standard, those checklist or other tool can be utilized on both checking by the applicant and explanation to the Inspection Body.

The checklists should be made clear whether they are newly specified in the Manufacturing Management Guidelines considering uniformity standards or are already specified in the company's regulations. In either case, explanations of what is specified in those documents and how they comply with the uniformity standards are recommended to be summarized.

#### ( 4 ) Invoking company regulations

If the matters required by the uniformity standards are documented in the company regulations, the Manufacturing Management Guidelines only need to include the chapter or paragraph number of the relevant section of those company regulations that relate to the uniformity standards. The applicant should submit Attachment 12 "Documents explaining the quality control system" (Form: JCAB FORM 8-002-12) (hereinafter referred to as "quality control documents") and explain it to the Inspection Body, which is required for the inspection of the quality control system, well before the start of manufacturing.



### 3. The Inspection Body's Level of Involvement

#### ( 1 ) If the applicant has not obtained a publicly known standard

The Inspection Body will verify through document inspection that the tentative Manufacturing Management Guidelines prepared and submitted by the applicant clearly states in appropriate text that satisfies the uniformity standards. If it does not comply with the provisions of Circular No. 8-001, Part III, Chapter 2, 1-1, the Inspection Body will request corrections to make it comply and continue the document inspection until it complies. In addition, the Inspection Body will request and verify documents other than the tentative Manufacturing Management Guidelines as necessary.

Note that the consistency between the contents confirmed in the document inspection and the current condition will be confirmed by an on-site inspection, if necessary. On-site inspections may be conducted at the same time as other on-site inspections such as conformity inspections and manufacturing process inspections.

#### ( 2 ) If the applicant has obtained a publicly known standard

For Class I UAS Type Certification, if the applicant has obtained a publicly known standard equivalent to JIS Q 9100 (which also applies to AS 9100 and EN 9100), the Inspection Body will verify through a document inspection that the applicant's quality control and quality control system are documented in the company regulations and that those documents are referenced in the tentative Manufacturing Management Guidelines.

For Class II UAS Type Certification, if the applicant has obtained a publicly known standard equivalent to JIS Q 9001 (which also applies ISO 9001), the applicant must check themselves whether the applicant's quality control system meets the uniformity standards and submit the results to the Inspection Body. The Inspection Body then verifies that all items have been verified. In this case, the Inspection Body will only verify that the manufacturer has a third-party certification equivalent to JIS Q 9001 and will not review the appropriateness of the applicant's self-verification. However, the Inspection Body will verify that the "appointment of the chief administrator of Manufacturing and Other Activities." and "inspection based on Article 132-18 of the Act" described in the Manufacturing Management Guidelines, which are the main differences between the uniformity standards and JIS Q 9001, are appropriately set.

Note that for both Class I and Class II Type Certification, if the necessary matters are not documented in the company regulations, the applicant will

be required to undergo the same examination as in the case where the applicant has not obtained a publicly known standard.

## Circular No.8-001 Part III Uniformity Standards

### Chapter 1 General

- 1-1 These Guidelines shall establish uniformity standards for class I UAS Type Certification and class II UAS Type Certification.
- 1-2 The applicant shall demonstrate that the manufacture and inspection (including inspections under the provisions of Article 132-18, paragraph 2 of the Act)(hereinafter collectively referred to as "Manufacture and Other Activities") of an unmanned aircraft system of a type pertaining to the application conform to the relevant provisions in Chapter 2, and describe matters concerning the implementation of said Manufacture and Other Activities in a document.
- 1-3 Means of compliance with the requirements set forth in the following Chapter may include, but not be limited to, a reference to the acquisition status of the known standards (equivalent to JIS Q 9100 for class I UAS Type Certification and to JIS Q 9001 for class II UAS Type Certification). If an applicant for class II UAS Type Certification has obtained a publicly known standard equivalent to JIS Q 9001, the applicant may demonstrate compliance with the requirements by applicant's own confirmation of meeting the requirements in the following chapter and submitting the results.

### Overview of the Standard

"Manufacturing and Other Activities" refers to the manufacturing and inspection of UAS type related to the application, as stipulated in Article 236-24, Paragraph 1, Item 1 (i) of the Enforcement Regulations of the Aviation Act (hereinafter referred to as the "Regulations" in this Part). Activities which do not relate to the type related to the application are not included.

The uniformity standards for obtaining "Type Certificate, etc." require showing compliance with the provisions of Circular No. 8-001, Part III, Chapter 2. Specifically, it requires the assurance of the continued uniform manufacture of UAS that embody the design of the UAS type applied for (UAS that meets safety standards). In addition to showing compliance with the requirements at the time of application or acquisition of UAS type certificate, etc., in order to ensure continued compliance with the standards, it is required that the management of quality control processes (processes, mechanisms) for the implementation of the Manufacturing and Other Activities be documented so that they function systematically and continuously, and that the Manufacturing and Other Activities to be carried out in accordance with said documents.

It is necessary to prepare "Manufacturing Management Guidelines" including

the uniformity standards of the inspection manual in Circular No. 8-001 and submit them to the Inspection Body.

Points of inspection

To ensure compliance with and continuing compliance with the provisions of Circular No. 8-001, Part III, Chapter 2, documented matters concerning the conduct of Manufacturing and Other Activities are confirmed.

The Inspection Body's Level Of Involvement (LOI)

Refer Part IV, 3. of this guideline, the Inspection Body's Level of Involvement.

Other useful information

None

## Circular No.8-001 Part III Uniformity Standards

### Chapter 2 Uniformity Standards

#### 1 Facilities

##### 1-1 Equipment

The applicant must have equipment necessary to embody the design during Manufacturing and Other Activities (including measuring instruments, test equipment and tools to be used for activity). In particular, in cases where the designer of the unmanned aircraft system is different from the manufacturer and the designer specifies functions and requirements of equipment, the manufacturer must have equipment that satisfies the functions and requirements specified by the designer.

