

## UNIVERSITY OF BATH HEALTH AND SAFETY STANDARD

### Drone Operations

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Aims	<p>As the cost of Small Unmanned Aircraft Systems (AKA Drones) has decreased their use in commercial operations has become more widespread and they have also become the subject of or tools in research projects. Their safe operation is heavily dependent upon competent and skilled operators following safe systems of work.</p> <p>This standard sets out what assurances might reasonably be sought and expected from a commercial operator of Small Unmanned Aircraft before granting them permission to operate on or over University property or events. This standard also sets out what control measures might reasonably be expected for the operation of Small Unmanned Aircraft that are the subject of or a tool of academic activities.</p>				
Scope	<p>The scope of this standard is limited to the operation of Small Unmanned Aircraft Systems, either in-house as part of a research project or as part of a commercial operation conducted by a third party, over University property or University events. The commercial operation of Small Unmanned Aircraft Systems might be contracted by the University or by another party using facilities at the University of Bath.</p> <p>This standard does not include in-house flights conducted indoors. Health and safety risks arising from indoor flights can largely be controlled by using as small an unmanned aircraft as possible and limiting the range of its flight using catch nets, tethers or similar.</p>				
Aerial Relevant Legislation	<p><a href="#">Air Navigation Order 2016</a> and Civil Aviation Authority guidance <a href="#">Unmanned Aircraft System Operations in UK Airspace CAP 722</a> – all Small Unmanned Aircraft flights, commercial or not, must be made in compliance with the ANO and guidance Health and Safety at Work Act 1974 Management of Health and Safety at Work Regulations 1992</p>				
Definitions	<p><b>Aerial Work</b> is any commercial operation of a Small Unmanned Aircraft performed under a contract between an operator and a customer in return for payment or other reward.</p> <p>Where amateur or volunteer pilots offer to provide a service that would otherwise be a commercial operation, the University will hold them to the same standard as they would a commercial operator.</p> <p>Flying operations for the purpose of research or development conducted “in-house” are not normally considered to be “Aerial work” provided no payment or reward is given or promised in respect of a particular flight. Flights performed “in-house” for academic research or teaching are not “Aerial work”.</p>				
	<p>A <b>Small Unmanned Aircraft (SUA)</b> means any unmanned aircraft having a mass of not more than 20kg without its fuel, but including any load attached. The aircraft may be fixed wing, rotary wing or a mixture of both. (An unmanned aircraft weighing more than 20Kg is not a SUA and more onerous regulations apply that are outside the scope of this standard).</p> <p>A <b>Small Unmanned Surveillance Aircraft (SUSA)</b> is a Small Unmanned Aircraft equipped to undertake any form of surveillance or data acquisition. Additional flight restrictions from the Air Navigation Order apply to Small Unmanned Surveillance Aircraft. The majority of Aerial Work will likely use a SUSA weighing 7Kg or less equipped with a camera and powered by a battery.</p>				

