![CAAM logo](Civil Aviation Authority of Malaysia)

CIVIL AVIATION GUIDANCE MATERIAL – 6013

CREW RESOURCE MANAGEMENT TRAINING

CRM

CIVIL AVIATION AUTHORITY OF MALAYSIA

INTENTIONALLY LEFT BLANK

Introduction

This Civil Aviation Guidance Material 6013 (CAGM - 6013) is issued by the Civil Aviation Authority of Malaysia (CAAM) to provide guidance for Crew Resource Management Training, pursuant to Civil Aviation Directives 6 Part 1 – Commercial Air Transport (CAD 6 Part 1 – CAT), Civil Aviation Directives 6 Part 2 – General Aviation (CAD 6 Part 2 – GA), Civil Aviation Directives 6 Part 3 – Helicopter Operations (CAD 6 Part 3 – HELI) and Civil Aviation Directives 6009 – Cabin Crew (CAD 6009 – CC).

Organisations may use these guidelines to demonstrate compliance with the provisions of the relevant CAD's issued. Notwithstanding Regulation 204 and Regulation 205 of the Malaysian Civil Aviation Regulations 2016 (MCAR 2016), when the CAGMs issued by the CAAM are used, the related requirements of the CAD's are considered as met, and further demonstration may not be required.

(Datuk Captain Chester Voo Chee Soon)
Chief Executive Officer
Civil Aviation Authority of Malaysia

Civil Aviation Guidance Material Components and Editorial practices

This Civil Aviation Guidance Material is made up of the following components and are defined as follows:

Standards: Usually preceded by words such as *"shall"* or *"must"*, are any specification for physical characteristics, configuration, performance, personnel or procedure, where uniform application is necessary for the safety or regularity of air navigation and to which Operators must conform. In the event of impossibility of compliance, notification to the CAAM is compulsory.

Recommended Practices: Usually preceded by the words such as "*should"* or "*may*", are any specification for physical characteristics, configuration, performance, personnel or procedure, where the uniform application is desirable in the interest of safety, regularity or efficiency of air navigation, and to which Operators will endeavour to conform.

Appendices: Material grouped separately for convenience but forms part of the Standards and Recommended Practices stipulated by the CAAM.

Definitions: Terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have an independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.

Tables and Figures: These add to or illustrate a Standard or Recommended Practice and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

Notes: Included in the text, where appropriate, Notes give factual information or references bearing on the Standards or Recommended Practices in question but not constituting part of the Standards or Recommended Practices;

Attachments: Material supplementary to the Standards and Recommended Practices or included as a guide to their application.

It is to be noted that some Standards in this Civil Aviation Guidance Material incorporates, by reference, other specifications having the status of Recommended Practices. In such cases, the text of the Recommended Practice becomes part of the Standard.

The units of measurement used in this document are in accordance with the International System of Units (SI) as specified in CAD 5. Where CAD 5 permits the use of non-SI alternative units, these are shown in parentheses following the basic units. Where two sets of units are quoted it must not be assumed that the pairs of values are equal and interchangeable. It may, however, be inferred that an equivalent level of safety is achieved when either set of units is used exclusively.

Any reference to a portion of this document, which is identified by a number and/or title, includes all subdivisions of that portion.

Throughout this Civil Aviation Guidance Material, the use of the male gender should be understood to include male and female persons.

Record of Revisions

Revisions to this CAGM shall be made by authorised personnel only. After inserting the revision, enter the required data in the revision sheet below. The *'Initials'* has to be signed off by the personnel responsible for the change.

ISS/Rev No.	Revision Date	Revision Details	Initials
ISS 01/REV 01	15th November 2022	Refer to summary of changes	CAAM

INTENTIONALLY LEFT BLANK

Summary of Changes

ISS/REV no.	Item no.	Revision Details
ISS01/REV02	Chapter 7	Incorporated CRM Training -Single Pilot
	Chapter 8	Attachment
		.
		.

INTENTIONALLY LEFT BLANK

Table of Contents

INTENTIONALLY LEFT BLANK

1   Background

1.1   The Operator is required to provide CRM training for all crew, including cabin crew. The training should focus on the functioning of crew members as a team and not simply as a collection of competent individuals. The crew members should be shown the importance of effective teamwork and communication, the barriers involved and how to overcome them. Emphasis should be given on their role as safety practitioners and the need to maintain a high level of awareness in the environment they operate in.

1.2   CRM constitutes an integral part of the Operator's operational activities. It focuses on situation awareness, communication skills, teamwork, leadership, task allocation, decision-making, error management, and stress management within a comprehensive framework of standard operating procedures (SOPs).

1.3   Effective CRM begins in initial training and it is strengthened by constant practice and feedback. It is sustained by continuing reinforcement as a part of the corporate culture and embedded in every stage of the training.

1.4   Investigations into causes of air operator accidents have shown that human error is a contributing factor in 60-80% the incidents and accidents. Long term research has demonstrated that these events share common characteristics. Many problems encountered by flight crew have very little to do with the technical aspects of operating in a multi-crew flight deck. Instead, problems are associated with poor group decision making, ineffective communication, inadequate leadership, and poor task or resource management. Pilot training programmes historically focused almost exclusively on the technical aspects of flying and on an individual pilot's performance. They, however, did not effectively address crew management issues that are also fundamental to achieving a safe flight.

