

SERIOUS GAMES FOR DEVELOPING INTUITION AND AGILE THINKING FOR DECISION MAKERS

Agostino Bruzzone^(a), Alberto Tremori^(a), Claudia Baisini^(b)

^(a)DIME, University of Genoa, Italy - www.itim.unige.it

^(b)CIM-coach AB, Sweden – www.cim-coach.se

^(a)agostino@itim.unige.it, alberto.tremori@simulationteam.com, ^(b) claudia.baisini@cim-coach.se

ABSTRACT

This paper describes on-going researches about the usage of serious games for training and education of a set of “soft skills” such as intuition and agile thinking. These skills are a critical asset for any kind of decision maker. This work is focused on military officers; however, the authors’ goal is to develop general methodologies and games that could find applications also in the industrial and business world, being decision making and, in particular, strategic decision making critical elements in every sector.

In this paper the theoretical framework and the preliminary ideas on possible games development are illustrated.

Keywords: Serious Games, Contextual Learning

1. INTRODUCTION

The CEO of a company as well as an Officer of our Armed Forces need to be trained to what Napoleon called “Coup d’Oeil” (glance) (Baisini, 2011). Indeed any person with responsibilities, today, has to operate in scenarios that are rapidly evolving and has to deal with huge amount of information to get to the final decision. So, even if the described approaches can be applied to several critical areas (Bruzzone&Longo 2010), the researches described in this paper are specifically focused on the decision making process in the Defense sector. In fact the conflicts in which Armed Forces are engaged are largely characterized by Interactive Complexity: the system is nonlinear, its proportions unstable and cause-effect patterns ambiguous. Large civilian presence and involvement, difficulties in identifying possible threats, high tempo, and dense terrain are typical features of the so called “three block war”, introduced by Gen Krulak, which requires the capability of making a broad range of decisions in little or no time at the micro tactical level. The squad leader has considerable decision making responsibility in this scenario. In order for him to get the best possible situational awareness, it is necessary to provide him with the necessary skill set (not tools, not rules) that allows him to ‘Read’ the operational environment and understand its regulating rules, rather than applying

frames of reference that would work in the Domestic environment. He must be provided with the capability of learning from the Context, stretching his mental models and transcend the obvious (Tremori et al. 2011). Research suggests that visual orientation can be recognized as the important feature for a group leader in urban combat; what one sees and how he interprets can be decisive. However, what has received less attention is the fact that the ability to make fast decisions in a situation of crisis depends also on the ability to make the right judgment of the situation; to perceive and understand context appropriately (Chun, 200). Such ability requires sophisticated training; a context based training that provides an agile mindset and the capability to learn and understand the context appropriately while deployed. Whether focusing on a squad leader of a distributed operation squad in a “three block war” environment, or on a Commander at the Operational Level, or on Intelligence and IOs, what is crucial is the context, which culture of course informs. In particular at the tactical level, it is paramount that a squad leader learns how to watch and interpret what is seen and refer to the local context (understand what he sees in relation to where he is) rather than interpreting it based on preconceived ideas or prior de-contextualized knowledge/information. Furthermore, he must do it fast, which is why the visual dimension and Intuition emerged as so critical: he must get that “Coup d’Oeil” that was considered crucial by Napoleon, and by many after him. He needs to develop that intuition that Gen. Krulak (Krulak, 1999) considers the most important characteristic of young leaders. In this paper is proposed a training philosophy and possible, effective, innovative solutions by Modeling & Simulation, to establish a solid ground for re-framing and creative decision making. To develop such kind of complex and articulated set of skills we are proposing an approach based on Modeling and Simulation and in particular on Serious Games *not* to “teach” new contexts but to stimulate and develop mental agility that help to understand different and every new context. Different scalable architectures and methodologies will be studied, designed, developed, tested, and deployed for decision makers’ education.

As emerged from this introduction, the ‘how to’ enhance the described set of is a particularly complex problem: research on these issues is ongoing (i.e. USMC) but no attempt has yet been made to leverage

on the potential of serious games for this kind of training. The goal of this research, as better explained in the next paragraph, is to investigate how to succeed in training and educating intuitiveness, glance and agile mindset by using serious games. We intend to develop the prototype of a game, which will be tested, and the effectiveness of the training methodology will be verified.