#### Overview of the Standard

Equipment necessary to embody a design in Manufacturing and Other Activities refers to machine tools, measuring instruments, testing equipment, tools, etc. used in Manufacturing and Other Activities. If the designer specifies the functions and requirements for equipment, the manufacturer is required to have equipment that satisfies the functions and requirements specified by the designer, list all equipment and demonstrate that equipment is under control of the manufacturer.

In case if the designer does not specify the functions or requirements for equipment, the manufacturer is required to determine if any equipment is essential for Manufacturing and Other Activities, list all equipment and demonstrate that equipment is under control if the manufacturer.

#### Points of inspection

If it is used for Manufacturing and Other Activities, even if it is a general-purpose device, a minimum description is required. For example, screwdrivers, metal measures, etc. are required to describe, but organize and collectively describe as "general-purpose tools (other than measuring instrument)" is an idea. Large equipment such as lathes, etc. are also required to describe, but collectively describe as "machine tools", etc. is an idea, too. The important thing is to commonly understand with the Inspection Body utilizing Preliminary Arrangements before for the application. However, note that general-purpose tools that require calibration such as torque wrenches should be treated as measuring instruments.

In case of the details of the measuring instrument (manufacturer, model number, product number, etc.) are not specified by the designer of the UAS, the manufacturer must select the necessary and appropriate measuring instrument that can embody the design data and use them in Manufacturing

and Other Activities. In such cases, if the type of measuring instrument is specified in documents, it can be said that the design and manufacturer's specifications are met. However, it is important that the equipment is identified and managed, such as whether it is subject to calibration or not.

Note that even if it is a general-purpose tool or machine tool, and if the model number or specifications of the tool or machine tool are specified in detail by the designer or manufacturer, it is necessary to follow those specifications.

When using equipment that is equivalent or better (hereinafter referred to as "equivalent equipment") rather than the equipment specified by the UAS designer, the procedures and responsibilities for determining whether the equipment is equivalent must be clearly stated and documented.

#### The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

#### Other useful information

The corresponding clause of JIS Q 9001 for this standard: 7.1.3.

## Circular No.8-001 Part III Uniformity Standards

### Chapter 2 Uniformity Standards

#### 1 Facilities

##### 1-2 Workshop

A workshop with equipment necessary for Manufacture and Other Activities must have sufficient area for performing such Activities and must ensure smooth implementation of work, without excessively burdening workers with adjustment of appropriate illumination and ventilation. If the designer of the unmanned aircraft system subject to Manufacture and Other Activities, or any equipment, parts, parachutes, and AEs set forth in Part II (hereinafter referred to as "Equipment, etc."), which are components of the unmanned aircraft system, specifies the work environment as necessary for Manufacture and Other Activities, the designer's instructions must be respected.

#### Overview of the Standard

An area sufficient for Manufacturing and Other Activities premises the work other than type-certified UAS does not interfere with Manufacturing and Other Activities. If Manufacturing and Other Activities and work other than type-certified UAS are carried out simultaneously in the same workshop, due to the environment shared, it is necessary to ensure that the workshop and environment that work other than type-certified UAS do not affect Manufacturing and Other Activities.

The environment designated as necessary by the designers, manufacturers, etc. of equipment, etc. includes the ventilation, lighting, temperature, humidity, dust, noise, etc. of the workshop.

#### Points of inspection

Even if the designer or manufacturer of the UAS does not specify the required environment, the designer or manufacturer of the equipment, etc. may specify the required environment, so these must be taken into consideration. For example, this applies when static electricity countermeasures are required when handling electronic boards installed in the UAS.

#### The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

#### Other useful information

The corresponding clause of JIS Q 9001 for this standard: 7.1.4.

Circular No.8-001 Part III Uniformity Standards

Chapter 2 Uniformity Standards

1 Facilities

1-3 Storage facility

The applicant must have a facility where materials, parts, and equipment, etc. necessary for Manufacture and Other Activities under Section 5-5 of this Chapter can be managed.

Overview of the Standard

The storage facilities required in this section refer to facilities for storing materials, parts, equipment, etc. used in Manufacturing and Other Activities using documented storage methods, etc. If the designers, manufacturers, etc. of the materials, parts, equipment, etc. have requirements for storage methods, storage environments, etc., it is required that storage facilities satisfy those requirements.

Points of inspection

If the environmental conditions (temperature, humidity, etc.) specified by the manufacturer of auxiliary materials such as composite molding auxiliary materials (e.g. release agents, release films, cleaning solvents), sealants, and adhesives are stricter than those specified by the designer, manufacturer, etc. of the UAS that is the subject of the Manufacturing and Other Activities work, the environmental conditions specified by the manufacturer of the auxiliary materials must take precedence.

This also applies not only to auxiliary materials, but also to parts and equipment, etc.

The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

Other useful information

The corresponding clause of JIS Q 9001 for this standard: 8.5.4.



Circular No.8-001 Part III Uniformity Standards

Chapter 2 Uniformity Standards

1 Facilities

1-4 Borrowing facilities and equipment, etc.

If any equipment, workshop, or storage facility needs to be borrowed, conformance of the borrowed items to the standards set forth in Sections 1-1 to 1-3 of this Chapter must be obvious. In addition, if the lender specifies the methods for managing and using the facility, workshop, or storage facility, the lender's instructions must be respected. The applicant must periodically confirm that the borrowed items are properly managed according to the standards set by the applicant as the UAS Type Certificate holder in accordance with Section 5-1 of this Chapter.

Overview of the Standard

Even when facilities and equipment are borrowed to carry out Manufacturing and Other Activities (facilities and equipment not owned by the applicant), they must be complied with the uniformity standards, and if the borrower specifies a management method, they are properly managed in accordance with that specified method, and the applicant must confirm that the management is appropriate before using the borrowed facilities and equipment for Manufacturing and Other Activities.

It is important to note that this is based on the idea that uniformity is guaranteed not only by the working capacity of the facilities and equipment, but also by the fact that the facilities and equipment are managed.

Regarding the way in which borrowed items are expressed, it is important to refer to 1-1 Equipment and make adjustments if necessary to reach a common understanding with the Inspection Body.

