CAE GESI™ Command & Staff Training

CAE

one step ahead

Meeting new demands in command and staff training

Today's armies are facing new challenges that place increasing importance on training. In addition to traditional military actions, armies are now involved in operations other than war (OOTW), joint and multi-national operations, network centric warfare, military operations in urban terrain (MOUT), asymmetric warfare, catastrophe support operations and more. These varied operational requirements have made transformation of military forces necessary. Combine the unpredictable nature of these operations with the fact that real training exercises are constrained by high costs and environmental concerns, and you have a perfect opportunity for constructive simulation.
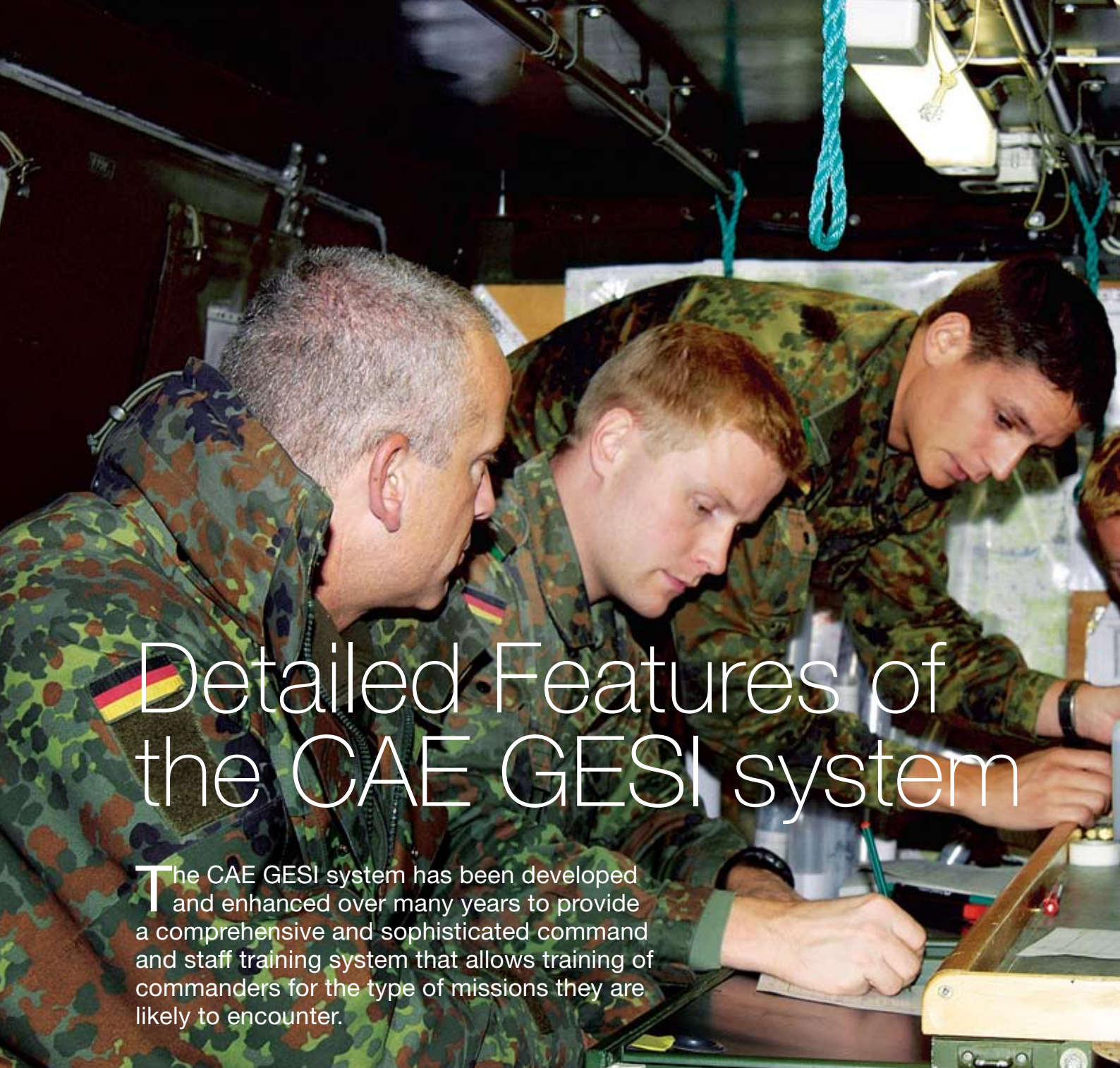
The CAE GESI™ System

