NETWORK MANAGER

ANNEX A TO TRM GUIDANCE MATERIAL - TRM MODULES

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Abstract			

This document details the current prototype TRM modules and maps them with the ICAO ATCO Competencies. Several new modules have been identified as necessary to update the current TRM Guidance Material. Additionally some of the current content needs updating to be aligned closer with ICAO standards on ATCO competence.

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DOCUMENT APPROVAL

The following table identifies all management authorities who have successively approved the present issue of this document.

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Edition History

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0.1	12/04/2020	Seychell & Bunjevac	First draft
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1 EXECUTIVE SUMMARY

The Guidelines for Developing and Implementing Team Resource Management were issued in 1996 in order to provide management and operational staff with relevant information to consider when developing and implementing TRM.

A TRM training course, together with course content and training objectives was proposed in Chapter 2 of the guidelines. In this training course, it was suggested that Situational Awareness, Decision-making, Communication, Teamwork, Leadership and Stress Management should form the mandatory subjects of a TRM training course.

Over the years, there have been a number of small changes in the training objectives but the basis had remained the same. In the meantime, ICAO had worked on new Procedures for Air Navigation Services (PANS) with respect to ATCO and ATSEP competencies. Naturally such standards, and the methodologies that evolved from them, had to be taken into account also for TRM training.

This revised guidance document details the current prototype TRM modules and maps them with the ICAO ATCO Competencies. Several new modules have been identified as necessary to update the current TRM Guidance Material. Additionally some of the current content needs updating to be aligned closer with ICAO standards on ATCO competence.

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2 Introduction

2.1 Current TRM Modules

The training content of the current prototype TRM course has six modules as shown in the figure below.
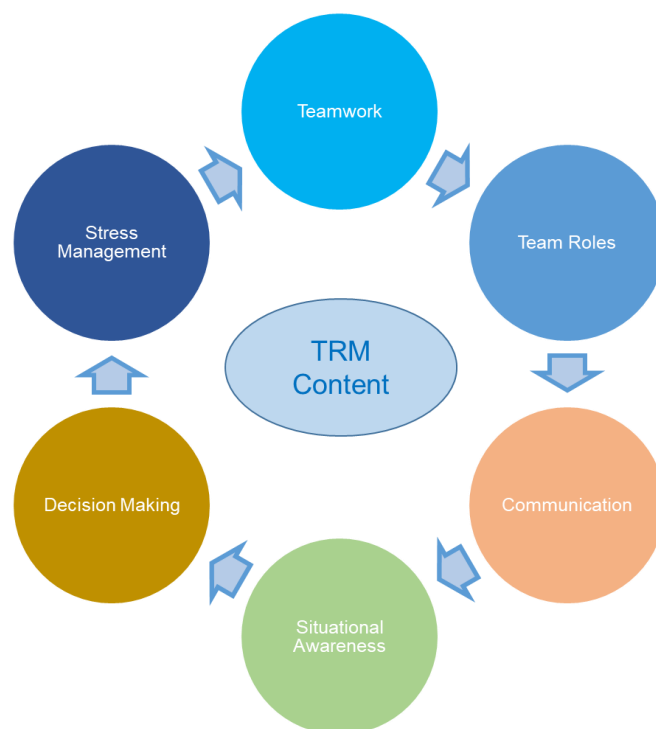
Figure 1 Prototype TRM Modules

Specific training objectives for each module are detailed in Section 3 of this document, while the following paragraphs gives a brief overview of each module.

Teamwork

This module looks at how people work together in teams and the dynamics of groups who work together. It explores what teamwork means in the air traffic control context and how newly-formed groups differ from long-lasting teams.

The module also investigates the way good teams operate and the values of good support and communication.

Aspects of team pressure and the problems of different units working together are also considered.

This module aims in helping participants:

- determine typical characteristics of ATM-related teamwork,

- identify typical attitudes and behaviours of team members that may have positive and negative effects on teamwork,

- identify the importance of recognising different character types within teams and their influence on teamwork,

- be aware of intra- and inter-cultural differences between teams (their own or other units) and sectors develop,

- be aware of the fact that each individual can interpret complex traffic situations differently.

