



ICAO

**EIGHTH MEETING OF THE ASIA PACIFIC ACCIDENT
INVESTIGATION GROUP (APAC-AIG/8)**

(Wednesday, 21 October 2020 on Virtual Platform)

Agenda Item 3: Update on ICAO AIG-Related Requirements and Activities

SURVEY ON SMALL UAS INVESTIGATION

(Presented by Japan)

SUMMARY

This paper presents a brief description of a survey conducted by Japan Transport Safety Board (JTSB) on the status of investigation for accident or incident involving small unmanned aircraft system, and provides information collected from several investigative authorities in response to the survey.

Action by the meeting is in Paragraph 3.

1. INTRODUCTION

1.1 The small unmanned aircraft system (UAS) has ushered in what we call “industry revolution in the sky”, opening up new opportunities through the utilization of small UAS. Small UAS has already been used for a wide range of applications such as aerial photography, pesticide spraying and infrastructure inspection. The usage of small UAS is expected to expand further into various fields like package delivery, patrol service and surveillance for agricultural management. There are expectations for small UAS as a tool for solving social challenges, e.g., labor shortage and aging society with fewer children, and for creating new added value.

1.2 In Japan, the comprehensive discussion toward further expansion of its utilization has been held by the government together with the private sector entities in order to establish an environment progressively from the perspective of technology and regulatory framework, aiming for small UAS operation over populated area beyond visual line of sight without visual observer in the target period of 2022.

1.3 Currently, the Japan Civil Aviation Bureau sets the rule for small UAS weighing 200 grams or more. Any person who intends to fly small UAS around airports, in airspace at or above 150m, or above densely inhabited districts is required to obtain permission. In addition, any person who intends to fly small UAS at night, beyond visual line of sight or at event sites, or for the purpose of transporting hazardous material or dropping off objects from small UAS is required to obtain approval. The owner is to be required to register detailed information about their small UAS.

1.4 In fiscal 2019, the number of permission and approval for small UAS operation reached around 50,000, nearly five times as much as the number in fiscal 2016. As the operation grows rapidly, the occurrences associated with these operations such as incursion into the airspace around the airport and minor injuries to people on the ground are increasing year by year.

1.5 At present, small UAS related accident or incident is not subjected to the investigation by JTSB in Japan. Given the expansion of small UAS operations such as those beyond visual line of sight without visual observer, JTSB acknowledges that small UAS needs to be considered as the subject of the investigation conducted by JTSB. With a view of better understanding the investigation in other investigative authorities and using as a reference to study the regulatory framework of small UAS investigation, JTSB conducted a survey on the status of investigation for small UAS with the cooperation of several selected investigative authorities.

2. DISCUSSION

2.1 In ICAO, the current scope of remotely piloted aircraft system (RPAS) considered for SARP's development by the RPAS Panel or other panels is limited to RPAS operating internationally within controlled airspace under instrumental flight rules (IFR) in non-segregated airspace or at aerodromes. This scope does not necessarily include small UAS operation outside the controlled airspace.

2.2 The amendment to Annex 13 has already been adopted to expand the definition of accidents and serious incidents to include UAS related accidents and serious incidents. Note 3 of 5.1.2 to Annex 13 states that "in the case of investigation of an unmanned aircraft system, only aircraft with a design and/or operational approval are to be considered", which provides flexibility for cases where an individual investigative authority decides to investigate an occurrence involving small UAS.

2.3 With a view of better understanding the investigation in other investigative authorities and using as a reference to study the regulatory framework of small UAS investigation, JTSB decided to conduct a survey related to the investigation for small UAS in other investigative authorities, mainly focusing on the criteria for determining whether specific occurrence involving small UAS are to be investigated.

2.4 JTSB recently sent a survey to several investigative authorities, requesting responses to a series of questions related to small UAS investigation. A questionnaire is provided in Attachment A. The survey has completed with the great cooperation of these investigative authorities. The outcome of the survey is outlined in Attachment B.

2.5 Follow-up enquiries has been made to clarify information as part of the survey. Review of the responses is underway and many details have to be carefully considered. Having said that, the preliminary comparative analysis of the outcome of the survey found that similarity and difference exists in these authorities' approach to small UAS investigation. Certain commentary may be made as follows.

- a) A majority has the regulation or policy to investigate occurrence involving small UAS and has an experience of the investigation for small UAS.
- b) The criteria applied to decide whether to investigate specific occurrence involving small UAS varies between the authorities. At least, small UAS related accident in which any person is fatally or seriously injured may be subjected to the investigation.
- c) Some investigative authorities have quantitative criteria such as aircraft maximum mass, which is used as a threshold when deciding whether to investigate.
- d) The level of investigation varies. Some investigative authorities apply scalable response to small UAS investigation, ranging from full investigation to record only investigation.