2. INTUITION AND AGILE THINKING

Napoleon referred to the intuitive capability to rapidly assess a situation and make a fast decision as “Coup d’Oeil” or “strike of the eye”: he believed it was a gift of nature. In fact, behavioral psychologists have identified the creative-intuitive personality as being “alert, confident, foresighted, informal, spontaneous and independent. Not afraid of its experiences, accepts challenges readily, unconventional yet comfortable in its role, able to live with doubt and uncertainty, and not afraid of exposing to criticism” (Mrazek, 1972). However, the military believes that although heredity and personality certainly play a role here, intuition can be cultivated and developed.

One definition of intuition is: “intuition is a developed mental faculty which involves the automatic retrieval and translation of subconsciously stored information into the conscious realm to make decisions and perform actions. Organized databases of knowledge gained through education – experiences, memorization, sensations and relationships – are the building blocks for intuitive thought” (Reinwald, 2000, p.86).

While MDMP (Military Decision Making Process) has demonstrated its effectiveness in long term planning, it carries some risks, identified in the literature as “bounded rationality” (Wolgast, 2005). An alternate approach is the one named as Intuitive (or Naturalistic) Theory of decision making based on the premise that individuals often use less formal but much faster decision making strategies (Gigerenzer et al. 2004, 1999; Gilovich et al., 2002) in real time situations (Bryant et al., 2003).

The “Coup d’Oeil” refers to the instant, global understanding of a situation. This refers to what the eye seizes, both literally and metaphorically. It is also the ability to see the whole and also to see what is not there.

Stemming from Klein’s definition of intuition as based on “experience to recognize key patterns that indicate the dynamic of a situation” a problem arises: a soldier has no experience of the local environment in which he is deployed, therefore his intuition would be based on experiences, patterns and dynamics that emerge from, and are applicable to, his prior context and circumstances. Such patterns, however, not necessarily are applicable to the context in which he is deployed and often can be deceptive. These issues are key to “understanding” and “learning” about the operational environment. The way in which an individual sees the world is the product of the

individual’s personal history, experiences, upbringing, personality, and of his social context. However, these frames not necessarily apply to the context in which he is to conduct his operation; in this case they can be misleading, as illustrated in the example below. Both Figure 1 and 2 could be a main road to a rural community anywhere but Figure 2 looks exotic to most Westerners.



Figure 1: Private Photo



Figure 2: Private Photo

3. THE PROJECT

“The human mind’s intuitive process is an irreplaceable determinant of combat success.” (Reinwald, 2000, p.88). Napoleon referred to the intuitive capability to rapidly assess a situation and make a fast decision as “Coup d’Oeil” or “strike of the eye” (glance): he believed it was a gift of nature. In fact, behavioral psychologists have identified the creative-intuitive personality as being “alert, confident, foresighted, informal, spontaneous and independent. Not afraid of its experiences, accepts challenges readily, unconventional yet comfortable in its role, able to live with doubt and uncertainty, and not afraid of exposing to criticism” (Mrazek, 1972). However, the military believes that although heredity and personality certainly play a role, intuition can be cultivated and developed.

From the many definitions of intuition three common traits can be identified:

- it is a phenomenon of subconscious thought
- it relies heavily on experience-based knowledge
- it is a comprehensive, unrestrained thought process

The “Coup d’Oeil” refers to the instant, global understanding of a situation, this is particularly appropriate to the subject discussed here because it refers to what the eye seizes, both literally and metaphorically. It is the ability to see the whole and also to see what is not there, and act.

According to Klein, whose Recognition Primed Decision Model is a milestone in decision making theory, the first source of power is intuition, which he defines as use of experience to recognize key patterns that indicate the dynamics of a situation. (Klein, 1998) This includes recognizing what is happening but also what is not happening, as both can provide clues. The ability to see what others cannot develops with experience. Because of vast experience one is able to see the pieces of the event that are not perceptible to

someone with less experience or expertise. (Wolgast, 2005).

The main goal of this work is first of all to develop a theoretical framework about contextual learning and its application for intuition and glance (“coup d’oeil”). This research will bring to the creation of conceptual models to develop a simulator, based on a serious game approach, which aim is to demonstrate the possibility to effectively train the soft skills described in this document. The simulator will be developed accordingly to a serious games approach: it will stretch over different levels and will be provided with a scoring system for players to create a strong engagement and a better learning experience.

