



# CAE GESI

An advanced constructive simulation system for Command and Staff Training



Your worldwide training partner of choice



**Who offers constructive simulation for training commanders and their staff?**

**We do.**

CAE GESI is an advanced, multi-purpose constructive simulation training tool used for a range of command and staff training requirements, including classroom training at schools and academies.



# Meeting New Demands

Today's armed forces are facing complex challenges with increasing demand on operational readiness at any time and any place. Missions not only include traditional force-on-force military actions, but also humanitarian assistance and stabilization operations, operations other than war (OOTW), joint and multi-national operations, network centric warfare, military operations in urban terrain (MOUT), asymmetric warfare, catastrophe relief operations, and more. New factors such as social media (with local and worldwide impact) and cyber warfare also play an increasing role.

All these varied operational requirements have made the transformation of military forces necessary. Combining the unpredictable nature of these operations with the fact that real training exercises are often constrained by high costs and environmental concerns, and you have a perfect opportunity for constructive simulation as an advanced tool for command and staff training (CAST).

## The CAE GESI System

CAE GESI is an advanced, multi-purpose constructive simulation system for comprehensive training, wargaming, decision support, concept development & experimentation (CD&E) and beyond.

It is designed to run complex and comprehensive exercises from the company up to division level, both in a computer-assisted exercise (CAX) and classroom environment, ultimately improving commanders and their staff in their decision-making capabilities. Using the CAE GESI system, commanders and their staff can conduct training exercises in their regular command posts using original equipment in a cost-effective and efficient manner.

The CAE GESI system represents the mission area, including own, hostile, friendly and neutral forces, terrain, weather, logistics, and more.

The results of any action (reconnaissance, engagements, casualties, information, and more) are provided to the user on a tactical map, supplemented by graphics, video, audio, and text boxes. All this information is presented in real-time and in such a way that the resulting report of the situation is highly realistic.

The trainees in the command post have no direct contact with the simulation system, which further adds to the level of realism of the exercise. The interactivity of the CAE GESI system makes a CAE GESI exercise as realistic as possible.

The CAE GESI system uses straightforward commands on a single entity level or more powerful commands on an aggregate level. The level of simulation detail can be defined upfront during exercise preparation or can be adjusted - on-the-fly - during an ongoing exercise, allowing the exercise director to adjust the complexity of an exercise to the needs and the progress of the training audience at any time.

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.



# Primary Features of CAE GESI

The CAE GESI system is a well-established, off-the-shelf, but fully customizable, multi-purpose constructive simulation system that comprises the experience of more than 20 years of extensive use and development. The CAE GESI system underwent several major improvement updates, adapting the system to changing training needs and modern technologies.

## Simulation Models

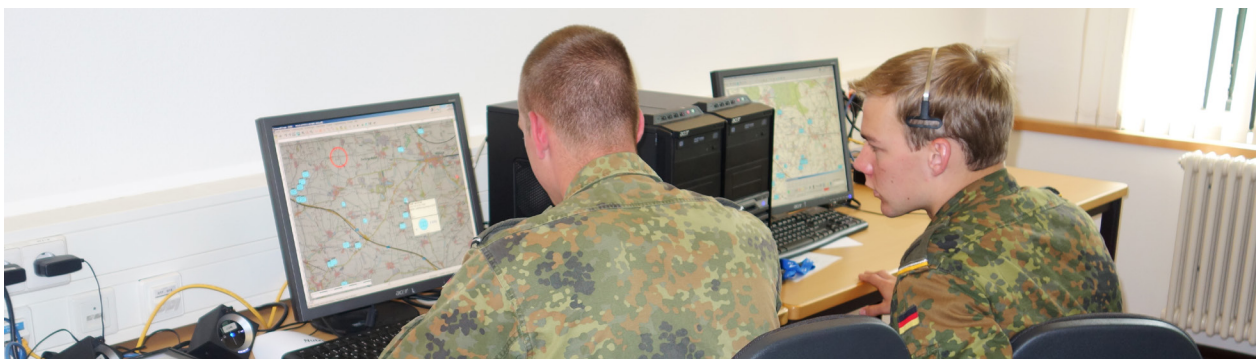
The CAE GESI software is designed to allow the modelling of all types of systems, including but not limited to infantry, tanks, trucks, fixed-wing and rotary-wing aircraft, ships, (e.g. aircraft carriers, frigates, submarines, ferries), unmanned aerial vehicles (UAVs) and unmanned ground vehicles (UGVs), artillery, engineering, police forces, firefighters, ambulances, civilians, refugees, terrorists and ethnic groups. Weapons, equipment and an exhaustive range of capabilities can be assigned to the system, such as freely definable weapons and ammunition (lethal and non-lethal), sensors (radar, thermal-imaging, nightvision, etc.), jammers, transportation and maintenance capabilities.