Points of inspection

It is necessary to confirm that the UAS Type Certificate Holder itself conducts regular checks to ensure that borrowed items are being properly managed in accordance with the standards settled by the UAS Type Certificate Holder, and not the standards of the party borrowed from.

If it is expected that facilities and equipment will be borrowed each time at the Manufacturing and Other Activities carried out, it is also necessary to confirm that a method has been put in place to verify that the facilities and equipment comply with the borrower's standards.

It is also useful to check the rental contract as one way of confirming that the items can be borrowed in actual.

#### The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

#### Other useful information

The corresponding clauses of JIS Q 9001 for this standard: 8.4.1, 8.4.2.

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2 Organization

The applicant must appoint a chief administrator for Manufacture and Other Activities. The chief administrator must be either the Representative Director, who is ultimately responsible for operation of Manufacture and Other Activities, or a person designated by the Representative Director as a person given necessary authority including operation. Manufacture and Other Activities must be evenly distributed among all units or responsible people of all units throughout the applicant's entire organization, and authorities and responsibilities of all the units must be made clear.

Overview of the Standard

(a) Chief administrator

The chief administrator here must be selected from the person who belongs to the UAS Type Certificate Holder but does not necessarily have to be the representative of the company, etc. Among the various operations carried out by the company, etc., it is sufficient to clarify the organizational work sharing and responsibilities related to Manufacturing and Other Activities and then appropriately appoint a chief administrator for said Manufacturing and Other Activities by the representative of the company or other administrator such as CEO.

It is also acceptable to have the representative of the company, etc., as the chief administrator, but in this case, it is necessary to clearly separate the organizational work sharing and responsibilities for Manufacturing and Other Activities from other work.

(b) Appropriate work sharing of Manufacturing and Other Activities

An appropriate work sharing does not prevent concurrent working, but it is not acceptable if the no one responsible for part of the Manufacturing and Other Activities, or multiple person responsible for part of the Manufacturing and Other Activities which makes the relationship of responsibility unclear, for example. It should also be noted that "each organization" in this context refers to the organization or person that corresponds to the work sharing of Manufacturing and Other Activities, and it includes the organization or person that conduct the audit which will be described later, for example.

Points of inspection

It is important that the applicant appoints a chief administrator who is suited to the actual situation of the organization and that the work sharing and

responsibilities are appropriate. Note that particular attention must be paid to the situation of concurrent working to make sure the work sharing and responsibilities for Manufacturing and Other Activities are appropriate.

#### The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

#### Other useful information

The corresponding clauses of JIS Q 9001 for this standard: 5.1, 5.3.

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Chapter 2 Uniformity Standards

3 Personnel

The personnel of each unit sharing Manufacture and Other Activities must be competent enough to carry out the tasks allocated to the unit. Each unit sharing Manufacture and Other Activities must be provided with a sufficient number of employees for performing tasks allocated to the unit.

Overview of the Standard

(a) Ability

Sufficient ability refers to ability (competence) that can be explained based on objective information, such as the granting of internal qualifications, acquisition of external qualifications, or years of proven experience.

(b) Appropriate allocation of human resources

A sufficient number of people refers to the number of people required resulting from calculating the manpower required for the basic processes in Manufacturing and Other Activities. Regardless of the motivation or ability of a particular individual, the number of people essential required to be secured based on converted general working hours are required.

Points of inspection

(a) Ability

It is important to confirm what skills the organization requires from its personnel and whether the personnel meet the organization's requirements.

(b) Appropriate allocation of human resources

Verify that each organization has determined the number of personnel required for its workload and the actual allocation of human resources are appropriate.

The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

Other useful information

Corresponding clauses of JIS Q 9001 for this standard: 7.1.2, 7.2

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Chapter 2 Uniformity Standards

4 Implementation method of work

Methods for preparing, operating, and managing the specific procedures for implementing Manufacture and Other Activities, including in-process inspections (“Intermediate Inspections”), functional inspections, final inspections, and inspections under the provisions of Article 132-18, paragraph 2 of the Act, must be established in the Manufacture Management Guidelines and complied with, so that the procedures are made clear and appropriate in work instructions, etc.

Overview of the Standard

The method of carrying out work and inspection related to Manufacturing and Other Activities specified by the designer of the UAS must be documented in such as working instructions, procedures, etc. It is also required that work and inspections be carried out in accordance with these documents.

In addition, the method of documentation, management and the responsibility for the documents be clarified and that anyone in the organization performing Manufacturing and Other Activities can access them are required in a uniformity standard. Details are described in Circular No. 8-001, Part III, Chapter 2, 5-6.

Note that intermediate inspections also include inter-process inspections (in-process inspections) that are carried out on the UAS manufacturing process (work in progress) move to the process one another. Note that this standard does not require to implement the intermediate inspections, but rather requires that when designers, manufacturers, etc. set intermediate inspections in the manufacturing process of UAS, the intermediate inspections are also important to be clarified regarding the creation, operation and management methods of the inspections and specified in appropriate documents.

Points of inspection

Ensure that the implementation method of work is properly documented so that Manufacturing and Other Activities are performed under controlled conditions. It is also possible to verify during process inspections that the implementation method of work is the method specified by the designer, manufacturer, etc. of the UAS.

#### The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

#### Other useful information

The corresponding clauses of JIS Q 9001 for this standard: 8.5.1 c), 8.6

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Chapter 2 Uniformity Standards

5 Quality control system

5-1 Maintenance and management of facilities

Methods for maintaining and managing facilities necessary for Manufacture and Other Activities under Section 1 of this Chapter must be clear and appropriate, must be established in an appropriate document, and must be complied with.

Overview of the Standard

Regarding the maintenance and management of facilities necessary for Manufacturing and Other Activities under Circular No. 8-001, Part III, Chapter 2, Paragraph 1, the following items (a) to (d) must be documented. In addition, when facilities or equipment are borrowed or shared, the borrower or the user must be able to guarantee that the owner or manager of the facility meets the following standards.

(a) Appropriate sharing of responsibility and authority regarding the facility  
Sharing of responsibility and authority for the operation of the system must be clear to the organization and department in charge.