These goals challenge traditional training and simulation paradigms that attempt to reproduce reality (the context) as perfectly as possible, to train the soldier to a sort of automatic “internalized and reflexive response”. We need to take these representations one step further: the role paid by what the subject expects to see cannot be handled well in photorealistic simulations as presently implemented. What is often crucial is to be able to see what we are not conditioned to see. To achieve this, we need to move education, training, and simulation technology beyond a concern with detecting and reinforcing certain rules of behavior or by producing “better” and “better” reproductions of reality.

Moving away from traditional Simulation and Gaming products, where the tendency is that of ‘representing’ reality, we suggest a training that focuses on challenging the player to develop his/her cognitive skills and teach to recognize what is salient in an Operational Context characterized by a high level of Interactive Complexity.

The methodology and the training tools and that we propose are based on the usage of simulation and in particular on Serious Games. In fact, Serious Games provide an opportunity to improve performances with reduced efforts to professional simulation with great attention to interfaces, story, emotional involvement, and graphics, as well as new technologies. The potential application areas for these games usually benefits of the introduction of Artificial Intelligence (Giribone, 1999) and enhanced realism through Human Behaviour (Bruzzone et al. 2011, 2010, 2007). These models are applied also to industrial processes considering both ergonomic (Cimino&Longo 2009, Curcio&Longo 2009) and process-related issues. It is common to develop Intelligent Agents (IA) able to drive several of the active entities in the game. For the purpose of training to the Coup d’Oeil we suggest the study and development of an “educational path” that starts from a simple, portable serious game solution and can move towards more complex and immersive synthetic environments. For all this different levels the basic concept is always to educate the user’s intuitive thought in recognizing key patterns. At the same time we want to increase users’ involvement and recreating some of the key factors in tactical decision making process: speed and stress.

A complete and extended Verification, Validation and Accreditation (VV&A) of the models and a rigorous testing based on the usage of the developed serious game activity will be completed to provide final results.

Among the areas of investigation will be to define how the serious game shall be tailored to specific users, i.e. high ranking officers, non commissioned officers or troop. At this stage we only differentiate with respect to : Tactical level: where the subject (all ranks) is dealing and analyse reality and process real data; for instance the *VTLM-Lince* driver that has to realize that there is something unusual, and consequently, potentially dangerous in the road he’s driving on.

- Operational Level: in this case the user is most likely working on meta-data (i.e. a map or intelligence report) to plan an operation.

Besides tailoring the game to specific users, this project has the goal of, first of all, develop the generic methodology to train people, despite their ranks or task (i.e. officers planning an operation as well a sergeant patrolling a road or a CEO or mid level managers) by:

- Increasing mental agility (capability to re-orient in contexts driven by unfamiliar frames of reference and mental models), flexibility and creative decision making. Particularly flexibility in relating to unknown situations: diminished reliance on familiar categories and stereotypes, increased learning from the context, as a consequence of increased confidence in handling unknown context.
- Diminishing implicit effect of stereotyping.

The prototype should represent logics that do not correspond to familiar categorizations or common sense. Such scenes/images would be created in order to:

- Identify and enhance the effects of existing categories and stereotypes.
- Generate “disconfirmation”
- Require the user to increase attention, observation skills, and interaction with the context in order to learn and identify clues relevant to understanding the logic underlying the scene.
- Relate to the context as a living system, one of constant movement and change rather than having a static picture as often found in Handbooks and briefs.
- Combine the identified cues in multiple ways building different plots in order to challenge common sense and stretch the boundaries of own categories to re-define them (Re-think/Re-frame).
- Identify what is happening in relation to the context.

Purely by way of example we can imagine (see Figure 3) that the prototypal game, running on an a mobile platform (i.e. tablet), will represent a specific geographic scenario (i.e. Afghan village or a Western town road), with incoherent elements in term of objects, people appearance (an Afghan lady with a *burqa*

walking in Bond Street in London), behavior (blond North European guys quarreling excitedly with typical South European gestures), noises (the main Kabul road with New York traffic noise) and even smells (grandma's cookies sweetness in a Middle East bazaar). Two main issues here are to be 'worked through':

- Status Quo Disconfirmation (or Unfreezing): the rules of the competition are not explained and they are not consistent with one's common sense and normal rules. In order to win user has to find the right way to score and so has to re-think his customary behaviors (and the logics underlying them).
- Recognize Key Patterns: while the user is focusing attention on the contest, due to the unusual rules (that create cognitive confusion), we start to inject in the scenario the incongruent elements. This would lead the user to re-create experience in ways that demonstrate the value of re-thinking 'common sense'. One strategy might be to have users become familiar with the game environment, assume that this is a 'stable' reality, and then slowly destabilize the 'taken for granted' order of things.

