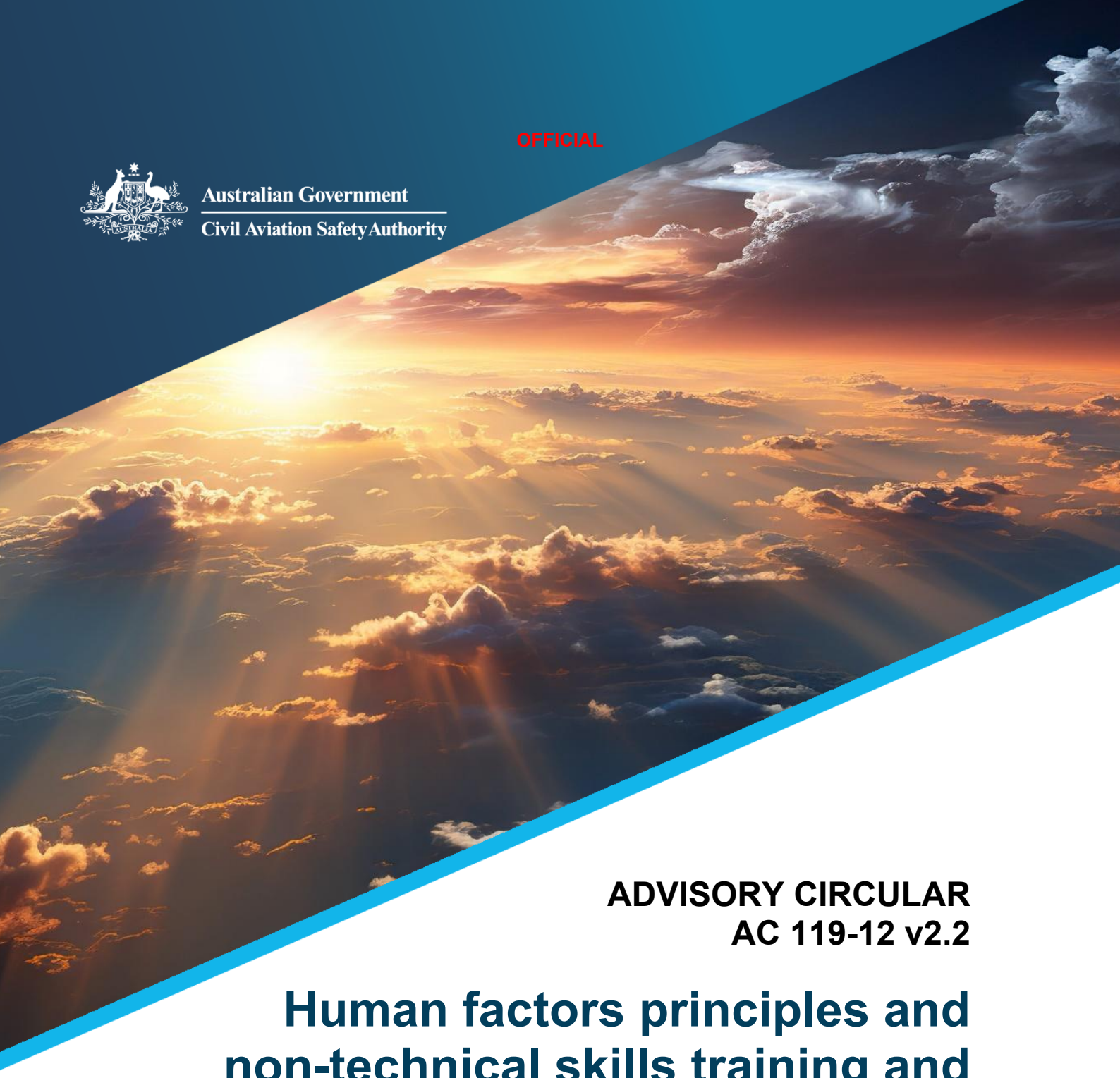
Australian Government
Civil Aviation Safety Authority



**ADVISORY CIRCULAR**
**AC 119-12 v2.2**

# Human factors principles and non-technical skills training and assessment for air transport operations

**File ref:** D26/91268

August 2026



## Acknowledgement of Country

The Civil Aviation Safety Authority (CASA) respectfully acknowledges the Traditional Custodians of the lands on which our offices are located and their continuing connection to land, water and community, and pays respect to Elders past, present and emerging.

Artwork: James Baban.

Advisory circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

**Advisory circulars should always be read in conjunction with the relevant regulations.**

# Audience

This advisory circular (AC) applies to:

- air operator's certificate holders that are subject to Part 119 of the *Civil Aviation Safety Regulations 1998* (CASR)
- flight crew
- air crew
- cabin crew
- operational safety-critical personnel.

Readers may choose to refer to specific sections of this AC when developing their own human factors and non-technical skills training and assessment program. Using the example programs described within the appendices will assist an operator to develop their own program.

# Purpose

CASA recognises that this AC will apply to operators with widely differing capabilities. It provides advice in the form of guidance material (GM) and, where relevant, suggests an acceptable means of compliance (AMC) with Part 119 of CASR pertaining to the requirement for human factors and non-technical skills (HF and NTS) training and assessment programs.

The intention is to translate the regulatory requirements into language that is easily understood and, where necessary, expand the information to ensure the intent of the legislation is clear. Any AMC outlined will allow an Air Operator's Certificate (AOC) holder to satisfy CASA of the regulatory requirement if they choose to use and follow the AMC material; however, they may also develop alternative means of compliance to the AMC if they so desire. This alternative means will, depending on whether the change is a significant or non-significant change, need to be pre-assessed and approved by CASA or could be evaluated by CASA during surveillance or certificate renewal events.

# For further information

For further information or to provide feedback on this AC, visit CASA's contact us page.

Unless specified otherwise, all subregulations, regulations, Divisions, Subparts and Parts referenced in this AC are references to the *Civil Aviation Safety Regulations 1998 (CASR)*.

# Status

This version of the AC is approved by the National Manager, Flight Standards Branch.

**Note:** Changes made in the current version are annotated with change bars.

**Table 1: Status**

| Version | Date | Details |
|---|---|---|
| v2.2 | August 2026 | • Various editorial amendments.<br>• Two new paragraphs added to section 5.4. |
| v2.1 | May 2026 | • Added excluded personnel definition.<br>• Added appropriate references to the recent HF/NTS exemption added into the main Part 119 exemption instrument CASA EX68/24 as section 15A, and amended relevant footnotes.<br>• Added content to program objectives, included provision for documenting procedures where standard is not met, amended text relating to recurrent training in Appendix A.<br>• Reformatting and editing in Appendix B.<br>• Editorial amendments throughout. |
| v2.0 | March 2026 | Major revision - please read document in its entirety. |
| v1.0 | November 2020 | This AC replaces AC SMS-3(1) - Non-technical skills training and assessment for regular public transport operations. to AC 119-12 Human factors principles and non-technical skills training and assessment for air transport operations. |

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# 1 Reference material

## 1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

**Table 2: Acronyms**

| Acronym | Description |
|---|---|
| AC | advisory circular |
| AOC | Air Operator's Certificate |
| CASA | Civil Aviation Safety Authority |
| CASR | *Civil Aviation Safety Regulations 1998* |
| CRM | crew resource management |
| FOQA | flight operations quality assurance |
| HF | human factors |
| HF/NTS TAP | human factors and non-technical skills training and assessment program |
| HP | human performance |
| HOTC | head of training and checking |
| ICAO | International Civil Aviation Organization |
| LOSA | line operations safety audit |
| NTS | non-technical skills |
| SMS | safety management system |
| TAP | training and assessment program |
| TNA | training needs analysis |

## 1.2 Definitions

Terms that have specific meaning within this AC are defined in the table below. Where definitions from the civil aviation legislation have been reproduced for ease of reference, these are identified by 'grey shading'. Should there be a discrepancy between a definition given in this AC and the civil aviation legislation, the definition in the legislation prevails.

**Table 3: Definitions**

| Term | Definition |
|---|---|
| assessment | The process of observing, recording, and interpreting individual knowledge and performance against a required standard. |

| Term | Definition |
|---|---|
| air crew member | A crew member for a flight of an aircraft (other than a flight crew member) who carries out a function during the flight relating to the safety of the operation of the aircraft, or the safety of the use of the aircraft. |
| behavioural marker | A single non-technical skill or competency within a work environment that contributes to effective or ineffective performance. |
| behavioural marker system | An organised set of competency descriptors, collectively representing the domain of non-technical skills required for successful performance in a specified role. |
| cabin crew member | A crew member who performs, in the interests of the safety of an aircraft's passengers, duties assigned by the operator or the pilot in command of the aircraft but is not a flight crew member. |
| cognitive task analysis | An analysis applied to cognitive aspects of human–machine interaction that are not directly observable. Through this type of analysis insight into the knowledge representations, thought processes, mental strategies, and goal structures that underlie task performance are possible. |
| competency | A combination of skills, knowledge and attitudes required to perform a task to a prescribed standard. |
| crew resource management (CRM) | A team training and operational philosophy with the objective of ensuring the effective use of all available resources to achieve safe and efficient flight operations. |
| excluded personnel | in relation to an Australian air transport operator, means a member of the operator's operational safety-critical personnel who is not either:<br>a. a crew member for Australian air transport operations conducted by the operator; or<br>b. a person employed by the operator under a contract of service (that is, a direct employee)<br><br>**Note:** This definition is for the purposes of section 15A of CASA EX68/24. |
| facilitator | A person who enables learning in a student-centred environment by guiding participants through discussions, interactions, structured exercises and experiences. |
| flight crew member | A crew member who is a pilot or flight engineer assigned to carry out duties essential to the operation of an aircraft during flight time. |
| flight dispatcher | for an Australian air transport operator, means a person designated by the operator to control and supervise flight operations, including supporting, briefing and assisting pilots in command in the safe conduct of flights.<br><br>**Note:** A flight dispatcher is also known as a flight operations officer. |
| human factors (HF) | The minimisation of human error and its consequences by optimising the relationships within systems between people, activities and equipment. |
| human factors principles | means principles concerned with the minimisation of human error and its consequences by optimising the relationships within systems between people, activities and equipment. |
| human performance (HP) | Refers to how people perform their tasks, represents the human contribution to system performance. |

| Term | Definition |
|---|---|
| learning outcome | An objective action that a student demonstrates as a result of learning. A learning outcome can be a demonstration of knowledge, a skill, or an attitude. Generally, learning outcomes are assessed at the course and/or program levels. |
| line-oriented flight training (LOFT) | Refers to aircrew training which involves a full mission simulation of situations which are representative of line operations, with special emphasis on situations which involve communications, management and leadership. |
| line operations safety audit (LOSA) | A behavioural observation data gathering technique, which aims to capture data on the performance of flight crews during normal operations. |
| medical transport specialist | means:<br>a. a crew member for a flight who carries out a specified function during the flight relating to a medical transport operation, and who is not:<br>i a flight crew member for the flight; or<br>ii an air crew member for the flight; or<br>b. a crew member, for a flight, of a kind prescribed by the Part 119 Manual of Standards for the purposes of this paragraph.<br><br>**Note:** At the time of publishing v2.2 of this AC, no crew members were prescribed in the Part 119 Manual of Standards for paragraph (b) of this definition. |
| non-technical skills (NTS) | The mental, social, and personal-management abilities that complement the technical skills of workers and contribute to safe and effective performance in complex work systems. They are specific human factors competencies such as critical decision-making, workload management, team communication, situation awareness, and stress management, which may minimise human error in complex systems. |
| operational safety-critical personnel | for an Australian air transport operator, an aerial work operator or a balloon transport operator:<br>a. means personnel carrying out, or responsible for, safety-related work, including:<br>i personnel carrying out roles that have direct contact with the physical operation of aeroplanes, rotorcraft or Part 131 aircraft used in the operator's Australian air transport operations, aerial work operations or balloon transport operations; and<br>ii personnel carrying out roles that have operational contact with personnel who operate aeroplanes, rotorcraft or Part 131 aircraft used in those operations; and<br>iii personnel described as operational safety-critical personnel in the operator's exposition or operations manual; but<br>b. does not include personnel who are employed or engaged by the operator (whether by contract or other arrangement) and are engaged in:<br>i the provision of continuing airworthiness management services for aeroplanes, rotorcraft or Part 131 aircraft used in the operator's Australian air transport operations, aerial work operations or balloon transport operations; or<br>ii carrying out maintenance on an aeroplane, rotorcraft, Part 131 aircraft or aeronautical product on behalf of an approved maintenance organisation. |
| safety culture | People's values, attitudes, beliefs and behaviours relating to safety. Organisations with a positive safety culture are characterised by a genuine |

| Term | Definition |
|---|---|
| | commitment, by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures. |
| safety management system (SMS) | A systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures. |
| safety-related work | Any task or role that has the potential to influence the safe conduct of aviation operations, through error identification, error mitigation, and/or responses to emergency situations. Aviation occupations engaged in safety-related work would include flight crew, cabin crew, aircraft and crew dispatchers, load control staff, and planning and management roles, such as safety management and flight operations. |
| task analysis | The analysis of how a task is accomplished, including a detailed description of both manual and mental activities, task duration, frequency, allocation, complexity, environmental conditions, necessary clothing and equipment, and any other unique factors involved in or required for one or more people to perform a given task. Information from a task analysis is used for purposes such as personnel selection and training, the design of tools, equipment and automated systems, and the refinement of procedures such as checklists and decision support processes. |
| training | The process of bringing a person to an agreed standard of proficiency by practice and instruction. |
| training needs analysis | The identification of training needs at employee, departmental, or organisational level, in order for the organisation to perform effectively. |