(b) Maintenance and management

The maintenance of the facility must be performed in a manner specified by the facility's designer. If the facility's designer has not specified a method, the applicant may set their own. In either case, however, it is necessary to be able to confirm the appropriateness of the maintenance method, etc. Also, the results of the check and inspection must be recorded.

(c) Accuracy control

For equipment that requires accuracy control, traceability to the corresponding Standard Reference Instrument must be clear, and the intervals and methods of calibration must be in accordance with the method specified by the equipment's designer or publicly known standards. In addition, considering the case if the equipment found deviate from the tolerances specified by the equipment's designer during the calibration, a method must be established for reviewing the appropriateness of the work carried out using that equipment, etc. Furthermore, for measuring instrument, the intervals (or validity period) of calibration must be indicated on the equipment and equipment that does not require calibration must be labeled, so that users can know.

(d) Number of items management

In order to prevent equipment being left on the UAS manufactured, the number of items of equipment must be checked regularly and the appropriateness of their management must be confirmed.



#### Points of inspection

(a) Appropriate sharing of responsibility and authority regarding facilities and equipment

Particular care must be taken when the organization and department responsible for operating the system are different.

(b) Maintenance and management

If the applicant has established its own methods for maintaining and managing facilities and equipment, verify that the methods are appropriate by checking that they have been established based not only on past performance but also on objective information, etc.

(c) Accuracy control

Care that there is a case calibration intervals and methods may not be in accordance with the methods specified by the designer of the equipment or publicly known standards.

(d) Number of items management

When multiple tools are managed as a set, it is necessary to check whether the tools that make up the set are also managed appropriately.

#### The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

#### Other useful information

The corresponding clauses of JIS Q 9001 for this standard: 7.1.3, 8.5.1 a)1), 8.5.1 d)

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Chapter 2 Uniformity Standards

5 Quality control system

5-2 Education and training of personnel

With regard to education and training for employees of each unit sharing Manufacture and Other Activities under Section 3 of this Chapter, the types of training, trainees, training curriculum, and methods for implementation, evaluation, and recording must be clear and appropriate, must be established in an appropriate document, and must be complied with. The training must not only correspond to the types of Manufacture and Other Activities, but also be classified into new, regular, and temporary training according to the time for implementation and include acquisition of special qualifications.

Overview of the Standard

The contents of (a) to (g) below must be documented for the education and training of personnel belonging to each organization that is responsible for Manufacturing and Other Activities under Circular No. 8-001, Part III, Chapter 2, Paragraph 3.

In addition, even if the implementation of education and training is outsourced, the outsourcing party must guarantee that the outsourcee satisfies the standards here.

(a) Appropriate sharing of responsibility and authority

Sharing responsibility and authority for the operation of personnel education and training systems must be clear to the organization and department in charge.

(b) Types of education and training

Education and training should include not only initial training but also regular training for a set period. In addition, when personnel are hired or transferred, the knowledge and skills of the person hired or transferred should be evaluated, necessary education and training should be identified, and such training should be provided. Furthermore, special training should be provided to those who perform work that requires special knowledge and skills. Additional training should be provided to those who are found to lack knowledge and skills.

(c) Scope of education and training

The training should scope workers, inspectors, and indirect personnel such as auditors.

(d) Training Curriculum

When formulating a training curriculum, the gap between the knowledge

and skills required for each job (internal qualifications, etc.) and the standard knowledge and skills of the training recipients should be analyzed, and the content necessary to fill the gap (and the frequency of regular training) should be determined.

The training curriculum, each training item should include an overview, implementation method, training duration, and the name of the outsourcee if the training is to be outsourced.

If there are requirements that training recipients must meet (internal qualifications, training history, experience, etc.), these must be clearly stated.

Educational materials should be based on the latest materials and recognized by the organization.

It is desirable to continually evaluate whether the training curriculum is appropriate and effective, and to consider whether it needs to be changed as appropriate.

(e) Implementation method of conducting education and training

Implementing methods of conducting education and training include not only education and training away from normal work, but also on-the-job training, which is training received while at working.

(f) Education and training evaluation method

The education and training provided should be individually evaluated and recorded, except the item when individual evaluation is not required.

(g) Record method of education and training

Records of personnel education and training must include at least the name, position, qualifications, training requirements, and training history for each individual.

In addition, if there is a training completion certificate, that certificate or a copy thereof must be properly managed.

Points of inspection

Confirm that each of (a) through (g) above is appropriately implemented to the organization.

In addition, if the Manufacturing and Other Activities is to be outsourced, confirm how that each of (a) through (g) above implemented to both side.

The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

Other useful information

The corresponding clauses of publicly known standards that serve as

references for this standard: 7.2 of AS 9110, 7.2 of EN 9110  
(JIS has no related provisions)

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Chapter 2 Uniformity Standards

5 Quality control system

5-3 Revision of implementation method of work

With regard to the revision (change) of the implementation method of work pursuant to Section 4 of this Chapter, details of the revision must be determined in accordance with the provisions of Section 4 of this Chapter, and the handling of the implementation method and procedures invalidated by the revision must be clear and appropriate, must be established in an appropriate document, and must be complied with.

Overview of the Standard

Regarding the revision (change) of implementation method of work in accordance with Circular No. 8-001, Part III, Chapter 2, Section 4, the following items (a) to (c) must be documented.

(a) Appropriate sharing of responsibility and authority

Sharing of responsibility and authority for the operation of the system must be clearly defined as to the organization and department responsible.

(b) Content of revision(change)

The revision(change) made should be confirmed that it meets the latest specifications of the designer, manufacturer, etc. of the UAS.

(c) Handling of invalid implementation method and/or procedures of work

Any implementation method of work that has become invalid as a result of the revision(change) surely not to be used in the business.

Points of inspection

It is important to note that confirming how the implementation method of work that has become invalid as a result of the revision(change) not to be used in the business will vary depending on the medium (electronic media or paper) used for Manufacturing and Other Activities.

