

# Simulation and Preparation for Operational Engagement

A few years ago, simulation was associated only with the aeronautical formation and then with tank crews training; but now it covers the entire spectrum of the Army’s activities that are linked to training the soldiers, preparing the forces, and getting ready for the future. Chief DSRO<sup>1</sup> recently declared in an article published in the “National Defense review”: “What is not war is simulation”; which means that **simulation is now regarded as being one of the priority building blocks of operational engagements which it supports and for which it may become an efficiency multiplier.**

To discuss the topic of simulation, in relation with the preparation to operational engagement, is not only a question of defining what it brings today through the large number of tools that are available to the Army, but it is also important to raise the issue of what simulation doesn’t allow, otherwise there would be a major risk that simulation could be the cause of dissatisfactions or even worst of counterproductive and nonsensical training. Finally it is also a question of trying to define what simulation could be able to bring tomorrow in an environment characterized by reinforced and durable constraints which will undoubtedly force us to continue to do better, and with less.

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## What does simulation bring us today?

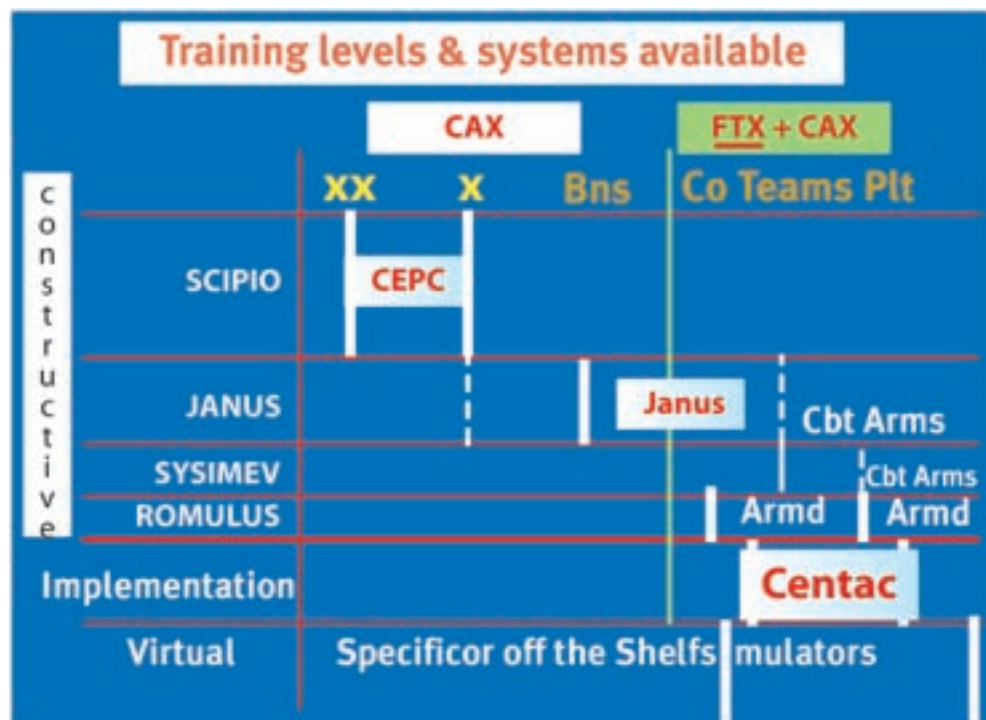
Since the complexity of the modern joint and combined arms operations imposes an evolution of the forces training and preparation methods while resorting to leading-edge technologies, simulation allows in many regards, in an increasingly constrained budgetary context, to **optimize the costs and serviceable time and to increase the training realism for an all-professional force** which has thus to be immediately efficient when deployed on a theater. In that regard, simulation tools should take a growing importance in the array of processes available to educate, train and evaluate individual as well as units and staffs.

As it is shown on the figure below, the simulation tools are present at all levels, although level 1 (Rapid Reaction (FR) Corps) has currently to resort to foreign training centers.