CAE's GESI (GEfechts-SImulation System, the German word for combat simulation system) is a constructive simulation system designed to run complex and comprehensive exercises from company up to division level, both in a computer-assisted exercise (CAX) and classroom environment. Using the GESI system, commanders and their staff conduct normal training exercises in regular command posts using original equipment. Just like in actual battle, they communicate with their subordinate commanders using regular radio equipment or command and control (C2) information systems. However, in a CAE GESI training system, these subordinate commanders are not located in the field, but instead in the simulation building at the GESI workstations. The CAE GESI system is then used to represent the mission area, including own and perceived enemy forces, terrain, weather, logistics and the results of any actions (reconnaissance, engagements, casualties, information, and more) using graphics (simulation), video/audio support and text boxes. All this information is presented in real-time and in such a way that the resulting report of the situation by the subordinate commanders will become as realistic as possible. The subordinate commanders report the perceived situation to the trainees in the command post through the radio or C2 equipment. In this way, the trainees in the command post will not have any direct contact with the simulation system, which further adds to the level of realism of the exercise. The fact that all key decision-making roles are played by humans helps make a CAE GESI exercise as realistic as possible.

In addition, the number of subordinate commanders necessary for a realistic operation of the system is kept to a minimum through the use of an easy to use graphical interface and efficient control of the simulated forces. The CAE GESI system uses straight-forward commands on a single entity level or more powerful commands on an aggregate level, and the system also supports using one of the artificial intelligence-based commands.

All CAE GESI systems are completely operated by the end users, including scenario development, system parameter set-up and adjustment. There is no need for any on-site support personnel from CAE; however, CAE does offer several levels of remote and on-site support.

Detailed Features of the CAE GESI system

The CAE GESI system has been developed and enhanced over many years to provide a comprehensive and sophisticated command and staff training system that allows training of commanders for the type of missions they are likely to encounter.

CAE GESI-smartt

In 2008, CAE's newest GESI product line called GESI-smartt (simulation model with adaptive resolution of terrain and troops) was released to the market. CAE GESI-smartt offers outstanding capabilities for current and future training requirements. Some of the most impressive features are the multi-simulation and the scalability over three different levels of resolution, allowing a much wider scope of use (from detailed urban to large scale joint operations in one exercise).

Interoperability

Numerous interfaces have been developed for GESI and have been successfully used in training exercises (local and distributed), research and analysis studies, and concept development and experimentation (CD&E). These interfaces include, but are not limited to: multi-lateral interoperability program (MIP), high-level architecture (HLA), extensible mark-up language (XML) and keyhole mark-up language (KML). These interfaces allow the CAE GESI system to connect with systems such as C2I systems; constructive, virtual and live simulation systems; geographic information system (GIS) databases; and exercise management and control systems.

Simulation Models

The CAE GESI software was originally designed to allow modeling of most weapon systems used within modern combined arms combat. However, in order to cope with the requirements for the operations in today's ever-changing environments, a range of models and functions have been added to support OOTW, MOUT and joint operations training.

The scenario editor is used to set up and/or modify the initial situation. This editor allows the user to define the following exercise conditions:

- Environmental (time, date, duration, day light conditions and weather, including winter models);
- Task organisation for all participating parties and their relations;
- Exercise areas;
- Troop locations;
- Operations plan.

The simulation parameter editor is used for the generation and modification of all simulation entities. The data that can be edited includes the task organisations, vehicle configurations, weapon system parameters including hit probability calculations, logistic parameters, timing and duration of events, graphical symbols and many more.

After Action Review

The AAR software is the key tool for evaluating the effectiveness of the training exercise and provides comprehensive feedback to the trainees. The complete exercise is recorded allowing for a replay of any situation seen from the point of view from any party or an overall (god's eye) view over all parties involved in the exercise. While the exercise is running, bookmarks are created either automatically or manually. These bookmarks then assist in an easy retrieval of situations of interest. Radio communications on all frequencies are also digitally recorded so they can be replayed during the AAR debrief session. The CAE GESI system also supports creation of tactical situation graphics as well as a wide range of statistical overviews.

