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**1**

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## **SAFETY HUMAN PERFORMANCE SUB-GROUP**

### **WORKING AREA 10 SAFETY AND TEAM WORK FACTORS**

#### **TRM IMPLEMENTATION 2014**

#### Introduction

Teamwork plays an essential role in the provision of ATM services. There are various professionals involved and they need to interact effectively together to ensure the safe, orderly and expeditions flow of traffic.

#### Scope of Survey

The purpose of the 2014 was to study the evolution of TRM Implementation over the past three years. It also checked on the effectiveness of the EUROCONTROL TRM support.

Some ANSPs run other Human Performance enhancement programmes similar to TRM but call them a different name. The survey also attempted to address this matter.

### Survey Method and Size

A small questionnaire highlighting key issues regarding this matter was prepared and distributed to members of the Safety Team and Safety Human Performance Sub-Group. The Safety Team were also addressed because not all ANSPs have nominated a representative on the SHP SG.

It was planned to follow the questionnaire by an unstructured telephone interview where clarification was needed. However, as many of the respondents provided detailed answers to the questions posed, this was not necessary. There were several small queries but it was possible to address them through email correspondence.

All EUROCONTROL States were addressed in the request for information. A check with the ESSIP 2012 report reveals that besides Maastricht UAC (MUAC), all states were reporting on HUM02.1. Additionally, besides the civil ANSP, a number of states declared that this objective was also to be met by their military providers.

Twenty-six replies were received – from MUAC, 23 civilian ANSPs or combined civil-military ANSPs and 2 military ANSPs, either via the questionnaire or via email exchange. This response represents 62% of the member states (including MUAC) obliged to implement TRM through HUM02.1. Although this sample size was not scientifically calculated it was considered to be quite representative of the present situation. Furthermore it was ascertained that the respondents were from different types of ANSPs (e.g. small vs. large, mature vs. developing, high vs. low traffic, geographical location) thereby further strengthening the validity of the responses.

Results and their Analysis

Response

	2014 Survey		2011 Survey	
ANSPs	Civil	Military	Civil	Military
Response	24	2	19	2

Figure 1 Responses

41 states and MUAC were within the area of applicability of HUM02.1. On the other hand this objective was not applicable to 27 Military ANSPs because they do not provide ATC to GAT. Also some ANSPs are combined civil-military. It could not be ascertained if all solely military ANSPs received the survey questionnaire because not all states have nominated a military representative on the Safety Team or other EUROCONTROL safety/human performance related bodies.

