



Guidance for An Garda Síochána and First Responders attending an Aircraft Accident



Issue 2, produced by the Air Accident Investigation Unit, 2022



An Roinn Iompair
Department of Transport

WHAT TO DO WHEN AN AIRCRAFT ACCIDENT IS REPORTED



Locate the aircraft
(Section 5)

01



Preserve life
(Section 12)

03



Collect basic aircraft
information
(Section 6)

05



Identify witnesses
and take statements

07

02

Approach Aircraft
with extreme
caution (Sections
10 and 11)



04

Secure accident
site (Section 9)



06

Call AAIU ASAP -
01 804 1538
(24 hours)





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1. Foreword

Aviation accidents range in scale from those involving large public transport passenger airliners with many fatalities and injuries, to those involving small light aircraft with one person on board. The Emergency Services are usually the first trained personnel to arrive at the aircraft accident site and provide valuable assistance minimising injury, loss of life and reducing property loss through damage and fire. Following the rescue effort, it is important to preserve evidence so that the factors that contributed to the accident may be identified. This booklet has been prepared by the Air Accident Investigation Unit (AAIU) of the Department of Transport to assist emergency personnel in better understanding the essential procedures that need to be followed in the aftermath of an aircraft accident, as well as the many hazards that may exist at aircraft accident sites.

Large scale public transport aircraft accidents are rare. However, if such an accident was to occur in Ireland, it would be considered a major emergency and subject to the Framework for Major Emergency Management. An Garda Síochána, the Health Service Executive and the Local Authorities are the agencies charged with managing the response to emergency situations which arise either locally or regionally. The Framework provides for an overall, combined response as soon as a major emergency is declared. The mobilisation procedures of the Major Emergency Plans of the three relevant agencies will be activated immediately, once they are notified of the declaration of a major emergency.

General aviation accidents occur from time to time in Ireland. However, the numbers of fatalities or serious injuries involved are normally small and it is unlikely that a major emergency would be declared.

The normal sequence of events after an accident occurs is:

- Accident occurs.
- Emergency Services respond.
- Accident Reported to AAIU (by Air Traffic Control, An Garda Síochána, the Pilot/Operator or an eye witness).
- AAIU Go-team dispatched.
- An Garda Síochána secure accident site when rescue/preservation of life tasks have been completed.
- AAIU Team arrive and after a site briefing from the Garda/member-in-charge, commence initial investigation, including recording of site through photography, retrieval of flight recorders, wreckage and witness statements.
- AAIU continues investigation and develops a report for publication

2. Role of the AAIU

The AAIU is the agency in Ireland responsible for the investigation of aviation Accidents, Serious Incidents and Incidents in accordance with:

- Annex 13 to the International Civil Aviation Organisation Convention (ICAO) – Aircraft Accident and Incident Investigation;
- Regulation (EU) No 996/2010 of the European Parliament and of the Council on the investigation and prevention of Accidents and Incidents in civil aviation;
- Statutory Instrument (S.I.) No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulations, 2009.

The fundamental purpose of such investigations is to determine the circumstances and causes of these events, in order to avoid similar occurrences in the future. It is not the purpose of such investigations and their associated reports to apportion blame or liability.

The AAIU is an operationally independent unit within the Department of Transport and is also functionally separate from the Irish Aviation Authority (IAA), which is the Regulatory Authority and aviation service provider for the State. The AAIU has its head office at Leeson Lane, Dublin 2.

3. What Is An Aviation Accident/Serious Incident?

The full definitions of an Accident and Serious Incident are contained under Section 3, Part 1 of S.I. 460 of 2009, Air Navigation (Notification and Investigation of Accidents and Incidents) Regulations, 2009, the relevant extracts of which are included as Appendix A.

An Accident is an occurrence, during the period of operation of the aircraft, where the aircraft incurs serious damage (with certain exceptions) or in which any person suffers death or serious injury. The legal definition of 'aircraft' is given in Appendix A. This definition includes (but is not limited to) all powered fixed-wing aircraft, gliders, helicopters, autogyros, paramotors, paragliders, para- trikes, Unmanned Aerial Vehicles (UAVs) and hot air balloons.

4. Who Must Report An Aviation Accident?

Anyone learning of an aviation accident or serious incident should, in addition to alerting the Gardaí and the Emergency Services, report the accident to the AAIU as soon as possible. The legal responsibility for notification of an accident or serious incident rests first with the Commander of the aircraft or, if he/she is fatally injured or incapacitated, then the Operator. In practice, first information usually reaches the AAIU from Air Traffic Control (ATC), an Airport Authority, the Gardaí dealing with the accident, the Pilot, or a member of the public.

5. Missing Aircraft

If an aircraft is reported as missing, and all normal efforts have been made to locate it (e.g. calling the Pilot's mobile phone, contacting the intended landing airfield), then Shannon Air Traffic Control should be contacted (Tel: 061 770700) as they may be able to locate the aircraft using radar data. The Air Traffic Controllers will need to know basic information about the aircraft such as the registration, the time and location of the departure of the aircraft and its intended landing location.



If Air Traffic Control are unable to locate the aircraft, the Irish Coast Guard should be contacted (Tel: 01 662 0922) so that they can initiate a search operation. Coast Guard Officers will also require basic information about the aircraft.

6. What the AAIU Need To Know

When an accident is reported to the AAIU, accurate information will help to identify the aircraft type/location and put in place an appropriate response. Notification by telephone to the AAIU 24 hours phone line (**01 804 1538**) is the normal method used in most circumstances. Please immediately report as many of the following details as possible but **do not delay notification** if all the information is not available. An example notification form is given in Appendix B.

(a) Aircraft type and its registration letters/numbers

Civil Aircraft: The registrations of Irish civil aircraft, are in one of two formats; either beginning with the letters EI followed by three additional letters (example EI-ABC) or the letters EJ followed by four additional letters (example EJ-ABCD). The registration marks normally appear on either side of the fuselage (main body), the tail fin/rudder combination and the wings. Be aware that fire may have consumed part of the registration.

Military Aircraft: For Irish military aircraft, the registration is made up of three numbers (e.g. 277) on either side of the fuselage. In addition, the aircraft's serial number, tri-colour as well as some form of squadron or unit identification may be found on the wings and the tail fin/rudder combination.

Foreign Civil Aircraft: It is difficult to predict how a foreign civil aircraft may be identified, as some countries use five letter codes e.g. G-BXTO for the UK and others use a mixture of letters and numbers e.g. N803DE for the USA. The country's national flag is often located close to the registration.

Foreign Military Aircraft: It is difficult to predict how a foreign military aircraft may be identified, but as a general rule, military aircraft serial numbers are painted on either side of the fuselage, with the countries national flag located either on the wings or on the tail fin/rudder combination.

- (b) Name of the owner or operator, or military operating unit.
- (c) Names of the pilot/crew and any other people on board (name, rank, and serial number for military).
- (d) Date and time of the accident.
- (e) Aircraft's last departure point and its destination.
- (f) Location of the accident, including directions on how to reach the scene.
- (g) Extent of any personal injuries to the occupant(s) or others.
- (h) Nature of the accident i.e. Phase of flight (e.g. Take-off, landing, etc. mission, and description of occurrence.
- (i) Extent of damage to the aircraft.