- e) In some investigative authorities, small UAS investigations are conducted by aircraft accident investigators who have acquired knowledge specific to small UAS. On the other hand, no special investigation equipment are used other than PC application software for small UAS.

2.6 JTSB also recognizes that a key area is the capability of small UAS investigation. Small UAS specific training may need to be developed to support this investigation.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) Take note of the results of the survey on small UAS related investigation that was conducted by JTSB
- b) Encourage to work closer to share knowledge and experience with other investigative authorities

Question Answer Sheet

Thank you very much for your cooperation.

Please answer the questions involving small unmanned aircraft except for the unmanned aircraft like the RPA that could be approved / certified by the Annex 6 / Annex 8.

For Q.2 to Q.12, it is sufficient to answer only when applicable.

Q.1 Does your authority investigate the unmanned aircraft accidents / Incidents?

Accidents	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Incidents	<input type="checkbox"/> YES	<input type="checkbox"/> NO

Q.2 If you answered YES to Q.1, when did your authority start the unmanned aircraft investigation?

Q.3 How does your authority set the criteria for determining which unmanned aircraft accident or incident is to be investigated? We would appreciate it very much if you could provide us with laws and regulations, relevant materials which could let us know about the criteria.

And please answer the following a to d.

a. Does your authority have the criteria related to the maximum mass of the unmanned aircraft (UA)?

YES NO

If you answered YES, please write down following matters in the column.

- the outline of the criteria (e.g., Limited only to the case that the maximum mass of UA is greater than specific value) ; and
- the reason that the criteria was set (e.g., It is same maximum mass as that Airworthiness certification is needed.)

b. Does your authority have the criteria related to the purpose of flight?

YES NO

If you answered YES, please write down following matters in the column.

- the outline of the criteria (e.g., Except the case in military operation; Limited only to the case in commercial operation) ; and
- the reason that the criteria was set (e.g., UA which was approved its operation is to be investigated, and the operator shall obtain operational approval to use UA in commercial.)

c. Does your authority have the criteria related to the area or operating on flight?

YES NO

If you answered YES, please write down following matters in the column.

- the outline of the criteria (e.g., Limited only to the case beyond visual line of sight) ; and
- the reason that the criteria was set (e.g., UA which was approved its operation is to be investigated, and the operator shall obtain operational approval to use UA beyond visual line of sight.)

d. Please check all classes which are investigated. If there are necessary conditions to be investigated, please write down in the column. (e.g., number of fatal or injuries, extent of damage, limited only to certain UA, etc.)

<input type="checkbox"/> Fatal	
<input type="checkbox"/> Injury	
<input type="checkbox"/> Damage to	
<input type="checkbox"/> Collision	
(UA and UA collision)	
<input type="checkbox"/> Collision	
(manned aircraft and UA collision)	
<input type="checkbox"/> Airprox	
(UA and UA near collision)	
<input type="checkbox"/> Airprox	
(manned aircraft and UA near collision)	
<input type="checkbox"/> Crash	
<input type="checkbox"/> Missing	
<input type="checkbox"/> Release of load	
<input type="checkbox"/> Fire	
<input type="checkbox"/> Serious damage to aircraft	
<input type="checkbox"/> Other	

Q.4 Does your authority have the investigation classifications for the unmanned aircraft accidents or incidents to be investigated? (e.g., those of detailed investigation including field investigation, brief investigation, or only recording facts on database) If yes, please write down the outline in the column, or attach relevant materials.

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Q.5 How many investigations on the unmanned aircraft accidents or incidents has your authority conducted for three years from 2017 to 2019? Among those investigations, how many cases are involved with manned aircraft?

(e.g., in 2017, three cases accidents, five cases serious incidents, one case involving manned aircraft accident)

Q.6 From among those unmanned aircraft accidents or incidents to be investigated, is there any case that falls under the following items from a to d? Please check YES or NO.

And if you answered YES, please write down the total number of conducted for three years from 2017 to 2019.

(a) Has your authority forwarded a notification of the accidents or incidents to the State of Manufacture or Design as the State of Occurrence?

YES NO

If you answered YES, please write the total number for three years ()

(b) Has any other state authority participated in the investigation carried out by your authority?

YES NO

If you answered YES, please write the total number for three years ()

(c) Has your authority participated in the investigation conducted by other state?

YES NO

If you answered YES, please write the total number for three years ()

(d) Has your authority has issued safety recommendations?

YES NO

If you answered YES, please write the total number for three years ()

Q.7 Please provide us with a typical example of the unmanned aircraft accident investigation reports, if your authority has. (Or if it is published on the website, please paste the link for access to it.)

Q.8 Concerning Q.3, are there any issues which your authority is currently studying or planning to revise the criteria in future? If yes, please write down the outline in a column, or attach relevant materials.

(e.g., Our organization has decided to expand the scope of accidents or incidents to be investigated by 2022.)

