



**WORKING PAPER**

**THIRTEENTH AIR NAVIGATION CONFERENCE**

**Montréal, Canada, 9 to 19 October 2018**

**COMMITTEE A**

**Agenda Item 5: Emerging issues**

**5.2: Operations below 1000 feet**

**TACTICAL RISK MANAGEMENT OF UNAUTHORISED UAV INTRUSIONS**

(Presented by the United Arab Emirates)

**EXECUTIVE SUMMARY**

This paper presents the tactical risk assessment model introduced by the United Arab Emirates to manage events where unauthorised aircraft, such as unmanned aircraft systems (UAS), enter controlled airspace. The tactical risk assessment ensures that actions taken are commensurate to the risk posed by the intruder, and avoids introducing additional risk associated with mass diversions and airspace restrictions.

**Action:** The Conference is invited to:

- a) note the contents of the working paper;
- b) refer the model to the Remotely Piloted Aircraft Systems Panel (RPASP), the Unmanned Aircraft Systems Advisory Group (UAS-AG), and the Air Traffic Management Operations Panel (ATMOPSP) for further consideration as global guidance material; and
- c) consider the adaptation of such a model into State regulations.

**1. INTRODUCTION**

1.1 The United Arab Emirates is a leader in unmanned aircraft system (UAS) development and innovation. Several advanced projects are underway and through extensive research and development, the General Civil Aviation Authority (GCAA) have a policy of flexible risk-based regulatory approach to support growth and innovation while maintaining safety.

1.2 Nevertheless, while a level of control is maintained over commercial and experimental operations, the proliferation of small personal UAS by the general public has been a significant cause for concern. The intrusion by small UAS into controlled airspace, particularly near major airports, combined with the lack of air traffic control (ATC) experience in dealing with such events caused multiple instances of large airspace restrictions or airport closures, which in themselves introduce additional hazards into the system.

## 2. DISCUSSION

2.1 The penetration by an unauthorised aircraft into a portion of controlled airspace without prior permission from the air traffic services provider may result in multiple safety, efficiency, environmental and security risk concerns. Such infringements:

- a) are hazardous to other airspace users and may immediately result in a significant increase in the workload of pilots, air traffic control officers (ATCOs) and supervisors such as, coordination, the need to break-off an approach, change aircraft sequence for landing or implement other contingency measures, etc.;
- b) may increase the risk to operational safety of other aircraft through unexpected extended airborne delays, diversions and increased likelihood of fuel emergencies;
- c) may cause an unacceptable cost to industry, due to numerous delays and diversions incurred through closures of or restrictions placed on airports and airspace;
- d) may pose a significant threat to national security since such unauthorised flights will not be under normal communications and surveillance or may have adverse environmental impacts through increased emissions caused by resultant delays to other air traffic.

2.2 Consequently, the development and implementation of comprehensive contingency measures, where the risk is tactically analysed and assessed through collaborative decision-making processes between ATC management, supervisors, ATCOs and other relevant personnel and stakeholders, should manage the safety and security risks to an acceptable level, while minimising the impact on normal operations by unauthorised aircraft.

2.3 In November 2016, the United Arab Emirates GCAA published Safety Decision 2016-16 to provide a regulatory framework and guidance to ANSP on how to tactically risk assess intrusions into controlled airspace, and take mitigating actions while ensuring those measures are proportionate to the risk posed by the intruder, and that as little additional stress is introduced into the system. The Safety Decision was reviewed in July 2017 to provide further guidance in the form of a national template, at request of the ANSPs. The entire process has been highly successful in reducing the adverse impact on intruder aircraft while maintaining an appropriate level of safety.

2.4 The process is summarised in the following paragraphs:

2.4.1 Air traffic services units (ATSUs) shall develop, establish, implement and maintain an safety management system (SMS) to ensure:

- a) hazard identification is pro-actively conducted to prevent from airspace penetration by an unauthorised aircraft (e.g. unmanned aerial vehicle (UAV));
- b) risk mitigation activities are effectively performed to assure safe continuity and adaptability of service provisions with, if the situation deems it necessary, the deployment of the contingency plan that includes a tactical risk assessment process when the airspace is in the presence of unauthorised aircraft. The contingency plan shall be activated or de-activated in a timely manner; and

- c) appropriate and effective coordination with associated aerodrome(s), surrounding and adjacent ATSU's and local appropriate authorities, as applicable while carrying out activities specified in a) and b) above.