INTENTIONALLY LEFT BLANK

2   Definition and Concepts

2.1   Crew Resource Management (CRM)

2.1.1   CRM refers to the effective use by the flight crew of all available resources, namely, human resources, hardware, and information to achieve safe and efficient operation. Other groups routinely working with the flight crew and who are involved in decisions required to operate a flight safely are also essential participants in an effective CRM process. These groups include, but are not limited to, flight dispatchers, cabin crew, maintenance personnel and air traffic controllers.

2.2   Crew Resource Management Training

2.2.1   CRM training is one way of addressing the challenge of optimising human-machine interface and the accompanying interpersonal activities. These activities include team building and maintenance, information transfer, problem solving, decision making, maintaining situation awareness, and dealing with automated systems.

2.2.2   CRM training is for the development of knowledge and skills related to human performance. It is based on awareness that a high degree of technical proficiency is essential for safe and efficient operations. However, demonstrated mastery of CRM concepts cannot overcome a lack of technical proficiency. Similarly, high technical proficiency cannot guarantee safe operations in the absence of good CRM.

2.2.3   The recommendations for CRM training programmes in this CAGM are derived from the coordinated efforts made by representatives from the aviation community. These recommendations provide useful reference for understanding and application of the critical elements in CRM training.

2.3   Basic Concepts Of CRM

2.3.1   While there are various useful methods in use in CRM training today, certain essentials are universal:

a)   CRM training is most effective within a training programme centred on clear, comprehensive standard operating procedures.

b)   CRM training should focus on the functioning of crew members as a team, not as a collection of technically competent individuals. Whenever possible, pilots should be graded as a crew, rather than as individuals.

c)   CRM training should instruct crew members how to behave in ways that foster crew effectiveness.

d) CRM training should provide opportunities for crew members to practise the skills necessary to be effective team leaders and team members.

2.4 Threat and Error Management

2.4.1 It is now understood that pilot errors cannot be entirely eliminated. It is important, therefore, that pilots are trained in appropriate threat and error management skills and procedures to prevent as many errors as possible. Since such errors cannot all be prevented, the detection of and recovery from errors should also be addressed during threat and error management skill and procedure training. This follows that during assessment of pilots, skills in threat and error management (error prevention, threat detection, and error recovery) should be considered.

3 Components of CRM Training

Note. – The topics outlined below have been identified as critical components of an effective CRM training. No matter how effective each syllabus segment is, one-time exposure will not be sufficient. The attitudes and norms that contribute to ineffective crew coordination may develop over a crew member's career. To optimise training effectiveness, CRM should be embedded in every stage of crew training, and CRM concepts should be stressed in line operations as well.

3.1 Commitment From Management

3.1.1 CRM programmes are received much more positively by operations personnel when senior managers, flight operations managers, and flight standards officers conspicuously support CRM concepts and provide the necessary resources for training. Flight operations manuals and training manuals should embrace CRM concepts by providing crews with necessary policy and procedure guidance centred on clear, comprehensive SOPs. Central to the CRM concept is communication. It is essential that every level of management supports a safety culture in which communication is promoted by encouraging appropriate questioning. It should be made perfectly clear in the operations manuals, and in every phase of the pilot's training that appropriate questioning is encouraged and that there will be no negative repercussions for appropriate questioning of one pilot's decision or action by another pilot.

3.2 Initial CRM Training

3.2.1 The operator is to ensure that a flight crew member undergoes and complete initial CRM training, as part of the introduction training, before the flight crew member commences line flying. Initial CRM training addresses the nature of the operations of the operator concerned, as well as the associated procedures and its company culture. This includes areas of operations that produce particular difficulties or involve adverse weather conditions and unusual hazards.

3.2.2 A flight crew member who has not previously completed the operator's initial CRM training has to complete the initial CRM training course before commencing line flying. The initial CRM training should be completed within a specified period of time after the new flight crew member has joined the operator. If the flight crew member has not been previously trained in Human Factors, the flight crew member should then undergo a theoretical course based on the human performance and limitations programmes for the Airline Transport Pilot License (ATPL) (refer applicable requirements for the issue of Flight Crew Licenses in CAD 1 - PEL) which should be completed before the initial CRM training.

3.2.3   The operator is to ensure that a cabin crew member undergoes and complete initial CRM training, as part of the introduction training, before the cabin crew member commences operational duties. The initial training for all crew members should cover all elements specified in the applicable tables in 4.3.

3.3   Annual Recurrent CRM Training

3.3.1   CRM training is to be included as part of annual recurrent training. Recurrent CRM training includes modular classroom CRM training in the non-operational environment to review and amplify CRM components, followed by practice and feedback exercises. In accordance with CAD 6 Part 1, all major topics of CRM training are to be covered over a period not exceeding 3 years.

3.3.2   The topics covered in the annual recurrent CRM training should include the elements specified in the applicable tables in 4.3 accordingly.

3.3.3   Whenever practicable, parts of the CRM training for flight crew should be conducted in FSTDs that reproduce a realistic operational environment and permit interaction. This includes but is not limited to line-oriented flight training (LOFT) scenarios.

3.3.4   Likewise, whenever practicable, parts of the CRM training stated in the applicable tables in 4.3 for cabin crew should be incorporated into the annual Emergency and Safety Equipment training, such as door drills and firefighting drills, so it reproduces a realistic operational environment and permits realistic interaction.

Note 1. – CRM elements should be integrated into all the phases of recurrent training by all the personnel conducting recurrent training.

Note 2. – The Operator should ensure that all personnel conducting recurrent training are suitably qualified to integrate elements of CRM into this training.

