



**Civil Aviation Advisory
Publication (CAAP)**

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Human Factors (HF) and Non-Technical Skills (NTS) Training for Regular Public Transport (RPT) Operations

This is an advisory publication. It describes some options for complying with the Civil Aviation Regulations 1988 (CAR 1988).

Always read this advice in conjunction with the appropriate regulations and any Civil Aviation Orders (CAOs).

Contents

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The relevant regulations and other references

- Civil Aviation Regulations (CAR) 1988, Regulation 217 – Training and Checking Organisations
- Civil Aviation Order (CAO) – Section 48
- CASA Civil Aviation Advisory Publication (CAAP) 5.59–(0) *Teaching and Assessing Single-Pilot Human Factors and Threat and Error Management*
- CASA (2008) *Safety Behaviours: Human Factors for Pilots Training Resource*
- Joint Aviation Authorities (JAA) (2001) (JAR-OPS Subpart N (Amendment 3.1 - December
- Federal Aviation Administration (FAA) Advisory Circular 120-51E *Crew Resource Management Training*
- UK Civil Aviation Authority (CAA) (2006) CAP 737 *Crew Resource Management (CRM) Training*
- International Civil Aviation Organization (ICAO) (1998) *Human Factors Training Digest No. 2 Flight Crew Training Cockpit Resource Management (CRM) and Line-Oriented Flight Training (LOFT), Circular 217 – AN/132*
- ICAO (1998) *Human Factors Training Manual, DOC – 9683*
- ICAO (2002) *Human Factors Guidelines for Safety Audits Manual, Doc – 9806*
- ICAO (2006) *Safety Management Manual (SMM). Doc 9859 AN/460. First Edition*
- International Organization for Standardization (ISO) 13507 – *Human Factors Design*
- ISO 0241-11 (1999) – *Human Centred design process for interactive systems*
- ISO9241-8 – *Guidance on usability*

Who this CAAP applies to

This Civil Aviation Advisory Publication (CAAP) applies to holders of Air Operator's Certificates (AOCs) for Low Capacity and High Capacity Regular Public Transport (RPT) operations.

Why this publication was written

This CAAP provides advice and guidance for developing Human Factors (HF) training and associated Non-Technical Skills (NTS) assessment for Flight Operations Safety-Critical Personnel.

Status of this CAAP

This is the first CAAP written on this subject.

For further information

For policy advice contact CASA's Human Factors Manager (Telephone 131 757 or email humanfactors@casa.gov.au).

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Acronyms & definitions

Acronyms and definitions are contained in CAAP SMS-1 which should be read in conjunction with this CAAP

1. Introduction

1.1 The Civil Aviation Safety Authority (CASA) recognises that the operations to which this CAAP will apply are numerous and varied, and will endeavour to adopt a flexible approach to its application consistent with the maintenance of good standards. Low Capacity RPT operators should take this into account when reading this document and considering its implications for their type of activities.

Persons covered under this CAAP include all operational safety-critical personnel performing safety-related work. This includes:

- flight crew;
- cabin crew;
- aircraft or crew dispatchers and load control staff;
- safety management personnel; and
- flight operations senior management.

Note: For smaller operators that have one person conducting multiple roles (for example, dot points 1, 3 and 4 as identified above), that person only needs to undertake the HF training for the role that has the highest level of organisational accountability and complexity. This, however, does not exclude other operations safety-critical personnel.

Persons NOT covered under this CAAP:

- aircraft maintenance licence holder staff (Civil Aviation Safety Regulations (CASR) Part 66) and Maintenance Organisations staff (CASR Part 145); production and design organisations. Further information in regard to the current status of HF requirements can be found in CASRs Parts 66, 145 and 147;
- aerodrome staff (CASR Part 139 – Aerodromes); and
- air traffic services staff (CASR Part 65 – Air Traffic Services Licensing, and CASR Part 172 – Air Traffic Services Providers).

Note: Whilst the majority of personnel stated above are considered safety critical, the HF requirements are covered under their own regulatory framework.