Operational staff would then have the opportunity to come up with ways on how to improve their individual teamwork style and their attitude towards colleagues, thus helping to improve effective teamwork

Team roles

This module explores the various roles found in the team, in particular the roles of leadership and followership. These roles are even more complex because of the subtle but important divisions of role allocation in some ATC situations. The module also looks at the problems that arise from ambiguous roles found in the ops room and from the existence of hierarchical and non-hierarchical leadership structures in some environments.

Leadership roles can be tacitly given, i.e. they evolve from several less tangible things. These may be the personality traits of the individual, in combination with the acquired knowledge and skills that a person has. Many of these 'leadership' qualities are not always given by the organisation, but often the organisation recognises these developed skills and uses them in a less formal way than the giving of management or supervisory roles.

This module aims in helping participants:

- understand the relevant positions and status of team members within an ATM team,

- determine the different roles, duties, responsibilities and the effect of their position in a team,

- be aware how dominant behaviour can have a negative impact on other team member's performance,

- describe authority and assertiveness,

- discuss the role of team supervisors or other team leaders,

- identify specific characteristics which influence leadership within teams,

- determine their attitude towards authority,

- explore effective and ineffective leadership,

- explore effective and ineffective followership.

The operational staff can then develop approaches on how to avoid errors due to misunderstandings arising from ambiguous team roles and adopt various kinds of

behavioural methods, which can help to achieve consistency in order maximise efficient team operation.

Communication

Communication is often cited as the leading cause of error in aviation. Therefore, it is important to explore the complexities that are inherent in this area.

The module looks at the dynamics of communication and the several important variables included in this area; in particular the aspects of verbal and non-verbal exchange. The problems of listening are presented and their association with hearback/readback errors are explored. Finally, those aspects of communication that create barriers to understanding are discussed and comments associated with good communication practices are presented.

This module aims in helping participants

- be aware of the danger of bad or confusing communication,

- identify the functions of communication and analyse how communication is being performed within teams and how it can affect safety,

- understand how communication provides information, establishes interpersonal relationships, and maintains attention to tasks and monitoring,

- recognise how misunderstandings can be avoided, suggestions communicated constructively and what effects praise/criticism can have,

- be aware of the barriers to communication and ways of eliminating them.

Operational staff could then develop strategies on how to communicate effectively, how to intervene efficiently in typical ATM-related situations and how to give and receive feedback and constructive criticism.

Situational Awareness

This module explores the personal understandings of situational awareness and its role for the individual in ATC. It discusses how the equipment enhances, or otherwise, the ATCO's mental picture. It is important that situational awareness between individuals is shared. The module also focuses on detecting the deterioration and the recovery of situational awareness.

Additionally the issues of team situational awareness are addressed and the complexities of the ATCOs maintaining the same picture as the pilots they control.

This module aims in helping participants

- understand situational awareness,

- identify symptoms of deteriorated situational awareness,

- identify factors that may have a positive or negative influence on situational awareness,

- be aware of the effect of high and low workload on situational awareness.

Operational staff would then have the opportunity to develop appropriate ways and methods to address deteriorated awareness. Additionally, once the participants

understand the effect of shared mental models, they can look into how to develop common understanding of typical situations that may influence efficient teamwork.

Decision making

This module explores the characteristics of decision making and the fact that in ATC there are several different types of decision making processes/methods which are used, in particular, tactical and strategic methods. The problems of judgement errors as well as successful solutions brought by adequate judgement calls are addressed from both an individual and team perspective.

Finally, the module looks at individual decision making styles and attitudinal differences.

This module aims in helping participants

- appreciate the work factors that can have an influence on safe and efficient decisions for themselves and team members,

- understand factors which contribute to effective team decision-making,

- understand the structured process of decision-making in special situations.

The participants would then be able to come up with ways on how to use interpersonal diplomacy, appropriate assertiveness and team-oriented decision-making in order to generate positive reinforcement and respect within a team in order to maintain a safe working environment and improve it.

Stress Management

The module looks at what stress is and how it effects each individual in both positive and negative ways. It explores the symptoms of stress and how these can be managed.

This module also investigates the work stressors found in ATC, and, in particular, that stress which is found in the individual, besides those stressors which effect the team.

This module aims in helping participants

- understand job-related stress situations,

- recognise the effects of stress on teamwork,

- learn how to avoid stress through better planning, priority setting and workload delegation.

The participants would then be able to come up with ways to minimise stress and cope with stress situations in teams.