2.4.2 The tactical risk assessment shall be documented and implemented to determine the appropriate actions to be taken in the event of airspace infringement which shall include the following requirements:

- a) obtain as much information as possible of the induced hazard from any source;
- b) warn other aircraft of the induced hazard through the passing of essential traffic information; and
- c) determine if any restrictions are necessary within the airspace, airways or aerodromes following the report or observation of the airspace infringement.

2.4.3 ANSPs shall provide supervisors and ATCOs with:

- a) a solid knowledge of the federal regulatory requirements for light sport aircraft and UAS operations promulgated by the GCAA; and
- b) adequate instructions to ensure they can:
  - 1) direct requests for intended UAS operations affecting their airspace to the GCAA;
  - 2) deny access to their airspace to any UAS operation unless the individual or organisation operating the UAS can provide a copy of the approval issued by the GCAA. Regulatory requirements and/or approvals established by other aviation authorities than GCAA are insufficient; and
  - 3) reference UAS flying zone maps published by GCAA (refer [www.gcaa.gov.ae](http://www.gcaa.gov.ae)) . The use of any UAS flying zone maps or publications not published by the GCAA is illegal according to Civil Aviation Law Article 20 of the Federal Act 20 of 1991; and
  - 4) adequate training, instructions and guidance for the recognition of unlawful interference with an aircraft through a tactical risk assessment and the management of unauthorised aircraft operations in their airspace.

2.4.4 Such procedures, instructions and guidance should ensure that all hazards, risks and mitigations will be appropriately and tactically assessed. Decision may include any safety and security measures involving aerodrome and airspace restrictions, and appropriate involvement with police, military and other security authorities.

2.4.5 When ATSU's become aware of an unauthorised aircraft in their airspace, they shall immediately:

- a) commence providing traffic information to other aircraft about the hazard posed by the unauthorised aircraft irrespective of how little information may be known. This essential traffic information shall continue for a period of no less than sixty minutes, unless it can be confirmed the unauthorised aircraft has vacated the airspace before this time;

- b) ensure that its ATS personnel has executed a tactical risk assessment with the aim to determine if a hazardous area needs to be established to protect other traffic;
- c) once the extent of the hazardous area has been determined, analyse the threat to other aircraft operations using all information available at that point in time in order to determine appropriate mitigations. Such mitigations may include but are not limited to:
  - 1) advise aircraft in the vicinity of the unauthorised aircraft operation by passing essential traffic information (as appropriate) and advise aircraft to take avoiding action if necessary;
  - 2) allow operation of active runways to continue:
    - with mitigation and caution after careful analysis of all available information even if the position of the unauthorised aircraft may be deemed sufficiently far from the active runway; and
    - if information received provides reasonable assurance that the unauthorised aircraft is not a threat to other aircraft;
  - 3) consider sterilising the identified hazardous area, with the exception of the police or military aircraft which are tasked with intercepting or shadowing the unknown or unidentified aircraft; and
  - 4) consider changing runway direction, or restricting runway operations if the unauthorised aircraft affects the departure climb-out area, final approach for arrivals or other traffic in the vicinity of the aerodrome;
- d) inform the appropriate authorities including police, military and other security authorities as per the locally agreed procedures; and
- e) endeavour to identify the aircraft by:
  - 1) attempting to establish two-way communication with the concerned aircraft or to obtain information from other aircraft in the area; and
  - 2) inquiring other ATSUs within the flight information region (FIR) or ATSUs serving the adjacent FIRs about the concerned aircraft and requesting their assistance in establishing two-way communication with it.

