NATO STANDARD

AAMedP-1.7

AEROMEDICAL ASPECTS OF AIRCRAFT ACCIDENT AND INCIDENT INVESTIGATION

Edition B Version 2

APRIL 2025

NORTH ATLANTIC TREATY ORGANIZATION

ALLIED AEROMEDICAL PUBLICATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

30 April 2025

1. The enclosed Allied Aeromedical Publication AAMedP-1.7, Edition B, Version 2, AEROMEDICAL ASPECTS OF AIRCRAFT ACCIDENT AND INCIDENT INVESTIGATION, which has been approved by the nations in the MILITARY COMMITTEE AIR STANDARDIZATION BOARD (MCSAB), is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 3318.

2. AAMedP-1.7, Edition B, Version 2, is effective upon receipt and supersedes AAMedP-1.7, Edition B, Version 1, which shall be destroyed in accordance with the local procedure for the destruction of documents.

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4. This publication shall be handled in accordance with C-M (2002)60.

Thierry POULETTE
Major General, FRA (A)
Director, NATO Standardization Office

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RESERVED FOR NATIONAL LETTER OF PROMULGATION

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
CZE	At present CZE has no required test technical equipment to perform the simulation of impact damage to helmet to define kinetic energy of impact, probable impactor and probable level of transmitted force in accordance with paragraph e., point (5), (6), (7) of Appendix 1 to Annex A of publication AAMedP-1.7(B). CZE also cannot perform a correlation of head injury with impact data according to paragraph f. of Appendix 1 to Annex A of publication AAMedP- 1.7.(B).
ESP	Spain will implement this STANAG with the following reserve: The personal information could not to be exchanged, in case of being considered confidential or restricted information.
ITA	APPENDIX 1 to ANNEX A to AAMedP-1.7 - INFORMATION REQUIRED FOR DAMAGED HELMETS (page A-1-1): according to our regulation, currently the aeromedical member is not responsible to collect information required for damaged helmets. The specific data will be collected by an appropriate authority responsible for analysis.
MKD	The Army of the Republic of North Macedonia ratified and implement this STANAG without paragraph “e” of APPENDIX 1 of ANNNEX A, cause the MKD has no test technical equipment to perform the simulation of impact damage to helmet to define kinetic energy of impact, probable impact or probable level of transmitted force.
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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CHAPTER 1 INTRODUCTION

1.1 AIM

The aim of this standard is to standardize the essential points to be covered in the aeromedical investigation of accidents and/or incidents in order to facilitate the exchange of comparable information between nations.

1.2 GENERAL

1. This standard requires the following:

   a. A medical officer, preferably with specialist aeromedical qualifications, will participate, when possible, in the investigation of all aviation accidents and/or aeromedical incidents as aeromedical advisor to or as a full member of any Aircraft Accident and Incident Investigation Board established.

   b. The aeromedical member of the investigation board will be responsible for obtaining medical information in accordance with current national regulations.

   c. This standard relates to aircraft and UAV/RPAS- accidents and incidents. Ref : Chapter 3.19 Accident/Incident investigations of the Stanag 7234 / AATMP-51 NATO REMOTELY PILOTED AIRCRAFT SYSTEMS (RPAS) AIRSPACE INTEGRATION (AI)

   d. In the case of fatal accidents, the legal custodian of the bodies will be requested to facilitate the performance of autopsies on all fatalities to ascertain the causes of all injuries and their chronological sequence.

      Ideally all autopsies should be performed or observed by a specialist in forensic medicine and trained in aviation pathology and should include an appropriate histological, biochemical, toxicological, radiological and other special investigation. This pathologist can be either a civilian or service medical officer. When a decision has been made to perform an autopsy, the aeromedical board member or advisor will assist the pathologist in problems of an aeromedical nature.

Whilst every effort should be made by the investigating aeromedical officer to obtain an autopsy in a fatal accident, it will be necessary to adhere to the national and local medico-legal policy.

e. After the necessary lifesaving and fire-fighting actions have been taken, the police and other authorities will be requested to secure the scene of the accident until the Board has finished its on-site investigations. Personal protective equipment should be worn in case of AC/RPAS with fiber/composites. More specifically: Protective clothing (disposable coveralls), safety goggles or protective eyewear, work gloves and dust mask.

Photographs, drawings and maps must be made as soon as possible, showing position and condition of those involved in the accident. If for technical or social reasons the wreckage has to be moved, all the necessary positional information must have been obtained prior to removal.

Personal belongings, clothing and flight/protective equipment remaining on any part of a body should be retained in position on the body and should not be removed or cut, in order to facilitate positive identification and to aid the investigation.

Careful notes must be taken of any necessary alterations made to the wreckage and equipment.

Evidence from witnesses will be taken as early as possible, to avoid collusion.

f. The aeromedical member or advisor will support or carry out, if required, an examination of identification data such as color of hair and iris, finger and footprints, scars, dental identification, etc., of the deceased.

g. The aeromedical member or advisor will conduct a full examination of clothing and of personal and safety equipment to correlate damage noted with injury causation or prevention (see Appendix 1 and 2) Survivors and fatalities will be examined and this will include, if possible, appropriate X-ray examination and color photographs. X-rays of feet and hands of a dead body may lead to accurate determination of who was on the controls at the time of impact.

h. The information gathered from the aeromedical examination reports, external examination and autopsy must be related to the magnitude and direction of damaging forces and assessed with the information obtained from the damage sustained by aircraft structures, seats, etc., caused by fire, explosion, impact forces, etc.

i. There will be close cooperation between the aeromedical member or advisor and other members of the Aircraft Accident and Incident Investigation Board, in order to find the correct sequence of factors leading up to the accident or incident, causing the accident or incident and resulting in the final damage.

j. The aeromedical member or advisor will be aware that a variety of human factors including the recent physical and mental health of individuals involved in the accident or incident may lead to a better understanding of the problems involved. The advice of human factors specialists should be sought during the aeromedical investigation of an accident or incident.

k. Guides to the minimum amount of data to be collected by the Aircraft Accident and Incident Investigation Board investigating accidents and/or aeromedical incidents are attached as Annexes A and B. Annex A also contains an Appendix 1 considering damaged helmets and an Appendix 2 considering Post Ejection Data.

