NATO STANDARD

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AEROMEDICAL TRAINING OF FLIGHT PERSONNEL

Edition A Version 2

May 2024

NORTH ATLANTIC TREATY ORGANIZATION

ALLIED AEROMEDICAL PUBLICATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

3 May 2024

1. The enclosed Allied Aeromedical Publication - AAMedP-1.2, Edition A, Version 2 - AEROMEDICAL TRAINING OF FLIGHT PERSONNEL, which has been approved by the nations in the Military Committee Air Standardization Board (MCASB), is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 3114.

2. AAMedP-1.2, Edition A, Version 2, is effective upon receipt and supersedes AAMedP-1.2, Edition A, Version 1, which shall be destroyed in accordance with the local procedure for the destruction of documents.

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

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS

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

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
ALB	Albanian Air Force does not have fixed wings. This STANAG will be implemented only for the training of the rotor wings' personnel
CAN	(1) Reference Chapter 1, Section 1.2, Paragraph 1.d – Canadian aircrew personnel receive Hypoxia Recognition Training (HR) every 10 years vice 5 years as stated. Lessons are received every 5 years; (2) Reference Chapter 1, Section 1.8 (Medical Facilities)-Canadian aeromedical training utilizes a Combined Altitude Depleted Oxygen (CADO) system at a pressure altitude of 10,000 feet above sea level (ASL). The DCS/DCI ricks has been deemed extremely low, thus Canada has decided the hyperbaric standby posture is not required; (3) Reference Chapter 2, Section 2.1, Paragraph 2.a(10)-Acceleration Environment in Flight is instructed only to Ejection Seat aircrew. All other aircrew will only be instructed in this topic if transferring to an ejection seat aircraft; (4) Reference Chapter 2, Section 2.1, Paragraph 2.a(12) – Escape from Aircraft in Flight is instructed only to Ejection Seat aircrew. All other aircrew will only be instructed in this topic if transferring to an ejection seat aircraft; (5) Reference Chapter 2, Section 2.1, Paragraph 2.a(19) – Toxic Substances in not instructed during Canadian Aeromedical Training; (6) Reference Chapter 2, Section 2.1, Paragraph 1.a(20) – Health Promotion, Malaria, HIV and sexually transmitted diseases are not instructed during Canadian Aeromedical Training but may be covered if aircrew are deployed to specific at risk areas; (7) Reference Chapter 2, Section 2.2, Paragraph 1.b(2) – Training in Pressure Breathing. The maximum pressure for aircrew candidates is 25 mmHg vice 30 mmHg; (8) Reference Chapter 2, Section 2.3, Paragraph 1.a(2) – Non-Ejection Seat personnel are not exposed to a rapid decompression; (9) Reference Chapter 3, Section 3.1, Paragraph 2.b(1) – Experience of Hypoxia. After Initial AMT training, Canadian rotary wing aircrew only complete didactic (on-line/Distance Learning) AMT to maintain their qualifications; and (10) Reference Chapter 3, Section 3.1, Paragraph 2.b(2) – Experience of Spatial Disorientation. After Initial AMT training, Canadian rotary wing aircrew only complete didactic (on line/Distance Learning) AMT to maintain their qualifications.
CZE	At present CZE does not match the requirements of publication AAMedP-1.2(A) Version 1 defined in the following points: - Chapter 2.4, point 2.b.(2)

	- Chapter 3.2, point 1.b.(2) - Chapter 3.3, point 2.b.(1)
FRA	France considers that the practical part of refresher training must be optional, in accordance with the capacity to mobilize flight personnel and instructors and because of the heavy equipment that it entails.
HUN	Rapid decompression training is not available due to technical problems. Spatial disorientation training is not available due to technical problems. Underwater escape training is not available due to technical problems.
LVA	1.Latvian National Armed Forces do not have capacity to provide training in accordance with STANAG 3114. The range of training depends on market research. 2.Latvian Air Force will provide only the rotary wing personnel training.
PRT	Portuguese Air Force does not have the capability to verify all requisites and specifications required by this STANAG, namely what his written on the section 1.6, chapter 1; section 2, chapter 2; paragraph 1.b (4), section 2.2, chapter 2; paragraph 2.a (2) and 2.b (2), section 2.4, chapter 2; paragraph 2.b (1), section 3.3, chapter 3.
SVK	The Slovak Republic is not able to execute the complete aeromedical training itself due to the absence of the necessary training facilities (a hypobaric chamber with the experience of a rapid decompression, DOT, a centrifuge, an underwater escape training device). The whole practical training has to be organized with other NATO partners and purchased (e.g. Aeromedical Centre in Prague, the Czech Republic). The Slovak Republic reserves the right to execute the limited aeromedical training in accordance with contracts with partner NATO nations (e.g. LBPN instead of centrifuge).
SVN	Use of hypobaric chamber and High G-force centrifuge will be regulated by Military Aviation Authority.
TUR	Türkiye will apply the STANAG to all flight personnel except the pilots who have commander badge. Commander badge is given to senior pilots who have more than 3000 flight hours as a first and instructor pilot. If these pilots had any practical flight physiology training before they might be exempt from practical part of the physiological training.
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CHAPTER 1 INTRODUCTION

