Modelling Country Reconstruction based on Civil Military Cooperation

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ABSTRACT

This paper provides a general overview about the use of Modeling & Simulation techniques as support to training, planning and decisions making in Country Reconstruction, after wars, natural disasters, large crisis and conflicts. In particular the authors focus on CIMIC (Civil - Military Cooperation) activities and on CIMIC process in asymmetric wars. One goal of this research is to introduce a new Conceptual Model that can connect Human Emotions (fear, trust, anger…) to something or someone in scenarios generated by Computer Generated Forces (CGF). This interest resulted from the conviction that the success of a CIMIC Operation derives from the counterinsurgents capacity in separating local population from rebels. So, the intent is to model military actions' effects (positive or not) on civilians' emotions.
In the first part of the paper current applications of IACGF (Intelligent Agents for Computer Generated Forces) are examined. In the second part, three different real cases of CIMIC operations are taken back to study CIMIC process and to identify typical phases and activities and typical actors. In the third part conceptual model is given to reproduce CIMIC operations' effects in terms of trust and gratitude toward military forces and fear or anger towards rebels or terrorists.

1. INTRODUCTION

Modelling and Simulation (M&S) are extensively used in a wide range of military applications, from development and validation of new systems and technologies to operations analysis and assessment to training support for combat situations. In military areas (Exercise, Defence Planning, Training and Education, Support to Operations), the importance of M&S is steadily increasing.
In particular, there are a lot of simulation systems good for providing training environments: Computer Aided Exercises (CAX) is a well known example. Successful results are achieved in the development of digital battlefields, by using joint and single service simulation system with different complex level and aggregation. These systems allow a reduction in cost and an increase of possible investigating scenarios.
It's important to consider into new models that [7]:

- New forms of threats to "the West" are spreading over. In fact during the 20th century, military modeling and simulation were dominated by classic "force on force" engagements, battles, and campaigns, while now peace operations, counter- terrorism, counter-narcotics, counter-proliferation, information warfare, or rules and governmental power recover for fledgling democracies and free market economies are becoming more relevant than in the past.
- New enemies for military forces are represented by paramilitary organizations, insurgencies, guerrilla forces, terrorists, drug cartels, hackers, media warriors, and ethnic or religious mobs are new enemies for military forces.
- Military missions success is increasingly influenced by religious, cultural, and humanitarian considerations that have not been part of traditional warfare.

However, the vast majority of existing models don't treat these phenomena in any reasonable way. For this reason, the use of Computer Generated Forces (CGF) is a need to support this kind of simulation. 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.
In the last years, the nature of conflicts has changed from "force to force" battles to unconventional ones, in which civilian are involved and become the key of operations success. So the necessity to evolve the existent CGF/SAF increases, with the awareness that "What's needed from defense simulations today are models which can take into account the messy decision making processes of commanders and troops in the face of incomplete, conflicting, and sometimes wrong information in an atmosphere in which the rules and constraints upon which decisions are based are neither clear nor static" [14].
In the last few years, significant advances have been made by the Computer Generated Forces (CGF) and Semi-Automated Forces (SAF) communities to make synthetic military environments more realistic.

Today, after having acquired totally or partially the capability of modularity and providing significant enhancements on main models accuracy, researchers are investigating on new interesting aspects, among which:

- Full level interoperability and real time distributed simulation
- Defining moderator (fatigue, stress,…) for human behavior 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 organizations, in urban environments.

In particular there is a clear problem in CGF lack of fitness to the real operational planning, problem that requires to face the following issues: development of realistic virtual environments and at the same time CGF adaptable to the planner needs, creation of database of reusable CGF for different frameworks and implementation in the CGF of the possibility to modify its behavior based on clear and understandable parameters settings.

To overcome these limitations in current CGFs, synthetic entities are either controlled directly by a human or have their behavior managed by a human.

The lack of realism and full autonomy of synthetic entities thus limits CGF ability to replace human operators. Obviously, a more realistic way to model this kind of scenarios is needed: something that reproduces human behavior, including plausible mistakes and correct decisions.