1.3 DEFINITIONS

a. Aeromedical incident is defined as “an occurrence in which the safety of the flight or completion of the mission was compromised due to medical reason”.

b. Aircraft accident is defined as “any occurrence that causes damage and/or injuries, due to the use of an aircraft/RPAS in flight, or with the intention of performing a flight, or repositioning the aircraft on the ground with use of the aircraft’s engine(s). Starting at the moment a person comes on board with the intention of one of the above until all persons on board with the same intention have left the aircraft”.

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ANNEX A GUIDE TO MINIMUM AEROMEDICAL INFORMATION TO BE RECORDED IN CASE OF AN AIRCRAFT ACCIDENT

1.A.1 PART I - GENERAL INFORMATION

(To be completed for each accident as applicable)

1. The Aircraft/RPAS:

   a. aircraft type and mark;

   b. aircraft serial number;

   c. parent unit of aircraft;

   d. time flown since last major engineering service;

   e. any abnormality in flight previous to that in which accident occurred.

2. The flight:

   a. Purpose of flight; Training/Demonstration/Ferry-flight/Post-maintenance check/Operational Deployment/Non-operational deployment/Other:…

   b. Pre-flight briefing (adequacy, time and length);

   c. Time of take off (Zulu/Local/…)

   d. Brief description of flight with any discrepancies between planned and actual flight.

3. The accident:

   a. Date and time (Zulu/Local/…)

   b. Place;

   c. Phase of flight (ground ops/taxiing/take off/initial climb/in flight maneuvering/transit/approach/landing/other);

   d. Photographs of accident, site, wreckage and damage, etc.

4. Physical conditions at time and site of accident:

   a. Level of illumination (day/night/dawn/dusk);

   b. Visibility;

   c. Cloud cover;

d. Precipitation;

e. Surface wind (including upper wind velocity) and temperature;

f. Wind speed and heading at ejection altitude:

g. Temperature, Humidity, Sealevel pressure;

h. External conditions (terrain, blowing snow, blowing dust or sand).

5. Summary of information concerning occupants of aircraft. Record for each individual occupant in the aircraft:

a. Name;

b. Rank and Number;

c. Age and Sex;

d. Crew duty;

e. Position in aircraft;

f. Medical condition as a result of the accident:

(1) Uninjured;

(2) Injured (slight, moderate, severe);

Addition of the Abbreviated Injury Scale

(3) Killed during accident (incinerated/not incinerated);

(4) Survived accident but died subsequently (seen/not seen before death);

(5) Missing.

6. Information relating to the in-flight phase of the emergency. (To be completed for all accidents except those, which occur prior to the beginning of take-off):

a. Nature of the emergency:

(1) Collision with ground/sea/obstacle;

(2) Emergency in flight;

(3) Mid-air collision;

(4) Enemy action

(5) Other or unknown;

b. Operating conditions at time of the emergency:

(1) Aircraft control (solo/dual/auto pilot/remote piloting);

(2) Single/Formation (leader/number) flight;

(3) Form of ground control,

c. Cause of the emergency (structural failure/collision/fire/lack of fuel/loss of control/failure of power/loss of auxiliary systems/other);

d. Flight path (altitude, speed and attitude) immediately before and during the emergency;

e. Abandonment in flight. The manner of the abandonment (assisted/unassisted) and its success are to be recorded in summary form for each individual in the aircraft. (The details of each individual abandonment are recorded elsewhere - Part II).

7. Information relating to crash or emergency landing. (To be completed only if aircraft was occupied at moment of impact with the ground):

a. Seating. Record for each individual airman and passenger in the aircraft prior to the accident:

(1) Type (manufacturer and mark) and orientation (to line of flight) of seat;

(2) Position of seat pan and seat back;

(3) Type of restrain harness;

(4) Type of quick release fitting;

(5) Type of personal survival pack;

(6) Weight setting of the seat (appropriate for occupant);

(7) Survival / personal equipment (e.g. helmet, Nomex, gloves etc.);

b. Actions prior to ground impact:

(1) Time between onset of emergency and realization that crash was inevitable;

(2) Nature and time of warning to aircraft occupants that impact would occur;

(3) Stowing and securing of loose items;

(4) Seat harness (fastened or unfastened/degree of adjustment);

(5) "Go Forward" lever (locked/unlocked) = seat belt lever;

c. The impact;

(1) Obstructions on approach;

(2) Surface onto which impact occurred (type, contour, obstruction);

(3) Details of impact (attitude, forward and vertical speed and angle at impact, estimated deceleration, secondary impact, damage to aircraft);

(4) Details of crash site;

d. The effect of impact. Record for each individual occupant of the aircraft at impact:

(1) Damage to seat;

(2) Restraint harness (adjustment, damage);

(3) Operation of quick release fitting (ease of opening by normal means, inadvertent operation);

(4) Escape from aircraft (escape route, ease of escape, cause of difficulties);

(5) Operation of the seat (effectiveness at absorbing energy).

8. Information relating to ditching and escape from aircraft in water. (To be completed only if aircraft was occupied at moment of impact with water):

a. Seating as for 7.a.;

b. Actions prior to water impact as for 7.b.;

c. The impact:

(1) Obstructions on approach;

(2) Sea state (Beaufort scale, surface wind speed, direction and wave height, water temperature);

(3) Details of impact (attitude, heading of aircraft, forward and vertical speed, and angle at impact, estimated deceleration, secondary impact, damage to aircraft, aircraft sink rate, fire and smoke);

d. The effect of impact as for 7.d.

