

# USING CRISISKIT AND MOPED TO IMPROVE EMERGENCY MANAGEMENT TEAM TRAINING

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**Abstract:** In order to reduce the effects of a disaster, people in the emergency management organization have to be trained. In recent years training emergency management teams has become a bigger issue. A realistic and effective training of emergency management teams however is a difficult matter. We search for ways to improve this kind of training and to reduce the costs. In this paper two tools that can be used to improve emergency management training, CrisisKit and MOPED, will be discussed.

## 1 INTRODUCTION

In order to reduce the effects of a disaster, people in the emergency management organisation have to be trained. In recent years training emergency management teams has become a bigger issue. A realistic and effective training of emergency management teams however is a difficult matter. We search for ways to improve this kind of training and to reduce the costs. In this paper two tools that can be used to improve emergency management training, CrisisKit and MOPED, will be discussed.

Emergency management, the decision making involved in directing relief operations after the disaster, is an issue of great public and private concern because of the potential losses involved (Schaafstal, Johanston & Oser, 2000). Emergency management is often extremely complex. The teams have to operate in hectic circumstances and often decisions have to be made based on incomplete information. The team members often hardly know each other and frequently have to work co-located. Fighting a disaster, a crisis team has to perform many tasks, partly parallel, partly successive.

As a result of this complexity emergency management training should have some characteristics. Competence based training is important because the teams have to be

trained for unexpected and unprecedented situations. Teams need to be trained on the process of emergency management, rather than on specific situations: reality is simply too refractory. An other important element in an emergency management training is communication and co-operation within the team. It is not uncommon that the people in an emergency management team have never met as a team before a disaster. The multi-disciplinarity of an emergency team has some consequences for the training as well. During an emergency or disaster different organisations have to co-operate to fight the disaster, requiring good communication between the teams (Stroomer & Schaafstal, 2001). An electronic learning environment meeting these requirements is CrisisKit, and will be discussed in section two.

Training distributed teams makes performance measurement and feedback more difficult, since the subteams and team members are not on the same location. In order to give adequate feedback, it is essential that observers of the different teams can compare and integrate their observations. In a distributed context, there should be a relation between the performance of the own team and the higher level team in order to evaluate and improve the co-ordination and teamwork. An interesting question is what should be measured during distributed team training and how the training staff should be supported in doing this. MOPED is a method an tool providing this support, and will be discussed in section three.