2.2 ICAO Competency Framework

In 2016, ICAO issued a new Competency Framework for ATCOs and ATSEPs as part of PANS-Training , which becomes applicable in November 2020. In early 2017, the implementation guidance document, Doc 10056 Manual of Air Traffic Controller Competency-based Training and Assessment, was published.

The work done by ICAO on the Competency Framework is of interest and can be used as a means to specify and enhance HF training in view that the majority of the ICAO ATCO/ATSEP competencies incorporate elements of HF in them.

Assessment of ATCO/ATSEP competencies is a required standard. The assessed competencies can be seen as 'Technical' and 'Non-Technical'. However, competencies are not and cannot be clearly separated. The listed ICAO competencies are integrated at detail level as well because they all refer to the performance expected from a single individual. At the same time the non-technical competencies are often associated with HF skills leading to the assumption that it is possible to assess an individual's improvement in non-technical competencies during TRM sessions. The opinion of TRM practitioners and specialists is that attempts in measuring ATCO competence during TRM sessions will be misleading. ATCO on-going competence is part of assessment process performed by competence assessors that integrates both technical and non-technical job elements. TRM is an operational HF maintenance programme and Acceptable Means of Compliance in fulfilling ATCO HF continuation and unit training requirements.

This document maps the current TRM modules with the ICAO ATCO competencies in order to demonstrate where it aligns with the ICAO competence standards or what is required to align the current TRM modules with these standards.

2.3 ATCO Competency Framework

ICAO's ATCO Competency Framework specifies the Competency Unit, the Competency Element and the Performance Criteria/Observable Behaviour. The latter component was found to be extremely illustrating because several competency units that, at first looked as pure 'technical' competencies, had a number of 'non-technical'/HF performance criteria/observable behaviours associated with to them. This reaffirms the statement above that 'technical' and 'non-technical' competencies cannot be clearly separated.

2.4 Linking TRM with ICAO Competency Framework

Work on linking the TRM guidance material with the ICAO Competency Framework started even prior to the public release of the ICAO document.

In September 2017, during a TRM workshop in Brussels, an exercise was undertaken to identify the gaps and the matches between ATCO/ATSEP competencies and the existing TRM modules.

The work was continued during a TRM working session held at IANS Luxembourg in April 2018, where a group of TRM, HF and Training experts mapped the TRM module objectives with the Competency Elements and Performance Criteria/Observable

Behaviour specified in ATCO Competency Framework. This exercise indicated that the present TRM modules already address many of the Performance Criteria/Observable Behaviours.

Two ICAO Competences, namely Traffic and Capacity Management and Separation and Conflict Resolution, were considered to be purely technical and any HF Performance Criteria/Observable Behaviours associated with these competencies were adequately addressed by the criteria specified for the other competences.

The conclusion from the April 2018 event was that there were some gaps, which had to be addressed by either revising the current modules or creating new ones. Consequently, a working group was formed to analyse the results of the workshop and propose a way forward. Chapter 6 of this document details the contributors and reviewers of this guidance material.

3 Gap Analysis between ICAO ATCO Competencies and TRM Modules

3.1 Purpose

This section outlines the objectives of the current TRM modules, the results of the mapping with the ICAO ATCO competencies, additional objectives and recommendations.

3.2 ICAO ATCO Competencies

ICAO Document 9868 specifies ten ATCO competencies:

- Situational Awareness,
- Traffic and Capacity Management,
- Separation and Conflict Resolution,
- Communication,
- Coordination,
- Management of non-routine situations,
- Problem Solving and Decision making,
- Self-Management and Continuous Development,
- Workload Management,
- Teamwork.

3.3 Teamwork

The training objectives of this TRM module are:

- Discuss teamwork and why it is needed in ATM,
- Identify various models of teamwork and discuss their components,
- Share positive and negative aspects of teamwork
- Identify safety related issues concerned with Teams and Teamwork in ATM,
- Develop strategies to ensure good teamwork practices,
- Develop strategies to identify peer pressure.

ICAO Competences	Current TRM Module
Self-Management and Continuous Development Workload Management Teamwork	Teamwork
Additional Objectives Teamwork	

Upon review it was noted that:
 	
• Diversity discussion to be included in the Teamwork module and address:
 	
    o Think and discuss how we interpret the term "diversity,"
 	
    o Analyse concrete examples,
 	
    o Develop strategies to accept and respect differences and similarities between themselves and others,
 	
    o Discuss and analyse positive and negative impact automation has on teams,
 	
    o Analyse the relationship between automation and trust.	