1.A.2 PART II – ESCAPE IN FLIGHT

II (a) – EJECTION OR ATTEMPTED EJECTION

1. Escape system:

   a. Escape path clearance system;

   b. Ejection seat (type and Mark, serial number, modification status); Appendix 2

   c. Personal survival pack.

2. Action before initiation:

   a. Radio call;

   b. Delay to allow other individual to escape;

   c. Adjustment of posture, harness and personal equipment;

   d. Lapsed time from decision that ejection was required to initiation.

3. Aircraft state at initiation:

   a. Control (under control/not under control);

   b. Speed, attitude, altitude, acceleration and deceleration.

4. Initiation of ejection:

   a. Method (handle, hand(s) used, command by pilot him- or herself/commanded by other pilot/sequenced, inadvertent, impact, automatic or manual personal survival pack lowering system);

   b. Difficulty in initiation (reach/location/adequacy of pull).

5. Clearance of ejection path:

a. Method of clearance (canopy jettison (manual, automatic)/through canopy/miniature detonating cord);

b. Injury attributable to clearance of path (by canopy fragments, lead particles).

6. Ejection from aircraft:

a. Injury due to acceleration of ejection;

b. Injury due to contact with aircraft (within or outside cockpit);

c. Effectiveness of trunk and limb restraint systems;

d. Injury due to air blast (head and limb flailing);

e. Behavior of personal equipment during ejection phase (loss, damage).

7. Separation from aircraft to separation from seat:

a. Stability of man-seat combination (stable, tumbling, swinging, rotating);

b. Injury attributable to instability of man-seat combination;

c. Man-seat separation (altitude and speed, automatic or manual);

d. Injury attributable to man-seat separation;

e. Behavior of personal equipment whilst in seat (loss, damage).

8. Deployment of main parachute:

a. Deployment (normal/nature of abnormality/damage to parachute, harness);

b. Injury attributable to extraction and deployment;

c. Behavior of personal equipment during deployment of main parachute.

II (b) – UNASSISTED ESCAPE

9. Escape system:

a. Escape path clearance (door, hatch/manual, automatic);

b. Static seat (position and type, harness system);

c. Personal survival pack.

10. Action before initiation:

    a. State of personal equipment (oxygen mask and supply, radio transmission devices);

    b. Position in aircraft when emergency declared;

    c. Order to abandon (ordered/own initiative).

11. Aircraft state during abandonment:

    a. Control (under control or not);

    b. Speed, attitude, altitude, acceleration forces.

12. Abandonment:

    a. Clearance of escape path (self/other);

    b. Movement to seat and to escape hatch (ease of movement, obstructions);

    c. Emergence from aircraft (difficulty in leaving);

    d. Injury attributable to abandonment (on moving to seat, to escape hatch, on emergence into airstream).

13. Deployment of parachute:

    a. Method (static line, automatic, manual);

    b. Mode of deployment (normal/nature of abnormality/damage to parachute, harness);

    c. Injury attributable to deployment.

II (c) - PARACHUTE DESCENT
(To be completed for both ejection and unassisted escape)

14. Previous parachuting experience

15. Parachute harness:

    a. Type;

    b. Damage;

    c. Attitude suspended below parachute;

d. Discomfort from harness.

16. Stability of parachute-man complex:

a. Occurrence of oscillation;

b. Factors precipitating oscillation;

c. Action taken to reduce oscillation.

d. Parachute opening shock

17. Post parachute deployment drill:

a. Personal Survival Pack and lanyard (checks, lower, discard);

b. Oxygen mask and protective helmet (lowered, discarded);

c. Life preserver (inflation);

d. Preparation of parachute release fittings (unlocked quick release fitting).

18. Collision during descent:

a. Object collided with (parachutist, seat, overhead cables, trees).

19. Surface impact:

a. Nature of surface:

(1) Land (inclination, nature and hardness of surface, obstructions);

(2) Water (Beaufort scale, wave height, temperature, presence of ice);

b. Surface wind (direction and velocity);

c. Steering of parachute (by risers, by specific device);

d. Vertical and horizontal speeds at impact;

e. Injuries attributable to impact.

20. Post impact behavior:

a. Dragging after impact (speed, duration, cause of stop of dragging);

b. Release of parachute (ease of reach and operation of parachute release);

c. Entanglement in parachute harness (nature of entanglement and difficulty in freeing from parachute);

d. Life preserver:

(1) Method of inflation (manual/automatic);

(2) Time of inflation in relation to water impact;

(3) Effectiveness of life preserver (attitude in water);

e. Damage to personal equipment (by landing impact/dragging).

II (d) - SURVIVAL - RESCUE AND RECOVERY

21. Land Survival:

a. Surface (type of terrain tree/sand/flight deck/paved surface/rocks/flat field), surface wind, temperature and precipitation);

b. Previous experience of survival (practice/real);

c. Mobility of airman;

d. Location aids (list each available, those used and effectiveness of each);

e. Shelter and protection (nature and effectiveness);

f. Food and water (availability and consumption);

g. Contact with rescuers (method and time).

22. Sea Survival:

a. Sea state (Beaufort scale, temperature and surface wind)/ shallow water:

b. Previous experience of sea survival (practice/real);

c. Life preserver (remained inflated/required topping up);

d. Personal Survival Pack (retained/lost, flotation, opening, use of contents);

e. Life raft:

(1) Inflation (manual/automatic, effective/deficient);

(2) Re inflation required;

(3) Boarding (time in sea before boarding, case of boarding);

(4) Bailing out water (amount and frequency);

(5) Apron or canopy (time erected, inflated);

(6) Floor inflated (time, means);

f. Location aids (list each available, and use and effectiveness of each);

g. Food and water (availability and consumption);

h. Contact with rescuers (method and time).

i Name and contact details of rescuers

ii Actions taken by rescuers

1 On personal equipment

2 On person

23. Rescue and recovery:

a. Position and time when rescued (location of survivor);

b. Method of rescue (own efforts, rescue service involved and mode of rescue);

c. Difficulties.

