# NEW EDUCATIONAL PROGRAMS BASED ON M&S FOR STRATEGIC ENGINEERING

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**ABSTRACT**
This paper proposes a new initiative, named STRATEGOS, devoted to promote Strategic Engineering as a new discipline to be taught in University and to prepare a new generations of engineers able to use new technologies for supporting decision makers on strategic issues.
This initiative is strongly based on the capability to combine different methodologies in real applications; the pillars of this discipline are represented by Modeling and simulation, data science, machine learning and smart optimization solutions. Also, the paper proposes applications and program as example for further developments.

Key Words: *Strategic Engineering, Simulation*

## INTRODUCTION

In modern world we face many challenges that usually require efficient strategic decision making; therefore we assist, not rarely, to failures due to decreasing of trustiness in Institutions and Politics among the population. It happens similarly in military operations as well sometime in industry and business. These kinds of issues in supporting strategies have been addressed since centuries by classical writers, including Livy and Machiavelli, therefore, recently some pretty interesting reading about these subjects with special attention to complex scenarios and systems have published (Powell 1992 Mintzberg 1994; Galula 2002; Gordon 2017). Obviously, many books related to decision making and strategies are available, but a crucial element emerging as critical is the decision making capability (Summers 2009; Luttwak 2016; Payly 2017). This problem has two evident sides: decision makers along with their staff should acquire new capabilities. Nowadays we are experiencing the revolution of information age and many new data sources and resources are available; indeed also computational capabilities are much higher than before and AI (Artificial Intelligence) is demonstrating major advances (e.g. intelligent search, human profiling, communications, transportations, etc.) in complex scenarios (Massei et al.2014). So it is evident that today it turns possible to use enabling technologies and new methods into an integrated way to support decision makers, but, at the same time, it emerges the necessity to prepare a new generation of scientists, engineers and decision makers able to work using this new tools and related innovative approaches.
A promising solution to this challenge is provided by Strategic Engineering, a new discipline focusing exactly on these issues. The authors developed an new educational program, named STRATEGOS that is an example of new deal in this direction and could represent a way toward the necessary achievement in Strategic decision making (Bruzzone 2018b).

## MODELS FOR STRATEGIC ENGINEERING: SOME EXAMPLES

Despite the highly innovative nature of Strategic Engineering, ideas about this capabilities have been considered since several years (DARPA 2007); furthermore it is evident that today multiple models are already available to be used; in the following few

examples based on Simulation Team achievement are listed (Bruzzone 2013; Bruzzone et al. 2009, 2011, 2014, 2015, 2016):

- ARPIAS: Augmented & virtual Reality for Population modeling based on Intelligent Agents
- BACCUS: Behavioral Advanced Characters & Complex Systems Unified Simulator
- CRIPEM: CRitical Infrastructure Protection in Extended Maritime framework
- Decision Theatre: SMARTCITY, Strategic Decision Making in Urban Environment
- DIES-IRAE: Disasters, Incidents & Emergencies Simulation & Interoperable Relief Advanced Evaluator
- MALICIA: Model of Advanced pLanner for Interoperable Computer Interactive Simulation
- MEGACITY Simulator
- MOSES: Modeling Sustainable Environments through Simulation
- SIMCJOH: Simulation of Multi Coalition Joint Operations involving Human Modeling - Virtual Interoperable Simulation & Virtual Interoperable Commander
- SO2UCI: Simulation for Off-Shore, On-Shore & Underwater Critical Infrastructure
- ST_CRISOM: Simulation Team Crisis Simulation, Organization and Management
- S4PT: Safety, Security Simulation System for Port Terminals
- T-REX:Threat network simulation for REactive eXperience

In these solutions apply Intelligent Agents and interoperable simulators, able to create a virtual framework where is possible to test strategies (Bruzzone & Massei 2017); indeed these simulators and virtual environments have to be even considered as major resources for E&T programs (Education and Training) in Strategic Engineering to organize classes, interactive experiences, exercises and role play games in realistic scenarios with experts (Di Bella 2015).