The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

Other useful information

Corresponding clauses of JIS Q 9001 for this standard: 8.5.6, 7.5

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Chapter 2 Uniformity Standards

5 Quality control system

5-4 Acquisition, management, and operation of technical materials

With regard to technical materials such as drawings, specifications, process requirements, work instructions, and standards, the latest version of such technical materials must be obtained and must be made easily available to employees who need the materials to perform Manufacture and Other Activities. Furthermore, the handling of technical materials that become obsolete due to changes must be clear and appropriate, must be established in an appropriate document, and must be complied with.

Overview of the Standard

Keeping technical documents up to date and easily accessible at all times is also important in order to prevent reworking or reverting to the past.

When outsourcing the acquisition, management, and operation of technical documents, the outsourcing party such as the UAS Type Certificate holder must guarantee that the outsourcee satisfies the standards here.

(a) Appropriate sharing of responsibility and authority

Sharing responsibility and authority for the operation of the system must be clearly defined as to the organization and department responsible.

(b) Acquisition of technical documents

Acquisition of the latest technical materials necessary for business operations should be possible.

(c) Management and operation of technical documents

The latest technical documents acquired must be provided to all personnel who utilize them. The distribution destination of each technical document must be clearly defined, even within the company, and the person in charge of managing the document (including replacing revisions) at the distribution destination must be designated. In addition, documents that are not managed by the UAS Type Certificate holder must be prohibited from bringing them into the work site.

(d) Handling of invalid technical documents

Any Technical document that has become invalid as a result of revision or abolished surely not be used in business.

Points of inspection

If Manufacturing and Other Activities are outsourced, confirm that the

outsourcing party guarantees the acquisition, management, and operation of the outsourcee.

#### The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

#### Other useful information

The corresponding clauses of publicly known standards that serve as references for this standard: JIS Q 9100 7.3, 7.5

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Chapter 2 Uniformity Standards

5 Quality control system

5-5 Management of materials, parts, and equipment, etc.

Methods for managing materials, parts, and equipment, etc. including storage methods and the storage period must be clear and appropriate, must be established in an appropriate document, and must be complied with. For management, the following provisions must be established.

- (1) If the designer or manufacturer of materials, parts, and equipment, etc. specifies the storage method, their instructions must be respected.
- (2) To prevent the mixing of defective products, a system for ensuring that defective materials, etc. are not used for Manufacture and Other Activities must be established.

Overview of the Standard

The management of materials, parts, equipment, etc. must be documented in accordance with the following (a) through (e).

When outsourcing the management of materials, parts, equipment, etc., the outsourcing party such as UAS Type Certificate holder must guarantee that the outsourcee meets the following (a) through (e).

(a) Appropriate sharing of responsibility and authority

Sharing responsibility and authority for the operation of the system must be clear to the organization and department in charge.

(b) Storage method

The storage method must be clear and in accordance with the method specified by the designer.

For items that must be stored in a special manner (items with specified storage temperatures, etc.), indication suit to the item are needed on the item or its container, etc.

(c) Preventing the mixing of defective products

Unusable materials, parts, equipment, etc. must be clearly isolated and make it not to be diverted. A method to clearly indicate that unusable materials, parts, equipment, etc. must be set.

(d) Preventing mixing of materials, parts, equipment, etc. handled in works other than Manufacturing and Other Activities

When work other than the Manufacturing and Other Activities of UAS related to the UAS Type Certificate or their component parts is carried out in the same workshop, measures must be taken to prevent the unintentional mixing of materials, parts, equipment, etc. by separating the



work area (including the installation of partitions and marking of white lines on the floor).

(e) Storage period

For items with a prescribed storage period, a method for managing the storage period must be set, and the expiration date must be indicated on the item or its container, etc.

Points of inspection

(a) Appropriate sharing of responsibility and authority

Confirm that the organizational managers and personnel responsible for the management of materials, parts, equipment, etc., and their responsibility and authority are listed.

(b) Storage method

Confirm that the storage and management methods for materials, parts, equipment, etc. are described.

(c) Preventing the mixing of defective products

Confirm that the instructions for labeling and identifying unusable materials, parts, equipment, etc., as well as the methods for isolating and storing them from non-defective items are provided.

(d) Preventing mixing of materials, parts, equipment, etc. handled in operations other than Manufacturing and Other Activities

If Manufacturing and Other Activities are carried out in the same workplace, confirm that there are procedures in place to prevent the unintentional mixing of materials, parts, equipment, etc. of those do not relate to.

(e) Storage period

For items with a specified storage period, confirm that the expiration date and the format for displaying it are indicated.

The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

Other useful information

The corresponding clauses of publicly known standards that serve as references for this standard: JIS Q 9100 8.5.4

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Chapter 2 Uniformity Standards

5 Quality control system

5-6 Acceptance inspections of materials, parts, and equipment, etc., and intermediate and final inspections of the unmanned aircraft system and equipment, etc.

Methods for preparing, operating, and managing written inspection procedures must be established in an appropriate document and complied with, so that measures to be taken in connection with the following provisions are clear and appropriate.

(a) Standards for implementation of acceptance inspection of materials, parts, and equipment, etc. to be used for Manufacture and Other Activities must conform to those specified in the implementation method for work in which the materials, parts, and equipment, etc. are used under Section 4 of this Chapter. The method for implementing acceptance inspection must be sufficient to determine conformity with the standards mentioned above.

(b) Standards for implementation of intermediate and final inspections of the unmanned aircraft system and equipment, etc. constituting the aircraft and the inspection under the provisions of Article 132-18, paragraph 2 of the Act must conform to those specified in the implementation method for work in which the materials, parts, and equipment, etc. are used under Section 4 of this Chapter.

The method for implementing intermediate and final inspections and the inspection under the provisions of Article 132-18, paragraph 2 of the Act must be sufficient to determine conformity with the standards mentioned above, including the form of the inspection (whether it is conducted by the workers or by a third party independently from the workers). If the manufacturer's quality assurance process can ensure the conformity to the standards mentioned above, an intermediate inspection and a final inspection may be combined and performed at once. In addition, if conformity to the standards mentioned above is assured, the inspection under the provisions of Article 132-18, paragraph 2 of the Act may be additionally combined.