1.A.3 PART III - BEHAVIOUR OF PERSONAL EQUIPMENT
(To be completed for each individual involved in the accident)

1. Record the personal equipment worn, whether it was effective and, if not, why not. Document any evidence which shows that the equipment was either protective or caused injuries. Record whether it was recovered or not and whether it was intact or damaged. This information should include the following components of the aircrew personal flying equipment:

a. Protective helmet;

b. Helmet mounted systems;

c. Visor system;

d. Oxygen equipment (mask, man mounted regulator, personal hose assembly);

e. Boom/throat microphone/CEP’s;

f. Corrective flying spectacles; Contact lenses;

g. Anti-G suit;

h. Underwear; Urinary devices (AMXD/other)

i. Thermal insulative garment;

j. Thermal conditioning garment (air, liquid or electrical);

k. Coverall (flying, immersion (ventile/non-ventile) combat suit);

l. Socks and gloves

m. Flying boots;

n. Life preserver/Survival aids waistcoat;

o. NBC protective clothing and respirator;

p. Personal body armor;

q. Personal weapon;

r. Body mounted harness system;

s. NVG automatic or manual separation system;

t. Leg restraint garters and lines;

u. Arm restraint lines;

v. Chest counter pressure garment.

w. Wearables (Acceleration meter, O2 meter, CF meter)

1.A.4 PART IV – INDIVIDUAL INFORMATION
(To be completed for each individual involved in accident)

1. Personal information:

a. Identification:

(1) Name;

(2) Rank;

(3) Age;

(4) Sex;

(5) Crew position;

(6) Qualifications;

(7) Marital status;

(8) Family and interpersonal relationship;

(9) Financial problems;

(10) Non-aviation related activities;

(11) Experience and flying time on accident aircraft type;

(12) Mission experience;

(13) Performance level;

(14) Assessment of flying skills (obtained from flying records);

(15) Medical category (including date awarded);

(16) Review of medical records and other relevant medical history;

b. Anthropometry (data eventually obtained from existing records):

(1) Height;

(2) Weight;

(3) Sitting height;

(4) Buttock-knee length;

(5) Shoulder breadth;

(6) Functional reach;

(7) Buttock-heel length;

(8) Hand dominance;

c. Physiological: input from wearables

(1) Sensory or perceptual limitations;

(2) Boredom;

(3) Fatigue and perturbation of circadian rhythms;

(4) History of airsickness;

(5) Acceleration tolerance;

(6) Somatic - sensory illusions;

(7) Sudden incapacitation;

(8) Physical fitness;

(9) Thermal stress;

d. Psychological (information obtained by psychologist if necessary):

(1) Personality development;

(2) Professional difficulties;

(3) Professional dissatisfaction;

(4) Past experiences including previous accident/mishap history;

(5) Stress;

(6) Ambition;

(7) Attitudes to authority;

(8) Emotional stability;

(9) Personality profile;

(10) Judgement;

(11) Situational awareness (disorientation);

(12) Reaction to emergency;

(13) History of consumption of alcohol or drugs (legal or not);

(14) Physical/mental task/workload over saturation;

e. Activity prior to accident:

(1) Brief account of activity in 48 Hr prior to the accident;

(2) Work / rest history;

(3) Food intake;

(4) Recent illness;

(5) Therapeutic drugs;

(6) Ingestion of alcohol or legal/illegal drugs;

(7) Use of fatigue countermeasure drugs;

(8) Use of non-pharmacological fatigue countermeasures;

(9) Quality of recent sleep patterns during previous 72 hr.; (wearables ?)

f. Training and Currency:

(1) Flying hours (total, instrument flight, night, NVG, etc.);

(2) Aeromedical (date last given, scope, spatial disorientation training, etc.);

(3) Survival;

(4) Underwater escape including EUBA (= emergency underwater breathing apparatus);

(5) CRM (= cockpit resource management) training received.

2. Organizational:

a. General:

(1) Operational organization;

(2) Selection and training;

(3) Mission demands;

(4) Flight procedures;

(5) Management;

b. Psychosocial (information obtained by psychologist if necessary):

(1) Crew composition;

(2) Leadership and communication.

3. Engineering:

a. Cockpit ergonomics;

b. Instrumentation;

c. Cockpit displays;

d. Use of NVG and other helmet mounted systems.

4. Environmental:

a. Weather related factors;

b. Temperature related factors;

c. Noise;

d. Vibration;

e. Radiation and environmental hazards;

f. Speed related factors;

g. Geographical;

h. Air traffic control factors.

5. Post-accident survival. Human aspects of problems related to:

a. Injury;

b. Escape sequence;

c. Ejection;

d. Ground egress survival training;

e. Rescue.

1.A.5 PART V – INJURIES

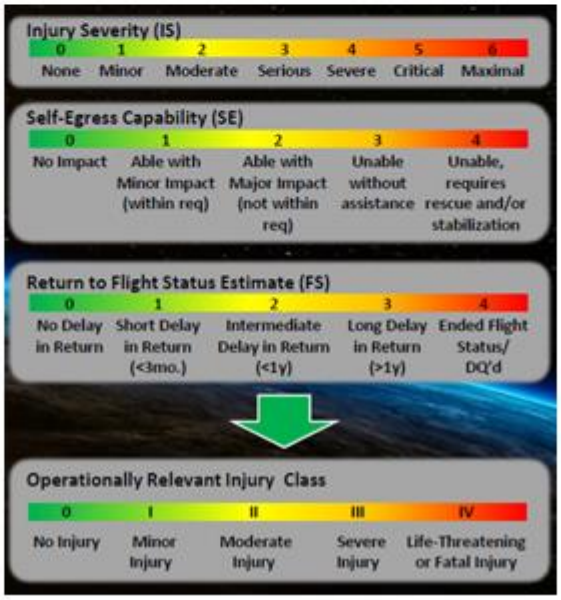
(To be completed for each individual occupant injured in the accident)

Proposition to combine the AIS (abbreviated injury scale (digital tool in spring 2023)) with self-egress capacity and return to flight status

Injuries should be fully documented, and consideration may be given to coding all the injuries using the Abbreviated Injury Score (AIS). Use of the AIS will be useful for the sharing of injury information between Nations and other relevant bodies should this be required and permitted.