	<p>A <b>Permission<sup>1</sup> or exemption for Aerial Work</b> is a licence issued by the Civil Aviation Authority (CAA) that permits the use of Small Unmanned Aircraft and/or Small Unmanned Surveillance Aircraft. A Permission is required for all Aerial Work (i.e. commercial operations involving an operator and a customer). The permission will set out the conditions and restrictions to be followed to address flight safety. Most operators performing Aerial Work will hold a Standard Permission for Aerial Work.</p>
	<p>A <b>competent SUA or SUSA pilot</b> is one who has sufficient knowledge, practical training and skill to safely carry out the planned tasks. In order to be issued a Permission from the CAA, a pilot must demonstrate his competence. The most common route is to complete written test and flight assessments with a National Qualified Entity (NQE) to earn a Basic National UAS Certificate Small (BNUC-S), Remote Pilot Qualification (RPQ) or equivalent.</p>
	<p>An <b>Operations Manual (AKA Operational Safety Case, OSC)</b> is a manual setting out the safe system of work that the operator will follow. In order to be issued a permission from the CAA, the operator must develop and present a satisfactory OSC to the CAA. The Operations Manual will specify separation distances from persons, vessels, vehicles and structures (dependent on whether or not they are under the control of the Remote Pilot) as well as other control measures</p>
	<p><b>Operating a Small Unmanned Aircraft using Visual Line Of Sight (VLOS)</b> means operating such that the aircraft can clearly be seen by the person flying it at all times when it is airborne. Having VLOS allows the pilot to manoeuvre the SUA it so as to prevent collisions<sup>2</sup>. The rules require that VLOS must be maintained without having to resort to the use of binoculars, telescopes or other such devices.</p>
	<p>A <b>congested area</b> in relation to a city, town or settlement, means any area which is substantially used for residential, industrial, commercial or recreational purposes. Restrictions are placed on flights over congested areas by the ANO 2016 and the CAA Permission</p>
	<p>A <b>flight plan</b> is a plan produced prior to the flight detailing the hazards and risks on the flight path and any additional measures over and above the OSC and permission requirements that need to be taken to complete the flight safely.</p>
	<p>An <b>Operators ID</b> is a registration with the Civil Aviation Authority of individuals or organisations (or section of an organisation) that are responsible for drones or model aircraft. An Operators ID is required where drones or model aircraft between 250g and 20Kg are flown outdoors for recreational or “in house” work purposes (ie not aerial work).</p> <p>Visit <a href="https://register-drones.caa.co.uk/">https://register-drones.caa.co.uk/</a> to obtain an Operators ID.</p>
	<p>A <b>Flyers ID</b> is a registration with the Civil Aviation Authority of individuals who wish to fly a drone or model aircraft. A Flyers ID is required where drones or model aircraft between 250g and 20Kg are flown outdoors for recreational or “in house” work purposes (ie not aerial work). A Flyers ID requires the flyer to pass an online multiple choice.</p> <p>Visit <a href="https://register-drones.caa.co.uk/">https://register-drones.caa.co.uk/</a> to obtain a Flyers ID.</p>
Responsibility for implementation	<p><b>For Aerial Work (i.e. commercial work undertaken by a contractor)</b></p> <ul style="list-style-type: none"> <li>Managers contracting the services of a Small Unmanned Aircraft operator (an example might a member of Estates contracting an operator to undertake a roof survey),</li> <li>Managers liaising with a third party using facilities at the University of Bath who wishes to contract the services of a Small Unmanned Aircraft operator (an example might be a member of Sports Development liaising with a sports team who wish to film an event).</li> </ul> <p><b>For in house research projects (i.e. non-commercial work undertaken by University staff and students)</b></p> <ul style="list-style-type: none"> <li>Heads of Department and Research Supervisors</li> </ul> <p><b>For recreational flights on University premises</b></p>

<sup>1</sup>A CAA Permission is required for: All commercial flights (i.e. Ariel Work); All Small Unmanned Surveillance Aircraft flights commercial or otherwise within 150m of a congested area / organised open air crowd or more than 1000 persons, and/or within 50m of people or properties/objects that are not under the pilot’s control.

<sup>2</sup> The current CAA policy is that all Unmanned Aircraft Systems (small or otherwise) must be under the command of a remote pilot - see CAP 722, Chapter 3 CAA Policy on UAS Autonomy.