# 1.3 References

## Legislation

Legislation is available on the Federal Register of Legislation website https://www.legislation.gov.au/

**Table 4: Legislation references**

| Document | Title |
|---|---|
| CASA EX68/24 | Part 119 of CASR - Supplementary Exemptions and Directions Instrument 2024<br>**Note:** Section 15A of this instrument contains exemptions relating to HF/NTS TAP requirements for excluded personnel. |
| CASA EX73/24 | Flight Operations Regulations – SMS, HFP&NTS and T&C Systems – Supplementary Exemptions and Directions Instrument 2024<br>**Note:** This instrument replaced *CASA EX87/21 Flight Operations Regulations – SMS, HFP&NTS and T&C Systems – Supplementary Exemptions and Directions Instrument 2021* from 2 December 2024. |
| CASR dictionary | **Note:** The CASR dictionary is in Volume 5 of the CASR. |
| Part 61 of CASR | Flight crew licensing |
| Part 119 of CASR | Australian air transport operators - certification and management |

| Document | Title |
|---|---|
| Part 121 of CASR | Australian air transport operations - larger aeroplanes |
| Part 133 of CASR | Australian air transport operations - rotorcraft |
| Part 135 of CASR | Australian air transport operations - smaller aeroplanes |
| Regulation 119.175 of CASR | Program for training and assessment in human factors principles and non-technical skills |
| Regulation 119.180 of CASR | Training in human factors principles and non-technical skills for flight crew etc<br>**Note:** This regulation contains specific requirements for 5 particular types of operational safety-critical personnel: flight crew members, cabin crew members, air crew members, medical transport specialists and flight dispatchers. |
| Regulation 119.185 of CASR | Training in human factors principles and non-technical skills for other operational safety-critical personnel<br>**Note:** This regulation contains specific requirements for all other operator operational safety-critical personnel not included in the scope of regulation 119.180. |

## Advisory material

CASA's advisory materials are available at https://www.casa.gov.au/publications-and-resources/guidance-materials

### Table 5: Advisory material references

| Document | Title |
|---|---|
| AC 1-02 | Guide to the development of expositions and operations manuals |
| AC 61-08 | Teaching and assessing non-technical skills for single-pilot operations |
| AC 61-09 | Competency-based training and assessment for flight crew |
| AC 61-16 | Spin avoidance and stall recovery training |
| AC 119-01 and 138-11 | Safety management systems for air transport and aerial work operators |
| AMC/GM Part 119 | Acceptable means of compliance and guidance material - Australian air transport operators—certification and management |
| CASA HF/NTS resource kit | Safety Behaviours: Human Factors for Pilots |
| Sample exposition / operations manual and the Guide | CASR flight operations sample exposition / operations manual and associated guide<br>**Notes:**<br>1. This package consists of 2 documents: the sample exposition / operations manual and the Guide to the sample exposition / operations manual.<br>2. These documents are available on the CASA webpage 'Industry compliance templates'. |

# International Civil Aviation Organization documents

International Civil Aviation Organization (ICAO) documents are available for purchase from http://store1.icao.int/

Many ICAO documents are also available for reading, but not purchase or downloading, from the ICAO eLibrary (https://elibrary.icao.int/home).

### Table 6: ICAO references

| Document | Title |
|---|---|
| ICAO Annex 6 Part I | Operation of Aircraft - International Commercial Air Transport — Aeroplanes |
| ICAO Annex 6 Part III Section II | Operation of Aircraft - International Commercial Air Transport — Helicopters |
| ICAO Annex 19 | Safety Management |
| ICAO Doc 9683 | Human Factors Training Manual |
| ICAO Doc 9859 | Safety Management Manual |
| ICAO Doc 9870 | Manual on the Prevention of Runway Incursions |
| ICAO Doc 10002 | Cabin Crew Safety Training Manual |
| ICAO Doc 10151 | Manual on Human Performance for Regulators |

# 2 Background information

## 2.1 Scope and structure of this AC

2.1.1 This AC provides guidance for operators when developing a human factors principles and non-technical skills training and assessment program (HF/NTS TAP) by discussing the following matters:

- underlying principles
- development of content
- implementing a program
- evaluating program effectiveness.

2.1.2 The AC is structured as follows:

- sections 1 to 4 contain broad information relevant to all HF/NTS TAP
- sections 5 to 8 discuss in detail the elements of an HF/NTS TAP
- Appendix A provides the following 3 examples of HF/NTS TAPs for a combined Part 133 and Part 135 operator with 10 or less operational safety-critical personnel:
  - content developed and delivered using a named external HF/NTS training provider
  - content developed and delivered using an un-named external HF/NTS training provider (for example, the operator might choose to change providers and prefer not to change their exposition when this occurs)
  - supervised self-learning using CASA's Safety behaviours: Human factors for pilots' resource kit, supported by an instructor or third-party provider as required.
- Appendix B provides an example of a self-developed HF/NTS TAP for a small airline of 70 operational safety-critical personnel.

Operators may use the sample text in the appendices and tailor it to meet their HF/NTS TAP requirements.

## 2.2 Safety purpose

2.2.1 For individuals and teams to perform effectively in safety-critical environments, they must be proficient in technical skills (such as manipulation of aircraft controls, arming aircraft doors, marshalling, loading baggage, refuelling), and non-technical skills (such as communication, decision making, maintaining situational awareness and managing stress).

2.2.2 The International Civil Aviation Organization (ICAO) and leading aviation safety organisations have identified 'system' related activities as the greatest contributor to improved aviation safety. This includes safety management systems (SMS), human factors (HF) and 'data-driven oversight'.

2.2.3 Developing and maintaining human factors awareness and strengthening non-technical skills helps personnel recognise how human capabilities, limitations and interactions shape operational performance, supporting safe, effective task performance and reducing the potential for human error.

## 2.3 Basic requirements

2.3.1 Part 119 of CASR requires air transport operators[1] to have a program for training and assessing operational safety-critical personnel in human factors principles and non-technical skills (regulation 119.175 of CASR)[2]. This is representative of a systems approach to HF and is reflective of the broader CASR. Regulations 119.180 and 119.185 of CASR specify the requirements for when the initial training and assessment program must be completed for different kinds of operational safety-critical personnel.

2.3.2 Operators must ensure their HF/NTS TAP covers both fundamental HF principles and NTS elements. The term *human factors training* is commonly used in parts of the aviation industry to describe training in topics such as threat and error management (TEM), crew resource management (CRM) and NTS. However, HF and NTS are different training elements. The distinction between the two is explained in sections 2.4 and 2.5 of this AC.

2.3.3 Historically, CRM has been the most widely used strategy to train non-technical skills in aviation. Because many safety-related roles within aviation do not work as 'crews', the broader term *NTS training* was introduced as a more general and inclusive term for this form of training. Operators may continue to use established terminology such as *CRM* or *team resource management* when describing HF and NTS training and assessment. For the purposes of this AC, *NTS training* and *CRM training* can be considered interchangeable.

## 2.4 What are human factors principles?

2.4.1 The broad domain of human factors is an applied science that examines the physical, cognitive and organisational aspects of how people interact with their environment. *Human factors principles* are defined as the principles concerned with minimising human error and its consequences by optimising the relationships within systems between people, activities and equipment. These principles form the knowledge elements that explain how human performance (HP) is influenced and support an understanding of human capabilities, limitations and influences within the broader operational system.

2.4.2 Knowledge and awareness of HF principles enable personnel to recognise how these factors shape performance. Understanding and application of this knowledge helps strengthen and optimise HP, supports effective decision-making, and contributes to reducing the potential for error across the aviation system.

2.4.3 ICAO identifies 5 HP principles[3], which highlight different aspects of people's performance. These principles are:

1. Principle 1: People’s performance is shaped by their capabilities and limitations
2. Principle 2: People interpret situations differently and perform in ways that make sense to them
3. Principle 3: People adapt to meet the demands of a complex and dynamic work environment
4. Principle 4: People assess risks and make trade-offs
5. Principle 5: People’s performance is influenced by working with other people, technology and the environment.

[1] At the time of publishing v2.2 of this AC, Australian air transport operators taking advantage of the exemptions in Part 6 of CASA EX73/24 are not yet required to have an HF/NTS TAP. These exemptions end on 1 December 2026, by which time operators must have implemented their HF/NTS TAP.

[2] Australian air transport operators are exempted from the requirement to have an HF/NTS TAP for operational safety-critical personnel who are excluded personnel. Refer to section 15A of CASA EX68/24.

[3] International Civil Aviation Organization. (2021). *Manual on human performance (HP) for regulators* (Doc. 10151).

2.4.4 These 5 HP principles are interactive and overlapping. Together, they offer differing insights and perspectives that form a multi-dimensional picture of human performance. They apply generally to all people involved in aviation activities—at the individual, team, and organisational levels.

2.4.5 Training in HF principles gives personnel the knowledge they need to understand the HP principles and apply this knowledge to support safe and efficient operations. It includes the 3 aspects of how people interact with their environment: physical, cognitive, and organisational. The 5 HP principles support a shared understanding of how and why people behave as they do, enabling better recognition, anticipation and management of human performance influences. Training in HF principles also provides an 'awareness' level of understanding across a broad range of HF topics, forming the foundation for other safety risk management activities, including NTS training.

## 2.5 What are non-technical skills?

2.5.1 Non-technical skills (NTS), sometimes referred to as NOTECHS, are the cognitive, social and self-management skills that complement technical skills and support safe and effective task performance. They relate to applied HP competencies via behavioural skills or techniques that ensure individuals and teams can function effectively to mitigate threats and errors within the operating environment. They are essential for optimising safety and performance during routine work conditions, as well as managing critical situations or emergencies.

2.5.2 Examples of cognitive skills are situational awareness (attention to changes in the work environment) and decision-making. Social or interpersonal skills include communication, teamwork, and leadership. Skills in self-management (personal adaptation) include the management of stress and fatigue, being able to manage and sustain one’s motivational levels and emotions, as well as possessing or accessing available resources to prevent performance decline.

2.5.3 NTS training is a generic term which encompasses a range of HP awareness, knowledge, and skills programs, with an emphasis on the application of HF knowledge in operational settings. In contrast to HF courses which develop the foundational knowledge of HP limitations and capabilities, NTS training provides personnel with the understanding and skills required to apply that knowledge and to manage all available resources (including themselves) more safely and effectively.

