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AVIATION SAFETY

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J. MAJ
Major General, POL (A)
Director, NSA

RECORD OF CHANGES

Change Date	Date Entered	Effective Date	By Whom Entered

RECORD OF RESERVATIONS

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CHAPTER 1

AVIATION SAFETY POLICY

SECTION I

101. INTRODUCTION

1. Aircraft accidents constitute a considerable drain on aircrew lives and aircraft - vital resources upon which a nation depends for its security. The cost of training personnel and the acquisition of modern aircraft make the preservation of these resources a major consideration in the efficient accomplishment of an air arm's task. However, military flying necessarily includes an element of risk, and a balance has to be reached between safety considerations and acceptance of those risks that are essential to the completion of the task. The decision on the right balance, or risk threshold, is largely one for subjective judgement by commanders and it should aim at ensuring the optimum prospect of successful task achievement with the properly controlled risk to aircraft and crews. By continuing to task success in this way, aviation safety makes a major contribution to the operational efficiency of an air arm.

2. Within NATO, there is the additional dimension of interoperability whereby forces of one nation may deploy and operate with those of another. Unless procedures are harmonised for such eventualities, there is scope for misunderstanding, occurrences, attrition of resources, and consequent diminution of task success. Such harmonisation applies equally to aviation safety. For this reason, this document sets out aviation safety principles that apply to the operation of all air weapons and platforms and all environments.

3. Aviation safety policy is characterised by the need to reduce the very high cost of losses and damage involved in aircraft occurrences. However, occurrence prevention cannot be accomplished in isolation; the commander's task includes an assessment of the balance of priorities. In war, times of crisis and during Peace Support Operations, task achievement is paramount and a higher degree of risk may have to be accepted if operational requirements so dictate. In peace, avoidance of unnecessarily high levels of risk is generally paramount within stated training or operational task requirements. Thus the commander must constantly adjust the risk threshold to take account of the aviation safety and operational factors involved. Risk management is crucial for commanders in the decision making process. Both real and potential hazards can be identified and regulated at any command level or in any phase of flying operations and it behoves all personnel, regardless of status or responsibility, to be aware of the need to identify and manage all risks wherever possible. The executive responsibilities of commanders dictate that aviation safety rests within the chain of command, from the most junior ranks upwards. The task of established aviation safety staffs is to provide specialist advice and guidance which will assist commanders to meet this responsibility with maximum effectiveness. Thus, in effect, aviation safety needs are given equal precedence to task needs, but the responsibility for any compromise between them falls on the command chain.

102. PURPOSE OF DOCUMENT

1. The purpose of this document is to set out aviation safety principles, policies and procedures – in particular those aimed at accident prevention – for use as required by participating nations, and by commanders and personnel at all levels in the prosecution of their common task. This document is a basic reference for everybody involved in aviation safety, both in occurrence prevention – starting from the development, testing and introduction of material and procedures – and in its aftermath – the determination of the causes of an occurrence and the implementation of measures to prevent its recurrence. Most nations have their own aviation safety manuals and regulations which should be used to amplify the principles, policies and procedures set out in this document in line with specific national requirements.

103. AIM OF AVIATION SAFETY

1. The aim of aviation safety is to increase the operational efficiency of any aviation force by reducing to a minimum those risks which contribute to aircraft occurrences and to minimise the effects of those occurrences. Used effectively, aviation safety becomes a force multiplier for air operations in that it seeks to minimise the loss of resources by identifying and resolving potential aviation safety problems before they can impact adversely on operational efficiency. Where solutions to problems cannot be found, commanders should be advised of the risks involved to enable them to make appropriate operational decisions. Successful implementation of aviation safety policy is dependent upon the application of working principles which have evolved, and will evolve in the future, with the increasing complexity of flying operations.

SECTION II - PRINCIPLES

104. ORGANISATION

1. An aviation safety organisation should be structured so that it can communicate directly with the commander and his executives at all levels. In this way, flying activities will be considered in the context of aviation safety at all levels of command.

105. RESPONSIBILITY AND ACCOUNTABILITY

1. An aviation safety organisation in itself should have no executive function; its role is to monitor and advise on flying activities and regulate aviation safety policy. Executive responsibility for implementation of aviation safety measures lies with the commander in the light of the perceived balance of safety and operational considerations; assessment of acceptable risk thresholds is crucial to this process. See also Chapter 2.

106. PRECEDENCE

1. In the assessment of risk thresholds, aviation safety generally should enjoy at least equal precedence to operational considerations. Even in war, aviation safety considerations will still be important if losses are to be kept to a reasonable minimum.

107. RISK AWARENESS

1. It is incumbent upon all personnel to play their own part in accident prevention. Risk detection and avoidance are crucial to this process; even risks or instances of carelessness which are trivial in themselves can, in isolation or in combination with other factors, create an occurrence. The extent to which a person or system is exposed to danger or hazard represents the risk of a certain activity as a course of action. A hazard (or danger) is something with the potential to cause harm; risk is the likelihood of that potential being realised. Risk Assessment is the process of identifying, characterising and estimating the values of risks, and evaluating their significance (hazard identification and risk measurement). In carrying out Risk Assessments, it is important to distinguish between the hazard (the potential for harm) and risk (the likelihood of that harm being realised in a given period of time). Risk Assessment on its own, however, achieves nothing at all – it has to be linked to action in order for risks to be managed and improved, ie Risk Management. See also Chapter 8.

108. POTENTIAL CAUSES

1. Whereas risk awareness can help to avoid accidents and incidents during day-to-day aircraft operations, it is incumbent upon the individual, and aviation safety staffs in particular, also to seek to identify potential causes wherever possible.

109. REPORTING SYSTEM

1. Full and accurate reporting is essential to the maintenance of good aviation safety. Accurate reports, including details of resulting investigations, allow important lessons to be learned and so play a major part in future occurrence prevention. Furthermore, the reports provide the basis for remedial action, statistical analysis and publicity – all important principles of aviation safety in themselves. Much of the responsibility for reporting rests at local level; however, reports must be passed to higher formations in order that the overall picture can be analysed for wider application where required. The aviation safety reporting system should not be a substitute for other specialist reports, although it may complement them. See also Chapter 2.

110. DISCIPLINARY ACTION

1. In particular, any reports generated by an aviation safety reporting system should not be used as a basis of, or be any part of, any disciplinary procedure.

111. STUDY AND ANALYSIS

1. Study and analysis of recorded data is important if all lessons learned, together with remedial action, are to be extracted from the aviation safety reporting system. Reports must be studied not only for their intrinsic value but also in context of other, similar, reports so as to determine common features. Occurrences reported at local level may appear as isolated incidents, whereas commanders, by comparing an occurrence with others, can take a broader view and detect trends. Similarly, when operating circumstances change – new role, base, aircraft or procedure – study and analysis of data can help to ensure that causes of previous occurrences are not reintroduced. See also Chapter 4.

112. INVESTIGATION PROCEDURES

1. All occurrences require thorough investigation to determine remedial action and to highlight lessons learned. Incidents of a routine nature should be investigated at local level using local personnel; more serious occurrences should be the subject of an inquiry. In either case, any investigation must be thorough - it is not sufficient just to know what happened; all possible causes must be identified. They should not be confused with, or obscured by, the ultimate effect. See also Chapter 3.

113. REMEDIAL ACTIONS

1. Executive branches are responsible for remedial action considered necessary as a result of aviation safety investigations. Thus it is important that aviation safety staffs pass data and analyses to commanders without delay, where necessary with proposals for corrective action.

114. EDUCATION AND PUBLICITY

1. The aviation safety organisation must not just gather information, it must also disseminate it. This task can be divided into education and publicity. See also Chapter 5.

   a. Education. While aviation safety is an essential part of the task of everyone concerned with flying, those selected for aviation safety appointments need special training.

   b. Publicity. The information published by an aviation safety organisation is based on the principle of aviation safety awareness; if everyone connected with aircraft is told how, in his sphere, occurrences can be, or have been caused, then the possibility of repetition of such occurrence is reduced.

115. EXCHANGE OF INFORMATION

1. Exchange of information between military and civil flying organisations is mutually beneficial. This is better undertaken by national aviation safety organisations rather than by a number of executive branches, and channels should be secured for an exchange of relevant information with similar organisations. In addition, there should be an exchange of information with the aircraft industry with due regard being paid to security considerations. See also Chapter 2.

116. AIRWORTHINESS OF AIRCRAFT

1. Commanders need to ensure the continuing airworthiness of aircraft. Any failure to maintain an aircraft in an airworthy condition, as defined by the appropriate airworthiness requirements, should render the aircraft ineligible for operation until it is restored to an airworthy condition.

CHAPTER 2

RESPONSIBILITIES

SECTION I - RESPONSIBILITY AND ACCOUNTABILITY

201. OCCURRENCE PREVENTION PROGRAMME

1. All NATO members are responsible for implementing a safety programme for occurrence prevention. Any international agreements involving safety programme interaction between member nations should be addressed in either Memorandums of Understanding (MOU) or other agreements between the participating nations. Exchange of information as outlined in STANAG 3102, *Flight Safety Cooperation in Common Ground/Air Space*, will assist in occurrence prevention standardization, and enhance overall aviation safety. Ultimately, the commander of a unit is responsible and accountable for the safe operations of the unit.

202. STANDARDS

1. Safety standards help eliminate unsafe acts or conditions that lead to occurrences. Commanders, managers, supervisors and individuals within each unit should identify rules and procedures that identify hazards and enhance occurrence prevention. An effective safety program depends on individuals at all levels integrating hazard identification and occurrence prevention efforts into every activity, and being accountable for complying with applicable safety standards. Units should establish procedures and inspections to ensure compliance with all safety standards.

203. HOST BASE RESPONSIBILITIES

1. Bases hosting other NATO units have overall responsibility for safe operations and for informing the visiting unit of their local safety rules and standards. However, each unit retains ultimate responsibility and accountability for the safe operations within their unit. If the host base is not a NATO member nation, its safety rules, procedures and standards should still apply. However, if no occurrence prevention programme exists at the host base, the NATO nation with the largest air unit at the base should assume responsibility for coordinating safety requirements with the host base.

204. VISITING UNIT RESPONSIBILITIES

1. NATO units operating at another nation's host base should adhere to the safety rules and standards of the host base insofar as they are not less restrictive than the corresponding national rules and standards otherwise in effect for the unit. The senior officer of the visiting unit should ensure all unit members understand the importance of hazard identification and occurrence prevention, and are aware of, and comply with, host base safety rules. The visiting unit should have an aviation safety officer who should oversee compliance with both host base and visiting unit safety standards, and ensure occurrence reporting and prevention measures are being followed.