Q.9 Concerning your investigators for the unmanned aircraft accidents or incidents, please let us know about the following a to c, (please write down the outline in the column, or attach relevant materials.)

(a) Required skills, qualifications or experience of the investigators

**(b) Number of the investigators specializing in unmanned aircraft; and
Average number of the investigators involved in the investigation of one unmanned aircraft accident or incident**

(c) Outline of the education and training for investigators

Q.10 Does your authority have any investigation tools or equipment peculiar to unmanned aircraft accidents or incidents investigations which are not used in manned aircraft accidents or incidents investigations?

If yes, please provide us with the relevant materials on how they are.

Q.11 Concerning the following items, a to i, please check YES or NO that the state administrative authority have safety regulations on the unmanned aircraft.

Items	YES	NO
a. Does the state authority approve the unmanned aircraft flying over urban area (populated area) beyond visual line of sight?	<input type="checkbox"/>	<input type="checkbox"/>
b. Does the state authority has registration system?	<input type="checkbox"/>	<input type="checkbox"/>
c. Does the state authority has aircraft airworthiness certification system? (Adequacy of daily maintenance)	<input type="checkbox"/>	<input type="checkbox"/>
d. Does the state authority has aircraft type approval/certification system? (Compliance of safety regulation)	<input type="checkbox"/>	<input type="checkbox"/>
e. Does the state authority has obligation to install Flight Data Recorder on unmanned aircraft? If yes, please write the device type ()	<input type="checkbox"/>	<input type="checkbox"/>
f. Does the state authority has operating pilot's license/competence certification system?	<input type="checkbox"/>	<input type="checkbox"/>
g. Does the state authority has license system for business using unmanned aircraft? (e.g., cargo transport, agrochemical spraying, surveying, patrol, etc)	<input type="checkbox"/>	<input type="checkbox"/>
h. Does the state authority has certification system of educational training organizations for unmanned aircraft operating pilots?	<input type="checkbox"/>	<input type="checkbox"/>
i. Does the state authority has certification system of operation / traffic management system?	<input type="checkbox"/>	<input type="checkbox"/>

If yes, please attach the relevant materials.

Q.12 Concerning the answers of Q.1 to Q.11, although we will use them for our considering on the inside, if there are information which JTSB shall not disclose, please let us know concrete parts of those information.

Organization		AAIB	ARAIB	ATSB	BEA	NTSB	TSB	TSIB	
1	Small UA investigation	Accidents	Yes	Yes	Yes	Yes	Yes	Yes	
2		Incidents	Yes	No	No	Yes	Yes	Yes	
3	When the Investigation started		Jan-15	2006	14-Sep-13	2016	2010	2010	Aug-10
4	Criteria for UA investigation	Maximum mass	<p>The AAIB follow a decision flowchart to determine the course of action required. (See Appendix 1)</p> <p>1. Under Aviation Safety Act of Korea, Unmanned Aircraft Systems(UAS) is categorized into the following types: powered UAS and unmanned airship . - Powered UAS: Unmanned aircraft, unmanned helicopter or unmanned multicopter less than 150kg(basic empty weight) except fuel weight - Unmanned airship: Umanned airship Less than 180kg(basic empty weight) except fuel weight and a length of 20meters or less 2. For UAS which exceeds the above mentioned criteria, ARAIB considers it the same as aircraft. 3. In order to ooperate unmanned aircraft(UA), airworthiness certificate must be obtained same as aircraft. In case powered UAS exceeds a maximum of 25kg(12 kg for airship), safety certification must be obtained.</p>	None	<p>Preliminary information</p> <p>The BEA is also in the process of formalizing its policy for handling UAV accidents/incidents. The criteria mentioned below are currently being evaluated and are likely to evolve.</p> <p>European regulation (EU) 996/2010, which governs safety investigations, leaves the choice of whether or not to conduct investigations into accidents/incidents involving UAVs to the initiative of the national safety investigation authorities.</p> <p>From the time being, UAV activity is governed by national regulations, which in France include criteria based on mass and type of operations.</p> <p>As of January 1, 2021, European regulations (EU) 2019/945 and (EU) 2019/947 will come into force. In these regulations the distinction is made according to the level of risk (UAV mass and safety functions, people proximity, operator in view of the UAV or not...). Based on these criteria, operator will have to obtain approval from the national regulation or not. The need for an approbation, together with the confirmed or possible injuries will be the main criteria for us to decide weather to investigate or not.</p>	Currently we exempt drones with mass <300 lbs that do not cause serious injury or fatality.	<p>Criteria: TSB has taken the position that RPAS occurrences are reportable to the TSB when above 25 KG; a person is killed or sustains a serious injury as a result of coming into direct contact with any part of a small RPAS (250 g to 25 KG) and a collision occurs between an RPAS of any size or weight and another manned aircraft. TSB evaluates each reportable occurrence individually and determines if an investigation shall be conducted and what class of investigation should be assigned by doing a assessment. The following questions are used in the occurrence classification to assess the probability of adverse consequences arising in similar occurrences in the future:</p> <ul style="list-style-type: none"> • Is there a history of occurrences like this one or is this an isolated occurrence? • Are there any apparent links to TSB Watchlist issues? • Are there any apparent links to outstanding TSB recommendations, safety concerns or emerging issues being monitored by the mode? • How much equipment, systems or infrastructure might have similar issues? • How many operating or maintenance personnel are following or are subject to the practices or procedures in question? • How frequently are the procedures, practices, and equipment in question used? • Are there underlying organizational, management, or regulatory issues that constitute systemic hazards posing a threat to public safety? <p>. Reason why that criteria was set: 01 June 2019, Transport Canada(TC) has enacted new rules in the Canadian Aviation Regulations (CARs) regarding small RPAS. TSB set these criteria at the same time than the new rules went out.</p>	<p>The decision to investigate is not based on maximum mass. Currently, the TSIB only investigates occurrences involving UAV operated by operator with Operator Permit or activity permit issued by the Civil Aviation Authority of Singapore (CAAS). The UAV can be of any weight.</p>	

