

Registry Publication 5

Occurrence, Serious Incident and Accident Reporting

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Amendment Record

Version	Date	Details
1	2 February 2018	Initial issue
2	28 June 2018	Addition of paragraph 3.2.7

Foreword

1. This Registry Publication (RP) provides guidance on the processes and procedures for the reporting of occurrences, serious incidents and accidents relating to Isle of Man registered aircraft, which if followed will ensure compliance with the following applicable legislation:

- Air Navigation (Isle of Man) Order 2015¹;
- Air Navigation (General) Regulations 2006² as amended and as applied to the Isle of Man by the Civil Aviation (Subordinate Legislation) (Application) Order 2006³.

(Note: The Isle of Man is not bound by European Union regulations pertaining to occurrence reporting and is not licensed to use the European Central Repositories for occurrences (ECR-ECCAIRS)).

2. The Isle of Man Aircraft Registry (IOMAR) espouses a 'Just Culture' in the interests of the ongoing development of flight safety. This means that the IOMAR supports the development, within all areas of the aviation community, of a culture in which individuals:

- are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training or that reflect accepted norms, but which result in a reportable event;
- accept that there may be circumstances where they are required to undertake additional training or be restricted in their activities to ensure safety;
- recognise that gross negligence, wilful violations and destructive acts are not tolerated.

4. It is fundamental to the purpose of the reporting of incidents and accidents, that the knowledge gained from the investigation of these occurrences is disseminated so that we may all learn from them. Without prejudice to the proper discharge of its responsibilities, the IOMAR will not disclose the name of the person submitting the report or of a person to whom it relates unless required to do so by law; or the person concerned authorises disclosure.

5. If any safety follow-up action arising from a report be necessary, the IOMAR will take all reasonable steps to avoid disclosing the identity of the reporter or of those individuals involved in any reportable occurrence. However, personal details may need to be shared with the licensing authority of the individual e.g. UK CAA for the holder of a UK issued flight crew licence.

¹ SI 2015/870 as amended by SI 2016/155

² SI 2006/601

³ SD 909/06

1. Objectives

1.1 The objectives of accident, serious incident and occurrence reporting are:

- the prevention of accidents and incidents and not to attribute blame or liability;
- to contribute to the improvement of air safety by ensuring that relevant information on safety is reported, collected, stored, protected and disseminated.

2. Definitions

2.1 "**Occurrence**" means an operational interruption, defect, fault or other irregular circumstance that has or may have influenced flight safety and that has not resulted in an accident or serious incident.

2.2 "**Serious incident**" means an incident involving circumstances indicating that an accident nearly occurred.

2.3 "**Accident**" means an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

- a person suffers a fatal or serious injury as a result of:
 - being in or upon the aircraft,
 - direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
 - 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

- the aircraft sustains damage or structural failure which:
 - adversely affects the structural strength, performance or flight characteristics of the aircraft, and
 - would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tyres, brakes, fairings, small dents or puncture holes in the aircraft skin; or
 - the aircraft is missing or is completely inaccessible;

2.4 "**Airprox**" means a situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised.

3. Mandatory Occurrence Reports (Form 30)

3.1 Requirement to Report

- 3.1.1 It is a legal requirement for operators, commanders and aircraft maintenance engineers of Isle of Man registered turbine powered aircraft to report occurrences that endanger or that if not corrected would endanger an aircraft, its occupants, or any other person. Examples of occurrences that must be reported are provided at Annex A.
- 3.1.2 A voluntary occurrence report may be made of a perceived actual or potential hazard that is not mandated to be reported. The same process shall be followed as for the submission of Mandatory Occurrence Reports.