205. EXCHANGE OF SAFETY INFORMATION

1. An effective exchange of safety information enhances occurrence prevention, and there are several avenues available for useful and valuable sharing of safety information. STANAG 3101, *Exchange of Safety Information Concerning Aircraft and Missiles*, offers an excellent foundation for information exchange with detailed listings for each member nation of aviation safety points of contact, aircraft and missile types. Nations that wish to enter special relationships for exchange of particular safety information should consider Memorandums of Understanding (MOU) that allow such transfer of information while honoring unique national requirements and restrictions. These arrangements can offer access to safety databases, lessons learned, system safety information, special studies, etc. The NATO Flight Safety Panel is responsible for the production and amendment of aviation safety STANAGs. It also provides an excellent opportunity to discuss safety issues and establish relationships with other member nations. Frank and detailed discussions help to build clear understandings of safety matters confronting individual nations and joint operations. The Air Forces Flight Safety Committee (Europe) is another forum for detailed discussion and interactions between member nations to enhance occurrence prevention.

206. OTHER ACTIVITIES

1. In addition to the above, host base and visiting unit aviation safety officers should ensure that all aircrew members are familiar with local aviation safety issues. Examples of such safety issues may include, but are not limited to, Air Traffic Control hazards, potential FOD, airfield construction, and airfield limitations such as inadequate lighting, lack of runway/taxiway markings, and insufficient response and rescue assets.

SECTION II – PREVENTATIVE MEASURES

207. SAFETY AUDITS

1. Safety audits help identify hazards and measure compliance with safety rules and standards. Through audits, the safety staff help commanders determine the condition of work areas, adherence to safe work practices, and overall compliance with safety programme requirements.

208. SAFETY AUDIT RESPONSIBILITIES

1. Commanders should ensure procedures are in place that mandate audits for safety, to include ground operations, flight operations, and overall compliance with safety procedures and standards. Audits should be conducted periodically and formal reports raised. The reports should contain as a minimum the following information:

   a. A description of any hazards or unsafe practices.

   b. Causes of deficiencies and hazards noted.

   c. Recommendations for preventative measures.

Each unit should have a procedure to address the recommendations and to ensure that preventative measures are taken and hazards mitigated.

209. SAFETY PROGRAMME EVALUATION

1. Systems should be in place to assess the safety programme management of each flying unit. Safety programme management assessments should address commander and supervisor support, compliance with programme directives, and the effectiveness of occurrence prevention. A written report should be provided to the commander and safety staff of the unit that has been inspected.

210. HIGH INTEREST AREAS

1. High Interest Areas are those areas considered as having the greatest risk to life or property. They also include areas of repeated occurrence, or as a matter of judgment, require added monitoring. High Interest Areas should be included in all audits, and should be susceptible to no-notice assessment.

211. MONITORING

1. Monitoring is a continuous process which takes place in addition to audits. It is the routine, informal surveillance of operations to ensure adequate control of hazards and compliance with safety programme objectives. The following are examples of areas that should be routinely checked:

a. Aircraft ground handling and parking.

b. Fuel servicing, hot refueling, and integrated combat turnarounds.

c. Aircraft maintenance procedures and facilities (all shifts).

d. Hazardous compressed gases and chemical storage, handling and use.

e. Air freight, cargo compatibility, handling, loading, and unloading.

f. Work performed at elevated heights.

g. Activities requiring use of personal protective equipment.

h. All flight operations from mission planning and briefings, take-off, employment, and recovery and landing and including air traffic control.

212. HAZARD IDENTIFICATION AND MITIGATION

1. Occurrence prevention depends on identifying, reporting and minimizing hazards promptly and efficiently. Any person assigned, attached or under contract to a flying unit is expected to report hazards that effect aviation safety. Reportable hazards include any unsafe procedures, practices, or conditions. Commanders have the ultimate responsibility to minimize any and all identified hazards. Hazards should be reported to the immediate supervisor, as well as safety staff, and all flying units that may be affected. However, if the hazard is eliminated on the spot, no report is required unless it is believed the hazard may reappear. If the hazard presents imminent danger, immediate supervisors are expected to take quick action to correct the situation or apply control measures. Safety staff, along with involved units, should investigate any reported hazard and determine the best control measures or corrective actions, keep a file of hazard reports, along with a record of control measures and/or corrective actions taken, and should provide feedback of the control measures or corrective actions taken to the individual who reported the hazard.

SECTION III – REPORTING PROCEDURES

213. OCCURRENCE REPORTING

1. The reporting and investigation of occurrences involving military aircraft and/or the missiles of 2 or more nations will follow the procedures found in STANAG 3531, *Safety Investigation and Reporting of Accidents/Incidents Involving Military Aircraft and/or Missiles*. Occurrences or hazards involving the safe conduct of air traffic will be in accordance with STANAG 3750, *Reporting and Investigation of Air Traffic Incidents.* Procedures and formats for the reporting of birdstrikes, and the exchange of information of migration intensity are found in STANAG 3879*, Birdstrike Risk/Warning Procedures.*

214. AIRCRAFT AND MISSILE ACCIDENT/INCIDENT

1. Member nations have a responsibility to investigate aircraft or missiles occurrences which occur on or above their territory. In the event that an occurrence involves 2 or more nations, the nation of occurrence is responsible for conducting an investigation, but should normally delegate the responsibility to the operating nation. The nation on or above whose territory (nation of occurrence) the occurrence occurred is responsible for immediately notifying the operating nation(s) and other involved nation(s) of the occurrence in accordance with the procedures outlined in STANAG 3531. A Safety Investigation Committee, as outlined in STANAG 3531, is normally composed of investigators, observers, technical experts and any other assistance deemed necessary to facilitate the investigation. They will gather and analyze data to determine the cause and to make safety recommendations where appropriate. Provisions in paragraph 11 of STANAG 3531 allow for separate safety investigations when required by laws or agreements of member nations. Investigation Reports and completed findings should be forwarded to the involved nations that participated in the safety investigation with copies made available to other member nations on request.

215. AIR TRAFFIC INCIDENTS

1. The purpose of STANAG 3750 is to reduce the risk of mid-air collisions and occurrences caused by air traffic procedural or ground facility failures. For purposes of reporting, air traffic incidents are those determined to be a serious occurrence involving air traffic and are classified as AIRPROX (in-flight 'near miss' occurrences), PROCEDURES (faulty procedures or non-compliance with existing guidelines), or FACILITY (failure of ground facilities). Reporting of in-flight occurrences will be made initially by radio, followed by a written report to officials of the nation in whose airspace the occurrence occurred as soon as possible after landing by completing an Air Traffic Incident Report Form (STANAG 3750, Annex A). Responsibility for conducting the investigation of air traffic occurrences normally lies with the nation in whose airspace the occurrence occurs. Investigation reports, to include an assessment of the degree of risk of collision and measures that have been or will be taken to prevent a recurrence, will be forwarded in accordance with STANAG 3750 Annex B to the nations whose crews and installations were involved in the occurrence.

216. BIRDSTRIKE RISK ASSESSMENT

1. Exchange of timely information concerning the potential for birdstrikes is fundamental in avoiding damage to, or loss of, aircraft. Communicating data using the standardized format found in STANAG 3879, Annex B (*Birdstrike Risk Message*) to the National Agencies listed in STANAG 3879 Annex A, ensures that this information is useful and quickly disseminated. The *European Military Birdstike Form, STANAG 3879* Annex C, should also be completed.

CHAPTER 3

OCCURRENCE INVESTIGATION

301. PURPOSE

1. The purpose of every safety investigation is to determine all issues that contribute to an occurrence. This information is used to prevent recurrence of similar events.

302. PRELIMINARIES

1. While national classification and investigative procedures may differ, most are likely to follow the same broad principles. The less serious occurrences will generally be investigated at local level as a matter of routine; however, the more serious occurrences will almost always be the subject of a formal investigation/inquiry. Guidance for the convening of an investigation/inquiry is set out in national documents and STANAGs 3531 and 3750; general guidance is set out below for use by commanders and staffs responsible for defining and implementing investigation/inquiry policy.

303. INITIAL PROCEDURES

1. Aircraft occurrences differ from one another in their circumstances. However, investigation/inquiry techniques do not; they simply comprise the collection, collation and analysis of evidence from which to draw conclusions and make recommendations. This is accomplished by applying the following general principles:

a. Responding to the occurrence with the proper resources to safeguard evidence.

b. Determination of the composition of the investigation/inquiry board.

c. Co-ordination of activities with other interested agencies.

d. Assembling any specialist investigation/inquiry and/or recovery equipment.

e. Identifying and assembling facilities to enable the recording of witness evidence.

f. Collecting evidence, including photographic and video evidence of the occurrence site.

304. PRELIMINARY INSPECTION

1. Any delay in the initiation of an investigation/inquiry can hamper its progress since environmental factors can cause deterioration of perishable evidence, and the memory of key witnesses to fade. Therefore, regardless of which nation is the "Operating" or "Involved Nation", a team comprised of available specialists from either or both should initiate a preliminary inspection of the occurrence site. The aim of this inspection should be to ensure that vital evidence, particularly that of a perishable nature, is preserved or appropriately recorded (by photography or video) and, if possible, to gain an initial assessment of what may have happened for the benefit of the main investigation/inquiry team. This preliminary inspection will therefore assist the main investigation/inquiry whose formation, if multi-national, may be subject to delay.

305. CONTINGENCY PLANNING

1. Nations should ensure that contingency plans are in place to facilitate the establishment, deployment and initial progress of such occurrence inspection and investigation/inquiry teams. Such plans must reflect not only national protocols but also, importantly, local circumstances, in particular unit capabilities. They should be drawn up in line with manpower and equipment capabilities – including both host and potential visiting nation assets - and reflect any local topographical factors which may impede logistical support of a team in the field. While it is impractical to draw up a single plan for use at all locations, the same general principles should apply. However, details of local procedures, particularly those of any great significance, should be notified to higher formations and given to any visiting force on or before their arrival, together with the general aviation safety guidance set out in STANAG 3102. There will be occasions when both the "Operating" and "Involved" nations deem it necessary to conduct their own parallel investigation/inquiry; guidance is set out in STANAG 3531.

306. ASSOCIATED INVESTIGATIONS/INQUIRIES

1. In addition to the main investigation/inquiry, there may well be a requirement to instigate other associated, but specialist, ones. Some of them - for example, those involving air traffic procedures and meteorological phenomena - may well be able to be completed locally. Others, however, particularly those of a technical nature – engine and structural analysis – may well require more sophisticated facilities than those available locally. It is important that teams identify early which will be required so that such facilities can be alerted to the nature of the task ahead. In a worst case, a technical inspection of sophisticated equipment could involve the services of a research laboratory which may not be available in the nation of occurrence. In such a situation, agreement and clearance may be required to export wreckage. Once all such specialist investigations/inquiries have been completed, the investigation/inquiry board may have to assemble the detailed evidence and draw its own conclusions before producing its report.

307. REPORTING

1. Although an investigation/inquiry board should not be constrained as to what it should include in its report, the following should be the minimum:

a. A description of the occurrence.

b. An analysis of the evidence.

c. A summary of the investigation/inquiry findings.

d. A statement of the cause(s) of the occurrence.

e. Recommendations for preventative measures.