— END —



## **SAFETY DECISION 2016-16**

### **Issue 02**

**Date of Initial issue: 15<sup>th</sup> June 2016**

**Date of this Issue: 05<sup>th</sup> July 2017**

#### **SUBJECT:**

CONTINGENCY MEASURES FOR UNAUTHORISED AIRCRAFT<sup>1</sup> WITHIN CONTROLLED AIRSPACE

#### **REFERENCE PUBLICATIONS:**

CAR PART II, Chapter 10

CAR PART II, Chapter 11

CAR Part IV (UAS)

CAR Part VIII, Subpart 4

CAR Part VIII, Subpart 10

GM-03 CONTINGENCY PLANNING FOR AIR TRAFFIC SERVICES

#### **REASON:**

The purpose of this Safety Decision is to:

- ensure civil aviation regulations are adhered to when unauthorised aircraft, either reported or observed, affect aircraft safety, security and efficiency in controlled airspace, and
- provide decisions, recommendations and guidance on contingency measures to be implemented by ATS Units to tactically manage the risk to safety to an acceptable level, while limiting restrictions to other air traffic.

In the context of this document, the term 'unauthorised aircraft' will be used as a generic term to encompass unknown or unidentified aircraft in controlled airspace, whether manned or unmanned, remotely piloted or autonomous.

The penetration by an unauthorised aircraft into a portion of controlled airspace without prior permission from the air traffic services provider may result in multiple safety, efficiency, environmental and security risk concerns. Such infringements:

- are hazardous to other airspace users;
- may immediately result in a significant increase in Pilot's, ATCO's and Supervisor's workload such as, coordination, the need to break-off an approach, change aircraft sequence for landing or implement other contingency measures, etc.;

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<sup>1</sup> This term *encompasses unknown or unidentified aircraft in controlled airspace, whether manned or unmanned, remotely piloted or autonomous.*



- may increase the risk to operational safety of other aircraft through unexpected extended airborne delays, diversions and increased likelihood of fuel emergencies;
- may cause an unacceptable cost to industry, due to numerous delays and diversions incurred through closures of or restrictions placed on airports and airspace;
- may pose a significant threat to national security since such unauthorised flights will not be under normal communications and surveillance;
- may have adverse environmental impacts through increased emissions caused by resultant delays to other air traffic.

Consequently, the development and implementation of comprehensive contingency measures, where the risk is tactically analysed and assessed through collaborative decision-making processes between ATC Management, SUPs, ATCOs and other relevant personnel and stakeholders, should manage the safety and security risks to an acceptable level, while minimising the impact on normal operations by unauthorised aircraft.

Any deviation from GCAA regulatory requirements is considered a violation of UAE Civil Aviation Law and UAE National Civil Aviation Regulation with direct safety and security risk implications.

The reason of this issue 02 is to incorporate guidance material which has been developed in consultation with Air Navigation Service Providers (ANSPs). The guidance material is hereafter attached as Appendix A

#### REQUIREMENTS:

##### REQUIREMENT No. SD 2016-16(01):

*ATSUs shall develop, establish, implement and maintain an SMS to ensure:*

- hazard identification is pro-actively conducted to prevent from airspace penetration by an unauthorised aircraft (e.g. UAS); and*
- risk mitigation activities are effectively performed to assure safe continuity and adaptability of service provisions with, if the situation deems it necessary, the deployment of the contingency plan that includes a **tactical risk assessment process** when the airspace is in the presence of unauthorised aircraft. The contingency plan shall be activated or de-activated in a timely manner.*
- appropriate and effective coordination with associated Aerodrome(s), surrounding and adjacent ATSUs and local appropriate authorities, as applicable while carrying out activities specified in a) and b) above.*

##### REQUIREMENT No. SD 2016-16(02):

*The **tactical risk assessment process** required by paragraph 1)b) above shall be documented and implemented to determine the appropriate actions to be taken in the event of airspace infringement which shall include the following requirements:*

- obtain as much information as possible of the induced hazard from any source;*



- b) *warn other aircraft of the induced hazard through the passing of essential traffic information; and*
- c) *determine if any restrictions are necessary within the airspace, airways or aerodromes following the report or observation of the airspace infringement.*

**GUIDANCE TO REQUIREMENT No. SD 2016-16(02)a):**

*The following “aide-memoire” may facilitate the collection of such information:*