Table 1 Gap Analysis between ICAO competency elements and current TRM Teamwork module

3.4 Team Roles

The training objectives of this TRM module are:

• Develop an understanding of the formal and informal hierarchical structures in the ATM system,

• Discuss positive and negative aspects of having clear and prescribed team roles,

• Develop an understanding of how attitudes towards authority are formed and how a person defines his/her own authority,

• Develop strategies to avoid misunderstandings arising from the roles of leadership and followership,

• Develop strategies to deal with submissiveness and aggressiveness,

• Develop strategies to foster assertiveness.

ICAO Competences	Current TRM Module
Workload Management Teamwork (leadership)	Team Roles
Additional Objectives Team Roles	
Upon review it was noted to include: • Discuss and analyse concrete examples how workload influences interactions between the roles team members have, • Discuss and analyse positive and negative impact automation has on the existing team roles and interactions. Note Leadership discussion is a part of the existing Team Roles module.	

Table 2 Gap Analysis between ICAO competency elements and current TRM Team Roles module

3.5 Communication

The training objectives of this TRM module are:

• Discuss the nature, functions and forms of communication,

• Illustrate communication in ATM,

• Analyse breakdowns in communication, their sources and impact on safety in ATM,

• Share successful communication examples,

• Develop strategies for effective and safe communication,

• Develop strategies to give and receive constructive feedback.

ICAO Competences	Current TRM Module
Coordination (effective COMM) Self-Management and Continuous Development (communicating change) Workload Management (distraction management) Teamwork	Communication
Additional Objectives - Effective Communication (new title proposed)	
Upon review it was noted to include: • Discuss impact of automation in daily life communications, • Discuss and analyse positive and negative impact that automation has on communication in ATC environment,	

- Analyse benefits/drawbacks of sharing emotions,

- Explore limits to sharing,

- Develop strategies to share/respond to emotion in contributory manner.

Note

Performance criteria/observable behaviours specified in the ICAO competency element 'Coordination' are closely linked to the objectives of the TRM modules 'Communication'. The current TRM Communications module needs to be reviewed to ensure it address' 'Effective Communication' as indicated for the ICAO Coordination competency element.

Table 3 Gap Analysis between ICAO competency elements and current TRM Communication module

3.6   Situational Awareness

The training objectives of this TRM module are:

- Discuss situational awareness and its role and impact in ATM,

- Identify various models of situational awareness and analyse their components, in the context of ATM,

- Analyse errors and breakdowns in situational awareness and their impact on safety in ATM,

- Discuss diminished situational awareness,

- Develop strategies to improve gaining and maintaining situational awareness,

- Develop strategies to detect deterioration of situational awareness

- Develop strategies to recover from deteriorated situational awareness.

ICAO Competences	Current TRM Module
Management of non-routine situations (recognition, identification) Self-Management and Continuous Development Workload Management (distraction management) Teamwork	Situational Awareness
Additional Objectives Situational Awareness	
Upon review it was noted to include: • Discuss and analyse the positive and negative impact automation has on individual and group situational awareness, • Analyse the relationship between automation and trust,	

> • Develop strategies to recognise benefits and drawbacks of automation and possible actions in case of system disturbances.

Table 4 Gap Analysis between ICAO competency elements and current TRM Situational Awareness module

3.7 Decision Making

The training objectives of this TRM module are:

- Discuss decision making processes and the factors that influence them,

- Share examples of successful and less successful decisions made,

- Discuss opportunities, limitations and errors in decision making,

- Analyse the notion of responsibility, both individual and shared,

- Develop strategies to improve identified steps and elements of various decision-making processes used in operations.

ICAO Competences	Current TRM Module
Coordination (effective Decision Making) Workload Management Problem Solving and Decision making Management of non-routine situations (priority, creation)	Decision Making
Additional Objectives Decision Making	
Upon review it was noted to include: • Discuss and analyse how automation is integrated in decision making process, • Analyse the relationship between automation and trust. <u>Note</u> Performance criteria/observable behaviours specified in the ICAO competency element 'Coordination' are closely linked to the objectives of the TRM module 'Decision Making'. The objectives of the TRM module 'Decision Making' are practically a match for the performance criteria/observable behaviours specified for the ICAO competency element Problem Solving and Decision Making. There was thus a proposal to rename the current TRM module as 'Problem Solving and Decision Making' to ensure a complete match.	