A successful result was achieved by the authors with the development of PIOVRA (Poly-functional Intelligent Operational Virtual Reality Agents) Intelligent Agents. In fact new CGFs, able to simulate "Intelligent" behavior, filling up the gap between user requirements and current available CGF performances, were created. PIOVRA Project represents an important experience in advanced Human Behavior Modeling within an Interoperable Framework [3].

2. COUNTRY RECONSTRUCTION AND CIMIC REAL CASE STUDY

This research is mainly concentrated on the CIMIC modeling & simulation by the use of IACGF (Intelligent Agent for Computer Generated Forces) applications in asymmetric warfare contexts. Generally, the strategy of conventional warfare prescribes the conquest of the enemy's territory and the destruction of his forces. Parts in conflict have similar military power and resources and rely on tactics that are similar overall, differing only in details and execution. In asymmetric warfare, belligerents, whose relative military power differs significantly, or whose strategy or tactics differ significantly, are involved. In this case it's important that new CGF percept the presence of different ethnic civilian groups on the territory [10].

CIMIC operations are applied in the following situations [6]:

- Stabilization of an urban area where different ethnic populations, police forces, political movement agitators, terrorists and gangs act close to the military forces, trying to maintain international peace and security.
- Agitation and incidents that are directly linked with the presence and missions of the military forces on the ground
- Possible demonstrations, riots, lootings, kidnappings, murders and attack against military forces could occur.

CIMIC (Civil - Military Cooperation) activities are becoming very necessary to restore ordinary activities in a civil country. CIMIC is the military answer to new needs of operative efficacy in international operations (peacekeeping or in general Crisis Response Operations).

MoD (Ministry of Defense) defines CIMIC as follows: "The main goal of CIMIC outside national ground is to contribute to the achievement of civil objectives in all fields (justice, culture, economy, social, security…) to rebuild socio- economic tissue in the area in crisis. It is an integrated part of crisis management's processes and its role is very important during initial phases when Civil Organizations are not able to satisfy needs of local populations and institutions" [13].

CIMIC contributes mainly to:

- Restore the contact with the population, with local and international authorities
- Give support to the population
- Contribute to the economic restart.

CIMIC Operations start from basic elements that are linked to life and health**:** water (with wells building or rehabilitation), human health (with the joint medical service's support), cattle (with vet support particularly appreciated by pastoral populations such as the Afghan ones) and education. Specific and priority attention must be paid to children and women. At last economic actions are required, above all, because country stabilization goes through the restart process of its economic activities, from the lowest local level up to the national one.

In particular the solution of a crisis is the result of a comprehensive approach to ensure cooperation and coordination between civil and military. The aim is to establish two kinds of relationships: on one hand with the local authorities, with influent people, with the population, and on the other hand with the international organizations (UN, EU, the Red Cross, etc.), and the non governmental organizations that are on the theatre. CIMIC Modeling must thus represent a complex scenario where all actors (civilian and military) have not the same needs nor do they have the same centers of interest. In any case it's necessary to establish a way for sharing knowledge, experiences, researches, know-how between military

and civilian actors, scientist, consultants and humanitarian organizations [4].

Case of U.S. Army in Vietnam (1959- 1975)

The Vietnam War, also known as the Second Indochina War, was fought between the communist North Vietnam, supported by its communist allies, and the government of South Vietnam, supported by the United States and other anti-communist nations.

The Viet Cong, a lightly armed South Vietnamese communist-controlled common front, largely fought a guerrilla war against anti-communist forces in the region.

The United States entered the war to prevent a communist takeover of South Vietnam as part of their wider strategy of containment.

The United States Army entered the Vietnam War with a doctrine well suited to fighting conventional war in Europe, but worse than useless for the counterinsurgency it was about to combat. The U.S advisors in Vietnam were unprepared by nature or training to do anything except build a Vietnamese army in their own image and likeness. The U.S. military themselves learned during this period of gradual disintegration the true nature of the battle in which they were engaged. This was an unconventional, internal war of counterinsurgency rather than a conventional struggle against an external foe. It was a battle for the "hearts and minds" of the indigenous (and especially the rural) population rather than a contest to win and hold key terrain features. It was an intermeshed political-economic- military war rather than one in which political and economic issues were settled by military victory. So, new military tactics had to be developed and also new political tactics had to be devised and above all the two had to be meshed together and blended. Unfortunately, the army had neither the knowledge nor the desire to change its orientation away from conventional war. This factor conducted to the failure [16].