# 3 HF/NTS TAP considerations

## 3.1 Program scalability and operational size/complexity

3.1.1 The aviation industry is characterised by a diverse range of operating environments and activities. The legislation requiring Australian air transport operators to have an HF/NTS TAP is 'outcome-based', thereby placing the responsibility and opportunity for delivering a suitable program with the operator.

3.1.2 It is reasonable and expected that operators would appropriately scale their program for their organisation and operations. Scalability considerations include the:

- size of the organisation's workforce
- organisational structure
- complexity of operational demands
- nature and number of interfaces
- nature and number of operating locations.

3.1.3 Operators must describe how they manage their program in their exposition[4]. Large, complex organisations may need a dedicated group of HF and NTS personnel, whereas smaller organisations may only need the services of an HF and NTS consultant or coordinator on a part time or contractual basis. Appendices A and B provide examples of HF/NTS TAP for different kinds of operators.

3.1.4 It is recommended that operators evaluate their activities to determine the appropriate level of resources to manage their HF/NTS TAP. Managing this program, like any other operator activity, involves having appropriate organisational policies, structures, personnel, and resources.

## 3.2 Integration with a safety management system

3.2.1 A safety management system (SMS) can provide valuable input into shaping an HF/NTS TAP to meet operational demands and strengthen safety and operational performance[5].

3.2.2 Operators may find it efficient to deliver SMS and HF/NTS training in an integrated manner where content overlaps, thereby reducing duplication. For example, when aligned with CASA's acceptable means of compliance, both training programs address safety culture (including just culture) and human performance, and explain how these elements interrelate to encourage reporting, reduce error and support safety.

3.2.3 The personnel responsible for managing and operating an SMS are operational safety-critical personnel as they conduct safety-related work. Regulation 119.185 of CASR requires these personnel to complete the operator's HF/NTS TAP. For such personnel, the program is recommended to include, but not be limited to, HF considerations relating to the following matters:

- hazard identification and safety investigations
- the development of risk controls
- the conduct and design of change management processes.

[4] See paragraph 119.205(1)(h) of CASR.

[5] Also refer to Multi-Part AC 119-01 and 138-11 Safety management systems for air transport and aerial work operators.

## 3.3 Integration with a training and checking system

3.3.1 For flight crew members and cabin crew members, the HF/NTS TAP must form part of the organisation's existing training and checking system[6]. For other operational safety-critical personnel that are required to complete an HF/NTS TAP, the program must be part of the training and checking system if the operator is required to comply with subregulation 119.170(4) of CASR.

3.3.2 It is recommended for all operators that the HF/NTS TAP is integrated into other competency events, as this enables the practical application of HF and NTS theory and enables contextual assessment of skills, attitudes, and behaviours.

3.3.3 For flight crew members this could involve assessing NTS during simulator and/or line proficiency checks (where line checks are required). For operators whose proficiency checks are combined with Part 61 of CASR events, such as flight reviews or instrument proficiency checks, integrating the HF/NTS TAP with the training and checking system improves training effectiveness and efficiency, as Part 61 requires NTS to be assessed during these events.

3.3.4 For operators who did not originally integrate the HF/NTS TAP with other training and checking events, integration would involve the redevelopment of existing training programs and manuals, but this has the benefit of increasing future training efficiency. If NTS assessments were previously conducted, integration would involve adding HF principles training that complements the existing NTS aspects.

## 3.4 Using a third-party training provider

3.4.1 Operators may use third-party providers for some or all aspects of their HF/NTS TAP. However, the operator (including relevant key personnel) remains responsible for the implementation, relevance and performance of the HF/NTS TAP. The TAP is 'their TAP' even if it is developed and/or delivered by another party. The HF/NTS TAP must be conducted in accordance with the operator's exposition.

3.4.2 The operator is responsible for determining that all aspects of a third-party delivered HF/NTS TAP are appropriate to their operation. Operators are recommended to have conducted a training needs analysis (TNA) (see Chapter 5 of this AC) appropriate to their operation's size and complexity and ensure that HF/NTS TAP content addresses their specific operational risks and safety performance.

3.4.3 Operators are recommended to brief third-party providers on their operational environment and organisational and safety culture to ensure that the HF/NTS TAP, as delivered, is appropriate for the operator and their operations.

3.4.4 HF/NTS training and assessment may be delivered to operational safety-critical personnel from multiple operators. However, each operator is responsible for ensuring that the content is relevant and appropriate to their own operations and personnel, and the specific duties and responsibilities those personnel perform for that operator.

3.4.5 When using a third-party provider, it is the responsibility of the operator to ensure the third-party provides evidence that they have relevant knowledge and experience of HF and NTS and the conduct of training and assessment. It is recommended that operators have a documented process to ensure third-party training providers have appropriately trained and competent staff in relation to HF/NTS course delivery.

[6] See paragraph 119.170(2)(a) of CASR.

## 3.5 Steps to develop an HF/NTS TAP

3.5.1 There are four steps to develop an effective HF and NTS training and assessment program. These steps, which are explained in Chapters 5, 6, 7 and 8 of this AC, are:

1. Identify the training and assessment needs.
2. Develop the training and assessment content.
3. Deliver the program requirements.
4. Evaluate the program effectiveness.




**Figure 1: Steps to develop an HF and NTS TAP**

# 4 HF/NTS TAP governance

## 4.1 Definition

4.1.1 Governance is the overall framework within an organisation that supports the making of decisions to meet the organisation's goals and objectives. Program governance refers to the rules and procedures that are used to control its delivery and provide the overall framework for making decisions. This decision framework comprises roles and responsibilities, approval processes, work deliverables, and the workflow that ties the overall decision-making steps together.

4.1.2 Operators can document the governance structure for their HF/NTS TAP in order to articulate the program's framework, from courseware development through to delivery and continuous improvement. The HF/NTS TAP governance can identify key roles and responsibilities, including integration with the SMS and training and checking system.

## 4.2 Program objectives

4.2.1 Objectives are brief, high-level statements of desired achievements. They are either process or outcome based and give direction to the organisation consistent with the organisation's safety policy[7].

4.2.2 Operators are responsible for defining the objectives for their HF/NTS TAP. In establishing these objectives, operators describe the strategic achievements or desired safety outcomes relating to HF and NTS within the organisation's operational context. They may be integrated into the objectives defined as part of the operator's SMS or training and checking system.

4.2.3 Effective HF/NTS TAP objectives define specific outcomes relating to human performance safety considerations and post-training competency expectations. That is, HF/NTS TAP objectives state intended safety outcomes such as the effective management of error, improved human performance, and increased procedural compliance. The objectives may also consider any outcomes of previous evaluations of the operator's HF/NTS TAP.

4.2.4 As an example, some objectives for an HF/NTS TAP[8] could be to:

- demonstrate measurable improvements in safety performance
- develop and strengthen personnel knowledge, skills, attitudes and behaviours to reduce human-error potential and enhance error detection and capture
- reduce errors associated with human performance limitations
- mitigate the adverse effects of external influences on human performance
- ensure all identified personnel complete the required HF and NTS training and assessment and maintain the required currency.

4.2.5 Within an HF/NTS TAP, program objectives are achieved through defined training and learning outcomes that specify the required standards of performance for participants.

[7] Also refer to Multi-Part AC 119-01 and 138-11 – Safety management systems for air transport and aerial work operators

[8] Also refer to *SMS for Aviation – A Practical Guide: Safety Policy and Objectives* (Booklet 2) available on the page titled 'Safety management system resource kit' on CASA's website.

## 4.3 Responsibilities

4.3.1 To ensure any training and assessment program remains effective, ongoing commitment to program objectives is essential and must be demonstrated by management. Management commitment to the HF/NTS TAP can be demonstrated through approved HF and NTS policies and the allocation of resources necessary for the program's design, delivery, evaluation and continuous improvement.

4.3.2 HF/NTS TAP policies set out the expectations for identifying and managing human factors influences within operations and across the organisation. Accountabilities, authorities and responsibilities for the HF/NTS TAP are defined, documented and communicated, so personnel at all levels understand their role in achieving program objectives.

4.3.3 Adequate resourcing is essential for the effective design, delivery and administration of all training and checking activities. The chief executive officer (CEO) is responsible for ensuring that appropriate resources are available, and for ensuring that training and checking of the operator's operational safety-critical personnel (other than flight crew) is conducted in accordance with the operator's exposition.

4.3.4 The head of training and checking (HOTC) is responsible for ensuring that training and checking of flight crew conducted by or for the operator is carried out in accordance with the operator's exposition.

4.3.5 An HF/NTS TAP manager or coordinator role may be described by other titles and does not need to be a dedicated position; its responsibilities may be undertaken as a secondary role by, for example, the HOTC or the safety manager.

4.3.6 It is recommended that the HF/NTS TAP manager/coordinator's responsibilities, irrespective of other duties, include:

- planning and facilitation of the HF/NTS TAP
- coordinating the promotion of HF/NTS TAP requirements through induction and recurrent training
- identifying ongoing HF and NTS training needs to support program objectives.

4.3.7 Facilitators are responsible for maintaining their currency in HF/NTS knowledge and training and for delivering the HF/NTS TAP in accordance with the operator's exposition.

## 4.4 Record keeping

4.4.1 Operators must maintain personnel training and checking records[9] relating to their HF/NTS TAP. This includes:

- the TAP activity undertaken
- when the TAP activity was undertaken
- whether the TAP was successfully completed
- any TAP qualification or certificate obtained.

4.4.2 Records may be kept separately or as part of another system, for example, as part of a training and checking system or an SMS.

4.4.3 Operators are responsible for detailing how records of HF/NTS training and assessment will be managed, including how they are documented, recorded and retained for the minimum required periods.[10]

[9] Regulation 119.225 of CASR.

[10] Regulation 119.240 of CASR.

4.4.4 Records must be made for all HF/NTS training and assessments within 21 days after the person undertakes the training and assessment.[9]

An HF/NTS TAP includes robust documentation and records that will assist and enable effective delivery and administration of the program. Examples of effective HF/NTS TAP records and documentation include:

- a list of the personnel who require HF/NTS training and assessment
- a means of determining when each person is due to undergo a specific HF/NTS training course
- a method of recording the HF/NTS training provided, the assessments undertaken, and the completion and assessment outcomes for each participant
- a schedule and records of recurrent HF/NTS courses for all operational safety-critical personnel
- the assessment means used to determine the effectiveness of the HF/NTS TAP.

# 5 Identifying training needs

## 5.1 Training needs analysis

5.1.1 In determining the training to be included in an HF/NTS TAP, operators consider the program's objectives, which define the desired outcomes and competencies of personnel. Comparing these objectives against current capabilities will identify who requires training and what level of training is appropriate. This process is often referred to as a training needs analysis (TNA)[11].

5.1.2 An effective TNA considers the different roles and operating environments within the organisation, and its outcomes inform the development and selection of training content.

5.1.3 An operator's HF/NTS TAP documentation is ideally recommended to include a summary of the TNA, outlining the training needs identified for each relevant role and operating environment (i.e. the hazards and other internal or external factors that influence human performance), such that this information is available to the operator if CASA asks the operator how they determined their HF/NTS TAP was appropriate to their needs.

## 5.2 Program participants

5.2.1 Personnel requiring HF/NTS training and assessment are specified in regulation 119.175 of CASR. Operators must ensure all required operational safety-critical personnel are included in the TNA.[12]

5.2.2 Understanding the roles and responsibilities of the personnel that are required to participate in the HF/NTS TAP will help further define the training competencies. Operators might consider:

- the types of operations undertaken
- the work environment, such as office-based, flight line or aircraft environments
- not limiting the scope to direct employees or operational safety-critical personnel only.

## 5.3 Identifying competencies

5.3.1 Having identified the personnel requiring HF and NTS training and assessment, operators can then determine the HF and NTS competencies required for those personnel, even if training is to be provided by a third-party provider. Any relevant known risks, for example incidents involving a breakdown in team communication, should be considered to ensure they are appropriately incorporated into the training.