2. The report should include documentary and photographic evidence together with any relevant data in support of the findings. If the cause(s) of an occurrence is/are not accepted unanimously by the investigation/inquiry board, dissenting members should record their own/national view in the report.

308. INVESTIGATIVE BOARD COMPETENCE

1. Experience has shown that investigations and inquiries are best conducted by personnel who are trained in occurrence investigative techniques and who are assisted by personnel who have direct experience of the aircraft and role involved. This ideal may be achieved by establishing a pool of suitably trained investigators to lead or provide procedural advice to investigations/inquiries who can be assisted by suitable specialists with expert knowledge on aircraft and role-oriented issues.

CHAPTER 4

INFORMATION AND DATA ANALYSIS

401. INTRODUCTION

1. The circumstances, and eventually the causes, of serious occurrences are almost always well known since they often have serious consequences and almost always attract attention. Conversely, less serious occurrences attract little immediate attention and, for several reasons, may not even be reported. Occurrence prevention, however, is based on learning lessons from previous occurrences so as to be able to put in place remedial measures to avoid them happening again. To achieve this objective, an adequate information recording and data analysis system should be established in which to record occurrence details. Such a system should permit the calculation of occurrence rates, thereby enabling trends in the rates to be monitored so that areas of concern can be promptly identified and addressed. It should then be possible to take proactive measures to reduce the occurrence rate and, in turn, prevent the more serious occurrence happening. Where appropriate, such information should also be made available to other national aviation units, directly or on request, to assist them in designing occurrence prevention measures of their own.

402. RATES

1. In order to provide comparable occurrence information, a rate may be calculated for specific occurrences. A rate may be defined as the number of events divided by the exposure to those events. The most common method is to relate occurrences to flying hours and, since the resultant figure would be very little, the result should be multiplied by 10,000:

Rate = (number of occurrences/flying hours) x 10,000

Alternatively, where the occurrence relates to a phase of flight, some other measure may be more appropriate. If, for example, landing accidents are being analysed, the number of occurrences per 10,000 landings (and/or rollers) could be calculated.

403. TREND

1. A trend is the tendency of a phenomenon to increase or decrease in a certain period of time. The recommended way to detect a trend is to use a rate plotted on a chart since it would readily show if the rate of occurrence of an event is increasing, decreasing or remaining constant.

404. DATA ANALYSIS

1. By investigating data from a wide range of occurrences, it is sometimes possible to find common causes, identify solutions and prevent such problems migrating to other aircraft types or areas. Such analysis will be easier if the database created is comprehensive and contains information relevant to the problem. This can normally only be achieved if there is a standard reporting format. For ease of information exchange, nations should be encouraged to adopt a form that contains at least the following fields of information:

Date.
Type of aircraft.
Aircraft fleet number.
Unit/Wing.
Phase of flight.
Description of the event.
Causal Factors (if appropriate).
Aircraft System.
Class/degree of injury.
Damage.
Causes (if appropriate).
Corrective Action.

2. By classifying and recording data in such fields, it is possible to determine if, for example, a particular type of aircraft, piece of equipment, or a unit is exposed to certain risks and then to target that area as appropriate. It is also very important to identify causal factors (if possible) in an occurrence since this may assist staffs to specifically target broader issues that impact on aviation safety. More than one causal factor is feasible and acceptable.

CHAPTER 5

PUBLICITY, EDUCATION AND TRAINING

PUBLICITY

501. EFFECTIVENESS

1. The promotion of aviation safety awareness stands or falls by the effectiveness of its publicity. The need for aviation safety publicity is self-evident, and aviation safety officers (ASOs) must be good PR practitioners. Although much guidance is received through the normal executive Air Staff and Engineering Staff official channels in the form of orders, instructions, policy decisions, etc, a great deal can be achieved through an aviation safety organisation.

502. MEDIA

1. Excellent publicity can be achieved through the use of aviation safety magazines/newspapers, newsletters, reviews, posters, videos, and reports, and through the use of computer networks (including the INTERNET) with links to aviation safety databases. At station and unit levels enhanced awareness can be achieved by including an aviation safety lecture in arrival briefings, the use of dedicated aviation safety displays, poster and caption competitions, and aviation safety “down” periods. The careful use of car and mirror stickers, and “floating discs” can also yield useful results. Liaison with other air arms, both nationally and internationally, the aircraft industry, and commercial and general aviation also plays an important part in the dissemination of aviation safety “best practice”.

503. AVIATION SAFETY AWARDS

1. Aviation Safety Awards can be used to reward individuals for conscientious observation and alerting of potential dangers and hazards, and to encourage aviation safety awareness and vigilance on the part of all personnel. Any individual or group of people can be considered for an award and the decision should be rewarded with the maximum of publicity. Where appropriate, military personnel should be encouraged to submit entries for associated civilian aviation awards.

504. EDUCATION

1. The aim of aviation safety education should be to create the necessary awareness at all levels of a military organisation. Aviation safety is a Command function, and an ongoing system of good communication and feedback is essential if the maximum benefits are to be realised from any aviation safety organisation. All aviation safety staffs should be provided with the necessary background training and education to enable them to inform and educate other personnel of all branches/trades and experience levels. Memorandums of Understanding, and Bi-lateral Agreements, eg STANAG 3101, with other nations can be a very useful tool to enhance aviation safety awareness, and the opportunity should be taken to become involved in both national and international aviation safety groups and forums.

505. TRAINING

1. Aviation safety training is essential for both aviation safety specialists and all personnel who need to have an awareness of aviation safety in their day-to-day activities. Appropriate training in accident investigation, human factors, investigation/inquiry board membership, post-crash management, and risk management should be considered for specialist ASOs; and for other personnel, training in flying and maintenance supervision and human factors are among areas that should be considered. Aviation safety should be an integral part of all personnel training from initial training through specialist, and command and staff training.

CHAPTER 6

AIRCRAFT CRASH/DISASTER AND POST-CRASH MANAGEMENT

601. INTRODUCTION

1. Since serious occurrences generally occur where and when they are least expected, it is important that critical occurrence response procedures are prepared and put in place to deal with them. Sound procedures should assist in minimising loss of life and injuries, preventing consequent hazards and ensuring protection of evidence for the following investigation/inquiry. Some advice on Crash and Disaster Planning can be found in ICAO Doc 9137-AN-898.

602. PLANNING

1. A Crash/Disaster plan (alternatively called a Pre-accident Plan) should be established at any site where aircraft operations take place on a regular basis. The plan should involve every civil and military organisation that has a legitimate interest in any serious occurrence. The plan should specify the responsibilities for each operational and support element to which tasks are assigned. Close liaison must be established with those responsible for the air operations and their support, including, search and rescue operations and airfield services, namely crash-fire and rescue. Key elements for consideration should be: saving life, limiting additional property damage, preserving evidence (when safe to do so). Notification of next of kin and other follow-on activities would be carried out once the immediate response has been completed.

603. TRAINING

1. Personnel involved in the plan must perform regular training exercises, simulating various serious occurrence scenarios, designed to train and test efficiency and effectiveness. The plan should be reviewed on a regular basis to ensure the currency of instructions and that newly learned lessons are embodied as soon as possible.

604. SPECIFIC INSTRUCTIONS

1. The overall procedures prescribed in the Crash/Disaster plan should, where necessary, be amplified by specific instructions. Such specific procedures should be set out in annexes and should relate to a unit's specific mission. Such plans should include mention of any specific risk-related procedures that may be required (eg – dealing with armaments or hazardous substances, eg blood pathogens).

605. POST-CRASH MANAGEMENT

1. Whenever there has been an aircraft accident, the procedures set out in the local Crash and Disaster Plan should be implemented immediately. Exceptionally, they may be overridden by special procedures - eg those involving a nuclear response organisation. As outlined in paragraphs 0601 to 0604, Crash and Disaster procedures are intended to deal with the immediate situation. Once they have been completed, and subject to agreement of the investigation/inquiry board, there will at some stage be a requirement to recover any wreckage from the accident site. This is the responsibility of a Post-Crash Management organisation which should effect its task whilst ensuring that the general public and the recovery teams are afforded the maximum protection from any direct or indirect threats from the crashed aircraft, particularly one containing composite structures. To achieve this aim, visiting nations should be responsible for providing the host nation with a list of aircraft specific hazards and the specialised equipment and training for personnel to handle them. Since aircraft accidents can occur anywhere, nations should consider their need for a central rather than a local recovery organisation. Whichever option is adopted, host base and visiting units should be prepared to assist in the post-crash management activities as required.

CHAPTER 7

HUMAN PERFORMANCE IN MILITARY AVIATION[1]

701. INTRODUCTION

1. Military aviation is increasingly viewed as a highly sophisticated and complex system. It is of vital importance to understand and manage both the fundamental characteristics and limitations of human performance in such complex systems, and the social and behavioural aspects that are fundamental to human capability. Human Performance in Military Aviation (Human Factors) encompasses the broad study of psychology, physiology and ergonomics with the objective of improving safety, through the optimisation of the system or by improving the human-machine interface. A better understanding of Human Factors (HF) and the broad application of its knowledge is a major contributor to flight safety, and should result in a safer and more efficient working environment.

2. There are several methods that can be used to address HF issues, including the SHEL Model, Boeing's Maintenance Decision Error Aid (MEDA) programme, ATA Specification 113, UK CAA Notice #71, the HF Analysis and Classification System (HFACS) DOT/FAAAM-0/7, and ICAO Digest No. 7 "Investigation of HF in Accidents and Incidents".

702. HUMAN ERROR

1. Technological advances in the design and production standard of military aircraft during the last half of the 20th century has radically changed the demands made of personnel. Operators in such systems must function efficiently and effectively, often under demanding conditions in environments for which they are not biologically adapted. Though the human element is the most flexible, adaptable and valuable part of the aviation system, it is also the most vulnerable to adverse influence. Lapses in human performance are cited as causal factors in the majority of occurrences, and comprehensive analysis has shown that ‘human error’ is implicated in up to 80% of aviation accidents.

2. Historically, investigating agencies have demonstrated a predisposition towards attributing proximal causes to occurrences. Simply ascribing the label ‘pilot error’ to an accident or incident is no longer an acceptable conclusion of the investigation process. The contemporary ‘systems approach’ to occurrence investigation demands that we should establish not only ‘what’ happened but also ‘why’. The challenge for an investigator is to reconstruct an unfolding occurrence as it appeared to the people involved, and to establish how their assessments and actions evolved in the context of their changing situation. Due account should be taken of how the operational and organisational environment influenced their assessments and consequent actions.

[1] Taken partly from the Flight Safety Foundation Handbook, Issue 1, June 2000.

703. ORGANISATION AND CULTURE

1. Organisational imperatives and the prevailing culture must coherently support human performance initiatives and interventions. The safety of any system depends crucially on the willing participation of both operators and managers. Policies and standard operating procedures should be designed to enable wide dissemination of human performance knowledge and experience. A climate of trust should be supported by clear guidelines designed to encourage and reward the reporting of safety critical information. Flexibility should be designed into organisational systems to allow for high-tempo operations and variation in risk levels. Finally, the organisation should be able to draw appropriate conclusions from its safety data, and be willing to learn and implement change when needed.