1	2	3	4	5
X	X	X X	X X	. X

AIS Code	Description
1	Minor
2	Moderate
3	Serious
4	Severe
5	Critical
6	Maximal (currently untreatable)



1. External:

   a. Burns (site and degree, pre or post mortem, cause);

   b. Hemorrhage (site and degree), abrasions, bruises, cuts, lacerations, belt marks;

   c. Shock (cause);

   d. Loss of consciousness (duration, time, period of retrograde amnesia, time of post traumatic amnesia);

e. Result of external examination (form and extent of injury to be recorded in table and on diagrams of surface of the body, including photographs).

2. Skeletal. Site and extent of injury to bony skeleton and joints to be recorded in table and on suitable diagrams of the skeletal system. X-ray photographs, computerized tomography, magnetic resonance imaging and radioisotope scans should be included if possible and needed. An MRI scan of the spine is recommended.

3. Internal injuries. Site, intensity and outcome of each internal injury to be recorded.

4. Noise-induced hearing loss

5. Cause of injuries. Mechanism considered to be involved in production of each injury is to be recorded.

6. Disposition. Whether alive or dead when first seen. If alive place of medical treatment.

7. Fatality. Record time, date and cause of death.

1.A.6 PART VI - AUTOPSY REPORT

(To be completed for each individual who died as a result of the accident)

1. Aircraft/RPAS involved:
   a. Aircraft type and mark;
   b. Aircraft serial number.
2. Personal particulars:
   a. Name;
   b. Number and rank;
   c. Position in aircraft.
3. Dates and times:
   a. Date and time of accident;
   b. Date and time of death;
   c. Date and time of autopsy;
   d. Names of pathologist and observers.

4. Place of autopsy
5. Condition of body at autopsy
6. External distinguishing features and means of identification
7. Traumatic lesions. External injuries, soft-tissue injuries, bone fractures and luxation (of joints).
8. State of individual organs:
    a. Record state of and damage to each of the organs including:
    b. Brain - Spinal Cord;
    c. Eyes;
    d. Middle ear;
    e. Mouth including teeth (dental identification);
    f. Glottis, Tonsils;
    g. Pleural space, Mediastinum;
    h. Trachea and Bronchi, Lungs;
    i. Pericardium, Heart and great vessels (including coronary arteries);
    j. Diaphragm;
    k. Peritoneal cavity, Mesentery;
    l. Esophagus, Stomach, Intestines, Appendix;
    m. Liver - Gall bladder, Spleen, Pancreas;
    n. Kidneys, Adrenal glands;
    o. Pelvic organs, Genitalia;
    p. Thyroid;
    q. Pituitary.
9. Pre-existing disease.
10. Causation of injuries.
11. Results of toxicological examination. (e.g. peripheral/femoral venous blood; central venous blood; urine; stomach contents; vitreous humour; tissue from brain, lung, kidney and liver; muscle and fat tissue).

12. Results of histological study.

13. Results of nuclear radiation measurements if done.

14. Cause of death. Specify disease or condition directly leading to death, antecedent causes and morbid conditions and any other condition contributing to death.

Remarks by pathologist

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APPENDIX 1 INFORMATION REQUIRED FOR DAMAGED HELMETS

1. The following specific data in the following sequence is required to facilitate the exchange of comparable information between nations:

a. Helmet:

(1) Serial number for future reference. Detailed information. Evidence of retention and configuration, chinstrap, mask and visor position, etc.;

(2) Type and size of helmet, degree of fit, special modifications;

(3) Photographic recording. Full coverage of shell;

(4) Details of specific areas;

(5) Full description of helmet damage:

(a) Shell and visor;

(b) Lining/suspension tapes;

(c) Neck strap/break links;

(d) associated equipment - oxygen mask, ear protectors, NVG system, NVG face protection visor, helmet-mounted systems;

(6) Estimated length of time helmet was in use;

(7) Prior reporting of HMD optic misalignment:

b. Accident and/or Incident:

(1) Date;

(2) Ejection/crash/mid-air collision/other incidents causing damage;

(3) Brief summary of incident containing all the information relevant to head impact, to include speed and attitude;

(4) Pre-incident position of the visor (raised or lowered);

(5) Description of any objects known or thought to have been struck by the head (canopy, instruments, ground, escape system, etc.);

(6) Windblast. Details if loss or movement of helmet is applicable;

c. Head Injury:

(1) Any evidence of superficial/skull/brain injury with sites;

(2) Copies of pathology report, X-rays, etc. as appropriate;

(3) Any evidence of concussion (or confusion);

(4) Follow-up. Return to flying;

(5) In fatal cases, was head injury the cause of death?

d. Correlation of Head Injury with Helmet Damage;

e. Simulation of Impact Damage to Helmet to Define:

(1) Kinetic energy of impact (joules);

(2) Probable impactor;

(3) Probable level of transmitted force;

f. Correlation of Head Injury with Impact Data;

g. Assessment of Part Helmet Played in Incident.

2. Where possible, all helmets damaged in service should be sent to the appropriate authority responsible for review and analysis of helmet data.