5.3.2 An effective TNA will identify what level of HF competence is required for each of the various HF/NTS syllabus elements. This may vary depending on the person's level of authority and the environment in which they operate.

5.3.3 It is strongly recommended that operators consider hazards and operational risks identified by their SMS when undertaking an analysis of the HF and NTS competencies their personnel require. Ideally, this analysis would be undertaken by someone who:

- is familiar with the nature and objectives of HF and NTS training
- has current knowledge of the job requirements and context of the roles being analysed

[11] Also refer to Multi-Part AC 119-01 and 138-11 – Safety management systems for air transport and aerial work operators, and SMS for Aviation – A Practical Guide, booklet 5

[12] Refer to the AMC/GM Part 119 document for guidance on which operational safety-critical personnel are encompassed by regulation 119.175 of CASR, and to section 15A of CASA EX68/24 for exemptions from HF/NTS TAP requirements for excluded personnel.

- understands the human factors associated with the operational safety risks and safety events in the organisation.

5.3.4 Identifying issues within specific roles or operational tasks using 'in-house' information strengthens the relevance and effectiveness of the HF/NTS TAP. Routine sources, such as job task assessments, audit reports, technical training evaluations, performance appraisals and SMS outputs (for example, safety and occurrence reports, LOSA observations and FOQA trends), can provide valuable insight into human performance issues within the organisation.

## 5.4 Tools to identify training needs

5.4.1 There are several tools and techniques that an operator might choose to use to help examine existing information or to generate new information to assist in the identification of training needs. These tools vary in their sophistication from basic to quite complex - the complexity and variety of the tools chosen depend on the size, complexity and diversity of the operations undertaken by the organisation. Broadly, these tools can be categorised into three types: event-based, questioning, and observation. Table 7 shows some examples of tools and techniques for each type.

**Table 7: Popular types of tools and techniques used to identify HF and NTS training needs**

| Type | Tools/Techniques |
|---|---|
| Event-based analyses<br>(Examining safety reports to identify patterns) | • Accident/incident analysis in one's own or similar operations<br>• Analysis of confidential reporting systems |
| Questioning techniques<br>(Seeking information directly from workers) | • Interviews: structured, unstructured and semi-structured<br>• Focus groups<br>• Questionnaires and surveys |
| Observational techniques<br>(Watching individuals and teams at work) | • Direct: observation by trainer/researcher not engaged in the work at hand<br>• Participant: observation by a co-worker<br>• Remote: such as live or recorded video and audio |

5.4.2 When analysing information obtained through such tools and techniques, operators should consider not only what happened, but also the HF influences and NTS associated with the circumstances. For example, identified issues may relate to communication, decision-making, fatigue, or organisational factors. Analysis of this information can assist operators in determining which topics should be included in an HF/NTS TAP and the extent to which those topics should be emphasised during training and assessment.

5.4.3 Event-based analyses are not limited to occurrences within an operator's own organisation. Accident investigation reports, occurrence data and safety publications relating to similar operations or operating environments can provide valuable insight into HP risks relevant to the operator's activities. Recurrent themes identified through these sources can provide useful context for developing and refining HF and NTS training content and ensuring its relevance to the operating environment.

5.4.4 It is recommended that multiple sources of information and multiple tools/techniques be used in efforts to identify required competencies. Observational techniques have the added benefit of being useful when developing 'desk-top like' assessment measures. Complex operators may benefit from the use of analytical tools, such as occupation analysis and cognitive task analysis. Typically, HF specialists would be engaged to undertake these sorts of analyses.

5.4.5 Regardless of the tools used, a TNA-supporting gap analysis identifies, documents, and details the gaps between any current training and the identified training needs. This is achieved with either a checklist or matrix with training needs, current training and identified gaps/deficiencies readily identified. This assists the operator to form an accurate understanding of the basis for course content development.

# 6 Developing training content

## 6.1 How to develop training content

6.1.1 Once the operator has identified the required competencies, training content that addresses these needs can be developed. As an HF/NTS TAP must include both HF principles and NTS[13], to be effective the content will cover both fundamental HF principles and NTS elements that are relevant to the operator's activities and operational risks. In developing training content, consideration is given to how it supports the achievement of the HF/NTS TAP objectives. Where appropriate, the content may be integrated with other training, such as SMS-related training, and training and checking events. In practice, most operators will develop an integrated HF and NTS training program.

6.1.2 CASA has developed a suite of human factors learning resources that include booklets, videos, a workbook and a facilitator guide, available in the Safety Behaviours: Human Factors for Pilots resource kit on CASA's website. These resources provide foundational HF knowledge and may be incorporated into an operator's HF/NTS TAP where appropriate[14].

6.1.3 When developing training content, operators may consider opportunities to design material that supports training efficiencies. Provided suitable training and assessment standards can be achieved and maintained, content development may consider factors such as:

- structuring material so it can be delivered to 'mixed' employee groups, enabling shared learning and encouraging cross-functional understanding
- sharing of training content and resources with other operators where appropriate
- negotiating the use of a larger operator's training programs and resources
- utilising an 'off-the-shelf' training product
- modularising content to allow flexible delivery while ensuring learning continuity and minimising the risk of knowledge erosion
- identifying HF/NTS topics that overlap with other existing training, such as SMS training, and designing materials to reduce duplication through integrated modules
- utilising an external service provider if internal expertise in training delivery is limited.

## 6.2 Depth of content

6.2.1 The goals of training programs are accomplished through multiple phases of training. For example, phases of training may include orientation training[15], initial or awareness training, conversion training, upgrade training and ongoing recurrent or refresher training. Regarding HF and NTS training, the depth of training (developmental phases) and teaching methods will vary across phases and can be tailored to suit the size, nature and complexity of the organisation and operations.

6.2.2 The outputs from a TNA will assist in the selection of HF and NTS topics to meet the operator's identified needs. To be suitable, the content of NTS training will have direct relevance to the operational safety issues encountered by participants.

6.2.3 Due to the 'systems' nature of HF, the topics covered in HF and NTS training are interrelated. This means that even if a topic is not identified through a TNA, the topic may still provide relevant background knowledge to support other topics identified in the TNA. Operators are

[13] Refer to regulation 119.175 of CASR.

[14] The relevant HF and NTS topics supported by this kit are outlined in sections 6.3 and 6.4 of this AC.

[15] Also referred to as induction training.

responsible for ensuring that foundational topics are not omitted from their HF/NTS TAP if the foundational topics are required to support other relevant topics.

6.2.4 Competency may not be achieved through attendance, participation or assessment in a single training activity, and may require and benefit from integration into relevant aspects of training and operations. Integration reinforces the key principles detailed in the following sections.

6.2.5 Both initial and recurrent HF and NTS training and assessment contribute to the depth of content within the program. Recurrent training reinforces previously introduced concepts and skills, allowing key knowledge to be revisited to maintain relevance, strengthen understanding, and support ongoing performance improvements.

## 6.3 Content relating to human factors principles

6.3.1 An operator's HF/NTS TAP must include training and assessment related to HF principles to maximise operational safety outcomes. These training elements provide basic knowledge and the formation or consolidation of attitudes likely to promote appropriate safety behaviours within the workplace, along with advanced understanding of important concepts. The focus of the HF knowledge phase is the development of practical knowledge relevant to skilled performance.

6.3.2 HF principles training includes:

- safety culture
- human performance principles basics
- stress and its management
- fatigue and its management
- workload management.

6.3.3 The Safety Behaviours: Human Factors for Pilots resource kit introduced earlier in this AC includes material that can support HF principles program content. The most relevant booklets (and supporting videos) for training in HF principles include:

- Resource booklet 1 Introduction
- Resource booklet 2 Safety culture
- Resource booklet 3 Human performance
- Resource booklet 10 Design and automation.

6.3.4 Teaching methods commonly used to achieve the HF knowledge phase include pre-course readings, presentations, practical exercises, detailed case studies and documentaries.

## 6.4 Non-technical skills content

6.4.1 While the initial emphasis in HF/NTS training is knowledge and comprehension of HF principles, the NTS element of the program includes appropriate operational behaviours and skills training and assessment.

6.4.2 This phase develops the practical non-technical skills needed to perform tasks safely, by building on the knowledge gained in the previous phase and applying it in an operational context.

6.4.3 NTS are the applied specific human competencies which may minimise human error in aviation. These include but are not limited to:

- communication
- teamwork
- leadership

- situational awareness
- judgement and decision making
- threat and error management
- human information processing.

6.4.4 The content of these NTS elements may be contained within different training module titles. For example, situational awareness may be within an information processing module.

6.4.5 To be retained, skills (and concepts covered in previous training phases) must be regularly reinforced through direct application or via refresher training.

6.4.6 The most relevant sections of The Safety Behaviours: Human Factors for Pilots resource kit for training in NTS include:

- Resource booklet 4 Communication
- Resource booklet 5 Teamwork
- Resource booklet 6 Situational awareness
- Resource booklet 7 Decision making
- Resource booklet 8 Threat and error management
- Resource booklet 9 Human information processing.

6.4.7 Also refer to UK CAA CAP 737: Flight-crew human factors handbook for human factors knowledge and practical NTS training guidance.

6.4.8 Teaching methods commonly used to achieve the skills phase typically include classroom-based learning with practical exercises and detailed case studies. When using a case study from within their organisation, operators should consider the relevance of the scenario (i.e., is it still valid?), the contributing factors in the event (i.e., does it contain issues identified in the training?), and the culture of the organisation (i.e., the event is used as a learning exercise, not to apportion blame).

## 6.5 Training outcomes

6.5.1 The knowledge and skills developed through the HF and NTS training program aim to establish and foster specific attitudes and behaviours in personnel. Attitudes are formed by the knowledge gained, combined with the individual's feelings and values. These attitudes, together with the organisational culture, foster the achievement of desired behaviours. These behaviours are reinforced within daily operations and through periodic training and checking activities.

6.5.2 An overall focus of the training is to ensure personnel understand the operational implications of HF and HP principles in the performance of their day-to-day duties. Personnel then use this knowledge and awareness to monitor and adjust behaviour and take preventative or early corrective action to address hazards as part of routine operations.

6.5.3 Effective training will develop an awareness of the factors that may influence, limit and bias how individuals perceive, interpret and make sense of the world. Building on this awareness, personnel will develop the skills and strategies required to recognise these influences and apply alternative perspectives to promote optimal performance.

6.5.4 To achieve the HF/NTS TAP objectives and levels of human performance competencies required, it is recommended that operators consider the different categories of trainee competence which can be achieved:

- **Awareness:** introduces the basic HF concepts and provides a common language and frame of reference for knowledge and skill development.
- **Knowledge:** development of knowledge focuses on HF knowledge relevant to specific practical applications and skilled performance.

- **Skills:** the tools and techniques focused on treating or mitigating areas of increased error potential or severe consequences. They are initially developed through practice and feedback, followed with reinforcement at a later stage through recurrent training and assessment.
- **Attitudes:** play an important part in determining overall behaviours and performance. Aspects relating to operational practices, desirable professional attributes, and dispositions conducive to professional performance can be considered under this heading. Attitudes have been strongly emphasised in the role of appropriate attitudes in sustaining and implementing safe and effective operational practices.

# 7 Training and assessment requirements

## 7.1 Program strategy

7.1.1 The HF/NTS TAP strategy defines the training methods, objectives, and resources related to HF and NTS training within the context of the organisation. The strategy also defines the duration of training based on a TNA, as well as considering initial and recurrent timeframes.

7.1.2 In developing an HF/NTS training and assessment strategy, operators may consider:

- how training is to be conducted (i.e., delivery methods)
- when training is to be conducted
- standards and competencies expected to be achieved at training completion
- processes to ensure all required personnel complete required HF/NTS training
- how to address unsatisfactory performance or failure to achieve assessment outcomes
- process for development of training and assessment plans, including course outlines and syllabi
- processes and training required for new staff
- processes and training required on a recurrent basis
- processes for evaluating the relevance and effectiveness of the training materials, methods, and facilitators.