	<ul style="list-style-type: none"> <li>Head of Department who has control of the area in which the flights are to take place</li> </ul>		
Training availability:			
Standard to meet		Accountability	Reference documents and more information
A	<b>Standard to meet for operations of Small Unmanned Aircraft performed by a commercial operator (i.e. Aerial Work)</b>		See definitions of Aerial Work and Small Unmanned Aircraft
A1	Permission to fly If the manager does not control the area or event over which the SUA will operate, then the manager gains the permission of whichever manager(s) have control.	Manager	Most flights are likely to take place over areas controlled by Sports Development or Estates.
A2	Operational Safety Case The manager asks for and is given a current copy of the SUA operators Operational Safety Case (AKA Operations Manual). The OSC is current and valid for the SUA to be used and the flight to be carried out. OSC will be required for all in-scope SUA activities	Manager	The OSC is likely to contain copies of the operator's insurance, CAA permission and pilot qualifications. <a href="#">Guidance on OSC requirements is available from the CAA</a>
A3	Insurance The manager asks for and is given a valid copy of the SUA operator's insurance for the proposed tasks.	Manager	Advice can be sought from the University Insurance Services Manager The insurance documentation is likely to be included in the OSC.
A4	Civil Aviation Authority Permission The manager asks for and is given a copy of the SUA operators CAA permission. The CAA permission is current and valid for the SUA to be used and the flight to be carried out.	Manager	The operators should have a Standard Permission for Aerial Work (or an exemption) as a minimum. The CAA permission is likely to be included in the OSC.
A5	Competent Pilots The manager asks for and is given evidence that the pilot holds a valid SUA pilots qualification.	Manager	The pilot will normally hold a Basic National UAS Certificate – Small (BNUC-S), Remote Pilot Qualification (RPQ) or equivalent. The pilot's qualification is likely to be included in the OSC.
A6	Flight Plan The Manager asks for and is given a copy of the SUA flight plan. The operator can explain how performance of the flight plan can be completed in compliance with the Air Navigation Order, the CAA permission and the Operations Manual.  Compliance with the ANO includes maintaining Visual Line Of Sight during the flight, allowing the pilot to manoeuvre the SUA so as to prevent collisions.  The operator can explain how performance of the flight plan can be completed in compliance with flight restrictions over congested areas and in proximity to crowds and buildings.	Manager	The flight plan format is likely to be included in the OSC. The Air Navigation Order SUA flight requirements, article 94 and article 95 apply – see Appendix

A7	<p>Take-off and landing area</p> <p>The Manager agrees a take-off and landing area with the SUA operator. The area is such that the SUA is not flown within 30 metres of any person (excluding the pilot and persons under the control of the pilot) when taking off or landing.</p> <p>The manager and operator agree what measures are needed to secure the take-off and landing area during the flight.</p>	Manager	The Air Navigation Order SUA flight requirements, article 94 and article 95 apply, most notably 95(3) and 95(4) – see Appendix
A8	<p>Planning and Risk Assessment</p> <p>The CAA permission, the operators OSC and the flight plan in combination should consider all likely flight risks and the control measures needed. Unless the flight involves hazards and risks not covered by the CAA permission and the OSC then an additional risk assessment is not required.</p>	Manager	If further risk assessments are required then it is the responsibility of the SUA operator to provide these to the relevant manager.
A9	<p>Log flights with Security</p> <p>The Manager reports to Security when flights have been scheduled.</p>	Manager	
B	<b>Standard to meet for operations of Small Unmanned Aircraft performed “in-house” (i.e. not Aerial Work)</b>		See definitions of Aerial Work and Small Unmanned Aircraft
B1	<p>Operators ID</p> <p>The manager who has control over the SUA will register with the Civil Aviation Authority for an Operators ID. Control means that the manager can regulate who uses the SUA, where they use them and how they use them.</p> <p>All SUA flown will be clearly marked with the Operators ID under which they operate.</p>	Heads of Department Research Supervisors	See definition of Operators ID
B2	<p>Permission to fly</p> <p>If the manager does not control the area or event over which the SUA will operate, then the manager gains the permission of whichever manager(s) have control</p>	Heads of Department and Research Supervisors	Most flights are likely to take place over areas controlled by Sports Development or Estates.
B3	<p>Operation risk assessment</p> <p>The manager ensures that a risk assessment is completed for the operation of the Small Unmanned Aircraft.</p>	Heads of Department and Research Supervisors	
B4	<p>Competent Pilots</p> <p>The manager assures himself that the Small Unmanned Aircraft pilot has sufficient piloting skills to perform the planned flight safely.</p> <p>For this standard, a level of competence sufficient to perform the flight without causing an injury or property damage is sufficient.</p> <p>The manager assures himself that all Small Unmanned Aircraft pilots have registered with the Civil Aviation Authority and have a current Flyers ID.</p>	Heads of Department and Research Supervisors	See definition of Flyers ID
B5	<p>Flight Plan</p> <p>The manager ensures that a flight plan is made for each flight. The flight plan should explain how the flight can be completed in compliance with the Air Navigation Order.</p> <p>Compliance with the ANO includes maintaining Visual Line Of Sight during the flight, allowing the pilot to manoeuvre the SUA so as to prevent collisions.</p>	Heads of Department and Research Supervisors	The Air Navigation Order SUA flight requirements, article 94 and article 95 apply – see Appendix
B6	<p>Take-off and landing area</p> <p>The manager ensures that a take-off and landing area is used such that the SUA is not flown within 30 metres of any person</p>	Heads of Department	