- a) *An accurate position/location of the reported unauthorised aircraft is provided;*
- b) *Was the unauthorised aircraft stationary or moving? If moving, what was the observed direction and if possible provide an approximate speed?*
- c) *At what altitude was the unauthorised aircraft operating? Was it maintaining level flight, or climbing/descending?*
- d) *What is the type of aircraft? Is it manned, unmanned, fixed wing, quad copter, gyrocopter, etc.*
- e) *For an Unnamed Aircraft System (UAS), was the location of the UAS operator observed by the reporting source?*
- f) *Any other question relevant to the situation at that time, which may assist in assessing the risk to safety and or security.*

**REQUIREMENT No. SD 2016-16(03):**

*Compliance with paragraphs 1) a) and 1) b) shall, in particular, require ATSU's to provide SUPs and ATCOs with:*

- a) *solid knowledge of the federal regulatory requirements for Light Sport Aircraft and Unmanned Aircraft System (UAS) operations promulgated by the GCAA;*
- b) *adequate instructions to ensure they can:*
  - 1) *direct requests for intended UAS operations affecting their airspace to the GCAA;*
  - 2) *deny access to their airspace to any UAS operation unless the individual or organisation operating the UAS can provide a copy of the approval issued by the GCAA. Regulatory requirements and/or approvals established by other aviation authorities than GCAA are insufficient; and*
  - 3) *reference UAS flying zone maps published by GCAA (refer [www.gcaa.gov.ae](http://www.gcaa.gov.ae)). The use of any UAS flying zone maps or publications not published by the GCAA is illegal according to Civil Aviation Law Article 20 of the Federal Act 20 of 1991; and*
- c) *adequate training, instructions and guidance for the recognition of unlawful interference with an aircraft through a tactical risk assessment and the management of unauthorised aircraft operations in their airspace.*

**GUIDANCE TO REQUIREMENT No SD 2016-16(03)c):**

*Such procedures, instructions and guidance should ensure that all hazards, risks and mitigations will be appropriately and tactically assessed. Decision may include any safety and security measures involving*



*aerodrome and airspace restrictions, and appropriate involvement with police, military and other security authorities.*

**REQUIREMENT No. SD 2016-16(04):**

*When ATSU's become aware of an unauthorised aircraft in their airspace, they shall immediately:*

- a) *commence providing traffic information to other aircraft about the hazard posed by the unauthorised aircraft irrespective of how little information may be known (CAR VIII Subpart 4, 4.2.7.(b).8 refers). This essential traffic information shall continue for a period of no less than 60 minutes, unless it can be confirmed the unauthorised aircraft has vacated the airspace before this time;*
- b) *ensure that its ATS personnel has executed a tactical risk assessment with the aim to determine if a hazardous area needs to be established to protect other traffic;*
- c) *once the extent of the hazardous area has been determined, analyse the threat to other aircraft operations using all information available at that point in time in order to determine appropriate mitigations. Such mitigations may include but are not limited to:*
  - 1) *Advise aircraft in the vicinity of the unauthorised aircraft operation by passing essential traffic information (as appropriate) and advise aircraft to take avoiding action if necessary.*
  - 2) *Allow operation of active runways to continue:*
    - i) *with mitigation and caution after careful analysis of all available information even if the position of the unauthorised aircraft may be deemed sufficiently far from the active runway.*
    - ii) *If information received provides reasonable assurance that the unauthorised aircraft is not a threat to other aircraft;*
  - 3) *Consider sterilising the identified hazardous area, with the exception of the police or military aircraft which are tasked with intercepting or shadowing the unknown or unidentified aircraft.*
  - 4) *Consider changing runway direction, or restricting runway operations if the unauthorised aircraft affects the departure climb-out area, final approach for arrivals or other traffic in the vicinity of the aerodrome;*
  - 5) *Alert aircraft operating in Class G airspace if appropriate.*
- d) *inform the appropriate authorities including police, military and other security authorities as per the locally agreed procedures. Those procedures must be reviewed and practiced (for effectiveness check) at least annually, through an exercise or live event which is subject to a documented debrief review;*
- e) *endeavour to identify the aircraft by:*