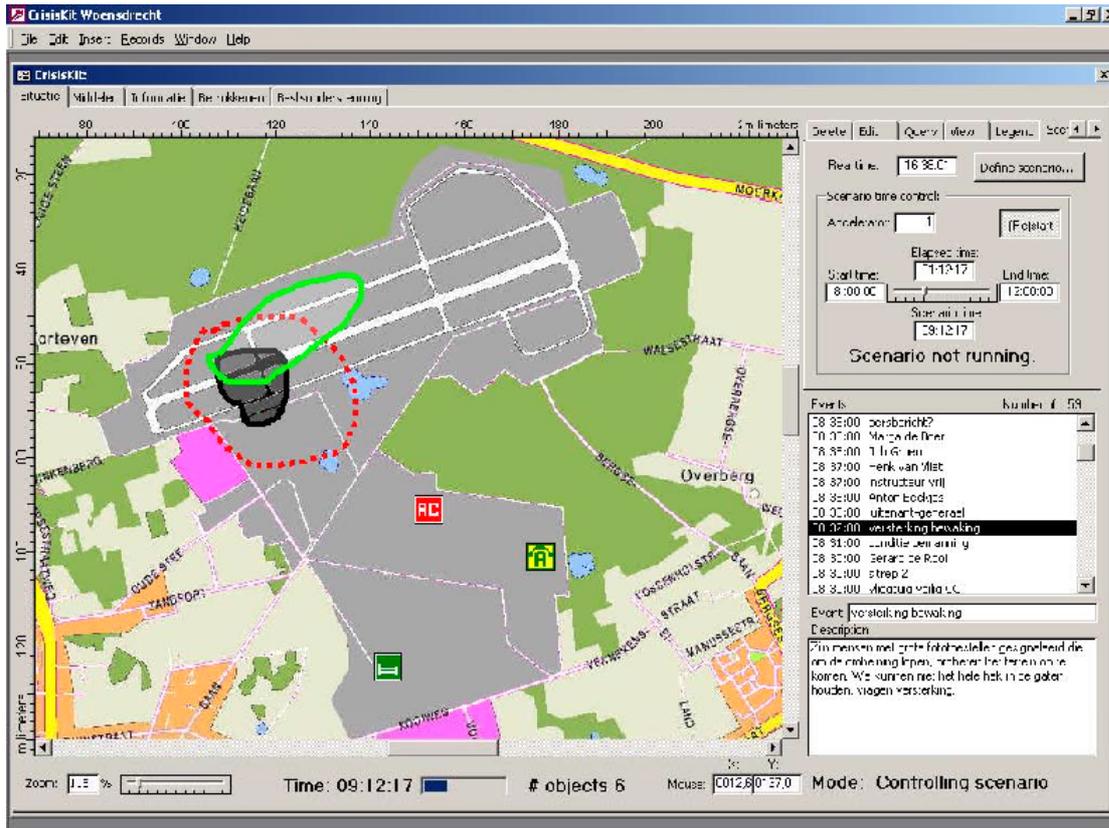


Figure 1. CrisisKit, shared situation screen

## 2 CRISISKIT



Figure 2. CrisisKit in action

### 2.1 Description

CrisisKit is a training and support tool for emergency management teams. It was originally developed as an emergency management support tool for distributed teams in the emergency management organisation. CrisisKit was developed based on an analysis of the emergency

management organisation and the emergency management process in the Netherlands (van Rijk, Post & van Verseveld, 2001; Schaafstal & Post, 2002). Based on this task analysis it was decided which tasks and processes could be technologically supported. It consists of a number of displays, for example a shared situation screen, a decision support tool, etc. Figur 1 shows the main screen with the shared situation screen and the inbox for scenario events. CrisisKit was originally developed as a flexible research tool in which we could test the impact of varies kinds of support tools and organizational structures, as described in the paper of Post in this Workshop proceedings. For more information about the development of CrisisKit as a support tool or the description of the support functionalities we refer to Post (2004).

Recently CrisisKit is extended as a tool for training and this aspect of the tool will be the focus of this paper. Based on our training concepts as well as the suggestions of emergency management domain specialists, we have extended the program with a number of special training features. These training features support the scenario developer and the training staff. It allows them to completely prepare the exercise in advance. There is an editor to create information events and to time stamp

them, a tool to assign the participating emergency managers to the exercise and a tool for assigning information events to the emergency managers. When the training staff starts the scenario during an exercise, the events will appear at the pre-defined time on the workstations of the pre-defined manager(s) who can respond for example by starting actions or informing others. It is also possible to change the events, the event allocation or the event time during the exercise and to temporarily halt the scenario, for example for a short briefing. This makes the program flexible enough to be able to let the scenario respond to the reactions of the team that is being trained (van Rijk & Zwartenkot, 2003).

## 2.2 Evaluation

CrisisKit as a training and support tool was evaluated during a training of a team of emergency officers of The Dutch Royal Air Force. For this exercise CrisisKit was adapted to the emergency management situation at the airport, which means we used a map of the airport as a situation screen, included the emergency plan so it would be digitally available and a scenario was written based on the learning objectives of the team. The developed scenario was implemented in CrisisKit and was used as a basis for the exercise. Role-players from the higher (OCC) and lower control (executives on the spot) were used to respond to the requests of the team of emergency managers or to make requests. This interaction made the scenario realistic. Before the real exercise started the emergency officers and the role-players were trained in the use of CrisisKit. During the exercise the role-players and the emergency officers were in a different room. Through NetMeeting requests could be sent from the role-players to the emergency officers and vice versa. The role-players could consult each other before sending a request or answering to a request. The emergency officers responded to the events and the requests in three ways: forward the message, solve the problem mentioned in the message, or not respond at all.

## 2.3 Results

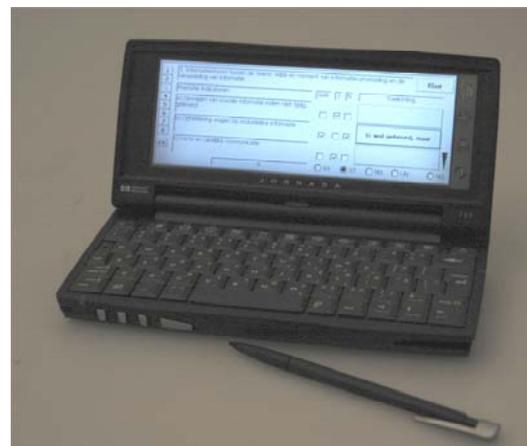
CrisisKit as a tool for training has several advantages. First of all it can reduce the workload of the training staff. During the preparation of an exercise event distribution can be automated, the moment the scenario starts everything will automatically evolve. It is however possible for the training staff to interfere in the scenario, events can be added or the allocated time can be adjusted based on the reactions of the team members. This computerisation makes it possible to decrease the size of the training staff and it gives the training staff more time

for other things such as role-playing or observation. Another advantage of computerised event distribution is that the timing of an event is logged, which can be practical during the debrief. Based on this information it can be determined for example based on what information a decision is made, or what information should have been shared or is missed even though it was available. Using chat or e-mail to communicate between teams also provides a logging of information sharing.