3.2 Initial Reporting

- 3.2.1 Reports are to be made to the Isle of Man Aircraft Registry (IOMAR) by completing and submitting Part 1 of the [Form 30 Mandatory Occurrence Report](#) **within 96 hours** of the occurrence coming to the knowledge of the person making the report. Where possible the report should be completed electronically but if necessary the IOMAR will accept hand written copies.
- 3.2.2 For Airprox events that have taken place within the UK FIR, an [Airprox Report](#) should in addition be sent directly to the UK Airprox Board (UKAB) and copied to the IOMAR.
- 3.2.3 It is important for the narrative of the report to clearly describe what happened or was found and immediate actions taken to address the situation. Follow the time sequence of the occurrence sticking to and including all the relevant facts. Do not assume or make anything up but do provide suggestions or recommendations which might assist the subsequent assessment and investigation. It helps to be concise and using short sentences will help with this. If possible, ask someone to check your report before submission to ensure that it makes sense, contains the relevant information and can be interpreted as intended.
- 3.2.4 To assist clarity and understanding, photographs and/or diagrams should be included with the report where appropriate.
- 3.2.5 Personnel submitting reports should also comply with any additional requirements specified in their organisation's safety management system as applicable.
- 3.2.6 The IOMAR will acknowledge receipt and issue a unique serial number.
- 3.2.7 If any reporter considers that it is essential that their identity not be revealed, the report itself should be clearly annotated 'CONFIDENTIAL' and submitted directly to 'Director of Civil Aviation' and the envelope should be marked 'Personal'. The request will be respected and the reporter will be contacted personally, either by the Director of Civil Aviation or their deputy. Confidentiality cannot, of course, be guaranteed when an occurrence is reported separately by another party or in respect to gross negligence, wilful violations or destructive acts. Reporters submitting a Confidential Report must also accept that effective investigation may be inhibited, however, the IOM CAA would rather have a Confidential Report than no report at all.

3.3 Investigation by Aircraft Operator

3.3.1 Following submission of Part 1 of Form 30, the Aircraft Operator is responsible for ensuring that an investigation is conducted by an appropriate person to establish:

- the root causes that led to the occurrence;
- corrective measures that will be put in place to avoid similar events in future.

3.3.2 The IOMAR does not prescribe who shall conduct the investigation but it should be carried out in accordance with any requirements specified in the Operator's safety management system as applicable. Guidance on the incident investigation methodology is at Annex B.

3.3.3 On completion of the investigation and **within 30 days** of the date of notification of the occurrence by the reporter, Part 2 of Form 30 is to be completed and submitted to the IOMAR.

3.4 Isle of Man Aircraft Registry Actions

3.4.1 The IOMAR will review the completed Part 1 and Part 2 of the Form 30 to:

- ensure that the root causes have been identified;
- confirm that appropriate corrective measures have been put in place;
- establish any common themes and trends;
- identify any wider safety promotion or follow on activity that the Registry needs to undertake.

3.4.2 The IOMAR will subsequently confirm when the occurrence is 'closed'.

4. Aircraft Serious Incidents and Accidents

4.1 Reporting

4.1.1 The commander of the aircraft (or the aircraft operator, if the commander has been killed or incapacitated) must, without delay, notify serious incidents and accidents involving Isle of Man registered aircraft as follows:

- For events in the UK, a UK Overseas Territory or a Crown Dependency, inform the UK Air Accidents Investigation Branch (AAIB) using their 24-hour reporting line - Telephone: +44 1252 512299.
- For events in countries other than the UK, a UK Overseas Territory or a Crown Dependency, inform the local accident investigation authority - contact information is available from the [International Civil Aviation Organisation](#).

4.1.2 The following information shall be provided to the relevant accident investigation authority:

- type, model, nationality and registration marks of the aircraft;
- names of the owner, operator and hirer (if any) of the aircraft;
- name of the commander of the aircraft;
- date and time (UTC) of the accident or serious incident;
- last point of departure and the next point of intended landing of the aircraft;
- position of the aircraft in relation to some easily defined geographical location;
- number of:
 - crew on board and the number killed or seriously injured;
 - passengers on board and the number killed or seriously injured;
 - other persons killed or seriously injured as a result of the accident;
- nature of the accident or serious incident and the extent of damage as far as is known.

4.1.3 Regardless of the location of the event, Part 1 of [Form 30](#) must always be completed and submitted to the IOMAR no later than 96 hours following discovery of the accident or serious incident. It is expected that the Part 2 will be completed and submitted to the IOMAR following the completion of the independent accident/serious incident investigation by the relevant accident investigation authority.