	(excluding the pilot and persons under the control of the pilot) when taking off or landing. The manager ensures that suitable measures are taken to secure the take-off and landing area during the flight.	and Research Supervisors	
B7	Log flights with Security The Manager reports to Security when flights have been scheduled.	Heads of Department and Research Supervisors	
	Note: Some in-house flights may require a CAA Permission. Permission is needed for all <b>Small Unmanned Surveillance Aircraft</b> flights commercial or otherwise within 150m of a congested area / organised open air crowd or more than 1000 persons, and/or within 50m of people or properties/objects that are not under the pilot's control.	Heads of Department and Research Supervisors	See Permission for Aerial work issued by the CAA definition  Obtaining a CAA permission is onerous, requiring training, testing and assessment.
C	<b>Standard to meet for operations of Small Unmanned Aircraft performed for recreational purposes</b>		
C1	Permission to fly The University will consider applications to conduct recreational flights on University property on a case by case basis. The operator will need the permission of the Department that control the area in which the flight is to take place. (In practice, this is most likely to be Sports Development as they control the only spaces that are suitable for recreational flying).	Head of Department who has control of the area in which the flights are to take place	Most flights are likely to take place over areas controlled by Sports Development or Estates.
C2	The Manager will not grant permission for recreational SUA flights unless the pilot holds valid insurance. The Manager will not grant permission for recreational SUA flights unless the pilot has a current Operators ID and Flyers ID issued by the Civil Aviation Authority.	Head of Department who has control of the area in which the flights are to take place	See definition of Operators ID and Flyers ID
C3	Flight Plan The Manager will seek a flight plan from the recreational pilot(s) that explains how the SUA flight(s) will be completed in compliance with the Air Navigation Order.  Compliance with the ANO includes maintaining Visual Line Of Sight during the flight, allowing the pilot to manoeuvre the SUA so as to prevent collisions.	Head of Department who has control of the area in which the flights are to take place	The Air Navigation Order SUA flight requirements, article 94 and article 95 apply – see Appendix
C4	Take-off and landing area The manager agrees a take-off and landing area with the recreational SUA pilot(s). The area is such that the SUA is not flown within 30 metres of any person (excluding the pilot and persons under the control of the pilot) when taking off or landing. The manager and operator agree what measures are needed to secure the take-off and landing area during the flight.	Head of Department who has control of the area in which the flights are to take place	The Air Navigation Order SUA flight requirements, article 94 and article 95 apply, most notably 95(3) and 95(4) – see Appendix
C5	Log flights with Security The Manager reports to Security when flights have been scheduled.	Head of Department who has control of the area in which the flights are to take place	

**Standard Monitoring and Measurement Criteria**

A short statement setting out how the standard will be monitored and by whom. This should also detail where the monitoring findings will be reported to and how frequently. Where the standard relates to a risk that appears on the University’s health and safety risk register then monitoring frequency and reporting will be in line with that procedure.

The boxes below will provide an overview of the actual things that will be measured as part of the monitoring process.