TRM Implementation

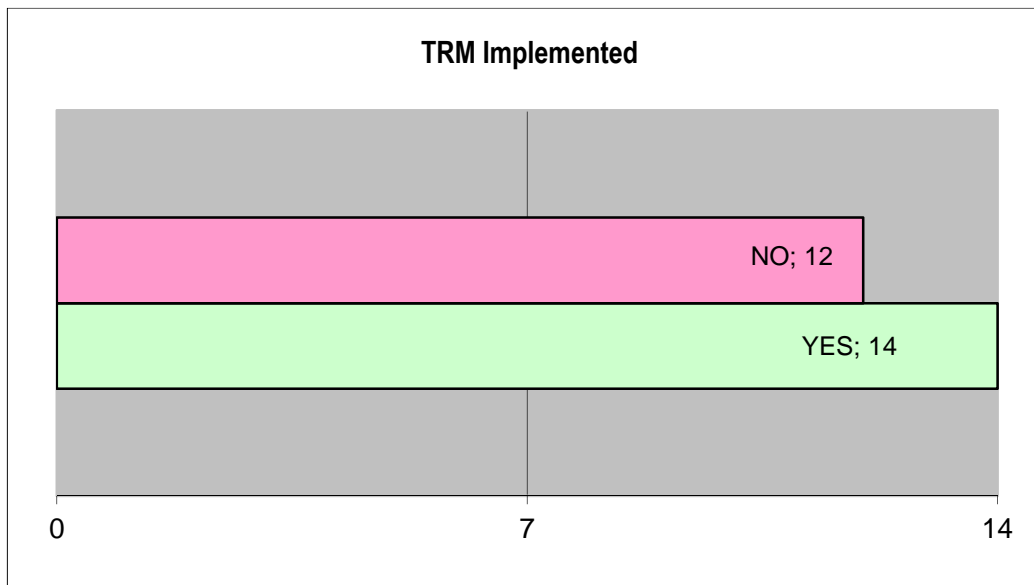


Figure 2 TRM Implementation

Figure 2 shows that there were 14 positive replies. This compares unfavourably with the response to the same question made in 2011 when 16 ANSPs had replied positively. This downward trend becomes more significant when one compares the response rate of the two surveys. (See Figure 1)

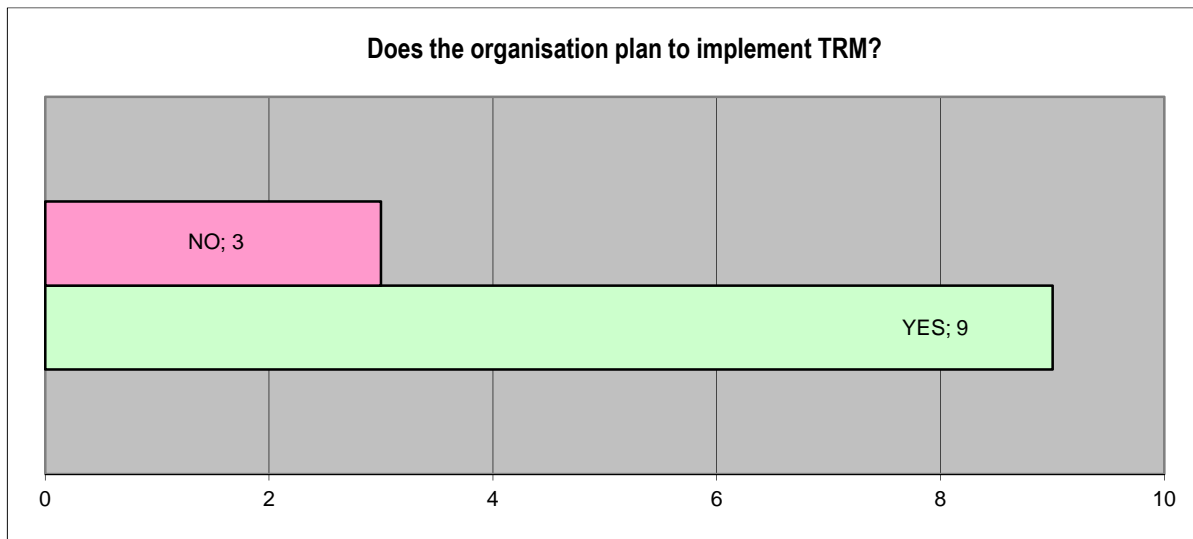


Figure 3 Planning to implement TRM

A good number of the respondents who had replied in the negative regarding TRM implementation indicated that their organisation plans to implement it. The range of time-frames mentioned is though quite extensive because it stretches from a few months through several years to the non-committal 'future'.

According to the *ESSIP Report for 2012*, out of the 45<sup>1</sup> civil ANSPs to which Objective HUM 02.1 applied, 26 had reported that they had implemented TRM while 14 stated that they planned to do so. Additionally 9 military ANSPs stated that this objective had been completed while 2 reported that they had no plans for TRM implementation from the total of 15 military stakeholders to whom the objective was applicable.

There is clearly a discrepancy between what was reported in the ESSIP and the data gathered by the 2014 survey. From the civil side, some of the discrepancy could be explained because a few ANSPs did not reply to the questionnaire. It is known that since 2012:

- at least 2 ANSPs which have not replied in this survey have implemented TRM,
- 1 ANSP, which had reported objective completed in the ESSIP, reported in the 2014 survey that it has stopped the programme,
- 2 ANSPs who were planning to implement have stated in the 2014 survey that they have decided to postpone indefinitely implementation.