Discussion points

APPENDIX 2 POST EJECTION QUESTIONNAIRE

The following questionnaire can be used by the aeromedical investigation or advisor as an aide-mémoire to the ejection investigation. Furthermore, it may be used to share information between nations, or other relevant bodies, should national policies permit.

General Information

Air Force (e.g. Royal Air Force)	
Date of Ejection	
Aircraft Platform	
Synopsis of mishap and ejection	
Reason for ejection	☐ STRUCTURAL FAILURE ☐ PILOT LOSS OF CONTROL ☐ PROPULSION SYSTEM FAILURE ☐ CONTROL SYSTEM FAILURE ☐ COLLISION WITH TERRAIN ☐ MIDAIR COLLISION ☐ OTHER ……
Flight Phase	☐ GROUND OPERATIONS ☐ TAXI ☐ TAKE OFF ☐ INITIAL CLIMB ☐ TRANSIT ☐ IN-FLIGHT MANOEUVRING ☐ APPROACH ☐ LANDING ☐ OTHER ……

Weather Conditions

Meteorological information at time and location of ejection helps serve mishap reconstruction. An online aftercast for the accident day can be used.

Surface Temperature		
Sea-Level Pressure		

Wind Speed at ejection altitude		
Wind Heading at ejection altitude		

Ejection Details

Please utilise both columns Crew 1 and Crew 2, as and when appropriate, for example for speed and altitude at ejection.

	Crew member 1	**Crew member 2**
Attitude	☐ LEVEL ☐ DESCEND ☐ ASCEND	☐ LEVEL ☐ DESCEND ☐ ASCEND
Aircraft Descent (Sink) Rate		
Aircraft Pitch Rate		
Aircraft Roll Rate		
Aircraft Yaw Rate		
Aircraft Acceleration		
Aircraft Angle of Attack or NOSE UP/DOWN		
Aircraft Sideslip Angle		
Aircraft Roll Angle or BANK RIGHT / LEFT		
Aircraft G		
Speed at ejection (KEAS)		
Altitude at ejection (AGL)		
Max seat G's during initial catapult (if possible refer to seat recorder data)		
Ejection (Sequencer) MODE selected.		

Was the correct mode selected? If no, describe.		
Number of occupants	☐ SOLO ☐ TWIN ☐ FLOWN SOLO	
Initiation method	☐ SELF ☐ COMMANDED ☐ AUTO EJECT	
Command from	☐ FRONT ☐ REAR ☐ AUTO EJECT	
ISS Mode selected (N/A for single seat) e.g. COMMAND FORWARD, SOLO, BOTH		
Did Command system work as intended? If NO, add comments.	☐ YES ☐ NO Comments:……	
If commanded, were all crew warned for ejection (nature of warning and time lapse)?	☐ YES ☐ NO Comments:	
If commanded, were all crew in a suitable position for ejection?	☐ YES ☐ NO Comments:	
Was the ejection within seat performance envelope? If no, provide reason (speed, attitude, altitude, terrain clearance, etc.)	☐ YES ☐ NO ☐ UNKNOWN ……	☐ YES ☐ NO ☐ UNKNOWN ……..

For an ejection within envelope, was it successful or fatal?	☐ SUCCESS ☐ FATAL	☐ SUCCESS ☐ FATAL
For an ejection out of envelope, was it successful or fatal?	☐ SUCCESS ☐ FATAL	☐ SUCCESS ☐ FATAL
Reason for fatality, if applicable	☐ OUT OF ENVELOPE ☐ ESCAPE SYSTEM MALFUNCTION ☐ MAINTENANCE ERROR ☐ PRE-EJECTION[1] ☐ POST-EJECTION[2] ☐ LANDING ☐ DROWNING ☐ HUMAN CONSIDERATIONS[3] ☐ MISCELLANEOUS[4] ☐ UNKNOWN ☐ OTHER ……..	☐ OUT OF ENVELOPE ☐ ESCAPE SYSTEM MALFUNCTION ☐ MAINTENANCE ERROR ☐ PRE-EJECTION ☐ POST-EJECTION ☐ LANDING ☐ DROWNING ☐HUMAN CONSIDERATIONS ☐ MISCELLANEOUS ☐ UNKNOWN ☐ OTHER ……..
Any indication as to the lapse time from decision that ejection may be required to initiation		

Aircrew Information

	Crew member 1	**Crew member 2**

[1] Injuries sustained before the ejection was initiated resulting in a fatality, not the ejection itself (e.g. bird-strike injuries, mid-air collisions)
[2] Injuries sustained/health complications after the ejection was successfully completed, which resulted in a fatality (e.g. hypothermia)
[3] Errors made by the occupant in the operation of or in the use of the escape system leading to a fatality (e.g. "Ejectee was not strapped in to the seat, and therefore not attached to the parachute")
[4] Used to describe cases where the cause of the fatality is unclear (e.g. "Subsequently died in hospital from injuries sustained during the ejection / landing")

Nude Mass Or which of these best describes the weight class of the crew: lightweight, medium weight, heavy weight.		
Boarding Mass		
Standing Height (before ejection)		
Sitting Height (before ejection)		
Knee-to-Buttocks Length		
Age		
Gender		
Crew Station	☐ FRONT ☐ REAR ☐ SINGLE	☐ FRONT ☐ REAR ☐ SINGLE
Pilot Recovery Time (from time of ejection to first aid medical rescue team assisting crew) Add any useful narrative around aircrew's medical condition while awaiting rescue.		
Seat Bucket Position from Bottom Up (Seat Height in inches or millimetres)		
Seat Tilt Adjustment Position, if applicable to ejection seat type		
Adjustable Backrest Position, if applicable to ejection seat type		
Back Spacer Fitment (qualified additional back support pad), if applicable to ejection seat type for small crew	☐ YES, please specify: ☐ NO	☐ YES, please specify: ☐ NO