A	<p><b>Standard to meet for operations of Small Unmanned Aircraft performed by a commercial operator (i.e. Aerial Work).</b></p> <p>The number of SUA operations involving Aerial Work (i.e. commercial operations involving an operator and a customer) will be small; probably no more than one or two each year. Every three years, past instances of Aerial Work will be identified and a third of them will be checked to ensure that:</p>
A1	Permission to fly was sought and obtained (of applicable)
A2	The operators Operational Safety Case was seen
A3	The commercial operator had valid insurance (this would normally be recorded in the Operational Safety Case)
A4	The commercial operator held a valid CAA Permission (this would normally be recorded in the Operational Safety Case)
A5	Commercial pilots qualifications were seen (this would normally be recorded in the Operational Safety Case)
A6	The flight plan was seen (most flight issues would normally be recorded in the Operational Safety Case)
A7	Take-off and landing area agreed (this would normally be recorded in the flight plan)
B	<p><b>Standard to meet for operations of Small Unmanned Aircraft performed in house (i.e. not Aerial Work).</b></p> <p>The number of SUA operations performed in-house (i.e. not Aerial Work) will be highly dependent upon what research projects, if any, are being pursued. Every two years, current research projects involving SUA (as either tools or the subject of research) will be identified and checked to ensure that:</p>
	A current Operators ID issued by the Civil Aviation Authority held.
B1	Permission to fly was sought and obtained
B2	Operation risk assessment completed and recorded
B3	Pilots sufficiently competent to undertake flight(s) and hold a current Flyers ID issued by the Civil Aviation Authority.
B4	Flight plan completed (this might be incorporated into the operational risk assessment)
B5	Take-off and landing site secured (this might be incorporated into the operational risk assessment or flight plan)
C	<p><b>Standard to meet for operations of Small Unmanned Aircraft performed for recreational purposes.</b></p> <p>The number of SUA recreational flights performed each year will be highly dependent upon recreational pilots seeking and being granted permission to fly. In practice, it is likely that permission will only be given if a Student Union Society was formed and sought permission. Every two years, permissions given for recreational flying will be identified and checked to ensure that:</p>

C1	Permission to fly was obtained
C2	The recreational pilot operator had valid insurance
C3	Flight plan completed
C4	Take-off and landing area agreed

**Small Unmanned Aircraft**  
Article 94.—

- (1) A person must not cause or permit any article or animal (whether or not attached to a parachute) to be dropped from a small unmanned aircraft so as to endanger persons or property.
- (2) The person in charge of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made.
- (3) The person in charge of a small unmanned aircraft must maintain direct, unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions.
- (4) The person in charge of a small unmanned aircraft which has a mass of more than 7kg excluding its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight, must not fly the aircraft—
  - (a) in Class A, C, D or E airspace unless the permission of the appropriate air traffic control unit has been obtained;
  - (b) within an aerodrome traffic zone during the notified hours of watch of the air traffic control unit (if any) at that aerodrome unless the permission of any such air traffic control unit has been obtained; or
  - (c) at a height of more than 400 feet above the surface unless it is flying in airspace described in sub-paragraph (a) or (b) and in accordance with the requirements for that airspace.
- (5) The person in charge of a small unmanned aircraft must not fly the aircraft for the purposes of commercial operations except in accordance with a permission granted by the CAA.

**Small Unmanned Surveillance Aircraft**  
Article 95.—

- (1) The person in charge of a small unmanned surveillance aircraft must not fly the aircraft in any of the circumstances described in paragraph (2) except in accordance with a permission issued by the CAA.
- (2) The circumstances referred to in paragraph (1) are—
  - (a) over or within 150 metres of any congested area;
  - (b) over or within 150 metres of an organised open-air assembly of more than 1,000 persons;
  - (c) within 50 metres of any vessel, vehicle or structure which is not under the control of the person in charge of the aircraft; or
  - (d) subject to paragraphs (3) and (4), within 50 metres of any person.
- (3) Subject to paragraph (4), during take-off or landing, a small unmanned surveillance aircraft must not be flown within 30 metres of any person.
- (4) Paragraphs (2)(d) and (3) do not apply to the person in charge of the small unmanned surveillance aircraft or a person under the control of the person in charge of the aircraft.
- (5) In this article, “a small unmanned surveillance aircraft” means a small unmanned aircraft which is equipped to undertake any form of surveillance or data acquisition.