Case of DERB in Kosovo

Until 1989, Kosovo enjoyed a relatively independent status within the Federal Republic of Yugoslavia. However, in 1989, the Serbian leader Slobodan Milosevic forced the region under the control of Belgrade, depriving Kosovo of its former autonomy. Kosovar Albanians who made up 90 % of the population strongly opposed Milosevic's action. After the Serbian authorities struck down the opposition, the guerrilla movement Kosovo Liberation Army emerged in Albania and Nato launched Operation Allied Force by commencing air strikes on Kosovo. In this context the intent is to analyze cooperation between civilian actors and Dutch Engineering Relief Battalion (DERB). A model was developed and applied to eight civil military cooperative arrangements (see figure 1).

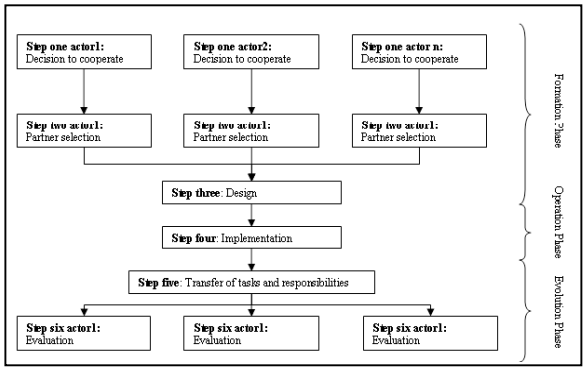

Figure 1. Process Model for civil-military cooperative arrangements in Kosovo case.

Researchers argued that the development of a cooperative arrangement is similar to a relationship between people: first two people meet, then they fall in love, next they engaged and finally they grow old together or sometimes divorce. Although not one cooperative arrangement travels the same path, a successful arrangement generally unfolds in several overlapping phases: the formation phase, the operation phase and the evolution phase.

These phases were organized in six steps:

- **Decision to cooperate.** On 11 June 1999 the assignment to form and prepare an engineering battalion was issued by the staff of the Dutch first division. A reconnaissance party, shortly followed by an advance party, was deployed in Kosovo to investigate construction sites suitable for housing the Dutch contingent over three compounds and to conduct an initial humanitarian assessment by contacting MNB South, present humanitarian organizations and the local authorities and representatives. In cooperation with the Human Resource Coordination (HRCC) and a German Cimic company, a detailed assessment was made, predominantly regarding the shelter situation. Three criteria were defined to determine priority areas in which humanitarian assistance was most needed: the degree of damage done to the villages (houses demolished at least 70 percent were considered high priority cases, small villages were top priority; the altitude of the priority areas (at an altitude from 500 meters the winter had usually started in October; the repatriation of refugees was taken into account (villages to which many former inhabitants had returned were considered priority areas).
- **Partner selection.** Based on the identified civilian actors, DERB undertook several actions in its search for appropriate partners for cooperation. These actions involved (informal) conversations between Cimic employees and representatives of humanitarian organizations. DERB implicitly used different criteria to select partners, such as partner's availability of financial means and capabilities, compatibility of personalities, compatibility of national and organization cultures.

- **Design.** After selecting a partner, DERB and the selected humanitarian partners usually concluded their agreement on cooperation verbally or by a written contract in which parties declare their intents and working plans.
- **Implementation.** The actors were involved in the actual implementation of assistance activities in several ways.
- **Transfer of tasks and responsibilities.** Most cooperative arrangements of DERB and its civilian partners ended as planned. While ending a cooperative arrangement, tasks and responsibilities were usually transferred to the civilian actors. In a few cases the military remained responsible after termination of the cooperative arrangement.
- **Evaluation.** Having transferred the tasks and responsibilities, little attention was generally paid to evaluation of the cooperative arrangement. The Dutch government evaluated the activities of the Dutch troops in Kosovo. With respect to DERB the report noticed that cooperation with humanitarian organizations and MNB South was good but lacked an integral policy [16].