7. Obligation to Investigate

Every reported aviation Accident or Serious Incident, to which S.I. 460 of 2009 applies, will be the subject of an investigation by the AAIU.

The Chief Inspector of Air Accidents may take measures to investigate any Incident that is not a Serious Incident where he or she considers such an investigation may be expected to draw significant air safety lessons.

The extent of investigations and the procedures to be followed in carrying them out are determined by the Chief Inspector of Air Accidents, taking into account the principles and the objective of the relevant regulation and depending on the lessons the Chief Inspector may expect to draw from the occurrence for the improvement of aviation safety. Definitions pertaining to the investigation of Accidents and Serious Incidents to State Aircraft are presented as Appendix A, (Definitions).

8. AAIU Response

The actual location and circumstances of the Accident / Serious Incident and whether it is a civilian or military aircraft will determine the type of response.

In practice, notification is normally passed to the AAIU Chief Inspector of Air Accidents who will decide on what action to take. Aviation occurrences come in three categories; Accidents, Serious Incidents and Incidents. The majority of the annual reported occurrences are relatively minor and will usually be investigated by correspondence and telephone.

For Accidents or for a more significant Serious Incident, a team of AAIU Inspectors will be dispatched to carry out a Field Investigation. Their time of arrival will be dependent on the distance they have to travel and whether it is by surface transport or air transport. While every effort is made to arrive at the site as soon as possible, there will sometimes be a period of several hours after the initial notification before the Inspectors can reach the scene. In some remote areas, it could be the next morning before they arrive.

9. Custody and Preservation of Evidence

The AAIU recognise that the Garda Síochána and Emergency Services personnel have a duty to take action immediately on arrival at an accident scene. However, to facilitate the determination of the factors that contributed to the accident, it is important (where possible) to disturb a site as little as possible. It is vital that any fire is extinguished as soon as possible and, when all has been done to save life and minimise injury, that the wreckage should be disturbed as little as possible. It is important that the Fire Service does not allow any post-impact fires to burn out as this will cause unnecessary damage to the wreckage and will destroy evidence.

All aircraft accident sites outside of military airfields/bases should initially be secured by An Garda Síochána to prevent unauthorised persons from entering the area. There may also be a requirement to maintain a security presence during the on-going examination of the accident site. No persons



should be allowed to unnecessarily disturb the aircraft wreckage or any ground marks made by the aircraft at the accident site. Any aircraft involved in an accident remains in the custody of An Garda Síochána until the arrival of the AAIU and/or the Military Authorities. In accordance with S.I. No. 460 of 2009 Air Navigation (Notification and Investigation of Accidents and Incidents) Regulations, 2009, Part II, Section 10, a person shall not move or otherwise interfere with the aircraft, a part of the aircraft, the contents of the aircraft, or the site or object, unless prior permission has been granted by the AAIU, or except in consideration of the following:

- (a) the aircraft or any part of the aircraft may be moved or interfered with in so far as may be necessary for the purpose of extricating survivors or animals from the aircraft;*
- (b) with the agreement of the AAIU, the aircraft or any part may be moved for the purposes of removing any mail carried by the aircraft, preventing destruction by fire or any other cause, or preventing any danger or obstruction to the public, air navigation or other means of transport;*
- (c) goods or passengers' baggage may, if released by a person authorised under paragraph (1) as not being required as evidence, be removed from the aircraft under the supervision of a member of An Garda Síochána, but in the case of an aircraft which has come directly from a place outside the State, shall not be removed from the aircraft, or the vicinity of the aircraft, except with the consent of an officer of Customs and Excise;*
- (d) the aircraft or any of its parts or contents, if lying in a position of danger to life or property or to the aircraft, part or contents, or if wrecked in water, may be moved to such extent as may be necessary for bringing it or them to a place of safety;*
- (e) where it is necessary to disturb or move aircraft wreckage, or any mail or cargo in the aircraft or wreckage, the person supervising the disturbance or movement shall, whenever possible, take measures (which may include the preparation of descriptive notes, the taking of accurate measurements, the making of sketches and the taking of photographs and video recordings) to record the original scene, and the position and condition of the wreckage and of any significant impact marks.*

The prevention of unauthorised persons entering an accident site is based on; respect for casualties, protection of valuables, important or classified equipment, the preservation of evidence to establish the factors that contributed to the accident, and the prevention of unnecessary exposure to hazards. In essence, the accident site should initially be treated as a crime scene and secured accordingly.

AFTER THE INITIAL EMERGENCY RESPONSE PHASE, THE ACCIDENT SITE SHOULD BE DISTURBED AS LITTLE AS POSSIBLE, UNTIL THE ARRIVAL OF THE AIR ACCIDENT INVESTIGATION UNIT

In the case of accidents or serious incidents occurring at airports there may be debris scattered along the runways or taxiways, which need to be mapped. There is often considerable pressure to sweep paved areas to allow operations to continue and the AAIU has no wish to cause unnecessary delays. In such circumstances the AAIU guidance is that, after obtaining the AAIU's agreement, the initial clearance of debris should be to the edge of the paved area and the distribution of these items recorded. This will help investigators to reconstruct the accident sequence

An Garda Síochána should also consider the following:

- Secure the accident site by placing a cordon around all scattered wreckage as well as other evidence such as ground scars/marks made by the aircraft.
- Carefully record, as soon as possible, the positions in the aircraft wreckage from which any survivors of the accident were assisted. It helps injury prevention research if deceased person(s) remain in their original place until a pathologist can examine them. If this procedure is likely to distress the public or relatives of the deceased persons, the bodies may be removed. If a body must be removed before the Coroner/Pathologist arrives, the position and posture of the body should be carefully recorded and the record attached to the body. Please note that for the benefit of the AAIU or the Military Authorities, it is not essential to the investigation for bodies to be left in-situ, once they have been properly recorded.
- Take some photographs, recordings or sketches of any items/evidence that are likely to be obliterated or lost prior to the arrival of the investigation teams.
- Secure the wreckage, including any scattered wreckage away from the main accident site, and any of the aircraft's contents or papers against loss or further damage.
- Note the names, addresses, contact details and intended movements of any witnesses to the accident.
- Prevent interference with rescue and associated operations.
- Admit only authorised personnel to the accident site; and
- Keep bystanders outside the established zone of safety.

Photographs and videos: In inclement weather, protection of vital areas such as the cockpit, lighter pieces of wreckage and ground scars may be preserved by covering with a tarpaulin. Should coverings not be available, photography and videoing of the scene would assist the investigative team greatly. Where the accident occurs during night-time hours, it is likely that the examination of the wreckage will be postponed until first light. In this event, on-going security of the site will have to be provided by An Garda Síochána. Use of the Defence Forces and/or the Civil Defence should also be considered.

When an aircraft accident has occurred, the AAIU will often request that the Irish Aviation Authority (IAA) temporarily restricts access to the airspace above the accident site. The IAA will issue a NOTAM (NOTice to AirMen) to communicate this restriction to the aviation community. This restriction is for the safety of personnel operating on the site, and also to prevent footage of the accident scene being taken by other aircraft or drones and being shared publicly.