Electronic training tools, such as CrisisKit make it possible to log all kinds of information during the exercise, for example the moment information is opened, the actions that are taken, the time that is needed to communicate, etc. Logging however can only partly replace human observers when the focus is on the team processes like information exchange, communication, and supporting behavior. MOPED (Mobile Performance measurement and Evaluation of Distributed team training) is a tool developed to support the observers of distributed team exercises.

## 3 MOPED

Figure 3. MOPED on a pocket pc



### 3.1 Description

The MOPED method and tool are developed to improve the performance measurement and feedback during distributed team training. To improve the training effectiveness, performance measurement and feedback should be conducted systematically and in a standardized manner across all distributed teams (Dwyer, Folkes, Oser, Salas & Lane, 1997; Fowlkes, Lane, Salas, Franz & Oser, 1994). MOPED comprises several generic categories on

Category	Performance indicators	AAR	Y	N	Explanation
1	3. Information flow between teams: timing and modality of information exchange				
2	Performance indicators				
3	a) Requesting crucial information if not provided in time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Prevented misunderstanding
4	b) Brief and relevant communication	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5	c) Informing the adequate person/team	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6	Ready				
7	Name of observer				
8	<input type="radio"/> EX <input checked="" type="radio"/> ST <input type="radio"/> MA <input type="radio"/> UN <input type="radio"/> NG				

Figure 4. Questionnaire

which the performance of a distributed team can be assigned. The categories are based on the Command and Control Process Measurement Tool (C2PMT), a generic checklist comprising standards a command and control team should meet (van Berlo & Schraagen, 2000; Schraagen & van Berlo, 2001). Every standard is briefly clarified and explained in order to ensure a uniform interpretation by the observers: it describes the contents and coverage of the standard and, if applicable, the relation with other standards. For every standard, performance indicators have been formulated giving concrete form to the standard enabling the evaluators to observe and interpret the team processes. These performance indicators are formulated concisely, and are easily scored in terms of whether the behavior was observed or not. The evaluator can explain and illustrate every observation. For the performance measurement and feedback in distributed team training, C2PMT has been adjusted (C2PMT-Distributed). C2PMT-D is a tool observers can use to score targeted behaviors that are both important within the team and between the distributed teams (van Berlo, Hiemstra & Hoekstra, 2003; Hiemstra, van Berlo & Hoekstra, 2003).

Based on previous research on the Mobile Aid for Training and Evaluation (Pruitt, Burns, Wetteland & Drumestre, 1997; Lyons & Allen, 2000), the C2PMT-D was implemented on two hand-held devices, a pocket pc and a tablet pc. In order to offer a tool that can easily be managed by observers, the number of categories have been kept to a minimum of eight categories; preparation, information flow within a team, information flow between teams, use of ICT systems, team decision making, active monitoring of critical tasks, interpersonal relations and mutual support and back up facilities (van Berlo, et al, 2003).

MOPED consists of six parts represented as buttons on the start-up screen. By tapping on the touch screen each part can be opened. The six parts are;

- New: an observer can log in and start a new session
- Questionnaire: the checklist with performance indicators
- Grading: overview of the gradings
- AAR: overview of observations indicated as relevant for the after action review
- Send data: transmitting data to a central database
- Results: observers results of other teams, received and integrated by a central database

Figure 4 shows the Questionnaire, the numbers on the left indicate the eight categories of the C2PMT-D. By tapping one of the numbers the corresponding category can be opened, in the example information flow between teams: timing and modality of information exchange (category three) is opened. This category consists of several specific performance indicators such as requesting crucial information if not provided in time. Each performance indicator can be scored as observed or not observed. In case the observer wants to include a performance indicator in the AAR, he checkmarks the AAR button. On the right side of the display, the observer can explain and illustrate the rating by giving positive and/or negative examples. By tapping on an explanation box, a pop-up window is opened to type in the text. Inclusion of these example behaviors is important for providing feedback in the final written report and for enhancing learning opportunities (van Berlo, et al, 2003). The arrows completely to the right enable the observer to scroll through all performance indicators of a category. After filling out all the performance indicators, an overall grading can be determined for the category (EX: excellent, ST: satisfactory, MA: marginal, UN: unsatisfactory, NG: not graded). Checkmarks and explanations made by the observer are automatically linked to other parts of MOPED. During the course of an exercise, the observer can easily switch between the categories.