The comprehensive AAR can all be done in a highly efficient way. The time needed for preparing a complete multi-media debriefing with the CAE GESI tools is approximately one to two hours for an exercise that may have lasted several days.

Terrain Databases

To further add to the realism of the CAE GESI system, high resolution and high quality terrain databases in different resolutions are provided. Only a minimal set of data is necessary to create these databases for any part of the world, and most standard data sources can be used. From simply paper maps and elevation data, complete terrain databases can be created including roads, rivers, lakes, houses, trees, high voltage lines and other special objects (hospitals, airports, and more). Also, terrain elevation and object height are included in the data, which allows the user to display the terrain in a two-dimensional (2D) map view as well as a 3D view. Due to the fact that all terrain data is digitised, options like road-following are included and add to the realism and ease of operation. State-of-the-art GIS tools accelerate the database generation process and reduce costs accordingly.

The simulation model furthermore includes detailed logistics as well as medical models to make exercises even more realistic. Casualties as a result of direct or indirect fire or other causes are generated and need to be addressed within the exercise.

Editors

The CAE GESI system features a range of tools designed to make tailoring an exercise a simple task. There are two primary editors for GESI: the scenario editor and the simulation parameter editor. Using these editors, customers have full control over the behaviour of their systems and do not need any support from CAE preparing and executing their exercises.

New and future training applications

With military forces now involved in a range of traditional and non-traditional roles, CAE is adapting the CAE GESI system to support additional training requirements. Following is a brief overview of how the GESI system is being used for new training applications and some future CAE GESI capabilities.

SiTA - Classroom Systems

Since 2006 a special version of the CAE GESI software called SiTA (Simulation-based Tactical training for military Academies) has been in use at military academies as a classroom system for tactical education. At the basis of these systems is still the proven CAE GESI constructive simulation software with several additional modules included specifically for student training in a classroom environment. For example, an electronic education plan guides the students through the lessons and controls system behaviour like simulation and internal/external resource access. An educational network allows instructors full control over the system, giving them the possibility to guide individual students as easily as working with the whole class. The CAE GESI-SiTA system is designed so that it can be executed in existing computer-based training environments. Its layout and functionality will continuously be updated in line with the development of the CAE GESI core application.

FINLAND
KESI

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2 Systems

Future developments

Military commanders are facing challenges that have changed dramatically in the recent past and will continue to change in the future. This demands that a command and staff training tool also needs to be updated on a regular basis in order to ensure mission readiness for the numerous challenges military commanders will face. CAE employs a large group of software and systems engineers to ensure the continuous evolution and improvement of the CAE GESI software.

Due to current contracts with its customers, the further development of the CAE GESI system is ensured for a number of years to come. These enhancements cover a very large part of the existing GESI training spectrum, including OOTW, peacekeeping and humanitarian assistance, MOUT, joint and multi-national operations, emergency management and disaster planning. In addition, the enhancements will improve the usage of the CAE GESI system on the training levels of company and division, allowing the product to be used even more efficiently on these training levels.

Customers

CAE GESI is the primary constructive simulation training tool used for command and staff training in Europe. Germany, Italy, Austria, Ireland, Finland and Norway are all using the CAE GESI system for a range of command and staff training requirements, including classroom training at schools and academies.

User conference

For more than a decade, CAE has organised an annual CAE GESI user conference to facilitate dialogue and exchange between the GESI users. This unique conference is a popular platform for the exchange of experiences, ideas and information and is organised at one of the customer's training sites. The conference is not only accessible for GESI users, but also for anybody interested in constructive simulation.