When wreckage is found, and where in the opinion of the individual, it is considered to be of significance (Instruments, mechanical parts etc.) the site should be marked and the item brought to



the attention of an Inspector of Air Accidents. The Inspectors have the powers to require evidence to be produced and to retain it.

10. Safety at Aircraft Accident Sites

In common with all disaster sites, the safety of attending personnel at an aircraft accident site is paramount. Aircraft wreckage and the accident site itself may contain specific threats to safety. Overall responsibility for safety at the site will depend on the nature and scale of the accident. However, any organisation working at the site, be it emergency response or investigation, shall retain responsibility for the safety of their own personnel and others working under their direction while using their own procedures. To ensure that a high level of safety management is maintained during site operations, it is important that organisations co-ordinate their activities.

At major, large scale accident sites, a risk management group may be formed to assist with the safety management process. Initiation and chair of the group is normally co-ordinated by the Local Authority emergency planners. Group members should include safety co-ordinators from the main organisations involved, including the AAIU, Military Authorities, An Garda Síochána, Fire Service, Ambulance Service, Civil Defence, Emergency Planners, Environmental Protection Agency and contractors.

The fire service will often be the first emergency service to arrive at an aircraft accident site. Where the accident occurs in close proximity to a military airfield/base or civilian airport, it is possible that a Defence Forces fire brigade unit or an Airport Rescue Fire Fighting Service (ARFFS) may also respond. Both these resources will have specialised personnel and specific equipment available to deal with aviation accidents. A key consideration at accident sites is that rescue personnel do not themselves become a casualty. In the heat of the moment and the desire to alleviate suffering and minimise casualties, individuals could place themselves at considerable personal risk of injury or even death.

Some larger commercial airliners carry deployable flight recorders, Emergency Locator Transmitter (ELTs) and dangerous cargo. Smaller general aviation aircraft may carry ballistic parachute recovery systems and military aircraft can carry weapon systems, ejection seats and/or pyrotechnics. Such hazards may need to be neutralised by specialist personnel. Cautious haste and an awareness of the hazards at aircraft accident sites will better prepare personnel for the tasks at hand.

Upon completion of the firefighting and rescue phase, the AAIU will normally assume responsibility for investigation and recovery operations at the site. AAIU personnel will undertake an assessment of safety hazards posed by the aircraft wreckage and cargo. The advice of the senior Fire and Garda Officers will be sought to establish information on identified hazards. Specialist personnel may be employed to assist with the assessment process, in particular, in relation to buildings and other structures at the site. At major accident sites, this assessment phase is likely to take some time, resulting in a pause in operations before further work can continue.

On completion of the assessment, suitable control measures will be introduced to ensure the safety of personnel working or visiting the site. Control measures are likely to include limiting access to

all or specific site areas, the use of protective clothing, restriction of both ground and air traffic movement, and may also include the operation of an entry pass system.

Some accidents may have implications for public safety and, given the extent and duration of site operations in major accidents, may also have a significant impact on the daily routine of the local population. Past experience has shown that the involvement of the Local Authority, in particular the Emergency Planning department, is essential for the effective co-ordination and non-investigation activities at and around major accident sites. The AAIU will seek to maintain a close liaison with the Local Authorities to provide advice and assistance where required.

11. Common Hazards at Aircraft Accident Sites

THE HAZARD INFORMATION CONTAINED IN THIS DOCUMENT IS NOT INTENDED TO BE PRESCRIPTIVE OR EXHAUSTIVE AND DOES NOT REPLACE THE NORMAL RISK ASSESSMENT PROCEDURES USED BY INDIVIDUAL AGENCIES.

Damage to modern aircraft can result in release of dangerous materials at an accident site, e.g.:

- Airborne synthetic products similar in nature to asbestos fibres;
- Toxic materials that may inadvertently be inhaled or affect the skin;
- Potentially explosive devices such as oxygen bottles, high-pressure tyres, hydraulic accumulators, ballistic parachute recovery systems and, for military aircraft, rocket-powered or explosive cartridge-powered ejection seats, inflatable restraint systems, pyrotechnics and unexploded high explosive ordnance stores;
- Pathogenic (body) products; and
- Radioactive materials.

Only personnel who are essential to extricating survivors, the protection of the wreckage from destruction by fire or other causes, the prevention of damage to other transport or danger to the public, should enter an accident site.

Aerospace vehicles may also be involved in an accident on Irish Soil. These vehicles may vent dangerous gasses for some time after landing and contain unfired retro-rockets. Such vehicles may also contain a nuclear power source. For detailed information on accident site hazards see Appendices C, D and E.



Electrical Equipment such as batteries may be indicated by a 'lightning bolt' symbol.



High pressure aircraft tyres may be damaged during accidents and should be approached with caution.



12. Rescue of personnel from crashed aircraft

THIS SECTION IS FOR GUIDANCE ONLY. TRAINED EMERGENCY SERVICES PERSONNEL SHOULD FOLLOW THEIR OWN ESTABLISHED PROCEDURES.

Without unnecessarily endangering emergency personnel, rescue and care of survivors is the first priority at an aircraft accident site. If survivors appear to be in the aircraft, and rescue seems possible, consider the following:

- Use care in approaching wreckage by vehicle, particularly if the approach is along the crash path, as survivors may have ejected or been ejected from the aircraft. Alternatively, if you are the first on the scene you may find no one present. Several possibilities exist, the occupants may have parachuted to safety, may have survived and left the scene to seek assistance, or have been consumed in the wreckage
- Approach the site from upwind (with the wind at your back) and downhill if possible to avoid inhalation of burning materials, some of which may be toxic, or irritating to the breathing tract.
- Look around the crash path, and maintain a clear observation of the accident site and associated hazards.
- Information related to access, rescue and how to open doors and canopies, will generally be printed in red or black and yellow print on the aircraft.
- Blood-borne pathogens, smoke, dust and composite fibre splinters may be present at accident sites. Wear appropriate Personal Protection Equipment (PPE) to prevent against risk of infection or injury.
- Render first aid and care to survivors where possible, until relieved by medical personnel.
- Attempt to account for all occupants. The airline, operator, or ATC should be able to provide details of the number of persons onboard. Where the aircraft has disintegrated in flight, the wreckage, survivors and casualties may be scattered over a large area.
- Summon medical assistance if required. Consider shelter for casualties if the accident site environment poses potential hazards.
- If there is evidence of a spreading post-accident fire or possible explosion from fuels or armaments, move survivors to a safe distance from the scene.
- If survivors require immediate evacuation to medical facilities, they should be decontaminated of hazardous materials prior to being removed if possible. For example, military aircrew life vests contain explosives and hazardous materials. They should be stowed in a safe location at the accident site.



Example of canopy opening mechanism on military aircraft

Some military aircraft may have ejection seats fitted. The Irish Air Corps turbo-prop PC9/A trainer has TWO ejection seats fitted in each aircraft. These aircraft also have an in-built explosive system for emergency jettisoning of canopies. Extreme care must be taken whenever ejection seats are observed to be among the wreckage and must be treated as LIVE. Under normal circumstances, the words "EJECTION SEAT" contained in a bright red inverted triangle, located on either side of the cockpit fuselage is an indication that the aircraft is fitted with ejection seats. The "MAKING SAFE" of ejection seats is best left to trained personnel. However, if an urgent requirement exists to unstrap and remove survivors from an aircraft, use utmost care and avoid interfering with items (straps, pull handles etc), which are generally colour coded with yellow and black stripes. For more detailed information on this subject see **Appendix D**.