704. THE AIM OF HF IN AVIATION

1. HF in aviation aims at increasing the awareness of the human element within the context of the system and provides the necessary tools to improve safety and efficiency. Manufacturers study the human element/equipment interface when designing new equipment and its physical components. Seats are designed to fit the sitting characteristics of the human body, controls are designed with proper movement, instruments lay-out and information provided are designed to match human characteristics, etc. This task is made more difficult because the human being adapts to mismatches, thus masking any mismatch without removing it, and constituting as such a potential hazard. Examples of that are the 3-pointer altimeters, the bad seating lay-out in cabins that can delay evacuation, etc. It is current common practice for manufacturers to encourage airlines and professional unions to participate in the design phase of aircraft in order to cater for such issues.

2. Continuously interacting with the human element are aspects such as procedures, check-lists, manuals, etc, introduced to regulate or to create defences to cater for deficiencies in the various processes. Problems in this area are often more intangible and consequently more difficult to resolve (e.g. misinterpretation of a procedure, confusion of symbology, etc…).

3. One of the most difficult interfaces to match is the human and the environment. Aviation operates within the context of broad social, political, economical and natural constraints that are usually beyond the control of the human being. While part of the environment has been adapted to human requirements (pressurisation and air conditioning systems, sound-proofing, etc.) and the human element adapts to natural phenomena (weather avoidance, turbulence, etc.), the incidence of social, political and economical constraints is central to the interface, and should be properly considered and addressed by those in authority to alter the outcome and improve efficiency

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4. Bringing proficient and effective individuals together to form a group or a set of views does not automatically imply that the group will function in a proficient and effective way unless they can function as a team. For them to do so successfully leadership, good communication, crew-co-operation, teamwork and personality interactions are required. Crew/Team Resource Management (CRM/TRM) and Line Oriented Flight Training (LOFT) can assist in achieving that goal. CRM can become Corporate or Company Resource

Management, since staff/management relationships, corporate climate and company operating pressures can significantly affect human performance.

705. SAFETY AND EFFICIENCY

1. Safety and efficiency are so closely interrelated that in many cases their influences overlap and factors affecting one may also affect the other. HF has a direct impact on this, with safety being affected by many variables. In a particular aircraft accident, one causal factor cited in the report was that "variation in panel layout amongst the aircraft in the fleet had adversely affected crew performance". Wrong information entered into a database and unnoticed by a crew or erroneously entered by it can result in a tragedy. In a case where an aircraft crashed into terrain, information transfer and data entry errors committed by navigation personnel and unchecked by flight crew, were among the causal factors. Failure to communicate vital information can result in aircraft and life loss. In one runway collision, misinterpretation of verbal messages and a breakdown in normal communication procedures were considered as causal factors.

2. Environmental considerations are not only limited to natural, social or economical constraints, but also the political climate, which could lead to a tragedy beyond the control of the aircrew. An illustration of such a tragedy is the loss of Pan-Am 101 over Lockerbie in 1988. An airworthy aircraft which "had been maintained in compliance with the regulations" and flown by "properly licensed and medically fit crew" disintegrated in-flight due to "the detonation of an improvised explosive device located in a baggage container".[2] As a result of that crash latent failures present in the aviation security system at airports and within the airlines were identified, and regulations and procedures redefined to address those failures and prevent reccurrence.

3. Efficiency is also directly influenced by HF and its application, which in turn has a direct bearing on safety. For instance, motivation constitutes a major boost for individuals to perform with greater effectiveness which will contribute to a safe operation. Properly trained and supervised crewmembers working in accordance to SOPs are likely to perform more efficiently and safely. Cabin crew understanding of passengers behaviour and the emotions they can expect on board is important in establishing a good relationship which will improve the efficiency of service, but will also contribute to the efficient and safe handling of emergency situations. Finally, the proper layouts of displays and controls in the cockpit enhances flight crew efficiency while promoting safety.

706. FACTORS AFFECTING HUMAN PERFORMANCE

1. Although the human element is the most adaptable component of the aviation system, it is influenced by many factors affecting human performance such as fatigue, circadian rhythm disturbance, sleep deprivation, health and stress. These factors are affected by environmental constraints such as temperature, noise, humidity, light, vibration, and working hours.

2. Fatigue. Fatigue may be physiological whenever it reflects inadequate rest, as well as a collection of symptoms associated with disturbed or displaced biological rhythms. It may also be psychological as a result of emotional stress, even when adequate physical

[2] UK AAIB Aircraft Accident Report 2/90.

rest is taken. Acute fatigue is induced by long duty periods or an accumulation of particularly demanding tasks performed in a short period of time. Chronic fatigue is the result of cumulative effects of fatigue over the longer term.

3. Circadian Rhythm Disturbance. Human body systems are regulated on a 24-hour basis by what is known as the circadian rhythm. This cycle is maintained by several agents such as day and night, meals, and social activities. When this cycle is disturbed, it can negatively affect safety and efficiency. Circadian rhythm disturbance or circadian dysrhythmia is not only expressed as jet lag resulting from long-haul flights, but can also result from irregular or night scheduled short-haul flights. Symptoms of circadian dysrhythmia include sleep disturbance, disruption of eating and elimination habits, lassitude, anxiety and irritability. These can lead to slower reaction, longer decision making times, inaccuracy of memory, and errors in computation which will directly affect operational performance and safety.

4. Sleep Deprivation. The most common symptom of circadian dysrhythmia is sleep disturbance. Tolerance to sleep disturbance varies between individuals and is mainly related to body chemistry and emotional stress factors. In some cases sleep disturbance can involve cases of over-all sleep deprivation. When that stage is reached it is called Situational Insomnia, i.e. it is the direct result of a particular situation. In all cases, reduced sleep will result in fatigue. Some people have difficulty sleeping even when living in normal conditions and in phase with the circadian rhythm this is called Clinical Insomnia. Sufferers need to consult a medical doctor and refrain from using drugs, tranquillisers or alcohol to induce sleep, as they all have side effects which will negatively affect performance and therefore the safety of flights. To overcome problems of sleep disturbance it is necessary to adopt a diet close to meal times, learn relaxation techniques, optimise the sleeping environment, recognise the adverse effects of drugs and alcohol and be familiar with the disturbing effects to circadian dysrythmia to regulate sleep accordingly.

5. Health. Certain pathological conditions (heart attacks, gastrointestinal disorders, etc.) have caused sudden pilot incapacitation and in rare cases have contributed to accidents. But such incapacitation is usually easily detectable by other crewmembers and taken care of by applying the proper procedures. The more dangerous type is developed when a reduction in capacity results in a partial or subtle incapacitation. Such incapacitation may go undetected, even by the person affected, and is usually produced by fatigue, stress, the use of some drugs and medicines, and certain mild pathological conditions such as hypoglycemia. As a result of such health conditions, human performance deteriorates in a manner that is difficult to detect and therefore, has a direct impact on safety. Even though personnel are subject to regular periodical medical examinations to ensure continuing health, that does not relieve the responsibility to take all necessary precautions to maintain physical fitness. It hardly needs to be mentioned that fitness will have favourable effect on emotion, reduce tension and anxiety, and increase resistance to fatigue. Factors known to positively influence fitness are exercise, healthy diet and good sleep/rest management. Tobacco, alcohol, drugs, stress, fatigue and unbalanced diet are all recognised to have damaging effects on health. Finally, it is each individual’s responsibility to arrive at the workplace “fit for duty”.

6. Stress. Stress can be found in many jobs, and the aviation environment is particularly rich in potential stress factors. Some of these stress factors have accompanied the aviation environment since the early days, such as weather phenomena

or in-flight emergencies; others like noise, vibration and G-forces have been reduced with the advent of the jet age while disturbed circadian rhythms and irregular night flying have increased. Stress is also associated with life events which are independent from the aviation system but tightly related to the human element. Such events could be sad ones like a family separation, or happy ones like weddings or childbirth. In all situations, individual responses to stress may differ from a person to another, and any resulting damage should be attributed to the response rather than the stress factor itself. In any environment, individuals are encouraged to anticipate, recognise and cope with their own stress, and perceive and accommodate stress in others, thus managing stress to a safe end. Failure to do so will only aggravate the stressful situation and might lead to problems.

707. PERSONALITY AND ATTITUDE

1. Personality traits and attitudes influence the way we behave and interact with others. Personality traits are innate or acquired at a very young age, and are deep-rooted, stable and resistant to change. They define a person and classify him/her (e.g. ambitious, dominant, aggressive, mean, nice, etc.). On the other hand, attitudes are learned and endure tendencies or pre-dispositions to respond in a certain way, the response is the behaviour itself. Attitudes are more susceptible to change through training, awareness or persuasion. The initial screening and selection process of aircrew aims at detecting undesired personality characteristics in the potential crewmember in order to avoid problems in the future. HF training aims at modifying attitudes and behaviour patterns through knowledge, persuasion and illustration of examples revealing the impact of attitudes and behaviour on flight safety. That should allow the personnel to make rapid decisions on what to do when facing certain situations.

708. CREW/TEAM RESOURCE MANAGEMENT (CRM/TRM)

1. CRM/TRM are practical applications of HF. They aim at teaching personnel how to use interpersonal and leadership styles in ways that foster effectiveness by focusing on the functioning of members as a team, not only as a collection of technically competent individuals, i.e. it aims at making personnel work in “synergy” (a combined effect that exceeds the sum of individual effects). When first introducing CRM/TRM some people might see it as a threat, since it constitutes a ‘change’. However, with the majority of accidents having lapses in human performance as a contributing causal factor, and with nearly 2 decades of CRM/TRM application in the international aviation community providing a very positive feedback, this ‘change’ can be seen as a “strength”. CRM/TRM can be approached in many different ways, nevertheless there are some essential features that must be addressed, and certain skills must be taught and inter-active group exercises must be accomplished. It is necessary to be aware of issues such as synergy, the effects of individual behaviour on teamwork, the effect of complacency on team efforts, the identification and use of all available resources, the statutory and regulatory position of the pilot-in-command as team leader and commander, the impact of company culture and policies on the individual, and the interpersonal relationships and their effect on teamwork.

2. Communication Skills. Effective communication is the basis of successful teamwork. Barriers to communication are explained, such as cultural difference, rank, age, team position, and attitudes. Aircrew are encouraged to overcome such barriers

through self-esteem, participation, polite assertiveness, legitimate avenue of dissent, and proper feedback.

3. Situational Awareness. Total awareness of the surrounding environment is emphasised, as is the necessity from personnel to differentiate between reality and perception of reality, to control distraction, enhance monitoring and cross-checking, and to recognise and deal with incapacitation, especially when subtle.

4. Problem Solving and Decision Making. These skills aim at developing conflict management within a time constraint. A conflict could be immediate or ongoing; it could require a direct response or certain tact to cope with it. By developing judgement within a certain time frame, personnel develop the skills required to bring conflicts to safe ends.

