ADVISORY CIRCULAR

SUBJECT:	DATE:	AC NUMBER:	VERSION:
ADVANCED OPERATIONS WITH UNMANNED AIRCRAFT SYSTEMS	2025-06-03	107-01	1.0

NOTE: THIS ADVISORY CIRCULAR IS PUBLISHED TO PROVIDE REGULATORY INFORMATION AND DESCRIBE ACCEPTABLE MEANS OF COMPLIANCE WITH THE GENERAL AUTHORITY OF CIVIL AVIATION REGULATIONS (GACAR).

CHAPTER 1 – INTRODUCTION

1.1 Purpose.

The purpose of this Advisory Circular (AC) is to provide information and instructions to persons seeking authorization to operate Unmanned Aircraft Systems in the Specific Category of operations.

1.2 Applicability.

This AC is applicable to UAS operations in the Specific Category, as defined in GACAR Part 107 Subpart A (in Article § 107.10), within the Kingdom of Saudi Arabia airspace. The regulatory requirements for the Specific Category of operations are provided in Subpart D of GACAR Part 107.

The following are examples of possible advanced UAS operations that could be authorized:

- Night operations
- Operations over people
- Transport and/or dropping of cargo/goods
- Operations with unmanned aircraft up to 150 kg
- Beyond Visual Line of Sight (BVLOS) operations
- Operations in airspace near aerodromes or heliports
- Operations for humanitarian aid and emergency support
- Operations over mountainous terrain, areas with snow or above water
- Operations with multiple unmanned aircraft (e.g. for drone light shows)
- Operations in airspace designated for Unmanned Traffic Management (UTM)

1.3 Cancellation.

This is the first version of this advisory circular and it cancels no other advisory circulars.

1.4 Related Regulatory Provisions.
GACAR Parts 48, 107

1.5 Related Reading Material.
GACA AC 107-02 Remote Pilot Certification

1.6 Definitions of Terms Used in this Advisory Circular.
GACAR Part 1 contains the main listing of defined terms and abbreviations used in the GACARs. Additional terms relevant for the Unmanned Aircraft Systems domain are defined in GACAR Part 107.

1.7 Approval.
This Advisory Circular has been approved for publication by the Executive Vice President of the Aviation Safety and Environmental Sustainability Sector of the General Authority of Civil Aviation.

1.8 Glossary.
The following terms are used throughout this document.

AC	Advisory Circular
AGL	Above Ground Level
AIP	Aeronautical Information Publication
ATC	Air Traffic Control
ATM	Air Traffic Management
BVLOS	Beyond Visual Line-Of-Sight
FPV	First Person View
GACA	General Authority of Civil Aviation
GNSS	Global Navigation Satellite System
ICAO	International Civil Aviation Organization
NM	Nautical Miles
OA	Operational Authorization
OM	Operations Manual
SMS	Safety Management System
SOP	Standard Operating Procedures
UA	Unmanned Aircraft
UAS	Unmanned Aircraft System
UOC	Unmanned Aircraft System Operator’s Certificate
UTM	Unmanned aircraft systems Traffic Management
VLOS	Visual Line-Of-Sight
VMC	Visual Meteorological Conditions

CHAPTER 2 – GENERAL GUIDANCE

2.1 Risk based approach

The GACA follows a risk-based approach to regulate operations with unmanned aircraft, taking into consideration two principal risks: the risk of a UA causing a fatality to persons or damaging property on the ground and the risk of collision between a UA and another airspace user in any phase of flight.

Operations in the Open Category, within Standard Operations Limitations as defined in GACAR Part 107 § 107.10, are expected to have low risk. For operations in the Specific Category, a risk assessment will need to account for operational complexity factors, including aircraft size, location, altitudes, airspace classification and complexity of the operation, day/night operations and mitigations that may be imposed. An Operational Risk Assessment (ORA) will have to consider likelihood and severity of the associated risks. For example:

- Unmanned aircraft size and physical characteristics (mass and materials) could influence the likelihood that the aircraft may injure people, damage property or damage another aircraft
- Proximity to aerodromes could increase the likelihood of a collision with other airspace users
- Operations in populated or congested areas could increase the likelihood of injury to persons and loss of control due to frequency interference, loss of GNSS signal or other factors
- Operating altitudes could influence the likelihood of a collision with other airspace users
- Complex pilot tasks or operating environments could also increase the likelihood of an incident.

Depending on the risk associated with the operations, there will be different requirements for the UAS operator as regards e.g. Operations manual; Safety Management System; Declaration of Compliance or Airworthiness Certificate, registration and/or marking and the use of remote ID for the unmanned aircraft.

<table>
<tr><th colspan="2">Open Category</th><th colspan="3">Specific Category</th></tr>
<tr><td>250 g – 15 kg</td><td>15-25 kg</td><td colspan="3">Less than 150 kg</td></tr>
<tr><td colspan="2">No operational risk assessment
(Standard Operating Limitations)</td><td colspan="3">Operations risk assessment
(e.g. SORA)</td></tr>
<tr><td>Very low risk</td><td>Low Risk</td><td>Low risk</td><td>Medium risk</td><td>High risk</td></tr>
<tr><td colspan="2">No Operations Manual</td><td colspan="3">Operations Manual</td></tr>
<tr><td colspan="3">No Safety Management System</td><td colspan="2">Safety Management System</td></tr>
<tr><td>No UAS Declaration of Compliance (DoC)</td><td colspan="2">UAS DoC
(self-declaration)</td><td>UAS DoC (validated by the GACA)</td><td>-</td></tr>
<tr><td colspan="4">No UAS Certificate of Airworthiness (CofA)</td><td>UAS CofA</td></tr>
<tr><td colspan="2">UAS Registration *</td><td colspan="3">UAS Registration and Marking</td></tr>
<tr><td colspan="2">UAS Operator registration</td><td colspan="3">UAS operations authorization / UAS operator certification</td></tr>
<tr><td colspan="5">UAS geographical zones & airspace authorization</td></tr>
<tr><td colspan="2">Remote Pilot theoretical knowledge test and self-declaration of practical skills</td><td colspan="3">Remote pilot theoretical exam + practical training + practical test with Designated Remote Pilot Examiner</td></tr>
<tr><td colspan="4">Remote ID *</td><td>ADS-B</td></tr>
</table>

Figure 1 Risk based approach to regulating operations with unmanned aircraft

2.2 Frequently Asked Questions.

What UAS operations does this AC refer to?

Unmanned aircraft with maximum take-off mass of 25 kg or less and are operated in the Open Category as defined in GACAR Part 107 § 107.10(a), entirely in accordance with Standard Operating Limitations, are not the focus of this AC. Please refer to GACAR Part 107 Subpart B for requirements relating to these UAS operations.

This AC applies to all UAS operations in the Specific Category, as defined in GACAR Part 107 § 107.10(b). The regulatory requirements for these types of UAS operations are provided in Subpart D of GACAR Part 107.

What types of aircraft does this AC apply to?

For GACAR Part 107 operations, the key term is "Unmanned Aircraft (UA)." A UA is: "an aircraft which is intended to be operated with no pilot onboard."

The rules also refer to a UA *System* (UAS), which is "an aircraft and its associated elements which are operated with no pilot on board." The UAS includes its associated remote pilot station or stations, the required command and control links and any other components required to operate the system.