2. Application and Scope of this CAAP

2.1 Application to Low Capacity RPT operators

2.1.1 CASA recognises that RPT operators have finite and limited resources to implement NTS training and assessment. Where possible, suggestions on how smaller operators may implement the requirements of this CAAP are specified throughout. In general, a smaller RPT operator may wish to consider the following:

- using a mixed employee group for training to reduce disruption;
- conducting training with other operators to share costs and resources;
- utilising the training resources of a larger operator, with whom a relationship already exists;
- staggering modular training over a longer period to minimise employee downtime;
- utilising an external service provider if internal expertise in training delivery is limited; and/or
- implementing an 'off-the-shelf' training product if expertise in course development is lacking; and
- compliance issues during both approval and surveillance associated with a mix of the above solutions.

2.1.2 Each of the above strategies may present a number of challenges to be addressed. For example, conducting training with other operators may ignore specific cultural or procedural differences. Therefore, operators should consider the relative merits of the above strategies and decide on the most appropriate training delivery method, given organisational culture considerations, number of employees, and use of contracted resources.

3. Introduction to HF Training and NTS Assessment

3.1 Human Factors

3.1.1 HF is a dynamic multi-disciplinary field that aims to optimise the relationship between people and their activities by the application of applied sciences, such as psychology, other behavioural and social sciences, as well as engineering, ergonomic and physiology. HF involves the study of the human's capabilities, limitations, and behaviours, and the integration of that knowledge into the design of systems to reduce error, enhance safety and improve efficiency.

3.1.2 The International Civil Aviation Organization (ICAO) has incorporated HF training requirements into the training and licensing requirements within Annex 1 (Personnel Licensing) and Annex 6 (Operations of Aircraft). Australia is incorporating competency-based HF training and assessment into its licensing and operational regulations.

(See the proposed CASR Part 61 titled *Flight Crew Licensing*, CAAP and CAAP 5.81(0) titled *Flight Crew Licensing Flight Reviews*).

3.1.3 The aim of HF training is:

- to enhance and further develop non-technical skills to improve human and team performance, as part of an overall approach to addressing safety risks; and
- to enhance knowledge of HF and develop skills and attitudes which, when applied appropriately, can provide more effective risk controls in safety-critical environments.

3.2 Human Factors Training

3.2.1 Many organisations within the aviation industry have implemented HF awareness and training programs. The typical objective of such programs is to continually improve safety and efficiency, via the reduction and management of human error at the individual, team and organisational level. This objective is based on the understanding that human error can never be eliminated; only managed.

3.2.2 Contemporary HF training squarely focuses on providing safety personnel with the skills to manage the consequences of human error. This implies that error is a normal and expected condition, of which the consequences are just as important as the cause. In other words, it is what operators choose to do about the consequences of error that is important, rather than the act of committing the error itself.

3.3 Non Technical Skills or Crew Resource Management (CRM) Training

3.3.1 NTS or CRM training is an applied form of HF training that has been used successfully with flight and cabin crew. (While the recent change of name from Crew Resource Management to Non Technical Skills training recognises the development of the discipline, for the purpose of this CAAP NTS is synonymous with CRM).

3.3.2 In contrast to predominantly knowledge-based HF courses, NTS training uses an experiential, adult learning approach to provide operational personnel with the understanding and skills required to manage themselves and all available resources more safely and effectively.

3.3.3 NTS was developed as a response to new insights into the causes of aircraft accidents which followed from the introduction of flight recorders into modern jet aircraft. Information gathered from these devices has suggested that many accidents result not from a technical malfunction of the aircraft or its systems, nor from a failure of aircraft handling skills or a lack of technical knowledge on the part of the crew; it appears instead that they are caused by the inability of crews to respond appropriately to the situation in which they find themselves.

For example, inadequate communications between crew members and other parties could lead in turn to a loss of situational awareness, a breakdown in teamwork in the aircraft, and ultimately to a wrong decision or series of decisions which result in a serious incident or a fatal accident.

3.3.4 The importance of the NTS concept and the utility of the training in promoting safety and more efficient aircraft operations have now been recognised worldwide. This CAAP presents guidelines for the development, implementation, reinforcement and assessment of NTS training for flight crew members and other operational safety-critical personnel.

3.3.5 NTS can be defined as a management system which makes optimum use of all available resources – equipment, procedures and people – to promote safety and enhance the efficiency of flight operations.

3.3.6 NTS is concerned not so much with the technical knowledge and skills required to fly and operate an aircraft but rather with the cognitive and interpersonal skills needed to manage the flight within an organised aviation system.

3.3.7 The NTS training model first developed for airline pilots has been extended to other important components of the aviation system, including cabin crew.