Example cut-out panel for emergency access.



Ejection Seat Warning Symbol.



Example door release mechanism

Military aircraft may also have armaments onboard, while Search and Rescue (SAR) aircraft/helicopters carry a variety of pyrotechnics. The “MAKING SAFE” and removal of these items must be left to trained personnel. These assemblies can explode with devastating violence, particularly if fire has occurred. DO NOT disturb armament thrown clear from aircraft.

STAY CLEAR FROM WING-MOUNTED TANKS, ARMAMENT PODS, UNDERCARRIAGE LEGS, TYRES AND PRESSURE VESSELS (GAS BOTTLES).



Break-in point indication

For the purpose of rescue, the location of access doors, hatches, break-in points and cut-out panels are generally indicated on the external surfaces of military aircraft by a yellow arrow, bordered black. For access doors and hatches a red arrow will indicate the external controls with the operating instructions for the controls nearby. At break-in points and cut-out panels the arrow will indicate an area delineated by a broken line (usually yellow). This area may be cut out to gain entry to an aircraft interior should access doors be blocked or inoperative. Caution needs to be exercised to avoid cutting devices which could ignite spilled fuel.

Systems requiring extra care in their operation or handling due to their containing an explosive device are generally indicated by a red or grey triangle.

Commercial passenger aircraft will often have emergency evacuation slides installed in the doors of the aircraft. If the slides have not been deployed by the aircraft occupants as part of an evacuation sequence, then they may still be armed. Consequently, the doors should be approached with extreme care.

The position of emergency equipment on aircraft, which is accessible from outside the aircraft, is generally indicated by a silhouette with an associated written description. Where a first-aid kit is carried, its marking will be found adjacent to an access panel or exit from which the kit is accessible.



Example door release mechanisms.

To minimise risk of fire or further fires, establish a NO-SMOKING zone around the accident site. Volatile/flammable materials may have been scattered over a wide area, and in rare cases evacuation from homes in the accident area may be necessary

To prevent the inadvertent ingestion of harmful materials, including biological hazards, establish a NO-EATING zone around the accident site.



13. Organisation of the Investigation

An Investigator-in-Charge (IIC) will be appointed by the Chief Inspector of Air Accidents and will be responsible for the overall conduct and control of the accident investigation.

With the increasing complexity of the aviation environment, e.g. flight operations, aircraft systems, and air traffic control, it may be necessary for investigative teams to call on outside specialists to assist in particular aspects of specific investigations. These personnel can be co-opted under strict confidentiality agreements from the airline operator involved, the manufacturers of the aircraft, its engines and equipment, or other government agencies. They will be formed into working groups under the direction of the AAIU. The number and scope of the groups depends on the site and the complexity of the specific accident.

The IIC will decide on which specialist working groups are required and will co-ordinate and direct the efforts of the groups. The IIC will also ensure that regular liaison is maintained between the AAIU and An Garda Síochána, the Emergency Services, the Local Authority and the Coroner.

14. Flight Recorders



Flight Data Recorders (FDR) and Cockpit Voice Recorders (CVR), commonly referred to as “Black Boxes”, provide vital information to the investigation about the final moments of the flight. The recorders (Boxes) are in fact coloured an orange ‘Dayglow’, and while these boxes are virtually indestructible, the data contained therein can be corrupted or even lost, unless the boxes are removed by trained personnel. Not all aircraft are fitted with a flight recorder. If flight recorders are found at the accident site, the immediate vicinity must be secured and the location of the flight recorder reported to the air accident investigation team.

UNDER NO CIRCUMSTANCES SHOULD THE RECORDERS OR ANY OTHER RECORDING DEVICE BE INTERFERED WITH BY PERSONS OTHER THAN THE AIR ACCIDENT INVESTIGATION UNIT

15. Other Recording Devices

Whilst some aircraft will not be fitted with Flight Recorders, most aircraft will carry some form of recording device. These may be an integral part of the aircraft, such as a GPS unit, a device that has been installed on the aircraft by the pilot, such as a GoPro camera, or a personal device, such as a tablet or a mobile phone that the pilot carries with them. All of these devices can be used to record flight data or footage of the flight, and as such they are vital to the investigation. Any recording devices that are found should be secured (ideally without moving the device) and notified to the AAIU.

16. Documentation

A large number of documents and papers may be carried by aircraft (known as the Aircraft Library), and the recovery and preservation of this material is vital. Any papers associated with an aircraft accident that are found in close proximity to the accident site should be carefully collected and held, with a minimum of handling of damaged or burnt specimens. If the flight deck/cockpit of a public transport aircraft remains intact, access should be prevented and documents not removed unless there is a risk of their loss or damage.

The documents carried often include, the Certificate of Airworthiness, Certificate of Registration, Certificate of Maintenance, Technical Log, Load and Balance Sheets, Aircraft and Operations Manuals, maps, notes, etc. Examination of such documents and analysis of the information contained in them may provide vital evidence for investigators

17. Eyewitnesses to Accident

Eyewitnesses are extremely important in helping to determine the factors that contributed to the accident. The names, addresses and contact details of witnesses should be sought, noted by An Garda Síochána and the list passed to an AAIU Inspector on their arrival at the accident site.

Preliminary eyewitness statements detailing first reactions can be of considerable value to investigations. Such statements will be untainted by reflection, rumour or exposure to the news media.

Witness statements should include, where possible:

- Names, addresses and contact details;
- Position from which the eyewitness observed the event;
- Time of accident;
- Weather conditions at time of accident;
- Direction aircraft was heading or coming from and what it appeared to be doing;
- Estimate of aircraft's height (estimate of angle above surrounding terrain from observer's position using trees and buildings as a reference where possible);
- Was aircraft on fire in flight?
- What sounds were heard?
- What was the impact angle of the aircraft?
- Did any objects fall from the aircraft prior to impact?
- If objects did fall from the aircraft, what was the flight path of the aircraft at the time (level, climbing, diving)?
- Were any photographs/video recordings taken of the accident sequence?



18. Post Mortem - Aviation Pathology

An Garda Síochána on behalf of the State or County Coroner have jurisdiction on all fatalities in Ireland. Emergency Services personnel and other authorities work closely together with An Garda Síochána and the Coroner. All crew and passengers fatally injured in a civil or military aircraft accident are subject to a post mortem examination by the Coroner.

In addition, AAIU legislation provides for an autopsy examination to be carried out, and for an Inspector of Air Accidents to specify additional examinations and tests in order to provide evidence to the Investigation.

Fatalities should not be moved without agreement from an Inspector of Air Accidents and/or until a specialist doctor (or other competent medical authority with aviation medical experience) has examined them and should only be moved under An Garda Síochána supervision. On no account should clothing or safety equipment be removed from fatalities before specialist medical examination and recording.