- 1) *attempting to establish two-way communication with the concerned aircraft or to obtain information from other aircraft in the area;*
- 2) *inquiring other ATSUs within the FIR or ATSUs serving the adjacent FIRs about the concerned aircraft and requesting their assistance in establishing two-way communication with it;*
- f) *promptly notify the GCAA Duty Investigator (Mobile: 050 641 4667); and*
- g) *submit a ROSI within 3 hours from the time of the occurrence.*

**GUIDANCE TO REQUIREMENT No. SD 2016-16(04)a):**

*In some circumstances an ATIS broadcast associated with the airspace concerned may be sufficient to provide traffic information.*

**GUIDANCE TO REQUIREMENT No. SD 2016-16(04)b):**

*The extent of this area should be based on information derived from the reporter, such as the aircraft type, size, speed, general performance characteristics and fuel source. It may be necessary to extend this area if the intruder cannot be identified for an extended period.*

*Based on the Table 1 below, as the common types of UAS normally operate within a localized area, within Line of Sight of the operator, a reasonable assumption may be made that the UAS operation will normally be contained within approximately a 1 nm radius of the reported position of the drone.*

*To assist SUPs and ATCOs in conducting the tactical risk assessment a list of common UAS/ Drone types and performance characteristics should be provided to assist decision makers in this process. Where used, this list should be kept updated by ATSUs to reflect current technology and known new types of UAS/ Drones available.*



Table 1:

From sources available as of October 2016 the following table gives an example of UAS types commonly operated in UAE and their performance characteristics.

Manufacturer	Model	Type	Weight	Max Speed Knots	Max Service Ceiling Ft	Duration Min
DJI	Phantom	Quadcopter	1.2Kg	30	20,000	25
DJI	Phantom 4	Quadcopter	1.2Kg	40	20,000	30
DJI	Inspire 2	Quadcopter	1.9Kg	60	14,000	27
DJI	Mavic	Quadcopter	700g	35	16,000	27
DJI	Matrice	Hexacopter	4.0Kg	45	15,000	30
Parrot	Bebop	Quadcopter	1Kg	20	1,000	25
Parrot	Disco	Fixed Wing	1Kg	40	1,000	40
Parrot	AR Drone	Quadcopter	1Kg	20	4,000	15
Yuneec	Typhoon	Quadcopter	1.3 Kg	20	5,000	25
Aibotix	X6	Hexacopter	4 Kg	20	10,000	30
Sensefly	eBee	Fixed Wing	700g	48	4,000	50
Asctec	Falcon 8	Hexacopter	2 KG	30	3,000	22
Microdrones	MD4	Quadcopter	1.1 Kg	25	3,000	25
Aeryon	Skyranger	Quadcopter	2.4 Kg	20	500	10
Lockheed Martin	indago	Quadcopter	2 Kg	35	500	40



**GUIDANCE TO REQUIREMENT No. SD 2016-16(04)c):**

*Based on the performance characteristics of common UAS types, as contained in Table 1, it can be expected that the average maximum flight duration of an UAS intruder may not exceed 30 minutes. Therefore, following a period of no less than 30 minutes from the last report of the unauthorised aircraft, restrictions relating to the identified hazardous area may be relaxed.*

*Note: If reports indicate that the unauthorised aircraft has a higher performance characteristic than usual, then the above time periods should be adjusted accordingly.*

*The attached Appendix A is to assist ATSU's in developing processes to achieve the intent of this SD. The template provided is for guidance only and should be adapted by local units to suit their circumstances.*

**CONTACT:**

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## APPENDIX A

### Guidance Material for the Tactical Risk Assessment of Unauthorised Aircraft within Controlled Airspace

This tactical risk assessment template should be adapted by ANSPs to incorporate relevant local procedures, and be accompanied by supporting documentation as deemed appropriate.