3.4 Relationship between Non Technical Skills and Threat and Error Management (TEM)

3.4.1 The focus of contemporary NTS programs is on the detection and management of threats, or TEM. This concept first emerged in the late 1990s and builds on applied error management strategies pioneered by the University of Texas.

3.4.2 While the TEM concept has reinvigorated and refocused NTS training efforts in recent years, there has been some misunderstanding of the relationship between TEM and NTS training. This relationship has recently been clarified by ICAO as follows:

‘...TEM is an *overarching safety concept with multiple applications in aviation*; while NTS is exclusively a *training intervention*. The basic concepts underlying TEM (threats, errors and undesired aircraft states) can be integrated – for example as an additional module – within existing NTS programs. This is because TEM countermeasures build in part – although not exclusively – upon NTS skills. The combination of TEM concepts with NTS skills thus introduces the opportunity to present the utilisation of NTS skills by flight crews anchored in the operational environment, from an operational perspective. It is emphasised that TEM training does not replace NTS training, but rather complements and enhances it.’

3.5 Non-technical skills and behavioural markers

3.5.1 Non-technical skills include specific HF competencies such as critical decision-making, team communication, situational awareness and workload management. The rationale for developing specific HF competencies amongst operational safety-critical personnel is that it will enhance their ability to detect and manage threats and errors that are implicated in the majority of aviation incidents and accidents.

3.5.2 The objective of HF training is to ensure that operational safety-critical personnel possess the competencies necessary to perform safely in all circumstances. As with any form of training, to design, develop and evaluate HF training adequately, it is necessary to clearly define these competencies – the specific interpersonal skills, behaviours and attitudes associated with safe, proficient performance. The term *Behavioural Markers* is commonly used in aviation and other industries to describe these competencies. These are observable, defined behaviours that contribute to effective or ineffective performance within a work environment.

3.5.3 Further information on non-technical skills assessment is provided in Section 8 of this CAAP.

4. Critical Success Factors for Implementing a Human Factors Training and Assessment Program

4.1 Training and assessment program

4.1.1 The HF Training and assessment program, to be successful, must be embedded in the organisation's SMS. The following critical success factors denote a best practice approach to fulfilling this requirement.

4.2 Management commitment

4.2.1 The success of any HF or SMS program is dependent on the level of commitment demonstrated by management. The management group plays an important role in ensuring that the program is adequately resourced as well as continuing to demonstrate active interest and support. Managers should also provide visible leadership in clearly demonstrating the principles and standards of behaviours associated with HF.

4.2.2 Management commitment will come from an understanding and acceptance in regard to the following:

- HF training has an important contribution to make to aviation safety;
- the benefits of HF training may not be instant and will not be realised without ongoing investment and effort; and
- HF training will impose obligations on management to actively demonstrate key principles such as error acceptance, a just safety culture and a learning organisation.

4.3 Other critical success factors

4.3.1 In addition to management commitment, the success of any HF training program may depend on the following factors:

- having well trained facilitators;
- facilitators and assessors should be ideally 'peers' of the participants who have current operational knowledge, speak their 'language' and understand the professional and organisational cultures;
- staff having a high level of trust in the organisation;
- the safety culture of the organisation is established and supported by management;
- sufficient resources (people, materials, time) are allocated to the provision of all forms of training;
- the individual's assessment takes account of all the relevant factors influencing human performance within the operational context;

- the program assessment is based either on available data from validation studies, recognised data resources, or accepted estimation techniques;
- those responsible for managing safety and conducting incident and accident investigations should also be made aware of and/or required to participate in any HF training initiative; and
- safety investigations should adequately consider HF-related issues and, where possible, be used as case studies in training to ensure organisational relevance.

4.4 Limitations

4.4.1 As with any training initiative, it is important to recognise that HF training and assessment is not intended:

- to act as a panacea for all organisational problems;
- to be a quick fix for non-performing individuals or systems;
- to replace or compensate for a lack of technical proficiency;
- to be conducted as a passive lecture course;
- for solely online delivery;
- to dictate staff behaviour or provide a specific prescription on how to work with others; or
- to alter personality or provide any sort of therapy to participants.

5. Determining the Target Audience and Training Needs

5.1 General principles

5.1.1 **Safety objective** - The concepts presented in the HF training course should have direct relevance to the operational safety issues encountered by participants. Highlighting the safety benefit is designed to attract the interest of even highly experienced and professionally self-assured operators in acquiring new skills.