Annex A - Occurrences to be Reported

1. Overview

- 1.1 This Annex contains examples of occurrences that shall be reported as required by the Occurrence Reporting Directive. The list cannot be completely comprehensive; therefore, any other occurrences, which are judged by those involved to endanger or that if not corrected would endanger an aircraft, its occupants, or any other person, shall also be reported.
- 1.2 The contents of this Annex shall not preclude the reporting of any occurrence, situation or condition which, if repeated in different but likely circumstances or allowed to continue uncorrected, could create a hazard to aircraft safety.
- 1.3 If the circumstances of the events listed below are such that it is considered that an accident nearly occurred - the event shall instead be classified as a "serious incident" and reported to relevant accident investigation authority.

2. Aircraft Flight Operations

- 2.1 Operation of the aircraft:
 - a. Avoidance manoeuvres:
 - i. risk of collision with another aircraft, terrain or other object or an unsafe situation when avoidance action would have been appropriate;
 - ii. an avoidance manoeuvre required to avoid a collision with another aircraft, terrain or other object;
 - iii. an avoidance manoeuvre to avoid other unsafe situations.
 - b. Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting, overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings on a closed, occupied or incorrect runway.
 - c. Runway incursions.
 - d. Inability to achieve predicted performance during take-off or initial climb.
 - e. Critically low fuel quantity or inability to transfer fuel or use total quantity of usable fuel.
 - f. Loss of control (including partial or temporary) regardless of cause.
 - g. Occurrences close to or above V1 resulting from or producing a hazardous or potentially hazardous situation (e.g. rejected take-off, tail strike, engine-power loss etc.).
 - h. Go around producing a hazardous or potentially hazardous situation.

- i. Unintentional significant deviation from airspeed, intended track or altitude (more than 300 ft) regardless of cause.
- j. Descent below decision height/altitude or minimum descent height/altitude without the required visual reference.
- k. Loss of position awareness relative to actual position or to other aircraft.
- l. Breakdown in communication between flight crew (CRM) or between flight crew and other parties (cabin crew, ATC, engineering).
- m. Heavy landing — a landing deemed to require a 'heavy landing check'.
- n. Exceedance of fuel imbalance limits.
- o. Incorrect setting of an SSR code or of an altimeter subscale.
- p. Incorrect programming of, or erroneous entries into, equipment used for navigation or performance calculations, or use of incorrect data.
- q. Incorrect receipt or interpretation of radio-telephony messages.
- r. Fuel system malfunctions or defects, which had an effect on fuel supply and/or distribution.
- s. Aircraft unintentionally departing from a paved surface.
- t. Collision between an aircraft and any other aircraft, vehicle or other ground object.
- u. Inadvertent and/or incorrect operation of any controls.
- v. Inability to achieve the intended aircraft configuration for any flight phase (e.g. landing gear and gear doors, flaps, stabilisers, slats etc.).
- w. A hazard or potential hazard which arises as a consequence of any deliberate simulation of failure conditions for training, system checks or training purposes.
- x. Abnormal vibration.
- y. Operation of any primary warning system associated with manoeuvring the aircraft e.g. configuration warning, stall warning (stick shaker), over-speed warning etc. unless:
 - i. the crew conclusively established that the indication was false and provided that the false warning did not result in difficulty or hazard arising from the crew response to the warning; or
 - ii. operated for training or test purposes.
- z. GPWS/TAWS 'warning' when:
 - i. the aircraft comes into closer proximity to the ground than had been planned or anticipated; or

- ii. the warning is experienced in instrument meteorological conditions or at night and is established as having been triggered by a high rate of descent (mode 1); or
 - iii. the warning results from failure to select landing gear or landing flaps by the appropriate point on the approach (mode 4); or
 - iv. any difficulty or hazard arises or might have arisen as a result of crew response to the 'warning' e.g. possible reduced separation from other traffic. This could include warning of any mode or type i.e. genuine, nuisance or false.
- aa. GPWS/TAWS 'alert' when any difficulty or hazard arises or might have arisen as a result of crew response to the 'alert'.
 - bb. ACAS RAs.
 - cc. Jet or prop blast incidents resulting in significant damage or serious injury.