**Note:**

*In the context of this document, the term 'unauthorised aircraft' will be used as a generic term to encompass unknown or unidentified aircraft in controlled airspace, whether manned or unmanned, remotely piloted or autonomous.*

No.	ACTIONS TAKEN	DONE	COMMENTS
	<b>INITIAL ACTIONS</b>		
1.	ATC to pass essential traffic information to other aircraft that may be affected by the Unauthorised Aircraft.		
2.	Confirm there is no approval for the intended operations affecting <b>Name of the ATC Unit</b> CTR/CTA.		
<b>Note 1: Deny access to <b>Name of the ATC Unit</b> CTA/CTR to any UAS operation unless the individual or organisation operating UAV can provide a copy of the approval issued by GCAA.</b>			
3.	<b>REPORTED INFORMATION</b>		
3.1	Identifier of the reporter (aircraft/person etc.)		
3.2	Time of initial report		
3.3	<b>LOCATION</b>		
3.3.1	Is an accurate position/location of the unauthorised aircraft provided/available?		
3.3.2	Was the unauthorised aircraft stationary or moving?		
3.3.3	Direction of flight		
3.3.4	Approximate speed		
3.3.5	Altitude		
3.3.6	Maintaining level flight/ Climbing/ Descending?		
3.4	<b>AIRCRAFT/OBJECT DESCRIPTION</b>		
3.4.1	What is the type?		
3.4.2a	➤ Is it manned?		
3.4.2b	➤ Is it unmanned?		
3.4.3	➤ Fixed Wing? Multi-rotor?		
3.4.4	➤ Gyrocopter?		
3.4.5	➤ Other?		
3.4.6	➤ Model (If known)		
3.4.7	➤ Size		



3.4.8	➤ Colour		
3.4.9	➤ Fuel Source		
3.5	For RPAS (drone) is the location of RPAS operator observed by reporting source?		
<i>Note 2: Common types of RPAS normally operate within a localized area, within line of sight of the operator. A reasonable assumption may be made that the UAS operation will normally be contained within approx. a 1 NM Radius of the reported position.</i>			
<i>Note 3: Based on performance characteristics of common UAS types, it can be expected that the average maximum flight duration of an UAS may not exceed 30 minutes.</i>			

4	Complete the local call out checklist		
5	Is airspace surrounding the Unauthorised Aircraft being sterilized? (if so, size of sterilisation area should be considered to be expanded with increased speed and/or unpredictable behaviour of Unauthorised Aircraft.)		
<i>Note 4:</i>			
<ul style="list-style-type: none"> <li>- Consider suspending runway operations at <b>Name of the ATC unit</b> if the Unauthorised Aircraft is within an area banded <b>XXXXXXXXXXXXXXXXXX</b>.</li> <li>- Consider suspending departures if the Unauthorised Aircraft is within the <b>XXXXXXX</b> area.</li> <li>- Consider suspending arrivals if the Unauthorised Aircraft is located within <b>XNM</b> of the extended centreline on final approach and within <b>X NM</b> from touchdown for <b>RWYXXXXXX</b> and <b>RWY XXXXXX</b>.</li> </ul>			
<i>Note 5: Runway operations may continue if information received provides reasonable assurance that the Unauthorised Aircraft is not a threat to aircraft. Essential Traffic information shall be passed in all cases.</i>			
6	➤ Notification list		
	➤ GCAA Duty Investigator		
7	Alert and inform appropriate Sectors and adjacent ATSU's if deemed appropriate		
8	Limit number of aircraft within <b>name of the ATC unit</b> CTA/CTR if deemed appropriate.		
9	Submit ROSI within 3 hours		

#### Additional Information Required:

1.	Who reported the Unauthorised Aircraft.		
	➤ Operator/Callsign/ Name		
	➤ Any additional information available (Contact details)		
	➤ Weather data		
2.	Was assistance provided by available police/military aircraft to assess the situation?		
3.	Inform all concerned when normal operations resume.		





## SAFETY ALERT 04/2016

Issued: 29<sup>th</sup> June 2016

### SUBJECT:

Contingency measures for unauthorised UAS operation or unknown/unidentified aircraft within controlled airspace.

### REFERENCE PUBLICATION:

CAR PART II Chapter 10  
CAR Part VIII, Subpart 4  
CAR Part VIII, Subpart 10  
GM 03 CONTINGENCY PLANNING FOR AIR TRAFFIC SERVICES

### CATEGORY:

Attention and Recommendation

### REASON:

The purpose of this Safety Alert is to:

- ensure civil aviation regulations are adhered to when unauthorised UAS operation or unknown/unidentified aircraft, either reported or observed, affect aircraft safety in controlled airspace, and
- provide recommendation and guidance on contingency measures to be implemented.