With regards to the military ANSPs, the discrepancy is easier to explain as it was not possible to reach all of them for the survey.

<sup>1</sup> The ESSIP covered 41 states and MUAC but 3 states reported that they had 2 ANSPs.

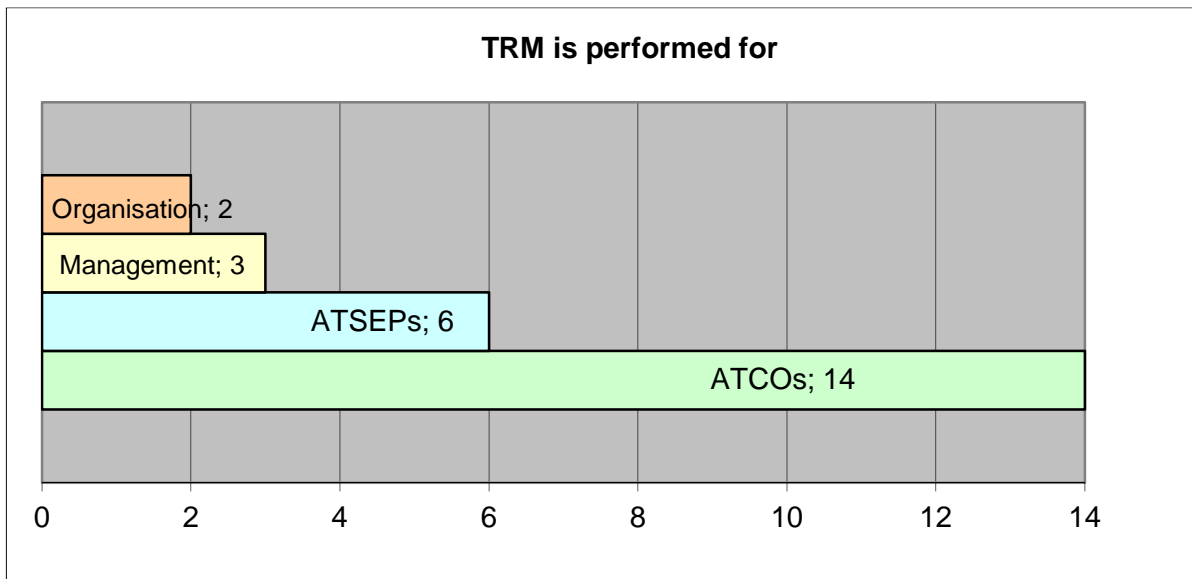


Figure 4 Scope of TRM programme

TRM remains predominantly an Ops tool because the programme usually addresses only ATCOs. As indicated in Figure 4 some ANSPs have already expanded the programme to include other ATM professionals and there are others ready to do so. In some ANSPs Watch Managers and lower (administration) grades or ATC Experts holding valid ATC licences or local ATM unit management also participate in the TRM sessions. However these were considered to be part of the Operational/Engineering Staff for the purposes of the survey.

Joint sessions

ATCOs + Ops Mgt	ATSEPs + Eng Mgt	ATCOs + ATSEPs	Other
6		2	5

Figure 5 Joint Sessions – Responses.

Some of the ANSPs reported that joint sessions are held in more than one domain. A few replies indicated that Ops organises sessions between various units e.g. Radar and Tower ATCOs. Comments in the survey indicated that those ANSPs which organise joint sessions consider the joint ATCO-Ops Management sessions as the best way to improve the efficiency of the TRM programme thus leading to improved safety.

It is interesting to note that joint ATCO-ATSEPs sessions are minimal while none of the ANSPs include Engineering Management in their sessions. One ANSP is planning to organise joint ATCO-ATSEP sessions while another finds the idea interesting but considers it difficult to implement on a voluntary basis.