Case of Algerian War of Independence (1954-62)

The war in Algeria offers most of usual characteristics of a revolutionary war. On the insurgent side, a small group of leaders aim at overthrowing the existing order. On the counterinsurgent side, a government endowed with vastly superior strength, but ideologically weak and burdened with the responsibility of maintaining law and order, reacts to stay in power. Experience shows that in this sort of war the political factors are just as important as the military ones, above all in Algeria where there was practically no military contest in the conventional sense owing to the superiority of the French armed forces in size, equipment, training and command. The insurgent leaders in Algeria were able to:

- Create and develop a strong, tested revolutionary party
- Gather around it as large as possible a popular front
- Then, and only then, proceed to open violence and initiate guerrilla warfare
- When bases have been acquired, organize a regular army and wage a war of movement, having achieved overall superiority over the opponent, launch a final annihilation campaign.

On the counterinsurgent camp, Algeria was administrated like any French metropolitan area. The territory was divided into three departments, each headed by a "prefect". The success of the FLN strategy depended on the solution of three essential problems: armament for the guerrillas, the psychological effects of their operations and control of the Moslem population. In this situation, the war could be won only if French forces succeeded in divorcing the rebels from population. There was the conviction that with psychological action the population could be manipulated. The support from population was the key to the whole problem; support meaning not sympathy or idle approval but active participation in the struggle. In any circumstances, whatever the cause, the population is split among three groups: an active minority for the cause, a neutral majority and an active minority against the cause. It's necessary to help the pro minority to emerge, assuring military's firmness of their intentions [10].

This result can be achieved by a series of well-defined political-military operations:

- Selection of the area on the basis of demographic and social characteristics (density of population, the foothold that the population offers to military action, the degree of infection, the smallest cleavage within the population, the population's access to counterinsurgent 's propaganda).
- Destruction or expulsion of the large bands
- Implanting the pacification units not in positions having a military value, but where the population lives.
- Establishing contact with the population, imposing firmly counterinsurgent's will, controlling their activities and movements so as to cut them off from the rebels, building schools and dispensaries.
- Control of the population (dividing villages in more parts, making a census of houses and families).
- Gathering intelligence, collecting information about rebels.
- Propaganda during this period.
- Destruction of the rebel cells considering that population fears the rebels more than it fears counterinsurgents and the entire population participates in the rebellion and everyone knows the members of the political cell in his village.
- Installation of provisional elected officials.
- Search for activities, defining the activist.
- Grouping and educating the activist.

3. CIMIC PROCESS ANALYSIS

Studying the described cases, the authors defined a process for CIMIC Operations. In particular they take in consideration that:

- Significant results are achieved by the Armed forces on relying on the population, with very little troops and equipment
- After the first phase of the military action, it is in the longer term that stabilization can be consolidated and made to last
- CIMIC Operations aim to gain populations trust, assisting the country and its inhabitants

So it's possible to identify a common process of leading CIMIC activities. In particular one can recognize these phases:

- **Planning phase**: education of military forces to the cultural and social attitudes of local

population, collection of knowledge and information about countries features and relevant people, propaganda towards population, selection of specific areas of interest.

- **Execution phase:** getting in touch with local population, obtaining trust by people, executing "good" actions towards people's healthy, education and security.
- **Maintenance phase**: maintenance of peace, isolating rebels and helping local population to rebuild their State.