## STRATEGIC ENINEERING INITIATIVES

Strategic Engineering is an emerging new discipline that was already promoted in different Initiatives by authors including Workshops, R&D Projects, Seminars, Webinars, etc. For instance recently several workshop, presentations or tracks were included in conferences such as :

- Future Forces Forum, Praha, October
- 11th Workshop in Applied Modeling and Simulation, Praha, October
    - *Strategic Engineering & Simulation Session*
    - *Serious Games for Strategy Session*
- 15th International Multidisciplinary Modeling & Simulation Multiconference, Budapest, September
- 8th International Workshop in Defense and Homeland Security Simulation, Budapest, September
    - *Track on Simulation for Strategic Engineering, Budapest, September*
- *Logistics Enhanced by Simulation Nowadays: Strategies and Guidelines for addressing New Opportunities & Challenges*, Invited Speech at TIDE, Think-Tank for Information, Decision and Execution Superiority, Spring 2018, organized by NATO ACT (Allied Command for Transformation)
- *Presentations* on the 3rd NASP International Workshop on Conflicts and Institutions

In addition there are active calls for Journals on this subject:

- *Special Issue on M&S and SG for Strategic Engineering*

## STRATEGOS INITIATIVE

As anticipated, STRATEGOS represent a new initiative devoted to promote quantitative analysis and modeling for strategic decision making process (Bruzzone 2018a). Indeed along the years several qualitative approaches are emerged addressing management issues for companies and even qualitative engineering turned to be popular. The good performance of qualitative engineering in supporting professionals playing key roles, is strongly related to the necessity to take decision in presence of highly degree of uncertainty while facing complex systems that result not predictable and it could still have application for those who are confident with these approaches. Therefore many realized a strong change due to technological enablers: indeed, it results evident that new technologies allow to access, process and model huge amount of data, often obtained in quasi-real-time. It makes possible to perform quite effective quantitative analysis. The point is create engineers mastering these technologies in order to combine them together and obtain reliable and punctual quantitative results. In facts, STRATEGOS aims to create a new generation of engineers dealing with Strategic Thinking based on quantitative models and methodologies so that they might support Decision Makers. It is evident that these achievements strongly rely on specific techniques such as advanced Modeling & Simulation (M&S) and Mathematical Modeling (Cianci et al. 2016). Obviously several enabling technological and scientific areas supporting this approach are to be covered by STRATEGOS Program.


*Figure 1 – STRATEGOS Programs, courses, workshops and project work*

In facts, the term Strategy define the ability to deal with a variety of variables, considering uncertainty, extensibility, scalability, dependability as well as opponent reactions.

Also, it make sense to remind a major Strategist, Von Moltke, who defined "Strategy as a system of expedients; it is more than a mere scholarly discipline". He was used to add that "no plan of operations extends with any certainty beyond the first contact with the main hostile force" (Militarische Werke, 1871). These considerations are still valid today, however the Preußischer Generalfeldmarschall did not state "Strategic Planning is useless" but the opposite: the necessity to adopt a Dynamic and Fluid Strategic Approach that is exactly what we have to face nowadays. In facts, STRATEGOS does not deal with creating Strategists, but people mastering the techniques and technologies to create Dynamic and Fluid Aids to Strategic Decision Making based on current advances. So the main aim of STRATEGOS, Master in Engineering, is to prepare people to develop these new models and architectural solutions able to win the present and future competition within a wide spectrum of applications. From this point of view, it is possible to find a validation of this approach in many current initiatives; for instance, it makes sense to consider just one statement, among millions, that confirms the importance of Strategic Engineering: "If you want to grow, find a good opportunity. Today, if you want to be a great company, think about what Social Problem you could solve." (Ma Yun, alias Jack Ma, co-founder and executive chairman of Alibaba, in 2018: Personal Net Worth 42.2 GUSD; Alibaba 462th World Raking, 23.8GUSD Revenues, 6.2GUSD Profits, 56% Growth in Net Revenues, Stocks +15% within a single month). Indeed if we analyze major success in business (e.g. Facebook, Alibaba, Amazon, Booking, etc.) they are strongly addressing social issues and turning them into a business opportunity.