The CAE GESI software is using the principle of building blocks, allowing the user to create more complex systems from small, reusable blocks, which adds to CAE GESI's flexibility and efficiency.

The CAE GESI software includes simulation models that cover combat, reconnaissance, air defence, airspace management, joint operations, joint fire and close air support, information operations, mines, logistics, medical services (including different types of casualties, required equipment and treatment), chemical, biological, radiological, and nuclear (CBRN), improvised explosive devices (IEDs), natural disasters, OOTW, MOUT and more.

CAE GESI simulation models take into account different types of terrain. Among others, the movement of ground elements is influenced by terrain slope, road class, barriers, soil type, weather conditions, obstacles and the military load classification (MLC) of bridges.

To support different use cases and training needs, the CAE GESI software allows adjusting the complexity of the simulation models before and even during exercise and includes built-in and configurable intelligence to automate situation-dependant behaviour.



# Creating and Controlling Simulation Runs

The CAE GESI system features all necessary tools to create and execute training, wargaming or experiments.

The CAE GESI Exercise Editor is designed to make tailoring an exercise or experiment a simple task. Being a fully graphical tool – no text editor required – with drag and drop, customers have full control over the behaviour of their CAE GESI system. The CAE GESI Exercise Editor, for example, allows the user to create and modify weapon systems, vehicle configurations, troop structure (ORBAT) and troop dislocation, environmental conditions, operation plans, entity behaviour, events and more.

The CAE GESI Central System Control allows the user to configure, start, stop and monitor the status of computer equipment and exercises from a central location, which supports larger exercises with distributed teams. The CAE GESI Directing System allows the directing staff to monitor and modify an ongoing exercise or experiment, having full control of all forces. The CAE GESI Tactical Workstation (TWS) is the main application to monitor and control units during an exercise or experiment and provides only a limited view onto the mission area, corresponding to the view of the units being controlled at that particular TWS.

The above tools are supplemented by CAE GESI Observation, CAE GESI After Action Review (AAR)/Debrief and CAE GESI Replay. The CAE GESI system provides the complete infrastructure to create, run, modify, record and analyse exercises and experiments. As with all components of CAE GESI, users can adjust the system to their needs, use case or exercise dependant, but still having all capabilities at hand.

## After Action Review

The After Action Review (AAR) software evaluates the effectiveness of the training exercise and provides extensive feedback to the trainees. The complete exercise is recorded allowing for a replay of any situation seen from the point of view of any party or an overall view of all parties. While the exercise is running, bookmarks are created either manually or automatically, for example, at first loss, emergency drop of paratroopers, or firing at a medical facility. These bookmarks assist in an easy retrieval of situations of interest. Radio communications can also be 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 statistics to supplement AAR. Preparation and execution of an AAR session is done in a highly efficient way, during an ongoing exercise – for example, with an intermediate AAR session, or after exercise as final AAR.



## Terrain Databases

The CAE GESI terrain databases include different types of roads and rivers, lakes, factory premises and cities, trees, different types of soil, elevation profile and object height with corresponding effect on the simulation models.

Terrain databases can be created from standard data sources and satellite images can be used as an overlay. Since all terrain data is digitised, options like road-following are included and add to the realism and ease of operation of CAE GESI.

## Interoperability

Numerous interfaces have been developed for CAE 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: high-level architecture (HLA), extensible mark-up language (XML), FFI according to STANAG 5527 and C-BML. These interfaces allow the CAE GESI system to connect to a wide range of C2I systems; live, virtual and constructive simulation systems; geographic information system (GIS) databases; and exercise management and control systems.

# One Simulation, Multiple Applications

The CAE GESI constructive simulation system is the baseline for multiple CAE applications. Following is a brief overview of how the CAE GESI system is being used for derived applications.

# CAE GESI-SiTA Classroom System

By evolving CAE's renowned GESI constructive simulation system, CAE has created a new simulation tool called CAE GESI-SiTA (Simulation-based Tactical training for military Academies) for student education in a classroom environment.