2.2 Emergencies:

- a. Fire, explosion, smoke or toxic or noxious fumes, even though fires were extinguished.
- b. The use of any non-standard procedure by the flight or cabin crew to deal with an emergency when:
 - i. the procedure exists but is not used;
 - ii. the procedure does not exist;
 - iii. the procedure exists but is incomplete or inappropriate;
 - iv. the procedure is incorrect;
 - v. the incorrect procedure is used.
- c. Inadequacy of any procedures designed to be used in an emergency, including when being used for maintenance, training or test purposes.
- d. An event leading to an emergency evacuation.
- e. Depressurisation.
- f. The use of any emergency equipment or prescribed emergency procedures in order to deal with a situation.
- g. An event leading to the declaration of an emergency ('Mayday' or 'Pan').
- h. Failure of any emergency system or equipment, including all exit doors and lighting, to perform satisfactorily, including when being used for maintenance, training or test purposes.
- i. Events requiring any use of emergency oxygen by any crew member.

2.3 Crew incapacitation:

- a. Incapacitation of any member of the flight crew, including that which occurs prior to departure if it is considered that it could have resulted in incapacitation after take-off.
- b. Incapacitation of any member of the cabin crew which renders them unable to perform essential emergency duties.

2.4 Injury:

Occurrences, which have or could have led to significant injury to passengers or crew but which are not considered reportable as an accident.

2.5 Meteorology:

- a. A lightning strike which resulted in damage to the aircraft or loss or malfunction of any essential service.
- b. A hail strike which resulted in damage to the aircraft or loss or malfunction of any essential service.
- c. Severe turbulence encounter, an encounter resulting in injury to occupants or deemed to require a 'turbulence check' of the aircraft.
- d. A windshear encounter.
- e. Icing encounter resulting in handling difficulties, damage to the aircraft or loss or malfunction of any essential service.

2.6 Security:

- a. Unlawful interference with the aircraft including a bomb threat or hijack.
- b. Difficulty in controlling intoxicated, violent or unruly passengers.
- c. Discovery of a stowaway.

2.7 Other occurrences:

- a. Repetitive instances of a specific type of occurrence which in isolation would not be considered 'reportable' but which due to the frequency with which they arise, form a potential hazard.
- b. A bird strike which resulted in damage to the aircraft or loss or malfunction of any essential service.
- c. Wake-turbulence encounters.
- d. Any other occurrence of any type considered to have endangered or which might have endangered the aircraft or its occupants on board the aircraft or on the ground.

3. Aircraft Technical

3.1 Structural:

Not all structural failures need to be reported. Engineering judgment is required to decide whether a failure is serious enough to be reported. The following examples can be taken into consideration:

- a. damage to a principal structural element (PSE) that has not been designated as damage-tolerant (life-limited element). PSEs are those which contribute significantly to carrying flight, ground, and pressurisation loads, and the failure of which could result in a catastrophic failure of the aircraft;
- b. defect or damage exceeding admissible damages to a PSE that has been designated as damage-tolerant;
- c. damage to or defect exceeding allowed tolerances of a structural element, the failure of which could reduce the structural stiffness to such an extent that the required flutter, divergence or control reversal margins are no longer achieved;
- d. damage to or defect of a structural element, which could result in the liberation of items of mass that may injure occupants of the aircraft;
- e. damage to or defect of a structural element, which could jeopardise proper operation of systems. See (ii) below;
- f. loss of any part of the aircraft structure in flight.

3.2 Systems:

The following general criteria applicable to all systems are proposed:

- a. loss, significant malfunction or defect of any system, subsystem or set of equipment when standard operating procedures, drills etc. could not be satisfactorily accomplished;
- b. inability of the crew to control the system, for example:
 - i. uncommanded actions,
 - ii. incorrect and/or incomplete response, including limitation of movement or stiffness,
 - iii. runaway,
 - iv. mechanical disconnection or failure;
- c. failure or malfunction of the exclusive function(s) of the system (one system could integrate several functions);
- d. interference within or between systems;

- e. failure or malfunction of the protection device or emergency system associated with the system;
- f. loss of redundancy of the system;
- g. any occurrence resulting from unforeseen behaviour of a system;
- h. for aircraft types with single main systems, subsystems or sets of equipment: loss, significant malfunction or defect in any main system, subsystem or set of equipment;
- i. for aircraft types with multiple independent main systems, subsystems or sets of equipment: the loss, significant malfunction or defect of more than one main system, subsystem or set of equipment;
- j. operation of any primary warning system associated with aircraft systems or equipment unless the crew conclusively established that the indication was false, provided that the false warning did not result in difficulty or hazard arising from the crew response to the warning;
- k. leakage of hydraulic fluids, fuel, oil or other fluids which resulted in a fire hazard or possible hazardous contamination of aircraft structure, systems or equipment, or risk to occupants;
- l. malfunction or defect of any indication system when this results in the possibility of misleading indications to the crew;
- m. any failure, malfunction or defect if it occurs at a critical phase of the flight and is relevant to the system operation;
- n. significant shortfall of the actual performances compared to the approved performance which resulted in a hazardous situation (taking into account the accuracy of the performance-calculation method) including braking action, fuel consumption etc;
- o. asymmetry of flight controls; e.g. flaps, slats, spoilers etc;