5. Leadership. In order for a team to function efficiently it requires a leader. Leadership skills derive from authority but depend for their success on the understanding of many components such as managerial and supervisory skills that can be taught and practised, realising the influence of culture on individuals, maintaining an appropriate distance between team members enough to avoid complacency without creating barriers, care for one's professional skill and credibility, the ability to hold the responsibility of all crew members, and the necessity of setting the good example. The improvement of these skills will allow the team to function more efficiently by developing the leadership skills required to achieve a successful and smooth followership in the team.

6. Critique. Discussion of cases and learning to comment and critique actions are both ways to improve one's knowledge, skills and understanding. Review of actual occurrences to create problem-solving dilemmas that participants can act-out and critique through the use of feedback systems will enhance personnel awareness of their surrounding environment, make them recognise and deal with similar problems, and help them solve situations that they might encounter.

7. Line Oriented Flight Training (LOFT). LOFT is considered to be an integral part of CRM training, where the philosophy of CRM skills is reinforced. LOFT refers to aircrew training which involves a full mission simulation of situations which are representative of flying operations, with emphasis on situations which involve communication, management and leadership. As such it is considered as a practical application of CRM training and should enhance the principles developed therein and allow a measurement of their effectiveness.

709. DATA COLLECTION AND ANALYSIS

1. It is vital that interventions or mitigating strategies are informed by accurate and tested data. However, the collection and analysis of suitable human performance data provides investigators with considerable challenges. Legacy information systems commonly embody a bias towards technical information though analysis of psychological processes, and organisational contexts plays an important part in the understanding of overall human performance and the likelihood of error. Databases used in the collection of human performance data must offer the investigator a comprehensive and useful taxonomy (system of classification) for the input and extraction of such information.

710. TRAINING

1. Paradoxically, many of the characteristics that are conventionally found in successful aviators may render them resistant to training in human performance. Simplistic training techniques for raising awareness of human error issues are unlikely to achieve change in performance. Experiential methods linked to explicit performance requirements, rather than passive training methods with an academic output, are likely to provide greater benefit in modifying attitudes and behaviours.

2. For a CRM/TRM programme to be successful it must be embedded in the total training programme, it must be continuously reinforced, and it must become an inseparable part of an organisation's culture. CRM/TRM should thus be instituted as a regular part of periodic training, and should include practice and feedback exercises such as complete crew LOFT exercises.

CHAPTER 8

MILITARY AVIATION RISK MANAGEMENT

801. INTRODUCTION

1. Military Aviation Risk Management (RM) is a decision-making process to systematically evaluate possible courses of action in any given situation, identify risks and benefits, and determine the best way forward. It provides personnel with the means to enhance operational capability while limiting all dimensions of risk, thereby increasing an organisation's ability to accomplish its mission, whether it is flying an aircraft, loading a truck with supplies, or establishing a computer network. World-class organisations have always been distinguished from others as those that demonstrate continuous improvement, and developments in safety management over the years have realised improvements in safety performance. RM adds rigour to the traditional approach to operational effectiveness, and risk reduction directly strengthens military aviation capability.

2 All military missions and daily routines involve risk, and all operations need decisions that require assessment of any potential risk. All personnel are responsible for identifying those potential risks and adjusting or compensating appropriately. Risk decisions must be made at a level of responsibility that corresponds to the degree of risk, taking into consideration the benefit of the mission and the timeliness of the required decision. Hazards should be identified using the same disciplined and logical thought processes that govern all other aspects of military endeavours. The aim is to increase mission success while reducing the risks to the lowest practical level. RM is an essential element of military doctrine; uncertainty and risk are part of all military operations. A time-tested principle of operations is taking bold, decisive action, and a willingness to identify and control or accept the associated risk. Risk is the probability and severity of failure or loss from exposure to various hazards. Carefully determining the hazards, assessing the risks they present, and then analysing, controlling and executing a supervised plan that accounts for these resultant risks contributes to the success of the application of military force.

3. RM is applicable to all levels of military operations from strategic to tactical. It is not a radical new way of doing business; however, it does provide a process that will allow greater and more consistent results rather than relying solely on experience. The cornerstone of RM success is the early education of personnel in its principles and tools.

802. RM PRINCIPLES

1. Three principles govern all actions associated with the management of risk.

   a. Accept No Unnecessary Risk. RM provides tools to determine which risk, or what level of risk, is unnecessary. As an example, choosing the lowest threat ingress to a target versus the most direct route avoids unnecessary risk. The corollary to this axiom is “accept necessary risk” required to successfully complete the mission or task.

   b. Make Risk Decisions at the Appropriate Level. Those accountable for success or failure must be determined in the RM decision process. The appropriate level for risk decisions, the risk owner, is the one who can allocate the resources to reduce the risk or eliminate the hazard and implement controls. Commanders at all levels must ensure subordinates know how much risk they can accept and when they must elevate the decision to a higher level. The risk owner is required to elevate decisions to the next level in the chain of command after it is determined that controls available to him/her will not reduce residual risk to an acceptable level.

   c. Accept Risk only when Benefits Outweigh the Costs. All identified benefits should be compared to all identified potential costs of risks occurring. The process of weighing such costs against benefits helps to maximise unit capability. Even high risk endeavours may be undertaken when there is clear knowledge that the sum of the benefits exceeds the sum of the costs. Balancing costs and benefits may be a subjective process and open to interpretation; ultimately, the balance may have to be determined by the appropriate authority.

803. RM OBJECTIVES

1. RM contributes to occurrence prevention and therefore to combat capability by minimising the risks due to hazards, consistent with other cost, schedule, and mission requirements. Beyond reducing losses, RM also provides a logical process to identify and exploit opportunities that provide the greatest return on investment of time, money and resources. The overall objective of RM comprises the following elements:

   a. Enhance operational effectiveness at all levels, while preserving assets and safeguarding health and welfare.

   b. Integrate RM into operational activity from planning to debriefing, ensuring decisions are based upon assessments of the risk integral to the activity and mission.

   c. Create an environment in which all personnel are trained and motivated to manage risk in all their activities.

   d. Identify opportunities to increase military aviation capability to help in ensuring decisive victory in any future conflict at the least possible cost.

804. LEVELS OF RM

1. The RM process exists on 3 levels. While it would be preferable to perform an in-depth application of RM for every mission or task, time and resources may not always be available. One of the objectives of RM training is to develop sufficient proficiency in applying the process so that RM becomes an automatic part of the decision making methodology to make sound and timely decisions.

2. Time-Critical. Time-critical RM is an "on the run" mental or verbal review of the situation using the basic RM process without necessarily recording the information. This time-critical process is used to consider risk while making decisions in a time-compressed situation; for example, during the execution phase of training or operations as well as in planning and execution during crisis responses. It is particularly helpful for choosing the appropriate course of action when an unplanned event occurs during execution of a planned operation or daily routine.

3. Deliberate. Deliberate RM is the application of the complete process. It primarily uses experience and brainstorming to identify hazards and develop controls and is therefore most effective when done in a group. Examples of deliberate applications include the planning of upcoming operations, review of standard operating, maintenance, or training procedures, and damage control or disaster response planning.

4. Strategic. This is the deliberate process with more thorough hazard identification and risk assessment involving research of available data, use of diagram and analysis tools, formal testing, or long term tracking of the hazards associated with the system or operation (normally with assistance from technical experts). It is used to study the hazards and their associated risks in a complex operation or system, or one in which the hazards are not well understood. Examples of strategic applications include the long-term planning of complex operations, introduction of new equipment, materials and missions, development of tactics and training curricula, high risk facility construction, and major system overhaul or repair. Strategic RM should be used on all high priority or high visibility risks.

5. Opportunity-Risk and Training Realism. Just as every organisation should be targeting its more important risk issues, it should also be systematically targeting risk barriers to expanded operational capabilities and increased training realism. As a general rule, about half the effort expended on RM should be directed toward using RM to expand operational capabilities and effectiveness. The other half is directed at reducing various other types of risk.

805. RM PROCESS

1. RM is a continuous process providing a basic structure for the detection and assessment of hazards, and the analysis and control of risk, thereby enhancing performance and maximising combat capabilities. Individuals at all levels are responsible for RM. The stages in any RM process are.

a. Hazard Identification. The first stage involves application of appropriate hazard identification techniques in order to identify hazards associated with an operation or activity. A hazard can be defined as any real or potential condition that could cause mission degradation.

b. Risk Assessment. The risk assessment stage involves the application of quantitative or qualitative measures to determine the probability and severity of ill effects potentially resulting from exposure to a hazard.

c. Risk Control Measure Analysis. The next stage involves the evaluation of specific strategies and controls that reduce or eliminate the identified risk. Effective mitigation measures reduce at least one of the three components of risk, that is, probability, severity and exposure.

d. Risk Control Decisions. Then, decisions are made at the appropriate level based upon analysis of the overall costs and benefits, and the most mission supportive risk controls are chosen.

e. Risk Control Implementation. Once control measures have been selected, an implementation strategy must be developed and carried out.

f. Supervision & Review. RM is a process that continues throughout the life cycle of a system, mission, or activity. Once controls are in place, the process must be periodically re-evaluated to ensure its effectiveness and mission supportiveness.

2. To gain maximum benefit from RM, the following must be kept in mind.

a. Apply the Stages in Sequence. Each stage is a building block for the next, and it is important to complete each one, however briefly, before proceeding to the next. For example, if hazard identification is interrupted to focus on control of a particular hazard before identification is complete, other more important hazards may be overlooked and the RM process may be distorted. Until hazard identification is complete, it is not possible to properly prioritise risk and the subsequent control efforts.

b. Maintain Balance in the Process. All stages are important. If an hour is available to apply the RM process, it is important not to lose sight of the total process. Spending 50 minutes on hazard identification may not leave enough time to effectively apply the other stages. The result is sub-optimal RM. Of course, it would be simplistic to rigidly insist that each stage has a time limit. The idea is to assess the time and resources available for RM activities and allocate them in a manner most likely to

produce the best overall result. Remember the 80/20 rule - 80% of the result is often achieved with only 20% of the effort, and the remaining 20% of the result often takes 80% of the effort.

c. Apply the Process as a Cycle. Supervision and review feeds back to the beginning of the process. It is this cyclic characteristic that generates the continuous improvement characteristics. When it is established that some risks have been significantly reduced, hazard identification is reapplied to find new hazard targets. In this way, the RM process is continually re-evaluating the risks.

d. Involve People Fully. The only way to assure the RM process is supportive is to provide for the full involvement of the people actually exposed to the risks. Take the time to periodically revalidate RM procedures and ensure that they are mission focused and are viewed positively by personnel.

806. RM INTEGRATION

1. A key objective of RM is to accomplish it as an integrated aspect of mainstream mission processes. When RM is effectively integrated, it quickly ceases to be consciously identifiable as a separate process. It is a logical process of weighing potential costs of risks versus anticipated benefits.