1.1 AIM

The aim of this standard is to detail minimum standards of aeromedical training required for flight personnel in order to promote safety and efficiency in the operation of military aircraft and to allow aircrew of one NATO nation to fly in equivalent aircraft of another nation without additional aeromedical training. This standard does not cover specific training requirements for operating with night vision devices or in a CBRN environment.

1.2 GENERAL

1. This standard requires the following:

    a. Flight personnel shall receive, as a minimum, the initial and refresher aviation medicine training detailed in Chapters 2 and 3.

    b. All flight personnel shall receive the initial aeromedical training described in Chapter 2 prior to being placed on flying status.

    c. All flight personnel will receive the refresher training described in Chapter 3 on change in the type of aircraft they are operating or if they are returning to flight duties having not been engaged actively in operational flying for a period of more than 3 years.

    d. All flight personnel engaged in flight operations will receive the refresher aeromedical training described in Chapter 3 at intervals not exceeding 5 years. However, there may be circumstances where aircrew, having been in engaged actively in operational flying, will require refresher aeromedical training more frequently than 5 years. This may apply particularly to single seat fast-jet flying. More frequent refresher aeromedical training will be at the discretion of individual Nations.

    e. Flight personnel are defined as those personnel who hold a medical flight category and who have an essential role in the completion of the flight mission. They work within the aircraft during its flight. Non-constituted crew, such as aeromedical evacuation personnel, are not flight personnel, but they may require some elements of the training described herein. However, their training is not considered further within this standard.

1.3 INITIAL AND REFRESHER TRAINING

1. Flight personnel must be given appropriate instruction in the physiological and psychological factors that affect their performance and safety in the flight environment. An initial course of aeromedical training is required either before the start of flying training, or during the early stages of flying training. This is described further in Chapter 2.

2. Refresher training in aviation medicine is required throughout the careers of flight personnel. This refresher training should cover the principles of the subject and emphasize those aspects related directly to the type of aircraft and role in which the individual aircrew member will operate. While it is important to review fundamental principles, it is envisaged that refresher training should emphasize the practical application of these principles. Refresher training should also include any improvements in equipment or aircraft safety that are relevant to the aircraft flown by those attending the course. Refresher training is detailed in Chapter 3.

1.4 AIRCRAFT TYPE

The aeromedical instruction given to aircrew of different aircraft type (Simple Single Engine, Fast Jet, Fixed Wing Non Fast Jet and Rotary Wing) can vary in important respects. The standard outlined below distinguishes these groups of flight personnel and is divided into common core and aircraft specific requirements.

1.5 LIFE SUPPORT EQUIPMENT AND AIRCRAFT SPECIFIC TRAINING

Where practicable instruction in the physiological and psychological aspects of flight should be integrated with instruction on the life support and escape equipment which is to be used by the flight personnel. There is considerable merit in aeromedical training courses being aircraft type or group specific with the instruction related directly to the aeromedical features and life support equipment of the aircraft type or group that the students are operating.

1.6 INSTRUCTORS

The aeromedical training detailed in this standard should be delivered by appropriately trained personnel approved by their National Authority to undertake this type of training. Where possible instructors should have experience of flying operations or hold a flight qualification. Instructors must have practical knowledge of aviation medicine and human physiology.

1.7 MEDICAL FITNESS FOR TRAINING

All flight personnel attending for aeromedical training must hold a flying medical category. Additionally, immediately prior to hypobaric chamber exposure or emergency underwater breathing experience, each student is to be questioned or screened concerning his/her medical fitness to undergo such training.