In facts, social factors play a major role in development of Strategies and the access to computational capabilities based on new quantitative models reproducing the dynamics of Complex Systems an using big data. It is interesting to outline that STRATEGOS initiative is among first ones worldwide and it specifically focuses on applications for industry, business and governmental agencies. A special attention will be devoted to Defense as well as other applications: organizational changes, finance, marketing, services, operations. The Master addresses

the requirements for developing capabilities for support to Strategy Planning and Development and the major pillar is Modeling and Simulation, Artificial Intelligence and Machine Learning, Innovative Operational Research & Data Analysis (Sciomachen et al. 2005). The STRATEGOS students are expected to learn how to design architecture for supporting decision process and how to combine the different methodologies in algorithms to be supported by Information and Communication Technologies (ICT). It is important to state that engineers are not just about to design new Systems and Products, but also to support Definition and Development of New Strategies. Obviously these aspects deal with the ability to define and implement New Processes, new Solutions and change Organizations able to guarantee the achievement of Strategic Goals. In facts new Systems have a quite long and risky Operational Lifecycle, strongly affected by many variables as well as by changing boundary conditions and general scenarios. STRATEGOS aims to provide the students with proper understanding of all these issues. As anticipated, up to now they are often roughly addressed by educational practices: for instance, by applying basic qualitative approaches or simplified static analysis methodologies to provide insights of complex systems.

## THE EDUCATIONAL PROGRAM

The abovementioned new Engineering Master Program, MSc, deals with enabling technologies while combining different domains to address Strategic Decision Making.

STRATEGOS is a Joint Venture among different Engineering Departments, Faculty of Economics and Political Science as a new educational path providing deep Scientific Knowledge as well as Technical Engineering Skills combined with Strategic Planning and Decision Making Approaches in use for Business and International Affairs.

The final goal is to give a proper scientific background to those expected to work closely with decision makers with different backgrounds. The graduates will be capable to develop, tailor, propose and update strategies both on planning and development phase. The new Strategic Engineers will be able to use advanced quantitative methodologies and Models directly together with decision makers and executives for Strategy Definition, Innovative Solution Development and Capability Assessment. The details of the focus are under definition within the steering committee (international experts in different domains e.g. power, communications, defense, consultancy). Indeed the scope is to create a strong synergy between Academia and Industries as well as Governmental Institutions, Military Services and International Organizations. In this way the professionals generated as outcome of STRATEGOS will experience leading Institutions and Companies while their internship & project works to reinforce their capability to operate in a variety of application domains ranging from Manufacturing to Engineering, from Military Sector to Business, from Politics to Personal and Societal Development. They should be able to apply Strategies using the most appropriate Models, but also to finalize system requirements and to design new Methodologies, Techniques and Instruments for Strategic Planning and Management (Amico et al. 2000). Topics addressed in STRATEGOS include:

- Computational Methods
- Computer Programming
- Continuous Modeling and Simulation
- Crisis Management
- Cyber Physical Systems
- Cyber Warfare
- Decision Making
- Decision Support Methods
- Discrete Modeling and Simulation
- Game Theory
- Graphics Modeling and Simulation
- Human Behavior Modeling
- Hybrid Warfare
- International Relationships & Geopolitical Models
- Mining and Analyzing Big Data
- Modeling and Design of Complex System
- Modeling and Simulation of Maritime Systems
- Modeling for Monitoring and Diagnostics
- Models and Principles of Economy
- Operational Research
- Probabilistic System Design
- Social Network Modeling
- Software Systems Design Techniques

STRATEGOS program includes seminars and workshops open to selected audience addressing hot spots (e.g. Social Network Modeling, Demand Forecast, Modeling for B2C, Hybrid Warfare, Human Behavior Modeling, Cyber Warfare, Crisis Management, Anti-Access Area Denial A2AD, Agile C4I, CBRN, etc.). Indeed these subjects are pretty relevant and require use of modern scientific approach to be effective (Gerasimov, 2013) it worth to mention that current operational scenarios propose very interesting cases where strategies, despite big efforts, resulted in failures due to multiple causes that a Modeling approach could face (Jalali 2017; Di Bella 2015). The students will perform team working on simulators (figure 2) as MIPET students do (MIPET is the 1st International Master Program of Genoa

University in Industrial Plant Engineering and Technologies). Topics such as project management, construction, sustainability issues are addressed by experts from Industry using computer simulation to investigate alternatives and finalize virtual experience: innovative simulators such as SIMCJOH will be in use for this purpose (Bruzzone et al.2015). Moreover, STRATEGOS is an International Master open to student from worldwide, lectures are delivered in English language and optional courses will be offered also in other Languages to improve cultural background in soft skills (e.g. Project Management, Team Building) as well as in Language (e.g. Italian, English, Spanish, Chinese, Portuguese). The STRATEGOS program is currently organized over 2 years, where 3 semesters are focused on lectures, exercise, simulations, role play games and laboratory activities, while the latest is devoted to a project work within a Company or Institution; indeed it is possible also to spend some weeks in international initiatives to enhance the capabilities of the students.

