



CRM Training Programme for FOI and setup of our work with Human Factors in the Swedish Transport Agency

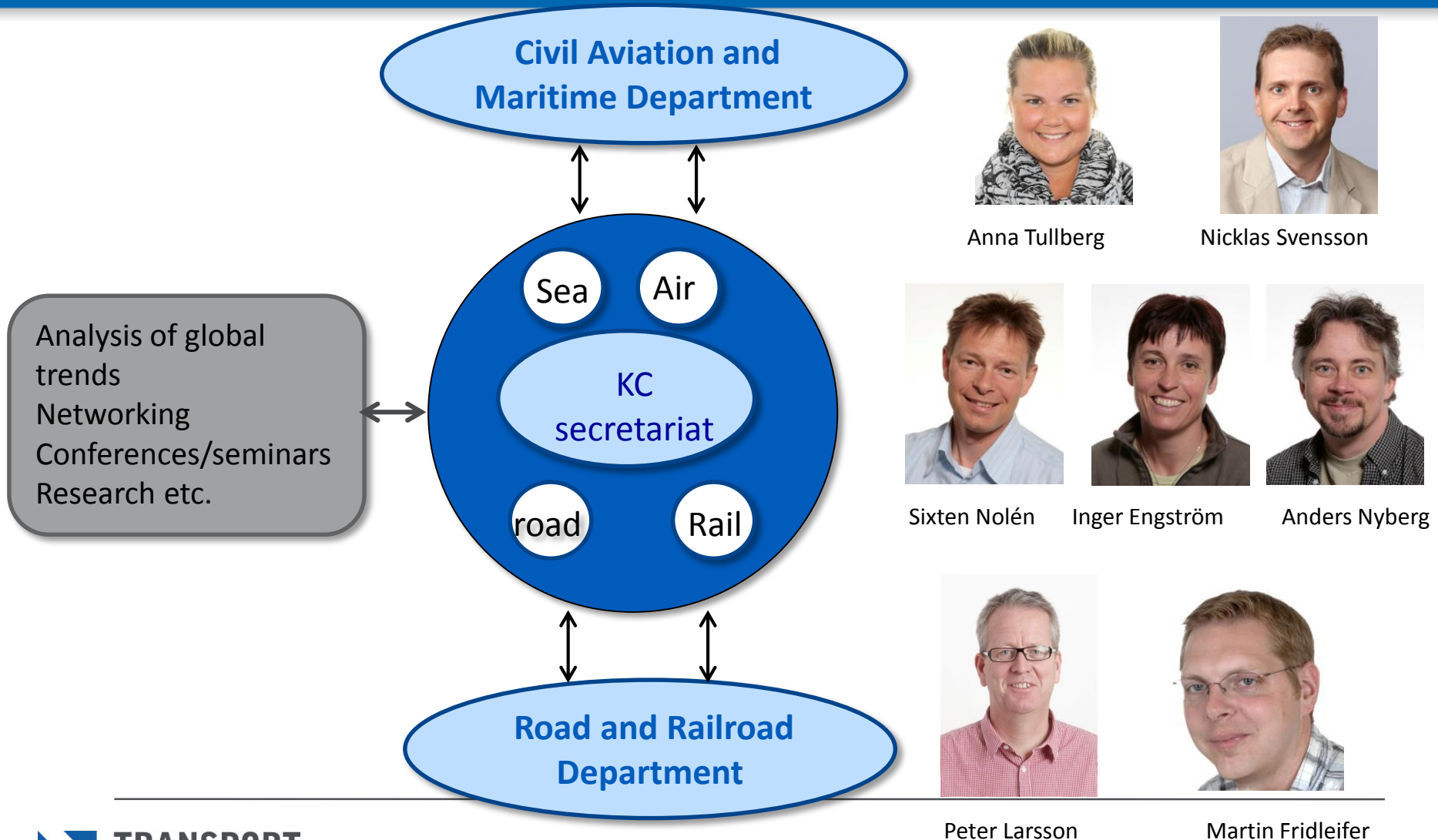
NAA Workshop – “CRM in Practice”
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Human factors in four transportation modes



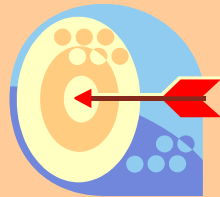
Center of Competence for Human Factors/Man-Technology-Organisation