For each inspection conducted during the work, clear instructions (on the inspection timing, etc.) must be given in work instructions, etc., determination standards (such as limit values) must be specified, and procedures must be established so that inspection results are properly recorded. Thus, inspection results must be recorded in accordance with the procedures mentioned above. The method for storing records must be clear

and appropriate. The provisions of Article 236-33 of the Regulation for Enforcement of the Civil Aeronautics Act must apply to the retention period for the inspection record under the provisions of Article 132-18, paragraph 2 of the Act. For inspections, the following provisions must be established.

- (1) A person competent enough to conduct inspection in accordance with the standards and method set forth in this Section must conduct the inspection. A worker may conduct the inspection.
- (2) Products that are found to be non-conforming as a result of an inspection must undergo necessary corrective action or be clearly separated as non-conforming products.
- (3) While equipment, etc. is inspected by the UAS Type Certificate holder, the inspection must be handled as follows depending on the attributes of the equipment, etc. that is handled in the process of Manufacture and Other Activities.
  - (i) Equipment, etc. that is manufactured by the UAS Type Certificate holder must be appropriately inspected within the holder's inspection system.
  - (ii) Equipment, etc. that is manufactured by a manufacturer other than the UAS Type Certificate holder must be treated as being outsourced from the UAS Type Certificate holder, and the holder must conduct an appropriate acceptance inspection.

#### Overview of the Standard

Inspections under this standard are conducted by inspectors to ensure that work is being carried out in accordance with the documents that establish the method correspond to various types of inspection.

Acceptance inspections are inspections (at receipt) conducted when materials, parts, equipment, etc. need for work are purchased from their manufacturers, etc. For acceptance inspections, one case is the simple purchase of materials, parts, equipment, etc. that are specified by standards. The other case is the inspection at incoming of materials, parts, equipment, etc. that standards and methods are established according to their importance and impact, meeting their standards as well. In this case, it is important that the inspections are carried out in accordance with these standards and confirm that they comply with the standards.

Intermediate inspections (inter-process inspections and in-process inspections) and final inspections are inspections conducted during work related to Manufacturing and Other Activities (inspections conducted during the manufacturing process), and those conducted during the intermediate process are treated as intermediate inspections, and those conducted at the

final process are treated as final inspections.

Note that functional inspections, flight inspections, etc. are also included if necessary for final inspections.

#### Points of inspection

- a. The personnel responsible for the inspection, the person in charge, and their responsibility and authority must be listed.
- b. The inspection standards and methods must be described.
- c. Information about documents etc. that should be verified during the inspection must be described.
- d. The qualifications of the personnel conducting the inspection and the inspection standards, etc. must be described for each type of inspection.

Regarding the standards and methods for acceptance inspection for the UA weighing less than 25 kg in Class II UAS Type Certification, in the case of simple purchases of materials, parts, equipment, etc. specified by standards (purchased items), it can be said that the standards and methods for acceptance inspections are sufficient to confirm objective evidence from the supplier that the received item is a standard product as required (delivery note with product number and standard number, inspection report, etc.) as long as it is taken into consideration together with the supplier's quality track record. However, for materials, parts, equipment, etc. that are important in demonstrating compliance with the standards, it is necessary to confirm that standards and methods have been established to confirm that the product meets the requirements of the UAS designer.

#### The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

#### Other useful information

The corresponding clauses of JIS Q 9001 for the standard5-6(a): 8.4.2 d), 8.5.1, 8.6

The corresponding clauses of JIS Q 9001 for the standard5-6(b): 8.5.1, 8.6

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Chapter 2 Uniformity Standards

5 Quality control system

5-7 Process control

With regard to process control, methods for controlling the conformity of the work process to the implementation method of work under Section 4 of this Chapter must be clear and appropriate, must be established in an appropriate document, and must be complied with.

Overview of the Standard

It is required that the appropriate sharing of responsibility and authority as well as the content of process management for a series of processes, including planning of work related to Manufacturing and Other Activities, the process of carrying out the work, completion of the work, and record management, be documented.

Points of inspection

(a) Appropriate sharing of responsibility and authority regarding process management

Confirm that the organizational managers and personnel in charge for process management and their responsibility and authority are listed.

(b) Contents of process management

Confirm that the flow of the main processes in Manufacturing and Other Activities, such as planning, carrying out of the work, conducting inspections, checking, and managing records, is described along with the department in charge of each process (utilizing a flow chart to describe is also acceptable).

Also confirm that the method of handover between processes is described.

The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

Other useful information

The corresponding clauses of publicly known standards that serve as references for this standard: JIS Q 9100 4.4.1, 8.1

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Chapter 2 Uniformity Standards

5 Quality control system

5-8 Management of implementation of work by the outsourcee in case of outsourcing

With regard to outsourcing management, the criteria for selecting the outsourcee, the scope and content of outsourcing, methods for acceptance inspection, and methods for auditing the outsourcee must be established in an appropriate document and must be complied with. The outsourcer must ensure that the outsourcee is competent enough for the outsourced work and conducts work in accordance with the order, through outsourcee management. Thus, standards and procedures for auditing the outsourcee must be established in order to ensure that the audits are appropriately conducted with appropriate frequency, so that the retention of the outsourcee's ability to perform work, which has been examined at the time of selection of the outsourcee, may be confirmed.

Overview of the Standard

The outsourcing party is required to ensure, through outsourcing management, that the outsourcee has sufficient capabilities for the outsourced work and can carry out the work in accordance with the order from the outsourcing party.

Regarding the appropriateness of outsourcing management, the following items are required to be documented and observed.

(a) Appropriate sharing of responsibility and authority

Sharing of responsibility and authority for the operation of the system must be clear to the organization and department in charge.

(b) Selection of outsourcee(contractor)

When outsourcing, selection criteria for outsourcee must be clearly defined to examine whether the outsourcee's capabilities (facilities, organization/personnel, materials, systems, etc.) are sufficient for the work to be outsourced, and outsourcee must be screened in a manner sufficient to examine whether they meet those criteria.