3.4   Acquiring A New Aircraft Type-Rating

3.4.1   If a pilot acquires a new aircraft type-rating, elements of CRM training should be integrated into the transition training. Line Orientated Flying Training (LOFT) with emphasis on CRM should be applied in training for a multi-crew aeroplane. Training involving communications and the use of automation should also be developed for crew who operate aircraft with advanced technology flight decks, or for crew transitioning to such flight decks.

3.5   Command Training

3.5.1   Elements of CRM training as specified in the applicable tables in 4.3 should be incorporated into the training for a crew member to undertake appointment as a pilot-in-command.

3.6 In-charge Cabin Crew member course

3.6.1 CRM training for In-charge Cabin Crew members should be the application of knowledge gained in previous CRM training and operational experience relevant to the specific duties and responsibilities of an In-charge Cabin Crew member. The operator should ensure that for the In-charge Cabin Crew member course, the CRM training elements are integrated into the training, as specified in the tables in 4.3.

3.7 Joint CRM Training

3.7.1 Operators should provide joint CRM training for flight crew and cabin crew during recurrent CRM training. The joint training should address at least:

a) effective communication, coordination of tasks and functions of flight crew and cabin crew; and

b) mixed multinational and cross-cultural flight crew and cabin crew, and their interaction, if applicable.

3.7.2 Joint CRM training may be carried out by either a flight crew CRMI or cabin crew CRMI or both, provided the CRMI is well versed with the applicable duties of the crew involved. The use of two CRMI (one of each flight crew and cabin crew) is highly beneficial.

3.7.3 There should be an effective liaison between flight crew and cabin crew training departments. Provision should be made for transfer of relevant knowledge and skills between flight crew and cabin crew CRMI.

3.8 Contracted CRM Training

3.8.1 If the operator chooses not to establish its own CRM training, another operator, a third party or a training organisation may be contracted to provide the training. In case of contracted CRM training, the operator should ensure that the content of the course covers the specific culture, the type of operations and the associated procedures of the operator. When crew members from different operators attend the same course, the CRM training should be specific to the relevant flight operations and to the trainees concerned.

3.8.2 When contracting CRM training, the operator must ensure that:

a) the organisation conducting the training is authorised by the CAAM to conduct the training;

b) the contracted CRM training comply with the applicable requirements; and

c) any aviation safety hazards associated with contracted CRM training are considered by the operator.

3.9   **Training Elements**

3.9.1   The CRM training elements to be covered are specified in the tables in 4.3. The operator should ensure that the following aspects are addressed:

3.9.1.1   Automation and philosophy on the use of automation

a)   The CRM training should include training in the use and knowledge of automation, and in the recognition of systems and human limitations associated with the use of automation. The operator should, therefore, ensure that the flight crew member receives training on:

1)   the application of the operations policy concerning the use of automation as stated in the operations manual; and

2)   system and human limitations associated with the use of automation, giving special attention to issues of mode awareness, automation surprises and over-reliance including false sense of security and complacency.

b)   The objective of this training should be to provide appropriate knowledge, skills and attitudes for managing and operating automated systems. Special attention should be given to how automation increases the need for crews to have a common understanding of the way in which the system performs, and any features of automation that make this understanding difficult.

c)   If conducted in an FSTD, the training should include automation surprises of different origin (system and pilot induced).

3.9.1.2   Monitoring and intervention

Flight crew should be trained in CRM-related aspects of operation monitoring before, during and after flight, together with any associated priorities. This CRM training should include guidance to the pilot monitoring on when it would be appropriate to intervene, if felt necessary, and how this should be done in a timely manner. Reference should be made to the operator procedures for structured intervention as specified in the operations manual.

3.9.1.3   Resilience development

3.9.1.3.1   The main aspects of resilience development can be described as the ability to:

a)   learn ('knowing what has happened');

b)   monitor ('knowing what to look for');

c)   anticipate ('finding out and knowing what to expect'); and

        d)   respond ('knowing what to do and being capable of doing it').

3.9.1.3.2   Operational safety is a continuous process of evaluation of and adjustment to existing and future conditions. In this context, and following the description in 3.9.1.3.1, resilience development involves an ongoing and adaptable process including situation assessment, self-review, decision and action. Training in resilience development enables crew members to draw the right conclusions from both positive and negative experiences. Based on those experiences, crew members are better prepared to maintain or create safety margins by adapting to dynamic complex situations.

3.9.1.3.3   CRM training should address the main aspects of resilience development. The training should cover:

        a)   Mental flexibility

            Flight crew and cabin crew should be trained to:

            1)   understand that mental flexibility is necessary to recognise critical changes. Crew members should be prepared to respond to situations for which there is no set procedure;

            2)   reflect on their judgement and adjust it to the unique situation. Crew members should learn to review their judgement based on the unique characteristics of the given circumstances.

            3)   avoid fixed prejudices and over-reliance on standard solutions. Crew members learn to update solutions and standard response sets, which have been formed on prior knowledge; and

            4)   remain open to changing assumptions and perceptions. Crew members should learn to constantly monitor the situation, and are prepared to adjust their understanding of the evolving conditions.

        d)   Performance adaptation

            Flight crew and cabin crew should be trained to:

            1)   mitigate frozen behaviours, overreactions and inappropriate hesitation. Crew members should learn to correct improper actions with a balanced response.

            2)   adjust actions to current conditions. Crew members should learn to respond in accordance with the actual situation.