### APPLICABILITY:

- UAE Air Traffic Services Units (ATSU)
- Air Traffic Controller Supervisors (SUP)
- Air Traffic Controllers (ATCOs)

### DESCRIPTION:

The penetration by a manned or unmanned aircraft into a portion of controlled airspace without prior permission from the air traffic services provider may result in multiple safety, efficiency, environmental and security risk concerns. Such infringements:

- are potentially hazardous to other airspace users;
- may immediately result in a significant increase in ATCO's and Supervisor's workload such as coordination, the need to break-off an approach, change aircraft sequence for landing or implement other contingency measures, etc.;
- may cause an unacceptable cost to industry, incurred through closures of airports and airspace due to numerous delays and diversions; and
- may pose a significant threat to national security since such flights will not be under normal communications and surveillance.



Consequently, the development and implementation of comprehensive contingency measures, which as a minimum are analysed and assessed through collaborative decision-making processes between ATC Management, Supervisors, ATCOs and other relevant personnel, should minimise interference by unknown or unidentified aircraft operations with the normal operations.

Any deviation from GCAA regulatory requirements is considered a violation of UAE Civil Aviation Law and UAE National Civil Aviation Regulation with direct safety and security risk implications.

#### **RECOMMENDATIONS:**

##### Recommendation 1:

ATSUs should review contingency plans to ensure safe and orderly flow of traffic in the event of a disruption of an air traffic control service or a related support service due to airspace penetration by an unauthorised UAS operation or, an unknown or unidentified aircraft. The contingency plan should include the eventuality of closure or restrictions of airspace, airways or aerodromes following the report of such type of infringement.

##### Recommendation 2:

The ATSU should review current procedures for ATC Supervisors and ATCOs to ensure that they have been provided with adequate instructions, training (including awareness training of the GCAA regulatory requirements for Light Sport Aircraft and UAS Operations as per civil aviation regulations) and guidance for the management of authorised or unauthorised and unknown or unidentified aircraft operations and recognition of any indication of situations of unlawful interference with an aircraft. Such instructions and guidance should ensure that all hazards, risks and mitigations have been assessed appropriately and they may include any safety and security measures involving aerodrome and airspace availability, and appropriate involvement with police, military and other security authorities.

Procedures should ensure that as much information as possible is obtained from any reporting source. The following “aide-memoire” may facilitate the collection of such information:

- a) Ensure that exact position/location of the reported aircraft/UAS is provided;
- b) Was the aircraft/UAS stationary or moving? If moving, could this be best described as fast/slow or is it possible to provide an approximate speed?
- c) If moving, what was the observed direction of flight?
- d) At what altitude was the aircraft/UAS operating? Was it maintaining level flight, or climbing/descending?
- e) Are you able to identify the type?
- f) What size and colour was the aircraft/UAS? Was there any distinctive markings?
- g) What is the location of the UAS operator if observed by the reporting source?
- h) Any other question relevant to the situation at that time.





**Recommendation 3:**

An unauthorised UAS operation, or an unknown or unidentified aircraft which causes an unsafe situation is considered a serious incident with safety and security implications. ATSUs shall establish and implement a procedure to ensure:

- prompt notification to the GCAA Duty Investigator (Mobile: 050 641 4667); and
- a ROSI is submitted within 3 hours from the time of the occurrence.

**Recommendation 4:**

As soon as an ATSU becomes aware of an unauthorised UAS operation, or an unknown or unidentified aircraft in its airspace, the ATSU should endeavour to establish the identity of the aircraft whenever this is necessary for the provision of ATS or required by the appropriate military authorities in accordance with locally agreed procedures.

The following steps may assist an ATSU to identify the aircraft:

- a) attempt to establish two-way communication with the aircraft;
- b) inquire of other ATSUs within the FIR about the flight and request their assistance in establishing two-way communication with the aircraft;
- c) inquire of ATSUs serving the adjacent FIRs about the flight and request their assistance in establishing two-way communication with the aircraft;
- d) attempt to obtain information from other aircraft in the area.