5.1.2 **Course focus** - Training should be focused on enhancing the performance of staff as members of a team rather than as individuals, although some self-management competencies are typically also addressed.

5.1.3 **Course facilitation** - Courses are conducted by trained facilitators, whose operational experience gives them credibility with the group. They are also selected on their ability to act as positive role models in the organisation.

5.1.4 **Course structure and length** - Initial HF topics are ideally delivered in a single consolidated training event, rather than dispersed over many months, providing a substantial one-off exposure to HF and safety concepts. Initial training courses are usually between one and three days duration, and are usually supplemented by an annual recurrent training event.

5.1.5 When determining course duration, the organisation needs to take into account relevant risk issues, as identified through the SMS.

5.1.6 However, it is recognised that some organisations will find it impractical to conduct an extended HF training course due to resource limitations or limited access to employees. An acceptable alternative may be to split the HF syllabus into smaller modules to be delivered over a longer period of time.

5.1.7 **Participants** - HF training can bring together in the classroom participants with different experience, backgrounds, knowledge, beliefs and opinions. This is a valuable opportunity to exchange experiences and to influence attitude change through exposure to other opinions and ideas.

5.1.8 **Joint training** - Where appropriate, members of extended or dispersed teams may be involved in joint training, reinforcing the 'one team/crew concept' and increasing mutual understanding and respect.

5.1.9 **Classroom climate** - A classroom climate is created that allows open discussion and disclosure and the potential to learn from the mistakes and 'near misses' of others in a 'no blame' environment.

5.1.10 **Feedback to organisation** - HF training courses can provide a new avenue for organisational feedback and learning, if management agrees to listen to participant concerns on issues such as fatigue, additional training needs, or operational hazards.

5.1.11 **Ongoing assessment of learning** - NTS and behaviour become the focus of feedback, development and ongoing reinforcement as HF concepts are integrated into subsequent training activities or performance management programs.

5.2 Identifying the target audience

5.2.1 In principle, HF training is applicable to all Operational Safety-Critical Personnel. In practice, some safety critical personnel are exposed to greater safety hazards in their daily work than others, and some have greater capacity than others to influence accidents or safety incidents, through their actions or inactions.

5.2.2 For this reason, RPT operators should decide the scope of their training program. A training needs analysis should be conducted to determine particular training needs and to prioritise target groups for HF training in their own organisation.

Further guidance on conducting a training needs analysis is contained in section 5.3 of this CAAP.

5.2.3 One strategy to assist with the training needs analysis is to consider the person's role within the organisation, and their interaction with people in other operational areas. While the aviation operational environment involves a variety of complex interactions between individuals, these range in nature from common, routine interactions, through to infrequent, yet safety-critical communications with remote third parties never previously encountered.

5.2.4 All operational safety-critical personnel can benefit from HF training. This may include:

- Senior Managers and Line Managers;
- Safety Managers, including those involved in safety investigation, communication or analysis activities;
- Training Managers and Facilitators/Trainers;
- Examiners or Competency Assessors;
- Load Controllers, including aircraft loading staff;
- Operations Control staff; and
- other operational staff as per a risk-based approach identified by the RPT operator (see Section 6.2.1 below for more guidance).

5.3 Training Needs Analysis

5.3.1 The same HF training will not be required by all Operational Safety-Critical Personnel. A Training Needs Analysis (TNA) should be conducted to:

- develop a profile of training priorities for a specific Flight Operations Safety-Critical Role based on risk issues identified by the SMS;
- identify training gaps, i.e. where relevant training is not currently provided;
- customise an HF training syllabus; and
- evaluate possibilities for joint training.

5.3.2 It is recommended that this analysis be undertaken by one or more subject matter experts who, individually or collectively meet the following criteria:

- are familiar with the nature and objectives of HF training;
- have current knowledge of the job requirements and context of the role in question;
- understand the HF associated with safety events in their own organisation; and

- understand the principles of developing a Training Needs Analysis framework, and course design.

5.3.3 Refer to the Department of Education, Science and Training (DEST)/Australian Qualification Framework (AQF) documentation (www.dest.gov.au).

6. Developing Training Content

6.1 Training objectives - core elements

6.1.1 HF Training should include a number of core elements that should be delivered at an appropriate level for each type of training course, whether initial or recurrent. Depending on the type of training course being conducted, flight crew, cabin crew and where appropriate other operational safety-critical personnel should undergo joint training.