The Appendix to this Annex gives a list of examples of reportable occurrences resulting from the application of these general criteria to specific systems.

3.3 Propulsion (including engines, propellers and rotor systems) and auxiliary power units (APUs)

- a. Flameout, shutdown or malfunction of any engine.
- b. Overspeed or inability to control the speed of any high-speed rotating component (for example: APU, air starter, air cycle machine, air turbine motor, propeller or rotor).
- c. Failure or malfunction of any part of an engine or powerplant resulting in any one or more of the following:
 - i. non-containment of components/debris;
 - ii. uncontrolled internal or external fire, or hot gas breakout;
 - iii. thrust in a direction different from that demanded by the pilot;

- iv. thrust-reversing system failing to operate or operating inadvertently;
 - v. inability to control power, thrust or rpm;
 - vi. failure of the engine mount structure;
 - vii. partial or complete loss of a major part of the powerplant;
 - viii. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers;
 - ix. inability, by use of normal procedures, to shutdown an engine;
 - x. inability to restart a serviceable engine.
- d. An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTTC):
- i. for a single-engine aircraft; or
 - ii. where it is considered excessive for the application; or
 - iii. where this could affect more than one engine in a multi-engine aircraft, particularly in the case of a twin engine aircraft; or
 - iv. for a multi-engine aircraft where the same, or similar, engine type is used in an application where the event would be considered hazardous or critical.
- e. Any defect in a life-controlled part causing its withdrawal before completion of its full life.
- f. Defects of common origin which could cause an in-flight shut-down rate so high that there is the possibility of more than one engine being shut down on the same flight.
- g. An engine limiter or control device failing to operate when required or operating inadvertently.
- h. Exceedance of engine parameters.
- i. FOD resulting in damage.

3.4 Propellers and transmission

- a. Failure or malfunction of any part of a propeller or powerplant resulting in any one or more of the following:
- i. an overspeed of the propeller;
 - ii. the development of excessive drag;
 - iii. a thrust in the opposite direction to that commanded by the pilot;
 - iv. a release of the propeller or any major portion of the propeller;

- v. a failure that results in excessive imbalance;
- vi. the unintended movement of the propeller blades below the established minimum in-flight low-pitch position;
- vii. an inability to feather the propeller;
- viii. an inability to change propeller pitch;
- ix. an uncommanded change in pitch;
- x. an uncontrollable torque or speed fluctuation;
- xi. the release of low-energy parts.

3.5 Rotors and transmission

- a. Damage or defect of main rotor gearbox/attachment which could lead to in-flight separation of the rotor assembly and/or malfunctions of the rotor control.
- b. Damage to tail rotor, transmission and equivalent systems.

3.6 APUs

- a. Shut down or failure when the APU is required to be available by operational requirements, e.g. ETOPS, MEL.
- b. Inability to shut down the APU.
- c. Overspeed.
- d. Inability to start the APU when needed for operational reasons.

3.7 Human factors

Any incident where any feature or inadequacy of the aircraft design could have led to an error of use that could contribute to a hazardous or catastrophic effect.

3.8 Other occurrences

- a. Any incident where any feature or inadequacy of the aircraft design could have led to an error of use that could contribute to a hazardous or catastrophic effect.
- b. An occurrence not normally considered as reportable (e.g., furnishing and cabin equipment, water systems), where the circumstances resulted in endangering the aircraft or its occupants.
- c. A fire, explosion, smoke or toxic or noxious fumes.
- d. Any other event which could endanger the aircraft, or affect the safety of the occupants of the aircraft, or people or property in the vicinity of the aircraft or on the ground.

- e. Failure or defect of passenger address system resulting in loss of, or inaudible, passenger address system.
- f. Loss of pilot seat control during flight.

