

ANNEX D

Training and Checking

APPENDIX D1

Conversion and Line Training

The following guidance material aims to provide operators with a resource for developing and writing procedures for training and checking.

Meeting conversion training and checking requirements

Operators should provide suitable training (conversion training) for a pilot before commencing unsupervised line operations when he or she:

- commences employment;
- changes operator; and
- changes to an aeroplane for which a new aircraft type or class rating is required.

Future regulations under CASR Part 61 require that the holder of a pilot licence must not exercise the privileges conferred by the licence in an aircraft unless he or she is competent in the task of operating the aircraft. Therefore, before a pilot can operate a different aircraft type, or model within the class, the operator must be satisfied the pilot is competent to operate the aeroplane in accordance with the specific instructions for the type and model. In addition, the pilot must understand the differences in each model of the aircraft type.

The operator must specify the minimum qualifications and experience required before a flight crew member undertakes conversion training. The conversion training is to be carried out by suitably qualified personnel in accordance with a syllabus of training. The syllabus of conversion training can be varied to suit the flight crew member's previous experience and training.

At the completion of any conversion training, proficiency must be demonstrated prior to unsupervised line flight. The conversion training course will be the first element of training for any flight crew member and should integrate with the recurrent training and checking program.

Note: *Training and Checking functions can be carried out either by an 'in-house' organisation or contracted through a CAR 217 organisation (and, in the future, under CASR Part 142).*

Line check

The line check is an important factor in the development, continuance and refinement of high operating standards and provides the operator with a valuable indicator of the appropriateness and/or effectiveness of the organisation's training policy and methods. Part of the manual should set-out the details of company line check programs.

Line checks are a test of a flight crew member's ability to perform a complete line flight operation satisfactorily, including pre-flight and post-flight procedures and the use of any equipment carried aboard the aircraft.

The line check is an opportunity for an overall assessment of the pilot's ability to perform the duties required as specified in the Operations Manual. Therefore, the route chosen should be representative of the scope of a pilot's normal operations.

For a successful line check, the pilot will demonstrate the ability to operate in accordance with the company SOPs, 'manage' the flight and make appropriate command decisions.

Note: *Normally a line check would be conducted on a revenue flight, therefore emergencies cannot be simulated.*

APPENDIX D2 – RECURRENT TRAINING AND CHECKING

Recurrent Training and Checking

CAR 217 requires that the system provide “two checks of a nature sufficient to test the competency of each member of the operators operating crews” the key here is to break this statement down into its components;

Firstly, Competency – the operator must define (understand) what these competencies are in the context of their approved operations. The operator needs to look at what its crews do and assess the key competencies are for those tasks. These will be different for each type of operator. Eg an RPT operation in regional turboprop aircraft will be different from a Day VFR charter operator. Let’s look at a sample of these competencies in different contexts;

RPT /IFR Charter	Day VFR Charter	Flying School (<i>ab initio</i>)
Competencies of Day VFR syllabus for a Commercial pilot ATPL specific (if applicable) Instrument flying Emergency operations* Multi-crew cooperation Dealing with passengers (if applicable) Night landing and take-off Operations over a route/location Flight planning and loading Systems and procedures specific to an operator	Competencies of Day VFR syllabus for a Commercial pilot Emergency operations Dealing with passengers Flight planning and loading Systems and procedures specific to an operator	Competencies of Day VFR syllabus for a Commercial pilot Emergency operations Standardisation of training Briefings Systems and procedures specific to an operator Assessment standards

* Emergency operations need to be relevant to the aircraft and operation conducted in a simulator if required by regulations. Many simulators have limitations that require part of the check to be conducted in an aircraft.

Secondly, sufficient to show competency - Once the key competencies have been identified then the operator should conduct an (risk) assessment on which of these need to be displayed sufficiently to prove the competency exists. As we know that emergency procedures cannot be conducted with passengers on board, this means that single check of competency must be done over multiple sorties or flights. For example, a proficiency check is used to demonstrate competency in emergency procedures and instrument flying skills and a line check is used to show normal operations, loading, route specific planning etc. Therefore a single check of competency involves two separate flights (maybe more).

The checks themselves may be used to cover other regulatory requirements such as recency and currency or a command instrument rating renewal (Instrument proficiency check) may be used for the IFR and emergency components of the competency check. The following diagram shows a suggested breakdown of a single check of competency;

CHECK OF COMPETENCY (must be demonstrated twice in a 365 day period)		
Proficiency check/IPC	Line Check	Night Check (if req'd)
CPL/ATPL standard	CPL/ATPL standard	Night (TO – LDG)

CHECK OF COMPETENCY (must be demonstrated twice in a 365 day period)			
Multi-crew cooperation		Flight planning	<i>May be conducted as Part of Line or Prof check</i>
IFR skills (recency)		Loading	
Emergency procedures		Route specific	
Company SOP		Location specific	
Human Factors TEM		Company SOP	

It is important that an operator can clearly define what competency is and how that will be assessed before they progress into designing the system and the components of the checks that will provide the evidence of these competencies.

For RPT and future Air Transport operations, it is the operator's responsibility to develop a recurrent training and checking program applicable to the specific type of operation.

Recurrent ground and refresher training and emergency and safety equipment training must be carried out by suitably qualified personnel. A suitably qualified person shall be a person determined by the operator.

Recurrent training in an aeroplane or flight simulator can only be conducted by a person who is authorised by the operator after satisfying the operator's experience and knowledge requirements for an instructor or examiner authorised under CASR Part 61 or relevant Part 82 CAOs.

In the case of recurrent proficiency checks, these may only be conducted by a person authorised by the operator and who holds an examiner rating also authorised under Part 61 or relevant Part 82 CAOs.

Line checks may be conducted by a pilot in command who has been trained in Crew Resource Management (CRM) concepts and assessment skills that are acceptable to CASA. Acceptable to CASA should be taken to mean a person that has been trained and assessed by the operator in accordance with the procedures documented in this part of the Operations Manual.