6.1.2 The following core elements are based on ICAO (1998) requirements and should be covered as a minimum.

6.1.3 Company safety culture, Standard Operating Procedures (SOPs), organisational factors:

- information acquisition and processing;
- situational awareness;
- workload management;
- human error and threats;
- threat and error management;
- communication and co-ordination;
- leadership and team behaviour synergy;
- decision-making and conflict resolution;
- stress and stress management;
- fatigue;
- health;
- vigilance;
- cultural factors;
- automation and the philosophy of the use of automation (if relevant);
- specific type-related differences; and
- case-based studies.

6.2 Customisation

6.2.1 Training materials and learning activities should have demonstrable relevance to the day-to-day operational activities of the participants. The ideas and concepts within the curriculum, exercises and discussions should be linked directly to the safety issues encountered by the operational staff. Without this link to work experiences and practices, the theoretical concepts of HF are at risk of being too abstract to be understood and not then translated into changed workplace behaviours.

6.2.2 Customisation can occur in the following ways:

- identifying particular performance deficiencies amongst an employee group, and giving special focus to these in HF training;
- choosing accident or incident case studies that are operationally relevant and have good local learning points; where possible, actual safety incidents that have occurred within the organisation should be used;
- administering surveys to ascertain the safety-related attitudes and behaviours of employees;
- technical or operational performance data, for example, obtained through flight data recorders, simulators or other monitoring equipment;
- observational information from behavioural auditing methods such as the Line Operations Safety Audit process (ICAO, 2002); and
- new initiatives and related safety or cultural change projects can be reinforced through customisation of HF topics for example, a 'Just Culture' approach for safety reporting.

6.3 For Flight Crew

6.3.1 **Training overview** - HF training can be conducted as distinct modular courses, or can be integrated into other technical and non-technical training programs. In either case, it should address the equivalent operational phases of initial, conversion, command/upgrade and recurrent training.

6.3.2 Where HF training is integrated into other courses, HF objectives should be clearly identified and assessed where appropriate with respect to well-defined behavioural markers.

6.3.3 The course duration should be appropriate to meet the training objectives.

6.3.4 A flight crew member should be evaluated and feedback provided regularly throughout the HF training programme and reviewed at key points to assess progress.

6.3.5 As a guide, the following core elements as specified in Section 6.1 of this CAAP are shown in the following Table, as applied to various operational phases of training.

TABLE 1. Core elements across different operational phases of training

Core Elements	Initial NTS Training	Operator's Conversion Training when changing type	Operator's Conversion Training when changing operator	Command / Upgrade Training	Recurrent Training
(a)	(b)	(c)	(d)	(e)	(f)
Company safety culture, SOPs, organisational factors	In depth	Not required	In depth	In depth	As appropriate
Information acquisition and processing situation awareness, workload management	Overview	Overview	Overview	In depth	As appropriate
Human error and reliability, error chain, error prevention and detection	Overview	Overview	Overview	In depth	As appropriate
Threat and error management	Overview	Overview	Overview	In depth	As appropriate
Communication and co-ordination inside and outside the cockpit	Overview	Overview	Overview	In depth	As appropriate
Leadership and team behaviour synergy	Overview	Overview	Overview	In depth	As appropriate
Decision-making	Overview	Overview	Overview	In depth	As appropriate
Stress, stress management, fatigue and vigilance	Overview	Overview	Overview	In depth	As appropriate
Cultural factors	Overview	Overview	Overview	In depth	As appropriate
Automation, philosophy of the use of automation (if relevant)	As required	As required	As required	In depth	As appropriate
Specific type-relation differences	As required	In depth	Not required	In depth	As appropriate
Case-based studies	In depth	In depth	In depth	In depth	As appropriate

Note: For other guidance, also refer to the ICAO Human Factors Training Manual (1988), Part 2, Chapter 2.

Note: this table is not intended to be used as a training matrix.

6.3.6 **Initial NTS training** - Initial NTS training programs are designed to provide both knowledge and application of HF relevant to flight operations. An operator should ensure that all applicable core elements are integrated into the initial NTS training course. A minimum of two days is recommended.

6.3.7 An operator should ensure that initial NTS training addresses the nature of the operations of the company concerned, the associated procedures and the culture of the company. This should include potential threats to operational safety, specific to the nature of the company operations.