A few replies showed ATCO sessions are held in conjunction with other professions. The most common of these were pilots, flight data assistants, flow controllers, flight information

service staff or military staff (both ATCOs and pilots). One ANSP has also performed a joint session with ACC staff from a neighbouring ANSP. Another has reported that bespoke sessions are organised at airports and the participants include ATCOs, pilots, fuellers, loaders and staff from the safety and security services (police and fire).

Responsibility

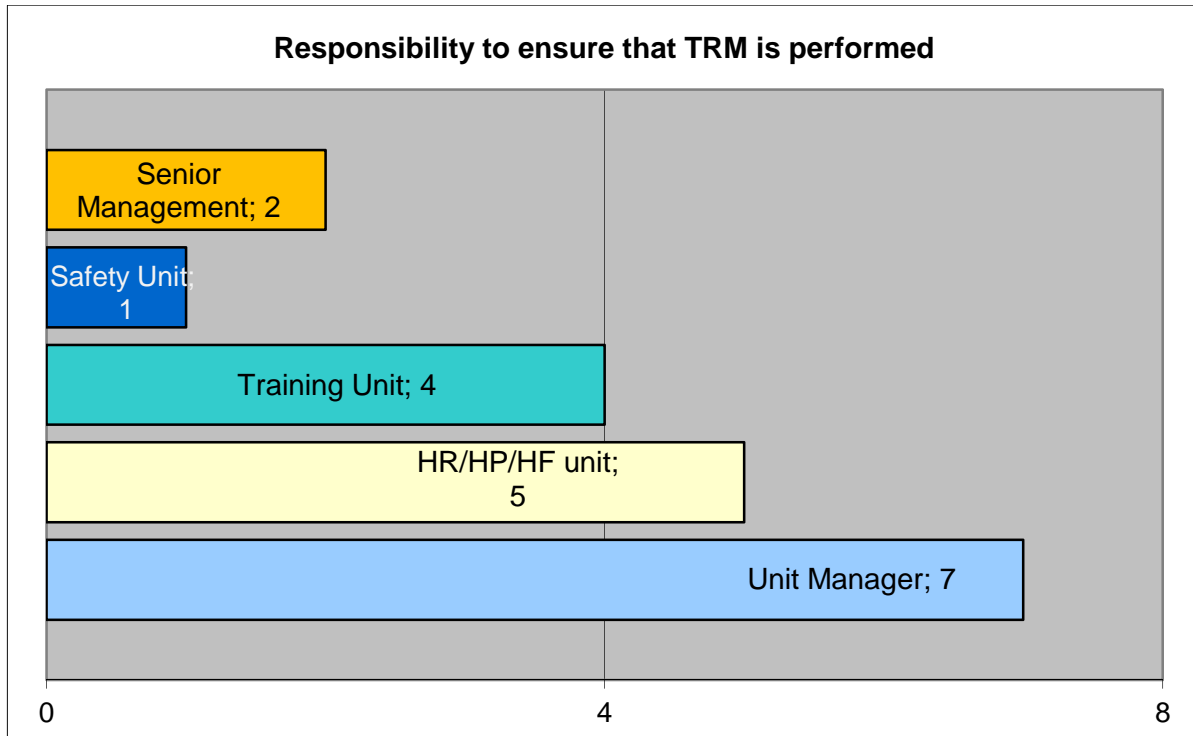


Figure 6 Responsibility for TRM sessions

The responses to this question were very similar to those received in 2011. (See Figure 7) Many of the replies once again showed the Unit Management as primarily responsible to ensure that TRM is performed. Some ANSPs have replied that the responsibility is shared, most commonly with the HP/HF/HR unit or the Training unit. In some cases the responsibility rests with the Safety Unit or even Senior Management.

The responsible manager for TRM may vary in those ANSPs who have implemented TRM for other professionals besides ATCOs. For example, in one case the Unit Manager was responsible for ATCO TRM but the HF unit was responsible for ATSEP TRM.