1.8 MEDICAL FACILITIES

Medical facilities and a suitably qualified medical officer are to be readily available whenever flight personnel are decompressed in a hypobaric chamber. The medical facility is to include ready access to a hyperbaric chamber, in which the treatment of decompression sickness can be carried out.

1.9 ASSESSMENT

The National Authority may require testing of students at the end of the course or during the course. Such testing can be formal or informal and should be at the discretion of the National Authority.

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CHAPTER 2 INITIAL AVIATION MEDICINE TRAINING OF FLIGHT PERSONNEL

2.1 COMMON CORE

1. **General.** The initial aviation medicine training shall consist of a common core of academic instruction and practical exercises regardless of the aircraft type that the aircrew member intends to fly, supplemented by aircraft specific training. Initial training will be completed prior to the aircrew member being placed on flying status.

2. **Syllabus of Instruction.** The initial course of instruction shall consist of the following academic and practical elements:

a. Academic Instruction

(1) **The Atmosphere**. Composition and changes of pressure and temperature with altitude. Relationship between volume and pressure of a mass of gas. Concept of partial pressure.

(2) **Respiration and Circulation**. Basic anatomy and physiology of the respiratory and circulatory systems. Exchange of oxygen and carbon dioxide between the atmosphere and the tissues. Changes in the composition of the alveolar gas with altitude.

(3) **Hypoxia**. Causes and effects of hypobaric hypoxia, including symptoms and signs, times of useful consciousness and factors influencing the intensity of hypoxia. Principles of prevention of hypoxia at altitude, including the use of oxygen in flight.

(4) **Oxygen Equipment**[1]. Principles of aircraft oxygen equipment, including methods of storage, control of flow and pressure, masks and emergency oxygen supplies, illustrated by reference to the oxygen system fitted to the aircraft to be flown by the flight personnel on the course. Principles of pre-flight and in-flight checks of oxygen system and emergency drills, including failure of supply, decompression, toxic fumes in the cabin

(5) **Cabin Pressurisation**. Physiological requirements for cabin pressurisation. Principles of cabin pressurisation and typical cabin altitude/aircraft altitude relationships. Causes and effects of rapid decompression. Emergency procedures following loss of cabin pressurisation.

[1] If not covered in Ground School

(6) **Hyperventilation**. Causes and effects of hyperventilation in flight, including symptoms and signs. Actions to be taken when hyperventilation occurs.

(7) **Gas Expansion/Compression**. Effects of change in altitude on gas containing cavities, including middle ear, sinuses, gastrointestinal tract and lungs. Effects of gas trapped in teeth. The effects of barotrauma and its avoidance. Techniques to be used to alleviate the effects of pressure change, such as the Valsalva and Frenzel manoeuvres. The importance of ear clearing manoeuvres should be stressed.

(8) **Decompression Sickness**. The mechanism, symptoms and signs, incidence, predisposing factors, and avoidance of hypobaric decompression sickness. The prevention and immediate emergency management of the condition in flight.

(9) **Thermal Stress**. Principles of heat transfer and regulation of body temperature. Sources of heat in aviation, including environmental (on the ground and in flight), avionics and aerodynamic. Thermal load imposed by flying clothing. Effects of heat, including sweating, discomfort, impaired performance, heat collapse and exhaustion. Reduction of heat strain on the ground and in flight. Sources and effects of cold stress, including wind chill, frostbite, generalized hypothermia and water immersion. Reduction of cold effects on the ground and in flight – clothing, insulation and water exclusion. The emergency first aid treatment of heat illness, cold injury and hypothermia.

(10) **Acceleration Environment in Flight**. Physics of acceleration in flight. Terminology of magnitude, direction and duration. Common forms of sources of accelerative forces in aviation - linear, radial and angular accelerations. Protection against G forces in flight, anti-G equipment and the anti-G straining manoeuvre (AGSM).

(11) **Short Duration Acceleration**. Short duration acceleration and deceleration arising in aviation – assisted take-off, arrested landing, crashes, buffet, seat ejection, parachute opening and landing. Effects of short duration accelerations, including tolerance. Effects of posture, muscular tensing and restraint systems. Principles of restraint harnesses and other restraint systems. Effects of head impact and principles of head protection.

(12) **Escape from Aircraft in Flight**. Physiological limits to manual escape, parachute opening shocks, parachute landing and possible patterns of injury following escape (if relevant to aircraft type). Additional training on assisted escape detailed at Section 0202.