Emergency and safety equipment checking shall be conducted by a suitably qualified person. A suitably qualified person shall be determined and authorised by the operator in accordance with criteria set out in the Training and Checking section.

The approved training and checking program should be set-out under the following criteria/structure:

- it should detail experience and proficiency requirements including limitations (if any) applicable to the training and checking personnel;
- it should detail course content and timelines;
- it should detail the ground refresher syllabus and completion standards for each aeroplane type;
- it should detail the course outlines, syllabus and completion standards for each flight or simulator training program; and
- where the pilot conducts various types of operations under different flight rules in different aircraft classes, the operator's course should detail the elements applicable that must be addressed by each crew member.

The program should include ongoing continuing improvement of the ground and refresher training and should take into account accident, incident and occurrence review.

APPENDIX D3

Ground and refresher training

Ground and refresher training is considered the mechanism by which the operator ensures that flight crews gain and retain information essential to the safe operation of its aircraft. A prudent operator may consider spreading such training throughout the year with particular emphasis being placed on issues relevant to the approaching season and its associated weather characteristics and its effect on safety.

Aeroplane performance issues, particularly in relation to engine failure and terrain avoidance planning and procedures, should be included in the programs particularly in relation to flight in IMC. Many twin engine aeroplanes used in charter operations exhibit marginal performance characteristics after an engine failure. Therefore, flight crews should be able to demonstrate a sound level of decision making competency for the appropriate actions to be taken in the event of an engine failure during takeoff.

Ground and refresher training should include refresher training that addresses the following where applicable:

- aeroplane systems, including any computerised navigation system, TAWS, Airborne Collision Avoidance System (ACAS) where fitted. Where practicable this training could be conducted in the aeroplane type fitted with the system or an appropriate simulator;
- operational procedures and requirements such as those relating to aircraft performance, wet and contaminated runways, equi-time points (ETPs) and point of no return (PNR) as applicable to the operations, ground de-icing and in multi-pilot operations, pilot incapacitation;
- assessment of single engine climb performance and the relationship to obstacle clearance;
- relevant operational procedures and requirements for the single-engine VFR, ASETPA or floatplane operations;
- aeroplane or simulator training (or where acceptable to CASA, a synthetic trainer) should include all major failures of the aeroplane systems;
- short field take-off and landing training to satisfy regulatory requirements and meet the applicable standard in the planned MOS Part 61; and
- where engine-out manoeuvres are permitted to be carried out in an aeroplane, the engine failure must be simulated and conducted by day in VMC with the pilot under test conditions that simulate IMC. The normal method of simulating IMC (unless it is a VFR operation) is with the use of a 'hood' or 'foggles' so that the instructor/examiner has unrestricted vision from the cockpit.

When developing ground refresher training, knowledge should be verified by a questionnaire or other suitable method. Prudent and well-structured ground training and self development will form a sound adjunct to the operator's SMS.

APPENDIX D4

Proficiency Checking

VFR proficiency check program

The following guidance is offered to operators for developing a proficiency check program for a pilot to demonstrate that he or she is maintaining the required competencies for continued unsupervised operations.

Pilot proficiency checking, unlike line checking, cannot be undertaken as part of revenue operations with passengers or with other non-specific flight crew on board.

Lack of competency in any part of the proficiency check will require refresher training before being reassessed. A pilot cannot resume unsupervised line operations unless all elements of a proficiency check have been demonstrated to the required standard of competence.

Proficiency checking programs should include, but not be limited to, such items as the ability to prepare for the proposed flight, using company flight planning techniques and use of the navigation aids the pilot is endorsed on and required to use.

The check should cover all operations including abnormal and emergency procedures, as applicable for single and multi-engined aircraft, ASEA (formerly ASETPA) and floatplane aeroplanes.

A program of checking should include a night flight that includes a circling approach and landing. For other than proficiency checks in a flight simulator, this element could be completed as part of the line check provided there are no simulated emergencies.

Ground segment

The following guidance for the ground segment of a proficiency check applies to all aircraft operations. The operator should tailor the ground segment applicable to the aircraft type and model and should use an aircraft where possible for the purpose of practical demonstration. The check should include but not be limited to:

- general knowledge of the aeroplane systems including fuel sampling to check for contamination;
- other pre-flight requirements as listed in the AFM and Operations Manual; and
- the correct recording of defects and use of the Minimum Equipment List (MEL) according to the operator's standard operating procedures.

The pilot's general knowledge should be checked with respect to:

- the effect of weight and temperature on aeroplane performance;
- the effect of the failure of the critical engine on aeroplane performance including during a baulked approach;
- the effect of the aircraft configuration on take-off and landing performance; and
- the effect of various and severe weather conditions including thunderstorm avoidance, turbulence and aeroplane icing limitations.

In-flight segment

The instructor or examiner, if in a control seat, should normally be deemed as the pilot in command with the pilot under check acting in a capacity of 'in command under supervision'. Where the instructor or examiner occupies a backseat/jump seat (in an observing role), he/she is not the pilot in command.

A clear briefing prior to the proficiency check is essential. The actions by the pilot under check and by the instructor or examiner in the event of a real emergency should be briefed and clearly established. Normally the pilot under check will be flying the aircraft and there should never be any doubt as to who is flying the aircraft. Positive phraseology should be used and a visual check (side-by-side) or control movement (tandem) is recommended to verify that the exchange as occurred in the event that the instructor or examiner has to take control.

The pilot under check should demonstrate his/her ability to operate in accordance with the standard operating procedures as detailed in the company Operations Manual. Emergency procedures should include, as applicable, engine failure in single-engined aircraft, ASETPA, floatplanes and multi-engined aircraft, during which any limitation parameter of the AFM must not be exceeded. Simulation of an engine failure after take-off should only be by setting zero thrust. Where the AFM prohibits an action this action must not be simulated.