**ROLES FOR STRATEGIC ENGINEERS**

The STRATEGOS Engineers could serve in multiple roles in Industry, Business, International Activities, Defense and Homeland Security; some examples are listed hereafter:

- Scenario Identification, Definition and Analysis
- Support Decision Makers by Quantitative Methodologies, Models and Analytical Approaches
- Strategic Analysis and Decision Support in Defense
- Development of Models, Processes and Analysis to support Governmental and International Institutions, Policy Makers and Public Authorities
- Support to Industry in Strategic Decision Making, Planning and Scenario Definition
- Development of Models of Complex Systems
- Data Farming by Simulation to extend, integrate and fuse Big Data for Data Analytics
- Development of New Algorithms, Models and Architecture devoted to model, simulate, anylize and support decisions in complex Systems
- Modeling, also through the capture of data and information conditioning, of the scenario in which the organization moves
- Supporting the management of an Organization, civil or military, in defining the objectives and planning the actions necessary to achieve them
- Simulation, through the implementation of self-built systems, of the evolution of events on the basis of planned actions to verify whether the objectives of the organization are likely to be achieved.
- Development of plans to defend and restore to normal operating conditions following attacks or major emergencies.

**PLACEMENT OPPORTUNITIES**

Modeling, analysis and strategy planning are some of the competences and skills expected to be usable for several applications. The expected target include large companies, but also Small Medium Size Enterprises (SMEs) given the typical current uncertainty in Industry and Business.

Specific competences, that are expected to be useful particularly for advanced business dealing with complex systems and closer to the world of the research, include discrete and continuous modeling, statistical techniques, scenario simulations, enabling ICT technologies.

Position in public/private research and management/administration centers is targeted as well as in Industries and Companies. Hereafter some examples:

- Support to the Board of Directors: Oil & Gas, Industrial Process Plants & Industries, Major Manufacturing Companies, Strategies for B2B, Strategies for Business to Consumers, Strategies for Communications Services, Strategies in Energy, Strategies in Resilience & Sustainability, Strategies in Investments, Retail, etc.
- Support to the Directors: Strategies on Operations for Major Industries, Strategies in Multi-Project Management in Companies, Operational Level and Grand Tactics devoted to implement Strategies, etc.
- Strategies for Specific Domains: Power, Constructions, Services, Logistics, Marine Sector, Airport Networks and new Air Traffic Control Solutions; New developments enabled by Autonomous Systems; Space & Aerospace (e.g.Micro Satellites and Enabling Technologies in Aerospace); Underwater Resources (e.g.Impact of advances in Underwater Robotic Systems), etc.
- Support to Defense & Homeland Security: Commander Decision Support in Operational Planning -Course of Action Definition, Quantitative Support to Negotiation and Consensus, Strategies for Homeland Security & Defense, New Programs and Simulation Based Acquisition, etc.
- Support to Agencies & Governmental Institutions (e.g. EDA, ONU, NATO): Strategies on International Affairs, Consensus, Strategies in Service to Society, Health Care & Strategies, etc.

- Models for Companies specialized in complex Systems and Plants, etc.
- Design, service and management companies (including Banks and Insurances) requiring scenario simulation and data processing and interpretation, etc.
- Companies (e.g., software houses, mechanical electrical and electronic components and systems, etc.) interested in Decision Making and Engineering, especially considering product/system/service strategy. This should concern also SMEs.