Whilst the cause of death following an aircraft accident is generally obvious in the broad sense, the standard autopsy report may not meet the requirements of the aircraft accident investigation. In general terms, the following additional information may be required by the AAIU:

AAIU Request	Reason
X-rays of pilot's hands and feet	May indicate which pilot was in control at the time of the accident.
Toxicological tests for alcohol and drugs	Indicates if a pilot was under the influence of alcohol or drugs at the time of the accident.
Toxicological test for carbon monoxide	Indicative of mechanical issues which may have led to carbon monoxide in the cockpit/cabin atmosphere.
Bruising or other visible injuries	Indicates whether seat restraints were worn or whether the person made contact with other parts of the cockpit (such as the instrument panel) during the accident sequence.

The information in the autopsy report combined with other evidence can allow the investigation to ascertain;

- (a) The cause of the accident:
 - (i) Mechanical failure in the aircraft (from body injury evidence).
 - (ii) Physical - Who was controlling the aircraft? Was there disease, which could have influenced the function of the crew or incapacitated them?
 - (iii) Toxicological - Were the crew affected by noxious fumes, drugs, or alcohol?
 - (iv) Physiological - Was there a defect in the pressurisation system?
 - (v) Evidence of injury by pre-impact explosion or fire.
 - (vi) Location of victims in aircraft.
- (b) Evidence of sequence of events of the accident.
- (c) Was the accident anticipated or not?
- (d) Evidence as to survivability.

A suitable decontamination procedure should be arranged by the site controller, if deemed necessary by the agencies involved in the rescue and the recovery and in agreement with the Investigating Authority. Human remains are to be handled and transported in accordance with standard coroner procedures.

In the case of an accident to a large passenger aircraft, problems associated with the identification of multiple casualties are introduced. In these situations Major Emergency Management processes involving multiple agencies and generally led by the Local Authority will be initiated.

19. Disposal of Wreckage

Depending on the circumstances of the accident, the wreckage:

- (a) May be removed by the AAIU for further examination at a suitable facility; or
- (b) Released at the accident site by the AAIU to its owners.

Aircraft wreckage preserved by an AAIU Inspector for the purpose of investigation or public inquiry may be disposed of to its owners, or their authorised representatives, on completion of the associated proceedings, or at such time as is considered appropriate by the Chief Inspector of Air Accidents.

20. Working with the Media

It is likely that the media will arrive at a scene very shortly after the accident has occurred. If the media arrive before the AAIU or military authorities, for their own safety, they must remain outside the secured area.

Although the media need to be provided with accurate and timely information, they must also comply with the law when collecting that information and ensure that their work does not affect



the health and safety of others, or hinder the work of the investigation. Misleading information can cause great distress to families and friends of those involved in an accident. Photography by the media of survivors or deceased persons should not be permitted.

Use of mobile telephones/Radios: Care should be exercised in the use of mobile telephones or radios, as the media may be capable of monitoring communication frequencies.

The news media are to be prevented from flying over or hovering over the accident site. A restricted zone above and around the site will normally be declared and promulgated to pilots by means of a 'Notice to Airman' — NOTAM. This can be arranged through the Irish Aviation Authority (IAA) — (Phone 01-671 8655).

The Chief Inspector of Air Accidents may release information arising from a civil aviation accident investigation. The Secretary General of the Department of Transport has authorised AAIU Inspectors to answer media questions in factual terms at the accident scene during the early part of an investigation. Later releases of information relevant to the AAIU investigation must be cleared by the Department of Transport/AAIU Press Office. An Garda Síochána or other organisations should confine their comments to the conduct of their own work and follow the advice of their own media departments.

The AAIU will not release to the public or media the names of the crew, passengers, the aircraft owner or the operator. The Coroner releases the names of the deceased persons only after next-of-kin have been informed and will often use the Garda Síochána as his agents. There should be no speculation as to the cause of the accident.

21. Co-operating With An Garda Síochána Inquiries

AAIU legislation provides that : *"If, in the course of an investigation, it becomes known or is suspected that an act of unlawful interference or criminal act was involved in the occurrence, the investigator in charge shall immediately initiate action to ensure that the aviation security authorities or the police of the states concerned are informed"*.

If an aircraft accident investigation involves other Garda Síochána inquiries (e.g., for the information of a coroner or a criminal investigation), the AAIU's Inspectors will assist where possible, within the constraints of the legislation, provided this does not compromise their own investigation. If early evidence suggests the accident was the result of a criminal act, An Garda Síochána would normally direct the investigation and the AAIU would not investigate. The AAIU would then provide technical assistance on request.

Evidence collected by an AAIU Investigator as part of an air safety investigation is usually not collected in a form readily usable in a court of law. For example, AAIU Investigators do not take formal statements from witnesses under the rules of evidence. Air safety records attract substantial protection under the Air Navigation Act. This is because, in the interest of future safety, the AAIU requires ready access to all evidence and if used for the purposes of blame, or to determine a

liability, such information or evidence may not be so fully available. Organisations that may wish to ascribe blame or liability must undertake their own separate investigation.

22. State Aircraft

A state aircraft is defined as an aircraft 'of the State used for military, customs or police services' and occurrences involving state aircraft, whether in the State or in international airspace, are not normally investigated by the AAIU. However, the Minister for Transport and the Minister for Defence may jointly direct that it is in the public interest that an occurrence should be investigated by the AAIU. In some cases a joint investigation may be undertaken by the AAIU and the other agency involved, and Inspectors from both agencies may attend the accident site.

'This is allowable in AAIU legislation "Where an occurrence in the State or in international airspace involves only State aircraft, the Minister and the Minister for Defence may jointly direct that the occurrence shall be treated as an occurrence to which these Regulations apply and these Regulations, with any necessary modifications, shall apply accordingly."

23. Offshore Accidents

Aviation accidents which occur at sea present particular technical and organisational challenges. In the immediate aftermath of the accident, multiple agencies (including An Garda Síochána, the Irish Coast Guard, the Defence Forces, Marine Institute and Commissioners of Irish Lights, etc.) could be involved in a Search and Rescue operation. At this stage, the AAIU will provide technical support to the lead agency. The AAIU may deploy hydrophone equipment to locate the underwater locator beacons from the aircraft's flight recorders (if fitted), and will liaise with the aircraft manufacturer who will provide technical advice on the aircraft type. It may be possible for the AAIU to initiate some investigation activities during this phase, but they are secondary to Search and Rescue activities.

Once Search and Rescue activities have been completed, and assuming no criminal activity is suspected, the AAIU will become the lead investigative agency, with specialist maritime assistance being provided by other agencies.

24. Drones

In recent years drones (also known as Unmanned Aerial Systems - UAS) have become a very common sight in our skies. Drones are used in a variety of commercial applications as well as a hobby for members of the public. The AAIU will investigate drone accidents where persons have been fatally injured or seriously injured, having come in contact with said drone or where a drone has endangered another manned aircraft.

All drones in Ireland with a weight above 1kg are required to be registered with the IAA and a registration label should be attached to each drone.



25. Irish Military Aircraft Accidents / Serious Incidents

All Irish military aircraft are the property of the Minister of Defence. The General Officer Commanding (GOC) the Irish Air Corps, pursuant to the Defence Act (1954), regulates the operation and maintenance of service aircraft. The Minister of Defence has established the office of the Air Corps Flight Safety Officer, whose responsibilities are defined in the Irish Air Corps Air Regulations Manual. These orders task the Air Corps Flight Safety Officer and the Chief Aeronautical Officer of the Military Airworthiness Authority, with the investigation of service aircraft accidents and incidents.