One has however to keep in mind that the most important is not to have tools available but rather to be able to get

the best out of these tools. From this point of view, **the place of simulation can be appreciated by taking into consideration at least three types of benefits:** savings in matter of time, money, and pedagogy.

**Saving time:** There is no common measure between preparing an exercise at battalion or brigade level with a simulation tool and a LIVEX, just like for the basic training of a tank driver or an army aviation pilot. But this saving of



time should not be wasted. The true saving is not realized by diminishing the amount of time dedicated to movements and equipment preparation. The true savings are achieved during the initial preparation of the teaching objectives, during the real time collection of relevant action analysis data, and finally during the after action review, which must be regarded as an integral part of the training.

This saving of time is then strictly proportional to the quality of the analysis which accompanies the action; it is the added value drawn out of the studies of errors or successes.

**Saving money:** Of course it is common to say that simulation is a money saving tool, and this is an idea which has often been promoted to convince “decision makers” to support simulation projects. But simulation benefits are not limited to saving fuel, travel expenses, equipment’s hours of operation and other commonly identified expenditures. The use of simulation makes it also possible to meet other significant current requirements such as the protection of people and environment. Thus the place of simulation within the overall forces preparation policy must also be appreciated in comparison with the indirect effects which it generates.

**Pedagogical benefits:** This should be the first benefit to be looked for when dealing with training soldiers and preparing forces. It is thus possible to envision that the live training of a company task force with human controllers and exercise ammunitions could be sufficient. It is also possible to wonder about the difference between “Carré vert<sup>2</sup>” and JANUS<sup>3</sup> types of exercises. In both cases, it is a matter of giving orders and making decisions. But the pedagogical benefits are totally different. The added value appears clearly as soon as we do not consider only basic learning, and mastery of the gestures and procedures, but rather the acquisition of competences, and this can only be achieved by learning from previous experiences. And this is exactly what simulation tools are supposed to offer: to record past experiences, present these experiences, allow the conduct of a critical analysis of an action and, if required, the possibility to

replay that action. Within a secure and progressive framework, simulation allows a type of individual and collective training which, although it might be regarded as insufficient and imperfect, allows the transfer of competencies onto real systems in much better conditions.

**Simulation** appears thus as a **very beneficial step in the forces preparation process**, at a low human, financial and material cost but with a strong pedagogical added value.

### The limits of simulation

Although simulation presents many advantages, it is important to be conscious of the tool limitations since simulation is only an imperfect representation of a modeled reality. Starting from that approach, it is possible to appreciate the right place and limits of the simulation within the operational preparation process.

A **first type of limits** is linked to the very nature of the simulation tools and to the conditions of their development which force us to **keep some sensible distance from the results observed** at the conclusion of simulation assisted education or training sessions.

One of the issues is, for instance, how to simulate what in the real world occurs on a random basis: in spite of all progresses that have recently been achieved, simulation still comes up against the replication of some specific phenomena: what is nominal is easy to reproduce on a model and can thus be studied in depth (for instance: speed associated to a mass on a trajectory will result in an unambiguous braking distance that will imply or not an accident); on the opposite, random, and accidental causes will generate consequences out of proportion that are either impossible to model or for which the cost of modeling would become exorbitant in comparison with the expected training objective. It is thus important to keep in mind that a simulation tool will only produce what it has been asked for. What has not been planned doesn’t exist. That limit, when it is put in the operational preparation process perspective, should incite

instructors and analysis teams to complete the system results with their own judgment based on their knowledge of the system and on their personal experience.

**A second limitation** lies in the risk of **loosing contact with the reality**.

Although the 3D displays are always more realistic, although the screens appearance is almost exactly similar to our C2 systems’, the playful dimension remains always present, and the operators are not placed under the same kind of stress as during real operation (when human lives are at risk).