*Figure 2- Interactive Class on PM in MIPET*

**STRATEGIC ENGINEERING SKILLS**

STRATEGOS Engineers are expected to address models and algorithms development and carry out Scenario and System Analysis. In addition the Strategic Engineers are trained to identify the Target Functions in a Complex Systems, that is why Strategic Engineer Skills include among the others:

- Engineering and Mathematics applied for modeling complex systems
- Modeling and Simulation
- Data Farming and Data Analytics
- Artificial Intelligence, Intelligent Agents and Machine Learning
- Robotic Process Automation and Autonomouys Systems and Heterogeneous Networks
- Mathematics, Information Technology and Engineering for the implementation of Simulators and for the Critical Analysis and Decision Making
- Economic and Political Analysis of Scenario and Operational Context and Feasibility Analysis of the Alternative Solutions
- Context Engineering for the Technical Sustainability of the Strategies developed and the Plans to implement Them
- AR, VR, Graphics and Visualization, to move results into an easily accessible and understandable, interactive, immersive and interoperable framework

STRATEGOS Degree is multidisciplinary, it aims to providing skills for addressing and coordinating complex systems such as that ones in Defense, Homeland Security and Industry. Simulation Team and Elios Lab provide a major support to promote the education activities of the Master making available their resources.

**STEERING COMMITTEE**

STRATEGOS Steering Committee involves Top Quality Experts and Scientists from Academia, Industry, Services and International Agencies in order to keep updated its contents and to guarantee continuous improvements. In addition, the engagement of Excellence Centers guarantee to enhance the opportunities for the STRATEGOS Students. Currently Agostino G. Bruzzone and Alessandro De Gloria serve as coordinators, however new organizations and institutions are expected to be involved into the process. Indeed Memorandum of Understanding, Patronage and Collaboration with many entities are foreseen, even considering Education & Training emerging needs (Mazal 2018).

**DESIGNIN FLEXIBLE SELECTION PROCESS**

The Selection process in this innovative program need to consider that different people could apply: new graduates with a BSc in Engineering, but also professional people such as officers or scientists working in this field and interested to develop strategic engineering skills; due to these reason STRATEGOS created a special Committee for selection including as observers representative of the Institutions and Companies involved in the Steering Committee. In addition STRATEGOS is designed as proposed in the general scheme, to develop and include specific workshops, seminars and preliminary classes devoted to provide credits to people applying for this MSc Program that don't have the titles to finalize the procedure; in this way the applicants will attend these initiatives and acquire missing credits.

In facts the admission to STRATEGOS is subject to the possession of specific curricular requirements and adequacy of personal preparation.

The verification of the preparation will be carried out as described in the academic regulations of the M.Sc.

Indeed for professional people with experience it will be possible to send applications to be evaluated by the selection Committee. The validation of such credits will be obtained as result of the recognition of

Professional knowledge, expertise and skills certified individually in accordance with current legislation
Other knowledge and skills gained through educational activities at university level is possible; obviously, considering the lectures and the educational material will be all in English, it is required to have adequate knowledge of the English language, with reference to disciplinary vocabularies, equivalent to B.2 or higher.

**CONCLUSIONS**

STRATEGOS focuses on developing an innovative framework for new generation engineers dealing with Strategic Engineering. They will attend classes and labs to use modern M&S, MS2G (Modeling, interoperable Simulation, Serious Games) (De Gloria et al. 2014) Machine Learning, Big Data, innovative ICT solutions. These "tools" have a great potential for effectively support strategic analysis for dynamic complex systems with emergent behavior. In addition, STRATEGOS considers as a major atout the partnership with Institutions and Companies: this is a stronghold able to support the Master by means of valuable Internships and Excellent Placement.

**REFERENCES**


Amico Vince, Bruzzone A.G., Guha R. (2000) "Critical Issues in Simulation", Proceedings of Summer Computer Simulation Conference, Vancouver, July

Bruzzone A.G. (2018a) "MS2G as Pillar for Developing Strategic Engineering as a New Discipline for Complex Problem Solving", Keynote Speech at I3M, Budapest, September

Bruzzone A.G. (2018b) "Strategic Engineering: How Simulation could Educate and Train the Strategists of Third Millennium", Proc.of CAX Forum, Sofia, September

Bruzzone A.G., Massei, M. (2017) "Simulation-Based Military Training", in Guide to Simulation-Based Disciplines, Springer, pp. 315-361