A flow chart of CIMIC Process is represented in the following figure:

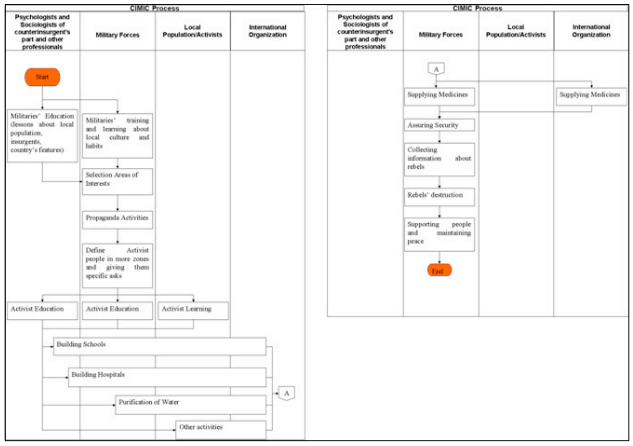

Figure 2. CIMIC Process

Activities to model are proposed as following:

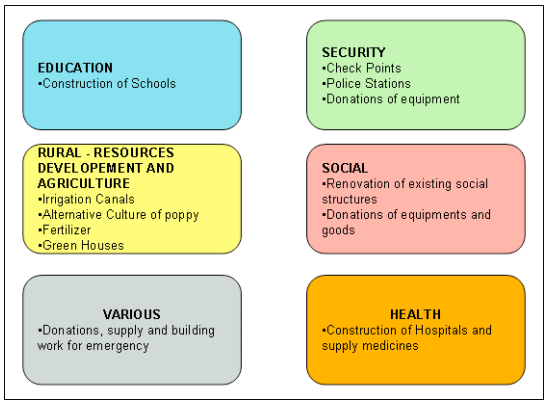

Figure 3. CIMIC Activities

4. A CONCEPTUAL MODELS TO REPRODUCE HUMAN BEHAVIORS

The conceptual model developed by the authors for this research is based on previous experience carried out in PIOVRA Project; in fact PIOVRA (Poly-Functional Intelligent Operational Virtual Reality Agents) represented the initial step forward to the creation of innovative CGF (Computer Generated Forces) able to demonstrate intelligent behavior.

The PIOVRA CGF was developed in reference to a set of features devoted to measure their capability to cooperate and compete as well as their attitude to incorporate human characteristics (i.e. fear, aggressiveness, fatigue and stress); PIOVRA CGF was tailored to reproduce population, demonstrations, ethnic groups, political parties, gangs and paramilitary forces, so a broad spectrum of entities characterizing asymmetrical warfare. Due to these reasons it is natural to consider the necessity to develop a new type of CGF, titled IACGF (Intelligent Agent for Computer Generated Forces) devoted to simulate complex behaviors. In particular, IACGF will be initially tested in CIMIC (Civil Military Co-operation) operations and will benefit of the conceptual models created for PIOVRA Project. IACGF will be focused on complex and critical applications involving both operational planning and training. The original PIOVRA CGF was driven by intelligent software agents and specific scenarios of urban disorders were used for demonstrating their capabilities. In fact the authors consider as critical the creation of the IACGF as HLA federates so that other simulation systems can be federated; therefore PIOVRA was demonstrated as an HLA federation interoperating with JTLS (Joint Theatre Level Simulator). In similar way it is expected that the new IACGF will be able to be interoperable with other simulators taking care of reproducing the factors and effects that characterise CIMIC activities; it will be useful to benefit from the legacy of PIOVRA CGF for specific aspects: i.e. the detection of different ethnic civilian groups on the territory and the relative perceptions. The use mode for the IACGF in CIMIC operational planning will include: training activities for Planners and/or Operations Commanders; in these case IACGF will operate in realistic scenarios in which the Decision Makers are able to choose among different options in presence of stochastic components and with a higher degree of uncertainty.

It is critical to be able to reproduce different basic behaviours in the units including:

- Friends
- Enemies
- Suspects (including terrorists)
- Neutrals

Obviously, dealing with CIMIC operations, it is fundamental to model realistic profiles including psychological and social modifiers as well as parameters such as stress level or level of aggregation. The capability of reproducing such behaviour is based on the use of Artificial Intelligence with special attention to the fuzzy logic applied in combining and estimating parameters based on membership functions and FAM (fuzzy allocation matrices). The approach to create IACGF for CIMIC scenario is based on OODA (Object Oriented Design and Analysis), from this point of view the following main type of objects have be defined:

- **Comportment Objects**, representing behavioural profiles corresponding to organisation, institutions, parties and group of people that define the general attitude, the characteristics of their elements (i.e. training level, social status mix, etc) and the pool of resources available

- **Action Objects**, representing units on the ground related to specific Comportment object and operating based on general task or specific orders and mutually interacting other action objects and with their comportment object.