3.9.1.4   Surprise and startle effect

        CRM training should address unexpected, unusual and stressful situations. For flight crew, the training should cover:

        a)   surprises and startle effects; and

b) management of abnormal and emergency situations, including:

1) the development and maintenance of the capacity to manage crew resources;

2) the acquisition and maintenance of adequate automatic behavioural responses; and

3) recognising the loss and re-building situation awareness and control.

For cabin crew, the training should be designed to prepare cabin crew to master sudden events and associated uncontrolled reactions.

3.9.1.5 Cultural differences

CRM training for flight crew and cabin crew should cover cultural differences of multinational and cross-cultural crews. This includes recognising that:

a) different cultures may have different communication specifics, ways of understanding and approaches to the same situation or problem;

b) difficulties may arise when crew members with different mother tongue communicate in a common language which is not their mother tongue; and

c) cultural differences may lead to different methods for identifying a situation and solving a problem.

3.9.1.6 Operator's safety culture and company culture

CRM training should cover the operator's safety culture, its company culture, the type of operations and the associated procedures of the operator. This should include areas of operations that may lead to particular difficulties or involve unusual hazards.

3.9.1.7 Case studies

a) Flight crew and cabin crew CRM training should cover aircraft type-specific case studies including:

1) accident and serious incident reviews to analyse and identify any associated non-technical causal and contributory factors, and instances or examples of lack of CRM; and

2) analysis of occurrences that were well managed.

b) If relevant aircraft type-specific or operator-specific case studies are not available, the operator should consider other case studies relevant to the scale and scope of its operations.

4 Suggested Syllabus Topics

4.1 CRM Integration

4.1.1 CRM performance requirements or procedures need to be integrated into relevant parts of crew training and the operator's SOPs. Specific callouts, checks, and guidance need to be included in normal checklists, quick-reference handbooks, abnormal/emergency procedures, manuals, and job aids. This integration should capture CRM principles into explicit procedures to be used by the flight crew.

4.2 CRM and Culture Issues

4.2.1 While and individual or a team may perform well under many conditions, they are subject to the influence of at least three (3) cultures:

a) The professional cultures of the individuals themselves,

b) The cultures of their organisation, and

c) The national cultures surrounding the individuals and their organisations.

4.2.2 If not recognised and addressed, factors related to culture may degrade crew performance. Hence, effective CRM training must address culture issues as appropriate in each training population.

4.3 CRM Training Syllabus

4.3.1 The tables below specifies which CRM training elements should be covered in each type of training. The levels of training in the tables can be described as follows:

a) 'Required' means training that should be instructional or interactive in style to meet the objectives specified in the CRM training programme or to refresh and strengthen knowledge gained in a previous training.

b) 'In-depth' means comprehensive training that should be instructional or interactive in style taking full advantage of group discussions, team task analysis, team task simulation, etc., for the acquisition or consolidation of knowledge, skills and attitudes. The CRM training elements should be tailored to the specific needs of the training phase being undertaken.

4.3.2 The table below provides the recommended syllabus for flight crew CRM training.

CRM training elements	Initial operator's CRM training	Operator conversion course when changing aircraft type	Operator conversion course when changing operator	Annual recurrent training	Command course
General principles					
Human factors in aviation; General instruction on CRM principles and objectives; Human performance and limitations; Threat and error management.	In-depth	Required	Required	Required	Required
Relevant to the individual flight crew member					
Personality awareness, human error and reliability, attitudes and behaviours, self-assessment and self-critique; Stress and stress management; Fatigue and vigilance; Assertiveness, situational awareness, information acquisition and processing.	In-depth	Not required	Not required	Required	In-depth
Relevant to the flight crew					
Automation and philosophy on the use of automation.	Required	In-depth	In-depth	In-depth	In-depth
Specific type-related differences	Required	In-depth	Not required	Required	Required
Monitoring and intervention	Required	In-depth	In-depth	Required	Required
Relevant to the entire aircraft crew					
Shared situation awareness, shared information acquisition and processing; Workload management; Effective communication and	In-depth	Required	Required	Required	In-depth

coordination inside and outside the flight crew compartment; Leadership, cooperation, synergy, delegation , decision making, actions; Resilience development; Surprise and startle effect; Cultural differences.					
Relevant to the operator and the organisation					
Operator's safety culture and company culture, standard operating procedures (SOPs), organisational factors, factors linked to the type of operations; Effective communication and coordination with other operational personnel and ground services.	In-depth	Required	In-depth	Required	In-depth
Case studies	In-depth	In-depth	In-depth	In-depth	In-depth

4.3.3   The table below provides the recommended syllabus for cabin crew CRM training.

CRM training elements	Operator's CRM training	Operator aircraft type conversion training	Annual recurrent training	In-Charge cabin crew member (ICC) course
General principles				
Human factors in aviation; General instruction on CRM principles and objectives; Human performance and limitations; Threat and error management.	Not required (covered under initial training required in CAD 6009 – CC)	Required	Required	Required
Relevant to the individual cabin crew member				
Personality awareness, human error and reliability, attitudes and behaviours, self-	Not required (covered under initial	Required	Required	Required

assessment and self-critique; Stress and stress management; Fatigue and vigilance; Assertiveness, situational awareness, information acquisition and processing.	training required in CAD 6009 – CC)			
Relevant to the entire aircraft crew				
Shared situation awareness, shared information acquisition and processing; Workload management; Effective communication and coordination inside and outside the flight crew compartment; Leadership, cooperation, synergy, delegation , decision making, actions; Resilience development; Surprise and startle effect; Cultural differences.	In-depth	Required when relevant to the type(s)	Required	In-depth
Specifics related to aircraft types (narrow/wide-bodied, single/multi-deck), flight crew and cabin crew composition and number of passengers	Required	In-depth	Required	In-depth
Relevant to the operator and the organisation				
Operator's safety culture and company culture, standard operating procedures (SOPs), organisational factors, factors linked to the type of operations; Effective communication and coordination with other operational personnel and ground services.	In-depth	Required when relevant to the type(s)	Required	In-depth
Case studies	In-depth	Required when relevant to the type(s)	In-depth	In-depth

