Editorial

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Biographical notes: Agostino G. Bruzzone is a Full Professor at DIME University of Genoa, Director of M&S Net (international network involving 34 centres), Director of the MISS McLeod Institute of Simulation Science – Genoa Center (28 centres distributed worldwide), Founder and President of the Liophant Simulation, member of the Simulation Team, Vice President and member of the Board of MIMOS (Movimento Italiano di Simulazione), and member of the NATO MSG. He works on innovative modelling & simulation, AI techniques, human behaviour modelling and GAs. He serves as the General Coordinator of scientific initiatives (i.e., I3M General Chair). He teaches 'M&S' for the DIMS PhD programme (Doctorship in Integrated Mathematical M&S). He is the Director of the Master programme in Industrial Plants for the University of Genoa. He is the Project Leader M&S at NATO STO CMRE – Centre for Maritime Research and Experimentation.

As technology advances, M&S evolves in unpredictable ways becoming even more effective and pervasive. Ranging from the military domain, where M&S applications have been extensively used for training and experimentation, it has become the main tool supporting both analysis and training in many application domains, including industry, logistics, healthcare and many others. M&S has proved its effectiveness for planning and experimentation supporting what-if analysis and the search for optimal solutions to be implemented. In this regard, M&S has improved the functionalities of decision support systems by being able to capture the dynamic nature of the problem under study and adding additional capabilities, such as optimisation, predictions, and estimates. Simulation can take into account uncertainties in a quantitative way so as to provide valuable support when evaluating the outcomes and the consequences of a particular choice. Therefore, substantial benefits can be achieved when it is applied to ongoing operations for supporting decision-making at different levels. This is particularly true when dealing with large multiscale and multidomain systems where complex interactions occur. In such cases, simulation can act as an integrated framework that allows its users to gain a better understanding, and to improve and speed-up decision-making processes.

Simulation-based training grounded in virtual environments and/or serious gaming has demonstrated high potential and has attracted the interest of the military, industry, logistics, academia and various agencies in pursuit of improving training and enhancing training effectiveness. Thanks to simulation, training has become a fully interactive, structured and often immersive experience where the substantial aspects of the real world are replicated; trainees can develop professional knowledge, skills and attitudes in a riskless environment while managers can benefit from reduced training costs and increased training effectiveness.

In both cases, whether M&S targets decision makers or trainees, it implies conceptualisation and implementation or, in other words, it is crucial to have both a formal specification with assumptions and constraints capturing the essence of the particular domain being considered and their translation in a computer-executable form. Needless to say, all the advantages and the potential that M&S approaches can provide rely on the ability to carry out conceptualisation and implementation activities as well as testing and experimentation. To this end, M&S theory and practice is endlessly enhanced with new paradigms, standards, approaches and solutions, thanks to the continuous efforts of researchers in dealing with even more complex and challenging applications.

In this perspective, this special issue on 'The future of modelling and simulation: training, experimentation and decision making' collects high quality and relevant contributions paving the way for further developments and new trends in M&S. Moreover, the papers that are part of this Special Issue are extended versions of the best papers published in the Proceedings of the International Multidisciplinary Modelling and Simulation Multiconference (I3M 2012), a timely opportunity for researchers and scientists to let their work be known and discuss with each other the new trends in the M&S area.

Without further ado, a brief overview of the paper published in this special issue is given as follows:

- 'A prototype for project management game development using high level architecture' by AbouRizk et al. proposes a framework based on the construction synthetic environment (COSYE) and on the high level architecture (HLA) with the aim of simplifying the development of project management games.

- 'A modelling and simulation approach to assessment of a negative binomial approximation in a multi-echelon inventory system' by Solis et al. applies a modelling and simulation-based approach to assess whether the approximation-based search procedures in the Gaves' model result in optimal or near-optimal stock levels for a multi-echelon inventory system.

- 'Proposal of a structured methodology for the measure of intangible criteria and for decision making' by De Felice and Petrillo applies the analytic hierarchy process (AHP) to identify a quality model aimed at assessing the performance of Italian racecourses.

- 'Testing the behaviour of different inventory control policies in case of extended reverse logistics by using simulation' by Longo proposes a review of the most important inventory control policies in reverse logistics and a simulation framework devoted to compare the behaviour of different inventory control policies in terms of supply chain costs.

- 'Innovative models for supporting operational planning' by Massei et al. proposes innovative simulation models based on the intelligent agents computer generated forces (IA-CGF) and aimed at supporting operational planning in civil military cooperation (CIMIC) and psychological operations (PSYOPs). Such models include logistic and operational aspects as well as the effects on people and groups, taking into account social and cultural aspects.

- 'Specification of CPN models into MAS platform for the modelling of social policy issues: FUPOL project' by Piera et al. proposes a modelling methodology to represent and analyse a context-aware multiagent-based system. The coloured petri net (CPN) formalism is used for capturing citizens' preferences and affinities when an urban change occurs; moreover, an approach to translate the CPN semantic rules into the rules used in NetLogo is presented.

In conclusion, my thanks go to all the people involved in the publication process of this special issue: the authors and the reviewers since they worked hard in improving the quality of the papers and the Editor-in-Chief and the journal manager for their continuous support along the publication process.