4. Aircraft Maintenance and Repair

- a. Incorrect assembly of parts or components of the aircraft found during an inspection or test procedure not intended for that specific purpose.
- b. Hot bleed air leak resulting in structural damage.
- c. Any defect in a life-controlled part causing retirement before completion of its full life.
- d. Any damage or deterioration (e.g. fractures, cracks, corrosion, delamination, disbonding etc.) resulting from any cause (e.g. as flutter, loss of stiffness or structural failure) to:
 - i. a primary structure or a PSE (as defined in the manufacturers' Repair Manual) where such damage or deterioration exceeds allowable limits specified in the Repair Manual and requires a repair or complete or partial replacement;
 - ii. a secondary structure which consequently has or may have endangered the aircraft;
 - iii. the engine, propeller or rotorcraft rotor system.
- e. Any failure, malfunction or defect of any system or equipment, or damage or deterioration thereof found as a result of compliance with an airworthiness directive or other mandatory instruction issued by a regulatory authority, when:
 - i. it is detected for the first time by the reporting organisation implementing compliance;
 - ii. on any subsequent compliance, it exceeds the permissible limits quoted in the instruction and/or published repair/rectification procedures are not available.
- f. Failure of any emergency system or equipment, including all exit doors and lighting, to perform satisfactorily, including when being used for maintenance or test purposes.
- g. Non-compliance or significant errors in compliance with required maintenance procedures.
- h. Products, parts, appliances and materials of unknown or suspect origin.
- i. Misleading, incorrect or insufficient maintenance data or procedures that could lead to maintenance errors.
- j. Any failure, malfunction or defect of ground equipment used for testing or checking of aircraft systems and equipment when the required routine inspection and test procedures did not clearly identify the problem, where this results in a hazardous situation.

5. Air Navigation Services, Facilities and Ground Services

5.1 Air navigation services (ANS)

- a. Near collision incidents (encompassing specific situations where one aircraft and another aircraft/the ground/a vehicle/person or object are perceived to be too close to each other):
- b. separation minima infringement;
- c. inadequate separation;
- d. near-controlled flight into terrain (near CFIT);
- e. runway incursion where avoiding action was necessary.
- f. Potential for collision or near collision (encompassing specific situations having the potential to be an accident or a near collision, if another aircraft is in the vicinity):
- g. runway incursion where no avoiding action is necessary;
- h. runway excursion;
- i. aircraft deviation from ATC clearance;
- j. aircraft deviation from applicable air traffic management (ATM) regulation:
 - i. aircraft deviation from applicable published ATM procedures;
 - ii. unauthorised penetration of airspace;
 - iii. deviation from aircraft ATM-related equipment carriage and operations, as mandated by applicable regulation(s).
- k. ATM-specific occurrences (encompassing those situations where the ability to provide safe ATM services is affected, including situations where, by chance, the safe operation of aircraft has not been jeopardised). This shall include the following occurrences:
 - l. inability to provide ATM services:
 - i. inability to provide air traffic services;
 - ii. inability to provide airspace management services;
 - iii. inability to provide air traffic flow management services;
 - m. failure of Communication function;
 - n. failure of Surveillance function;
 - o. failure of Data Processing and Distribution function;
 - p. failure of Navigation function;

- q. ATM system security.
- r. Provision of significantly incorrect, inadequate or misleading information from any ground sources, e.g. air traffic control (ATC), automatic terminal information service (ATIS), meteorological services, navigation databases, maps, charts, manuals, etc.
- s. Provision of less than prescribed terrain clearance.
- t. Provision of incorrect pressure reference data (i.e. altimeter setting).
- u. Incorrect transmission, receipt or interpretation of significant messages when this results in a hazardous situation.
- v. Separation minima infringement.
- w. Unauthorised penetration of airspace.
- x. Unlawful radio communication transmission.
- y. Failure of ANS ground or satellite facilities.
- z. Major ATC/ATM failure or significant deterioration of aerodrome infrastructure.
- aa. Aerodrome movement areas obstructed by aircraft, vehicles, animals or foreign objects, resulting in a hazardous or potentially hazardous situation.
- bb. Errors or inadequacies in marking of obstructions or hazards on aerodrome movement areas resulting in a hazardous situation.
- cc. Failure, significant malfunction or unavailability of airfield lighting.