Organization		AAIB	ARAIB	ATSB	BEA	NTSB	TSB	TSIB	
5	Criteria for UA investigation	Purpose of flight	<p>Primarily the AAIB investigate accidents and incidents to UAS operating under UK CAA permissions although we will carry out investigations involving "hobbyists" The AAIB would not normally investigate accidents or incidents solely involving military UAS'</p>	<p>Unmanned aircraft system(UAS) in military operations does not fall under Aviation Safety Act. Civilian use of unmanned aircraft system(UAS weighing more than 150kg) is only allowed for research and development, which requires permission. There is no UA which has been operated for commercial purpose so far. However, in some cases, UAS has been operated for commercial purpose (limited to pesticide spraying and aerial photography and etc.)</p>	<p>None</p>	<p>Yes it is a criteria according to the current national regulation. Formally, it won't be a criteria anymore in the framework of the UAV EU regulation. However, we can imagine that it will remain a criteria (professional or not) for our investigation process. One reason is that non-professional operators will mainly be unapproved operators to whom it is difficult to disseminate the safety lessons learned from investigations</p>	<p>We do not investigate drone used solely for hobby or recreational purposes regardless of damage or injury.</p>	<p>The purpose of flight is one of the questions we take into account when assessing the severity of the consequences of the occurrence. In assessing the severity of the consequences of the occurrence, consideration is given to the following:</p> <ul style="list-style-type: none"> • Did the occurrence involve commercial or private transportation? • How many lives were at risk? Were the persons at risk fare-paying passengers, transportation employees, bystanders, or the general public? • What might be the extent of other property damage? Is there direct property loss to the operator, damage to adjacent infrastructure, or third-party collateral damage? • Will there be an environmental impact? Has there been a dangerous commodity spill or disruption of natural habitat? • What might the impact on carriers and on their and others' commercial operations be? Has the occurrence affected their viability? Has the occurrence disrupted infrastructure? Have financial markets reacted? • How are the public and media likely to interpret information about the occurrence? What might the political implications be, locally, nationally, or internationally? 	<p>TSIB does not typically investigate recreational/hobbyist UA flying. As mentioned above, the operator has to fall under the civil aviation authority's activity/operator permit scheme.</p>

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Organization		AAIB	ARAIB	ATSB	BEA	NTSB	TSB	TSIB
6	Criteria for UA investigation	Area or operating on flight	<p>The AAIB primarily investigates accidents or incidents involving UAS operating under UK CAA Permissions for Commercial Operations (PfCO), UK emergency service operations or those operating under a CAA exemption to the Air Navigation Order.</p> <p>Any person who intends to operate unmanned aircraft system(UAS) must obtain approval(under Aviation Safety Act Article 68) and must comply with the following Article 206 of Aviation Safety Act Enforcement Regulations.</p> <ol style="list-style-type: none"> 1. Unmanned aircraft system is not allowed to operate in case there is a risk to human lives or assets. 2. Unmanned aircraft system is not allowed to operate in congested areas where residential and commercial districts are concentrated and places where lots of people are gathered 3. Unmanned aircraft system is not allowed to operate in case it does not obtain approval from air traffic control authority in air traffic control airspace, restricted airspace, caution airspace under Article 78 paragraph 1. 4. Unmanned aircraft system is not allowed to operate in case it is impossible to visually identify ground objects due to fog. 5. Unmanned aircraft system is not allowed to operate in case it violates distance criteria of flight visibility and clouds in accordance with appendix 24. 6. Unmanned aircraft system is not allowed to operate during night time 7. Unmanned aircraft operators must comply with notice determined by the Minister of Land, Infrastructure and Transport. 	None	In the framework of the EU regulation, it is one of the criteria to define operations requiring approval	None	See answer line 5.	None