Multi-engined aeroplanes

In addition to the correct application of the normal standard operating procedures the pilot under check should demonstrate that he/she is capable of extracting the maximum performance for the aircraft following a simulated engine failure once the critical speed is reached.

As applicable to aircraft type or class, satisfactory competency in the following activities should be demonstrated:

- rejected take-off (other than in flight simulators). This will necessitate the operator developing a safe strategy for assessing a rejected take-off, which may include the rejected take-off being demonstrated up to a safe speed dependent upon the yawing moment and controllability as well as any brake limitations. Touch drills being conducted while the aircraft is stationary may be all that can be achieved safely;
- engine failure after take-off at the aeroplane's take-off safety speed, or at a higher speed as necessary for safety; and
- engine failure during the approach and landing phase including a missed approach. (Where the aeroplane is fitted with reverse thrust its use during the landing roll should also be checked.)

An engine failure during the cruise presents the pilot with different considerations. Therefore the pilot should be able to demonstrate not only the ability to manage the engine failure in accordance with the AFM initial phase actions but also show that he/she has the required decision-making skills to successfully manage the aircraft until it is brought to a stop after landing. The pilot should demonstrate that they have at least taken the following points into consideration when developing a plan of action from the point of engine failure in a multi-engined aircraft:

- preserving the live engine and securing the failed engine in accordance with the AFM or Operations Manual Phase 1 actions and any subsequent actions;

- single-engine drift down including diversion off track to maintain LSALT;
- communication of the problem in accordance with the instructions set out in the ERSA such as what assistance will be required;
- location of the aircraft in relation to Critical Point (Equi-Time Point) and other suitable airports;
- consideration of the weather and the planning of the approach into the selected airport; and
- control and briefing of passengers.

Note: *The pilot's competency in extracting the maximum performance from the aeroplane with the most critical engine failed should be assessed during the check.*

Single-engined aeroplanes (VFR)

For operators of single-engined VFR aeroplanes the annual in-flight proficiency check should cover the correct management of the aeroplane's system and normal and abnormal procedures relevant to the operator's specific operations.

For the in-flight emergency phase the proficiency check should include, but not be limited to, the correct handling of:

- an engine failure after take-off, en-route engine failure and associated forced landing technique; and
- the identification of the symptoms of an impending stall in various aircraft configurations and appropriate recovery techniques.

Approved Single-Engine Aeroplane (ASEA)

The operator of an ASETPA will have developed procedures that are specific to the operation of these aircraft when applying for an approval. A proficiency checking program, in addition to normal standard operating procedures, should include but not be limited to the following:

- an engine failure/malfunction which necessitates stopping the aircraft on the ground;
- an engine failure/malfunction which necessitates a landing on the most suitable terrain adjacent to an aerodrome;
- an engine failure/malfunction which includes turning to execute a glide landing upon a serviceable runway, including a 'turn back' manoeuvre;
- a forced landing initiated from normal cruising altitude, during climb and descent and from the approach to land phase, in VMC and IMC down to 1 000 ft above ground level; and
- assessment of the knowledge of the SOP to conduct for a forced landing in IMC to ground level.

Floatplanes

Floatplane operators have additional operational considerations to those based on land. In addition to those already discussed for the single-engined VFR proficiency check, the floatplane operator should develop a proficiency checking program that takes into account the various operational differences when operating from waterways. These may include, but not be limited to, the following:

- glassy water take-off and landing technique;
- confined area operations including curved and crosswind take-off and landings;

- practice forced landings;
- sailing techniques;
- rough water operations; and
- docking and beaching.

APPENDIX D5

Emergency and Safety Proficiency checking

The operator should develop a proficiency checking program that will cover all the emergency procedures that the crew member may be called on to use. For example, an operator that does not conduct over water operations would not need to conduct proficiency checks pertaining to the use of life jackets or rafts.

The proficiency check should require the applicant to demonstrate a satisfactory level of theoretical knowledge for the relevant aero-medical topics and competency in the use of the aircraft emergency systems and equipment. A comprehensive practical demonstration of all ditching procedures should be checked if flotation equipment is carried.

The following theoretical knowledge topics should be included as applicable:

- the location and types of fire extinguishers carried, any limitation of their use and toxic effects that may adversely affect breathing including any other precautions to be observed when operating fire extinguishers;
- oxygen as applicable to operations on pressurised aeroplanes including:
 - effects of altitude on respiration and the recognition and effects of hypoxia;
 - duration of consciousness at various altitudes without supplemental oxygen, gas expansion, bubble formation and the physical phenomena of decompression; and
 - location and use of oxygen equipment including precautions in the use of oxygen;
- survival methods appropriate to the areas of operation (e.g. tropical, desert, remote areas, sea);
- control of passengers during emergencies including evacuation and the handling of disabled passengers;
- actions in the event of a hijack or attempted hijack; and
- aero-medical topics as applicable such as:
 - hyperventilation;
 - contamination of the skin/eyes by aviation fuel or hydraulic or other fluids;
 - hygiene and food poisoning;
 - malaria; and
 - effect and or side effects of medications¹.

Continued competency should be assessed in the practical operation of the following as applicable:

- emergency evacuation procedures and operation of the emergency exit/s;
- fitting of life jackets and location and use of equipment stowed as part of the life jacket;
- demonstration or video of the removal, stowage and launch of the life raft including knowledge and use of equipment stowed as part of the raft. (*Note: operators should use to their advantage the opportunity to inflate a raft at the time of serviceability expiry to enhance training*);
- the use of signalling equipment and survival beacon; and
- the method of operation of applicable portable fire extinguishers.

¹ See Appendix A8 of Annex A to CAAP 215 for detailed crew health information.

APPENDIX D6

Route and aerodrome competence qualifications

Current and future Air Transport regulations place responsibility on an aeroplane operator to provide information to ensure the pilot in command is qualified and competent to conduct a proposed flight, including all relevant aspects of the route to be flown, including suitable aerodromes, alternates and facilities and search and rescue services.