(c) Scope of work to be outsourced

The content of the work to be outsourced must be clearly specified.

(d) Notification to the outsourcee

The content of each individual task to be outsourced must be properly notified to the outsourcee.

(e) Acceptance Inspections

The standards and methods of inspection by the outsourcing party for the

outsourced work must be clear and sufficient to determine whether the work is being performed as specified in the preceding paragraph. These standards and methods must be sufficient to determine whether the work is being performed as specified in the preceding paragraph.

Note that acceptance inspections must be carried out by the outsourcing party themselves. Inspections carried out by the outsourcee must not be considered as acceptance inspections.

(f) Audit of outsourcee

The criteria for assessing whether the capabilities of the outsourcee is appropriate for the outsourced work must be clearly defined, and the outsourcing party must audit the outsourcee in an appropriate manner and with an appropriate frequency to ensure that the outsourcee complies with the criteria.

(g) Audit and inspection personnel

The audits, etc. described in paragraphs (b), (e) and (f) above should be carried out by personnel who are competent to carry out each of them, and there should be a mechanism to ensure that such competence is met.

Points of inspection

(a) Confirm that the both manager and the person in charge of the outsourcing management, and their respective responsibility and authority are listed.

(b) Confirm that the selection criteria for the outsourcee are described.

(c) Confirm that the details of the outsourcee and the contents of outsourced work are described.

Further details may be provided in separate company regulations, etc.

(d) Confirm that the method to clarify the details of the outsourcing work through purchase orders, etc. are described.

(e) Confirm that the standards and methods for acceptance inspections of the commissioned work (deliverables) must be described.

(f) Confirm that the method, frequency and personnel conducting the audit of the outsourcee are described.

The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

Other useful information

The corresponding clause of JIS Q 9001 for this standard: 8.4.

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5 Quality control system

5-9 Management of work records

With regard to management of work records, the scope and content of the records, as well as the method and period for storing the records, must be clear and appropriate, must be established in an appropriate document, and must be complied with.

Overview of the Standard

Regarding the appropriateness of record management, the following items must be specified in appropriate documents and observed. In addition, when outsourcing the storage of records to the outsourcee, the outsourcing party must guarantee that the outsourcee meets the following standards.

(a) Appropriate sharing of responsibility and authority

Sharing of responsibility and authority for the operation of the system must be clear to the organization and department in charge.

(b) Scope and content of the records

The scope and content of the records must be sufficient to ensure that Manufacturing and Other Activities are being carried out appropriately.

(c) Record keeping method and retention period

The method of record keeping must be such that records can be provided promptly when requested.

Records relating to Manufacturing and Other Activities must be kept for the same period as inspection records prepared under Article 132-18, paragraph 2 of the Act.

(d) Preventing falsification of records

Measures have been taken to prevent falsification of records, such as the proper management of stamps, seals, etc. which are for testing, inspections, operations, and other Manufacturing and Other Activities.

Points of inspection

(a) Confirm that the manager and the person in charge for record management, and their responsibility and authority are listed.

(b) Confirm that the records to be managed and their main formats are described.

(c) Confirm that the method of record keeping and the period for which records must be kept are described.

(d) Confirm that the methods for preventing the unauthorized use of stamps, seals, etc. and the falsification of records (such as storage and



management of stamps, seals, etc., and management of IDs and passwords in the case of handling electronic records) are documented.

#### The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

#### Other useful information

The corresponding clause of JIS Q 9001 for this standard: 8.5.1 (Reference 7.5)

Circular No.8-001 Part III Uniformity Standards

Chapter 2 Uniformity Standards

5 Quality control system

5-10 Audits conducted by a unit independent of units implementing work  
With regard to the audit system conducted by a unit independent of the units that conduct work, the timing of audits, auditors, standards and methods for auditing, methods for recording audit results, and procedures for measures to correct nonconformities must be clear and appropriate, must be established in an appropriate document and must be complied with. For audits, the following provisions must be established.

(1) Audits must be conducted under the responsibility of the chief administrator, who is ultimately responsible for compliance with laws and regulations. If the chief administrator does not conduct audits, persons designated by the chief administrator must conduct audits, and report audit results directly to the chief administrator.

(2) The persons conducting audits must belong to a unit independent of the subject of the audits and have knowledge of the Civil Aeronautics Act and other laws and regulations regarding the audited work.

(3) Appropriate measures to correct any nonconformity detected during the audits must be taken under the chief administrator's responsibility.

Overview of the Standard

The purpose of the audit is to maintain compliance with act, regulation and standard related to Manufacturing and Other Activities, as well as to build a healthy organizational environment by taking necessary corrective measures in a timely and appropriate manner.

In addition, since it is necessary to make it clearer that the primary responsibility for compliance lies with the organizations that carry out Manufacturing and Other Activities, organizations to have an audit system in place is required.

(a) Audit manager

Audits must be conducted under the responsibility of the chief administrator, who has final responsibility for compliance with act, regulation and standard, but it is not strictly required that the chief administrator conducts the audits themselves, and it is acceptable for the chief administrator to appoint an auditor from among the UAS Type Certificate holders under the responsibility of the chief administrator, and have them report the results of the audit directly, thereby fulfilling the audit responsibility of the chief administrator. Note that the chief administrator must take corrective measures for any non-compliance found during the audit, and re-audits must be conducted as necessary to

assess the effectiveness of the corrective measures.

(b) Standards for audit appropriateness

Audits contribute to maintaining the healthy organizational structures through independence, fairness, and other objective perspectives.

Therefore, even if an audit is conducted by someone who is not independent of the audited organization, a non-conformity is discovered, and said non-conformity is corrected, the audit will be considered inappropriate. The inappropriate or insufficient audit as such may only tend to be a waste of resources.

Although elements (1) to (8) are stated as standards for the appropriateness of an audit, there is nothing to prevent the addition of other elements necessary for conducting an appropriate audit.