5.2 Aerodrome and aerodrome facilities

- a. Significant spillage during fuelling operations.
- b. Loading of incorrect fuel quantities likely to have a significant effect on aircraft endurance, performance, balance or structural strength.

5.3 Handling of passengers, baggage and cargo

- a. Significant contamination of aircraft structure, systems and equipment arising from the carriage of baggage or cargo.
- b. Incorrect loading of passengers, baggage or cargo, likely to have a significant effect on aircraft mass and/or balance.
- c. Incorrect stowage of baggage or cargo (including hand baggage) likely in any way to endanger the aircraft, its equipment or occupants or to impede emergency evacuation.
- d. Inadequate stowage of cargo containers or other substantial items of cargo.
- e. Carriage or attempted carriage of dangerous goods in contravention of applicable regulations, including incorrect labelling and packaging of dangerous goods.

5.4 Aircraft ground handling and servicing

- a. Failure, malfunction or defect of ground equipment used for the testing or checking of aircraft systems and equipment when the required routine inspection and test procedures did not clearly identify the problem, where this results in a hazardous situation.
- b. Non-compliance or significant errors in compliance with required servicing procedures.
- c. Loading of contaminated or incorrect type of fuel or other essential fluids (including oxygen and potable water).

Appendix to ANNEX A

The following subparagraphs give examples of reportable occurrences resulting from the application of the general criteria to specific systems listed in paragraph 3.2 of the Annex.

1. Air conditioning/ventilation
 - a. complete loss of avionics cooling
 - b. depressurisation.
2. Autoflight system
 - a. failure of the autoflight system to achieve the intended operation while engaged
 - b. significant reported crew difficulty to control the aircraft linked to autoflight system functioning
 - c. failure of any autoflight system disconnect device
 - d. uncommanded autoflight mode change.
3. Communications
 - a. failure or defect of passenger address system resulting in loss of or inaudible passenger address
 - b. total loss of communication in flight.
4. Electrical system
 - a. loss of one electrical distribution system (AC/DC)
 - b. total loss or loss of more than one electrical generation system
 - c. failure of the back up (emergency) electrical generation system.
5. Cockpit/Cabin/Cargo
 - a. pilot seat control loss during flight
 - b. failure of any emergency system or equipment, including emergency evacuation signalling system, all exit doors, emergency lighting, etc.
 - c. loss of retention capability of the cargo loading system.
6. Fire protection system
 - a. fire warnings, except those immediately confirmed as false
 - b. undetected failure or defect of fire/smoke detection/protection system, which could lead to loss or reduced fire detection/protection

- c. absence of warning in case of actual fire or smoke.
7. Flight controls
- a. asymmetry of flaps, slats, spoilers, etc.
 - b. limitation of movement, stiffness or poor or delayed response in the operation of primary flight control systems or their associated tab and lock systems
 - c. flight control surface runaway
 - d. flight control surface vibration felt by the crew
 - e. mechanical flight control disconnection or failure
 - f. significant interference with normal control of the aircraft or degradation of flying qualities.
8. Fuel system
- a. fuel quantity indicating system malfunction resulting in total loss or wrong indication of fuel quantity on board
 - b. leakage of fuel which resulted in major loss, fire hazard, significant contamination
 - c. malfunction or defects of the fuel jettisoning system which resulted in inadvertent loss of significant quantity, fire hazard, hazardous contamination of aircraft equipment or inability to jettison fuel
 - d. fuel system malfunctions or defects which had a significant effect on fuel supply and/or distribution
 - e. inability to transfer or use total quantity of usable fuel.
9. Hydraulics
- a. loss of one hydraulic system (ETOPS only)
 - b. failure of the isolation system
 - c. loss of more than one hydraulic circuit
 - d. failure of the back-up hydraulic system
 - e. inadvertent ram air turbine extension.
10. Ice detection/protection system
- a. undetected loss or reduced performance of the anti-ice/de-ice system
 - b. loss of more than one of the probe-heating systems
 - c. inability to obtain symmetrical wing de-icing