GACAR Part 107 Subpart D applies to *all* UA with maximum take off mass of less than 150 kg that operate in the Specific Category. This could include different levels of automation, except fully autonomous aircraft.

Relevant weight limits referred to are unmanned aircraft with maximum take off mass less than 25 kg or more than 150 kg; any UA between 25 kg and 150 kg in any case requires Operational Authorization (OA) or UAS Operator Certificate (UOC) as proof that GACA approved operation(s) in the Specific Category. Any UAS with maximum take off mass greater than 150 kg may not be operated in the Specific Category defined by GACA.

What about model aircraft?

Model aircraft are traditionally regarded as small unmanned aircraft flown by hobbyists for purely recreational purposes. Model aircraft are considered unmanned aircraft and therefore GACAR Part 107 applies. The rules of GACAR Part 107 furthermore do not make a distinction between UA based on the purpose of the operation (e.g. recreational, commercial or professional). This position reflects the GACA view that the aviation related risk posed by unmanned aircraft, including model aircraft, operating under GACAR Part 107 differs very little between aircraft that are used for recreational, commercial or professional purposes.

In general, it is expected that operations with model aircraft will adhere to Standard Operating Limitations for the Open Category as defined in GACAR Part 107 § 107.10(a) and therefore Subpart B of GACAR Part 107 applies. Nevertheless, operators of model aircraft may also apply for an OA or UOC for the Specific Category.

2.3 Applicability, Authorization and Application.

The GACAR Part 107 Articles §107.113 Applicability, §107.121 Authorization and §107.123 Application are addressed below.

Do I need a certificate for Part 107 UAS operations?

You require an Operational Authorization (OA) or a UAS Operator Certificate UOC for the Specific Category if you intend to operate an unmanned aircraft that cannot operate strictly within the Open Category (i.e. within Standard Operating Limitations). Figure 1 outlines the decision pathway for UAS operators to consider.

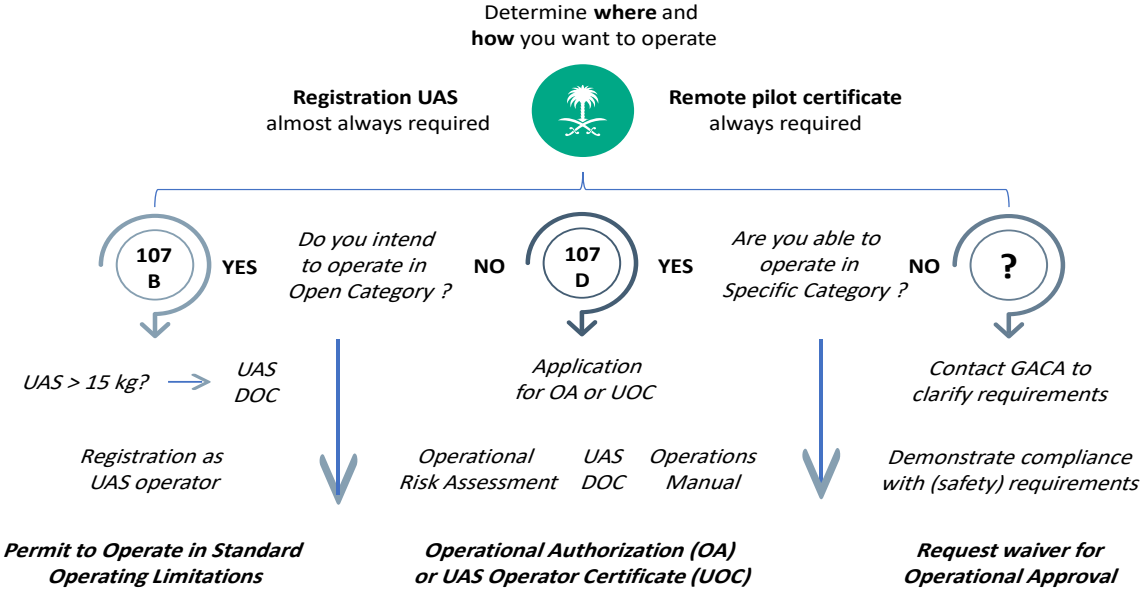

Figure 2 Decision aid for determining the applicable regulatory requirements

How do I know if I should operate in the Specific Category and apply for OA or UOC?

There are 16 key requirements for operations in the Open Category, within Standard Operating Limitations. You must:

(1) operate a small civil UAS that is 25 kg or less and always ensure that it is safe to operate;

(2) at all times, take all practicable steps to minimize hazards to persons, property and other aircraft (i.e. don't do anything hazardous)

(3) fly only in daylight

(4) give way to all manned aircraft

(5) have visibility for flight in Visual-Line-Of-Sight (VLOS) (i.e. be able to see the aircraft with your own eyes (e.g. not through binoculars, monitor or smartphone) to ensure separation from other aircraft)

(6) have minimum distance of the unmanned aircraft from clouds of no less than 500 feet (150 meters) below the cloud and 2,000 feet (600 meters) horizontally from the cloud.

(7) not fly your UAS higher than 120 m (400 feet) above ground level (AGL)

(8) not fly your UA within 30 m of a person, who is not directly associated with the operation of the UA.

(9) not fly over a person unless that person is directly participating in the operation of the UA; or located under a covered structure or inside a stationary vehicle that can provide reasonable protection from a falling UA.

(10) not fly your UAS unless areas of operation have been identified that are a) not in a prohibited area b) not in a restricted area, c) not over a populated area, d) not within 8 km of the movement area of a controlled aerodrome; and that are within the areas of operations authorized by the GACA

(11) not operate more than one unmanned aircraft at the same time

(12) not fly UAS that carry hazardous material

(13) not fly UAS in a manner that interferes with operations and traffic patterns at any airport, heliport, or seaplane base

(14) not fly in special-use airspace without the permission of the controlling authority of the area (e.g. military operating areas or restricted areas)

(15) have consent from anyone you want to fly above

(16) have the consent of the property owner or person in charge of the area you are wanting to fly above.

This list should not substitute for a full reading of GACAR Part 107. You should conduct a thorough assessment of your operation and ensure you understand the GACARs that apply to your operation, before deciding to operate. You should be aware that operations of a civil UAS in the Open Category also require you to have a remote pilot certificate and a Permit to Operate. You must always comply with the GACAR Part 48 provisions as regards the registration and marking of your UAS.

Generally, if you cannot operate your unmanned aircraft within the Standard Operating Limitations for the Open Category, your operation will need to be authorized or certificated for the Specific Category.

2.4 General remarks.

Thinking about your proposed operation

Before you make an application to the GACA for an Operational Authorization (OA) or UAS Operator Certificate UOC under GACAR Part 107, you will need to give some thought to the scope of your proposed operation.

Below are some useful prompting questions that will help define the level of risk posed by your operation, and thus the appropriate regulatory response. The questions are *some* of the considerations for applicants for an OA or a UOC and provide guidance based on current understanding of UAS capabilities. This AC does not detail requirements for every circumstance, as each application will be considered individually.

The following questions will help you decide if there are any GACAR Part 107 Subpart B requirements with which you cannot comply. You will need to address those areas specifically, when preparing your application.

Do you want to operate an aircraft with a maximum take-off mass of more than 150 kg?