After an exercise, the observer can send his observational data to the central database. In this central database, all observational data of all distributed observers are gathered and integrated. Only results that are explicitly related to the performance of the distributed team and not a local team are sent back to the observers in the field.

In the results overview of MOPED is shown for each performance indicator of a category how many observers scored 'Yes' or 'No'. It also shows the comments the observer made for the performance indicators.

In the AAR overview only those performance indicators are shown of which the observer indicated he wanted it to include in the after action review.

### 3.2 Evaluation

MOPED was evaluated by instructors of the Operational School of the Netherlands Royal Navy (van Rijk, Hiemstra & Hoekstra, 2004; van Berlo, et al, 2003). Four instructors used MOPED for two weeks during the examination of the command central team, responsible for the defence of a frigate. This team is divided into two teams who have to work together but have their own tasks as well: one covering the Anti Air Warfare domain, and the other the domain of Anti Surface/Subsurface Warfare. Since this was an official examination period we implemented the original examination forms of the Operational School, adjusted with some items of C2PMT-D. After discussions with the training staff, some extra functionalities were implemented in the tool; time stamp, a less dichotomous way of scoring and automated score calculation. To test the usability of two different hand-held devices, MOPED was available on a pocket-pc as well as on a tablet-pc.

Before the instructors started using MOPED, the functionalities were explained in about 15 minutes and each of them was given an evaluation questionnaire. After the two weeks each instructor was interviewed about their experiences with MOPED, the evaluation questionnaire was used as a directive.

### 3.3 Results

Based on their experiences in the two weeks the instructors were positive about MOPED. Especially the possibilities to save time were considered a major advantage, the results were immediately computed, and MOPED supported a quick arrangement of items for the debriefing. Since it was the first try-out of MOPED they also reported some disadvantages. They suggested some improvements in the debrief facility: instead of a fixed sequence of items based on the ranking in the questionnaire, they wanted to be able to sequence the items themselves. An other disadvantage reported was that once a new questionnaire was started the old ones could not be re-opened. This was considered a disadvantage

since some of the instructors were used to finish scoring the examination at a later time: since the exams follow each other rapidly, and they wanted the possibility to reconsider the scores afterwards.

Not all the C2PMT-D items were included in the custom made version of MOPED for the Operational School. For the examinations the instructors needed their own scoring forms. Some of the C2PMT-D items were added as an extra category and the instructors were asked to score these as well. However, the performance measurement focused on the commanders of the two teams, and the instructors did not see an added value of these questions.

## 4 CRISISKIT AND MOPED COMBINED

The two tools described in this paper are examples of tools that can be used to support emergency management training. Both tools concentrate on different aspects of the training. CrisisKit automatically distributes the scenario and therefore supports the scenario developers and the training leader. It also has the possibility to log information; for example actions taken or the time passed before information is opened. To optimise what is learned during training the performance of the team(s) have to be evaluated. Logging can not provide all the information needed in an after action review. Team processes are especially important in the evaluation of distributed team training and therefore observers are needed. CrisisKit does not support these observers. The MOPED method and tool however are especially developed to support observers during the performance measurement and feedback of distributed team training. It offers the observers a structured and standardised manner to measure the performance and to give feedback to distributed teams. At the moment MOPED is a stand alone support tool, which means that it is not connected to the training scenario. This generality makes it possible to use it for all kinds of distributed team training sessions. But a drawback is that because the observers have no insight in the evolving scenario they for example can not anticipate on critical scenario events or do not know what information is available at a particular time to use in the decision making. An electronic observer tool like MOPED has possibilities to support the observers on this aspect as well. For example the observers can be tipped when a critical event is coming. This kind of information is electronically available when CrisisKit is used. By combining the two tools we will be able to provide a more integrated training package, a standardised environment including structured observations, not only within teams but between teams as well. The tools can supplement each other.

In the near future we are planning to experiment with combining the tools to gain insight in the profits of the integrated training package. We will also look at other concepts that could be integrated, for example synthetic role players.

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