5 CRM Training and Assessment

5.1 The Critical Role Of Instructors And Examiners

5.1.1 The success of any CRM training programme ultimately depends on the skills of the people who administer the training and measure its effect. CRM instructors (CRMIs), Flight Instructors (FIs), Designated Flight Examiners (DFEs), and course designers must be skilled in all areas related to the practice and assessment of CRM. These skills comprise an additional level to those associated with traditional flight instruction and checking. Gaining proficiency and confidence in CRM instruction, observation and measurement requires special training for CRMIs, FIs, and DFEs in many CRM training processes. CRMIs, FIs, and DFEs need special training in order to calibrate and standardise their own skills. The best results occur when the crew examine their own behaviour with the assistance of a trained instructor who can point out both positive and negative CRM performance. Whenever highly effective examples of crew coordination are observed, it is vital that these positive behaviours are discussed and reinforced. Debriefing and critique skills are important tools for instructors, supervisors and examiners.

5.1.2 Feedback from CRMIs, FIs, and DFEs is most effective when it refers to the concepts that are covered in the initial CRM training. The best feedback refers to instances of specific behaviour, rather than behaviour in general.

5.2 CRM Assessment for Flight Crew

5.2.1 Any human factors programme should include appropriate assessment criteria as an integral component. Detailed behavioural measurement is integral to any assessment, since it is the best index of how individuals apply what they have learned. Behavioural measurement requires the development of objective behavioural markers, which can be externally judged and are relevant to the operating environment. Behavioural markers can be measured both during training as a marker of progress, and subsequently as an indicator of how well the training has transferred.

5.2.2 The flight crew must be assessed on their CRM skills in accordance with a methodology acceptable to the CAAM and published in the operators Operations Manual. The purpose of such assessment is to provide feedback to the flight crew collectively and individually and serve to identify retraining. The assessment can also be used to improve the CRM training system.

5.2.3 Assessment of CRM skills is the process of observing, recording, interpreting and debriefing the flight crew member's performance using an accepted methodology in the context of the overall performance. The flight crew member's CRM skills should be assessed in the operational environment, but not during CRM training in the non-operational environment. Nevertheless, during training in the non-

operational environment, feedback from the flight crew CRMI or from trainees on individual and crew performance may be given to the crew members concerned.

5.2.4   The assessment of CRM skills should:

a)   include debriefing the flight crew and the individual flight crew member;

b)   serve to identify additional training, where needed, for the flight crew or the individual flight crew member; and

c)   be used to improve the CRM training system by evaluating de-identified summaries of all CRM assessments.

5.2.5   Prior to the introduction of CRM skills assessment, a detailed description of the CRM methodology, including the required CRM standards and the terminology used for the assessment, should be published in the operations manual.

5.2.6   The methodology of CRM skills assessment should be based on the following principles:

a)   only observable behaviours are assessed;

b)   the assessment should positively reflect any CRM skills that result in enhanced safety; and

c)   assessments should include behaviour that results in an unacceptable reduction in safety margin.

5.2.7   It is necessary for the operators to establish procedures, including additional training, to be applied in the event that flight crew members do not achieve or maintain the required CRM standards.

5.3   Non-Technical Skills Assessment for Flight Crew

5.3.1   NOTECHS (non-technical skills) is a validated method for assessing flight crew CRM skills. The NOTECHS framework consists of four main categories:

a)   Cooperation: Cooperation is the ability to work effectively in a crew.

b)   Leadership and managerial skills: Effective leadership and managerial skills help to achieve joint task completion within a motivated, fully functioning team through coordination and persuasiveness.

c)   Situation awareness: Situation awareness relates to one's ability to accurately perceive what is in the flight crew compartment and outside the aircraft. It is also one's ability to comprehend the meaning of different elements in the environment and the projection of their status in the near future.

d)   Decision-making: Decision-making is the process of reaching a judgement or choosing an option.

5.3.2 Each of the four categories is subdivided into elements and behavioural markers. The elements are specified in Table 1 with examples of behavioural markers (effective behaviour). The behavioural markers are assessed by a rating scale to be established by the operator.

Table 1 — Categories, elements and behavioural markers of NOTECHS

Category	Element	Behavioural marker (examples)
Communication	Team building and Maintenance	Establishes atmosphere for open communication and participation
	Considering others	Takes condition of other crew members into account
	Supporting others	Helps other crew members in demanding situations
	Conflict solving	Concentrates on what is right rather than who is right
Leadership and managerial skills	Use of authority and assertiveness	Takes initiative to ensure crew involvement and task completion
	Maintaining standards	Intervenes if task completion deviates from standards
	Planning and coordination	Clearly states intentions and goals
	Workload management	Allocates adequate time to complete tasks
Situational awareness	Awareness of aircraft systems	Monitors and reports changes in systems state
	Environmental Awareness	Collects information about environment (position, weather and traffic)
	Anticipation	Identifies possible future problems
Decision-making	Problem definition and diagnosis	Review causal factors with other crew members
	Option generation	States alternative courses of action
		Asks other crew members for options
	Risk assessment and option selection	Considers and shares estimated risk of alternative courses of action
	Outcome review	Checks outcome against plan

5.4 Design, Implementation and Evaluation of CRM Training

5.4.1 The checklist in Table 2 provides guidance on the design, implementation and evaluation of CRM training, and on their incorporation into the operator's safety culture. Elements of the operator's management systems and the competency-based approach are incorporated in the checklist.