7.1.3 Theory-based training and assessment provide an efficient way to introduce HF principles and NTS concepts, establishing and reinforcing the foundational knowledge required before practical application.

7.1.4 Practical NTS training and assessment for flight crew could be incorporated in flight and/or simulator training, or systematic observation of on-the-job performance by specialist trainers with the goal of enhancing skills. Though the use of high-fidelity simulation is common with larger operators, there is compelling evidence to suggest that the use of low-fidelity simulation affords inexpensive and effective approaches to skills-based training which may be of value to smaller, less complex operations.

7.1.5 Practical NTS training for cabin crew and other operational safety-critical personnel could be incorporated into existing initial and ongoing training and checks, and technical tasks. For example, training and assessing air crew members in winching operations could focus on the technical task of operating the winch, but would also include NTS, such as communications and teamwork requirements to safely complete the task.

## 7.2 Duration of training and assessments

7.2.1 It is recommended that operators define the duration of the HF and NTS training and assessments based on their TNA and business requirements. In determining an appropriate duration, operators will need to consider the most effective way to deliver the training to the required personnel. Training could be delivered in a single consolidated training event, especially for induction training, or over a longer period via separate modules.

7.2.2 Where HF and NTS training or assessment requirements are integrated into existing technical training, operators are responsible for ensuring that the nature and duration of the training and assessment is suitable to the level of skill and proficiency required.

## 7.3 Training delivery

7.3.1 Efficient training delivery is designed to optimise knowledge and skills acquisition through a variety of learning approaches, including cognitive rehearsals, simulations, and real-world scenarios.

7.3.2 Knowledge training – consider what training and assessment methods are most appropriate for the nature of the operations. Knowledge training could be completed via:

- a traditional classroom setting
- online training
- virtual classroom
- self-paced learning
- case study briefings/presentation
- a combination of any or all the above.

7.3.3 Delivery to different occupational groups – HF and NTS knowledge training provide a valuable opportunity to bring together participants with different experience, backgrounds, knowledge, beliefs and opinions. Such diversity is generally considered to have many advantages, and operators may consider including different occupational groups in an HF and NTS training course. Where appropriate, members of extended or dispersed teams may be involved in combined training, reinforcing the 'one team/one culture' concept and increasing mutual understanding and respect. It is possible that not all team members are part of the same organisation, for example aerodrome staff, refuellers, or contracted ground handlers.

## 7.4 Facilitators

7.4.1 Effective facilitation, and selecting the right individuals to serve as facilitators, is essential to the acceptance and overall success of HF and NTS training. The skills and credibility of HF/NTS facilitators are vital components to effectively achieving desired training outcomes.

7.4.2 Operators' HF/NTS TAP documentation may describe how facilitators are trained and assessed to ensure they are suitably qualified to deliver HF and NTS training. This could include clearly identified core competencies for HF/NTS facilitators and an outline of any selection, training, and assessment processes used for facilitators and assessors. A training and standardisation program for HF/NTS facilitators and assessors may be established to further enhance training outcomes.

7.4.3 It is recommended that facilitator assessment processes include methods for observing, recording, interpreting, and debriefing facilitator performance. This could provide a means for facilitators to demonstrate appropriate communication skills and their ability to deliver HF and NTS course elements effectively. Attributes such as group management, group dynamics, personal awareness, and the ability to relate examples of good and poor HF/NTS behaviours to operational contexts may be considered.

7.4.4 Generally, delivery of HF and NTS training benefits from 'peer' facilitators who also have undergone specialised HF and NTS training. Peer facilitators know the operational context, they speak the language, and they are usually someone respected by the participant cohort. Facilitators with recent or current operational experience usually understand the professional and safety cultures of their organisation.

7.4.5 HF and NTS facilitators are not necessarily required to hold formal qualifications in HF or NTS. However, they will have an interest (the right attitude and behaviours) in HF and NTS, possess suitable communication, instructional and presentation skills, and hold sufficient operational experience to facilitate conversations around operational issues (the right knowledge and skills).

7.4.6 Facilitators may require additional training to ensure they:

- have adequate knowledge of human performance and limitations within safety critical operations
- have sufficient depth of knowledge in human factors principles to respond with authority to questions that may arise during HF and NTS training
- understand effective facilitation and adult learning principles and the training of small groups
- present course material in a variety of ways and conduct exercises, administer activities, and initiate, direct and maintain group discussions.

7.4.7 Training for HF/NTS facilitators may involve both theoretical and practical components. Practical training may include development of specific trainer skills such as integration of HF principles and NTS into day-to-day operational requirements. Refresher training may be used to cover any new course materials, evolving HF/NTS methodologies, research, organisational procedures and lessons learned. Facilitator currency requirements may be defined to ensure they maintain suitable instructional skills and relevant HF and NTS knowledge.

7.4.8 If an operator chooses to use a third-party provider to deliver their HF/NTS training, they will need to ensure that the third-party provider's facilitators are suitably qualified and experienced, know the operator's operational context, and speak the language used by the cohort being trained[16].

## 7.5 Assessing program participants

7.5.1 The HF/NTS TAP must include assessment in HF principles and NTS. An operator must include in its HF/NTS TAP documentation the method by which personnel awareness, knowledge, and skills in both HF principles and NTS are assessed.

7.5.2 ICAO identifies that any training assessment of personnel should focus on finding evidence that the student:

- understands how they contribute to system performance within their role and the operational implications of HF principles in performing their day-to-day duties, and
- can demonstrate they can use this knowledge to monitor and adjust their own behaviour to improve operational safety outcomes.

7.5.3 Where appropriate, operators may conduct both theoretical and practical assessments for HF principles and NTS. Theoretical assessments can be best suited to assessing the awareness and knowledge uptake of HF principles and introduction of NTS. Practical assessments allow for incorporation into routine performance evaluations during actual or simulated workplace environments for assessing skills.

7.5.4 Ideally, a practical assessment of NTS will be integrated into the routine performance evaluation activities and processes established for technical skills. This evaluation is best conducted in the actual or simulated workplace such as an aircraft, cabin, hangar, or ramp environment.

7.5.5 Where practical elements have been incorporated into classroom training, facilitators could assess participants through observation of the participant's interaction and/or participation in group activities or discussions. Another technique is direct assessment of practical skills, which includes task-based evaluation, process creation (checklists) and completion (performance).[17]

7.5.6 An appropriate assessment method will enable the operator to identify participants' achievement of the required HF and NTS awareness, knowledge, and skills, and any areas of deficiency in

[16] Relevant resources include AC 61-08 Teaching and assessing non-technical skills for single pilot operations; AC 61-09 Competency-based training and assessment for flight crew; and Safety Behaviours: Human Factors for Pilots.

[17] Also refer to UK CAA Standards Document 29: Guidance on the requirements for the training and testing of Human Factors for Flight crew under EASA Part ORO and EASA Part FCL.

the uptake of training competencies. Assessments should support confirmation of achievement of learning outcomes and highlight areas requiring further development for each participant.

7.5.7 Assessment could occur during and/or shortly after instruction, to encourage consolidation and retention of knowledge and skills. Assessments may be carried out using various methods, such as:

- short answers (selected response)
- multiple choice exams (selected response)
- scenario assessment evaluation essay (constructed response)
- observation of tasks (this may form part of competency assessment)
- demonstration during practical exercises
- informal assessment of participation by the instructor.

7.5.8 Assessment methods used should match the depth and level of learning and the required outcomes against both HF principles and NTS. Assessment of HF knowledge and NTS are most effective when integrated into routine performance assessment.

7.5.9 It is recommended that operators establish and include within their HF/NTS TAP the procedures to be followed when personnel do not achieve or maintain the required standards. These procedures may include the arrangements for any additional training and assessment to address identified deficiencies.

7.5.10 It is important that HF/NTS TAP assessors maintain recent or current operational knowledge and suitable qualifications, or training, in assessment techniques.

## 7.6 Using behavioural markers

7.6.1 Behavioural markers in aviation are commonly used in training and assessing NTS. While behavioural markers are not essential for the assessment of NTS, incorporating behavioural markers into technical training is an effective method to assess NTS outcomes.

7.6.2 Behavioural markers are designed to assess at the skills level the outcomes of the training program and may not provide an accurate assessment of outcomes related to awareness and knowledge of HF principles. Where behavioural markers are used by an operator to assess NTS competencies, the behavioural markers are ideally supported by other methods to assess HF principles competencies.

7.6.3 Behavioural markers were initially developed as a by-product of CRM training. They are descriptions of observable, non-technical behaviours that are present in teams or individuals, and which contribute to effective or ineffective performance in operational environments. Behavioural markers do not describe attitudes or personality traits, and not all behavioural markers will be observable in every situation.

7.6.4 Behavioural markers can be incorporated into practical, technical training and assessment to assess a participant's NTS and behaviours as they apply to the technical task. They are usually structured into a set of categories with various sub-components.

7.6.5 Line operations safety audit (LOSA[18]) is a well-known safety tool that utilises a behavioural marker system to support an understanding of flight crew behaviour and its situational context during normal operations. Where in place, the LOSA is a useful program that can be used to support development and continuous improvement of an operator's HF/NTS TAP.

7.6.6 Less complex operators may not need to use a stand-alone behavioural marker system but could instead simplify appropriate markers for their own use and integrate them into existing activities where possible.

[18] International Civil Aviation Organization. (2002). *Line operations safety audit (LOSA)* (Doc. 9803 AN/761).

7.6.7 If behavioural markers are utilised, it is recommended that assessing personnel receive specialised training to accurately identify required behaviours. Consistent training for assessors is essential to ensure accurate and reliable use of the behavioural marker system.

## 7.7 Training and assessment currency

7.7.1 An operator's HF/NTS TAP documentation may state that operational safety-critical personnel are required to complete initial HF and NTS training and assessment in accordance with regulations 119.180 and 119.185 of CASR[19]. The requirements for such training and assessment must be included in the exposition.

7.7.2 Operators determine their own currency requirements for HF and NTS knowledge and practical training and assessment and describe these requirements in their HF/NTS TAP exposition content. An operator's currency requirements may differ across different types of operational safety-critical personnel. When determining the interval between training and assessment events, it is recommended that operators consider the function and role of each position and the likelihood of knowledge or skill degradation.

7.7.3 A simple currency schedule, at the operator's discretion, where all knowledge training content is required to be covered and assessed at defined intervals (e.g., once every two years) might suffice. Alternatively, operators may choose other currency schedules, such as a cyclic training and assessment schedule. A cyclical training schedule would cover a sub-set of the course content at more frequent intervals, with the intent that all content is covered over an extended period. For example, an annual refresher training where all course content is covered over a three-year period.

7.7.4 The operator's HF/NTS TAP should detail the required actions if personnel become uncurrent, including the limitations on the performance of safety critical duties.

## 7.8 Recognition of prior learning

7.8.1 If an operator chooses to recognise a person's previous HF and NTS training and assessment, the operator is responsible for documenting the process used to identify any gaps through a TNA, and to determine the additional training or assessment needed to meet the operator's HF/NTS TAP requirements for the person's role and operational context. Recognition of prior learning (RPL) decisions can then be based on verifiable evidence of prior learning, with each decision documented in the person's training records.

[19] Australian air transport operators are exempted from compliance with regulations 119.180 and 119.185 for members of their personnel who are excluded personnel. Refer to section 15A of CASA EX68/24.

# 8 Evaluation and continuous improvement

## 8.1 Program evaluation

8.1.1 It is recommended that operators establish a framework for evaluating the effectiveness of the HF/NTS TAP by determining whether the program's objectives have been achieved. Where possible, the evaluation of the program's quality and effectiveness is conducted as part of the operator's SMS assurance processes. Effective evaluations are based on recognised and systematic sources of information, such as pre- and post-training surveys examining the safety-related attitudes and behaviours of personnel, as well as operational or simulator performance data.