	Unit Manager	HR/HP/HF unit	Training Unit	Safety Unit	Senior Management
2014	7	5	4	1	2
2011	8	4	2	1	1

Figure 7 Comparison between 2014 and 2011 responses re responsibility for TRM sessions

Review of TRM and feedback

	YES	NO	PLANNED
Is there a review to identify effects of TRM on the system?	9	3	2

Figure 8 Review of TRM

Nine ANSPs have replied that some kind of review is carried out to identify effects of TRM on the system (People, Procedures, Equipment and Environment). This response rate is better than that of the 2011 survey where only 5 of 14 indicated that there is some kind of review. This seems to support the premise made in the 2011 survey that the higher number of negative replies at that time could have been due to the recent implementation of TRM at some of the ANSPs. Once the TRM programme had matured, the ANSPs naturally started to review its effect.

Different methods are used to review the TRM programme. These included:

- Monthly reports which detail the causal factors found in investigation which are attributable to the interface between the pilots and controllers and also controller only team working.
- Evaluation through the quality system.
- Trend monitoring of the types of incidents featured in the programme to observe if improvements have resulted.
- A regular Human Factors coordination meeting organised regularly by Corporate Safety Management where ATSEP and ATCO TRM training delivery is addressed.
- Safety surveys on specific skills and behaviours including team-working issues.

Feedback from TRM sessions is considered important by the majority of the respondents.

The information gathered is used in various ways, such as:

- The results from the sessions are used in further materials in the TRM courses. These will also include areas that need to be clarified which then are included in the next session.
- After each TRM session reports are produced with proper suggestions and actions for departments/management to commit to. These reports are then discussed with unit managers for implementation. Participants also have the opportunity of raising specific questions/problems which are then forwarded to the appropriate contact person(s). In an ANSP the actions arising out of TRM sessions are also published, mentioning the fact that they were derived from TRM sessions.
- An annual report is issued with results and general conclusions to concerned domains.
- Feedback and results are used as inputs to the safety survey programme.
- Integrating suggestions and actions raised during TRM sessions into the simulator exercises and the continuation training case study analysis.

ATCO Competence Scheme

Half of the respondents (7/14) have replied that TRM forms part of the ATCO competence scheme. In two others it is part of the general policy but not included in the Unit Competence Scheme although it may be included in the Unit Training Plan provided that resources are available.

EUROCONTROL Support

The support provided by EUROCONTROL to the implementation and enhancement of TRM consists mainly of three main areas:

- courses,
- documentation,
- on-site support.

The survey sought to understand to see if the ANSPs have used any form of support and, if yes, they were asked at which stage of the TRM programme it was used and also to rate support provided.