(13) **Vision**. Anatomy and physiology of the eye and psychophysiology of perception, including range of sensitivity of the eye, dark adaption, central and peripheral vision, acuity, retinal induction, visual contrast, colour vision, empty field myopia, perception time, dynamic visual sharpness, depth perception, air-to-ground target acquisition and collision avoidance. Visual illusions, both during the day and at night, and those illusions that are rotary wing specific. Hazards to vision in flight and the principles of protection against hazards, including solar glare, birdstrike, canopy fragmentation devices, windblast, lasers and nuclear flash. The effects of hypoxia and, where appropriate, G forces on vision. Night vision goggles/devices, their advantages and limitations. Face protection.

(14) **Hearing**. Physical nature of sound and the decibel scale. Anatomy and physiology of the ear. Effects of noise, including temporary and permanent hearing loss, interference with communication, impaired performance and fatigue. Methods of reducing noise hazard. Principles of personal noise protection and an individual's responsibility for this protection. Noise exposure in everyday life.

(15) **Vibration**. Physics of vibration and sources in aviation. Effects of whole body vibration, including those on vision, performance of motor tasks and speech, fatigue and motion sickness. Avoidance of the effects.

(16) **Orientation and Disorientation**. The anatomy and physiology of vestibular apparatus. Mechanisms of orientation on the ground and in flight. Spatial disorientation in flight, definition and mechanisms. Common types of disorientation in flight illustrated by examples. Factors leading to disorientation and its avoidance. The management of disorientation.

(17) **Air Sickness**. Causes, incidence and causal mechanisms. Factors affecting susceptibility and adaptation to the flight environment. Prevention and treatment.

(18) **Human Performance**. Human information processing, including sensory filtering, limitations on processing, stored motor programmes and short and long-term memory. Attention, expectancy and motivation with emphasis on errors of perception. Causes, effects and avoidance of "mental" stress. The vital role of Crew Resource Management (CRM). Combat stress and the causes of both physical and mental stress due to extended working periods. The range and types of stress related illness in air operations.

(19) **Toxic Substances**. Major toxic substances in aviation, their effects and avoidance, including fuels, lubricants, products of combustion and fire extinguishing agents. Principles of action in the event of toxic contamination of the cabin atmosphere. Implications of pre-flight exposure to toxic substances.

(20) **Health Promotion**. Personal health factors and performance in flight, in peace and war, and in survival situations. Diet and weight. Exercise and physical fitness. Circadian rhythms and disturbances of rest/work cycles. The deleterious effects of alcohol and tobacco in the flying environment. The recognition of illness and the importance of reporting such illness. The dangers of malaria, HIV and sexually transmitted diseases. The risks of self-medication in the flying situation. The role of the flight surgeon/flight medical officer.

(21) **Medication in Aircrew**. Information on drugs likely to modify the state of wakefulness or sleep. Drugs likely to modify vigilance or psychomotor/cognitive performance. The use of OTC medicines by aircrew. Medication with 'fitness enhancing' drugs and their dangers.

(22) **Flying Clothing**. Concept of flying clothing and its protective and functional role. Clothing for protection against cold, wet and fire. Principles of layering and integration of garments, particularly with respect to a thermal barrier against cold and fire threat. Principles of head protection and effects of head impact. Importance of fit. Use of unapproved items. Care of personal flying clothing.

(23) **Survival and First Aid**. The medical aspects of survival with an overview of the peculiar problems arising in special situations. The essentials of first aid as they relate to aircraft incidents and accidents. The contents and use of the aircrew first aid pack. Survival in maritime, desert, jungle and arctic conditions. Some Nations may deliver this training as an essential component of other courses.

b. Practical Instruction

(1) **Experience of Change of Pressure and Hypoxia**. Each student shall undergo an exposure to reduced pressure in a hypobaric chamber to an operationally relevant altitude, where this is greater than 10,000ft (see amplifying notes below for specific aircraft types). The effects of changing ambient pressure upon the gas containing cavities, especially the ears and sinuses, are to be demonstrated to him/her. He/she is to be instructed in the techniques for introducing gas into the middle ear and sinuses during descent. He/she is to be given personal experience of the effects of the hypoxia, as appropriate to the aircraft being flown.

(2) **Experience of Spatial Disorientation**. The academic instruction on spatial orientation and disorientation should be reinforced by the practical demonstration of the effects of vestibular stimulation using a rotating chair or virtual simulation device to provide each student with a personal experience of some of the more common illusions.