If you want to operate an unmanned aircraft with a maximum take off mass of 150 kg or more, your operation does not fall within the GACAR Part 107. Please contact GACA for further guidance on the applicable GACARs.

Do you want to operate an aircraft with a maximum take-off mass of in between 25 kg and 150 kg?

If you want to operate an unmanned aircraft with a maximum take off mass of 25 kg or more, your operation typically falls within the Specific Category (it should be noted that the maximum take off mass of 25 kg includes any payload carried by the aircraft). You will only be permitted to operate an unmanned aircraft with maximum take off mass in between 25 and 150 kg under the authority of an OA or UOC.

Do you want to operate an aircraft with a maximum take-off mass of more than 15 kg?

If you want to operate an aircraft that weighs more than 15 kg, but not more than 25 kg, your operation may be in the Specific Category to be conducted under GACAR Part 107 Subpart D.

UA weighing between 15 kg and 25 kg may only be operated in the Open Category, if the UA is registered and approved by the GACA. This requires the UAS operator or manufacturer to submit a Declaration of Compliance (DoC) in accordance with GACAR Part 107 Subpart E "Unmanned Aircraft Systems declarations".

Do you intend to operate at night?

If you wish to fly at night you will need to explain in your application how you will address:

- the availability of aircraft lighting/aids to ensure your aircraft is visible to other UA operations or manned aircraft;
- how visual contact with the aircraft will be maintained;
- the areas of proposed operations;
- the risks to persons or property on the ground; and
- how notification of UA flights will be made to emergency services in the area.

The term "day" refers to a time period that begins at official sunrise and ends at official sunset. These are as listed in the electronic Aeronautical Information Publication (eAIP) (see https://aimss.sans.com.sa/).

Do you want to operate over crowds or in congested areas?

Operating above gatherings of people or congested areas where people may be present is inherently hazardous. Flight above or in proximity to large or dense crowds of people at events, have additional risks.

Applicants will be expected to address the following in their application:

- identification of the hazards and risks, including those that might be exacerbated by a crowd or people being present
- the configuration of the aircraft (fixed wing vs multi rotor, etc.)
- reliability of the UA (e.g. to include manufacturer's declaration)
- reliability of the control system
- mitigations in place in the event of any system failure
- system redundancy (such as an acceptable automatic recovery parachute)
- if practicable, the steps the operator proposes to obtain the consent of or to give notice to person(s) affected by the operation.

Operating close to buildings or structures where people are present or in close proximity may also be hazardous. If you are proposing to use a UA close to buildings, you will need to address additional concerns such as:

- procedures for dealing with the impact into a structure or object; and
- crowd/access control to ensure a safety perimeter in the event the aircraft falls to the ground.

Do you want to operate Beyond Visual-Line-Of-Sight (BVLOS)?

The standard operating environment for UAS operations is still to operate within unaided Visual Line-Of-Sight (VLOS). "Unaided" VLOS indicates the aircraft is able to be seen by the remote pilot without the use of equipment, such as binoculars or a telescope.

While GACAR Part 107 does not prohibit BVLOS operations, this type of operation presents a number of challenges for operators. The risks associated with BVLOS will require a strong safety case in your application. Some of the features of a safety case would include:

- identification of the airspace class to be used, any associated requirements and how the requirements will be met;
- ability to provide separation from other traffic such as operating in segregated airspace or a technological solution (e.g. detect and avoid system (DAA)); and
- mitigating risks to persons, property and terrain.

Applicants for BVLOS operations relying on segregated airspace will have to obtain approval for the designation of the airspace from the local air traffic control (ATC) unit before an OA or UOC for the BVLOS operation can be issued by the GACA.

Applicants should be aware that the establishment of special use airspace in accordance with GACAR Part 71 and GACAR Part 171 (i.e. military operating areas, restricted areas or danger areas) on a frequent basis and/or in numerous locations, can disrupt the conventional aviation system. In some cases, the use of special use airspace is not likely to be a workable solution except infrequently and for certain purposes such as research and testing in areas of low density aviation activity.

UA that are being flown using first person view (FPV) or from a remote device that requires the attention of the remote pilot will require a visual observer to be present to maintain the unaided visual line of sight at all times with the UA. The visual observer is to advise the pilot of any traffic that enters the operational area. It is important to include in the application by what means the UA observer(s) will remain in constant communication with the remote pilot.

An FPV operation without a visual observer is considered a BVLOS operation and will require applicants to address the safety considerations above.

Can I use observers to extend my Visual Line of Sight (VLOS)?

VLOS operations can extend the operational area by using enough visual observers who are in direct contact with the remote pilot. A visual observer notifies the remote pilot of traffic entering the operational area and, if necessary, the remote pilot halts the operation until traffic is clear.

A good example of extending the operational area with visual observers has been during powerline surveying. This could apply to other operations that may use UA including precision agriculture tasks.

VLOS operations with an extended operational area can be approved if conducted with an appropriate number of remote flight crew members for the operation and the UA continuously gives way to manned aircraft. If you wish to conduct VLOS operations over an extended area, you will need to establish a procedure for contacting other aviation operations in the area to identify scheduled operations and to advise them of the intended UA operation (e.g. for agricultural or local helicopter operations).

Do you want to fly above 400 feet above ground level?

Under GACAR Part 107 Subpart B, a 120 m (400 ft) ceiling applies to UA. The purpose of this ceiling is to create a buffer between conventional aircraft and those that are operating under GACAR Part 107 Subpart B.

The overarching obligation is on UA to give way to all manned aircraft. Conventional aircraft are generally not permitted to fly below 500 ft unless they have a reason to do so; some conventional aircraft operate below 500 ft such as agricultural operations; helicopters may operate below 500 ft.; aircraft operate below 500 ft when landing and taking off. The give way rule applies to both GACAR Part 107 Subpart B and Subpart D operations, unless an Operational Authorization or UAS Operator Certificate provides otherwise.

If you want to operate above 120 m (400 feet) you will need to first identify the class of airspace in which you intend to operate. Different rules apply depending on the airspace in which you intend to fly. You will need to consult ATC as to whether a clearance or special equipment is required, such as a transponder, or whether other conditions might be applied to the operation.

Do you want to fly near an airport, heliport or seaplane base?

You may fly your UA near an airport, heliport or seaplane base if it is a shielded operation and you obtain an OA or UOC. Examples of shielded operations could be a flight that takes place in a stadium below the height of the roof or a flight that takes place in a forested area below the height of the trees.

If you wish to fly a non-shielded operation near an uncontrolled airport, heliport or seaplane base, it is important that you demonstrate an understanding of the risks of doing so and can demonstrate ways of managing those risks.

In general, it will be required to inform the airfield operator and reach an agreement with the airport/heliport/seaplane base owner, before being able to operate under a GACAR Part 107 authorization. For this to happen, it will be important for you to demonstrate that you have thought through the following:

- how the airfield operator will be informed as to your operation; and
- how the appropriate frequencies will be monitored; and
- anything else relevant to ensure the safety of the manned aerodrome in question.

You will need to demonstrate that you have the knowledge and skills to operate near an aerodrome using the necessary technical equipment to communicate with air traffic control. This could include:

- Pilot license issued under GACAR Part 61, or
- Radio Telephony (RT) qualification

Do you want to transport dangerous goods?