6.3.8 On completion of initial NTS training, the flight crew member should be assessed in the operational role as competent to apply NTS practices to the task of safely operating the aircraft.

6.3.9 **Conversion course NTS training** - An operator should ensure that all applicable core elements are integrated into the conversion course.

6.3.10 During conversion training, the flight crew member should demonstrate that he or she is proficient in cockpit resource management techniques (see also CAO 40.2.1 Appendix V).

6.3.11 **Command course NTS training** - An operator should ensure that all applicable core elements are integrated into the command course.

6.3.12 Sound NTS skills are essential for leadership. On completion of command training, the flight crew member should be assessed in the operational role as competent to apply NTS practices to the task of safely operating the aircraft.

6.3.13 **Recurrent NTS training** - An operator should ensure that:

- elements of NTS are integrated into recurrent training each year; and
- modular NTS training covers all the core elements over a maximum period of no more than five years.

6.3.14 On completion of recurrent training, the flight crew member should demonstrate that he or she is proficient in cockpit resource management techniques (see also CAO 40.2.1 Appendix V).

6.3.15 **NTS evaluation and assessment** - There is a subtle difference between evaluation and assessment of NTS.

6.3.16 Evaluation is used to monitor learning progress during instruction and to provide continuous feedback to both student and instructor concerning learning successes and failures.

6.3.17 Assessment is designed to determine the extent to which instructional objectives are achieved and is used primarily for certifying mastery of the intended learning outcomes.

6.3.18 NTS can be objectively assessed by evaluating defined, observable behaviours (i.e. behavioural markers) against specified standards of performance (i.e. competencies). These may be defined by individual operators.

6.4 For Cabin Crew

6.4.1 **Training overview** - NTS training can be conducted as distinct modular courses, or it can be integrated into other technical and non-technical training programs. In either case, it should address the equivalent operational phases of initial, conversion, and recurrent training.

6.4.2 Where NTS training is integrated into other courses, NTS objectives should be clearly identified and assessed where appropriate with respect to well-defined behavioural markers.

6.4.3 The course duration should be appropriate to meet the objectives of the training.

6.4.4 A cabin crew member should be evaluated and feedback provided throughout all NTS training on their performance relative to specified NTS competency standards.

6.4.5 The same core elements as specified in Table 1, contained in Section 6.3.5 for Flight Crew of this CAAP, can also be applied to Cabin Crew during different operational phases of training.

6.4.6 **Initial NTS training** - Initial NTS training programs are designed to provide both knowledge and application of HF relevant to the operation. An operator should ensure that all applicable core elements are integrated into the initial NTS training course. A minimum of two days is recommended for the course.

6.4.7 An operator should ensure that initial NTS training addresses the nature of the company's operations, their associated procedures and the culture of the company.

6.4.8 On completion of initial NTS training, the cabin crew member should be assessed in the operational role as competent to apply NTS practices to the task of safely operating the aircraft.

6.4.9 **Conversion course NTS training** - An operator should ensure that all applicable core elements are integrated into the conversion course.

6.4.10 On completion of conversion training, the cabin crew member should be assessed in the operational role as competent to apply NTS practices to the task of safely operating the aircraft.

6.4.11 **Senior cabin crew upgrade course NTS training** - An operator should ensure that all applicable core elements are integrated into the upgrade course.

6.4.12 Sound NTS skills are essential for leadership. On completion of upgrade training, the cabin crew member should be assessed in the operational role as competent to apply NTS practices to the task of safely operating the aircraft.

6.4.13 **Recurrent NTS training** - An operator should ensure that:

- elements of NTS are integrated into all appropriate phases of recurrent training every year; and
- modular NTS training covers all the core elements over a maximum period of five years.

6.4.14 On completion of recurrent training the cabin crew member should demonstrate that he or she is proficient in cockpit resource management techniques (see also CAO 40.2.1 Appendix V).

6.5 For Operational Safety-Critical Personnel

6.5.1 It is expected that, as part of the process of developing a learning strategy, RPT operators will determine the particular training needs and the priority target groups for HF training for all Operational Safety-Critical Personnel. Ideally, this should be incorporated into the induction and recurrent training within the SMS training program, which aims to integrate HF and SMS.