- d. abnormal ice accumulation leading to significant effects on performance or handling qualities
 - e. crew vision significantly affected.
11. Indicating/warning/recording systems
- a. malfunction or defect of any indicating system when the possibility of significant misleading indications to the crew could result in an inappropriate crew action on an essential system
 - b. loss of a red warning function on a system
 - c. for glass cockpits: loss or malfunction of more than one display unit or computer involved in the display/warning function.
12. Landing gear system/brakes/tyres
- a. brake fire
 - b. significant loss of braking action
 - c. asymmetrical braking action leading to significant path deviation
 - d. failure of the landing gear free fall extension system (including during scheduled tests)
 - e. unwanted landing gear or gear doors extension/retraction
 - f. multiple tyre burst.
13. Navigation systems (including precision approach systems) and air data systems
- a. total loss or multiple navigation equipment failures
 - b. total or multiple air data system equipment failures
 - c. significant misleading indications
 - d. significant navigation errors attributed to incorrect data or a database coding error
 - e. unexpected deviations in lateral or vertical path not caused by pilot input
 - f. problems with ground navigational facilities leading to significant navigation errors not associated with transitions from inertial navigation mode to radio navigation mode.
14. Oxygen for pressurised aircraft
- a. loss of oxygen supply in the cockpit
 - b. loss of oxygen supply to a significant number of passengers (more than 10 %), including when found during maintenance or training or test purposes.
15. Bleed air system

- a. hot bleed air leak resulting in fire warning or structural damage
- b. loss of all bleed air systems
- c. failure of bleed air leak detection system.

Annex B - Occurrence Investigation Methodology

1. Introduction

- 1.1 Identifying the lessons to be learned from a safety occurrence requires an understanding of not just what happened, but why it happened. Therefore, the investigation should look beyond the obvious causes and aim to identify the contributory factors, some of which may be related to weaknesses in the system's defences or other organisational issues.
- 1.2 For maximum effectiveness, the outcome of the investigation should focus on determining hazards and risks and not on identifying individuals to blame. The way the investigation is conducted significantly influences the overall safety culture in the aviation organisation.
- 1.3 Investigations into occurrences are scalable and should be proportionate to the complexity of the event. It is also recognised that investigations may be conducted by lone individuals or by organisations with formal safety management systems. Therefore it is inappropriate to specify exact methodologies or detail to be applied by all. However, the generic guidance below should be useful to all.

2. Investigation Phases

- 2.1 The following phases should apply to all investigations but the level and depth applied to each phase is variable:
 - Set up of the investigation team with the required skills and expertise.
 - The size of the team and the expert profile of its members depend on the nature and severity of the occurrence being investigated as well as the size and capability of the organisation.
 - The investigating team may require the assistance of other specialists.
 - Often, a single person is assigned to carry out investigation of an incident considered to have limited potential to cause harm.
 - Gather factual information that is pertinent to the understanding of the circumstances and the events leading to the occurrence.
 - A variety of information sources will be used to collect the necessary data for the reconstruction of the event.
 - A fundamental part of any investigation is the collation of statements from those involved. It should be recognised that individuals often have varying recollections as a result of their own perspective of the event. The aim is to collate these and to establish the facts.
 - Event reconstruction in order to establish the exact sequence of events leading to the safety occurrence with its causal and contributory factors.
 - The output of the reconstruction phase should be a set of events which unifies the views of the various persons who were involved in these events immediately before and after the occurrence.

- Analysis of the information to provide explanation of why the occurrence happened and enable the drawing of conclusions and identification of safety actions to eliminate or mitigate the risk.
 - "5 whys analysis" is a quick, simple and useful method of root cause analysis. It involves starting at your hazardous condition/risk event, and then asking "Why did this happen?" You will then establish the preceding event/reason that lead to the hazardous condition. Next, you will ask, "And why did this preceding event happen?" Once again, you will establish the next event back. You will repeat this process until you arrive at the root cause. Usually you will ask "why?" about 5 times. You know you have arrived at the root cause when there is no real answer to "why?" In other words, when your answer "just because," you have arrived at the root cause.
- Drawing conclusions on the basis of collected and analysed information, generally presented by the following categories:
 - Main (direct) cause(s) and contributing factors leading to the occurrence;
 - Findings that identify additional hazards which have risk potential but have not played direct role in the occurrence;
 - Other findings that have potential to improve the safety of operations or to resolve ambiguity or controversy issues contributed to the circumstances surrounding the occurrence.
- Identification of safety recommendations and actions to be taken in order to eliminate or mitigate the safety deficiencies identified by the investigation.