STATE OF ART AND FUTURE TREND ON CGF

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Introduction

With the events of today, military and civilian organizations are under great pressure to train their people for the ever-changing battlefield. Simulation has helped them solve this training problem with a reduction in cost and an increase in the possible scenarios that can be investigated. Computer Generated Forces are tools which aim at supporting this kind of simulation.

Computer Generated Forces (CGF) are automated or semi-automated entities (such as tanks, aircraft, infantry) in a battlefield simulation that are generated and controlled by a computer system, perhaps assisted by a human operator, rather than by human participants in a simulator.

Usually the applications of CGF systems in simulation are grouped into three classes: training, analysis, and experimentation [Petty 2001].

- *Training.* Training simulations, in general, are simulations intended to induce learning of some kind in the (human) participants. CGF systems are often used in training simulations to provide both opposing forces and supplemental friendly forces for human participants in a simulation.
- *Analysis.* CGF systems are also used to generate entities in battlefield simulations being used for non-training purposes, such as analysis and experimentation. Analysis is the use of simulation to answer questions about some aspect of the system or scenario being simulated (effectiveness of new weapons systems, force structures, or doctrine). In analysis applications simulation is used in a carefully controlled way with run-to-run initialization differences restricted to the factors under question (e.g., different weapons performance levels).
- *Experimentation.* The experimentation application is similar to analysis, in that the simulation and CGF system is being used to answer questions, but in experimentation the questions are more open-ended and exploratory. Strict control of run-to-run differences is less important in experimentation than exploring in simulation a space of possibilities (e.g., a set of different notional weapons systems).

After less than twenty years of growing, military simulation environments, CGF appear to be at a new stage in their evolutions, concerning both design and development trends. Domain experts speak about a "third revolution". After having acquired totally or partially the capability of modularity/composability ("second revolution") and providing significant enhancements on main models accuracy, some other aspects are to be tackled, among which:

- Full level interoperability and real time distributed simulation ;
- Defining moderator (fatigue, stress, …) for human behaviour models which usually represent perfect soldiers;
- Enhancement (and often providing) the representation of low intensity conflict, multi-sided, without clearly identified friends, enemies or neutrals, civilians, non governmental organisations, in urban environments, …;