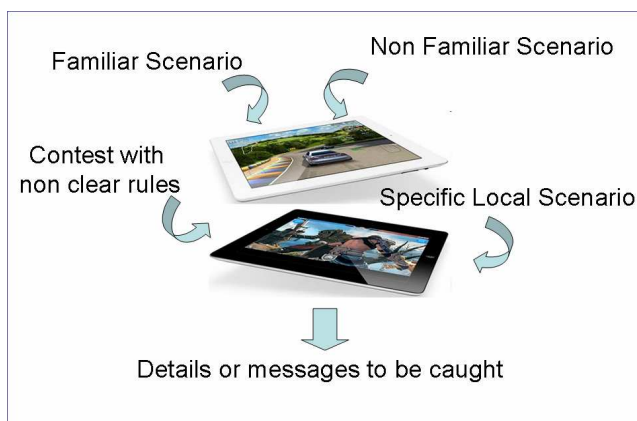


Figure 3 –Solutions for educating to understand stereotypes and develop observation skills

4. IMPACT IN THE DEFENSE SECTOR

As already mentioned our Armed Forces are largely involved in operations characterized by a strong Interactive Complexity, conceptual asymmetry in balance of power, and requiring fast decisions.

The proposed Serious Games for final demonstration of research results is perfectly aligned with the current doctrinal and training framework of Armed Forces. Indeed actual doctrines are the result of deep strategic changes and of new operational approaches increasingly influenced by non military factors (i.e. PMESII, PESTLE) and that influence the symmetry relations between opposite sides.

Training, as well, had to conform, moving from conventional educational program to an increased focus

on smaller units for tactical operations, where the most relevant part of military operations is made by recognition, surveillance, patrolling, specific stabilization operations and, as well, Civil and Military cooperation.

Therefore in this context squad leader has important responsibilities proportional to scenario difficulties but coherent with operation's superior orders. This requires not only a deep knowledge of orders and mission goals, but also a sophisticated training; a context based training that provides an agile mindset and the capability to learn and understand the context appropriately while deployed.

Accordingly to this, MDMP (Military Decision Making Process) has demonstrated its effectiveness in long term planning, by its very nature it carries some risks, identified in the literature as "bounded rationality". Such process improved for classical military doctrine, was re-adapted to current operative conditions but it is, for sure, too complex and onerous for minor units that must be agile and fast in completing assigned tasks.

An alternate approach is the one named as Intuitive (or Naturalistic) Theory of decision making and it is based on the premise that people often use less formal but much faster decision making strategies in real time situations. The "Coup d'Oeil" refers to the instant, global understanding of a situation, this is particularly appropriate to the subject discussed here because it refers to what the eye seizes, both literally and metaphorically. It is the ability to see the whole and also to see what is not there, and act.

According to Klein, whose Recognition Primed Decision Model is a milestone in decision making theory, the first source of power is intuition, which he defines as use of experience to recognize key patterns that indicate the dynamics of a situation. This includes recognizing what is happening but also what isn't happening, as both can provide clues. This ability comes from experience, the ability to see what others cannot. Because of vast experience one is able to see the pieces of the event that are not perceptible to someone with less experience or expertise.

It is important to stress that the training suggested in this project is a complement to efforts that are already taken, particularly within the USMC, to increase Situational Awareness and decision making skills.

The main goal of the proposed Serious Game will be to improve the methodological approach of trained personnel to enhance Contextual Situational Awareness and to refine the capability of using the best available decision making processes to complete assigned task. Finally such training, coherent with actual training needs emerging from operational scenarios, will be a further, important item to the capability of correlating different experiences of deployed personnel and to identify key patterns of the tactical context to understand operational dynamics.