807. RM BENEFITS

1. Benefits are not limited to reduced occurrence rates or decreased injuries, but may be actual increases in efficiency or mission effectiveness. Bold, high risk actions may be undertaken when the benefits have been carefully weighed against the probability and severity of loss; the analysis of current practices may reduce risks currently accepted; decisions are based on a reasoned and repeatable process instead of relying on intuition; and the adequate understanding of risk provides a clearer picture of unit strengths and weaknesses.

2. Acceptability of Risk. Risk acceptance is not as elementary a matter as it may first appear. Several points must be kept in mind - some degree of risk is a fundamental reality; RM is a process of tradeoffs; quantifying risk alone does not ensure safety; and risk can be a matter of perspective. Realistically, some risk must be accepted. How much is the prerogative of the defined decision authority, and that decision is affected by many inputs. As tradeoffs are considered and mission planning progresses, it may become evident that some of the safety parameters are forcing higher risk to successful mission completion. From the commander’s perspective, a relaxation of one or more of the established safety parameters may appear to be advantageous when considering the broader perspective of overall mission success. When a commander or manager decides to accept risk, the decision should be co-ordinated whenever practical with the affected personnel and organisations, and then documented so that in the future everyone will know and understand the elements of the decision and why it was made.

808. RM GUIDELINES & RESPONSIBILITIES

1. Guidelines:

   a. All human activity entails some element of risk.

   b. Do not panic at every hazard; there are ways of controlling them.

   c. Keep problems in proper perspective.

   d. Weigh risks and make judgements based on knowledge, experience, and mission requirements.

   e. Operations always represent a gamble to some degree; good analysis tilts the odds in your favour.

   f. Hazard analysis and risk assessment do not free us from reliance on good judgement, they improve it.

   g. It is more important to establish clear objectives and parameters for risk assessment than to find a “cookbook” approach and procedure.

   h. There is no “best solution.” There are normally a variety of directions to go, and each may produce some degree of risk reduction.

   i. Complete safety is a condition that seldom can be achieved in a practical manner.

   j. There are no “safety problems” in mission planning or design. There are only management problems that, if left unresolved, may cause problems.

2. Responsibilities:

   a. Commanders are responsible for the effective management of risk; selecting from risk reduction options provided by the staff; accepting or rejecting risk based on the benefit to be derived; training and motivating leaders to use RM; and if not authorised to accept high level risks, elevating to the appropriate level.

   b. Staff assess risks and develop risk reduction options; integrate risk controls into plans and orders; and identify unnecessary risk controls.

   c. Supervisors apply the RM process and direct personnel to use it; consistently apply effective RM principles and methods to operations and tasks; and elevate risk issues beyond their control or authority to superiors for resolution.

   d. Individuals understand, accept, and implement RM processes; maintain a constant awareness of the changing risks associated with an operation or task; and make supervisors immediately aware of any unrealistic risk reduction measures or high risk procedures.

ANNEX A

RELATED DOCUMENTS

INTRODUCTION

1. This document, AFSP-1 (A), is the first in the Allied Flight Safety Publications suite of documents and it sets out general policy and guidance on aviation safety issues. It complements other Allied Publications (APs), but relies on subordinate and national documentation for amplification on procedural issues.

FLIGHT SAFETY STANAGs

2. There exist 11 STANAGs relating directly to flight safety, which, if nations choose, either may be embodied in national regulations or held as stand-alone documents. For ease of reference, it is recommended that copies of the STANAGs should be inserted at the end of this AFSP. Each STANAG has a custodian who is a member of the NATO Flight Safety Panel (FSP), a body that periodically reviews the STANAGs to ensure that they remain complete and relevant to current circumstances. Any proposals to amend a STANAG, or to develop a new one, should be addressed, in the first instance, to the national Co-ordinating Member (CM) who will initiate appropriate action in line with guidance contained in the NATO Military Agency for Standardisation Administrative Instructions (MASAI). Details of national CMs are set out in Annex A.

OTHER APs and STANAGs

3. The FSP will make every effort to ensure that policy guidance contained in AFSP-1 (A) does not conflict with material in APs and STANAGs for which it is not responsible. There are, however, several related STANAGs, listed at Annex C, for which the FSWG has no responsibility, but which may overlap areas of aviation safety interest. Where this is the case, the flight safety STANAGs take primacy on aviation safety issues.

NATIONAL FLIGHT SAFETY DOCUMENTS

4. Nations may choose to adopt AFSP-1 (A) as their standard aviation/flight safety manual or to use it to complement and/or amplify existing national regulations. Should the latter course be taken, nations should ensure that their procedures reflect the spirit of the general guidance set out in AFSP-1 (A). However, if at some stage a nation finds itself unable to comply with AFSP-1 (A) principles and guidance, then it may need to consider applying a reservation to its AFSP-1 (A) ratification.

INTERNATIONAL RULES and REGULATIONs

5. Every attempt will be made to identify international aviation safety related rules and regulations and to incorporate them in AFSP-1 (A).

ANNEX B

NATO FLIGHT SAFETY WORKING GROUP
NATIONAL - CO-ORDINATING MEMBERS

The following list shows the office and appointment of each of the national co-ordinating members of the NATO Flight Safety Working Group.

BEL Etat-Major de la Force Aérienne
VSF/Ops
Quartier Roi Albert 1er
Rue de la Fusee, 70
1130 BRUXELLES
Belgium

BGR

CAN Directorate of Flight Safety
National defence Headquarters
MGen George R Pearkes Building
Attn: DFS/DFS 3
OTTAWA K1A OK2
Canada

CZE Senior Inspector of Flight Safety
Air Forces HQ
25002 Stara Boleslav
Czech Republic

DEU General Flugsicherheit in der Bundeswehr
Postfach 906110
D-51127 KOLN
Germany

DNK Defence Command Denmark
Attn: Air Board Member
Postbox 202
DK-2950 VEDBAEK
Denmark

ESP Estado Mayor del Aire
Divisione de Operaciones
Attn: Seguridad de Vuelo
Romero Robledo, 8
28071-MADRID
Spain

EST

FRA Etat-Major de l'Armee de l'Air
Bureau Emploi/Division SV
24, BoulvardVictor
00460 ARMEES
France

GBR Defence Aviation Safety Centre
(Attn: SO2 HF)
PO Box 333, RAF Bentley Priory
Stanmore, Middlesex
HA7 3YN
UK

GRC Hellenic Air Force General Staff
Attn: Flight Safety Directorate (FSD)
Stratopedon Papagou
HOLLARGOS-ATHENS
Greece-15561

HUN NATO FSWG Representative
H-8201 Veslprem
PO Box 86
HUNGARY

ITA Ispettorato Sicurezza Volo
Viale dell' Universita 4
00185 ROMA
Italy

LTU

LUX

LVA

NLD Ministry of Defence Air Staff
Attn: ACOS Flight Safety (HAVKEM)
Postbox 20703
2500 ES THE HAGUE
The Netherlands

NOR Headquarters Defence Command Norway
Inspectorate of Flight Safety/Kolsas
Oslo Mil/Huseby
0016 OSLO
Norway

POL

PRT Estado Maior da Forca Aerea
Attn: Gabinete de Prevencao de Acidentes
Ave da Force Aerea - Alfragide
2724-506 AMADORA
Portugal

ROU

SVK

SVN Military Aviation Authority
Zgornji Brnik 130k, pp 52
4210 Brnik
Slovenia

TUR Genelkurmay Anlasmalar Daire Bsk. Ligi
Attn: And.D.MAS.S
06100 ANKARA
Turkey

USA Headquarters AFSC/SEPP
9700 G Street, SE, Suite 216B
KIRTLAND AFB
NM 87117-5670
USA

ANNEX C

NATO FLIGHT SAFETY PANEL
FLIGHT SAFETY STANAGS AND RELATED DOCUMENTS

The following list sets out the STANAGs for which the NATO Flight Safety Panel is responsible together with flight safety-related STANAGs sponsored by other Working Groups, and other regulatory documents.

FLIGHT SAFETY STANAGS	RELATED DOCUMENTS
STANAG 3101FS - Exchange of Accident /Incident Information Concerning Aircraft and Missiles	STANAG 3318AMD - Aeromedical Aspects of Aircraft Accident/incident Investigation
STANAG 3102FS - Flight Safety Co-operation in Common Ground/Airspace	Nil
STANAG 3117FS - Aircraft Marshalling Signals	ICAO - Rules of the Air - Annex 2
STANAG 3230FS - Emergency markings on Aircraft	STANAG 3109ASSE - Symbol Marking of Aircraft Servicing and Safety Hazard Points
STANAG 3379FS - In-Flight Visual Signals	Nil
STANAG 3531FS - Safety Investigation and Reporting of Accidents/Incidents Involving Military Aircraft and/or Missiles	STANAG 3113ACC - Provision of Support to Visiting Personnel, Aircraft and Vehicles STANAG 3318AMD - Aeromedical Aspects of Aircraft Accident/Incident Investigation ICAO Doc 9137-AN-898- Annex 13 - Aircraft Accident Investigation
STANAG 3533FS - Flying and Static Displays	Nil
STANAG 3564FS - Rules for Live Air Weapons Demonstrations	
STANAG 3750FS - Reporting and Investigation of Air Traffic Incidents	ICAO - PANS/RAC DOC 4444-RAC/501/12
STANAG 3783FS - Air Weapons Ranges - Identification of Control Installations and Spectator Sites During Daylight Operations	
STANAG 3879FS - Birdstrike Risk/Warning Procedures (Europe)	Nil
STANAG 7160FS - Aviation Safety - AFSP-1 (A)	

ANNEX D

LEXICON

LEXICON OF TERMS AND DEFINITIONS

This Annex contains terms and definitions which may be used within AFSP-1 (A) or elsewhere in an aviation safety environment. Unless otherwise stated, they are drawn from AAP-6, 'NATO Glossary of Terms and Definitions'. Those marked "AFSP-1 (A)" have been agreed by the FSP and will be submitted for inclusion in AAP-6 in due course. Those marked AC/321-D/27 REV 3 have been agreed and are in the process of being incorporated in AAP-6. Where AAP-6 terms and definitions cover more than one element, only the air-related one is listed.

Accident (See occurrence).