Route qualification and competence should include knowledge of:

- terrain and minimum safe altitudes;
- relevant departure and arrival procedures;
- seasonal meteorological conditions;
- meteorological, communication and air traffic facilities, services and procedures;
- navigational facilities associated with the route along which the flight is to take place; and
- search and rescue procedures.

Within Australia, relevant information applicable to an intended flight is obtained through ready access to ERSA and/or the Operations Manual, route guide (or extracts from it) in the cockpit. Where applicable, departure procedure information may be obtained from services providers, provided the operator is satisfied with the source.

Outside Australian airspace the requirement can be accomplished by the pilot having ready access to a copy of the relevant En Route Supplement or equivalent (e.g. Jeppesen Airways Manual) and other relevant data contained within or extracted from the Operations Manual itself. Any document used must be capable of being easily and safely referred to by the pilot during flight.

Note: *Operators will need to plan for the renewal of these qualifications to ensure that a large number of pilots need renewals on the same date. This can be achieved by taking advantage of the three month window provided for renewals for pilots with existing qualifications.*

APPENDIX D7

Cabin Crew Training

Initial training programs

AOC holders may use the following structure to help shape their training programs for cabin crew.

Fire and smoke training

Fire and smoke training should include:

- emphasis on the responsibility of cabin crew to deal promptly with emergencies involving fire and smoke and, in particular, emphasis on the importance of identifying the actual source of the fire;
- emphasis on the importance of informing the flight crew immediately, as well as the specific actions necessary for coordination and assistance, when fire or smoke is discovered;
- emphasis on the necessity for frequent checking of fire-risk areas (including toilets) and the associated smoke detectors;
- instruction in the classification of fires, and the appropriate extinguishing agents and procedures for particular fire situations, the techniques of application of extinguishing agents, and the consequences of misapplication and of use in a confined space; and
- instruction in the general procedures of ground-based emergency services at aerodromes.

Survival training

Survival training should be appropriate to the areas of operation (for example, polar, desert, jungle or sea).

Water survival training

Water survival training should include actually donning and using a life jacket in water.

Before a cabin crew member first operates on an aeroplane fitted with life rafts or similar equipment, he or she should be given training on the use of that equipment, including actual practice in water.

Medical aspects and first aid

Medical and first aid training should include instruction in:

- first aid and the use of first-aid kits;
- the operator's policy concerning the use of any specialist emergency medical equipment carried (for example, auto-defibrillators);
- first aid associated with survival training and appropriate hygiene; and
- the physiological effects of flying, with particular emphasis on hypoxia.

Passenger handling

Training for passenger handling should include the following:

- advice on the recognition and management of passengers who are, or become, intoxicated with alcohol or are under the influence of drugs or are aggressive;

- training in methods used to motivate passengers and the crowd control techniques necessary to expedite an aeroplane evacuation;
- training in regulations covering the safe stowage of cabin baggage (including cabin service items) and the risk of it becoming a hazard to occupants of the cabin or otherwise obstructing or damaging safety equipment or aeroplane exits;
- training in the importance of correct seat allocation with reference to aeroplane weight and balance;
- training in duties to be undertaken in the event of encountering turbulence, including securing the cabin;
- training in precautions to be taken when live animals are carried in the cabin;
- dangerous goods training;
- any other training in security procedures not already required by the Aviation Transport Safety Regulations;
- training in the seating requirements relating to persons with reduced mobility, in accordance with the requirements of current and future Air Transport regulations; and
- training in the necessity of seating able-bodied persons adjacent to unsupervised emergency exits.

Communication

Cabin crew should be trained in effective communication between cabin crew and flight crew, including common aviation language and terminology.

Discipline and responsibilities

Each cabin crew member should receive training on the following:

- the requirement that crew members should perform their duties in accordance with the operator's Operations Manual;
- continuing competence and fitness to operate as a cabin crew member and flight and duty time limitations and rest requirements;
- an awareness of the regulations relating to cabin crew and the role of CASA, and of the authority and responsibility of the pilot in command;
- general knowledge of relevant aviation terminology, theory of flight, passenger distribution, meteorology and areas of operation;
- pre-flight briefing of the cabin crew and the provision of necessary safety information with regard to their specific duties;
- the importance of ensuring that relevant documents and manuals are kept up-to-date with operator amendments;
- the importance of identifying when cabin crew members have the authority and responsibility to initiate an evacuation and other emergency procedures; and
- the importance of safety duties and responsibilities and the need to respond promptly and effectively to emergency situations.

An operator should establish procedures to ensure that every element of initial training is carried out by a suitably qualified person.

Additional training programs for senior cabin crew members should include:***Pre-flight Briefing***

- Operating as a crew;
- Allocation of cabin crew member stations and responsibilities;
- Consideration of the particular flight including:
 - Aeroplane type;
 - Equipment;
 - Area of operation; and
 - Categories of passengers, including the disabled, infants and stretcher cases.

Co-operation within the crew

- Discipline, responsibilities and chain of command;
- Importance of co-ordination and communication; and
- Pilot incapacitation.

Review of operator's requirements and legal requirements

- Passengers safety briefing, safety cards;
- Securing of galleys;
- Stowage of cabin baggage;
- Electronic equipment;
- Procedures when passengers remain on board during transits;
- Turbulence;
- Documentation;
- Accident and incident reporting; and
- Flight and duty time limitations and rest requirements.

APPENDIX D8

Human Factors and Non-Technical Skills Training

Developing a Non-Technical Skills Training Program: a Case Study Approach²

Overview

Aim. The intent of this appendix is to provide guidance to high and low capacity regular public transport (RPT) operators on implementing the recommendations of CAAP SMS-3(1). To facilitate this, a hypothetical low capacity RPT airline is used to illustrate the main steps required to establish an effective non-technical skills training and assessment program.