Was a personal lumbar support equipment used?	☐ YES, please specify: ☐ NO	☐ YES, please specify: ☐ NO
Aircrew flight equipment configuration (flight suit type, gloves, immersion garment, etc.)	☐ WINTER SEA ☐ SUMMER LAND ☐ SUMMER SEA ☐ CHEMBIO Narrative for configuration description: ……... ……... ……... ☐ OTHER …….	☐ WINTER SEA ☐ SUMMER LAND ☐ SUMMER SEA ☐ CHEMBIO Narrative for configuration description: ……... ……... ……... ☐ OTHER …….
Helmet configuration inc. HMD modules details, Identification / Manufacturer		
Was the visor worn up or down?	☐ UP ☐ DOWN	☐ UP ☐ DOWN
Was the visor ripped off by the windblast?	☐ YES ☐ NO	☐ YES ☐ NO
Did the helmet remain on the head during the ejection sequence?	☐ YES ☐ NO	☐ YES ☐ NO
Did the mask remain secured during the ejection sequence?	☐ YES ☐ NO	☐ YES ☐ NO
Were NVGs worn at ejection?	☐ YES ☐ NO	☐ YES ☐ NO
Were the NVGs fitted with auto-detach?	☐ YES ☐ NO	☐ YES ☐ NO

Landing Conditions

	Crew member 1	Crew member 2
Landing Terrain	☐ WATER ☐ LAND	☐ WATER ☐ LAND
If on WATER	☐ SHALLOW WATER ☐ DEEP WATER	☐ SHALLOW WATER ☐ DEEP WATER
If on WATER	BEAUFORT SCALE ……. WAVE HEIGHT …… TEMPERATURE …….. PRESENCE OF ICE ……..	BEAUFORT SCALE ……. WAVE HEIGHT …… TEMPERATURE …….. PRESENCE OF ICE ……..
If on LAND	☐ TREES ☐ ROCKS ☐ SAND ☒ FLAT - FIELD ☐ PAVED SURFACE ☐ FLIGHT DECK ☐ OTHER ……	☐ TREES ☐ ROCKS ☐ SAND ☐ FLAT - FIELD ☐ PAVED SURFACE ☐ FLIGHT DECK ☐ OTHER ……
Describe Parachute Landing Fall (PLF). This is an attempt to understand if the crew was able to land per the PLF training.		
Previous parachuting experience	☐ YES ☐ NO	☐ YES ☐ NO
Stability of parachute: occurrence of oscillations, factors precipitating oscillations, action taken to reduce oscillations.		
If there were gusts on land at parachute landing, please provide if possible, the Wind Gust Speed		
If landing on flight deck, what was the wind over deck?		
If dragging after ground impact: indication of speed,		

duration, cause of stop of dragging		
Release of parachute (ease of reach and operation of parachute release)		

Post Ejection Survival

	Crew member 1	**Crew member 2**
Was the Personal Survival Pack PSP released manually or automatically? Automatic Deployment Unit (ADU) Switch Mode	☐ MANUAL ☐ AUTO	☐ MANUAL ☐ AUTO
Did the release mechanism function correctly?	☐ YES ☐ NO	☐ YES ☐ NO
Did the PSP lowering lanyard extend to its full length?	☐ YES ☐ NO ☐ PARTIALLY	☐ YES ☐ NO ☐ PARTIALLY
Did the Personal Locator Beacon (PLB) activate?	☐ YES ☐ NO	☐ YES ☐ NO
Did the liferaft inflate, if applicable?	☐ YES ☐ NO	☐ YES ☐ NO
Did the emergency oxygen system activate?	☐ YES ☐ NO Activation: ☐ AUTO ☐ MANUAL Did the system function as intended? ☐ YES ☐ NO	☐ YES ☐ NO Activation: ☐ AUTO ☐ MANUAL Did the system function as intended? ☐ YES ☐ NO

Did the life support system function correctly? Inc. release of aircraft disconnects	☐ YES ☐ NO	☐ YES ☐ NO

Aircrew Injuries

In what follows, please describe any injury sustained **with as much detail as possible**, following **the human body anatomical regions** and radiological findings when available. For example: Lumbar Spine-Vertebra L1-compression fracture; Lower Extremities-Ankle fracture (right or left), include description of bone involvement such as tibia/fibular fracture, open /closed, comminuted etc.

Expert medical input by a flight surgeon is recommended to be sought during the investigation of the flight safety center, to fill out this section as accurately as possible.

When possible, please provide a **suspected or confirmed cause** for the observed injury mechanism. Document any evidence which shows that equipment was either protective or caused injuries.

For aeromedical centers that do already code and classify injuries according to the **AIS** coding system, the 7-digit score can be provided for each injury. For aeromedical centers that do not make use of the AIS scoring system, a detailed anatomically-based description of each injury as well as an injury-causation scenario should be provided.

	Crew member 1	**Crew member 2**
Fitness to fly (before ejection)		

Any prior relevant medical conditions?		
Current medical advice at the time of completing the questionnaire: is the aircrew expected to be able to resume flying in the future?	☐ YES ☐ NO	☐ YES ☐ NO
Would the aircrew have been able to self-escape and evade (without assistance) if they had had to?	☐ YES ☐ NO	☐ YES ☐ NO
Was a CT-scan performed?	☐ YES ☐ NO	☐ YES ☐ NO
Was an MRI of the spine performed? with relation to ejection-related injuries only.	☐ YES ☐ NO	☐ YES ☐ NO

	Crew member 1	**Crew member 2**
Injury Description (**Injury #1**)		

AIS Score, if known (**Injury #1**)		
Cause (**Injury #1**) Examples: Ejection Forces Windblast Instability Parachute Opening Shock Transparency Removal Canopy Impact Landing Parachute Dragging Post-landing (and transit to rescue) Water-related Pre-ejection (e.g. during bird strike) **Aggravating Factors:** Improper use of equipment Posture at ejection Limb restraint operation AEA-related Harness operation Parachute risers interaction Survival kit-related	Please describe with as much detail as possible: …… ☐ Confirmed ☐ Only Suspected **Aggravating Factors:**	Please describe with as much detail as possible: …… ☐ Confirmed ☐ Only Suspected **Aggravating Factors:**

Please duplicate the above table if there are more than 1 injury to report.