Advanced aerodrome
An aerodrome, usually having minimum facilities, in or near an objective area. (See also aerodrome). AAP-6

Aerodrome
An area prepared for the accommodation (including any buildings, installations and equipment), landing and take-off of aircraft. See also advanced aerodrome; air strip; alternate aerodrome; landing area; landing site; main aerodrome. AAP-6

Aircraft
An aeroplane, helicopter or other machine capable of flight. AAP-6

Aircraft and/or missile accident/incident
Any occurrence which may be classified as an aircraft and/or missile accident/incident by any involved nation. STANAG 3531FS

Aircraft and/or missile accident/incident safety investigation
A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of cause(s) and, when appropriate, the making of safety recommendations. (Often shortened to Safety Investigation). STANAG 3531FS

Aircraft and/or missile accident/incident safety investigation committee
A group, comprised of such investigators, advisers and observers as may be deemed necessary by the involved nations, appointed to conduct the safety investigation of an accident/incident involving aircraft and/or missiles. (Often shortened to Safety Investigation Committee). STANAG 3531FS

Aircraft captain (See aircraft commander). AAP-6

Aircraft commander
The aircrew member designated by a competent authority as being in command of an aircraft and responsible for its safe operation. Note: The aircraft commander may also be the mission commander. (Also called aircraft captain). AAP-6

Aircraft damage categories
(See National Definitions). AFSP-1 (A)

Aircraft dispersal area
An area on a military installation designed primarily for the dispersal of parked aircraft, whereby such aircraft will be less vulnerable in the event of enemy air raid. AAP-6

Aircraft guide (See aircraft marshaller). AAP-6

Aircraft marshaller
A person trained to direct by visual or other means the movement of aircraft on the ground into and out of landing, parking or hovering points. (Also called aircraft guide). AAP-6

Aircraft marshalling area
An area in which aircraft may form up before take-off or assemble after landing. (See also manoeuvring area). AAP-6

Airfield (See aerodrome). AAP-6

AIRPROX
A situation in which, in the opinion of the 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.
STANAG 3750FS

Air strip
An unimproved surface which has been adapted for take-off or landing of aircraft, usually having minimum facilities. (See also aerodrome) AAP-6

Air traffic control service
A service provided for the purpose of: a - preventing collisions: (1) between aircraft; and (2) on the manoeuvring area between aircraft and obstructions; and b - expediting and maintaining an orderly flow of airtraffic. AAP-6

Air traffic incident
A serious occurrence involving air traffic such as Aircraft Proximity (AIRPROX), serious difficulty caused by faulty procedure or non-compliance with procedures (PROCEDURE), or failure of ground facilities (FACILITY). STANAG 3750FS

Alternate aerodrome
An aerodrome specified in the flight plan to which a flight may proceed when it becomes inadvisable to land at the aerodrome of intended landing. An alternate aerodrome may be the aerodrome of departure. (See also aerodrome; main aerodrome). AAP-6

Aviation safety hazard
Circumstances which have, or could have, resulted in an occurrence or could throw light on the causes of occurrences. Hazards may be: Actual - one considered to have been immediately dangerous to aircraft and/or which has, or could have, caused fatal or major injuries to personnel; or Potential - one which, although not dangerous or latently injurious at the time, would have been so if the situation had developed adversely or been complicated by other readily conceivable factors. AFSP-1 (A)

Casualty
In relation to personnel, any person who is lost to his organisation by reason of having been declared dead, wounded, diseased, detained, captured or missing. (See also injury). AAP-6

Commonality
The state achieved when the same doctrine, procedures or equipment are used. AAP-6

Compatibility
The suitability of products, processes or services for use together under specific conditions to fulfil relevant requirements without causing unacceptable interactions. (ISO-IEC). AC/321-D/27 REV 3

Control area
A controlled airspace extending upwards from a specified limit above the earth. (See also; airway; control zone; controlled airspace; terminal control area). AAP-6

Control zone
A controlled airspace extending upwards from the surface of the earth to a specified upper limit. (See also airway; control area; controlled airspace; terminal control area).
AAP-6

Controlled airspace
An airspace of defined dimensions within which air traffic control service is provided to controlled flights. (See also control area; terminal control area). AAP-6

Display air traffic zone
An airspace of well defined dimensions within which the aircraft manoeuvres performed in a flying display can be completed, and which is exclusively used for this purpose.
STANAG 3533FS

Flying display
A demonstration of aircraft, parachutists or any flying activity performed to a set programme before spectators on a public occasion, including tactical manoeuvres and demonstrations of simulated weapons deliveries or attack techniques outside recognised danger areas. STANAG 3533FS

FOD
Foreign object damage/debris (FOD) is any damage to an aircraft caused by material or equipment which originates from any source, either external or part of the aircraft. The definition excludes damage resulting from a bird strike. AFSP-1 (A)

Helipad
A prepared area designated for take-off and landing of helicopters, including touchdown/hover point. AAP-6

Heliport
A facility designated for operating, basing, servicing, and maintaining helicopters.
AAP-6

Host nation
A nation which receives the forces and/or supplies of allied nations and/or NATO organisations to be located on, or to operate in, or to transit through its territory.
AAP-6

Hovering
A self-sustaining manoeuvre whereby a fixed, or nearly fixed, position is maintained relative to a spot on the surface of the earth or underwater. AAP-6

ICAO
International Civil Aviation Organisation.

Implementation
In NATO Standardisation, the fulfilment by a member nation of its obligations as specified in a Standardisation Agreement. AAP-6

Incident (See occurrence).

Injury (See National Definitions).

Interchangeability
The ability of one product, process or service to be used in place of another to fulfil the same requirements. (ISO-IEC). AC/321-D/27 REV 3)

Interoperability
The ability of Alliance Forces, and when appropriate, forces of Partner and other nations, to train, exercise and operate effectively together in the execution of assigned missions and tasks. AC/321-D/27 REV 3

Involved nation
The nation of occurrence, the operating nation, the nation which owns the aircraft and/or missile involved in the accident/incident, the parent nation of any exchange officer involved in the accident/incident, and the nation which owns the equipment, facilities and/or personnel involved during the accident/incident. STANAG 3531FS

Landing area
A specially prepared or selected surface of land, water or deck designated or used for take-off and landing of aircraft. AAP-6

Landing site (See aerodrome).

Main aerodrome
An aerodrome designed for permanent occupation in peacetime, also suitable for use in wartime and having sufficient operational facilities for full use of its combat potential. (See also aerodrome, alternative aerodrome, redeployment aerodrome). AAP-6

Manoeuvring area
The part of the aerodrome to be used for the take-off and landing of aircraft associated with take-off and landing, excluding aprons. (See also aircraft manoeuvring area).
AAP-6

MISHAP (See occurrence).

Missile
The term includes air-to-air missiles, surface-to-surface missiles, air-to-surface missiles, surface-to-air missiles, and aerospace vehicles other than aircraft, whether guided or unguided. STANAG 3531FS

Mission
One or more aircraft ordered to complete one particular task. AAP-6

Nation of occurrence
The nation on, or above, whose territory (including territorial waters), or on whose ship, the accident/incident occurred. STANAG 3531FS

NATO standardisation agreement
The record of an agreement among several or all the member nations to adopt like or similar military equipment, ammunition, supplies and stores; and operational and logistic and administrative procedures. National acceptance of a NATO allied publication issued by the Military Agency for Standardisation may be recorded as a Standardisation Agreement. (Also called a 'STANAG'). (See also implementation; ratification; reservation; standardisation). AAP-6

NOTAM (See notices to airmen).

Notices to airmen
A notice, containing information concerning the establishment, condition or change in any aeronautical facility, service, procedures or hazard, the timely knowledge of which is essential to personnel concerned with flight operations. (Also called NOTAM).
AAP-6

Occurrence
An unintentional event associated with the operation of the aircraft in which: a - a person is fatally injured; b – the aircraft sustains damage or structural failure which adversely affects the structural strength, performance or flight characteristics of the aircraft or requires major repair or component replacement; or c – the aircraft is missing or completely inaccessible or d – hazards or could hazard aircraft operations. (See also National Definitions). AFSP-1 (A)

Operating nation
The nation which owns the aircraft and/or missile involved in the accident/incident. The involved nations may agree that the operating nation is the nation under whose direct control the aircraft and/or missile was being operated at the time of the accident/ incident. In this case, the nation which owns the aircraft and/or missile shall be an involved nation. (Note: The involvement of an exchange officer in any capacity shall not of itself make his/her parent nation an operating nation). STANAG 3531FS

Order
A communication, written, oral, or by signal, which conveys instructions from a superior to a subordinate.

AAP-6
Since the terminology used to express an order, instruction or to offer guidance may vary between nations, the following terms are defined for use with this document:

Are/is to – mandatory verb ordering a course of action.

Must – mandatory verb suggesting a course of action.

Shall/should – non-mandatory verb suggesting or requesting compliance with a course of action or used when offering guidance.

AFSP-1 (A)

Range
An area reserved and normally equipped for practice in weapons delivery and/or shooting at targets. (Also called target range). AAP-6

Ratification
In NATO Standardisation, the fulfilment by which a member nation formally accepts, with or without reservation, the content of a Standardisation Agreement. AAP-6

Reservation
In NATO Standardisation, the stated qualification by a member nation that describes that part of Standardisation Agreement that it will not implement or will implement only with limitations. AAP-6

Runway
A defined rectangular area on an aerodrome, prepared for the landing and take-off run of aircraft along its length. AAP-6

Safety investigation
A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of cause(s) and, when appropriate, the making of recommendations. (See also aircraft and/or missile accident/incident safety investigation).
STANAG 3531FS

Safety investigation committee
A group, comprised of investigators, advisers and observers as may be deemed necessary by the involved nations, appointed to conduct the safety investigation of an accident/incident involving aircraft and/or missiles. (See also aircraft and/or missile accident/incident safety investigation committee). STANAG 3531FS

Spectator enclosure
An area which isolates spectators from the display area and from aircraft movement areas. STANAG 3533FS

Spectator sites
Any areas outside the range control installations designated as viewing sites for visitors to the range. This includes vehicle parks. STANAG 3750FS

STANAG
The NATO term derived from standardisation agreement. (See also NATO standardisation agreement). AAP-6

Standardisation
The attainment of interoperability through the development and application of concepts, doctrines, procedures and designs to achieve and maintain the required levels of compatibility, interchangeability or commonality in the operational, procedural, materiel, technical and administrative fields. (See also NATO Standardisation Agreement).
AC/321-D/27 REV 3

Static display
A display of an aircraft and related equipment which does not include flight, taxiing or engine start. STANAG 3533FS

Tactical range
A range in which realistic targets are in use and a certain freedom of manoeuvre is allowed. STANAG 3750 FS

Target range (See range).

Taxiway
A specially prepared or designated path on an aerodrome for the use of taxiing aircraft. AAP-6

Terminal control area
A control area normally established at the confluence of Air Traffic Service routes in the vicinity of one or more major aerodromes. (See also airway; controlled airspace; control area; control zone). AAP-6

Threshold
The beginning of that portion of the runway useable for landing. AAP-6

Time on target
a. - time at which aircraft are scheduled to attack or photograph a target; b - in co-ordinated maritime operations, the time of arrival of the first warhead in a specified area. AAP-6

Touchdown zone
a – for fixed wing aircraft, the first 3000ft or 1000m of runway beginning at the threshold; b – for rotary wing and vectored thrust aircraft, that portion of the helicopter landing area or runway used for landing. AAP-6

ANNEX E

NATIONAL DEFINITIONS

To assist understanding and the exchange of information, some national definitions for aviation safety are set out below.

BELGIUM

Aircraft damage - any damage outside fixed limits to an aircraft, with the exception of its ammunition.