Main task for the Center in HF/MTO

Overall goals

- Ensure that HF/MTO is taken into account in the Transport Agency's core activities (i.e. oversight)



Starting points

- Intermodal
- Increased learning, finding synergies
- Strategic development
- Overall support
- Safety

Sample of Center of competence activities and deliverables

Strategic development

- HF/MTO generell

- Ma
- Def
- HF

- Initi

- Fat
- Aut
- Safe

- Safe

- Ove
- Def
- Gui

- Mapping regulatory requirements
- Investigation (two governmental inst)



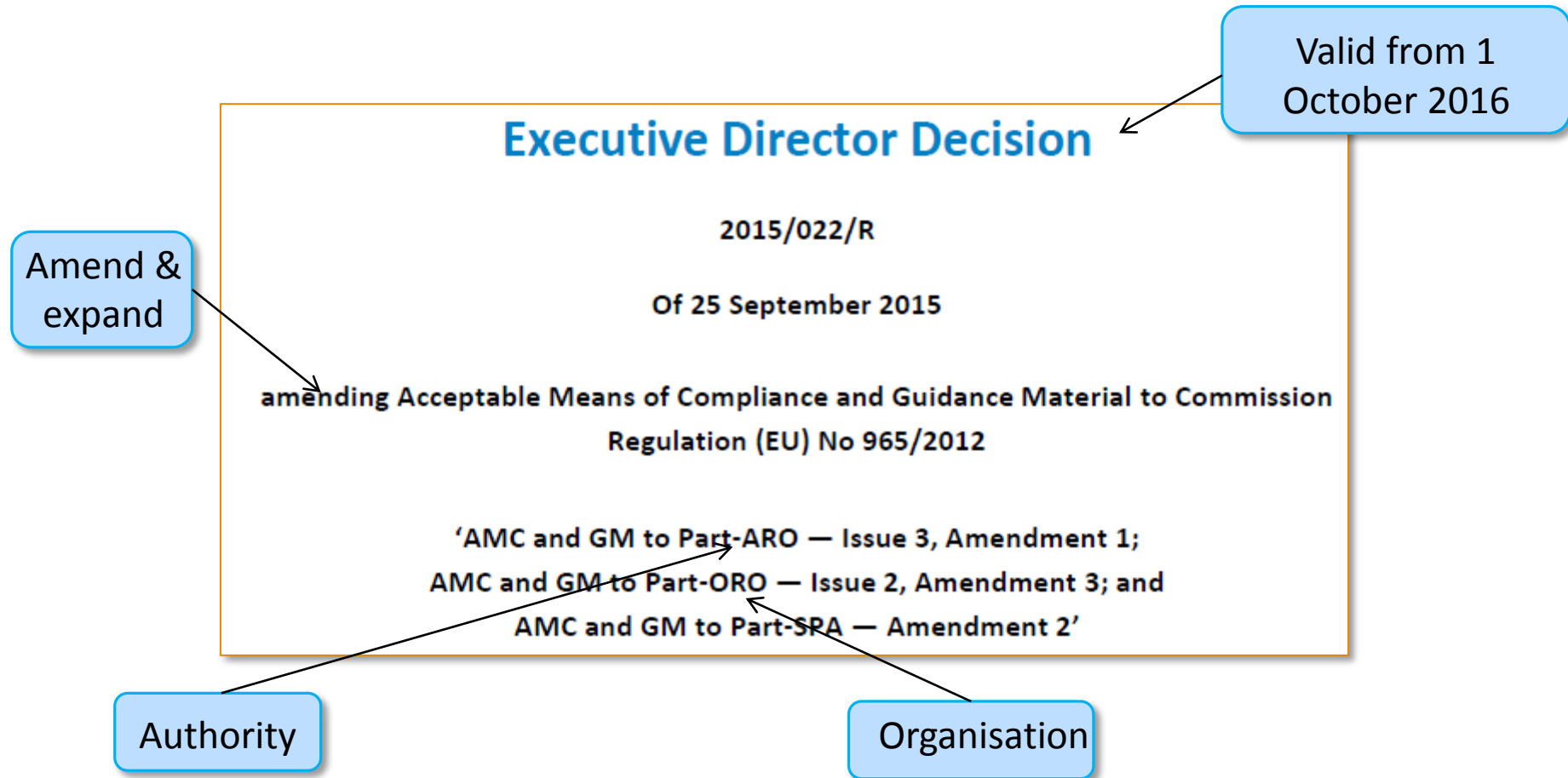
How about CRM-training?