UA operations may involve carriage of goods that have one or more inherent hazards and are therefore classified as dangerous goods. If you intend to transport dangerous goods, approval from the GACA will be needed. The GACA will review your request based on your risk mitigation measures for such operations, as included in your Operations Manual. The GACA may reject your request for such operations.

What should be included in your submission?

Safety management is the cornerstone of any aviation operation. Any UAS operation will introduce hazards and risks that will need to be managed. It is the responsibility of the UAS operator to demonstrate how the UAS operation will be conducted safely. An **Operational Risk Assessment (ORA)** must be prepared and submitted to the GACA for approval. The GACA must be satisfied that the UAS operation is safe, and that the operator is able to mitigate and control the safety risks before issuing the OA or UOC.

To demonstrate the safety of the proposed operation, the applicant must include an **Operations Manual (OM)**. The OM should include a process for conducting a risk assessment for the types of UAS operation that are intended to undertake. Refer also to GACAR Part 107 §107.123(b)(10) later in this AC.

It may be necessary for the UAS operator to establish a **Safety Management System (SMS)**. The SMS should be commensurate with the size of the UAS operator and the complexity of the intended UAS operations. The structure of the SMS should be in accordance with Appendix A. The GACA may provide further guidance on the requirement to establish and implement SMS during the application process.

In preparing the documentation, the applicant may wish to incorporate requirements from other parts of the GACAR Safety Regulations (e.g., some requirements from Part 91 *General Operating and Flight Rules*, or from Part 5 *Safety Management Systems,* or for special use airspace) This would help to provide assurance to the GACA that the operation is going to be conducted according to the highest level of safety.

CHAPTER 3 – SUMMARY OF REQUIREMENTS

3.1 Addressing the individual requirements.

§ 107.121 Authorization to Operate an Unmanned Aircraft

UAS Operators who either require to be authorized or prefer to be certified for operations in the Specific Category under GACAR Part 107 Subpart D will need to make an application to the GACA. The application form can be obtained from and submitted to the GACA through uas-ops@gaca.gov.sa.

The application form is comprehensive, due to the need to cover a wide range of different operations in the Specific Category that may be undertaken. Not all sections may need to be applicable if the intended UAS operation is relatively simple and could most likely be conducted with low risk. This can be determined in consultation with GACA personnel. The more information is provided, the more expeditious the GACA's assessment of the application will be and consequently the time taken for review/approval may be reduced.

When planning to make an application for the Specific Category, it is recommended to contact the GACA to determine whether a pre-application meeting is recommended to discuss the scope of the proposed operation and any application requirements. There is normally no cost associated with this meeting.

What will be assessed?

The GACA will start with the review of the Operational Risk Assessment (ORA) and the Operations Manual (OM), including the descriptions of the intended UAS operations. The documentation submitted in the application phase will be used as the guiding documentation for the review. The same type of information will be reviewed for those seeking authorization for short-term or one-time operations (typically based on an OA) as for longer-term operations (typically based on UOC).

Documentation to be organized prior to submitting a formal application include approvals required for operation in segregated airspace or a manufacturer's Declaration of Compliance (DoC), if applicable.

§ 107.123 Operational Authorization (OA) or UAS Operator Certificate (UOC)

The application for an OA or UOC requires submission of documentation addressing all important matters relating to the proposed UAS operations. The OM must be structured in accordance with Subpart H of GACAR Part 107 and should include concepts of operations (CONOPS) to describe how an operator will conduct its operations to maintain the required level of safety and remain in compliance with the rules.

To assist the GACA in reviewing your submission, it is helpful to compile a matrix that lists the required rules with an adjacent column listing which section/paragraph in their documentation compliance is demonstrated. The matrix supports the application process and assists the GACA in its assessment process.

§ 107.123(a) Application for OA or UOC

This rule lists the required items for an OA or UOC. A well written and comprehensive explanation of the UAS operation will help the GACA to assess your application quickly.

The GACA has the discretion to require only some of the items in the application, as appropriate, to the particular circumstances, context and characteristics of the proposed UAS operation. This emphasizes the benefit of a pre-application meeting to discuss what might be expected in the submission.

§ 107.123(b)(1) Person with primary responsibility for the operation

This rule requires the identification of all primary person(s). As the title implies, these are the person(s) who have primary control over any part of the UA operation and may not be the same person making the initial application. Those responsible for funding the operation and/or providing the resources including the aircraft should be included. It is usual to provide an organization chart showing lines of responsibility between persons identified as having accountability for any part of the operation. For owner/operator operations this will be relatively straightforward, but for large organizations it is expected that roles and lines of responsibility are clearly represented.

The selection process for primary person(s) including the level of scrutiny applied to make the selection may be reviewed by the GACA. In addition to knowledge of aviation regulations and experience in the industry, it is anticipated that the primary person(s) may undergo evaluations such as criminal background check, driving records review, compliance with transport safety regulatory requirements, conviction record for transport safety offences, pilot records history or other pertinent aviation records reports.

The GACA review of an organization's hiring process and the selection of the primary person(s) is not confined to considering particular criteria and may take into account any relevant matters and consider information obtained from relevant sources.

§ 107.123(b)(2) Person having control over privileges of the certificate

This rule requires the identification of any person(s) who has control over any of the part(s) of the OA or UOC issued to the organization. This may include the person(s) with control over the flights, training, or maintenance. The organization chart shows lines of responsibility and how information is reported.

§ 107.123(b)(4) Location of operation

This rule requires the identification of the actual areas UAS operations will occur. In some cases, areas can be delineated by street or highway names. In other cases, an aviation sectional chart or geographic map marking the area may be the best option. Coordinates of latitude and longitude can also be used.

While it is possible to seek approval for operations "within the Kingdom of Saudi Arabia (KSA)" or other large non-specific geographic areas, the applicant will need to explain how current airspace restrictions and/or other temporary operating conditions in effect for the operational area will be obtained.

§ 107.123(b)(5) Operational Risk Assessment

The rule requires an Operational Risk Assessment (ORA), which is part of a safety management system.

While there are many ORA methods that can be used, the ORA should be tailored to the risk of the operation, with appropriate risk mitigations stated. All the phases of an operation with unmanned aircraft should be considered.

The inclusion of a documented method for identifying hazards and controlling the associated risks will provide confidence that the intending operator understands the context of their operation and applies the standards that are likely to produce the best safety results. Consideration should be given to how this information is collected and disseminated to personnel, including the personnel's role in any mitigations.

There are different methods for identifying hazards and controlling the associated risks. Commonly used ORA methods that may be acceptable to the GACA for application to UAS operations are the following:

- ICAO Safety Management Manual (Doc 9859), Chapter 2, Section 2.5 Safety Risk Management;
- Specific Operations Risk Assessment (SORA), developed by JARUS and published by EASA;
- GACAR Part 5 Safety Management Systems, Subpart C, Safety Risk Management.

§ 107.123(b)(6) Reporting procedures

The rule requires procedures be implemented to report accidents and incidents. The GACA reporting form should be used as the reporting mechanism. Some sections of the form may not be applicable (in which case they should be left blank), but using the form will ensure consistency in the GACA reporting system.

You will generally be required to report the following types of events:

- injury to persons;
- loss of control;
- fly-away;
- engine or structural failure;
- incidents involving manned aircraft;
- incidents involving dangerous goods carriage;
- incursion into airspace not authorized; and
- damage to third party property.