In particular, this appendix provides practical guidance on how to:

- generate management and organisational commitment to non-technical skills training;
- identify non-technical skills training needs within your organisation;
- develop and conduct awareness training;
- collaborate with other organisations and agencies to improve training content and reduce the costs of training; and
- develop a schedule for the implementation of non-technical skills training.

To maximise alignment with the operational environment this guidance has also been shaped by advice from Brindabella Airlines.

A key reference is: *Safety at the sharp end: A guide to non-technical skills* by Rhona Flin, Paul O'Connor and Margaret Crichton, published by Ashgate in 2008.

Assumptions. There are a number of assumptions to be considered when reviewing this Appendix:

- The case study presented herein is intended to provide broad guidance. The information should not be considered as a strict template to meet the recommendations of CAAP SMS-3(1). Rather, any training program developed by operators should be designed to meet their own specific needs.
- For the purpose of this case study a Maintenance Controller was utilised as part of the Airline's internal team for development and implementation of non-technical skills training. While the human factors training requirements for maintenance personnel/organisations are covered by their own regulations, for some airlines a collaborative approach may be a more efficient and cost-effective. It may avoid unnecessary duplicated processes when developing human factors and non-technical skills training programs across the airline.
- It will take time to develop and implement a non-technical skills training and assessment program. For an operator without existing training in non-technical skills, a period of three years is considered a reasonable timeframe for phased implementation that relies mainly on in-house expertise to develop and deliver training to the recommended level.

² The text is reprinted from Appendix A to CAAP SMS-3(1).

- Timelines are adjustable. For the purposes of this case study, it is assumed that the low capacity RPT airline does not conduct non-technical skills training at present. Of course, most aviation operators will have some non-technical skills training (e.g., crew resource management (CRM)) incorporated within the existing training program. Therefore, the timelines given in the case study for the development of a non-technical skills training program should be shortened for operators who already meet some of the CAAP SMS-3(1) recommendations.
- Similarly, an operator that outsources components of the development, delivery and/or assessment of non-technical skills training to external specialist providers should also be able to reduce the timeline for reaching the recommended training and assessment goals.
- Training has three main developmental phases. Typically, non-technical skills training commences with awareness training, perhaps a two-hour session highlighting the importance of human and organisational factors to performance and safety by showcasing relevant case studies. A training needs analysis would assist in identifying areas for the next phase: more specialised knowledge development. These topics might be incorporated into a two-day training course tailored for particular occupations within the organisation (traditional CRM training courses for pilots are consistent with this approach). Once this knowledge has been assessed as having been assimilated by relevant personnel, a skills-based training phase can be implemented (for select staff – see Section 2 of CAAP SMS-3(1)).
- Training will be implemented gradually. Consistent with the three-phase hierarchy of training outlined in CAAP SMS-3(1) – awareness, knowledge, skills – non-technical skills training should be implemented in a staggered way to allow consolidation of learning, gradual attitudinal and behavioural change, and increasing integration of knowledge and skills into operations.
- Training should be integrated. There is considerable scope for the non-technical and technical aspects of aviation operations to be integrated into a consolidated training program (and associated training manuals). Such complementary training will more closely reflect the performance requirements of actual operations.
- Training will be continuously modified. The assessment and evaluation of training will help to ensure that training is regularly updated and that its effectiveness is constantly improved. There are many ways to evaluate training, from verbal feedback to sophisticated behavioural rating systems.

‘Blue Gum’ Airline

To provide a narrative flavour to this appendix, a fictitious airline will be used to discuss typical issues and challenges facing an airline that is developing a program of non-technical skills training and assessment.

Blue Gum Airline is a low capacity airline that conducts regular public transport operations between major capital cities and regional communities. Table 1 provides an overview of the personnel and aircraft within Blue Gum Airline.

Table 1: Blue Gum Airline Personnel and Aircraft

Business area	No.	Description
Aircraft	2	BAE Jetstream 41 (multi-crew)
	3	Fairchild Metro (multi-crew)
	1	PA-31 Navajo (single pilot)
Executive	1	Managing Director
	1	Chief Executive Officer
	1	Chief Operating Officer
	1	Chief Pilot
	2	Fleet Manager
	2	Maintenance Controller
Full-time Operational Personnel	1	Operations Manager
	1	Manager – Safety & Standards
	1	Document Controller
	29	Multi crew pilots (14x Captains; 15x First Officers)
	4	Cabin Crew
	2	Baggage Handlers
	7	Administrative Staff (e.g. Ticketing, Accounts)
	3	LAME
	4	AME
	4	Apprentices
Part Time (Casual)	3	Cabin Crew (casual)

Stages in Developing a Non-technical Skills Training and Assessment Program

Ensuring management commitment. In their weekly operations meeting, the company executive discussed the new CAAP SMS-3(1) and identified there were important training implications. The potential value of non-technical skills training to performance and safety standards was acknowledged. The executive decided to establish a training development team that would plan and coordinate the company's response to the CAAP SMS-3(1) recommendations. Executive guidance was that Blue Gum Airline would maximise the use of internal resources to develop and mature their non-technical skills training program, with selective use of specialist capabilities when appropriate.

Establishing a training development team. Publicity and discussions across the airline about the intention to establish a training development team ensued. A week later, the team was established with the following members: the Chief Operating Officer, the Manager Safety and Standards, and a pilot (First Officer) who was nearing the end of graduate certificate studies in aviation human factors at an Australian university and who was very keen to be involved. The Manager Safety and Standards was appointed team leader and was provided with formal authority and a budget to develop a non-technical skills training and assessment program for Blue Gum Airline.

Preparatory reading. The Training Development Team began to ‘read themselves into’ the task. The following resources were perused or studied (information in brackets indicates the time required):

Review CAAP SMS-3(1) in detail, including the appendices (3 hours).