Civil Aviation and
Maritime Department



Executive Director Decision for CRM



For the authority (our GAP-analysis)

AMC3 ARO.GEN.200(a)(2) Management system

QUALIFICATION AND TRAINING — CREW RESOURCE MANAGEMENT (CRM)

For the oversight of the operator's CRM training, the inspectors of the competent authority should be qualified and trained as follows:

(a) Qualification

To fulfil the qualification provisions, inspectors should:

- (1) have adequate knowledge of the relevant flight operations;
- (2) have adequate knowledge of human performance and limitations (HPL);
- (3) have completed initial CRM training;
- (4) have received additional training in the fields of group management, group dynamics and personal awareness; and
- (5) have experience in the assessment of the effectiveness of training programmes and management systems.

Fulfilled

(b) Training

The training of inspectors should be both theoretical and practical, and should include:

- (1) in-depth knowledge of the CRM training elements as laid down in Part-ORO; and
- (2) specific skills for the oversight of the operator's CRM training including the assessment of non-technical skills using proper techniques and methodologies.

Not fulfilled

Preparations for the oversight of CRM

- **Day 1 (spring 2016-present):**
 - Introduction of new AMC/GM
 - Introduction of new elements/topics
 - **Day 2 (fall 2016-present):**
 - Introduction Non-Technical Skills
 - Selected elements AMC/GM
 - Method and process for the oversight of CRM
 - **Day 3 (fall 2017):**
 - Practical assessment of NTS
 - Cont. Selected CRM topics
 - Evaluation/group discussion of our new oversight method
 - **Recurrent training FOI (min twice annually)**
 - Selected elements/topics (i.e. communication and non-reg topics as Safety-II)
-

Sample new elements & subjects (from syllabus)

- Surprise & startle effect
- Resilience development
- "Learn from positive experiences and occurrences" (i.e. "Safety I to Safety II")
- Training in group dynamics, group management and personal awareness
- More transparent connection to the operators' Management System (reporting, learning from experiences in the CRM-program etc.)

What level of knowledge should we as authority aim for?

- *"The inspectors should receive training regarding their own personal awareness to make them more "sensitive" towards the importance of these elements in the context of CRM training"*
- *"This part concerns the inspectors with the aim to have the same approach/ level like for CRM trainers. Here it is about the train the trainer course content specifically mentioned for CRM trainers. The inspectors should have good knowledge to judge the education concept for those trainers"*

Knowledge of
the elements



Is the operator's CRM
program good enough?

Develop our understanding of
why these elements are important



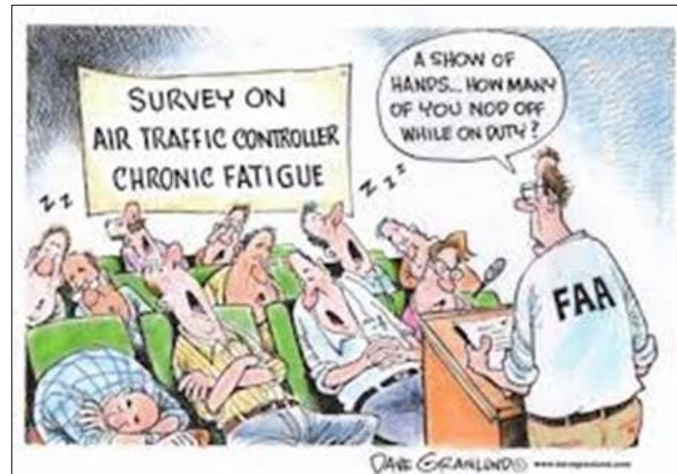
How can this affect my assessment
of the operator's program?

Anything else that could affect our assessment?

Sometimes it may very well be that we know how things are without getting an answer?

The operator's existing CRM-programs?

The operator's general/previous record?



Our own CRM experience?

Our own view on CRM?

A reasonable starting point is that most operators see the need for CRM and therefore develop as good CRM programs as possible, given prevailing conditions

Break down and operationalize (what to take with me as an inspector?)

Group dynamics

- How does the instructor take into account the composition of the group? (Background, nationality, culture, etc.)