Although several forgotten or even neglected notions (order transmission and execution delays, human losses, technical damages) have been reintroduced into the training tools, simulation could however entail some sort of trivialization of these problems. The risk is particularly credible since simulation tools (just like C2 tools such as SIR or SIT [Bn or Co CIS]) present interfaces that are always more alike and the operation commander in the field will see on his screen pixels quite similar to those of the simulation tools.

**A simulation tool can thus only give back what it has been designed for.** If it creates an environment close to the real world, it will only recreate it partially. Although simulation is useful for education and training, it only works within a limited intellectual field into which it would be perilous to remain confined. There are some precautions that must be taken before using simulation:

- It is important to know who designed the model and how it has been designed;
- It is important as well to have the possibility to add some uncertainty to the process;
- And finally, the simulation phase should be extended by placing the trainee back to a “life” situation that will remind him of the real life harshness (bad weather, intricate road network in the vicinity of large cities, HQ step up procedures that are dragging on indefinitely, ...)



coherence to all the systems that have been developed by each of the operational functions. There will be an additional challenge: integrating SIR<sup>4</sup> and SIT<sup>5</sup> within the capabilities that are implemented to conduct actions that are very much combined even at the lowest levels (Battle Space Digitization project). In addition, since digitized command networks are being generalized, they could also represent an opportunity to **put the simulation tools at user's immediate disposal**. This

## What about the future?

Before being able to determine what should be the place of simulation within tomorrow's forces operational preparation process, one should first define what could be the future types of engagements as well as the technical progresses which will indeed offer better employment possibilities as well as improved simulated situations and displays.

Talking first about operational engagements, it is probable that the **combined arms or even joint dimensions will be reinforced** even at the lowest tactical levels. Discontinuous types of field organization should continue to characterize the space framework, while the time framework should become more contracted due to the fact that information will be acquired and processed more rapidly and also due to a faster implementation of the weapons systems.

There is still a risk, but a limited one, to see the comeback of an enemy which would operate according to a known doctrine that could be modeled, but it is more probable, and still for a long time, that forces would be confronted to **asymmetrical/dissymmetrical types of situations, terrorism and to courses of actions that are not in keeping with our rationality and our way of thinking**. And last, the continuous and increasing pressure on our land and

air spaces will become more constraining as the possibilities to deploy in "open terrain" would have become less attractive due to airspace sharing conditions as well as those restricting the movements for our oversized road convoys.

Within the current context where the operational engagement tempo might not decrease, the simulation should evolve towards a **materialization of a virtual theater of operations** based on the networking of a set of installations and tools.

As a matter of fact, the research for **compatibility links between the various simulation tools** (including those that are linked to weapons systems) aims at federating them together creating thus a virtual combined arms and joint space. The issue is now to give a global

type of implementation would allow a simplifying continuum between training and engagement, and would offer an assistance to decision-making capability in operations. Lastly, the provision of "ready-to-wear" sequences in order to reduce the exercises preparation weight will become the privileged course of action in that struggle against time, certainly the toughest opponent of the moment.

*1 Simulation and Operational Research Division.*

*2 Map and/or sand table staff exercise.*

*3 Simulation tool.*

*4 Battalion Information System (CIS at Battalion level).*

*5 Terminal Information system : Contact unit battle management systems, offering a data transmission networks, the sharing of tactical information on a cartographic background such as access to the friend/foe situation.*

The resort to **modern simulation tools** which progressively interface with current CIS enables decision-makers as well as all other soldiers to learn, acquire and master know-how, procedures and reactions, and thus complements the use of classical education means. The simulation tools, which are actual **efficiency amplifiers**, can find their place alongside other training processes **with a few caveats**:

- they must have been designed to respond to well defined requirements,
- they must be used for what they have been designed,
- and lessons must be drawn out of successes and failures achieved during exercises.

Taken as a whole, **simulation** has become nowadays **one of the major building blocks of the land forces operational preparation**. The tough reality of combat engagements will be the only way to validate the training results since, although simulation allows to get very close to the real world, it will never be the real world.