3. **Additional Aircraft-Specific Training.** Additional training shall be delivered to trainee aircrew dependent on the aircraft type to be flown as set out in the following sections:

a. Section 2.2 (Fast Jet/High Performance/Ejection Seat Aircraft)

b. Section 2.3 (Fixed Wing non-Fast Jet Aircraft, incl. Air Transport/AAR aircraft)

c. Section 2.4 (Rotary Wing Aircraft)

d. Section 2.5 (Other aircraft incl. Light Aircraft and Remotely Piloted Aircraft)

2.2 FAST JET/HIGH PERFORMANCE/EJECTIONSEAT AIRCRAFT

1. In addition to the core training described in Para 2.1, the following additional items of academic and practical training shall be provided for aircrew intending to fly fast jet/high performance/ejection seat aircraft:

a. Academic Instruction

(1) **Hypoxia**. Pressure breathing at high altitude and the advantages/disadvantages of 100% oxygen.

(2) **Sustained +G Acceleration**. Effects of long duration +G acceleration on the circulation and consequences in the eye and central nervous system, including grey-out, black-out, loss of consciousness, including +G induced loss of consciousness (GLOC). Discussion of 'near or almost GLOC'. Tolerance of +G acceleration, including the effects of physical fitness, hypoxia, hyperventilation, thermal stress, alcohol, illness and previous experience/exposure. Protection against the effects of sustained +G – posture, muscle tensing, AGSM. Detailed instruction in the performance of AGSM. Consideration of anti-G equipment including pneumatic anti-G trousers and jerkin, anti-G valves and hydrostatic methods of anti-G protection. Pressure breathing for G protection.

(3) **Sustained –G Acceleration**. Effects of –G acceleration on vision, performance and consciousness.

(4) **Assisted Escape from Aircraft in Flight**. Physiological limits to manual escape. Aeromedical aspects of ejection, including effects of acceleration forces during ejection, man/seat separation, parachute opening shocks and parachute landing. Possible patterns of injury following ejection, including the mechanical causes of back injury, their avoidance and treatment. Q forces, facial and flail injuries. The immediate management of post ejection injury.

b. Practical Instruction

(1) **Experience of Change of Pressure and Hypoxia**. Each student shall undergo an exposure to reduced pressure in a hypobaric chamber to a simulated altitude of 25,000 feet. During this exposure he/she may be instructed in the operation of the oxygen equipment which he/she is to use in flight. Equivalent training at a lower simulated altitude is acceptable when combined with breathing gas with a depleted oxygen concentration - Combined Altitude and Depleted Oxygen (CADO) training. A Reduced

Oxygen Breathing Device (ROBD) may be used to deliver the hypoxia recognition training but on its own cannot simulate the pressure change or rapid decompression (see below). It will be for the National Authority to decide whether decompression from 8,000 feet to 25,000 feet will require pre-oxygenation.

(2) **Training in Pressure Breathing**. If the aircraft in which the student flies operates above 35,000 feet, each student is to receive training in pressure breathing wearing a pressure demand mask at breathing pressures up to 30mm Hg. This training may be followed by exposure to simulated high altitude in a hypobaric chamber, with use of positive pressure breathing. The maximum altitude should be held for at least 30 sec. The risk of decompression sickness will be reduced in this training procedure by breathing 100% oxygen for an appropriate period at ground level prior to the exposure.

(3) **Experience of Rapid Decompression**. Where the student is to fly in a pressurised aircraft it is recommended that he/she may receive personal experience of a rapid decompression in a hypobaric chamber. Ideally the initial and final altitudes and the rate of the decompression should be representative of the aircraft in which the student is to fly. An equivalent pressure change at a lower simulated altitude is acceptable. The duration of the pressure change of the rapid decompression should be 2-4 sec for low differential pressure cabins and 10-14 sec for high differential pressure cabins.

(4) **Centrifuge Training**. All fast jet aircrew should receive centrifuge training to demonstrate the effects of G and to practise the anti-G manoeuvres using both physiological techniques, such as AGSM and muscle straining, and the appropriate anti-G protective equipment. Wherever possible the centrifuge profile used during training should replicate the performance of the aircraft to be flown by the trainee.