You may also be required to undertake regular statistical reporting. When linked with incident reporting, data is provided to the GACA to determine the reliability of a UA operation or a particular model of UA. The more data gathered, the sooner reliability of an operation can be established which could inform policy work or revise limitations applied to a particular UA.

§ 107.123(b)(7) Licensing and qualifications

This rule relates to operating requirements for personnel licensing, qualifications, training and competency. The rule contemplates the GACA being satisfied around three key areas of knowledge and competence:

(1) general aviation knowledge (incorporating such things as airspace and air law); and
(2) detailed knowledge of the UA (including aircraft handling);
(3) practical flight skills for the intended UAS operations.

In assessing what qualification and/or knowledge may be required for personnel involved in a particular operation, the GACA will need to be satisfied as to the person's knowledge and competence. Generally, a qualification or pilot certificate or license will be evidence of this.

All assessments will occur in the context of the role the person will be performing and the nature and scope of the operation in which they are involved. This includes people performing the following types of roles:

- UA remote pilot-in-command;
- control station attendants;
- personnel handling dangerous goods;
- UA observers.

Persons having control and remote pilot

To be approved as a person having control and/or the remote pilot of a UA under a GACAR Part 107 certificate, it is expected that the relevant person will possess both general aviation knowledge, UAS competence for the model(s) of UA, and practical UAS flight skills for the intended UAS operation(s).

Unless the nature and scope of the operation requires otherwise, the following are likely to be acceptable to demonstrate general aviation knowledge:

- a pilot licence issued under GACAR Part 61, pilot certification;
- a remote pilot licence issued by a foreign aviation authority acceptable to the GACA;
- a certificate of achievement issued by a remote pilot training organization, which indicates:
- passing grade for the unmanned aviation theoretical course; and
- competency in operating UA; and
- competency in aviation radio telephony (if applicable).

Unless the nature and scope of the operation require otherwise, the following are likely to be acceptable to demonstrate UAS competence:

- a certificate of training from the manufacturer of the UA to be operated, or its KSA agent:
- a certificate of training from a remote pilot training organization authorized to conduct training.

The nature and scope of advanced UAS operations under GACAR Part 107 requires remote pilots to demonstrate specific practical UAS flight skills for the following intended UAS operation(s) (see also GACAR Part 107 §107.91):

- Night operations
- Operations above people
- BVLOS operations (> 1 km)
- Low altitude (< 400 feet) operations near aerodromes or heliports
- Operations in non-segregated airspace

- Transport and/or dropping of cargo/goods
- Operations with multiple and/or swarms of unmanned aircraft
- Operations over hilly or mountainous terrain
- Transport of dangerous goods for humanitarian aid or emergency support

The remote pilot(s) will need to show that they have successfully completed a practical training course on these UAS operations, through a certificate of achievement issued by a remote pilot training organization.

UA Observers/remote flight crew

Observers should not be impaired either visually or aurally other than by an impairment that can be corrected (e.g. with prescription glasses or hearing aids).

Unless the nature and scope of the operation require otherwise, observers will generally be expected to demonstrate competence in at least the following areas:

- methods of communicating with the pilot directly;
- action and backup action to take if communications fail;
- familiarity with the method of dividing the sky into sectors so reports to the remote pilot of an intruder's position can be located;
- emergency procedures should any unanticipated event take place.

Support crew tasked with providing crowd control will be expected to demonstrate that they are trained and authorized by the operator. Support crew should wear appropriate, high visibility apparel.

Once certificated, observers and support crew should be trained and authorized in writing by the operator. A record of any ongoing training and site authorizations should be held by the operator and the concerned crew member.

Flight time recording and operational experience

Pilots and other related personnel should maintain a logbook recording their flight time and operational experience. The logbook should record at least:

- the remote pilot's/crew member's name;
- UA type and serial number, if applicable;
- flight time;
- purpose of the flight;
- outcome of the flight; and
- operational flight or training flight details.

The logbook can be in paper or electronic form but should be able to be produced when requested by the

GACA. Maintaining these records will be useful when seeking to renew a GACAR Part 107 certificate and/or, when applying to change or increase the scope of an operation under an existing certificate.

§ 107.123(b)(8) Details of aircraft to be used

The GACA would expect to see the following information provided with an application:

- type of the UA (rotorcraft, fixed-wing, multi-rotor, etc.);
- dimensions and weight;
- identification of the manufacturer of the aircraft, or if it is a homebuilt UAS, the name of the person who constructed it and the date it was constructed;
- any associated attachments or equipment; and
- any unique markings or identification, including the primary and any secondary color of the UA.

The GACA may require marking in accordance with GACAR Part 48. If compliance with registration and markings regulations is not required, the expectation is that the UA will be marked using a fire-proof, permanent label that clearly identifies the operator with their contact information. The marking should be affixed in a location that can be read without removal of any cover. The label size can be scaled for the size of the UA.

§ 107.123(b)(9) Control systems

The rule requires the control system to be identified and approved. The Command and Control (C2) Link refers to the data link between the UA and its remote pilot station for the purposes of managing the flight.

Caution is necessary in regard to reliability of the C2 Link, including the potential for jamming or other interference. The GACA will ask UAS operator(s) to demonstrate that all risks associated with unreliable C2 Link are mitigated, and that contingency and emergency procedures are defined for loss of the C2 Link.

§ 107.123(b)(10) Aircraft maintenance

This rule requires you to establish a maintenance program that is acceptable to the GACA for all UA operated. The maintenance program should reflect the nature of the operation and the size and complexity of the UA. This program should be based on the manufacturer's maintenance instructions and should cover at least:

- a pre-flight inspection instructions or checklist;
- a post-flight inspection instructions or checklist;
- a periodic (i.e. regular) scheduled inspection timetable;
- details of any component finite or retirement lives;
- actions in regard to manufacturer's service information or airworthiness directives;
- person(s) responsible for maintenance on the aircraft; and
- damage tolerance criteria (i.e. when components such as a propeller must be changed).

Details of all maintenance actions will generally be expected to be recorded in an aircraft logbook. The following describes levels of maintenance performance that are likely to be acceptable under OA or UOC.

Small to Medium UA

Maintenance on small to medium size unmanned aircraft is generally considered to be the responsibility of the operator. The manufacturer's recommendations should be followed.

Small and medium UA manufacturers may only supply basic maintenance instructions in the form of a handbook or instructional manual. Operators will be expected to reflect any operating manual instructions and limitations in their maintenance program.

Battery Maintenance

Battery maintenance is important with both electric-powered and conventionally powered UA utilizing on-board electronics. Operators should develop good maintenance practices in regard to battery packs, including monitoring their performance and removing from service packs that indicate a loss of performance before they fail. Battery maintenance on lithium polymer ('LiPo') batteries is important as these can be very dangerous if not monitored carefully and treated with respect.

When transporting LiPo batteries to an operational site, best practice for handling and transporting dangerous goods should be followed and all recommended precautions carried out, including the use of safe bags, etc.

§ 107.123(b)(11) Operational procedures

The rule requires you to ensure that all operational procedures related to proposed operations need to be documented in an operations manual. This could include, but is not limited to:

- mission planning (operational risk assessment, dangerous goods risk assessment, consent from persons who are over flown, property owner permissions if required, NOTAM filing procedures);
- operating area assessment;
- meteorological limits and how they are determined;
- remote pilot and personnel duties during normal and contingency operations;
- checklists for the UAS;
- procedures for transporting dangerous goods or dropping of items;
- communication procedures between personnel during a UA operation;
- minimum distance from persons or property and the UA and how to discern the distance;
- camera operator operations and the communication links between observers;
- safety procedures at the base facility.