Overview relevant information within the *CASA Training Resource Safety Behaviours: Human Factors for Pilots* (3 hours).

Review *CAAP 5.59-1(0): Teaching and assessing single-pilot human factors and threat and error management* (2 hours).

Study the reference *Safety at the sharp end: A guide to non-technical skills; Chapters 9-11* (6 hours).

Identifying training needs. The training development team recognised that a training needs assessment with respect to non-technical skills was a crucial early step. As Flin et al (2008) noted:

“... a good training needs assessment will pay dividends when it comes to designing the training. There is no point in developing a training course that does not address the needs of a given job and ultimately the needs of the organisation, because it was based upon a poor training needs assessment. This is a waste of time, resources and money. Further, the opportunity to develop a worthwhile training course is lost” (p. 244).

Clarifying training goals. The training development team realised that it was premature to conduct a ‘gap analysis’ between present levels and desirable levels of knowledge and skill across their organisation because they had not yet determined what these desirable levels would be. At the next Executive meeting, the Chief Operating Officer sought guidance about the ultimate goals of training. It was decided to examine the Safety Management System for key indicators of non-technical skills that could be used to quantify skill levels. A parallel task to identify the skill domains of relevance to the main occupational groups listed in Table 2 was commenced. Common tools and techniques used to identify non-technical skills are listed in Section 4 of CAAP SMS-3(1).³

Conducting the training needs assessment process. The training development team decided to use questioning techniques and event-based analyses to determine training needs. The Chief pilot and one of the Maintenance Controllers were tasked to review the organisation’s safety incident reports, particularly for known hazards, risks and risk controls related to non-technical skills. The Chief pilot and Maintenance Controller also sought advice from the Human Factors section within CASA and the Australian Transport Safety Bureau (ATSB) website (<http://www.atsb.gov.au/>) about accident/incident analyses for similar operators in Australia. Discussion with Safety Managers from other low capacity airlines regarding the status of their non-technical skills training and their proposed way forward to address CAAP SMS-3(1) was also undertaken.

³ These techniques are discussed in detail in Chapter 9 of Flin et al.

A consultant was engaged to conduct interviews with senior personnel and focus groups with the main occupational groups within the airline. The consultant not only provided expertise in these questioning techniques, there was a general perception of impartiality that appeared to encourage frank disclosure and discussion. Four focus groups were conducted (two pilot groups; 1 maintainer group; and 1 miscellaneous group) over two days. A report was delivered by the consultant that summarised the key training themes emerging from the interviews and focus groups.

The training development team used the consultant's report, the analysis of company incident reports, feedback from other airline safety managers, CASA and the ATSB website, and their own experience with external CRM training to develop a list of training needs in a rough priority order.

Holding a strategic 'stakeholder commitment' workshop. A one-day workshop was then developed to engage and inform key company personnel about the emerging non-technical skills training program. Attendees at the workshop were:

- Managing director;
- Chief Executive Officer;
- Manager Safety and Standards (Facilitator);
- First Officer (Secretary);
- External consultant (Co-facilitator);
- Maintenance Controller x 1;
- Chief Pilot;
- Fleet Managers x 2;
- Aircraft Captain x 2;
- First Officers x 2; and
- Senior Cabin Crew x 1.

Components of the workshop were:

- a review of CAAP SMS-3(1) and its implications and potential benefits for Blue Gum Airline;
- a review of key issues and challenges drawn from the reference material examined by the training development team;
- a summary of relevant findings from internal and external safety incident databases and accident investigation reports;
- a presentation by the consultant who conducted interviews and focus groups about the findings;
- facilitated syndicate discussions to define training needs and challenges within the company; and
- a central discussion forum to develop consensus about the way ahead in terms of developing and implementing the non-technical skills training and assessment program.

Identifying the developmental phases of training. One outcome of the strategic workshop was the determination of the non-technical skills training requirement by occupational group and developmental phase of training (awareness, knowledge and skills – as outlined in Section 2 of CAAP SMS 3(1)). As shown in Table 2, occupations were grouped in light of the "Occupations this CAAP applies to" preamble section of CAAP SMS-3(1) which summarises formal ICAO guidance.

While there is no ICAO requirement for knowledge and skills-based training for several aviation industry occupations, Blue Gum Airline recognised the value of increased knowledge about non-technical skills across its entire staff and decided upon a policy to encourage all staff to undertake select parts of the knowledge phase of training on an opportunity basis. In addition, Cabin Crew would be sponsored to undertake relevant skills-based training provided by external agencies and larger airlines when opportunities arose.

Table 2: Non-Technical Skills Training by Occupation and Developmental Phase

	Comment	Awareness	Knowledge	Skills
Flight crew	This group would include licensed crew members charged with duties essential to the operation of an aircraft during a flight duty period.	√	√	√
Flight operations officer/flight dispatcher	These roles include persons designated by the operator to engage in the control and supervision of flight operations, suitably qualified in accordance with extant regulations who support, brief and/or assist the pilot-in-command in the safe conduct of the flight.	√	√	√
Cabin crew	A crewmember who performs, in the interest of safety of passengers, duties assigned by the operator or the pilot-in-command of the aircraft, but who shall not act as a flight crew member.	√	√	Not required but encouraged
Other personnel	Through the use of a SMS, should any unacceptable risks be attributed to the non-technical skills (e.g., fatigue, stress, communication, decision making etc) of other staff performing safety-related work (e.g., safety management personnel, flight operations senior management, ramp staff etc), it may be necessary to develop non-technical skills training programs as controls to manage this risk.	√	Not required but encouraged	Not applicable at this stage; will monitor SMS outcomes
Maintenance personnel	Noting that aircraft maintenance staff are subject to existing human factors/non-technical skills training requirements (refer to CASR Parts 66, 145 and 147), it was decided to attempt to include these staff in an integrated non-technical skills training program where feasible.	√	√	√

Constructing training objectives. Training objectives guide the development of the content of the course. For each non-technical skill that was identified in the training needs assessment, training objectives need to be written. In order to design methods to address these training objectives, specialist training development support may be required. Objectives should be developed so that they can be efficiently and empirically evaluated to determine whether they were achieved. Fortunately, the First Officer in the training development team was a Certificate Level IV qualified workplace instructor and felt confident he had the competencies to construct the training objectives, based on the preceding work and guidance from the strategic workshop.