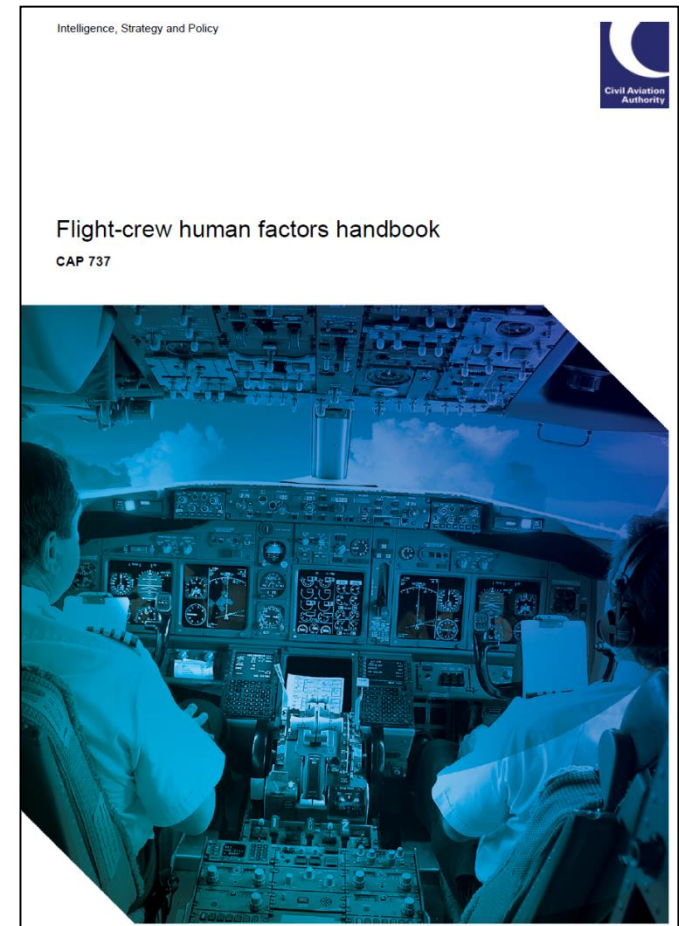
Group management

- How does the instructor handle the different situations that arise? (Different interpretations, views, pro or neg to CRM?)

Has the operator provided the instructor with sufficient knowledge, skills and prerequisites for transforming theory into practice?

Examples from CAP 737 (UK CAA)

- Facilitation skills
- How context affects our decision making
- Group think
- Norms & roles (formal & informal)
- The ability to act as a "CRM-role model"



Elements subject to our oversight

GM3 ARO.GEN.300(a);(b);(c) Oversight

CHECKLIST FOR CRM TRAINING OVERSIGHT

The following list includes the major elements for the monitoring of the operator's CRM training:

CRM & MS,
course content,
qualifications

Where? (facilities)

How? (methods)

Analysis &
evaluation

- (a) development of CRM training considering the operator's management system;
- (b) content of the CRM training syllabus;
- (c) qualification of CRM trainer;
- (d) training facilities:
 - (1) classroom;
 - (2) flight simulation training device (FSTD);
 - (3) aircraft; and
 - (4) cabin training device;
- (e) training methods:
 - (1) classroom training (instructions, presentations and behavioural exercises);
 - (2) computer-based training (CBT);
 - (3) line-oriented flight training (LOFT); and
 - (4) check or test;
- (f) training analysis:
 - (1) pre-course reading and study;
 - (2) integration of the different training methods;
 - (3) competence and performance of the trainer or instructor;
 - (4) assessment of flight crew members; and
 - (5) effectiveness of training.

Planning phase

- Where do we start and with what? (theme, selected parts of AMC, roles etc.)
- Selection of oversight activity?
 - Audit of CRM-syllabus
 - Observing classroom sessions (i.e initial, training of CRM-trainers)
 - Simulator (check & training)
 - Line-ops (check & training)
- Previous Audits:
 - Results: What have we seen? (Areas that we know should be included in the upcoming audit)
 - History, international highlights (prioritized areas i.e. NBM & culture)

Organisations have achieved different levels of CRM implementation

- **Example operator (Wideroe):**

How to create a new assessment

- Analyze present
- Choose theory
- Human and lea
- International ar
- Company policy
 - Leadership con
 - Trust
- Be brave!