Table 2 — Checklist for design, implementation, evaluation and incorporation of CRM training.

Steps	Description	Element
1	Needs analysis	Determine the necessary CRM competencies
		Develop CRM training goals
		Ensure the organisation is ready for CRM training

2	Design	Develop CRM training objectives
		Determine what to measure and how to measure it
3	Development	Describe the CRM learning environment
		Develop full-scale prototype of training
		Validate and modify CRM training
4	Implementation	Prepare trainees and environment
		Set a climate for learning (e.g. practice and feedback)
		Implement the CRM training programme
5	Evaluation	Determine training effectiveness
		Evaluate CRM training at multiple levels
		Revise the CRM training programme to improve effectiveness
6	Incorporation	Establish an environment where CRM training is positively recognised
		Reinforce CRM behaviours in daily work
		Provide recurrent CRM training

6 CRM Instructor (CRMI)

6.1 General

6.1.1 The operator is to ensure that all CRMIs conducting recurrent training are suitably qualified. The operator should also ensure that instructors and designated examiners responsible for the conduct of training and/or checking are qualified and able to integrate the elements of CRM into the training and/or checking.

6.2 Flight Crew CRMI Qualifications

6.2.1 The provision described herein are applicable to flight crew CRMIs responsible for classroom CRM training and are not applicable to:

a) holders of an FI certificate issued in accordance to CAD 1 – PEL, who conduct CRM training in the operational environment; and

b) instructors conducting training other than CRM training, but integrating CRM elements into this training.

6.2.2 A training and standardisation programme for flight crew CRMIs should be established.

6.2.3 A flight crew CRMI, in order to be suitably qualified, should:

a) have adequate knowledge of the relevant flight operations;

b) have adequate knowledge of human performance and limitations (HPL), whilst:

1) having obtained a commercial pilot licence (CPL) in accordance with CAD 1 - PEL;
2) having followed a theoretical HPL course covering the whole syllabus of the HPL examination;

c) have completed flight crew initial operator's CRM training;

d) have received training in group facilitation skills;

e) have received additional training in the fields of group management, group dynamics and personal awareness; and

f) have demonstrated the knowledge, skills and credibility required to train the CRM training elements in the non-operational environment, as specified in the recommended syllabus for flight crew CRM training in 4.3.

6.2.4 The following qualifications and experiences are also acceptable for a flight crew CRMI in order to be suitably qualified:

a) A flight crew member holding a recent qualification as a flight crew CRMI may continue to be a flight crew CRMI after the cessation of active flying duties if he maintains adequate knowledge of the relevant flight operations.

b) A former flight crew member may become a flight crew CRMI if he maintains adequate knowledge of the relevant flight operations and fulfils the provisions of 6.2.3 (b) to 6.2.3 (f).

c) An experienced CRMI may become a flight crew CRMI if he demonstrates adequate knowledge of the relevant flight operations and fulfils the provisions of 6.2.3 (b) to 6.2.3 (f).

6.3   Training of Flight Crew CRMI

6.3.1   Training of flight crew CRMIs should be both theoretical and practical. Practical elements should include the development of specific instructor skills, particularly the integration of CRM into line operations.

6.3.2   The basic training of flight crew CRMIs should include the training elements for flight crew, as specified in the recommended syllabus for flight crew CRM training in 4.3. In addition, the basic training should include the following:

a) introduction to CRM training;

b) operator's management system;

c) characteristics, as applicable:

1) of the different types of CRM trainings (initial, recurrent, etc.);
2) of joint training; and
3) related to the type of aircraft or operation; and

d) assessment.

6.3.3   The refresher training of flight crew CRMIs should include new methodologies, procedures and lessons learned.

6.3.4   Holders of an FI certificate issued in accordance to CAD 1 – PEL, who are also CRMIs, may combine the CRMI refresher training with instructor refresher training.

6.4   Cabin Crew CRMI Qualifications

6.4.1   The provisions described herein:

a) should be fulfilled by cabin crew CRMIs responsible for classroom CRM training; and

b) are not applicable to instructors conducting training other than CRM training, but integrating CRM elements into this training. Nevertheless, instructors who are integrating CRM elements into the aircraft type training, recurrent training

or In-charge cabin crew member training should have acquired relevant knowledge of human performance and limitations, and have completed appropriate CRM training.

6.4.2   A training and standardisation programme for cabin crew CRMIs should be established.

6.4.3   The cabin crew CRMI, in order to be suitably qualified, should:

a)   have adequate knowledge of the relevant flight operations;

b)   have received instructions on human performance and limitations (HPL);

c)   have completed an introductory CRM course, as required in CAD 6009 – CC.

d)   have received training in group facilitation skills;

e)   have received additional training in the fields of group management, group dynamics and personal awareness; and

f)   have demonstrated the knowledge, skills and credibility required to train the CRM training elements in the non-operational environment, as specified in the recommended syllabus for cabin crew CRM training in 4.3.