Bruzzone A.G., Massei M., Longo F., Cayirci E., di Bella P., Maglione G.L., Di Matteo R. (2016) "Simulation Models for Hybrid Warfare and Population Simulation", Proc. of NATO Symposium on Ready for the Predictable, Prepared for the Unexpected, M&S for Collective Defense in Hybrid Environments and Hybrid Conflicts, Bucharest, October 17-21

Bruzzone A.G., M. Massei, F. Longo, L, Nicoletti, R. Di Matteo, G.L.Maglione, M. Agresta (2015) "Intelligent Agents & Interoperable Simulation for Strategic Decision Making On Multicoalition Joint Operations". In Proc. of the 5th International Defense and Homeland Security Simulation Workshop, DHSS, Bergeggi, Italy

Bruzzone A.G., Massei M., Poggi S., Bartolucci C., Ferrando A. (2014) "IA for HBM as Support to Operations", Simulation and Modeling Methodologies, Technologies and Applications, Advances in Intelligent Systems and Computing, Springer, London, Vol. 319, pp 119-132

Bruzzone A.G. (2013) "Intelligent agent-based simulation for supporting operational planning in country reconstruction", International Journal of Simulation and Process Modeling, 8(2-3), 145-159.

Bruzzone A.G., Tremori, A., Tarone, F., Madeo, F. (2011) "Intelligent agents driving computer generated forces for simulating human behaviour in urban riots", Int.Journal of Simulation & Process Modeling, 6(4), 308-316

Bruzzone A.G., Cunha, G., Elfrey, P., & Tremori, A. (2009) "Simulation for education in resource management in homeland security", Proc. of SCSC, Istanbul, Turkey, July, pp. 231-238

Cianci, R., Bruzzone, A., & Sburlati, R. (2016) "A simulation of one dimensional contaminant transport". Proceedings of the Summer Computer Simulation Conference (p. 67). Society for Computer Simulation International.

DARPA (2007) "BAA 08-09 Deep Green Broad Agency Announcement (BAA)", DARPA Technical Report, Washington DC

De Gloria, A., Bellotti F., Berta R. (2014) "Serious Games for education and training." International Journal of Serious Games 1.1

Di Bella (2015) "Present and Futures Scenarios and Challenges for M&S terms of Human Behavior Modeling", I3M Keynote Speech, Bergeggi, IT

Galula, D. (2002). Pacification in Algeria, 1956-1958 (Vol. 478). Rand Corporation.

Gerasimov V. (2013) "The Value of Science is in the Foresight: New Challenges Demand Rethinking the Forms and Methods of Carrying out Combat Operations", Voyenno-Promysh-lennyy Kurier online, February 26

Gordon, R. J. (2017). The rise and fall of American growth: The US standard of living since the civil war (Vol. 70). Princeton University Press.

Jalali, A. A. (2017). A Military History of Afghanistan: From the Great Game to the Global War on Terror. University Press of Kansas.

Luttwak, E. (2016). The Grand Strategy of the Roman Empire: From the First Century CE to the Third. JHU Press.

Machiavelli, N. (2009). Discourses on Livy. University of Chicago Press (reprint from 1539

edition in Italian, “Discorsi sopra la Prima Decade di Tito Livio”)
Massei M., Poggi, S., Agresta, M., & Ferrando, A. (2014) "Development Planning Based on Interoperable Agent Driven Simulation", Journal of Computational Science, 5(3), 395-407
Mazal J., (2018) “MSG 152 Progress Report”, Proc.of CAX Forum, Sofia, September
Mintzberg, H. (1994). Rethinking strategic planning part I: Pitfalls and fallacies. Long range planning, 27(3), 12-21.
Pauly, R. J. (2017). Strategic Preemption: US Foreign Policy and the Second Iraq War. Routledge.
Powell, T. C. (1992). Strategic planning as competitive advantage. Strategic Management Journal, 551-558.
Sciomachen A., Tanfani E., Testi A. (2005) “Simulation Models For Optimal Schedules Of Operating Theatres” International Journal of Simulation: Systems, Science & Technology Vol. 6 No 12-13, Issn 1473-804x Online, 1473-8031 Print
Summers, H. G. (2009). On strategy: A critical analysis of the Vietnam War. Presidio Press.