(1) Appropriate sharing of responsibility and authority for conducting audits

Not only must the relationship between the personnel conducting the audit and the audited department be clearly understood, but the personnel conducting the audit must also be given sufficient authority to carry out the audit, and the responsibility that come with it must be clearly recognized. Furthermore, while such responsibility should be granted by the chief administrator, it is important to note that it is not a transfer of the chief administrator's authority. In other words, it must be clear that the personnel conducting the audit has merely been granted the authority necessary to audit the audited department under the responsibility of the chief administrator.

The audit plan must also be under the control of the personnel conducting the audit, and must be neutral and not influenced by the audited department.

The organization conducting the audit does not have to be a permanent organization, but in that case, the audit plan must be constantly managed under the chief administrator.

(2) Scope of the audit

The scope of the audit covers all Manufacturing and Other Activities that are subject to the Manufacturing Management Guidelines.

If Manufacturing and Other Activities are carried out in a wide range of departments, it is not necessary to complete the audit of all relevant departments in one audit, and it is acceptable to stagger the audit period for each department. However, it is necessary to avoid imbalances in the audits, such as departments being audited at different frequencies and some departments not being audited at all during a certain period.

(3) Audit planning

Audits must be planned so that they are conducted systematically and regularly at appropriate times, such as at the beginning of a fiscal year or at

the start of a specific project. Audits can be planned on an annual basis, with all audits of relevant departments completed within that fiscal year, or in line with the project cycle, but care must be taken to ensure that the plan achieves the purpose of the audit (maintaining compliance with act, regulation and standard, while building a healthy organizational environment by taking necessary corrective measures in a timely and appropriate manner).

Audits also include irregular audits that are conducted when changes occur in Manufacturing and Other Activities, or when the UAS Type Certificate holder deems it necessary.

#### (4) Audit Standards

The most important audit standard is whether operations and works related to Manufacturing and Other Activities comply with the Act, regulation and standard, but the audit criteria should also include compliance with internal regulation and standard.

On the other hand, even if an internal regulation has been intended to include matters set out in circulars or this guidance, it is important to keep in mind that in some cases there is a risk of violating act, regulation and standard despite compliance with the internal regulations for example, if the internal regulation has been established by broadly interpreting the circular, etc.

Based on the concerns such as above mentioned, audits must be conducted taking several risk into account. It is recommended that a checklist or other tool that specifically lists the items to be audited be created and used.

However, such checklists must also be reviewed regularly to ensure that there are no deviations from act, regulation and standard.

#### (5) The person conducting the audit

The auditor is required to be independent with respect to the subject of the audit. This is to prevent the audit from becoming meaningless. For this reason, the auditor may hold a position concurrently in an organization other than the organization being audited, and the organization to which the auditor belongs at the time of the audit does not have to be a permanent organization.

It is desirable for the auditor to be familiar with the Act, regulation and standards that must be complied with and be familiar with audit methods, but the important point is that the auditor has sufficient knowledge and experience of the business that is the subject of the audit, and has received education and training on the quality assurance system and audit methods. Within this, the chief administrator can appoint auditor in flex manner.

The auditor must receive internal education and training on the quality assurance system and audit methods. It is also possible to establish internal qualifications for auditors as a mechanism to guarantee the abilities of such

auditors.

It is also necessary that the auditor is not involved in audits of the department to which they belong.

(6) Storage and reporting of audit results

The results of the audit are recorded and kept, and unless the chief administrator conducts the audit himself, the chief administrator must receive a report on the results directly from the personnel who conducted the audit. This is to ensure that the evidence for the audit conducted and its result are kept, and to ensure response to non-compliance occurrence and prevention of recurrence. Regarding the storage of audit results, in the event of an accident or serious incident, the JCAB may request information from the designers and manufacturers of UAS or their component parts, which are the subject of Manufacturing and Other Activities, in order to identify the cause and guide improvements. In such cases, if there is an internal non-compliance, checking the audit records may help to correct the problem, so it is important to properly store the audit results.

(7) Corrective Action

If any non-conformities are found during an audit, the chief administrator of the UAS Type Certificate holder is required to take corrective measures. In addition, to confirm the effectiveness of the corrective measures, a re-audit is required if necessary.

(c) Outsourcing of audit

The chief administrator is required to be responsible for planning and conducting the audit and monitoring the disposition of the audit results.

For this reason, even when an audit is outsourced, the chief administrator must decide the body that conduct the audit, keeping in mind that responsibility for the audit is not transferred.

In addition, regarding the personnel who actually carry out the audit, it is possible to use personnel other than the UAS Type Certificate holder, provided that the UAS Type Certificate holder themselves examines whether the personnel has the capability referred to in item (5) of the previous paragraph and specifies the method of carrying out the audit.

Points of inspection

(a) Confirm the Audit manager

(b) Confirm the standard for audit appropriateness

(1) Appropriateness of sharing responsibility and authority for conducting the audit is clearly and appropriately documented.

(2) The description that can confirm the scope of the audit covering Manufacturing and Other Activities.

- (3) Audits are planned and conducted on a regular basis with adequate documentation.
  - (4) The criteria for the audit should be whether operation or work related to Manufacturing and Other Activities and other related work are in compliance with at least the Act regulation, standard (such as circular) and other provisions, and are stated in appropriate documents.
  - (5) The auditor must belong to an organization independent of the subject of the audit and have knowledge of the Act and other related regulations relevant to the business being audited and are stated in the appropriate documents.
  - (6) It must be properly documented that records of the audit results will be kept and reported directly to the chief administrator, and that the audit results will be made available promptly to the JCAB upon request.
  - (7) Appropriate corrective action must be taken under the responsibility of the chief administrator and be properly documented.
- (c) Outsourcing of audit
- If an audit is outsourced, the procedures, methods and outsourcee must be properly documented.

#### The Inspection Body's Level Of Involvement (LOI)

Refer to Part IV, 3. of this guideline, the Inspection Body's Level Of Involvement.

#### Other useful information

The corresponding clause of JIS Q 9001 for this standard: 9.2 (Reference 9.2.2 c)