The CAE GESI-SiTA classroom application offers a unique foundation to experience and learn tactical basics at a new level of detail and interactivity. Specifically designed for military academies, CAE GESI-SiTA allows the student to become more immersed than before in real-world battlefield scenarios and in-depth tactical training. For the first time, clear and comprehensive illustrations of complex tactical situations are available, showing the relationship between forces, time and terrain. This makes CAE GESI-SiTA the ideal tool for in-depth education in a classroom environment.

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 it can be executed in existing computer-based training environments. Its layout and functionality are continuously updated in line with the development of the CAE GESI core application.

# CAE GESI-EM - Emergency Management Training

Analyze, decide and command – efficient emergency management requires decision makers to anticipate the potential consequences of crisis situations and to use any available resource effectively to bring the situation under control.

The multitude of possible threats and risks make achieving this task a serious challenge to governmental institutions, aid agencies, local authorities and corporations, in particular those managing critical infrastructures. The best measures to prepare for crisis situations are emergency plans that answer the question "what if" and are supported by a team of well-trained crisis and emergency managers.

CAE's GESI Emergency Management (EM) simulation environment is an essential aid to meet these challenges. It simulates comprehensive emergency situations, providing an environment to develop emergency plans, and to train/prepare crisis and emergency managers. Its layout and functionality are updated concurrently with the development of the CAE GESI core application.





# The GlobalSim Solution

CAE and ROLANDS & ASSOCIATES (R&A) collaborated to develop a federated constructive simulation solution called GlobalSim. The GlobalSim solution combines CAE's GESI command and staff training system with R&A's Joint Theater-Level Simulation (JTLS).





## GlobalSim

The GlobalSim solution from CAE and R&A is a unique combination of two well-established systems, providing a comprehensive constructive simulation environment from the theater-level down to the tactical simulation level. Users can train in an integrated constructive simulation environment without requiring separate solutions for the “big picture” operational environment and the detailed tactical-level environment.

GlobalSim can be used for command post exercise support, contingency/management plan testing, coalition training among both military and civil agencies, budget-based wargaming, decision support, decision analyses, experimentation, and emergency preparedness training.

GlobalSim uses an open architecture and industry standards for interfacing with other systems to allow integration and experimentation with operational components.

### Some of the key features of GlobalSim include:

- Tightly linked and integrated federation between a theater-level aggregate simulation (JTLS) and a tactical, entity-level simulation (GESI);
- Supports the industry standard High-Level Architecture (HLA) to facilitate integration and interoperability;
- Combination of two of the world's leading constructive simulation solutions:
  - JTLS models the full spectrum of warfare, including land, air, naval, intelligence, logistics and special forces;
  - GESI is a high resolution synthetic environment entity-level simulation to model missions such as close combat, operations-other-than-war (OOTW), military operations in urban terrain (MOUT), and asymmetric warfare
- Flexible and situation-dependent multi-resolution modeling of forces.

### Some of the key benefits of the GlobalSim solution include:

- Integration of theater/strategic level operations with tactical unit operations thus allowing theater-level scenarios with tactical-level inserts;
- Single, integrated and more realistic view of the complete operational environment;
- Generation of realistic and unexpected consequences as well as other synergetic effects by combining the strengths of JTLS and GESI into one exercise;
- Easy-to-use exercise editors and comprehensive after-action review capability;
- Open architecture and standards for ease of integration and experimentation;
- Optimization of the number of operators and operating expense.

# 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 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.

# CAE GESI user community and user conference



The CAE GESI system was and is built in close cooperation with its users worldwide, taking into account both the congruent and different needs of armies and public safety agencies.

For more than a decade, the annual CAE GESI user conference facilitates the dialogue and exchange between the CAE 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 CAE GESI users, but also for anybody interested in constructive simulation.

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

# About CAE Defence & Security

CAE's Defence & Security business unit focuses on helping prepare our customers to develop and maintain the highest levels of mission readiness. We are a world-class training and mission systems integrator offering a comprehensive portfolio of training and operational support solutions across the air, land, sea and public safety market segments. We serve our global defence and security customers through regional operations in Canada; the United States/Latin America; Europe/Middle East; and Asia-Pacific, all of which leverage the full breadth of CAE's capabilities, technologies and solutions.

For more information visit our website  
[cae.com](http://cae.com)

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