The manufacturers operating guide and any limitations specified provide a useful starting point for establishing an operations manual.

§ 107.123(b)(12) Cargo-handling and dropping of items

This rule is intended to capture additional operating configurations in respect to the carriage of cargo or the dropping of items. Where an operator intends to move cargo, including the transport of dangerous goods, drop items or conduct agricultural operations, procedures should be developed to ensure the operation can be conducted without harming persons or property. The potential consequences of identified hazards with these type operations will be considered in the operator's ORA process. A safety management system, appropriate to the size of the organization, is especially useful for these types of operations.

Guidance on UA operations carrying dangerous goods is available in AC 107-37. It provides information about the safety risk assessment process and how to addresses key considerations to ensure safety.

§ 107.123(b)(13) Transport of dangerous goods

This rule is intended to capture the requirements regarding procedures and safety risk assessment for the handling and carriage of dangerous goods in the Specific Category. This could be for emergency support, agricultural, medical, or other services. Compliance with the provisions of GACAR Part 109 as regards the transport of Dangerous Goods by Unmanned Aircraft will also have to be demonstrated. The safety risk assessment should demonstrate that there is no high risk to third parties in case of an accident.

The Operations Manual should contain a separate chapter on dangerous goods, covering the following:

- Overview of dangerous goods used
- Assessment of the risk of using dangerous goods
- Measures to prevent harm or damage to third parties
- Measures to prevent harm of damage to the environment
- Measures to minimize consequences in case of an accident

The Operations Manual should contain a training program for all personnel associated with the transport and carriage of dangerous goods. This should include all remote pilots potentially involved in the carriage.

§ 107.123(b)(14) Construction and design of unmanned aircraft

GACAR Part 107 subpart E 'Unmanned Aircraft Systems declarations' contains the regulations regarding declarations for UAS that are operated under GACAR Part 107. In this respect, please note that operators or manufacturers may or need to declare to the GACA that the UAS complies with a performance standard to meet the safety objectives for the intended UAS operation(s) that result from the Operational Risk Assessment(s) (ORAs).

It should be realized that – depending on the risk associated with the intended UAS operations, which follows from the ORA – GACA may still be required to validate the Declaration of Compliance (DoC) for operations intended under GACAR Part 107. The GACA may also undertake verifications on a case-by-case basis.

The GACA's validation or verification will consider whether the UA has been designed and constructed to an appropriate standard or safety assurance level, and whether it is suitable for the proposed operation to be conducted, equipment to be used, or payload that will be carried. This can be evidenced by submitting a DoC from the manufacturer or the person who constructed the UA. At the discretion of GACA, they may

subsequently be required to provide the means of compliance data on which the DoC is based, to enable review of the method of testing and the derived data, and the results of e.g. a functional hazard assessment.

Other factors relevant to the GACA's validation or verification will be:

- the proposed use of the UA;
- the type, complexity, size and nature of operation of the UA;
- whether the GACA is familiar with the manufacturer and/or model of aircraft;
- whether the aircraft is the first of its kind in the KSA;
- any operating history of the particular UA or UA model/type;
- any certification or approval for the UA model/type by other States; and
- accident or incident statistics in the KSA or other States.

Any UA that holds type certification and is modified for use is expected to be maintained, as appropriate, in accordance with its type-certified status and meet ongoing regulatory maintenance requirements.

Availability of safety redundancies

The carriage of a flight termination parachute is considered a highly effective safety redundancy, and is a means by which an operator may demonstrate mitigation of key hazards associated with the operation of a UA, particularly in respect to managing the risks of flight over property and people. A flight termination parachute not only allows for a number of recovery efficiencies, but provides an emergency backup that can give confidence to the GACA in mitigating the ground risk.

Test/proving flights

The GACA may require operators to conduct flight testing or proving flights and include the data in the means of compliance that supports the DoC. An applicant may be required to present information on the UA operating history that demonstrates reliability, controllability and safe flight characteristics, as part of the application process. This may need to be obtained from the manufacturer. To meet this requirement, and for potential future statistical reporting requirements, an operator should ensure that accurate aircraft logbooks are maintained for each UA that is flown, including during testing or proving flights.

Logbooks should record at least the following information:

- UA identification by model and serial number;
- engine identification by type, model, and serial number;
- propeller(s) fitted by size and type;
- ground control station in use by manufacturer, model and serial number;
- defects and rectification details including component change details;
- time in service of aircraft and components;
- times for finite or overhaul required items;
- airworthiness directive or other manufacturer's service information tracking details;
- purpose of flight and area flown;
- identification of remote pilot;
- control system for any out-of-phase maintenance if appropriate (e.g. servo replacement);

- legible records of all maintenance inspections carried out, the date and the name of the inspector;
- legible records of any modification made to the design, structure, systems or controls of the UA;
- any other date required by the GACA.

§ **107.123(b)(15) Amendment and distribution of the application and documentation**

For this requirement, the applicant needs to have a process for amending the application submission. Controlling the documentation can be done using a List of Effective Pages (LEP) and a page allowing a chronological record of amendments. The amendment process should have a control sheet that tracks the amendment process. This may include:

- need for amendment;
- whether prior approval for the amendment is required by the GACA (see GACAR Part 107 § 107.135(b))
- acceptance of the amendment (by primary person)
- update of LEP and amendment page
- distribution to manual holders (including the GACA).

§ **107.123(b)(16) Approvals**

This requires the UAS operator to identify any approvals issued that are associated with the UAS operation. For example, evidence of any approvals on which the UAS operation may rely should be provided, such as a request for segregated airspace, manufacturer's DoC, UAS approval from other States, or evidence of approval from person(s) to be overflown.

§ **107.123(c) Reduced application requirements**

This rule allows the GACA to vary the submission content required proportionate to the kind of operation the applicant has requested. This would allow the GACA to tailor the initial application requirements of an operator to reflect the risk and complexity of their operation.

For example, an operator may intend to operate entirely in the Open Category but is seeking a UOC as a requirement for obtaining insurance for their operation. The GACA may decide that, given the operation is within Standard Operating Limitations, the operator's application need not be comprehensive on all matters covered under GACAR Part 107 §107.123(b). Essentially, the GACA can scale the applicant's submission requirements commensurate with the risk posed by the operation.

Another example when the GACA may scale the applicant's submission requirements is during an urgent response following a disastrous event. For these operations, the GACA may consider an expedited review for known UAS operators that the GACA has had an oversight experience with previously or a UAS operator who is pre-approved. The GACA will still require an operational request from the UAS operator and, depending on the area of operations, there may still be a need to obtain approval from SANS or others.

§ **107.123(e) Application acceptability**

The application and associated documentation are the basis for an AO or UOC issued by the GACA. Any changes to the information entered on the application or on the associated documents require amendment.

§ 107.125 Issuance of Operational Authorization (OA) or UAS Operator Certificate UOC

This rule enables the GACA to issue an OA or UOC, provided that the GACA is satisfied that all criteria have been met. The GACA may require additional information or procedures be added to the OA or UOC holder's submission or impose conditions or limitations by attachment to the certificate.