The objective of an Irish military aviation safety investigation of an accident is the prevention of a recurrence of the accident or incident. It is not the purpose of this activity to apportion blame or liability. Air Corps Flight Safety Office and the Military Airworthiness Authority staff are trained in the investigation of aircraft accidents and incidents.

These personnel will normally be appointed by GOC Air Corps to form an Air Corps Aviation Accident Investigation Team (ACAAIT) when an accident or incident occurs. The Irish Air Corps ACAAIT personnel will normally be the first Air Corps personnel to arrive at the scene.

As Irish military aircraft are state aircraft, it is possible that the Minister for Transport and the Minister for Defence may jointly direct that the AAIU carries out the investigation or that a joint investigation is undertaken. In that regard, it is possible that both AAIU and Military personnel will attend an accident site together.

26. What is an Irish Military Aircraft Accident / Serious Incident?

An Irish Military Aircraft Accident is covered under the Irish Air Corps Air Regulations Manual.

An Irish Military Aircraft Accident is an event occurring within the period of operation of an Irish military aircraft which results in loss of an aircraft, damage to or structural failure of an aircraft which adversely affects the structural strength, performance or flying characteristics of the aircraft, and requires major repair of the affected airframe component, or death of, very serious or serious injury to any person who was an occupant of the aircraft, or came into direct contact with either the aircraft, detached parts of the aircraft or stores released from the aircraft.

27. Who Must Report An Irish Military Aviation Accident?

The Irish Air Corps Air Regulations Manual requires the Aircraft Commander and the Operating unit to report accidents and serious incidents immediately to Chief of Air Staff (Operations) and the GOC. Should any person witness an aircraft accident and there is reason to suspect that an Irish Air Corps aircraft has been involved, they should contact the Irish Air Corps as soon as possible.

TO REPORT AN IRISH MILITARY AVIATION ACCIDENT TO THE IRISH AIR CORPS

Telephone: 01 403 7800 (24 hours)

Note: Contact the Irish Air Corps Operations Headquarters at Casement Aerodrome, Baldonnel, Co. Dublin, or the Air Corps Duty Officer who is available outside normal working hours, at the same location. The Air Corps HQ will then activate an emergency response plan.

28. Irish Air Corps Response

On receipt of notification of a military aviation accident/serious incident the Irish Air Corps will immediately dispatch an ACAAIT.

29. Disposal of Irish Military Aircraft Wreckage

The Irish Air Corps has responsibility for Irish military aircraft crash site mapping, and the Investigator-In-Charge (IIC) of the ACAAIT will ensure adequate mapping is completed to satisfy the Military Authorities, the Coroner and other agencies. After the on-site investigation has been completed, recovery and salvage of the aircraft, with associated costs remains the responsibility of the Irish Air Corps. The IIC and operating unit will initiate recovery and salvage action.

30. Foreign Military Aircraft

Investigation of accidents of Foreign Military Aircraft will be conducted by the AAIU in accordance with S.I. No. 460 of 2009 Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Part IV, Section 23.



Appendix A

DEFINITIONS CONTAINED IN STATUTORY INSTRUMENTS S.I. NO. 460 OF 2009 AIR NAVIGATION (NOTIFICATION AND INVESTIGATION OF ACCIDENTS AND INCIDENTS) REGULATIONS, 2009.

Relevant definitions in the Regulations are:

ACCIDENT: “accident” means an event associated with the operation of an aircraft with the intention of flight which, in the case of manned aircraft, takes place from the time any person boards the aircraft with the intention of flight until such time as all persons have disembarked, or in the case of unmanned aircraft, takes place between the time the aircraft is ready to move for the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down, in which—

(a) a person is fatally or seriously injured as a result of—

- (i) being in the aircraft,
- (ii) direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
- (iii) direct exposure to jet blast,

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew,

or

(b) the aircraft sustains damage or structural failure which—

- (i) adversely affects the structural strength, performance or flight characteristics of the aircraft, and
- (ii) would normally require major repair or replacement of the affected component, except for—
 - (I) engine failure or damage, when the failure or damage is limited to a single engine, its cowlings or accessories,
 - (II) minor damage to rotor blades,
 - (III) damage limited to propellers, wing tips, antennas, probes, vanes, tyres, brakes, or wheels,
 - (IV) superficial damage to landing gear, fairings, panels, or landing gear doors,
 - (V) damage to windscreens,
 - (VI) small dents or puncture holes in the aircraft skin, or
 - (VII) minor damage due to hail or bird strikes (including holes in the radome),

or

(c) the aircraft is missing or inaccessible;

AIRCRAFT: aircraft means any machine that can derive support in the atmosphere from the reactions of the air, other than the reactions of the air against the earth's surface;

FATAL INJURY: Fatal injury means an injury sustained by a person in an accident and which results in his or her death within 30 days of the date of the accident;

INCIDENT: "incident" means an event, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operations;

SERIOUS INCIDENT: "serious incident" means an event involving circumstances indicating that there was a high probability of an accident associated with the operation of an aircraft with the intention of flight, examples of which are specified in Schedule 1;

List of Examples of Serious Incidents

The incidents specified below are typical examples of serious incidents. These examples are not exhaustive and only serve as a guide to the definition of "serious incident":

- (a) near collisions requiring an avoidance manoeuvre to avoid a collision or an unsafe situation or when an avoidance action would have been appropriate;
- (b) controlled flight into terrain only marginally avoided;
- (c) aborted take-offs on a closed, engaged or unassigned runway, or from a taxiway (but excluding authorised operations by helicopters);
- (d) take-offs from a closed, engaged or unassigned runway, or from a taxiway (but excluding authorised operations by helicopters);
- (e) landings or attempted landings on a closed, engaged or unassigned runway, or on a taxiway (but excluding authorised operations by helicopters);
- (f) gross failures to achieve predicted performance during take-off or initial climb;
- (g) fires and smoke in the passenger compartment, in cargo compartments or engine fires, even though such fires were extinguished by the use of extinguishing agents;
- (h) vents requiring the emergency use of oxygen by the flight crew;
- (i) aircraft structural failures or engine disintegrations not classified as an accident;
- (j) multiple malfunctions of one or more aircraft systems seriously affecting the operation of the aircraft;
- (k) flight crew incapacitation in flight;
- (l) fuel quantity requiring the declaration of an emergency by the pilot;
- (m) runaway incursions classified as security A, in accordance with the severity classifications defined in the ICAO Manual on the Prevention of Runaway Incursions (DOC 9870);
- (n) take-off or landing incidents, such as undershooting, overrunning or running off the side of runways;
- (o) system failures, weather phenomena, operations outside the approved flight envelope or other occurrences, which could have caused difficulties controlling the aircraft;
- (p) failures of more than one system in a redundancy system mandatory for flight guidance and navigation.