	Organization	AAIB	ARAIB	ATSB	BEA	NTSB	TSB	TSIB
7	Fatal	be investigated	be investigated	be investigated	be investigated	be investigated	No specification on the number of fatality and not all fatal accidents are investigated. The decision is based on the assessment of the factors to consider when classifying an occurrence.	be investigated
8	Injury	be investigated	be investigated	be investigated	be investigated	if serious injury	There is no specific number of serious injury and not all accidents with serious injuries are investigated, the decision is based on the assessment of the factors to consider when classifying an occurrence.	be investigated
9	Damage to property	be investigated	be investigated	not be investigated	not be investigated	If this means damage to the drone, then yes, if it has an airworthiness/type certificate. If this means damage only to another object, then no (unless it involves substantial damage to an aircraft, as noted below in line 18).	not be investigated	not be investigated
10	Collision (UA and UA)	be investigated	To be determined depending on each occurrence	not be investigated	not be investigated	at our discretion (unlikely, unless above circumstances occur)	not be investigated	not be investigated
11	Collision (Manned aircraft and UA)	be investigated	To be determined depending on each occurrence	be investigated	be investigated	at our discretion (very likely)	Only if it is a collision with a manned aircraft. Not all collisions with manned aircraft are investigated, the decision to investigate is based on the assessment of the occurrence.	be investigated
12	Airprox (UA and UA)	be investigated	To be determined depending on each occurrence	not be investigated	not be investigated	not be investigated	not be investigated	not be investigated
13	Airprox (Manned aircraft and UA)	be investigated	To be determined depending on each occurrence	not be investigated	be investigated	not be investigated	near collision with a manned aircraft is a criteria. Not all near collisions with manned aircraft are investigated, the decision to investigate is based on the assessment of the occurrence.	not be investigated
14	Crash	be investigated	be investigated	only larger or high powered (such as jet engine) UA models	not be investigated	not be investigated	not be investigated	be investigated
15	Missing	be investigated	be investigated	not be investigated	be investigated	not be investigated	not be investigated	not be investigated
16	Release of load	be investigated	To be determined depending on each occurrence	not be investigated	not be investigated	not be investigated	not be investigated	not be investigated
17	Fire	be investigated	To be determined depending on each occurrence	not be investigated	not be investigated	not be investigated	not be investigated	not be investigated
18	Serious damage to aircraft	be investigated	To be determined depending on each occurrence	not be investigated	not be investigated	If this means to the drone, see above line 9. If this means to the other aircraft, yes.	not be investigated	be investigated
19	Other		To be determined depending on each occurrence					

Organization	AAIB	ARAIB	ATSB	BEA	NTSB	TSB	TSIB
20 Investigation classifications	The investigation classifications for UAS accidents and incidents are the same as those for manned aircraft. E.g Field investigation, correspondance investigation via the Aircraft Accident Response Form (AARF) and a Record Only investigation (information recorded for use in a database)	N/A	all UA investigations have been done as office-based short investigations	The detailed process is under development. We plan to conduct classic investigations or simply record the events in a database. For this second point, the most likely is that we will coordinate with the DGAC (French CAA) to optimize this recording of events and avoid duplicating this task.	nothing unique for UAS investigations--our classifications are the same as for manned aircraft	TSB does not have a specific classification for unmanned aircraft. Unmanned aircraft is therefore, the classification for the unmanned aircraft is the same then the one for aircraft: https://www.tsb.gc.ca/eng/lolis-acts/evenements-occurrences.html	TSIB uses the event risk classification matrix as found in attachment C to Annex 13 for manned and unmanned aircraft to determine the classification of an occurrence and to decide if an investigation is initiated.
21 Accident Investigation results for the past 3 years	2017, 18 Investigations -13 Record Only, 5 Correspondance investigations. None involving manned aircraft, 2018, 39 investigations, 21 Record Only, 18 Correspondance investigations. None involving manned aircraft. 2019 54 investigations, 24 Record Only, 29 Correspondance investigations, 1 field investigation. None involving manned aircraft.	Unmanned aircraft system investigation was performed once in 2017 and 2019, respectively. The Status of Manned Aircraft Accidents/Serious Incidents: (5/1) in 2017, (3/1) in 2018, (5/8) in 2019	two accidents in 2017, none in 2018, one accident in 2019	2019 (UAV crash during aerial work / photography of a public event, 2 persons injured ==> classified serious incident, investigation in progress)	3 involving known collisions with manned aircraft, 3 involving likely collisions with manned aircraft. Approx 10 incidents of minor injury or other event	TSB conducted one investigation (class 3) during this period which was a collision with manned aircraft. During this period, we have four class 5 investigation which is only data gathering (no analysis).	None