5. CONCLUSIONS

The effort of the on-going research described in this paper is to study a methodology to develop games that educate soft skills such as intuition and agility in thinking despite the specific scenario where the trainees are going to operate. This is an innovative approach in respect to mainstream existing researches, which focus on models that reproduce the reality of a specific operational environment (for critiques of this strategy in a maritime environment see Dekker, 2009). Often training is focused on notional or normative models designed to teach “how things are” or “how they are supposed to be”. The alternative path taken by the authors is to enhance the users’ cognitive systems by teaching them to learn by observing and engaging with operationally relevant field indicators, in more fundamental adaptive ways. The idea is to use a Serious Game approach that supports users, through strong engagement, to become more receptive to the signals sent by specific and generic environments. Further, it will help users “boot strap” from one environment to another without the need to return to first base each time. Most existing learning and training scenarios work off of a set of pre-defined, deterministic categories. This is true even with sense making models. How to reframe and train for beyond the obvious is an issue that has relevance not only in relation to the Modern Operational Environment, but to all branches of Decision Making. Understanding complex environments and to be able to extrapolate from one context to another would strengthen the war fighter’s cognitive assets and help him or her meet the challenges of today’s warfare, providing the ability to succeed also, and particularly, when reality turns out to be different was supposed to be’ (according to the handbook).

REFERENCES

- Abt C.C. (2002) *Serious Games*, University Press of America
- Argyris, C. and Schön, D. (1996) *Organizational learning II: Theory, method and practice*, Reading, Mass: Addison Wesley
- Baisini C., Tremori A., Enkvist T., Bruzzone A.G., James M. N. (2011), White Paper “Agile Intuition An innovative approach for educating Context Sensitive Coup d’Oeil”
- Baisini, C and Deinlein, E (2002) *Knowledge in Knowledge Intensive Organizations. The case of Crime Investigation and Consulting Firms*. Masters Thesis. Gothenburg School of Economics and Law, Graduated Business School.
- Baisini, C. (2009) *USMC and US Army at the Aftermath of OIF and OEF*, Internal Report for Swedish National Defense College, Department of Command & Control Studies
- Baisini, C. and Nyce, JM (2010) *Lethal Modeling*, Military Intelligence Professional Bulletin, June-July
- Baisini, C. Bjurström, E, Gemeinhardt, D. (2010) *Incorporating Contextual Sensitivity and Metacognition into Law Enforcement and Intelligence Activity*, FBI Terrorism Research and Analysis Program, Vol I, US Government Publication
- Bergeron B, (2006) *Developing Serious Games*, Charles River Media
- Bruzzone A.G., Tremori A. Buck W., (2012) “Definition of CD&E cycles to be used in the ”integration test bed (ITB)” to support Italian defence with M&S tools into the new systems development and acquisition processes”, Proceedings ITEC2012 London, May.
- Bruzzone A.G., Tremori A., Madeo F., Tarone F, (2011) "Intelligent agents driving Computer Generated Forces for simulating human behaviour in urban riots", Under Publication on International Journal of Simulation and Process Modelling (IJSPM).
- Bruzzone A.G., Massei M. Tremori A., Bocca E., Madeo F., Tarone, F. (2011) *CAPRICORN: Using Intelligent Agents and Interoperable Simulation for Supporting Country Reconstruction*, Proceedings of DHSS2011, Rome, Italy, September 12 -14
- Bruzzone AG, Longo F (2010). *An Advanced System for Supporting the Decision Process within Large-scale Retail Stores*. SIMULATION, vol. 86, p. 742-762, ISSN: 0037-5497, doi: 10.1177/0037549709348801
- Bruzzone A.G., Frydman C., Tremori A. (2009) *CAPRICORN: CIMIC And Planning Research In Complex Operational Realistic Network MISS DIPTM* Technical Report, Genoa
- Bruzzone A.G., Massei M., Tremori, A. (2009) *Serious Games for Training and Education on Defense against Terrorism - NATO MSG-069 Symposium Use of M&S in: Support to Operations, Irregular Warfare, Defence Against Terrorism and Coalition Tactical Force Integration*", Bruxelles, Belgium October 15, 16
- Bruzzone A.G., Elfrey P., Cunha G., Tremori A. (2009) *Simulation for Education in Resource Management in Homeland Security* Proceedings of SCSC2009, Istanbul, Turkey, July
- Bruzzone A.G., Cantice G., Morabito G., Mursia A., Sebastiani M., Tremori A. (2009) *CGF for NATO NEC C2 Maturity Model (N2C2M2) Evaluation*, Proceedings of I/ITSEC2009, Orlando, November 30-December 4
- Bruzzone A.G. (2009) *Intelligence and Security as a Framework for Applying Serious Games*,