6.5.2 More specific guidance on conducting a training needs analysis is provided in section 5.3 of this CAAP.

7. Course Designers, Facilitators and Examiners

7.1 General Requirements for Flight and Cabin Crew Course Designers, Facilitators and Examiners

7.1.1 These requirements apply to flight and cabin crew training.

7.1.2 The success of any NTS training ultimately depends on the skills of the people who administer the training and measure its effects. NTS course designers, facilitators and examiners must be skilled in all areas related to the practice and assessment of NTS. These skills comprise an additional level to those associated with traditional flight instruction and checking.

7.1.3 Gaining proficiency and confidence in NTS instruction, observation and measurement requires special training. Among those processes are role-playing simulations, systematic crew-centred observation, administering Line-Oriented Flight Training (LOFT) and providing usable feedback to crews.

7.1.4 Records of all training courses conducted by facilitators and examiners should be kept for a period of three years. These records should show the instructional course dates, the type of course or check, the name(s) of the candidate(s) and the type of simulator or aircraft (if any) used.

7.1.5 The application of NTS skills begins in initial training: These skills are strengthened by recurrent practice and feedback, and sustained by continuing reinforcement that is part of the corporate culture and embedded in every stage of training.

7.1.6 Operators should give due regard to the type of operation and to company culture when designing or agreeing to any NTS training.

7.1.7 An operator should ensure that all course designers/design teams have the:

- instructional design experience and understanding;
- NTS course design knowledge; and
- an understanding of the operational environment.

7.1.8 An operator should ensure that all facilitators and/or trainers:

- have the relevant knowledge for their role;
- have the necessary instructional and facilitation skills;
- have the ability to objectively assess and evaluate individual and team-based performance;
- have the ability to facilitate a constructive debrief of the assessment process and outcome;
- have the operational experience or detailed knowledge of the roles being trained or assessed;
- have completed a theoretical HF or NTS course;
- have completed a NTS facilitator's course; and
- be supervised by suitably-qualified training personnel when conducting specific training sessions until deemed competent.

7.2 NTS simulator instruction for flight and cabin operations

7.2.1 In addition to the required qualifications for all NTS course designers, facilitators and examiners, a NTS instructor conducting simulator instruction for flight or cabin operations should have appropriate air transport experience as a flight or cabin crew member.

7.3 General requirements for course designers, facilitators and examiners for non-aircrew Operations Safety-Critical Personnel

7.3.1 An operator should ensure that all course designers/design teams have the:

- appropriate knowledge for their role;
- necessary HF training course design skills; and
- appropriate operational experience.

7.3.2 An operator should ensure that all facilitators and examiners have:

- appropriate knowledge for their role;
- necessary instructional and facilitation skills;
- the ability to objectively assess and evaluate individual and team-based performance;
- the ability to facilitate a constructive debrief of the assessment process and outcome;
- completed the company's initial HF training course;
- completed a facilitator's course; and
- been supervised by suitably qualified training personnel when conducting specific training sessions until deemed competent.

7.4 Assessment of NTS training standards

7.4.1 In addition to the requirements specified in Section 7.1 of this CAAP, NTS examiners should assess all flight and cabin crew members for NTS competency. All NTS examiners should:

- have completed a course in Instructional Principles and Methods at Certificate IV (Australian Qualification Framework) relating to conducting training and conducting assessment or equivalent to an appropriate internal company standard; and
- have completed a NTS examiner's training course; and
- be deemed competent by a suitably-qualified NTS examiner.

Note: CASA is considering how to further assist operators to determine whether course designers, facilitators, trainers and examiners have the knowledge, skills, abilities, training and experience referred to in this CAAP. Additional advisory material will be published in due course after all options for meeting this objective are identified and assessed.

8. Non-technical Skills Assessment

8.1 Assessment of NTS for flight crew

8.1.1 Assessment is the process of observing, recording, interpreting and assessing, where appropriate, crew performance and knowledge against a required standard in the context of overall performance. It includes the concept of self-critique and feedback which can be given continuously during training, or in summary following a check.

8.1.2 NTS competencies should be customised to reflect the specific operating environment, culture and SOPs of individual operators and their established safety management system.

8.1.3 An operator should maintain a documented record of NTS training to demonstrate a flight or cabin crew member's completion of each stage of training. Records should be kept in accordance with CAO 82.5 Appendix 2.

8.1.4 NTS assessment should only be tied to the assessment of technical issues, and not carried out as a stand-alone assessment. Suitable methods of assessment should be established, together with the selection criteria and training requirements of the assessors, and their relevant qualifications, knowledge and skills. Operators should establish documented procedures to be applied in the event that personnel do not achieve or maintain the required standards.