8.1.2 Each of the 3 development phases of effective HF and NTS training will require resources to evaluate the effectiveness of the program as personnel progress within the training continuum (i.e., from being aware, to becoming knowledgeable and through to achieving skilled performance).

8.1.3 One useful framework for evaluating the effectiveness of an HF/NTS TAP consists of 4 parts:

- the **reaction** of students – what they think and believe about the training
- degree of **learning** – the resulting increase in knowledge and skills
- **behaviour** change – the extent learning is being applied back on the job
- **organisational results** – the effects on the business or the operating environment due to the participant's performance.

8.1.4 All 4 parts are measured to determine the extent of learning outcomes. The challenge of such an evaluation is that the complexity and cost of measurement tend to increase as more components are adopted. For each part, consider:

- **Reactions –** Participants' reactions to the training can be gauged via a simple questionnaire. This typically involves simple questions about interest in the training, its relevance, quality of presentation and materials, its effectiveness, and general comments about any aspect of the course.
- **Learning –** This refers to how well the concepts were understood and retained – i.e. have the participants acquired the relevant knowledge and skills? This can be assessed using pre- and post-course administration of a knowledge quiz, through practical examples and evaluation tasks during HF and NTS training. Assessment performed after potential use of the learning in the workplace will provide a practical application and retention of knowledge/skill element to an evaluation process.
- **Behaviour –** Evaluations at this level assess whether knowledge and skills learnt in training transfer to on-the-job behaviour. A widely used technique for assessing NTS in flight crew is the use of observational rating scales using behavioural markers such as LOSA.
- **Organisational results –** This is typically measured by an operator's achievement towards the objectives of the HF and NTS program. Activities which can provide information about this include analyses of organisational safety data, safety surveys conducted on a periodical basis, and outcomes of behavioural markers or LOSA programs.[20]

8.1.5 In addition to periodic program evaluations, operators may consider implementing methods for ongoing monitoring of the effectiveness of the HF/NTS TAP. This may include sampling day-to-

[20] Also refer to Multi-Part AC 119-01 and 138-11 – Safety management systems for air transport and aerial work operators.

day behaviours demonstrated by personnel and examining whether safety reports provide feedback on HP issues. The outputs of program evaluation and ongoing monitoring inform continuous improvement decisions.

## 8.2 Continuous improvement of the program

8.2.1 It is recommended that an operator's HF/NTS TAP documentation include processes outlining the mechanisms used to maintain and improve the effectiveness of the program.

8.2.2 The objective of HF/NTS TAP maintenance is to ensure the program's ongoing effectiveness and relevance to the operational context, whereas program improvement aims to enhance HF/NTS TAP outcomes in terms of awareness, knowledge, and skill development.

8.2.3 Continuous improvement may be supported through a process known as 'washback', whereby operators use program evaluation data to feed back into the design and make it more suitable, effective, up-to-date, and possibly more economical (time and cost saving).

8.2.4 Maintaining and continuously improving the HF/NTS TAP is an ongoing process as the organisation and operational environment constantly change. Program evaluation supports this process by providing information on program performance and identifying opportunities for improvement. This may involve considering questions such as: 'Where are we at present?', 'Is this where we expected to be at this time?' and 'Where do we want to be at point 'X'?'.

8.2.5 The continuous improvement process should be responsive to feedback from participants. Participant feedback can be used to improve the syllabus, instructor/facilitator performance and training techniques, helping to ensure the program remains current, effective and relevant to the operator's operational context.

8.2.6 Continuous improvement of an HF/NTS TAP may be informed by a range of inputs, including:

- using deficiencies identified during training and assessment to set future training topics
- identifying and using demonstrated strengths to support improvement in weaker performance areas
- using data on human performance issues, hazards and risks in daily operations, to determine training and assessment needs and develop realistic operational scenarios for training content
- identifying and using broader aviation industry risks associated with HP, where relevant to the operational context.

# Appendix A
# Human factors principles & non-technical skills (HF/NTS) training and assessment program: Sample Aviation

## Overview

### Sample Aviation - scope of operations

Sample Aviation conducts Part 133 and Part 135 operations, employing less than 10 operational safety-critical personnel.

Operations are conducted in the following aircraft:

- Robinson R22/R44
- Airbus AS350
- Cessna 182, 206 and 210
- Beechcraft Baron BE55/ BE58
- Piper PA-31 Navajo.

Sample Aviation's headquarters and main operating base are collocated, with additional operational facilities at several locations.

### HF/NTS training and assessment program - sample text options

Appendix A contains three sample HF/NTS program options, tailored to different approaches for developing and delivering Sample Aviation's HF/NTS program:

- content developed and delivered by a named third-party HF/NTS provider
- content developed and delivered by one or more third-party providers (provider yet to be determined)
- supervised self-learning using CASA's *Safety behaviours: Human factors for pilots* resource kit, supported by an instructor or third-party provider as required.

# Sample program 1: {Named external provider}

## Program purpose and objectives

The purpose of this HF/NTS training and assessment program is to enhance the HF knowledge and non-technical skills of the operational safety-critical personnel listed below.

The objectives of the program are to:

- ensure personnel develop and maintain the HF and NTS knowledge, skills and behaviours required to safely carry out their duties
- strengthen personnel capability to identify, manage and mitigate HF-related risks
- minimise errors arising from human performance limitations and enhance the capture of potential errors
- mitigate the adverse effects of external influences on human performance
- support continuous improvement in operational safety performance through the application of HF and NTS principles.

These objectives are supported through training and assessment that develops both foundational human factors knowledge and the application of non-technical skills relevant to our operational environment.

The knowledge and competencies developed through this program support the assessment of NTS and threat and error management competencies during the checks specified in {insert training and checking manual volume or document title}.

## Personnel required to participate in the program

### Flight crew

Flight crew must not carry out their duties unless they have completed the HF/NTS initial and recurrent training and assessment as required under this program.

### Other personnel

The following personnel must complete the HF/NTS training and assessment program within three months of appointment and meet all recurrent training requirements.

{Insert list of personnel}

- {Job title 1}
- {Job title 2}
- {Job title 3}

## Program responsibilities

The program is managed by the HOTC, who is responsible for ensuring that:

- program content remains operationally relevant and addresses our specific HF and NTS risks
- all identified personnel complete initial and recurrent training and assessment in accordance with program requirements
- the selected HF/NTS third-party training provider meets {Sample Aviation}'s requirements
- {insert additional responsibilities}.

## HF/NTS third-party provider

{Sample Aviation} uses {insert name of provider} as the provider for the HF/NTS program.

The HOTC will ensure that the HF/NTS third-party provider, in accordance with the program outline, will:

- develop and deliver syllabuses for both initial and recurrent training and assessment, ensuring all required course topics are covered and program timelines are met
- tailor training and assessment content as necessary to address the needs of specific operational safety-critical personnel and their roles
- adapt training and assessment content when requested, to address {Sample Aviation}'s current, emerging and newly identified HF and HP risks
- ensure all instructors are suitably qualified and competent
- provide assessment outcomes and completion records in a format compatible with {Sample Aviation}'s training records and currency tracking system
- provide access to lesson plans, learning materials, assessment tools and instructor details upon request.

## Program outline

**Table 8: Program outline**

| | Initial training course | Recurrent training course |
|---|---|---|
| Recency | As per section {insert document reference} | {x} year/s |
| Delivery method | Face-to-face or online | Face-to-face or online |
| Instructor qualifications | Refer to section {insert document reference} from {insert the name of the provider} | Refer to section {insert document reference} from {insert the name of the provider} |
| Student instructor ratio | {insert} e.g.10:1 | {insert} e.g.10:1 |
| Duration | {2} days {insert length from provider} | {1} day {insert length from provider} |
| Assessment method | Written exam {or insert method from provider} | Written exam {or insert method from provider} |
| Remedial training and assessment | {insert remedial training and reassessment procedure (or insert document reference)} | {insert remedial training and reassessment procedure (or insert document reference)} |
| Record of completion | Records of completion and currency are tracked in {Sample Aviation}'s currency tracking system. | Records of completion and currency are tracked in {Sample Aviation}'s currency tracking system. |
| Course topics | Example only. Adapt the text and insert topics from provider, ensuring the topics and content are tailored to and appropriate for your operations and personnel<br>• {History of human factors and | Example only. Adapt the text and insert topics and cycle from provider, ensuring the topics and content are tailored to and appropriate for your operations and personnel |

| | Initial training course | Recurrent training course |
|---|---|---|
| | HF/NTS training<br>• Human performance and limitations<br>• Threat and error management<br>• Communication<br>• Conflict resolution<br>• Safety culture<br>• Leadership and teamwork<br>• Fatigue and fatigue management<br>• Stress and stress management<br>• Information processing<br>• Workload management<br>• Automation<br>• Situational awareness<br>• Decision making<br>• The anatomy of an accident / case studies tailored to reflect {Sample Aviation}'s operational environment and safety risk profile and used to reinforce key HF/NTS learning outcomes} | {Recurrent training will revisit all major modules of the initial training course, with topics distributed as evenly as possible across a {x}-year cycle, as follows:<br><br>Recurrent training and assessment event #:<br>• topic 1<br>• topic 2<br>• topic 3<br>• etc<br><br>Recurrent training and assessment event #:<br>• topic 1<br>• topic 2<br>• topic 3<br>• etc<br><br>Recurrent training and assessment event #:<br>• topic 1<br>• topic 2<br>• topic 3<br>• etc<br><br>Training content will address current, emerging and newly identified HF and HP risks.<br><br>Case studies will be tailored to reflect {Sample Aviation}'s operational environment and safety risk profile and used to reinforce key HF/NTS learning outcomes} |

## Record keeping

Records of completion and currency are tracked in {Sample Aviation}'s currency tracking system.

## Program evaluation and continuous improvement

The CEO and the HOTC will review the HF/NTS program annually to ensure its content and method of delivery remain appropriate for {Sample Aviation}'s operations.

In addition to the scheduled annual review, opportunities for improvement may be identified through {Sample Aviation}'s training and checking and safety management systems, where deficiencies in HF/NTS knowledge or performance, or identification of HF-related hazards, trends or safety risks may indicate a need for enhanced or new program content.

Outcomes are to be recorded in the {insert document or location, e.g. Continuous Improvement Register (Form A03)} and retained in accordance with section {insert record keeping and management section}.

Following the annual HF/NTS program evaluation, or more frequently if a requirement for updated or new course content is identified, the HOTC will brief {insert name of third-party provider} to ensure the course content and delivery remain aligned with our operational needs and identified HF/NTS risks.

Any identified improvements or required changes are implemented in accordance with {Sample Aviation}'s management of change procedures in the Management of Change section of this exposition.

## Recognition of HF/NTS training and assessment completed with another operator

{Sample Aviation} may recognise HF/NTS training completed with another operator (e.g., Part 121, Part 135 or Part 141 operator) where the following conditions are met:

- the training was completed within the previous 2 years
- the person provides a certificate or evidence of completion
- the HF/NTS course content aligns with CASA HF/NTS advisory material, including AC 119-12 and the CASA Safety Behaviours: Human factors for pilots resource kit
- the content is substantially equivalent to the topics used in this program
- the HOTC reviews the evidence, undertakes an assessment to determine its validity and identifies any gaps between the completed training and this program
- the HOTC accepts the previously completed training as meeting, or partially meeting, the requirements of this program.

Where gaps in training and/or assessment are identified, the HOTC will determine the additional training and/or assessment needed to ensure the person meets the requirements of this program.

All recognition of prior learning evidence and decisions made, including details of the recognised equivalent training and any additional training and assessment undertaken, will be recorded in the person's training record.

Where equivalence cannot be confirmed, the person must complete the training and assessment as required by this program.

# Sample program 2: {Unnamed external provider}

## Program purpose and objectives

The purpose of this HF/NTS training and assessment program is to enhance the HF knowledge and non-technical skills of the operational safety-critical personnel listed below.