Competence
Test
Learning
Root caus
Complexity
Violatio
Respond
Threat

Cancel Line Check 2016 vs2

Overview Assessment Finalise DOE, JOHN Finalise HARPER, BRIAN Configuration

? LANDING NO STD NO -- - 0 + ++

This phase is from 50 ft until taxiing of the runway.

RMK ? OBSERVATIONS NO S H Op Ob T

Doe, John remark Windshear 15-25 kts, moderate turbulence

Harper, Brian remark Windshear 15-25 kts, moderate turbulence

RMK ? SHOOT Potential NO 1 2 3 4

RMK ? Adaptation NO WA H M L

Input from EASA (CRM seminar 2016)



Standardisation Findings on CRM

Competent Authorities



Approval and oversight of flight crew training and checking by CA:

- OPS Findings linked to an inadequate verification of compliance before issuing approvals or to an inadequate verification of continued compliance.
- In several cases, CRM was explicitly mentioned as one of the elements not adequately verified in operators' operations manuals, such as:

Findings Text cont.:

- Methodology CRM Skills Assessment
- Training (line checkers)
- Updating of CRM program

Legal Basis

ARO.GEN.310

Finding Text

When sampling operations manuals, it was found that there was no thorough review of the operations manuals [...]

- For 3 out of the 4 sampled operators, the methodology for the assessment of CRM skills was missing; [...]

the check-list, a following:



Examples of areas in our oversight of CRM

- CRM Training & Syllabus
 - ✓ How far has the operator come with the new AMC / GM? (focus on new elements such as resilience, startle effect, safety culture)
 - ✓ Integration of CRM in the various programs (i.e. repetition)
- Flight Crew CRM Trainer:
 - ✓ The Operator's established requirements (competence, training, how does the documentation look like, etc.)
- Assessment of CRM-skills:
 - ✓ Method, training of assessors, use of assessment data, connecting the SMS to the CRM program etc.

CRM Guidance Material

- Short reference document to inspectors (refresher and gaining new CRM knowledge)
- General indicators of effective CRM in an organization
- Distributed over:
 - ✓ Operator
 - ✓ CRM-trainers
 - ✓ Flight Crew
- Inspirations/ref from CAA UK CAP 737

What is effective CRM?

The purpose of this list is to provide general indicators on how effective CRM can look like in an organisation. The list contains 10 indicators each for the operator, CRM instructors and flight crew. As operators are different and of varying sizes, complexity etc., some indicators may be more relevant than others depending on the case.

This list can be used as a starting point for inspectors to develop their skills in and understanding of CRM. For example, the items listed under CRM instructors give an impression on what to expect of a good instructor.

Selected parts of a certain area or from all three of them can be integrated in inspectors' recurrent training for that sector, or be used to stimulate discussion on what kind of questions should be asked and what can/should be included in CRM oversight.

Operator:

1. CRM is integrated in various training programmes.
2. CRM design is, as far as possible, based on firm scientific evidence.
3. The purpose and objectives of CRM are highlighted in training and SMS monitoring.
4. Information from training is used to assess and evaluate CRM skills. Skills are individually assessed (rather than only CRM pass/fail).
5. Connection with FDM and/or ASR includes an analysis of CRM issues.
6. Safety management system (SMS) takes account of CRM issues (risk identification, analysis, actions etc.).
7. CRM material is distributed to crew and instructors (articles, investigation reports, study material etc.).
8. CRM instructors receive sufficient and relevant training for CRM, both at the level of initial and recurrent training.
9. CRM knowledge is well established from management level to flight crews and instructors.
10. Joint training is provided where appropriate.

CRM instructor:

1. The objectives of CRM training are clearly defined in the form of specific skills to be promoted and developed.
2. Behavioural markers are used in assessment, briefing and debriefing in an open and trustful way.
3. The instructor is able to identify and find the root causes of effective as well as ineffective CRM.
4. Simulator sessions allow the crews to practise time management skills in a way that replicates the real world (e.g. LOFT).
5. The instructor can provide practical CRM advice that helps to improve pilot/crew performance.
6. The instructor can illustrate different CRM models and concepts to further the knowledge and understanding of CRM.
7. The instructor facilitates the lessons well.
8. To maximise learning, the instructor focuses on a reasonable number of CRM issues in debriefing.
9. The instructor is a reliable CRM model for his/her colleagues and students.