In IACGF for CIMIC it will become very important to add social and cultural aspects (religious faith, beliefs, values, education, etc.) to psychological aspects (stress, fear, uncertainty, vulnerability, coolness). In particular, it's possible to distinguish negative emotions (anger, annoyance, unhappiness towards victims, for others, attacks and attackers, towards government) from positive ones (trust, optimism, thankfulness, relief, pride) and then to investigate theoretical links between people emotions and military actions. So, beginning from Psychological modifiers developed for PIOVRA Project and able to reproduce unit features, new elements will be added to new IACGF such as the capability to reproduce social network, creating dynamics interactions among people and among groups of people with own sociological and cultural characteristics.

With this research authors want to introduce new feelings, such as Trust or Gratitude or Recognisance, and above all to link these feelings not only with events that generate them, but also with people who are the makers of them. For instance, an explosion can generate fear in local population and, consequently, trust towards units that protect them and anger towards people responsible of the explosion. So, considering a CIMIC scenario, for instance the Disarmament Demobilization and Reintegration (DDR) of rebels, the main objective is to increase trust towards counterinsurgents and fear towards insurgents or rebels.

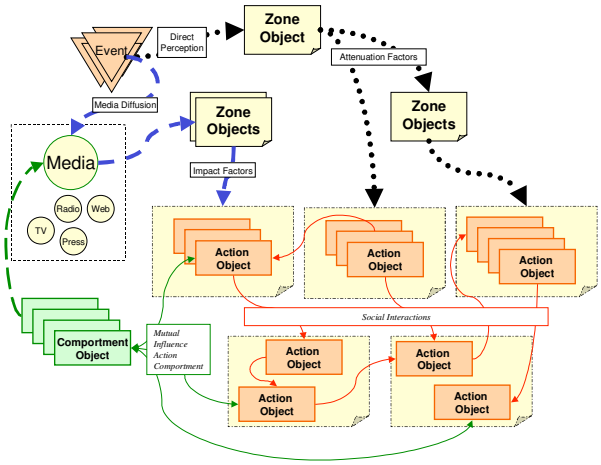

Figure 4. Fear Diffusion Model

Focusing attention on fear, this is related to events; in fact each event could generate a Risk/Danger Perception that corresponds to a *Generated Fear Level* modelled as a stochastic continuous variable between a minimum and maximum value related to the event type itself and modified by factors related to:

- Direct Perception: in this case there are attenuation factors that refer to the zone type where event happens, weather conditions and distance respect the action objects.
- Media Diffusion: in this case the factor represent the impact related to time and influence of different media
- Relata Refero: where the diffusion is going through the social network with mitigation factors due to the social communications.

The Generated Fear Level is compared with the *Action Object* properties related to social, psychological, cultural dynamic characteristics as well as its party attitudes and its current status; these elements affect the way each Action Object perceives the potential Fear generated by the event and the Human Behavior modifiers determine the reactions and are affected by different aspects such as fatigue and stress level of the unit as well as from the size/force of the Action Object respect the on-going event.

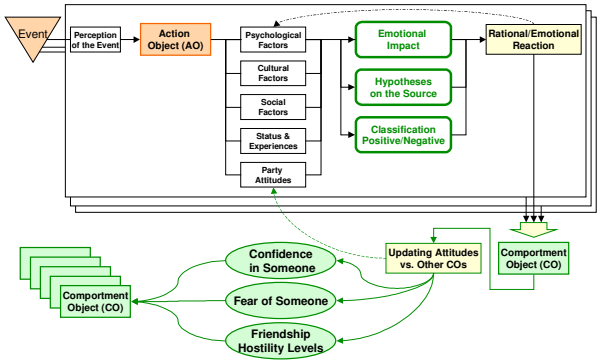

Figure 5 Event Impact Model

The reaction of the Action Object generates feedback in its own characteristics: i.e. improving or decreasing his capability to face such threats in future. In addition each Action Object generates an event assignment to a specific source to guarantee an upgrade of correspondent Comportment Object attitudes. These Attitudes are defined by membership functions applied to classes representing the attitude of a Comportment object respect another one, usually the following five classes are used:

Very hostile
Hostile
Indifferent
Friendly
Very Friendly

The element of this vector are evolving independently for each comportment object and attributed to action object and there is a mutual influence due to the event and actions during simulation run.