- Proceedings of Serixgame, Civitavecchia, November
- Bruzzone A.G., Briano A., Bocca E., Massei M. (2007). Evaluation of the impact of different human factor models on industrial and business processes". SIMULATION MODELING PRACTICE AND THEORY, vol. 15, p. 199-218, ISSN: 1569-190X
- Bruzzone A.G. (1996) Object Oriented Modelling to Study Individual Human Behaviour in the Work Environment: a Medical Testing Laboratory, Proc. of WMC'96, San Diego, January
- Bryant Dr. D. J, Webb Dr. R. D.G. and McCann C. (2003) Synthesizing two approaches to decision-making in Command and Control Canadian Military Journal Spring
- Chun, M. (2000) Contextual Cueing of Visual Attention Trends in Cognitive Sciences Vol. 4, No. 5 May pp.170-177
- Curcio D, Longo F (2009). Inventory and Internal Logistics Management as Critical Factors Affecting the Supply Chain Performances. INTERNATIONAL JOURNAL OF SIMULATION & PROCESS MODELLING, vol. 5(4), p. 278-288, ISSN: 1740-2123 (almeno 2 volte)
- Cimino A, Longo F, Mirabelli G (2009). A multi measure-based methodology for the ergonomic effective design of manufacturing system workstations. INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS, vol. 39, p. 447-455, ISSN: 0169-8141, doi: 10.1016/j.ergon.2008.12.004
- Dekker, Dahlstrom, van Winsen, Nyce (2009) Fidelity and Validity of Simulator Training, in Theoretical Issues in Ergonomics Science, Taylor & Francis Ed, 29 January
- Duggan, W. (2005) Coup d'Oeil: Strategic Intuition in Army Planning, SSI Publication, US Army War College
- Gigerenzer, G. (2004). Fast and frugal heuristics: The tools of bounded rationality. In D. Koehler & N. Harvey (Eds.), Blackwell handbook of judgment and decision making. Oxford: Blackwell.
- Gigerenzer, G., Todd, P. M., & the ABC Research Group (1999) Simple heuristics that makes us smart. Oxford: Oxford University Press.
- Gilovich, T., Griffin, D., & Kahneman, D. (2002). Heuristic and biases. The psychology of intuitive judgment. Cambridge: Cambridge University Press
- Giribone P., Bruzzone A, (1999). Artificial Neural Networks as Adaptive Support for the Thermal Control of Industrial Buildings. INTERNATIONAL JOURNAL OF POWER & ENERGY SYSTEMS, vol. 19, No.1, p. 75-78, ISSN: 1078-3466
- Greenwals, A. & Banaji, M. (1995) Implicit Social Cognition: Attitudes, Self-Esteem, and Stereotypes, Psychological Review, Vol. 102, No.1, 4-27
- Iuppa N, Borst T (2006) Story and Simulations for Serious Games: Tales from the Trenches Focal Press
- Klein, G. (1998) Sources of Power: How People Make decisions MIT Press Cambridge MA
- Klein, G. (2007) Flexecution as a Paradigm for Replanning, IEEE Computer Society Vol. 22, No. 5
- Kolb. D. A. and Fry, R. (1975) Toward an applied theory of experiential learning. in C. Cooper (ed.) Theories of Group Process, London: John Wiley
- Krulak Gen , C. (1999) Cultivating Intuitive Decision Making Marine Corps Gazette, May
- Massei M., Tremori A., Pessina A., Tarone F (2011) Competition and Information: Cumana a Web Serious Game for Education in the Industrial World, Proceedings of MAS2011, Rome, Italy, September 12 -14
- Michael D, Chen S (2005) Serious Games: Games That Educate, Train, and Inform, Course Technology PTR
- Mrazek Col, J. (1972) Intuition: an instantaneous backup system? Air University Review January- February
- Reinwald Maj, B. R. (2000) Tactical Intuition Military Review September-October p. 88
- Schein, E. H. (1992) Organizational Culture and Leadership. 2d. Ed. San Francisco, CA.: Jossey Bass
- Tremori A., Baisini C., Enkvist T., Bruzzone A.G., Nyce J. M. (2012), "Intelligent Agents and Serious Games for the development of Contextual Sensitivity", Proceedings of AHFE 2012, San Francisco, US, July
- Wolgast, K. (2005) Command Decision Making: Experience Counts, U.S Army War College Carlisle Barracks