The objectives of the program are to:

- ensure personnel develop and maintain the HF and NTS knowledge, skills and behaviours required to safely carry out their duties
- strengthen personnel capability to identify, manage and mitigate HF-related risks
- minimise errors arising from human performance limitations and enhance the capture of potential errors
- mitigate the adverse effects of external influences on human performance
- support continuous improvement in operational safety performance through the application of HF and NTS principles.

These objectives are supported through training and assessment that develops both foundational human factors knowledge and the application of non-technical skills relevant to our operational environment.

The knowledge and competencies developed through this program support the assessment of NTS and threat and error management competencies during the checks specified in {insert training and checking manual volume or document title}.

## Personnel required to participate in the program

### Flight crew

Flight crew must not carry out their duties unless they have completed the HF/NTS initial and recurrent training and assessment as required under this program.

### Other personnel

The following personnel must complete the HF/NTS training and assessment program within three months of appointment and meet all recurrent training requirements.

{Insert list of personnel}

- {Job title 1}
- {Job title 2}
- {Job title 3}

## Program responsibilities

The program is managed by the HOTC, who is responsible for ensuring that:

- program content remains operationally relevant and addresses our specific HF and NTS risks
- all identified personnel complete initial and recurrent training and assessment in accordance with program requirements
- the selected HF/NTS third-party training provider meets {Sample Aviation}'s requirements
- {insert additional responsibilities}.

## HF/NTS third-party providers

{Sample Aviation} uses external providers to develop and deliver the HF/NTS training and assessment program. The program is to be developed and delivered in accordance with the program outline below.

The HOTC will ensure that HF/NTS third-party providers, in accordance with the program outline, will:

- develop and deliver syllabuses for both initial and recurrent training and assessment, ensuring all required course topics are covered and program timelines are met
- tailor training and assessment content as necessary to address the needs of specific operational safety-critical personnel and their roles
- adapt training and assessment content when requested, to address {Sample Aviation}'s current, emerging and newly identified HF and HP risks
- ensure all instructors are suitably qualified and competent
- provide assessment outcomes and completion records in a format compatible with {Sample Aviation}'s training records and currency tracking system
- provide access to lesson plans, learning materials, assessment tools and instructor details upon request.

## Program outline

**Table 9: Program outline**

| | Initial training course | Recurrent training course |
|---|---|---|
| Recency | As per section {insert document reference} | {x} year/s |
| Delivery method | Face-to-face or online | Face-to-face or online |
| Instructor qualifications/competencies | Example only - insert your required instructor/facilitator qualifications/competencies<br>• {HF/NTS instructional competence (AC 119-12)<br>• AVIM0005 or equivalent competency<br>• Current aviation operational/training experience<br>• Familiar with CASA Safety Behaviours: HF for pilots kit} | Example only - insert your required instructor/facilitator qualifications/ competencies<br>• {HF/NTS instructional competence (AC 119-12)<br>• AVIM0005 or equivalent competency<br>• Current aviation operational/training experience<br>• Familiar with CASA Safety Behaviours: HF for pilots kit} |
| Student instructor ratio | {insert} e.g.10:1 | {insert} e.g.10:1 |
| Duration | {insert length from provider} (e.g. 2 days) | {insert length from provider} (e.g. 1 day) |
| Assessment method | Written exam {or insert method from provider} | Written exam {or insert method from provider} |
| Remedial training and assessment | {insert remedial training and reassessment procedure (or insert document reference)} | {insert remedial training and reassessment procedure (or insert document reference)} |

| | Initial training course | Recurrent training course |
|---|---|---|
| Record of completion | Records of completion and currency are tracked in {Sample Aviation}'s currency tracking system. | Records of completion and currency are tracked in {Sample Aviation}'s currency tracking system. |
| Course topics | Example only. Adapt the text and insert topics from provider, ensuring the topics and content are tailored to and appropriate for your operations and personnel<br><br>• {History of human factors and HF/NTS training<br>• Human performance and limitations<br>• Threat and error management<br>• Communication<br>• Conflict resolution<br>• Safety culture<br>• Leadership and teamwork<br>• Fatigue and fatigue management<br>• Stress and stress management<br>• Information processing<br>• Workload management<br>• Automation<br>• Situational awareness<br>• Decision making<br>• The anatomy of an accident / case studies tailored to reflect {Sample Aviation}'s operational environment and safety risk profile and used to reinforce key HF/NTS learning outcomes} | Example only. Adapt the text and insert topics and cycle from provider, ensuring the topics and content are tailored to and appropriate for your operations and personnel<br><br>{Recurrent training will revisit all major modules of the initial training course, with topics distributed as evenly as possible across a {x}-year cycle, as follows:<br><br>Recurrent training and assessment event #:<br>• topic 1<br>• topic 2<br>• topic 3<br>• etc<br><br>Recurrent training and assessment event #:<br>• topic 1<br>• topic 2<br>• topic 3<br>• etc<br><br>Recurrent training and assessment event #:<br>• topic 1<br>• topic 2<br>• topic 3<br>• etc<br><br>Training content will address current, emerging and newly identified HF and HP risks.<br><br>Case studies will be tailored to reflect {Sample Aviation}'s operational environment and safety risk profile and used to reinforce key HF/NTS learning outcomes} |

## Record keeping

Records of completion and currency will be tracked in {Sample Aviation}'s currency tracking system.

## Program evaluation and continuous improvement

The CEO and the HOTC will review the HF/NTS program annually to ensure its content and method of delivery remain appropriate for {Sample Aviation}'s operations.

In addition to the scheduled annual review, opportunities for improvement may be identified through {Sample Aviation}'s training and checking and safety management systems, where deficiencies in HF/NTS knowledge or performance, or identification of HF-related hazards, trends or safety risks may indicate a need for enhanced or new program content.

Outcomes are to be recorded in the {insert document or location, e.g. Continuous Improvement Register (Form A03)} and retained in accordance with section Record keeping and management.

Following the annual HF/NTS program evaluation, or more frequently if a requirement for updated or new course content is identified, the HOTC will brief the third-party HF/NTS provider {or insert name of third-party provider} to ensure the course content and delivery remain aligned with our operational needs and identified HF/NTS risks.

Any identified improvements or required changes are implemented in accordance with {Sample Aviation}'s management of change procedures in the Management of Change section of this exposition.

## Recognition of HF/NTS training and assessment completed with another operator

{Sample Aviation} may recognise HF/NTS training completed with another operator (e.g., Part 121, Part 135 or Part 141 operator) where the following conditions are met:

- the training was completed within the previous 2 years
- the person provides a certificate or evidence of completion
- the HF/NTS course content aligns with CASA HF/NTS advisory material, including AC 119-12 and the CASA Safety Behaviours: Human factors for pilots resource kit
- the content is substantially equivalent to the topics used in this program
- the HOTC reviews the evidence, undertakes an assessment to determine its validity and identifies any gaps between the completed training and this program
- the HOTC accepts the previously completed training as meeting, or partially meeting, the requirements of this program.

Where gaps in training and/or assessment are identified, the HOTC will determine the additional training and/or assessment needed to ensure the person meets the requirements of this program.

All RPL evidence and decisions made, including details of the recognised equivalent training and any additional training and assessment undertaken, will be recorded in the person's training record.

Where equivalence cannot be confirmed, the person must complete the training and assessment as required by this program.

# Sample program 3: {Self-learn pathway}

## Program purpose and objectives

The purpose of this HF/NTS training and assessment program is to enhance the HF knowledge and non-technical skills of the operational safety-critical personnel listed below.

The objectives of the program are to:

- ensure personnel develop and maintain the HF and NTS knowledge, skills and behaviours required to safely carry out their duties
- strengthen personnel capability to identify, manage and mitigate HF-related risks
- minimise errors arising from human performance limitations and enhance the capture of potential errors
- mitigate the adverse effects of external influences on human performance
- support continuous improvement in operational safety performance through the application of HF and NTS principles.

These objectives are supported through training and assessment that develops both foundational human factors knowledge and the application of non-technical skills relevant to our operational environment.

The knowledge and competencies developed through this program support the assessment of NTS and threat and error management competencies during the checks specified in {insert training and checking manual volume or document title}.

## Personnel required to participate in the program

### Flight crew

Flight crew must not carry out their duties unless they have completed the HF/NTS initial and recurrent training and assessment as required under this program.

### Other personnel

The following personnel must complete the HF/NTS training and assessment program within three months of appointment and meet all recurrent training requirements.

{Insert list of personnel}

- {Job title 1}
- {Job title 2}
- {Job title 3}

## Program responsibilities

The program is managed by the HOTC, who is responsible for ensuring that:

- program content remains operationally relevant and addresses our specific HF and NTS risks
- all identified personnel complete initial and recurrent training and assessment in accordance with program requirements
- an internal or external instructor is appointed to conduct HF/NTS assessments, workshops, or knowledge checks
- assessment evidence is reviewed to determine whether competency requirements have been met
- {insert additional responsibilities}.

# Program outline

**Table 10: Program outline**

| | Initial training course | Recurrent training course |
|---|---|---|
| Recency | As per section {insert document reference} | {x} year/s |
| Delivery method | Self-learn using CASA HF/NTS kit, with oversight/testing by an approved instructor | Self-learn using CASA HF/NTS kit, with oversight/testing by an approved instructor |
| Instructor qualifications | Example only - insert your required instructor/facilitator qualifications/competencies<br>• {HF/NTS instructional competence (AC 119-12)<br>• AVIM0005 or equivalent competency<br>• Current aviation operational/training experience<br>• Familiar with CASA Safety Behaviours: HF for pilots kit} | Example only - insert your required instructor/facilitator qualifications/competencies<br>• {HF/NTS instructional competence (AC 119-12)<br>• AVIM0005 or equivalent competency<br>• Current aviation operational/training experience<br>• Familiar with CASA Safety Behaviours: HF for pilots kit} |
| Student instructor ratio | Not applicable for self-study; for workshops or classes: {insert ratio} | Not applicable for self-study; for workshops or classes: {insert ratio} |
| Duration | Self-paced learning; guided review or classes {insert duration if applicable} | Self-paced learning; guided review or classes {insert duration if applicable} |
| Assessment method | Example only - insert your assessment methods<br>{Workbook activities, Q&A sessions, written responses, or selected topic testing conducted by an approved instructor} | Example only - insert your assessment methods<br>{Workbook activities, Q&A sessions, written responses, or selected topic testing conducted by an approved instructor} |
| Remedial training and assessment | {insert remedial training and reassessment procedure (or insert document reference)} | {insert remedial training and reassessment procedure (or insert document reference)} |
| Record of completion | Records of completion and currency are tracked in {Sample Aviation}'s currency tracking system. | Records of completion and currency are tracked in {Sample Aviation}'s currency tracking system. |
| Course topics | Example only. Adapt the text and insert topics from CASA HF/NTS kit, ensuring the topics and content are tailored to and appropriate for your operations and personnel<br>• {History of human factors and HF/NTS training | Example only. Adapt the text and insert topics from CASA HF/NTS kit, ensuring the topics and content are tailored to and appropriate for your operations and personnel<br>{Recurrent training will revisit all major modules of the initial training course, |

| | Initial training course | Recurrent training course |
|---|---|---|
| | • Human performance and limitations<br>• Threat and error management<br>• Communication<br>• Conflict resolution<br>• Safety culture<br>• Leadership and teamwork<br>• Fatigue and fatigue management<br>• Stress and stress management<br>• Information processing<br>• Workload management<br>• Automation<br>• Situational awareness<br>• Decision making<br>• The anatomy of an accident / case studies tailored to reflect {Sample Aviation}'s operational environment and safety risk profile and used to reinforce key HF/NTS learning outcomes} | with topics distributed as evenly as possible across a 3-year cycle, as follows:<br><br>Recurrent training and assessment event #:<br>• topic 1<br>• topic 2<br>• topic 3<br>• etc<br><br>Recurrent training and assessment event #:<br>• topic 1<br>• topic 2<br>• topic 3<br>• etc<br><br>Recurrent training and assessment event #:<br>• topic 1<br>• topic 2<br>• topic 3<br>• etc<br><br>Course topics will be reviewed and content adapted to address current, emerging and newly identified HF and HP risks.<br><br>Case studies are tailored to reflect {Sample Aviation}'s operational environment and safety risk profile and used to reinforce key HF/NTS learning outcomes} |

## Record keeping

Records of completion, evidence of completion of exercises, assessment outcomes and currency will be tracked in {Sample Aviation}'s currency tracking system.