The computation of Comportment Objects attitudes respect another comportment object, based on the action object reactions and their perception of the event impact, is proposed the specific relations.

In fact the following relations introduce the concept of *Pool* representing the people of an action object that have been not yet instantiated in Action Objects; even these people are subjected to influence of events as an additional "special" action object.

$$A_i^{Pool_{C_{zw}}} = \frac{Ao_i^{C_{zw}} + An_i^{Pool_{C_{zw}}} \mathrm{Im}^{Pool_{C_z}}}{1 + \mathrm{Im}^{Pool_{C_z}}}$$

$$A_i^{C_{zw}}(j) = \frac{Ao_i^{C_{zw}} + An_i^{A_{jw}} \mathrm{Im}^{A_j}}{1 + \mathrm{Im}^{A_j}}$$

$$A_i^{C_{zw}} = \frac{N^{Pool_{C_z}} A_i^{Pool_{C_{zw}}} In^{Pool_{C_z}} + \sum_{j=1}^{N^{C_z}} N^{A_j} A_i^{C_{zw}}(j) In^{A_j}}{N^{Pool_{C_z}} In^{Pool_{C_z}} + \sum_{j=1}^{N^{C_z}} N^{A_j} \cdot In^{A_j}}$$

$$\sum_{i=1}^{N_{classes}} A_i^{C_{zw}} = 1$$

A_i^{Czw} Attitude element in term of i-th class (i.e. very friendly) level for the z-th Comportment Object respect the w-th comportment object after the current event

$A_i^{Pool\ Czw}$ Attitude element in term of i-th class (i.e. very friendly) level for the Pool element of the z-th Comportment Object respect the w-th comportment object after the current event

Ao_i^{Czw} Old level for i-th attitude class (i.e. very friendly) for the z-th Comportment Object respect the w-th comportment object, before current event

$An_i^{Pool\ Czw}$ New level for i-th attitude class (i.e. very friendly) for the z-th Comportment Object respect the w-th comportment object, in relation to the current event

$Im^{Pool\ Cz}$ Impact perceived by the Pool of the z-th Comportment Object of the current event

$A_i^{Czw}(j)$ Attitude element in term of i-th class (i.e. very friendly) level for the j-th Action Object belonging to the z-th Comportment Object respect the w-th comportment object after the current event

An_i^{Ajw} New level for i-th attitude class (i.e. very friendly) for the j-th Action belonging to the z-th Comportment Object respect the w-th Comportment Object in relation to the current event

Im^{Aj} Impact perceived by the j-th Action Object of the current event

$N_{classes}$ Number of classes representing attitudes

N^{Cz} Number of Action Objects of z-th Comportment Object

$N^{Pool\ Cz}$ Number of people in the Pool of the z-th Comportment Object

N^{Aj} Number of people in the j-th Action Object

$In^{Pool\ Cz}$ Influence of the Pool of the z-th Comportment Object

In^{Aj} Influence of the j-th Action Object

It is important to note that the IACGFs relate Emotions such the fear proposed in the previous example to Scenario Actors; in addition it is even important to introduce the concept of fear mitigation on medium, long term. In fact, if a negative event (i.e. explosions) recurs several times, people get used to this particular condition and fear increasing stops.