- SERIOUS INJURY:** “serious injury” means an injury sustained by a person in an accident that—
- (a) requires hospitalisation for more than 48 hours, commencing within seven days from the date the injury was received,
 - (b) results in a fracture of any bone (except simple fractures of fingers, toes or nose),
 - (c) involves laceration which causes severe haemorrhage, nerve, muscle or tendon damage,
 - (d) involves injury to any internal organ,
 - (e) involves second or third degree burns or any burns affecting more than 5 per cent of the body surface, or
 - (f) involves verified exposure to infectious or injurious substances or injurious radiation;

STATE AIRCRAFT: “State aircraft” means an aircraft of the State used for military, customs or police services;

Part 23 of S.I. 460 of 2009 states:

23. (1) Where a foreign state aircraft is involved in an occurrence in the State these Regulations shall apply.

- (2) Where an occurrence in the State or in international airspace involves only State aircraft, the Minister and the Minister for Defence may jointly direct that the occurrence shall be treated as an occurrence to which these Regulations apply and these Regulations, with any necessary modifications, shall apply accordingly.
- (3) Where—
 - (a) an accident or serious incident involving a State aircraft occurs in another state and that state does not provide for an investigation conducted by an independent civilian accident investigation body in accordance with Annex 13, or
 - (b) an accident or serious incident occurs in another state involving—
 - (i) an aircraft registered or operated in the State, and
 - (ii) a foreign state aircraft or facility,

and that state does not provide for an investigation conducted by an independent civilian accident investigation body in accordance with Annex 13,

the Minister may direct that the accident or serious incident shall be treated as an accident or serious incident to which these Regulations apply and these Regulations, with any necessary modifications, shall apply accordingly.

- (4) If it appears to the investigator in charge that an investigation to which paragraph (1), (2) or (3) applies, has been completed but for the investigation of matters affecting the discipline or the internal administration of the operator of the state aircraft or facility which are more appropriate for the investigation by some other person or body, the investigation may be treated for the purposes of these Regulations as if it had been completed without such matters being investigated under these Regulations. In such a case the report of the investigation into the occurrence shall state those matters which the investigation did not deal with by reason of this paragraph.

Appendix B

AIRCRAFT ACCIDENT OR SERIOUS INCIDENT INITIAL NOTIFICATION

TO: AIR ACCIDENT INVESTIGATION UNIT

EMAIL: INFO@AAIU.IE

FROM:

ORGANISATION:

TEL:

EMAIL:

D. PILOT IN COMMAND:

ADDRESS:

TEL:

F. LAST POINT OF DEPARTURE:

POINT OF INTENDED LANDING:

G: ACCIDENT LOCATION:

GRID REFERENCE:

H. PERSONS ON BOARD:

CREW:

PASSENGERS:

INJURIES	CREW	PASSENGERS	OTHERS
FATAL			
SERIOUS			
MINOR/NONE			

I. NATURE OF EVENT & EXTENT OF DAMAGE:

A BRIEF DESCRIPTION OF THE ACCIDENT SITE:

NOTE:

NAME:

DATE/TIME

SIGNATURE:

PLEASE DO NOT DELAY NOTIFICATION IF SOME OF THE ABOVE INFORMATION IS NOT YET AVAILABLE



Appendix C

HAZARDS

Fire and Chemical Hazards

Materials used in aircraft construction, if subjected to intense heat, can produce hazardous situations or develop toxic side effects. Magnesium and aluminium metals in various mixtures are used extensively as structural components, particularly where lightweight framing is used. In some aircraft, magnesium is used in wheel assemblies. It is also used in pyrotechnics and burns with intense heat and radiates powerful light. Water should not be applied as an extinguishing agent to burning magnesium as an explosion may occur. Other hazardous metals such as Cadmium, Depleted Uranium, and Beryllium, are used in small quantities and can be extremely toxic when exposed to fire.

Composite materials (such as carbon fibre in an epoxy resin) are used extensively in modern aircraft. When involved in a fire, these materials may give off toxic fumes and loose fibres may be released in the smoke plume. It is possible, but not highly probable, that loose fibres may cause short-circuiting of electronics and electrical equipment. The major hazard is from inhalation and ingestion of free fibres and associated burning resin products. Only personnel equipped with self-contained breathing apparatus (SCBA) or full-face canister respirators with appropriate cartridges should enter the accident site until all fires are extinguished and loose composite fibres are suppressed. Toxic gases may also be given off when some plastics and adhesives are burnt.

Some materials used in aircraft construction may be rendered harmful after heating in a fire and then being extinguished with water. Their products may be strongly acidic (e.g., fluoro polymers, which yield hydrofluoric acid), and are dangerous to ingest (e.g., some magnesium alloys or depleted uranium which corrodes very rapidly in the presence of water). It is imperative that all personnel at the accident site wash all exposed areas of skin before eating or drinking. Should emergency services personnel at the site exhibit respiratory distress or skin irritation, they should evacuate the site and institute procedures for liquid hazards.

High pressure containers are used in some aircraft systems. These containers when subjected to heat may be the source of secondary explosions. Pressurised containers likely to be encountered may consist of oxygen, liquid nitrogen, hydraulic accumulators, landing gear struts and fire extinguisher bottles (fixed and hand-held).

Dangerous/hazardous cargo and small amounts of radioactive material may be present or scattered on the accident site.

If a battery has been damaged in the accident impact it is possible that acid could leak from the battery causing injury on contact.

Fuel

A primary hazard in a post-crash aircraft fire is the presence of aircraft fuels which, if ignited, pose considerable danger to survivors, rescue personnel, etc. Fuel used by aircraft will come from one of the following groups:

Avgas: is a high octane aviation petrol suited for piston-engined aircraft. It has a relatively low flash point and is therefore highly flammable/volatile. Avgas is used in civil general aviation aircraft and small military type aircraft.

Avtur: is the kerosene-type fuel used in all pure jet or turboprop aircraft and does not possess the low flash point qualities of Avgas. However, when heated its flash point is reduced significantly. This fuel burns longer and more intensely than Avgas.

Diesel: is also in use in some general aviation aircraft and has similar characteristics to Avtur.

Water Methanol: is used in small quantities to provide extra power and as an additive to Avtur in certain flight situations, such as take-off. This substance is alcohol-based and burns without a visible flame. If ignited during a crash, problems are likely to be encountered with extinguishment, as alcohol foam would need to be used. Circumstances may be such that, due to the small amount by comparison to main fuel supplies, alcohol foam may not be needed, but its existence must always be considered.

Warning: Water methanol is toxic. Wear full protective clothing if substance is suspected.

Explosive devices

Explosive devices will be present if the aircraft is fitted with ejection seats, canopy jettison or canopy systems or ballistic parachute recovery systems. Such devices will be concentrated in the cockpit area of the aircraft. Helicopters fitted with winches and cargo hooks may employ Electro-Explosive Devices (within the winch/reeling facility and/or cargo hooks) to enable emergency jettison of the cable or load. All due care should be exercised when operating near this equipment. Some aircraft utilise emergency flotation devices should it be necessary to ditch into water. This equipment is generally located on helicopters near the outer central fuselage and may present an additional explosive danger to personnel should it be activated at an accident site.

For further information on ejection seats and canopy jettison see Appendix D. For further information on ballistic parachute recovery systems see Appendix E.