Develop and conduct awareness training. As indicated in Table 2, Blue Gum Airline elected to conduct non-technical skills training for its entire staff. A two-hour module was developed and delivered by the First Officer member of the training development team using materials from his tertiary studies and existing presentations sourced from other airlines. The module was added to the existing induction training program for all staff and was conducted as part of the annual training program in order to capture all current staff. The awareness presentation was intended to promote improved awareness of the safety management system and human factors issues within Blue Gum Airline.

Other aims of the awareness training were to engage existing staff, determine their levels of motivation and interest in safety, and increase their awareness of the benefits of targeted non-technical skills training. If met with significant resistance at this time, Blue Gum Airline may have needed to implement further initiatives. Development of the awareness training required minimal resources and cost when compared with knowledge and skills-based training. An evaluation of the awareness training module was undertaken via a simple survey.

A specific goal was to make staff aware of the just culture concept and the importance of safety reporting (consistent with the CAAP SMS 1(0)). Specific content included:

- an opening statement by the managing director to demonstrate management commitment to the training program;
- an explanation of the potential benefits of human factors/non-technical skills training;
- an overview of human factors/non-technical skills and their relevance to Blue Gum Airline using a topical and riveting case study;
- an explanation of the 'Reason Model' including a Blue Gum Airline case study;
- an overview of the just culture concept and the responsibility of all staff to conscientiously report safety incidents;
- an invitation for internal 'safety champions' who would like to be part of the development and delivery of non-technical skills training; and
- a brief evaluation survey.

Maximising collaboration. As noted in Section 2 of CAAP SMS-3(1), operators are encouraged to make use of existing resources and to maximise collaborative opportunities with other airlines and industry agencies. Examples of such potential collaboration include:

- conducting training with other operators to share costs and resources;
- negotiating the use of a larger operator's training programs and resources;
- utilising an external service provider with relevant expertise and experience; and
- acquiring an 'off-the-shelf' training product (particularly if expertise in course development is lacking within the organisation).

Taking stock and setting a schedule. Given the high workloads of the members of the training development team, progress had been surprisingly swift. The preceding activities had occurred over a six-week period. The team felt it was time to evaluate their progress and determine a feasible schedule to establish an effective training and assessment program in accordance with the recommendations of CAAP SMS-3(1).

The broad outcomes to date were to develop knowledge-based training for pilots, flight dispatch, cabin crew and other staff. Additionally, it was identified that assessment of non-technical skills was required for pilots and flight dispatch.

Another outcome of the strategic workshop was a broad framework and schedule to develop and implement the training program. Table 3 provides the final product created by the training development team, in consultation with various senior Blue Gum employees. The table was refined over a period of four weeks after the strategic workshop by the Manager Safety and Standards. This provides information on the specific areas to be covered by Blue Gum Airline during implementation, including major training components, responsible persons, and timelines.

Developing knowledge-based training. On completion of the training schedule, it was time to commence the development of tailored 'knowledge based' training and associated forms of assessment for pilots, flight officers/flight dispatch and cabin crew. This developmental process required further working groups and subject matter expertise. One goal, for example, is to develop a two-day facilitated CRM training course for pilots. Given the extensive material provided in the Safety Behaviours Human Factors for Pilots, which was developed specifically for low capacity RPT operators, Blue Gum Airline elected to use this as a primary resource to tailor a CRM program to meets its own training needs.

The development of knowledge-based training is a work in progress in Blue Gum Airline, and this is where this appendix draws to a close. Once the knowledge-based training modules have had sufficient time to mature, and appropriate assurance as to their operational effectiveness has been completed through program evaluation, it will be time to consider skills-based training and assessment. Blue Gum Airline will primarily focus on skills-based training and assessment for pilots, and has elected in the first instance to adopt a modified version of the competency standards from the day visual flight rules (VFR) syllabus. The ultimate aim is to progress (via phased implementation) to a more elaborate form of assessment similar to the guidance material provided in Appendix 2 of this CAAP.

Conclusion. This appendix has provided guidance primarily focused toward smaller RPT operators that are commencing to develop non-technical skills training in response to the recommendations of CAAP SMS-3(1). It has covered a range of pragmatic topics, including how to generate management and organisational commitment to non-technical skills training; identify non-technical skills training needs within your organisation; develop and conduct awareness training; collaborate with other organisation and agencies to improve training content and reduce the costs of training; and setting a schedule for the implementation of non-technical skills training.

The authors are grateful for the guidance provided by Brindabella Airlines staff during the development of this document.

Table 3: Example project schedule for the implementation of CAAP SMS- 3(1)

Note: Blue Gum Airline has no existing non-technical skills training.