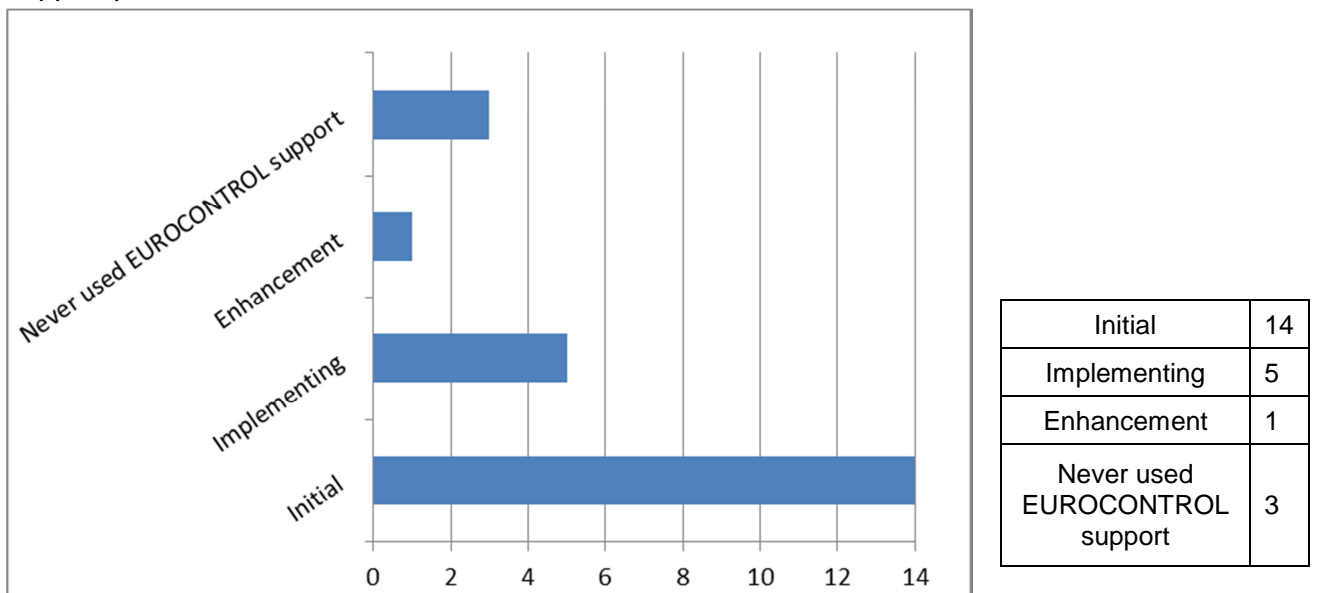


Figure 9 Use of EUROCONTROL support

It is interesting to note that three respondents have replied that they never used EUROCONTROL support. It is known that one of these ANSPs contracts an external provider to deliver TRM, consequently this may account for the negative response. One of the other two negative replies may be due to misunderstanding of the question because the TRM specialists from this ANSP were actually part of the task force that developed some of the EUROCONTROL material. On the other hand a couple of ANSPs which do not plan to implement TRM have also used the TRM documentation to develop internal HF material and have rated the EUROCONTROL documents.



Type of Support			Courses			Prototype Material	Good Practices GM	ORMA	On-site Support
			TRM-A	TRM-P	ARM				
Rating	1	Poor ☹️							
	2								
	3	Inadequate							
	4								
	5	Satisfactory ☺️							
	6					2			
	7	Good	1				1		
	8		2	4		2	2		
	9	Excellent 😊	3	2	1	4	2		2
	10		5	5	1	1	1	1	2
Total Number of Responses			11	11	2	9	6	1	4

Figure 10 Use and Rating of EUROCONTROL support

The results confirm the expectation that the most used form of support were the TRM courses and the TRM Prototype material. It was also satisfying to note that ANSPs were already using the Good Practices Guidance Material. The final draft of this document was available only from September 2014 which was merely a couple of months before the survey was carried out.

On-site support was started a few years ago. Due to EUROCONTROL resource restrictions, it is not possible to offer the support on a wide basis. Currently, two states are using this support as part of their initial implementation of TRM.

The result regarding ORMA was not surprising. Organisational Resource Management for ATM is a concept introduced a few years ago to extend TRM throughout the whole organisation. Many ANSPs have appreciated this concept but cannot find the resources needed to implement it. Two or three ANSPs were initially interested in assisting with the verification and validation of the concept but so far no further work has been carried out. Again, the lack of resources is the primary constraint.

Airport Resources Management (ARM) is aimed towards the airport operators who are encouraged to implement a programme similar to TRM. The low usage of ARM courses as indicated by the reply might be due to the fact that only ANSPs, which are not the target audience of this course, were addressed in this survey.

It is appreciated that many of the respondents rated highly the EUROCONTROL support, particularly the courses. The high 'mark' achieved by these courses can only be attributed to the highly competent instructors/course supervisor. The Prototype Material received the lowest mark; this is not a surprise, mainly because the prototype material was written in the late 90s. While the basic material and principles are still applicable, the document needs to be updated.

No responses were received about other forms of teamwork improving methods.