Aircraft armament

Aircraft armament may be present in Irish Air Corps and other military aircraft. These aircraft should only be approached from the rear, or a slight angle, until the absence of armaments has been confirmed. Such armaments may consist of a single weapon or a mix of high explosive, rockets, machine guns etc. Normally these items are carried under the wings and will be self-evident.

Accidental discharge of armament can occur through tampering with controls used to discharge the armament. Proceed with **EXTREME CAUTION** when extracting personnel or equipment located near operational controls (ie, control column or joystick), the instrument panel or any button or lever coloured red or marked with black and yellow stripes.

Pyrotechnics

Pyrotechnics will be present on most aircraft operated by the Irish Air Corps. They may consist of one or a mix of coloured signal flares, smoke generating devices and light emission devices. Such devices will normally be found in the main cabin area of larger military aircraft, the cockpit of smaller aircraft types and on personal survival equipment carried by the crew.



Appendix D

RESCUE FROM AIRCRAFT FITTED WITH EJECTION SEATS AND EXPLOSIVE CANOPIES

Ejection seats may be activated by either overhead or seat-pan initiating handles.

When rescuing occupants from military aircraft fitted with ejection seats, **EXTREME CARE** is necessary to avoid injury to yourself and the seat occupant. Depending on the type of aircraft, as well as ejection seats, the canopy will have either an explosive canopy jettison or canopy disintegration system fitted. These can be actuated to gain access to seat occupants but are **ONLY** used if the manual cockpit opening system is inoperative.

Instructions for the use of the canopy jettison or canopy disintegration system will be printed next to their external controls. These controls will be sited in the vicinity of the cockpit. Read the instructions carefully before use as the canopy or canopy debris will be displaced violently when the system is actuated and can kill or injure unprotected bystanders.

If the manual canopy opening system is inoperative, no post-accident fire is evident, and the seat occupants do not appear to require immediate medical assistance, consideration should be given to waiting for specialist military rescue personnel to gain entry to the cockpit area.

Should you successfully gain access to the seat occupants **DO NOT RAISE, MOVE, PULL OR TAMPER** with any handles painted yellow and black on the ejection seats, as these fire or eject the seat, imposing extreme danger to yourself and seat occupants.

If possible, and with the assistance of crewmembers, insert safety pin(s) into ejection seat systems to render them inoperable. The safety pin(s) are usually located on the handle of the canopy or in a clearly marked compartment in the cockpit near the ejection seat.

Before attempting to remove seat occupants remember to unfasten seat, shoulder and parachute harnesses, radio cords and oxygen leads. Take **EXTREME CARE** to ensure that the yellow and black coloured ejection seat actuating handles are not snagged when removing the seat occupants from the cockpit.

Note: These actions should only take place if **ABSOLUTELY** necessary, where danger to the occupant is evident. Safety pins are normally fitted into seat parts to prevent accidental operation of explosive devices when the aircraft is not in use. It is most unlikely that the safety pins will be in place. Accordingly, the ejection seats should **ALWAYS** be considered to be 'live' until specialist military personnel advise otherwise.

Remember spinal injury is common in ejection accidents so use due care in handling casualties who have ejected from aircraft.

Appendix E

BALLISTIC PARACHUTE RECOVERY SYSTEMS (BPRS)

One potential hazard emergency responders may encounter when attending an aircraft accident is a ballistic parachute recovery system (BPRS). While BPRS are intended to save lives, they have the potential to cause serious injury or death to first responders. In simple terms, a BPRS is a means of deploying a large parachute from the fuselage of an aircraft which allows the aircraft to descend in a controlled manner to earth following a significant in-flight event such as an engine failure or a loss of control. The BPRS is deployed manually by the Pilot pulling the activating handle. This means that there will be circumstances in which the aircraft has crashed, but the BPRS has not been deployed. For emergency personnel operating close to aircraft wreckage, this presents a significant hazard to their safety.



Typical ballistic parachute warning sign

The rocket motors are ignited by pulling an activation handle in the cockpit. The deploying parachute will accelerate to over 100 mph in the first tenth of a second after ignition. While the total firing period is only one second, anyone in the path of the escaping rocket could be seriously injured or killed. Some BPRS are indicated by red warning marks/decals on the outside of the aircraft. However, this is not always the case.



Example ballistic parachute activation handles (safety pin installed).



If the person(s) on board the aircraft are fatally injured, the safest option is to leave the victim(s) in situ, until the arrival of the AAIU investigation team. If however, there are injured person(s) inside the aircraft in need of immediate assistance, and it is suspected that a BPRS is installed, it is vitally important to make immediate contact with the AAIU and bring it to the attention of the AAIU Go-Team (01 804 1538) so they can advise on how to secure the system.

The parachute may be housed in a fabric covering called a 'softpack', in a fibreglass box called a vertical launch system (VLS) or a white aluminium canister. Each of the various container types may be mounted in a variety of locations, depending on which aircraft it is fitted to. As a very general rule of thumb, the rocket/parachute discharge point is located in the general area behind the cockpit seats, for example in the cargo area or upper fuselage area behind the cockpit.

If you have to extract an injured person(s) from the aircraft wreckage prior to the arrival of the AAIU GO-Team, it is recommended that you approach the aircraft from the front (towards the cockpit). Stay clear of the area behind the cockpit.

A BPRS is usually comprised of four major elements: Activation Handle, Activation Cable/Housing, Rocket Motor Assembly and Parachute Container.

The first thing first responders may see when they approach the cockpit is the red firing handle. This will be located near the seats in the cockpit, or it could be in the ceiling, as it must be at arm's length, so that the pilot can access it. The red firing handle connects to the activation housing, the flexible cable that links the firing handle to the igniter.

The pilot will normally remove the safety pin from the actuation handle prior to flight in order to arm the system and then replace it after flight to make it safe. However, it is also possible that the pilot did not arm the system for flight and thus the safety pin should still be inserted in the handle.

WARNING: Even with the safety pin inserted in the actuation handle, there is still a risk that the BPRS could activate due to disruption or movement of wreckage.

If the actuation handle has the pin removed, the system is armed and thus there is a serious risk to those attending the accident site. With this in mind the safety pin can usually be located somewhere in the forward section of the cockpit and inserted into the activation handle holder. If the safety pin cannot be located the use of zip ties is recommended as a temporary substitute.

Further information can be found at:

https://www.faa.gov/airports/airport_safety/certalerts/media/cert1304.pdf

WARNING: While an aircraft equipped with a BPRS should have clear warning marks/decals to identify the danger, the AAIU has on occasions experienced situations where no marks/decals were present, yet an armed BPRS was contained within the aircraft wreckage. If in doubt, do not approach the aircraft and await arrival of the AAIU.



**TO REPORT AN AVIATION ACCIDENT/
SERIOUS INCIDENT**



Air Accident Investigation Unit (AAIU)
Telephone: 01 804 1538 (24 Hours)

**TO REPORT AN IRISH MILITARY AVIATION
ACCIDENT/SERIOUS INCIDENT**



Irish Air Corps
Telephone: 01 403 7800 (24 hours)

Guidance for An Garda Síochána and First Responders attending an Aircraft Accident

Produced by the Air Accident Investigation Unit, 2022



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