Organization		AAIB	ARAIB	ATSB	BEA	NTSB	TSB	TSIB
22	Notification to the State of Manufacture/Design as the State of Occurrence	Yes	None	Yes (144)	Yes (1)	Yes (3)	None	None
23	Past 3 years of experience Participation of other state to your investigation	None	None	None	None	Yes (1)	None	None
24	Participation to the investigation of other state	None	None	None	None	Yes (2)	Yes (1)	None
25	Safety recommendation	Yes (3)	None	None	None	None	None	None
26	Typical example of the UA investigation reports	<p>https://assets.publishing.service.gov.uk/media/5f1ae9f8d3bf7f596648297e/DJI_M600_Pro_UAS_reg_na_07-20.pdf</p> <p>https://assets.publishing.service.gov.uk/media/5f1e85c0d3bf7f5969fa0f41/DJI_Matrice_M210_V2_reg_na_06-20.pdf</p> <p>https://assets.publishing.service.gov.uk/media/5d9f357d40f0b66859708649/DJI_Matrice_210_RTK_UAS_201018_11-19.pdf</p> <p>https://assets.publishing.service.gov.uk/media/5dfa44a5e5274a66f4fb5a6c/DJI_Matrice_210_UAS_registration_na_01-20.pdf</p>	We use the same format as aircraft accident investigation report.	http://www.atsb.gov.au/publications/safety-investigation-reports/?mode=Aviation&sector=Remotely%20piloted%20aircraft&initialTab=2	https://www.bea.aero/uploads/tx_elydbrapports/BEA2016-0098.pdf	For a recent example, see NTSB database at https://www.nts.gov/layouts/ntsb.aviation/index.aspx and search on DCA20IA034AB in the box for "Accident Number"	https://www.tsb.gc.ca/enq/enquetes-investigations/aviation/2017/a17q0162/a17q0162.html	None
27	Any issues which your authority is currently studying or planning to revise the criteria in future	At the moment there are no changes planned to the criteria used to determine the AAIB response to UAS accidents/incidents	N/A	We plan to update our accident and incident reporting regulations in 2021, that will limit immediately reportable matters (telephone call) involving UA to those resulting in fatal or serious injuries, and all other occurrences to be routine reportable (written report within 72 hours)	Just formalizing the process	Our change to airworthiness/type is in anticipation of delivery drone activity. We are also paying close attention to public safety operations.	Yes the TSB is planning on revising the criteria for investigating RPAS when ICAO has set the standards.	None

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Organization		AAIB	ARAIB	ATSB	BEA	NTSB	TSB	TSIB
28	Required skills, qualifications or experience of the investigators	The AAIB does not have a specialised investigator for UAS investigations although we do have a number of inspectors who act as a focal point for knowledge regarding different aspects of UAS operation including data recovery.	N/A	normal aviation investigators are used	No specific skills required to be appointed as IIC.	Currently, we have a cadre of investigators who look at UAS as a collateral duty. There is no formal required training	TSB does not have any specific requirements in regards of skill, qualifications or experience for investigators of a RPAS accidents. e	Similar as investigators for manned aircraft. TSIB has in-house training for its investigate to learn how to fly UAV for evidence collection. Through these training, the investigators learnt about the operational requirements, characteristics, behaviour, etc. of flying an UAV. For cross-country UAV, we have not had a chance to learn about them. TSIB has been trying to organise a training on investigation of UAV but has to delay due to COVID-19 situation.
29	Number of the investigators specializing in UA; and Average number of the investigators involved in the one UA investigation	To date, typically only one inspector has been involved in each UAs investigation unless there is a need for specialist data recovery and analysis which requires the specialisation of a Recorded Data Group inspector. The AAIB are currently carrying out a field investigation into a UAS accident which required the deployment of a team of three inspectors one from each of the Operations, Engineering and Recorded Data groups.	N/A	None	No specialized investigators. Please note that some of the investigators are qualified to operate UAV during on site investigations.	No investigator specializes in UAS.	None	One of our investigators had attended an investigation training on UAV at the Southern California Safety Institute and one of our investigators is a hobbyist on UAV. A total of seven investigators are undergoing UAV flying training to obtain the Operator Permit issued by the CAAS. At least one investigator will be assigned, depending of the scale of the accident or incident. The assigned investigator can source and consult with persons with relevant expertise from industry is required.
30	Outline of the education and training for investigators	No specialist training other than that normally completed by Inspectors of Air Accidents	N/A	none specific to UA	Not formalized yet but UAV topic will certainly be included in training programs of investigators in the future	Same as any air safety investigator	None	Other than the usual areas of expertise such as pilot, engineer, etc, TSIB is also looking out for, and arranging for specific training in UA investigations, particularly on cross-country UAV operations.
31	Investigation tools or equipment peculiar to UA investigations which are not used in manned aircraft investigations	The only specialist tool we currently use is DataCon, freeware that supports the download of some DJI flight logs.	N/A	None	internal specific test : battery / electrical system test / flight test to check the operation of the UAV in coordination with the manufacturer	None	None	None