Aircraft damage class(category)

> **Class 1** - the aircraft has disappeared, is destroyed or is economically not repairable.
>
> **Class 2** - the aircraft can be repaired, but the damage can not be repaired by the unit; or, an important component of the aircraft must be changed (eg main gear, wing, tail, fuselage, engine, gearbox or rotors).
>
> **Class 3** - the damage can be repaired by the unit without changing an important component.

HAPPENING (HAP) - any occurrence that causes no damage and/or injuries due to the use of an aircraft 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. This could lead/cause a MISHAP. There are 2 categories of HAP – high risk and low risk.

Injuries

> **Deadly injuries** - dead or injuries which cause the patient to die in less than 30 days.
>
> **Heavy injuries** - the patient is unable to work for more than 21 days.
>
> **Light injuries** - the patient needs medical attention but can work within 21 days.

MISHAP - any occurrence that causes damage and/or injuries, due to the use of an aircraft 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.

> **Category A** – aircraft damage Class 1 and/or at least one person with deadly injuries or missing.

Category B – aircraft damage Class 2 and/or at least one person with heavy injuries.

Category C – aircraft damage Class 3 and /or at least one person with light injuries.

BULGARIA

CANADA

Damage - damage to an aircraft is said to have occurred when the aircraft or any portion thereof, is lost or requires repair or replacement as a result of unusual forces, eg collision, impact explosion, fire, rupture, overstress, upset, wilful damage, sabotage or vandalism. This does not include faults that progressively develop as a result of normal flight stresses (eg, repeated applications of loads at or below the design operating limits of the aircraft), which n the long term result in fatigue failure. Such failures, which may be beyond the unit's resources to repair, or which may require replacement of major components, may be classified as progressive wear if the equipment has not been misused or subjected to unusual forces as indicated above. Accordingly, such failures shall not be classed as damage, but as normal wear resulting from prolonged service use. Additional damage may result from such failures, but it must be classified appropriately. Routine system or component unserviceabilities are not considered to be damage and need not be reported unless the originator feels that there was accident potential. The following categories are used to reflect the degree of damage:

Category A – the aircraft has been destroyed, declared missing, or damaged beyond economical repair (write-off).

Category B – the aircraft must be shipped, not flown under its own power, to a contractor or depot-level facility for repair.

Category C – the aircraft has sustained damage to a major component (as defined below) requiring repair beyond normal second-level maintenance capability

Category D – the aircraft has sustained damage that is within normal second-level repair maintenance capability, regardless of where or by whom the repair is carried out. This category includes damage repaired by replacement of third-level repairable components (other than major components).

Category E – the aircraft, including power plant, is not damaged, but accident potential exists.

Flight safety occurrence - any event involving the operation of an aircraft, or support to flying operations which causes an accident or incident. This could be an air occurrence (air accident or air incident, with or without weapons implications). Note – the following definitions are provided in order to fully understand the definition of a flight safety occurrence.

Air accident - any event involving a CF aircraft between the time the first powerplant start is attempted with intent for flight and the time the last powerplant or rotor stops (for a glider, from the time the hook-up is complete until the glider comes to rest after landing).

Air incident - an event involving a CF aircraft, between the time the first powerplant start is attempted with intent for flight and the time the last powerplant or rotor stops (for a glider, from the time the hook-up is complete until the glider comes to rest after landing).

Aircraft ground accident - this type of event involving CF aircraft occurs when there is no intent for flight, or when there is intent for flight but no powerplant start has been attempted, or after the
powerplants and rotors have stopped.

Aircraft ground incident this type of event involving CF aircraft occurs when there is no intent for flight, or when there is intent for flight but no powerplant start has been attempted, or after the powerplants and rotors have stopped.

Hazard - any condition that has the potential to cause injury or damage.

Injury - in accordance with CF Administrative Order 24-1, injuries shall be classified by a medical officer as very serious, serious, minor, killed or missing. These classifications may determine the type of investigation required.

CZECH REPUBLIC

DENMARK

Flying related occurrence - an unintentional or unfavourable occurrence taking place or being identified in the period from initiating engine start procedures with the intent of flying until the aircraft has been abandoned after performing normal shutdown procedures. Flying related occurrences consist of:

> **Accident** - aircraft disappeared destroyed or damaged beyond repair. Deceased or fatally injured person(s). Missing person(s). Seriously injured person(s) (absent from work for more than 21 work days).
>
> **Incident -** an occurrence not qualifying as an accident and involving one or more of the following: non-seriously injured person(s) (absent less than 21 work days); loss of aircraft parts; unintentional drop of aircraft items, cargo or equipment; unintentional drop or delivery of armament; detailed knowledge of an incident considered essential to flying safety or considered essential to prevent future incidents; air traffic incident (iaw Stanag 3750) – procedure, facility airprox.

ESTONIA

FRANCE

GERMANY

Aircraft accident and incident categories - occurrences during aircraft operation are differentiated by the location of the occurrence (in the air or on the ground) and according to the extent of any damage and/or according to the significance of the occurrence.

Category A – an accident in which a person is killed; a person is missing or an aircraft is destroyed; or an aircraft is missing or not recoverable.

Category B – an accident in which an aircraft is severely damaged or more than € 75,000 damage is caused.

Category C – an incident which is of significant meaning for flight safety work because it impaired or could have impaired flight safety or public safety or caused less than € 75,000 damage.

Category D – an incident which is meaningful for flight safety work because it impaired or could have impaired flight safety and is not a category C incident.

Injury - for the purposes of flight safety, injuries are classified as follows:

Fatal injury - any injury of one or several persons as the consequence of an aircraft accident or the resulting complications leading to death. The time frame between injury and death is irrelevant.

Serious injury – one which results in the expected loss of 2 months ability to work or the expected partial loss of more than 6 months ability to work.

Minor injury – any injury below a serious one.

GREECE

HUNGARY

ITALY

Major accident – an accident involving one or more aircraft, occurring during flight operations, in which an aircraft is declared FUD (Out of Use and Beyond Repair), FUR (Out of Use with Recoverable Parts) or R3 (Repairable at third-line Repair Maintenance), and/or a person receiving fatal or major injury, in the opinion of a competent medical unit, and/or serious damage is inflicted upon third parties.

Minor accident - an accident involving one or more aircraft, occurring during flight operations, in which an aircraft is declared R2 (Repairable at second-line Repair Maintenance), and/or a person receiving minor or slight injury, in the opinion of a competent medical unit, and/or slight damage is inflicted upon third parties.

Period of utilisation of an aircraft (flight operations) – extends from the time in which the crew starts the engine or engines with the aim of taking off, until the engine or engines are switched off at the end of the flight.

LATVIA

LITHUANIA

LUXEMBOURG

NETHERLANDS

NORWAY

POLAND

PORTUGAL

ROMANIA

SLOVAKIA

SLOVENIA

Accident - 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. a person is fatally or seriously injured as a result of:
   - being in the aircraft, or
   - direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
   - direct expsoure to jet blast,

b. 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, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or

c. the aircraft is missing or is completely inaccessible.

Incident - An occurrence, other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operation.

Fatal injury - An injury resulting in death within thirty days of the date of the accident.

Serious incident - An incident involving circumstances indicating that an accident nearly occurred.

Serious injury - An injury, which is sustained by a person in an accident and which:

a. requires hospitalization for more than 48 hours, commencing whithin seven days from the date the injury was received; or

b. results in a fracture of any bone (except simple fractures of fingers, toes or nose); or

c. involves lacerations which cause severe haemorrhage, nerve, muscle or tendon damage; or

d. involves injury to any internal organ; or

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 substances or injurious radiation.

SPAIN

Accident - any occurrence that causes damage to the aircraft, personnel or property.

Air accident - when the event occurs in the period between the aircraft rolling for take-off and, after landing, vacating the runway in a controlled manner.

Ground accident - if the event is directly related to the aircraft operation but the circumstances fall outside the above definitions.

Categories:

Major accident – the aircraft has disappeared, is destroyed or the damage reaches 80% or more of its value, or if a person is fatally injured or missing.

Severe accident – damage to the aircraft ranges from 15% to 80% of its value, or injuries are classified as severe from a medical point of view.

Minor accident – damage to the aircraft is below 15% of its value or injuries are classified as minor from a medical point of view.

Incident - any occurrence that causes neither damage nor injury but affects the safety of aircraft, personnel or air traffic.

TURKEY

Aircraft accident-incident - an accident involving one or more aircraft occurring on the ground or in the air during flight operations resulting in full, heavy or little damage to the aircraft, leading to death or fatal injury of the individuals on board or outside the aircraft and finally causing loss or damage of government or private property.

Major accident-incident - an accident-incident involving one or more aircraft, occurring during flight operations, and resulting in full or heavy damage to the aircraft. Death/injury may or may not occur during the accident-incident. (The aircraft requires depot-level maintenance).

Minor accident-incident - an accident-incident involving one or more aircraft, occurring during the flight operations, and resulting in little damage to the aircraft. Death/injury may or may not occur during the incident. (The aircraft requires base-level maintenance).

UNITED KINGDOM

Aircraft damage category - aircraft damage categories apply to damage to the aircraft as a whole, and are determined solely by the level of maintenance at which the aircraft itself is rectified. The damage category of a replaceable unit or component is not to be used to determine a damage category for the aircraft as a whole.

Category 1 - the damage is repairable on site by established first-line maintenance personnel.

Category 2 - the damage is repairable on site by established second-line maintenance personnel.

Category 3 - the damage is repairable on site but is beyond unit technical resources. Assistance from a repair and salvage unit or civilian contractor is required.

Category 4 - the damage is not repairable on site. The aircraft must be removed to an established repair depot or civilian repair organisation.

Category 5 - the aircraft is damaged beyond economic repair or is missing.

Injury

Fatal injury - an injury that results directly in the death of an individual either at the time of the accident or within one calendar year of that time. Missing persons are considered as fatally injured until evidence of their survival is confirmed.

Major injury - an injury that results in absence from all duties for 28 days or more, or permanent absence from primary duties

Minor injury - an injury that results in absence form all duties for between 7 and 28 days, and which falls outside the definition of major injury. In addition, unless categorised as major injuries, the following are always classified as minor injuries:

Slight injury - an injury that does not come within the provisions of major or minor injuries but nevertheless requires medical treatment as distinct from medical examination.

UNITED STATES

Accident - US DoD accidents are classified according to the severity of resulting injury, occupational illness, or property damage:

Class A accident - the resulting total cost of damages to Government and other property in an amount of $1 million or more; a DoD aircraft is destroyed; or an injury and/or occupational illness resulting in a fatality or permanent total disability.

Class B accident - the resulting total cost of damage is $200,000 or more, but less than $1 million; an injury and/or occupational illness results in permanent partial disability or when three or more personnel are hospitalised for in patient care as a result of a single accident.

Class C accident - a classification less severe than a Class B, as defined by each DoD component.

Foreign object damage (FOD) incident - reportable incident confined to turbine engine damage as a result of internal or external turbine engine FOD.