2.3 FIXED WING NON- FAST JET AIRCRAFT

1. In addition to the core training described in Para 2.1, the following additional training shall be provided for aircrew intending to fly Fixed Wing Non-Fast Jet Aircraft (e.g. Air Transport and Air to Air Refuelling aircraft):

a. Practical Instruction

(1) **Experience of Change of Pressure and Hypoxia**. Each student shall undergo an exposure to reduced pressure in a hypobaric

chamber to a simulated altitude of 25,000 feet. During this exposure he/she may be instructed in the operation of the oxygen equipment which he/she is to use in flight. Equivalent training at a lower simulated altitude is acceptable when combined with breathing gas with a depleted oxygen concentration - Combined Altitude and Depleted Oxygen (CADO) training. A Reduced Oxygen Breathing Device (ROBD) may be used to deliver the hypoxia recognition training but on its own cannot simulate the pressure change or rapid decompression (see below). It will be for the National Authority to decide whether decompression from 8,000 feet to 25,000 feet will require pre-oxygenation.

(2) **Experience of Rapid Decompression**. Where the student is to fly in a pressurised aircraft he/she is to receive personal experience of a rapid decompression in a hypobaric chamber. Ideally the initial and final altitudes and the rate of the decompression should be representative of the aircraft in which the student is to fly. An equivalent pressure change at a lower simulated altitude is acceptable. The duration of the pressure change of the rapid decompression should be 2-4 sec for low differential pressure cabins and 10-14 sec for high differential pressure cabins.

2.4 ROTARY WING AIRCRAFT

2. In addition to the core training described in Para 2.1, the following additional items of academic and practical training shall be provided for aircrew intending to fly Rotary Wing Aircraft (helicopters):

a. Academic Instruction

(1) **Sustained +G Acceleration**. The difference in the flying environment between attack and non-attack helicopters (medium G/low G).

(2) **Crash Worthiness and Survivability**. Aeromedical aspects of escape from helicopters, including underwater escape. Design features to improve crash worthiness of RW aircraft.

(3) **Vibration and Noise**. Vibration in helicopters, pathological sequelae. Active noise reduction. Sound proofing. Communication in helicopters.

(4) **Oxygen Equipment**. Any specific oxygen system that may be required for the operation of the RW aircraft at altitude.

b. Practical Instruction

(1) **Experience of Change of Pressure and Hypoxia**. If rotary wing aircrew are to be exposed to pressure altitudes in their operating environment where hypoxia is likely aircrew should be instructed in hypoxia recognition. The demonstration of hypoxia in rotary wing aircraft is particularly important as operations may take place where ground level is at high altitude. A Reduced Oxygen Breathing Device (ROBD) may be used to deliver the hypoxia recognition training or students may undergo an exposure to reduced pressure in a hypobaric chamber to an appropriate simulated altitude. During this exposure he/she may be instructed in the operation of the oxygen equipment which he/she is to use in flight (if relevant).

(2) **Experience of Under Water Escape**. It is essential that each student is given personal experience of underwater escape from a helicopter using a suitable under water escape training device which may include the use of underwater breathing apparatus. The importance of disorientation during this training should be stressed.

2.5 OTHER AIRCRAFT

1. **Light Aircraft.** Aircrew training to fly Light Aircraft only (simple single-engine propeller aircraft) should receive those elements of common core instruction necessary to achieve an understanding of their intended operating environment and its inter-relationship with their personal limitations. The subject material may be covered by classroom lectures or by directed self study.

2. **Remotely Piloted Aircraft.** Aircrew training to fly Remotely Piloted Aircraft only are not subject to the physiological stresses of operating in the aerial environment unless flying experience is included in their training. These aircrew should receive those elements of common core instruction pertinent to their operating environment: human performance, health promotion (incl. fatigue management) and the effects of medication on performance are particularly relevant in this group.

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CHAPTER 3 REFRESHER AVIATION MEDICINE TRAINING OF FLIGHT PERSONNEL

3.1 COMMON CORE

1. **General.** Refresher aviation medicine training shall consist of a common core of academic instruction and practical exercises regardless of the aircraft type that the aircrew member intends to fly[2], supplemented by aircraft specific training. Refresher training will be completed at intervals not exceeding 5 years and on change of aircraft type (major type – i.e. Fast Jet, Fixed Wing Non-Fast Jet and Rotary Wing) – Nations may wish to differentiate between these types of training. While general principles should be reinforced during refresher training, it is more important to emphasize the practical aspects of training and to give practical experience based on the underlying principles.