**Recommendation 5:**

ATSUs should immediately inform, in accordance with locally agreed procedures, the appropriate authority including police, military and other security authorities, if an unauthorised UAS operation or an unknown or unidentified aircraft may be the subject of unlawful interference.

**Recommendation 6:**

ATSUs should apply separation between identified aircraft and unauthorised UAS operations or an unknown or unidentified aircraft observed, and provide avoiding instructions. If the unauthorised or the unknown or unidentified aircraft operations cannot be observed by the ATSU, the ATSU must temporarily create a segregated airspace around the affected area(s) and provide the applicable separation minima to such airspace boundary.

In addition to completing a call-out list, the ATSU should analyse the threat to other aircraft operations using the information available at that point in time. The below list of actions may assist in resolving such situations:

- a) Stop departures;
- b) Airborne aircraft should avoid the affected area;
- c) Attempt to establish two-way radio communication with the unknown or unidentified aircraft, e.g. relevant frequencies and 121.5 MHz;



- d) Notify other ATSUs, police, military and other security authorities and request their assistance in establishing radio contact with the unknown or unidentified aircraft and determining the aircraft's position, altitude, description (type, colour, markings, etc.), route and intentions;
- e) Immediately inform affected ATSUs, police, military and other security authorities, Emirates ACC Supervisor, GCAA Duty Investigator and others as appropriate, if unable to establish radio contact with the unknown or unidentified aircraft and/or if radar identity cannot be established and/or the aircraft is suspected or known to be subject to unlawful interference;
- f) Military and other security authorities may determine that it is required to intercept or shadow unknown/unidentified aircraft (and possibly UAS operations), which would provide a high level of assurance on its position if this event continues for an extended period of time;
- g) Sterilise the airspace surrounding the unknown or unidentified aircraft, with the exception of a military aircraft which is intercepting or shadowing the unknown or unidentified aircraft. Consider the speed/altitude/routing when determining the size of the sterilisation area to be put in place. Increased separation from the sterilisation area should be established;
- h) Cease runway operations if unauthorised UAS operations or an unknown or unidentified aircraft affects the departure climb-out area, final approach for arrivals or other traffic in the vicinity of the aerodrome;
- i) Allow operation of active runways to continue:
  - i. with mitigation and caution after careful analysis of all available information even if the position of the unauthorised UAS operations or an unknown or unidentified aircraft may be deemed sufficiently far from the active runway. Note: ATC may consider changing runway direction; or
  - ii. if information received provides reasonable assurance that the unauthorised UAS operations or an unknown or unidentified aircraft is not a threat to other aircraft;
  - iii. continue monitoring of the situation until information has been received that it has been resolved.
- j) Advise aircraft in the vicinity of the unauthorised UAS operation or an unknown or unidentified aircraft by passing essential traffic information (as appropriate) and instruct aircraft to take avoiding action if necessary;
- k) Request any aircraft having visual contact with the unauthorised UAS operation (this can potentially identify the location of the UAS operator) or an unknown or unidentified aircraft to assist in providing further information to manage the situation;
- l) If deemed appropriate limit the number of aircraft within the area of responsibility, e.g. CTA/CTR. Coordinate alternative procedures as necessary;
- m) Alert aircraft operating in Class G airspace if appropriate.



**Recommendation 7:**

ATSUs should establish and implement processes and procedures to:

- ensure ATS personnel are trained in the promulgated federal rules prescribing UAS operations in the UAE; and
- instruct ATS personnel to:
  - direct requests for intended UAS operations affecting the ATCU's airspace to the GCAA;
  - deny approval, accept approval, or provide no objection for UAS operations without first obtaining relevant UAS Operational Approval from the GCAA;
  - deny access to ATCU's airspace to any UAS operation unless the individual or organisation operating the UAS holds an approval issued by the GCAA. Regulatory requirements and/or approvals established by other aviation authorities are insufficient; and
  - reference UAS flying zone maps published by GCAA only (refer [www.gcaa.gov.ae](http://www.gcaa.gov.ae)). The use of any UAS flying zone maps or publications not published by the GCAA is illegal according to Civil Aviation Law Article 20 of the Federal Act 20 of 1991.

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