CRM Guidance Material

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CRM instructor:

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Flight crew:

1. Pilots are familiar with the operator's behavioural markers.
2. Pilots show clear indications of CRM skills (e.g. communicate well, engage crew members).
3. Cockpit work is professional and relaxed.

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Inspector's checklist with questions to the operator in the oversight of CRM

- Left column GM for the authority and notes
- Middle column questions to the operator
- Right column link to current AMC / GM and notes for the inspector
- The intention is not to cover all areas during one and same oversight activity but rather to select a few topics/visit.

Relevant AMC/GM Competent authority (ARO, Authority) and notes	Oversight of the operator's CRM-program	Applicable AMC/GM for the operator (ORO, Organisation) and notes
GM3 ARO.GEN.300(a);(b);(c) Oversight CHECKLIST FOR CRM TRAINING OVERSIGHT	Sample of questions to the operator	AMC1 ORO.FC.115 Crew resource management (CRM) training CRM TRAINING — MULTI-PILOT OPERATIONS
(a) Development of CRM training considering the operator's management system	<i>Integration of CRM to the Management System:</i> 1. How do you ensure that risks / hazards identified by the management system are used in your CRM program and training? 2. What are you using from the management system in the process of updating / developing your CRM programs? (Eg risks / hazards, CRM assessments, well-managed situations, event reports)	(a) General: (7) Management system CRM training should address hazards and risks identified by the operator's management system described in ORO.GEN.200. <i>Under the training elements section, the following connection to the operator's management system is found:</i> (d) Annual recurrent CRM training: (2) Operators should update their CRM recurrent training programme over a period not exceeding 3 years. The revision of the programme should take into account information from the operator's management system including the results of the CRM assessment. (f) Training elements: 7) Case studies (i) CRM training should cover aircraft type-specific case studies, based on the information available within the operator's management system, including: (A) 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 (B) analysis of occurrences that were well managed. (ii) 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.
GM3 ARO.GEN.300(a);(b);(c) Oversight CHECKLIST FOR CRM TRAINING OVERSIGHT	Sample of questions to the operator	AMC1 ORO.FC.115 Crew resource management (CRM) training CRM TRAINING — MULTI-PILOT OPERATIONS
b) Content of the CRM training syllabus <i>Notes: The topics (elements) that are to be found in the CRM education can be found in the table contained in EASA's documents Annex II to ED Decision 2015/022 / R. It</i>	<i>CRM training syllabus:</i> 1. How do you ensure that the relevant CRM elements are reviewed and covered to the extent specified in the table? (Ref: Annex II to Decision 2015/022 / R: Table 1 - Flight Crew CRM Training)	g) CRM training syllabus Table 1 below specifies which CRM training elements should be covered in each type of training. The levels of training in Table 1 can be described as follows:

Sample CRM oversight questions to the operator

Relevant AMC/GM Competent authority (ARO, Authority) and notes	Oversight of the operator's CRM-program	Applicable AMC/GM for the operator (ORO, Organisation) and notes
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Samples questions CRM-trainer/instructor

GM3 ARO.GEN.300(a);(b);(c) Oversight CHECKLIST FOR CRM TRAINING OVERSIGHT	Sample of questions to the operator	
(f) Training analysis:		
(3) competence and performance of the trainer or instructor;	<p><i>Competence and performance of the trainer or instructor:</i></p> <p>4. <i>How do you ensure that your CRM instructors / trainers meet the competency requirements you have established?</i></p> <p>5. <i>What does your competency criteria for instructors / trainers look like? Please show and describe</i></p> <p>6. <i>What are the criteria based on, i.e. What have you used for baseline when deciding on these particular criteria?</i></p>	GM7 ORO.FC.115 Crew resource management (CRM) training FLIGHT CREW CRM TRAINER ASSESSMENT (c) The checklist in Table 1 provides guidance on the assessment of a flight crew CRM trainer. If a flight crew CRM trainer is competent in his/her role, the response to the questions in Table 1 should be 'yes'. When answering the questions in Table 1, justifications and examples related to the responses given should be provided.

Conclusion

- Training of our inspectors is important, they are our "CRM-radar"
- Oversight: Selection of areas/elements and focus initially on them (then proceed at the appropriate rate).
- Shared venture:
 - NAA: Improve the oversight of CRM
 - Operators: meet the new requirements and assure well implementation