8.1.5 Assessment should be in accordance with a methodology acceptable to CASA and serves the purposes of:

- providing feedback to the crew collectively and individually, and identifying retraining where necessary; and
- improving the HF training system.

8.1.6 RPT operators should specify a clear policy in regard to poor NTS performance.

8.1.7 Research into means of assessment has determined that acquired NTS are reflected in recognisable behaviours, whose characteristics are identifiable as measurable behavioural markers. NTS assessment should be accomplished via a behavioural marker system.

8.1.8 **CAAP SMS-1(0)** contains references for some behavioural marker systems which are currently used including:

- NOTECHS; and
- University of Texas behavioural markers;

8.1.9 AOC holders are encouraged to develop their own behavioural marker systems based on these examples, provided that their systems can demonstrate a similar level of robustness.

8.1.10 Instructors and examiners should be familiar with the marker system in use by the operator in order to enable them to make constructive debriefs and give guidance to crews to improve future performance and also to make recommendations for further training where this is necessary.

8.1.11 For NTS skills assessment, the following methodology is considered appropriate:

- an operator should establish the NTS training program including an agreed terminology. This should be evaluated with regards to methods, length of training, depth of subjects and effectiveness;
- the NTS standards to be used (e.g. NOTECHS) have been agreed by crews, operators and regulators, and reflect best practice;
- the standards are clear, briefed, and published (in the Operations Manual);
- the methodology for assessing, recording and providing feedback has been agreed;
- training courses are provided to ensure that crews can achieve the agreed standards;
- procedures are in place for individuals who do not achieve the agreed standards to have access to additional training, and independent appeal;
- instructors and examiners are qualified to standards agreed by all parties, and are required to demonstrate their competency to CASA or such persons as CASA may nominate; and
- a training and standardisation program for training personnel should be established.

8.1.12 **Periodic checks** - An operator should ensure that all flight and cabin crew members are assessed in the operational role as competent to apply NTS practices to the task of safely operating the aircraft during all periodic checks as also required in CAO 40.2.1, Appendix V (e).

8.1.13 **Line operations simulation** - When a flight simulator is used, Line Operational Simulation (LOS) should be utilised, where possible.

8.1.14 LOS includes LOFT, and Line Operational Evaluation (LOE).

8.1.15 LOFT is the original 'non-jeopardy' form of simulation training in which crews are not graded on their performance. In LOE, crews are graded. Both LOFT and LOE are full-mission simulations that include all phases of flight. For further information, see the UK's CAP 737 *Crew Resource Management (CRM) Training*, 2006.

8.2 Assessment of non-technical skills for cabin crew

8.2.1 While some of the non-technical skills for cabin crew are fundamentally similar to that of flight crew, the tasks required of cabin crew are different.

8.2.2 A formal process is recommended to define specific training needs for cabin crew. This analysis should be undertaken by one or more subject matter experts who, individually or collectively, meet the following criteria:

- are familiar with the nature and objectives of HF training;
- have current knowledge of the job requirements and context of cabin crew; and
- understand the HF associated with safety events in their own organisation, particularly as it relates to flight operations and cabin safety.

8.2.3 Operators should examine the Behavioural Markers used for flight crew and determine their applicability to cabin crew members.

8.3 Assessment of non-technical skills for non-aircrew operations safety-critical personnel

8.3.1 Operators should examine the Behavioural Markers used for flight or cabin crew and determine their applicability to the particular role being examined. More specific guidance on conducting a training needs analysis is provided in Section 5.3 of this CAAP.

9. Evaluation of Training Program Effectiveness

9.1 Evaluation and auditing

9.1.1 The evaluation of the training program effectiveness should be conducted within the operator's SMS processes.

9.1.2 Each operator should have a systematic assessment process. Assessment should track the effects of the training program so that critical topics for recurrent training may be identified and continuous improvements may be made in all other respects. Assessment of the training program should include observation and feedback by program administrators and self-reports by participants using standard survey methods.

9.1.3 All HF and NTS/TEM training and assessment documentation including course syllabi should be incorporated within the Company Operations Manual, along with the name of any third party providers. This could be a separate volume of the Operations Manual, but still an integral part of the suite.

9.1.4 The operator must be able to demonstrate to CASA that the quality of training programs, including course content, delivery and assessment, meets the intent of the regulations and accompanying guidance material.