	Organization	AAIB	ARAIB	ATSB	BEA	NTSB	TSB	TSIB	
32	Approval for UA flying over urban area (populated area) beyond visual line of sight	No	No	Yes	Yes	No answer	No	Yes	
33	Registration system	Yes	Yes	Yes	Yes	No answer	Yes	Yes	
34	Airworthiness certification system (Adequacy of daily maintenance)	No	Yes	No	No	No answer	No answer	Yes	
35	Aircraft type approval/certification system	Yes	Yes	No	Yes	No answer	No	No	
36	Safety regulations on the UA by the State administrative authority	Obligation to install Flight Data Recorder on UA	No	No	No	Yes	No answer	No	No
37		Operating pilot's license/competence certification system	Yes	Yes	Yes	Yes	No answer	Yes	Yes
38		License system for business using UA	Yes	Yes	Yes	Yes	No answer	No	Yes
39		Certification system of educational training organizations for UA operating pilots	Yes	Yes	No	No	No answer	No	Yes
40		Certification system of operation/traffic management system	No	Yes	No answer	No	No answer	No	No

Organization		AAIB	ARAIB	ATSB	BEA	NTSB	TSB	TSIB
<p>41 Safety regulations on the UA by the State administrative authority</p>	<p>Relevant information</p>	<p>https://www.caa.co.uk/News/New-drone-laws-come-into-effect-today-as-public-demands-regulation-increase-to-ensure-safer-flying/ https://dronesafe.uk/</p>	<p>No answer</p>	<p>https://www.casa.gov.au/drones</p>	<p>c. No (EASA is the competent authority for certification. The regulation on the certified category of operation is currently under development. It will include requirements on continuous airworthiness).</p> <p>e. Yes (Only for BVLOS operations : the UAS shall record 20 minutes of flight parameters (at least position, attitude, quality of signal))</p> <p>h. No (Any UAS operator can declare iteself as a training origanization : in that case, it shall comply with the applicable requirements. The compliance of these organizations is verified through continuous oversight)</p> <p>i. No (The European regulation on the certified category of operation and on UTM is currently under development.)</p>	<p>These actions are not part of the NTSB's jurisdiction. FAA would be the appropriate organization to respond.</p>	<p>https://tc.canada.ca/en/aviation/drone-safety/find-your-category-drone-operation#basic ; https://lois-laws.justice.gc.ca/eng/regulations/SOR-96-433/FullText.html#s-900.01</p> <p>a. Does the state authority approve unmanned aircraft flying over urban area (populated area) beyond visual line of sight? Canada does not currently allow routine BVLOS over urban areas. Operations are evaluated on a case by case basis and are approved using a Special Flight Operations Certificate (SFOC). We are however developing future regulations that will permit routine BVLOS operations but these will not address urban areas. This is considered to be the most complex environment, urban is likely to be the last type of environment included in the regulation for routine BVLOS operations.</p> <p>b. Does the state authority have a registration system? Yes, all Remotely Piloted Aircraft (RPA) between 250 g and 25 kg are required by regulation to be registered, in addition there are (SFOC) requirements for RPAS over 25kg to have a registration mark.</p> <p>c. Does the state authority have aircraft worthiness certification system? (Adequacy of daily maintenance) Currently Canada uses a manufacture' s declaration system based on the Standard 922 - RPAS Safety Assurance - Canadian Aviation Regulations (CARs).</p> <p>d. Does the state authority have aircraft type approval/certification system? (Compliance of safety regulation) Canada is not certifying RPAS yet. We are reserving certification for higher weight/risk RPAS as part of the future regulations. Currently our regulatory framework only supports manufacturer declarations for RPAS.</p> <p>e. Does state authority have an obligation to install Flight Data Recorders on unmanned aircraft? If yes, please write the device type () No, Canada does not have a regulatory requirement for flight data recorders in Remotely Piloted Aircraft Systems (RPAS) 250 g to 25 kg.</p> <p>f. Does the state authority have operating pilot' s license/competence certification system? Yes, Canada has an RPAS pilot certificate. The knowledge requirements exam is administered by the state. The practical skills (flight review) is conducted by industry. Standard 921 - Small Remotely Piloted Aircraft in Visual Line-Of-Sight (VLOS) - Canadian Aviation Regulations (CARs) covers the knowledge domains and flight review skills to be demonstrated.</p> <p>g. Does the state authority have licence system for business using unmanned aircraft? (e.g., cargo transport, agrochemical spraying, surveying, patrol, etc.) Currently for Remotely Piloted Aircraft Systems (RPAS) between 250 g and 25 kg Canada has not made a distinction between commercial use and recreational use in the regulations.</p> <p>h. Does the state authority have certification system of educational training organizations for unmanned aircraft operating pilots? Canada does not directly certify RPAS training organizations. RPAS training organizations self-declare against the published Knowledge Requirements for Pilots of Remotely Piloted Aircraft Systems 250 g up to and including 25 kg, Operating within Visual Line-of-Sight (VLOS) (TP 15263)</p> <p>i. Does the state authority have certification system of operation/traffic management system? If yes, please attach relevant materials Transport Canada is working closely with Nav Canada (who is a private, non-share capital corporation that owns and operates Canada's civil air navigation service (ANS) on behalf of the state) to help develop regulations related to the certification of traffic management system for RPAS.</p>	<p>No answer</p>