### Free Text Comments

Many of the survey respondents included free text comments. The majority of these comments addressed either identified benefits resulting from the usage of TRM or recommendations to EUROCONTROL on how to improve its support.

- Benefits
  - The results from the TRM sessions are used as inputs to ATCO refresher courses. We also use the results to feedback to the airlines where appropriate.
  - TRM has led to an improvement of procedures.
  - We identify areas that need to be clarified.
  - During the TRM sessions we try to come to an understanding which includes action for departments/management to commit to.
  
- Recommendations
  - Organise initial TRM awareness sessions and distribute additional info materials to ANSPs that plan to implement TRM in the near future.
  - Develop a facilitator refresher course.
  - We would appreciate more activities in field of sharing of TRM expertise between ANSPs and cases of support by the Management, as well be informed about the actions initiated by the organisations leading in the aviation Safety and HF developments/initiatives.
  - Evolve TRM description and concept as a Safety II tool i.e. get away from the focus on error. TRM can be an adaptive tool in a given working environment, an organisation learning tool, not only an error control mechanism.
  - The TRM structure should align closer to the NOTECHS or CRM soft skills training that have proven effective for the aircraft operators. TRM should be included in Regulation and ANSPs should be forced to adopt and implement a defined and regulatory approved TRM syllabus and structure which should also be an established part of an organisational SMS.

### Conclusions

The picture provided by this survey is a bit confusing when it comes to TRM implementation because only 14 respondents out of 26 (53.8%) indicated that TRM is implemented when compared to the 2011 survey where the positive replies amounted to 76.2% (16/21) of the responses. It is known that at least two ANSPs which have not responded to the survey have implemented TRM.

The survey confirmed that Team Resource Management is well established with respect to the ATCOs while others use it also for ATSEPs. Only one or two ANSP have indicated that they have TRM for other professionals. Organisation-wide TRM, which would include joint sessions by different ATM professions, is yet to be implemented. It seems that many professions are not yet ready to share their experience with outsiders.

Some states have stopped using TRM or did not develop it further. The main reason given is usually lack of resources, both financial and human. Other ANSPs confirmed that they have utilised TRM in the past and it is still part of their safety improvement framework. However there has been a slow decline in its use as it is not implicitly stated in regulation that TRM must be regularly performed.

It is encouraging to note on the other hand the number of states which are planning to implement TRM. The new ATCO Licensing regulation will surely provide impetus to TRM implementation, once the EASA Opinion is accepted and approved.

The ANSPs use various methods to ensure that the lessons learned from TRM sessions are taken on-board as necessary and action taken to improve the performance of the service. On the other hand, it seems that very few ANSPs have actually undertaken a formal survey/review to identify effects of TRM on the system to confirm the benefits of using it. While we can easily count the number of errors/incidents, it is quite difficult to demonstrate how many errors/incidents were avoided by normal/enhanced behaviour. TRM is only one of the various tools that the ANSP have to improve their safety performance. It is very hard to be able to pinpoint exactly that improved safety has resulted solely from TRM. The latest concept of Safety II applies to TRM because it is a Safety II tool as it ensures correct behaviour and the dissemination of good practices among the ATM professionals.

The quality and soundness of the EUROCONTROL material on the subject and also the level of other support provided is highly rated by the ANSPs. Many of the free text comments in the survey questionnaire urged EUROCONTROL to organise more meetings and workshops on the topic as such events will ensure a better dissemination of TRM working methods and lessons learned.

The modern safety concepts all emphasise the resilience of the system. The gap between the work-as-done (WAD) and the work-as-imagined (WAI) is bridged by human performance. Systems are complex sociotechnical system and people have to cope with the complexity of the actual work environment. TRM assists greatly in realigning WAI and WAD because it improves the quality of information about WAD and helps greatly in passing enhanced information to management who are 'designing' the system. At the same time TRM encourage mindfulness at the sharp end where the effect of something going wrong will have an immediate impact of safety.