Task/Subtask	Responsible position(s)	2010			2011						2012						2013		
		Jul - Aug	Sep - Oct	Nov - Dec	Jan - Feb	Mar - Apr	May - Jun	Jul - Aug	Sep - Oct	Nov - Dec	Jan - Feb	Mar - Apr	May - Jun	Jul - Aug	Sep - Oct	Nov - Dec	Jan - Feb	Mar - Apr	May - Jun
1. Management commitment		*																	
1.1 Continuously demonstrate commitment to the training and assessment of non-technical skills.	Executive Management	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
1.2 Develop policy supporting the implementation of non-technical skills training in the organisation.	Executive Management	*																	
1.3 Allocate appropriate resources to underpin development of the training program (financial, time and personnel resources).	Executive Management	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
2. Select key training personnel																			
2.1 Develop a scoping document for the non-technical skills training program, including areas of responsibility for the implementation team.	Executive Management	*																	
2.2 Select and authorise the training development team, chaired by the Manager Safety and Standards, which is responsible for program development and implementation.	Executive Management	*																	
2.3 Nominate personnel to develop and integrate non-technical skills assessment into their organisation.	Manager Safety & Standards	*																	
2.4 Examine the value of securing the external training development expertise during the initial implementation phase	Training development team	*																	
3. Familiarise training development personnel with the proposed program																			
3.1 Familiarisation with relevant training information (see paragraphs 11-18 of this appendix).	Training development team		*																

Task/Subtask	Responsible position(s)	2010			2011						2012						2013		
		Jul - Aug	Sep - Oct	Nov - Dec	Jan - Feb	Mar - Apr	May - Jun	Jul - Aug	Sep - Oct	Nov - Dec	Jan - Feb	Mar - Apr	May - Jun	Jul - Aug	Sep - Oct	Nov - Dec	Jan - Feb	Mar - Apr	May - Jun
4. Identify training needs																			
4.1 Conduct activities, with specialist support, to identify training needs across occupational groups. (See Section 4.2 of CAAP SMS-3(1)).	Training development team		*																
4.2 Summarise and prioritise training needs, with specialist support.	Training development team		*																
4.3 Develop training objectives, with stakeholder guidance.	Training development team			*															
5. Selection and training of instructional staff																			
5.1 Select staff to assist in the delivery of the non-technical skills program.	Training development team				*														
5.2 Instructional staff given training on instructional and facilitation methods, as required.	Training development team				*	*													
5.3 Awareness training is implemented.	Manager Safety & Standards					*	*	*	*	*	*	*	*	*	*	*	*	*	*
6. Knowledge-based training																			
6.1 Develop individual module/course objectives.	Training development team						*	*											
6.2 Acquire/develop appropriate material for knowledge-based training.	Training development team						*	*											
6.3 Develop the knowledge-based training module/course content.	Training development team							*	*										
6.4 Implement knowledge-based training modules/courses for pilots, flight dispatch and cabin crew.	Training development team									*	*	*	*	*	*	*	*	*	*

Task/Subtask	Responsible position(s)	2010			2011						2012						2013		
		Jul - Aug	Sep - Oct	Nov - Dec	Jan - Feb	Mar - Apr	May - Jun	Jul - Aug	Sep - Oct	Nov - Dec	Jan - Feb	Mar - Apr	May - Jun	Jul - Aug	Sep - Oct	Nov - Dec	Jan - Feb	Mar - Apr	May - Jun
7. Develop skills-based training and assessment measures																			
7.1 Conduct a non-technical skills familiarisation process.	Training development team										*	*	*						
7.2 Develop assessment measures using the CASA 'Safety behaviours' guidance material and CAAP 5.59-1(0).	Training development team											*	*	*					
8.0 Train instructional staff in assessment techniques																			
8.1 Conduct basic Instructional course for staff involved in assessment. ¹	Training development team														*	*	*	*	
8.2 Evaluate the effectiveness of the training program.	External specialist																*	*	
9.0 Implement assessment of non-technical skills																			
9.1 Develop and implement an information package for pilots on how the assessment system will work. ²	Training development team															*	*	*	
9.2 Implement new assessment of non-technical skills into current assessment program.	Training development team																	*	*
9.3 Foster a continuous improvement process utilising the company SMS and training feedback.	Manager Safety & Standards																		*
9.3 Develop competency-based assessment of non-technical skills to pass/fail criteria.	Training development team																		*

Notes:

1. The basic instructional course would include topics such as: The concepts of validity, reliability, bias and skill erosion; basic instructional techniques; technical assessment criteria; assessment forms; assessment scenario role-plays utilising video recording and feedback;.
2. The assessment system package would include components such as a brief history of non-technical skills assessment, assessment terminology and criteria; how to standardise assessment conditions; how training deficiencies will be dealt with.

Table 4: Example of a mature non-technical skills training program

Module Title	Module Description / Learning outcomes	Participants	Participant Numbers	Method of Assessment	Course Duration (Days)	Status of Course	Available for Delivery
Induction Training	Introductory session for all staff to generate awareness of key non-technical skills issues (see paragraph 23 of this appendix)	Pilot	Max 15	N/A	2	Complete	Yes
		Flight dispatch		N/A	2	TBA	No
		Cabin crew		N/A	2	Complete	Yes
		All new staff		N/A	0.5	TBA	No
Cabin crew non-technical skills	Training topics to include: <ul style="list-style-type: none"> ▪ Fatigue and stress management ▪ Alcohol and other drugs ▪ Communication ▪ Teamwork ▪ Leadership ▪ Situation awareness ▪ Decision making ▪ Other areas identified in the company's SMS 	All	Max 15	N/A	0.5		
Flight operations officer/flight dispatcher non-technical skills	Training to include: <ul style="list-style-type: none"> ▪ As for cabin crew plus threat and error management 	All	Max 15	N/A	0.5		
Initial Crew Resource Management for Pilots	Training to include: <ul style="list-style-type: none"> ▪ As for flight operations officer/flight dispatcher plus airmanship 	All	Max 15	Line and simulator assessment	2		

Module Title	Module Description / Learning outcomes	Participants	Participant Numbers	Method of Assessment	Course Duration (Days)	Status of Course	Available for Delivery
Non-technical skills assessment for check and training captains	Training to include: <ul style="list-style-type: none"> ▪ Topics areas as for pilots; albeit to a more advanced level 	All	Max 20	Line and simulator assessment	1		
Command Upgrade Training	Training to include: <ul style="list-style-type: none"> ▪ Topic areas as for check and training captains 	All	Max 6	Line and simulator assessment	2		
Recurrent non-technical skills training for personnel mandated under ICAO Annex 6	All topics to be covered in a 3-year cyclical program.	All	Max 15	To be determined	0.5		