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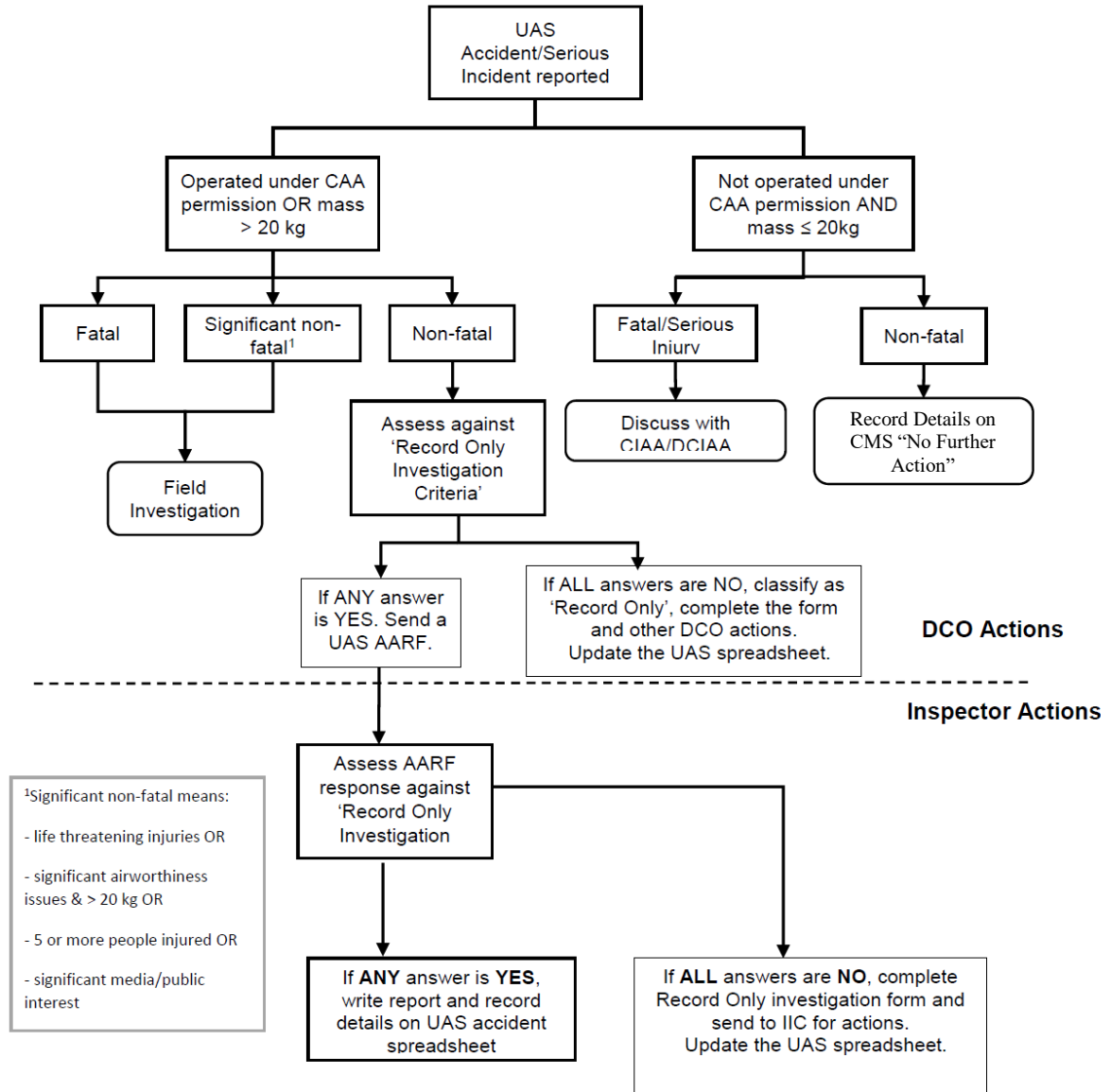


Figure 1 UAS accident decision flow chart

Note:

AARF Aircraft Accident Response Form. An investigation into an incident primarily completed through correspondence

Record Only A recording of the primary details of an incident for database and statistical purposes. Used for UAS accidents and incidents where no third-party damage was caused and where a safety investigation is not deemed appropriate

DCO AAIB Duty Coordinator

CMS AAIB Case Management System