## Risk Assessment Record

<b>Risk Assessment of:</b> Operations of Small Unmanned Aircraft performed “in-house” (i.e. not Aerial Work)	<b>Assessor(s):</b>	<b>Date:</b>
<b>Overview of activity / location / equipment / conditions being assessed:</b> Small Unmanned Aircraft (AKA Drones) weighing less than 7Kg, operated “in-house” on University property	This risk assessment is for operations of Small Unmanned Aircraft performed “in-house” (i.e. the work is not “Aerial Work” that involve a commercial work performed under a contract between an operator and a customer in return for payment or other reward). Departments can adopt this assessment or adapt it for their particular circumstances.	
<b>Generic or specific assessment?</b> Generic risk assessment – can be adopted or adapted for local use	<b>Context of assessment</b> (delete as appropriate): planning stage / ‘desk-top’ exercise / site visit / in consultation with employees / in consultation with managers / other (please describe)	

#	Hazard(s) identified	Persons affected	Existing controls & measures	A	B	A x B	Additional controls required
	<b>Equipment Selection</b>		<ul style="list-style-type: none"> <li>Select suitable equipment</li> </ul>				
	Unsuitable equipment fails during use	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Assess equipment performance requirements before purchase and ensure equipment meets requirements</li> <li>Ensure equipment is compliant with EU standards – check for CE marking or a CE declaration</li> </ul>				<ul style="list-style-type: none"> <li>Maintain equipment in a suitable condition</li> <li>Repair or replace parts which are no longer satisfactory</li> </ul>
	<b>Operational issues</b>		<ul style="list-style-type: none"> <li>Clearly delegate tasks</li> </ul>				<ul style="list-style-type: none"> <li></li> </ul>
	Tasks not completed leading to failure of some kind	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Ensure all tasks are clearly delegated and persons understand which tasks they are responsible for</li> <li>Ensure persons delegated tasks are competent to complete them</li> </ul>				Tasks to be delegated: <ul style="list-style-type: none"> <li>Equipment maintenance</li> <li>Equipment &amp; site checks</li> <li>Take off checks</li> <li>Flight control &amp; issues</li> </ul>
	<b>Equipment Maintenance</b>		<ul style="list-style-type: none"> <li>Maintain and repair as necessary</li> </ul>				

#	Hazard(s) identified	Persons affected	Existing controls & measures	A	B	A x B	Additional controls required
	Pilot may lose control of the SUA due to a mechanical fault	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Maintain SUA as per suppliers or manufactures instructions</li> <li>Repair SUA as per suppliers or manufactures instructions</li> </ul>				<ul style="list-style-type: none"> <li>Record maintenance and repairs in a maintenance log</li> </ul>
	Pilot may lose control of the SUA due to a battery fault	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Maintain and charge batteries as per suppliers or manufactures instructions</li> <li>Replace batteries as per suppliers or manufactures instructions</li> <li>Replace batteries when performance is unsatisfactory</li> </ul>				<ul style="list-style-type: none"> <li>Record battery charges and replacement in a maintenance log</li> </ul>
	Pilot may lose control of the SUA due to a software fault	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Update control software as and when new software releases are made</li> </ul>				<ul style="list-style-type: none"> <li>Record software updates in a maintenance log</li> </ul>
	<b>Pre-Flight Site Checks</b>		<ul style="list-style-type: none"> <li>Check site conditions before flying</li> </ul>				
	Pilot error due to unfamiliarity with the flying area	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Complete and record a flight plan for each flight – consider how compliance with ANO requirements can be met during flight</li> </ul>				<ul style="list-style-type: none"> <li>Do not fly if the flight plan shows any aspect of the flight to be unsatisfactory or id compliance with the ANO is not possible</li> </ul>
	Pilot error due to unsuitable position from which pilot operates	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Select a suitable position from which the pilot can operate – record in flight plan</li> </ul>				Pilot area requirements <ul style="list-style-type: none"> <li>Full visual coverage to maintain VLOS</li> <li>Avoid visual impairment from the sun</li> <li>Avoid visual impairment from obstacles</li> <li>Avoid unsuitable ground – such as uneven ground or steep slopes</li> <li>Avoid wind shear from trees and buildings</li> </ul>