As part of an application for a GACAR Part 107 certificate, the primary person(s) required by GACAR Part 107 § 107.123(b)(1) will be required to undergo a security background check. This will also be required for the remote pilot and other personnel with designated responsibility for any part of the operation.

Aviation safety

This rule prohibits the GACA from issuing an OA or UOC if by authorizing an operation it would be contrary to aviation safety. In other words, the authorization must not have an adverse impact on aviation safety. The impact of the proposed UA operation on manned aviation will be considered by the GACA.

Considerations include:

- injury to people in the air or on the ground;
- damage to property including other aircraft in the air or on the ground;
- disruption to the civil aviation system of the Kingdom of Saudi Arabia;
- creating a situation where other airspace users are subjected to taking action that could endanger their flight operations; and
- flight over sensitive areas such as power substations, government facilities, military installations, prisons, etc.

§ 107.125(b)(1) Requirements

This rule provides for the GACA to apply any requirements considered necessary having regard to the complexity of the operation, when issuing an OA or UOC.

It can be assumed that additional requirements will be proportionate to the size and complexity of the UAS operation and any similarity with manned aircraft operations. For example, the GACA may require an approved maintenance program for any large complex UAS proposed in the operation.

§ 107.125(b)(2) Conditions

This rule provides for the GACA to apply any condition considered necessary having regard to the complexity of the operation. The range and scope of UA operations is so vast that the decision on which conditions would apply to a particular operation can only be made once an application is received.

Special consideration will need to be given to the carriage of dangerous goods, e.g. for humanitarian aid or emergency support. It would be expected that the OA or UOC would include specific conditions and limitations related to these UAS operations to ensure the safety of third parties on the ground.

§ 107.125(b)(3) Markings

This requirement for the GACA to determine if marking under GACAR Part 48 is required has been covered in GACAR Part 107 § 107.23(b)(7). In most cases, the UAS operator will need to apply somewhere on the UA a fireproof, permanent label clearly identifying the registration number and the operator contact information.

§ 107.129(a) Operations specification

Upon completion of the assessment, the GACA may issue an OA or UOC. In either case, the GACA may issue conditions and limitations that clearly stipulate the privileges and type of operations that are authorized and any conditions imposed, in the interest of aviation safety. The conditions and limitations are determined by the GACA. They are likely to vary depending on the kind of operation and the aircraft used, although some conditions and limitations may be common across all certificates.

§ 107.129(b) Privileges of certificate holder

The rules indicate that if the GACA has specified in the OA or UOC that an operator must comply with any additional rules, the operator must comply.

§ 107.131 Duration of certificate

The rule provides that a certificate may be issued for a period of up to three years.

For first time applicants, the GACA may issue a certificate for a period of less than three years. This is to allow the GACA the time necessary to observe the operator's operational practices and allow for technology changes in the operating environment. During this period, the GACA may conduct inspections of the operator's facilities/locations and monitor the conduct of operations.

If the operator currently holds a GACA certificate, then the GACA may issue a new certificate with a five year validity period. This policy reflects the operator's safety practices in its performance of civil aviation activities to the GACA and that the GACA has the confidence that the operator will continue to exercise similarly under the new authorization.

§ **107.133 Conditions for operation for an Operational Authorization (OA) or UAS Operator Certificate (UOC)**

This rule makes it clear that the certificate holder must comply with all rules for the Open Category, except where the operation specifications provide relief from or varies certain GACAR Part 107 Subpart B rules.

It further requires the certificate holder to comply with their application submission and any conditions imposed by the GACA under conditions and limitations on the certificate or on the operation specifications attached to the certificate.

GACAR Part 107 § 107.123(b) makes it clear that the certificate holder is responsible for any other operator or personnel conducting operations under the authority of that certificate. He/she must ensure that all personnel are fully aware of the procedures in the application and understands the content, conditions and limitations specified on the certificate, and the operation specifications attached to the certificate.

§ **107.135 Changes to application**

Procedures for the amendment of the application are required to be documented in the application submission (refer to GACAR Part 107 § 107.123(b)(13). There are two types of amendment, those that require prior acceptance of the GACA and those that do not. A procedure for each should be described in the application submission.

§ **107.137 Renewal of certificate**

This rule is self-explanatory; however, to provide ample time to process a renewal application, the application should be submitted to the GACA at least 60 days prior to the certificate expiration date.

§ **107.149 Safety Management System**

The UAS operator's system for safety management should be commensurate with the size of the organization. The structure of the Safety Management System (SMS) of the UAS operator conducting advanced UAS operations should be in accordance with Appendix B of this Advisory Circular.

All the four safety management pillars should be addressed:

1) Safety policy & objectives,
2) Safety risk management,
3) Safety assurance, and
4) Safety promotion.

§ **107.151 Special use airspace**

This rule ensures that UAS operators are aware of – and do not conduct – UAS flights in prohibited areas. Furthermore, UAS operators should recognize that they clearly describe the operational requirements for flights in special use airspace in their Operations Manual. Besides prohibited airspace, special use airspace may include restricted airspace, military operations areas, national security areas, danger areas and so forth.

Flights within restricted areas are only allowed with specific GACA clearance and usually will be subject

to restrictions, while in prohibited areas flights are forbidden except in emergency situations. Flying in certain types of special use airspace may be sometimes be allowed without clearance, but can be hazardous.

§ 107.171 Insurance for UAS operations in the Specific Category

UAS operators conducting flights in the Specific Category are required to have an insurance policy with an appropriate insurance cover in place at the start of their UAS operations and for every UAS flight made thereafter. To enable verification of the validity of the insurance policy, the UAS operator should be able to provide proof – at any time – the expiry date of the insurance policy and to consider their registration as UAS operator to be invalid after that date.

§ 107.181 Security for UAS operations in the Specific Category

UAS operators are required to address any security requirements that may be brought forward by the GACA and national security bodies. The Operations Manual should describe the security measures that the UAS operator will implement. This should include at least the following:

- Protection of control link(s) connecting the unmanned aircraft to the controller or ground station;
- Procedures to ensure that security requirements applicable to the operations area are complied with;
- Measures to protect the UAS against unlawful interference and unauthorized modifications/access;
- Measures against unauthorized access to UAS operator's information and record keeping systems.

CHAPTER 4 – FOR FURTHER INFORMATION

4.1 Responsible Department(s).

The Unmanned Aircraft Systems (UAS) Department of the GACA Aviation Safety and Environmental Sustainability Sector is responsible for authorizing UAS operations in the Kingdom of Saudi Arabia.

4.2 Contact Details.

The Unmanned Aircraft Systems Department can be contacted at the following coordinates:

In person or by mail:
General Authority of Civil Aviation (GACA)
Unmanned Aircraft Systems Department
Aviation Safety & Environmental Sustainability Sector
GACA Headquarters – Building 1
Riyadh 13443

By email:
uas-ops@gaca.gov.sa

Appendix A Safety Management System

The structure of the Safety Management System (SMS) of the UAS operator conducting operations under GACAR Part 107 should be in accordance with Appendix 2 of ICAO Annex 19 *Safety Management*. This appendix specifies the framework for the implementation and maintenance of an SMS. The framework comprises four components and twelve elements as the minimum requirements for SMS implementation:

1. Safety policy and objectives
1.1 Management commitment
1.2 Safety accountability and responsibilities
1.3 Appointment of key safety personnel
1.4 Coordination of emergency response planning
1.5 SMS documentation

2. Safety risk management
2.1 Hazard identification
2.2 Safety risk assessment and mitigation

3. Safety assurance
3.1 Safety performance monitoring and measurement
3.2 The management of change
3.3 Continuous improvement of the SMS

4. Safety promotion
4.1 Training and education
4.2 Safety communication

The SMS of a UAS operator should be commensurate with its size and the complexity of its operations.