6.4.4   An experienced CRMI may become a cabin crew CRMI if he demonstrates a satisfactory knowledge of the relevant flight operations and the cabin crew working environment, and fulfils the provisions specified in 6.4.3 (b) to 6.4.3 (f).

6.5   **Training of Cabin Crew CRMI**

6.5.1   Training of cabin crew CRMIs should be both theoretical and practical. Practical elements should include the development of specific instructor skills, particularly the integration of CRM into day-to-day operations.

6.5.2   The basic training of cabin crew CRMIs should include the training elements for cabin crew, as specified in the recommended syllabus for cabin crew CRM training in 4.3. In addition, the basic training should include the following:

g)   introduction to CRM training;

h)   operator's management system;

i)   characteristics, as applicable:

1)   of the different types of CRM trainings (initial, recurrent, etc.);
2)   of joint training; and
3)   related to the type of aircraft or operation.

6.5.3   The refresher training of cabin crew CRMIs should include new methodologies, procedures and lessons learned.

6.5.4   The training for cabin crew CRMIs should be conducted by cabin crew CRMIs with a minimum of 3 years' experience. Assistance may be provided by experts in order to address specific areas.

6.6   Assessment of Flight Crew and Cabin Crew CRMI

6.6.1   A flight crew CRMI will be assessed when conducting the first CRM training course. The assessment is valid to the end of the month which it is done, 36 calendar months later. A Letter of Approval will be issued by the CAAM upon a successful assessment.

6.6.2   The assessment of a CRMI will be conducted by a CAAM Inspector, or experienced CRMIs holding examiner designation from the CAAM who have demonstrated continued compliance with the provisions for a CRMI and capability of that role for at least 3 years.

6.6.3   The operator should ensure that the process for the assessment is included in the operations manual describing methods for observing, recording, interpreting and debriefing the flight crew CRMI.

6.6.4   For renewal of the 36 month validity period, the flight crew CRMI should:

a)   conduct at least 2 CRM training events in any 12-month period;

b)   be assessed within the last 12 months of the 36 month validity period by the personnel stated in 6.6.2; and

c)   complete CRMI refresher training within the 36 month validity period.

6.6.5   The next 36 month validity period will start at the end of the previous period.

6.6.6   The checklist in Attachment A provides guidance on the assessment of a CRMI. If a CRMI is competent in his role, the response to the questions should be 'yes'. When answering the questions in the checklist, justifications and examples related to the responses given should be provided.

7   CRM Training

7.1   Single Pilot Operations

a)   For single-pilot helicopter operations with technical crew.

b)   For single-pilot operations should be applied with the following differences:

7.1.1   Relevant training

a)   Training should cover the relevant CRM training, i.e. initial operator's training, the operator conversion course and recurrent training.

7.1.2   Relevant training elements

a)   CRM training should focus on the elements specified in Table 4.3.2 which are relevant to single-pilot operations. Therefore, single-pilot CRM training should include, among others:

b)   situation awareness;

c)   workload management;

d)   decision-making;

e)   resilience development;

f)   surprise and startle effect; and

g)   effective communication and coordination with other operational personnel and ground services.

INTENTIONALLY LEFT BLANK

8   Attachments

8.1   Attachment A – CRMI-E Qualifying Checklist

ATTACHMENT G   CAAM/BOP/CRMI/001

CAAM	EVALUATION FORM INITIAL/REQUALIFICATION	CRM INSTRUCTOR/EXAMINER

To be filled by CAAM Safety & Security Inspector (CRMIE) or CAAM Authorised Crew Resource Management Instructor/Examiner (CRMIE)
Please **MARK (X)** at the respective column. Remarks column to be filled, should there be any observations, findings or concerns.

This form is to be submitted to CAAM together with Operator/Organisation IQP forms upon request for Initial Evaluation by CAAM Safety & Security Inspectors (CRMIE) and/or when being assigned to conduct the requalification on behalf of CAAM.

A: Evaluation Details		
Instructor Evaluated:		
Operator/Organisation:		
Location:		
Qualifying Type:	☐ Initial	☐ Requalification
Evaluation Type:	☐ CRM Instructor	☐ CRM Instructor/Examiner
Programme Details:	**Total Hours:**	
	Course Completion:	From to
Previous Authorisation Expiry Date: (*For Requalification Only*)		
CAAM Crew Resource Management Examiner (CRMIE)/ Authorised CRMIE:		

ATTACHMENT G   CAAM/BOP/CRMI/001

CAAM	EVALUATION FORM INITIAL/REQUALIFICATION	CRM INSTRUCTOR/EXAMINER

A1. PRESENTATION CONTENT	YES	NO
1. Course introduction	☐	☐
2. Content flow and well structured	☐	☐
3. Concise	☐	☐
4. Illustration used	☐	☐
5. Consistent format used	☐	☐
6. Appropriate use of animations (not overused)	☐	☐
7. Matter relevant to the topic	☐	☐
8. Appropriate conclusion	☐	☐