## Program evaluation and continuous improvement

The CEO and the HOTC will review the HF/NTS program annually to ensure its content and method of delivery remain appropriate for {Sample Aviation}'s operations.

In addition to the scheduled annual review, opportunities for improvement may be identified through {Sample Aviation}'s training and checking and safety management systems, where deficiencies in HF/NTS knowledge or performance, or identification of HF-related hazards, trends or safety risks may indicate a need for enhanced or new program content.

Outcomes are to be recorded in the {insert document or location, e.g. Continuous Improvement Register (Form A03)} and retained in accordance with section Record keeping and management.

Following the annual HF/NTS program evaluation, or more frequently if a requirement for updated or new course content is identified, the HOTC will determine the additional course content required to ensure the program remains aligned with our operational needs and identified HF/NTS risks, seeking the assistance of an external HF/NTS provider if necessary.

Any identified improvements or required changes are implemented in accordance with {Sample Aviation}'s management of change procedures in the Management of Change section of this exposition.

## Recognition of HF/NTS training and assessment completed with another operator

{Sample Aviation} may recognise HF/NTS training completed with another operator (e.g., Part 121, Part 135 or Part 141 operator) where the following conditions are met:

- the training was completed within the previous 2 years
- the person provides a certificate or evidence of completion
- the HF/NTS course content aligns with CASA HF/NTS advisory material, including AC 119-12 and the CASA Safety Behaviours: Human factors for pilots resource kit
- the content is substantially equivalent to the topics used in this program
- the HOTC reviews the evidence, undertakes an assessment to determine its validity and identifies any gaps between the completed training and this program
- the HOTC accepts the previously completed training as meeting, or partially meeting, the requirements of this program.

Where gaps in training and/or assessment are identified, the HOTC will determine the additional training and/or assessment needed to ensure the person meets the requirements of this program.

All RPL evidence and decisions made, including details of the recognised equivalent training and any additional training and assessment undertaken, will be recorded in the person's training record.

Where equivalence cannot be confirmed, the person must complete the training and assessment as required by this program.

## HF/NTS third-party provider

Where {Sample Aviation} appoints an external instructor or HF/NTS provider to support the self-learn program, that provider must meet the characteristics listed in section {insert document reference}.

# Appendix B
# Human factors principles & non-technical skills (HF/NTS) training and assessment program: Sample Airlines

## Overview

### Sample Airlines - scope of operations

Sample Airlines conducts Part 135 and Part 121 air transport operations, with a management team of less than 10, and 60 full and part-time staff.

Operations are conducted in the following aircraft:

- PA-31 Navajo (single pilot)
- Beech 1900D (multi-crew)
- Fairchild Metro (multi-crew).

Sample Airlines' headquarters and main operating base are collocated, with additional operational facilities at several locations.

Sample Airlines documents their HF/NTS training and assessment program as a dedicated chapter within their training and checking manual.

# Sample program {Provided in-house}

## Program objectives

Sample Airlines requires all flight crew and other operational safety-critical personnel to undergo the HF/NTS training and assessment program.

The objective of this program is to:

- enhance the human factors knowledge and non-technical skills of personnel
- assist in managing human performance and mitigating errors for the enhancement of overall safety performance
- {insert program objectives}.

The program includes initial and recurrent training courses that are managed and provided by Sample Airlines' training department.

## Program responsibilities

### Chief executive officer

The chief executive officer (CEO) will ensure that:

- training and checking of Sample Airlines' operational safety-critical personnel (other than flight crew), including training and assessment under this program, is conducted in accordance with Sample Airlines' exposition (119.130(1)(e))
- adequate resources have been allocated to the HF/NTS training and assessment program (119.130(1)(a))
- {insert responsibilities relating to the program}

### Head of training and checking

The program is implemented and managed by the head of training and checking (HOTC).

The HOTC is responsible for ensuring that:

- training and checking of flight crew contracted by or for the operator conducted in accordance with Sample Airlines' exposition (119.150(2)(c))
- {insert responsibilities relating to the program}

### Other personnel

All Sample Airlines flight crew and other operational safety-critical personnel are responsible for ensuring they attend and participate in HF/NTS training and assessment in accordance with Sample Airlines' exposition.

## Program participants

### Flight crew

Flight crew must not carry out their duties unless they have completed the HF/NTS initial training course and meet annual currency requirements (119.180(3)).

### Other operational safety-critical personnel

All other operational safety-critical personnel, as identified below, must be compliant with the HF/NTS training and assessment program within 3 months after being appointed to their position, and meet annual currency requirements (119.185(3)).

Sample Airlines identifies other operational safety-critical personnel by role or function as follows:

- rostering and scheduling personnel
- flight following and operations centre personnel, including personnel that conduct the preparation of weight and balance information
- ground handling personnel, including those tasked with loading/unloading of baggage, cargo, catering, and other amenities
- passenger check-in and boarding personnel
- any manager/supervisor responsible for management of flight crew or operational safety-critical personnel
- any other personnel whose role/duties require direct contact with the aircraft.

## HF/NTS training and assessment

### Delivery schedule

#### Flight crew

HF/NTS training and assessment for flight crew members will be conducted as part of initial induction ground school training, on an annual recurrency and as part of flight crew command upgrade training.

Table 11 specifies the duration and which HF/NTS training elements are to be covered in each type of training.

#### Other operational safety-critical personnel

HF/NTS training for other operational safety-critical personnel will be conducted as part of initial induction training and on an annual recurrency basis.

Table 11 specifies the duration and which HF/NTS training elements are to be covered in each type of training.

### Syllabus outline

#### Training elements

Table 11 specifies which HF/NTS training elements are to be covered in each type of training.

The HF/NTS training elements are tailored to the specific needs of the role and training phase being undertaken.

The levels of training in Table 11 can be described as follows:

- **In-depth**: training that is instructional or interactive in style taking full advantage of group discussions, team task analysis, team task simulation, etc., for the acquisition or consolidation of knowledge, skills, and attitudes.
- **Overview/summary**: training that is instructional or interactive in style to meet the program objectives or to refresh and strengthen knowledge gained in a previous training.

For annual recurrent HF/NTS training, all HF/NTS training elements shall be covered by distributing modular training sessions as evenly as possible over a 3-year period.

The selection of modular elements will initially be driven by HF/NTS analysis in relation to identified HF/NTS issues, hazards, or risks from the safety management system (SMS).

Where specific topic elements have been identified for inclusion via SMS risks or operational occurrences, an in-depth level of training will be undertaken for that element.

**Table 11: HF/NTS training syllabus outline**

| HF/NTS training elements | Initial HF/NTS | Annual recurrent HF/NTS | Flight crew command upgrade |
|---|---|---|---|
| Duration | 2.5 days | 1 day | 1 day |
| **General Principles** | | | |
| • HF and NTS in aviation<br>• Human performance principles and limitations<br>• Threat and error management | In-depth | Overview/summary | Overview/summary |
| **Individual factors** | | | |
| • Human error, reliability, attitudes, and behaviours<br>• Stress and stress management<br>• Fatigue and fatigue management<br>• Situational awareness<br>• Information acquisition and processing | In-depth | Overview/summary | In-depth |
| **Team factors** | | | |
| Automation and philosophy on the use of automation | Overview/summary | Overview/summary | In-depth |
| Monitoring and intervention | Overview/summary | Overview/summary | Overview/summary |
| • Shared situational awareness<br>• Shared information acquisition and processing<br>• Workload management<br>• Effective communication and coordination within teams<br>• Leadership and teamwork<br>• Decision-making<br>• Resilience development<br>• Surprise and startle effect | In-depth | Overview/summary | In-depth |
| **Organisational factors** | | | |
| • Safety culture and company culture<br>• Effective communication and coordination with other | In-depth | Overview/summary | In-depth |

| HF/NTS training elements | Initial HF/NTS | Annual recurrent HF/NTS | Flight crew command upgrade |
|---|---|---|---|
| operational personnel and ground services | | | |
| Case studies and organisational occurrences analysis | In-depth | In-depth | In-depth |

### Assessment

At the completion of each HF/NTS training course participants are required to undertake a written theory assessment, with an 80% required pass mark.

In the event of failure to achieve the required pass mark of the assessment, a re-sit of the theory assessment is required. The HOTC will review the assessment outcome and ensure appropriate remedial training is completed prior to the re-sit.

For face-to-face training, at the discretion of the facilitator, a verbal assessment may be undertaken to assess competency in lieu of the re-sit. This verbal assessment would include an assessment of the trainee's understanding of any areas of deficiency (as identified from their initial assessment results) and their broader understanding of the training content.

An informal NTS assessment is also required to be completed via facilitator observations of trainees' participation during group activities conducted within the classroom. These observations allow for informal assessment of trainees' attitudes and behaviours in relation to observable behavioural markers relating to NTS. Only in instances where deficiencies in observable behaviours have been identified will a formal follow-up and debriefing of NTS be undertaken with individual participants.

## Record keeping

Records of completion and currency will be tracked in Sample Airlines' training currency tracking system.

# Facilitators

All Sample Airlines' HF/NTS facilitators are required to have undertaken an internal train the trainer upgrade program and training pathway. The training pathway requires the following steps be completed for an individual to be approved to deliver HF/NTS training courses:

- **HF/NTS initial course training:** completion of initial HF/NTS training, including course assessment.
- **Training observation:** observing specific course content observation session/s, observing an approved HF/NTS facilitator delivering the different HF/NTS courses. (Note: this and the preceding step can be undertaken concurrently, at the discretion of the HOTC.)
- **Group learning and facilitation skills**: training in group learning and facilitation skills to provide knowledge and skills for effective facilitation, training of small groups and presentation of course material in a variety of ways, training in the conduct of group exercises, administering activities, directing and maintaining group discussions and conducting HF/NTS assessments and debriefings.
- **Supervised course delivery:** delivery of course under supervision of an approved HF/NTS facilitator.
- **Facilitator sign-off:** training delivery, assessment and sign-off completed by a HOTC-approved HF/NTS facilitator.

Facilitators for HF/NTS flight crew command upgrade training must be a current flight crew member.

All HF/NTS facilitators must remain current in the delivery of courses by having delivered a course not less than once every 12 months. If this currency is not maintained, the facilitator must complete the final two steps of the training pathway to regain currency (supervised course delivery and facilitator sign-off).

Release of new HF/NTS courseware will require all HF/NTS facilitators to undergo new courseware briefings. The HOTC will determine the duration and frequency of these briefings, based on the volume and significance of new or updated course material.

## HF/NTS third-party provided training

Where other operational safety-critical roles are fulfilled via contractors or third-party service providers, where their direct employer provides HF/NTS training a gap analysis must be undertaken to ensure that all the key HF/NTS syllabus content (identified in Table 11) has been delivered. For any identified deficiencies between the two, the personnel must complete training and assessment to a level equivalent to what would be achieved for direct employees of Sample Airlines.

Copies of HF/NTS training and assessment completion and currency records for all contractors or third-party service providers must be provided and maintained in Sample Airlines' training currency tracking system.

The HOTC will review all third-party provided HF/NTS training and assessment courses annually and confirm they continue to meet Sample Airlines' requirements.

## HF/NTS program evaluation/continuous improvement

The CEO and the HOTC are responsible for reviewing the HF/NTS program content annually and considering whether it remains applicable to Sample Airlines' operations. Any areas identified for improvement or changes are to be made in accordance with the Sample Airlines change management procedures.