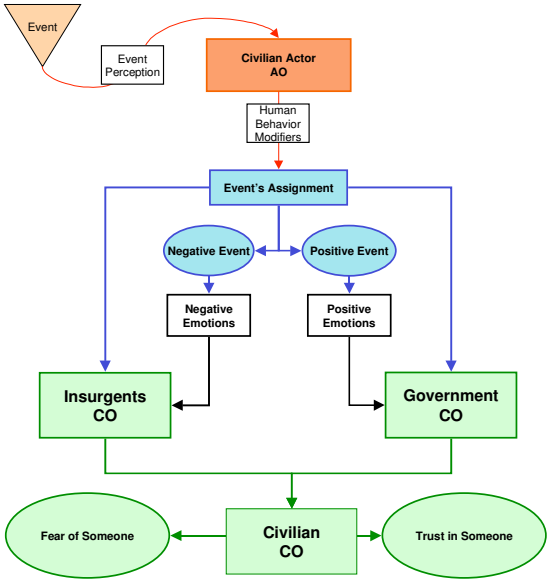

Figure 6. Fear Diffusion Micro Model

5. EXPERIMENTAL SCENARIOS

Based on previous described models it was created a simulation framework reproducing action objects belonging to different comportment objects in a town of middle size; the simulator, titled PSYOPS (Psychological Operation Simulator) was implemented in C++ for Windows ™ and its GUI is proposed in following figure.

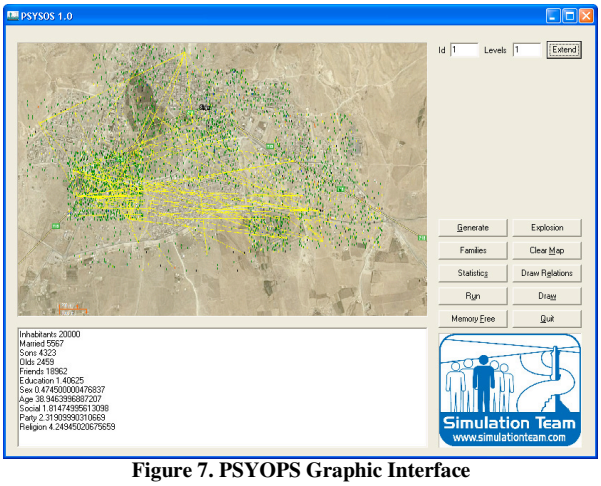

Figure 7. PSYOPS Graphic Interface

This simulator generates the population and creates stochastic social network consistent with constraints related to cultural level, age, sex, religion and social status of the inhabitants; obviously this represents an ideal framework to test the impact of critical events on the population.

Each individual in this case is an action object subjected to a set of activities around the clock corresponding to its status; agents direct the entities in term of movements (i.e. from house to work), actions (i.e. work, home activities, fun time), etc.

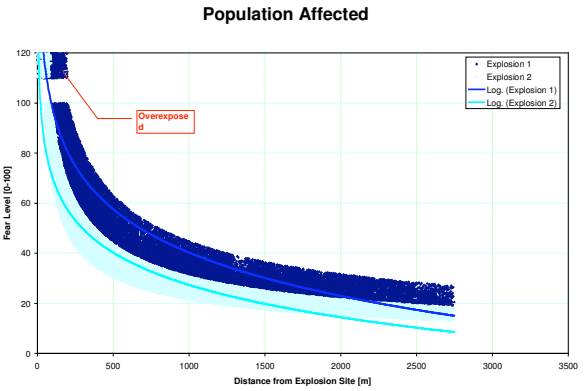

Figure 8. Fear due to Explosion

For testing diffusion in the population it was injected in the town an explosion and measured as people perceived it. The figure 8 provides a report of the fear level due to direct observation in case of two different explosions during early morning in rush hours; the results present the fear level of each individual in correspondence to its distance from explosion site considering a maximum threshold.

6. ACKNOWLEDGEMENTS

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7. CONCLUSIONS

This paper presents the initial research for the development of a new kind of Intelligent Agents devoted to simulate CIMIC Operations, taking in consideration psychological, social and cultural characteristics of units involved. In particular, starting from the successful results of previous Projects (i.e. PIOVRA), authors summarised case studies to be used in validation and verification of these simulation as well as model to attribute emotions to entities in order to consider the impact of CIMIC on the different players in complex scenarios; currently the authors are working to adapt their new IACGF to CIMIC scenarios; in this process new issues have been identified and some new models have been developed.

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