#	Hazard(s) identified	Persons affected	Existing controls & measures	A	B	A x B	Additional controls required
	Pilot error due to unsuitable weather Failure of SUA due to unsuitable weather	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Check weather forecasts when scheduling flights</li> <li>Check weather at launch site before commencing a flight and that conditions allow maintenance of VLOS</li> </ul>				
	Presence of SUA causes alarm to livestock or other animals	Person in presences of livestock or animals may be injured (Animals may suffer injury)	<ul style="list-style-type: none"> <li>Complete and record a flight plan for each flight – consider how compliance with ANO requirements can be met during flight</li> <li>Do not fly over livestock or animals</li> </ul>				<ul style="list-style-type: none"> <li>Alter flight path or abandon flight if the SUA appears to be causing alarm to livestock or animals</li> </ul>
	<b>Pre-Flight SUA and Transmitter Checks</b>		<ul style="list-style-type: none"> <li>Check equipment before flying</li> </ul>				
	Pilot may lose control of the SUA due to a mechanical fault	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Inspection SUA for faults before each flight and do not fly if the SUA is in an unsatisfactory condition in any way</li> </ul>				<ul style="list-style-type: none"> <li>Record inspections in an inspection log</li> </ul>
	Pilot may lose control of the SUA due to loss of battery power in the control unit or SUA	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Check SUA and controller batteries before each flight – do not use if they are below 90% charge</li> </ul>				<ul style="list-style-type: none"> <li>Record inspections in an inspection log</li> </ul>
	<b>Before take off</b>		<ul style="list-style-type: none"> <li>Check site before take off</li> </ul>				
	Pedestrians in area struck by SUA	Persons near or in flight area	<ul style="list-style-type: none"> <li>Scan area for pedestrians before take-off – delay or abandon flight if pedestrians in area</li> </ul>				<ul style="list-style-type: none"> <li>Seek permission of the manager who controls the area before scheduling flights to avoid event clashes</li> </ul>
	Aircraft in area struck by SUA	Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Scan area for aircraft before take-off – delay or abandon flight if aircraft in area</li> </ul>				
	<b>Perform Flight</b>		<ul style="list-style-type: none"> <li></li> </ul>				

#	Hazard(s) identified	Persons affected	Existing controls & measures	A	B	A x B	Additional controls required
	The SUA may collide with the flight crew, a pedestrian or an aircraft during the flight	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Perform flight in compliance with ANO requirements</li> </ul>				
	<b>In Flight Issues</b>		<ul style="list-style-type: none"> <li>Respond to in flight issues</li> </ul>				
	Pilot losses control of SUA in flight due to transmitter failure or frequency interference	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>Clear the take-off / landing area of all personnel</li> <li>Activate SUA failsafe mechanism so that it returns to the take-off / landing area using GPS</li> </ul>				
	Pilot losses control of the SUA in flight due to loss or propulsion, motor failure or aircraft battery failure	Persons near or in flight area	<ul style="list-style-type: none"> <li>Assess where the SUA is likely to come down. Ensure as far as possible that the site is clear.</li> </ul>				
	Public encroachment into the SUA flying area	Persons near or in flight area	<ul style="list-style-type: none"> <li>Pilot to land the SUA at the nearest available suitable landing area</li> </ul>				<ul style="list-style-type: none"> <li>The flight plan should consider what arrangements might be needed to prevent encroachment into the flight area</li> <li>The flight plan should consider what arrangements might be needed to prevent encroachment into the area from which pilot operates</li> </ul>
	Aircraft encroachment into the flying area	Persons near or in flight area Aircraft flying through the flight area	<ul style="list-style-type: none"> <li>If an aircraft has or is likely to encroach into the 400 feet height 500 metre flying bubble then pilot to descend SUA to about 10 feet above the ground and remain there until area clear</li> </ul>				

#	Hazard(s) identified	Persons affected	Existing controls & measures	A	B	A x B	Additional controls required
	Pilot loses all control of the SUA and it goes into a fly away situation	Persons near or in the flight route Aircraft flying through the flight route	<ul style="list-style-type: none"> <li>• Activate the return to home fail safe in case communication is re-established</li> <li>• Maintain VLOS as long as possible, noting altitude, direction of travel and remaining battery life</li> <li>• Contact local Air Traffic Control and Police and report and report situation</li> </ul>				<ul style="list-style-type: none"> <li>• If SUA is seen to crash, then execute shut down procedure in case communication is re-established</li> <li>• Recover the SUA is the crash site is accessible and it is safe to do so.</li> </ul>
	<b>Assessor signature:</b>		<b>Print name:</b>	<b>Review date:</b>			