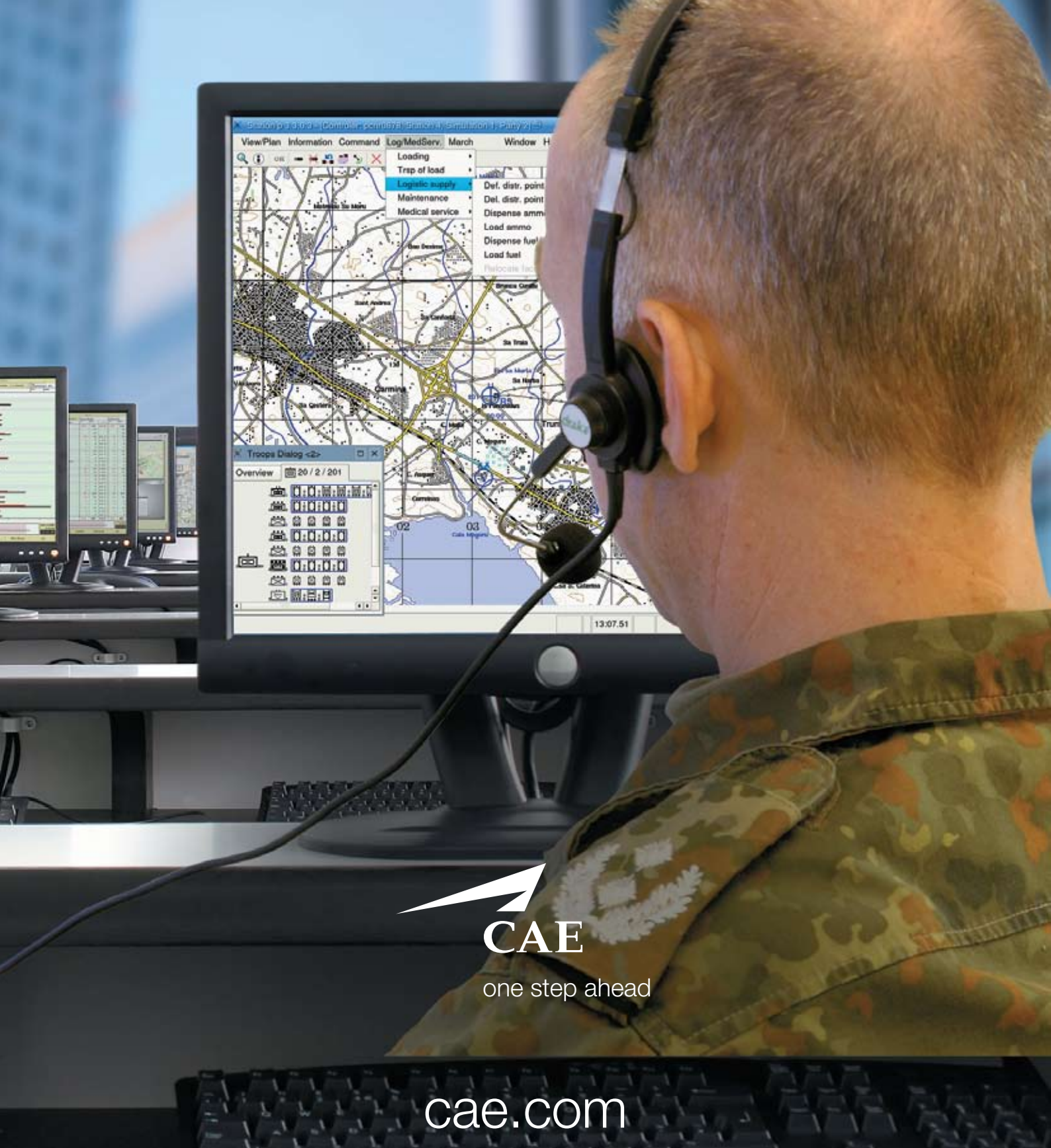## Helping you stay one step ahead

The CAE GESI Command and Staff Training System is part of a comprehensive portfolio of products and services that CAE offers related to training ground forces. The CAE GESI system enables highly efficient and cost-effective training of commanders and their staff, ensuring they are better prepared to make decisions and stay one step ahead to achieve mission readiness.

Emergency Management Training

Over the past few years, the diversity and proportion of risk and threats to civilian populations has increased significantly. Natural disasters such as earthquakes, hurricanes and floods strike more often and may inflict a high number of casualties. Technical disasters such as nuclear, chemical and railway accidents also have an enormous impact on civilian populations. Finally, terrorist attacks represent a global menace and confront emergency planners with the challenge to determine the best possible preventions against such intentions and actions.

Emergency management training with CAE GESI ensures that military, civil crisis and emergency staff are prepared and ready for a range of crisis situations. Its ability to simulate a wide variety of scenarios also helps analysts investigate potential threats and to work out and test respective emergency plans.