AUTHORS BIOGRAPHY

Agostino Bruzzone since 1991, he has taught "Theories and Techniques of Automatic Control" and in 1992 he has become a member of the industrial simulation work group at the ITIM University of Genoa; currently he is Full Professor in DIPTM. He has utilized extensively simulation techniques in harbour terminals, maritime trading and sailboat racing sectors. He has been actively involved in the scientific community from several years and served as Director of the McLeod Institute of Simulation Science (MISS), Associate Vice-President and Member of the Board of the SCS (Society for Modelling & Simulation international), President of the Liophant Simulation, VicePresident of MIMOS (Movimento Italiano di Simulazione) and Italian Point

of Contact for the ISAG (International Simulation Advisory Group) and Sim-Serv. He has written more than 150 scientific papers in addition to technical and professional reports in partnerships with major companies (i.e. IBM, Fiat Group, Contship, Solvay) and agencies (i.e. Italian Navy, NASA, National Center for Simulation, US Army). He teaches "Project Management" and "Industrial Logistics" at the University for students in the Mechanical Engineering (4th year), Management Engineering (4th year) and Logistics & Production Engineering (3rd Year) Degree Courses. His email address is agostino@itim.unige.it

Alberto Tremori is an Electric Engineer with a PhD in M&S. He acquired an extended experience in technology transfer and management of R&D projects with a particular focus on modeling and simulation (M&S) applied to different areas: process re-engineering in logistics, production and transportation systems; modeling complex non conventional scenarios and human behavior in defense and security. He's also interested in application of M&S to medical and social issues. He participated to several International Conferences as speakers in Europe, Asia and North America.

He worked with IBM as project manager. he had roles in commercial and sales management in Xerox in IDC. He was Site Manager and Project Coordinator for CFLI a Consortium devoted to provide training and education in the Logistic Sector. He was in charge of managing virtual simulation training projects for transportation. He worked also with several IT and Consulting Companies in Technology Transfer, Innovative Hi-Tech Projects and Business Development dealing with Small and Medium and Large Companies and National and International Agencies and Institutions.

He was co-founder and President in MAST a SME devoted to R&D projects with a particular focus to M&S. From 2009 He's faculty member of MIPET (Master in Industrial Plants) at University of Genoa. He's appointed from the Italian MoD to several NATO Research Groups.

He's currently working in the University of Genoa at DIME (former DIPTEM) as technical researcher, managing research projects in M&S and acting as Technology Transfer Manager.

Claudia Baisini started her studies in Economics and Law at the University of Milan. After some years she moved to the University of Aberdeen, King's College, where she focused on Organizational Studies, Cross Cultural Marketing Strategy, International Business, and Organizational Change and Learning. After a course at the Copenhagen Business School in Cross Cultural Marketing Strategy, she took her M.Sc. in International Management at the Graduated Business School of the University of Gothenburg, Sweden. Her Master Thesis' was on "Knowledge in knowledge intensive organizations; the case of crime investigation and consulting firms". After the Master Program she

worked at the University of Gothenburg where she deepened her competence in ethnographic studies and qualitative research. After working with International Humanitarian Operations and Crisis Response, in 2004 she joined the staff of the Swedish National Defense College in Stockholm. The most relevant projects: evaluation of the Planning Under Time pressure method (PUT), research assistant for a simulation program based on System Dynamics theories (STRATMAS, Strategic Management System), and a study focused on Situational Awareness of a squad leader in urban combat (MAC). Since 2007 she has been working as Defense contractor within Concept Development & Experimentation, and leads a project aimed at fostering dynamic decision making, organizational learning, and mental agility. She currently participates at three projects: 1. development of a Context Based Actors' Analysis method to understand the mindset of relevant actors in the Area of Operations, stemming from how our biases and categorizations influence our own understanding; 2. Development of a planning method based on CAS and dynamic decision making, to be used in fuzzy/complex environments; 3. Agility in Expeditionary Operations. Since 2009 she is a member of FBI TRAP (Terrorism Research & Analysis Program), a study group led by FBI Academy Behavioral Science Unit, Quantico, and collaborates with the USMC and NSA. Claudia is a Doctoral candidate at the University of Cambridge, UK.