Appendix B Last Minute Risk Assessment

The UAS operator should conduct Last Minute Risk Assessment (LMRA) to make sure that the risk that was estimated beforehand and the risk mitigation measures taken are consistent with the actual situation. LMRA are evaluations of potential risks shortly before the UAS flight is scheduled to take place. This assessment is critical and can help to prevent accidents, injuries, and other negative outcomes of flights.

ICAO Doc 9859 *Safety Management Manual* provides guidance on safety risk management, including on safety risk decision-making. An example of an ICAO safety risk decision aid is provided in the Figure below. Ideally, the process is followed at least two times: initially about one week before the UAS flights are about to take place and then on the day of the UAS flight, during the pre-flight preparations & checks. Depending on the defined risk level, it may be necessary to implement additional risk mitigation measures (in addition to those already included in the Operations Manual). If, after considering all the possible risk mitigations, the final outcome is "Do not perform operation", then the UAS flight(s) must not take place.

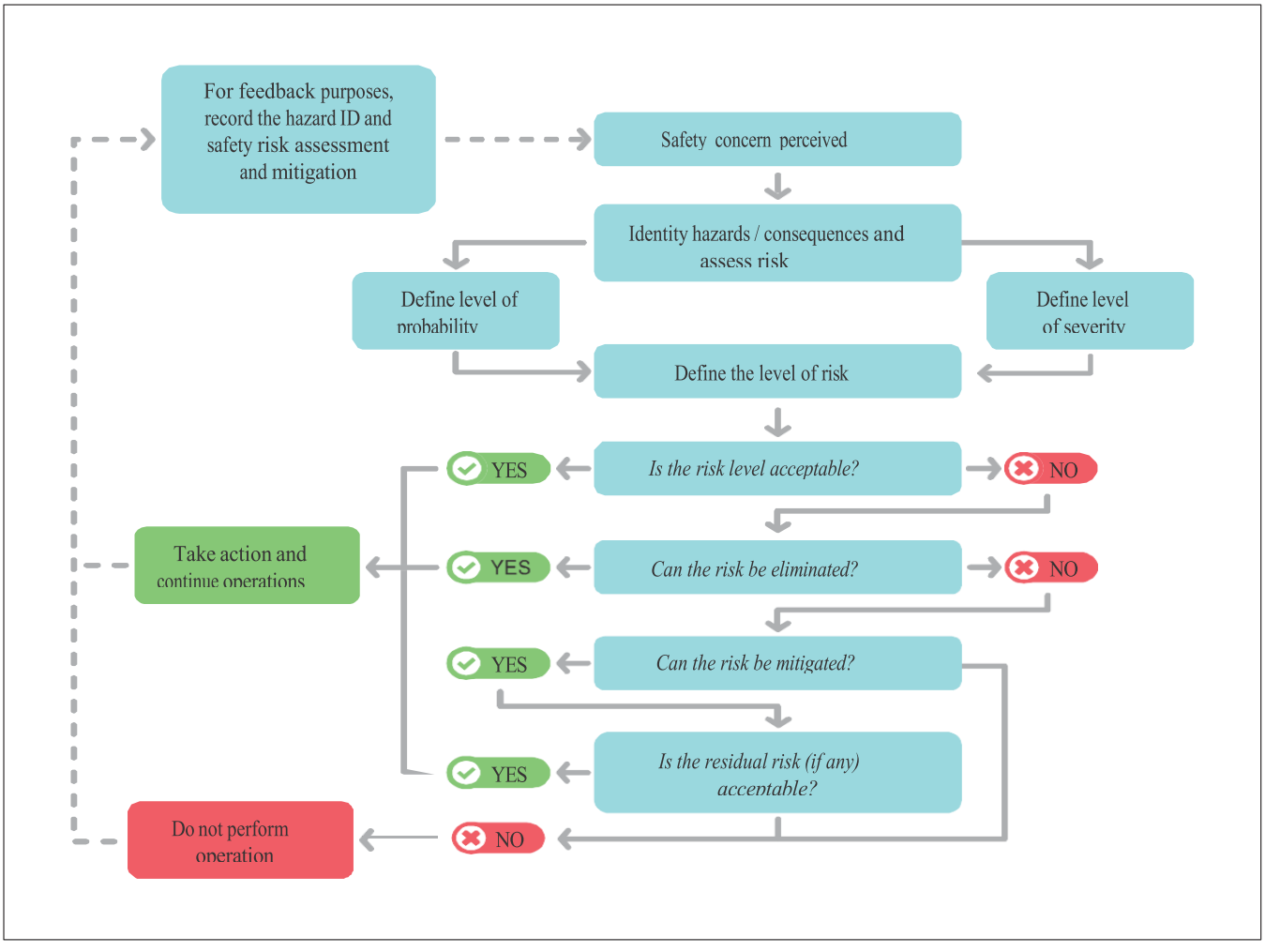

Figure 3 Safety risk management decision aid [ICAO Doc 9859, Section 2.5]

Note that a hazard is defined as *a condition or an object with the potential to cause or contribute to an*

aircraft incident or accident. Risk mitigation is *the process of incorporating defences, preventive controls or recovery measures to lower the severity and/or likelihood of a hazard's projected consequence.*

The Operations Manual should already contain a list of identified hazards and associated risk mitigation measures for all envisaged UAS operations, resulting from performing the *Operational Risk Assessments*.

The residual safety risks, i.e. the degree of safety risk that remains subsequent to the implementation of the initial mitigation and which may necessitate additional safety risk control measures, will be have to be reassessed by the remote pilot(s) during LMRA. This is because the actual situation on the day of the flight may differ from the assumptions made when safety risks were estimated beforehand (in the ORA). The LMRA may be performed by using a safety risk matrix, see example in Table 1 below. Depending on safety risk tolerability, different recommended actions are possible. This is illustrated in Table 2 below.

Table 1 Example safety risk matrix [ICAO Doc 9859]

Safety Risk		*Severity*				
Probability		*Catastrophic A*	*Hazardous B*	*Major C*	*Minor D*	*Negligible E*
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely improbable	1	1A	1B	1C	1D	1E

Table 2 Example of safety risk tolerability [ICAO Doc 9859]

Safety Risk Index Range	*Safety Risk Description*	*Recommended Action*
5A, 5B, 5C, 4A, 4B, 3A	INTOLERABLE	Take immediate action to mitigate the risk or stop the activity. Perform priority safety risk mitigation to ensure additional or enhanced preventative controls are in place to bring down the safety risk index to tolerable.
5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C, 1A	TOLERABLE	Can be tolerated based on the safety risk mitigation. It may require management decision to accept the risk.
3E, 2D, 2E, 1B, 1C, 1D, 1E	ACCEPTABLE	Acceptable as is. No further safety risk mitigation required.

— END —