A2. PRESENTATION SKILLS	YES	NO
1. Did the CRM Instructor/facilitator demonstrate the knowledge required for the role?	☐	☐
2. Did the CRM Instructor/facilitator support CRM concepts?	☐	☐
3. Did the CRM instructor/facilitator encourage trainees to participate, share their experiences and self- analyse?	☐	☐
4. Did the CRM instructor/facilitator identify and respond to the trainees' needs relative to expertise/experience?	☐	☐
5. Did the CRM instructor/facilitator show how CRM is integrated in technical training?	☐	☐
6. Did the CRM Instructor/facilitator incorporate company CRM standards when appropriate?	☐	☐
7. Did the CRM instructor/facilitator identify and discuss the non-technical reasons involved in accidents, incidents and events included in case studies?	☐	☐
8. Did the CRM instructor/facilitator regularly check for understanding and resolve ambiguities?	☐	☐
9. Did the CRM Instructor/facilitator demonstrate effective instruction and facilitation skills?	☐	☐

Remarks: Click or tap here to enter text.			
Overall Result:	Satisfactory ☐	Unsatisfactory ☐	
If unsatisfactory, what are the areas to be improved: Click or tap here to enter text.			
Can the approval be accorded?	YES ☐	NO ☐	
CRMIE Signature:		Date:	Click or tap to enter a date.

Page 2 of 3

ATTACHMENT G		CAAM/BOP/CRMI/001
CAAM	EVALUATION FORM INITIAL/REQUALIFICATION	CRM INSTRUCTOR/EXAMINER

Unacceptable Performance

1. Did the candidate support the achievement of the objectives, YES or NO? The candidate: • required multiple interventions and frequent assistance from the other facilitator(s) was required to support the achievement of the training objectives; or • clearly showed that their own poor knowledge, skills or attitude failed to support the achievement of the training objectives.	**2. Did the candidate support CRM concepts and did they role model best CRM practice?** The candidate: • expressed the opinion that CRM training is of little value; • was unfriendly, unwelcoming, impatient, insensitive, disrespectful or judgemental; • demeaned the trainees; • used humour inappropriately; • let personal opinion deflect from the training objectives; • rarely demonstrated empathy for the trainee's position; or • did not remain calm under stress or became overly emotional.	**3. Did the candidate demonstrate the knowledge required for the role?** The candidate: • was unable to describe the key training objectives for each subject, or could only describe them with difficulty; • displayed limited knowledge of the material presented; • either was unable to provide or could only provide limited elaboration or explanation of the material when asked to do so by the trainees; • displayed limited knowledge of the company behavioural/non-technical standards; • either was unable to explain or had great difficulty explaining the relationship between the company behavioural/non-technical standards and optimum performance in line operations. • displayed limited knowledge of the core CRM subjects, e.g., communications, leadership, workload/task management, teamwork, situation awareness, problem-solving and decision-making; or displayed limited knowledge of the legislative requirements or publications pertaining to Human Factors training for flight crew, e.g., CAP 737 and CAGM CRM 6013
4. Did the candidate encourage trainees to participate, share their experiences and self-analyse? The candidate: • made limited attempts to encourage trainees to participate, or share their experiences; or frequently either ignored or stifled trainee input.	**5. Did the candidate identify and respond to the trainees' needs relative to their expertise/experience?** The candidate: • did not attempt to establish the trainees' starting point, background or level of any relevant experience. • either failed to respond, made limited attempts or made inappropriate responses to trainees' requests for further explanation or elaboration of training material; or • made limited or no attempts to alter or adapt the training material or content when this was clearly required in order to meet the trainees' needs.	**6. Did the candidate integrate practical CRM within technical training and line operations?** The candidate: • failed to integrate practical CRM measures within technical training; or • was unable to relate CRM measures to line operations.
7. Did the candidate incorporate Company CRM Standards when appropriate? The candidate: • made no, or limited, attempts to link the applicable non-technical marker system or CRM standards to effective crew behaviours during line operations; or • made no, or limited, attempts to apply the applicable non-technical marker system or CRM standards when either describing or reinforcing effective behaviour.	**8. Did the candidate identify and discuss the non-technical reasons for accidents/incidents/events?** The candidate: • focused on the technical causes and made few, if any, attempts to identify any ineffective non-technical skills; or • made limited or inappropriate attempts to facilitate what may have been more effective behaviours when discussing incidents/accidents.	**9. Did the candidate regularly check for understanding and resolve ambiguity?** The candidate: • rarely attempted to ensure trainees' questions were adequately answered; or • rarely attempted to resolve any ambiguities or misunderstandings.

10. Did the candidate demonstrate effective instructional skills? The candidate: • was clearly unprepared and demonstrated a clear lack of familiarity with the training materials. • was often unclear, hesitant, confused, confusing or unstructured; • presented too much information using jargon, terminology and language that was inappropriate for trainees; • made few, if any, attempts to present the session in a relevant and motivating manner. • consistently failed to deal with inappropriate trainee behaviour that detracted from the training objectives or stifled trainee participation. • frequently glossed over key concepts or spent excessive time discussing irrelevant points. • consistently delivered material in a monotone fashion. • consistently delivered material with little or no eye contact; or • lacked energy and appropriate enthusiasm. The trainees were bored and disengaged.	**11. Did the candidate demonstrate effective facilitation skills?** The candidate: • rarely asked open questions that probed or deepened the discussion. • rarely reflected or deflected questions back to the trainees and consistently answered the trainees' questions directly without giving the rest of the group an opportunity to contribute. • consistently presented personal views and opinions and little attempt was made to either summarise or synthesise the participants' own views. • consistently interrupted the trainees or rarely gave them sufficient time to formulate a response; or • either consistently ignored trainees' responses or rarely displayed effective listening skills such a paraphrasing.

Page 3 of 3

INTENTIONALLY LEFT BLANK