Table 5 Gap Analysis between ICAO competency elements and current TRM Decision Making module

3.8 Stress

The training objectives of this TRM module are:

- Discuss stress and how it affects the ATCO's work in positive and negative way,

- Share job related stress situations,

- Develop strategies to cope with stress and its effects,

- Analyse how stress affects teamwork,

- Develop strategies to recognise and cope with stress situations in teams.

ICAO Competences	Current TRM Module
Management of Non-Routine Situations (mindfulness issues) Workload Management (mindfulness issues) Self-Management and Continuous Development	Stress
Additional Objectives Stress	
Upon review it was noted to include: • Understand permanent interaction between body and mind, • Recognise symptoms of stress and reduce negative emotions like frustration, anger etc., • Discuss ability for good decision making and problem solving under pressure, • Discuss and analyse system/automation disturbance cases and effect on individual and team stress, • Develop strategies to recognise system disturbances that generate stress and possible stress mitigations. <u>Note</u> A 'Resilience Management' module was developed and this new module would address some of the identified gaps.	

Table 6 Gap Analysis between ICAO competency elements and current TRM Stress module

3.9 Additional Considerations

i.   Two ICAO competences, namely 'Traffic and Capacity Management' and 'Separation and Conflict Resolution', were considered to be purely technical and any HF/HF Performance Criteria/Observable Behaviours were adequately addressed by the criteria specified for the other competences.

ii. There was initially a proposal to have a new TRM module titled 'Automation'. After the initial review it was considered that it would be better to have the 'Automation' proposed objectives distributed throughout the current six TRM modules because automation plays a significant role in all six areas.

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4   REFERENCES

ICAO Doc 9868 Procedures for Air Navigation Services — Training

5   ABBREVIATIONS AND ACRONYMS

ANSP	Air Navigation Services Provider
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATM	Air Traffic Management
ATSEP	Air Traffic Safety Electronics Personnel
ENAIRE	Spanish ANSP
HF	Human Factors
IANS	(EUROCONTROL) Institute of Air Navigation Services
ICAO	International Civil Aviation Organisation
INGENAV	ATM Consulting and Training Company
LFV/NUAC	Swedish En-route ANSP
NATS	UK ANSP
NAV Portugal	Portuguese ANSP
TRM	Team Resource Management

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Appendix 1 - Proposed New Modules

A1.1 Change Management

Rationale

New procedures and technology will certainly change the roles and functions of controller tasks and teamwork. Some future ATM system concentrate primarily on support and computer assistance tools for the tasks of individual controllers but not for teams. The consequence could be that the work connected to collective consultation and decision-making processes is less visible. Flexible rostering arrangements may change the present fixed team structures into more fluid ones. Therefore, the need for training in teamwork skills will increase to maintain efficient task performance in ATM.

Thus, the impact of systems innovations on teamwork needs to be considered. Despite it is not always possible to anticipate all system changes, provision should be made to ensure the continuity and stability of teamwork that enables teams to cope with system changes in the work environment. Consequently, TRM will need to take account of system changes.

Generic description

Change management is a systematic approach to dealing with the transition or transformation of an organisation's goals, processes or technologies.

This module addresses the definition and impact of changes, and it appeals to both organisational and personal attitudes and strategies to better manage change. The importance of change management has increased due to knowledge and innovation expanding at an accelerating rate. Coping with the rapid rate of innovation becomes a key factor for the development and survival of organisations, products, processes and even individuals. Change management is a systematic approach to dealing with the transition or transformation of an organisation's goals, processes or technologies. This process requires an appropriate approach towards change from both the organisation and the individual. Individual abilities are needed to effectively face change and become more resilient and allow progress.

The objectives of this modules are:

• Create awareness and understanding regarding change within the organisation and its individuals

• Discuss how individuals and organisations experience change

• Identify the factors contributing to success in change management

• Identify the challenges that ATM professionals face in change management

- Develop strategies to enhance personal contributions to the factors that led to successful change management.

- Develop strategies to enhance personal abilities to face challenges effectively

- Discuss how to create a supportive structure to enable sustainable adaptation to change

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