2. **Syllabus of Instruction.** Refresher training shall consist of the following academic and practical elements:

a. Academic Instruction

(1) **Altitude and Oxygen Equipment**. Revision of causes, mechanism, significance and avoidance of hypoxia, hyperventilation and decompression sickness. Oxygen equipment performance and operation in routine and emergency use (relevant to the aircraft being flown).

(2) **Vision**. Limitations of vision in aviation; techniques for improving visual performance; visual protection devices including laser protection. Night vision goggle/devices.

(3) **Spatial Disorientation**. Revisions of mechanisms underlying disorientation and of management of disorientation in flight. Discussion of recent incidents of disorientation and the lessons to be learnt from them.

(4) **Thermal Stress**. Revision of effects of heat and cold on performance and survival. Protection against, and alleviation of effects of, hot and cold stress.

(5) **Flying Clothing and Escape Systems**. Aeromedical aspects of the flying clothing, escape system and survival equipment to be used in the aircraft the flight personnel are to operate.

[2] Aspects of common core refresher training may be deleted if not relevant to the aircraft type being flown – see also Section 2.5.

(6) **Aircrew Health**. Discussion of fatigue and anti-fatigue protocols, workload, circadian rhythms, work scheduling, sleep and use of hypnotics, physical and mental fitness.

b. Practical Instruction

(1) **Experience of Hypoxia**. Each student should receive personal experience of hypoxia at an operationally relevant, simulated altitude, where this is greater than 10,000ft. This may be achieved by decompression in a hypobaric chamber, use of a reduced oxygen breathing mixture (that may be conducted under normobaric conditions) or a combination of both. Experience of rapid decompression is not required during refresher training, but it may be delivered by Nations where assessment of risk-benefit justifies its inclusion.

(2) **Experience of Spatial Disorientation**. Students shall receive practical demonstrations of the effects of vestibular stimulation using for example a rotating chair, or virtual simulation device or in-flight demonstration to reinforce academic instruction and provide personal experience limitations of the orientation sense relevant to the aircraft flown by the student.

3. **Additional Aircraft-Specific Refresher Training.** Additional training shall be delivered to Fast Jet and Rotary Wing aircrew as set out in the following sections – 3.2 (Fast Jet/High Performance/Ejection Seat Aircraft), and 3.3 (Rotary Wing Aircraft)

3.2 FAST JET/HIGH PERFORMANCE/EJECTION SEAT AIRCRAFT

1. In addition to the core training described in Para 3.1, the following additional items of academic and practical training shall be provided for fast jet/high performance/ejection seat aircrew:

a. Academic Instruction

(1) **Altitude and Oxygen Equipment**. Principles of the relevant aircraft oxygen system; its performance, operation and routine and emergency use.

(2) **Sustained +G Acceleration**. Effects of sustained +G, causes of reduced tolerance and methods of alleviating them.

b. Practical Instruction

(1) **Pressure Breathing**. If the student flies in an aircraft that can climb to above 35,000 feet, each student shall receive refresher training in pressure breathing at pressures up to 30 mmHg.

(2) **Centrifuge Training**. This will not normally be undertaken as part of the practical phase of refresher training. However, those Nations flying the latest generation of agile aircraft may wish to repeat centrifuge training as part of their regular refresher training for fast jet aircrew.

3.3 ROTARY WING

2. In addition to the core training described in Para 3.1, the following additional items of academic and practical refresher training shall be provided for aircrew flying Rotary Wing Aircraft (helicopters):

a. Academic Instruction.

(1) **Disorientation**. A review of the features of spatial disorientation unique to rotary wing aircraft.

(2) **Rotary Wing Operations**. A review of all factors specific to rotary wing operations including thermal stress and cold protection, vibration and noise, escape, including underwater escape, and any specific oxygen system required for the operation of the rotary wing aircraft at altitude.

b. Practical Instruction.

(1) **Experience of Underwater Escape**. For aircrews operating in a maritime environment or over large bodies of inland water personal experience of underwater escape from a helicopter using a suitable underwater escape training device which may include the use of underwater breathing apparatus.

3.4 LIGHT AIRCRAFT

Aircrew flying Light Aircraft only (simple single-engine propeller aircraft) should receive refresher training on those elements of common core instruction necessary to achieve an understanding of their operating environment and its inter-relationship with their personal limitations.

AAMedP-1.2(A)(2)