General System Information

	Crew member 1	Crew member 2
Seat Mark (e.g. Mk16) and Seat Type (e.g. 10A)		
Seat time in service		
Seat last maintenance date		
Description of seat damage pre-ejection, if any		
Description of seat subsystem failures or anomalies, if any		
Description of recovery parachute malfunction, if any		
Did the Leg Restraint function as intended?	☐ YES ☐ NO	☐ YES ☐ NO
Did the Arm Restraint, if applicable, function as intended?	☐ YES ☐ NO	☐ YES ☐ NO
Harness Type	☐ MAN-MOUNTED (e.g. Torso Harness) ☐ SEAT-MOUNTED (e.g. Integrated/Simplified Combined Harness)	☐ MAN-MOUNTED (e.g. Torso Harness) ☐ SEAT-MOUNTED (e.g. Integrated/Simplified Combined Harness)
Was a flight equipment specialist involved in the investigation? Was there any pertaining comment made with regards to harness restraint fitment,	☐ YES ☐ NO Comment: ……	☐ YES ☐ NO Comment: ……

fastening, adjustment, prior to ejection?		
Did the Neck Protection Device (NPD), if present, function as intended?	☐ YES ☐ NO	☐ YES ☐ NO
Description of any damage to recovery parachute, if any. When did the damage occur, if known.		
When was parachute last repacked?		
Was the Manual Over Ride (MOR) handle used?	☐ YES ☐ NO	☐ YES ☐ NO
Was the sequencer data retrieved, if applicable?	☐ YES ☐ NO	☐ YES ☐ NO
Method of Transparency Removal If through canopy, what were the canopy penetrators condition like?	☐ Jettison CJS (Rocket-assisted, aerodynamic release) ☐ Fragilization / Fragmentation (MDC) / Fracture CFS ☐ Severance CSS / Cutting (Flexible Linear-Shaped Charge FLSC) ☐ Through Canopy	
Was the transparency removed successfully?	☐ YES ☐ NO	
Evidence of flight equipment witness marks as a result of transparency (canopy) removal?	☐ YES ☐ NO	☐ YES ☐ NO
Evidence of canopy contact with helmet?	☐ YES ☐ NO	☐ YES ☐ NO
Description of any failure		
Any unfired cartridges? If so, how were they dealt with?	☐ Operator EOD ☐ Martin-Baker field personnel Please specify which cartridges, if possible.	

Further information	For example, cartridges (or rocket motor) in-life versus out of life, failed to fire, etc.

ANNEX B GUDE TO MINIMUM INFORMATION TO BE RECORDED IN CASE OF AN AEROMEDICAL INCIDENT DURING AIRCRAFT OPERATIONS

SECTION A: Information concerning aircraft and sortie

1. Aircraft type and mark 2. Identification letters/numbers
3. Nationality.
4. Date of flight on which incident occurred
5. Type of sortie
6. Stage of mission
7. Usual air base
8. Base from which aircraft took-off (if different from 7)
9. Time of reporting for duty
10. Time of take-off
11. Weather conditions
12. Visibility
13. Time of landing

SECTION B: Information concerning the individual involved

1. Service number
2. Rank, Names
3. Nationality
4. Age and Sex
5. Weight, Height, Build
6. Marital status
7. Living accommodation (mess, quarter, etc.)
8. Aircrew category (pilot, navigator, etc.)

9. Crew position at time of incident (captain, co-pilot, etc) and duty performed at time of incident (e.g. whether actually in control of the aircraft)
10. Medical category
11. Total number of flying hours
12. Number of hours on type
13. Time and type of meal taken before incident
14. Smoking habits
15. Presence of intercurrent infection
16. Therapeutic drugs taken over previous 72 Hrs
17. use of fatigue countermeasure drugs
18. use of non-pharmacological fatigue countermeasures
19. Sleep pattern over previous 72 Hrs
20. Last leave period
21. Unusual pattern of activities for previous 72 Hrs
22. Alcohol consumption within previous 72 Hrs
23. Any known domestic/occupational mental stress
24. Previous accidents/incidents
25. Previous aviation physiology training:
    a. - date
    b. - place
    c. - type of course
26. Excursion underwater wearing SCUBA within 24 Hrs

SECTION C: Details of in-flight incident

1. Time into sortie when incident occurred and stage of mission
2. Nature of first symptom(s) experienced
3. Time course of subsequent symptoms
4. Duration of symptoms

5. Action taken to report symptoms
6. Actions taken to overcome symptoms
7. Aircraft altitude when incident occurred
8. Cabin altitude when incident occurred
9. Attitude of aircraft when incident occurred (level flight, ascending, descending, turning, aerobatics)
10. Presence of vibration
11. Type of oxygen system installed in aircraft
12. Type and size of oxygen mask worn
13. Personal flying clothing assembly worn
14. Oxygen contents at time of incident
15. Normal operation of magnetic indicators
16. Difficulty breathing either in or out
17. Noticeable change in rate or depth of breathing
18. Change in pressure delivered by oxygen system
19. Visual disturbance
20. Tremor or uncoordination of limbs
21. Difficulty in mental concentration
22. Change in hearing acuity
23. Tingling in hands, feet, lips
24. Presence of nausea
25. Headache
26. Pain or discomfort in any anatomical site:
    a. joints
    b. abdomen
    c. chest
    d. ear (R or L)
    e. sinuses (frontal/maxillary)

27. Mental state at time of incident (relaxed/tensed) 28. Thermal comfort (hot - cold)
29. Unusual smell/smoke etc.

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