

THE SIMULATION PROFESSIONAL CERTIFICATION PROGRAM: A STATUS REPORT

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ABSTRACT

Under the auspices of the National Training Systems Association, a program was developed to establish organizations and processes whereby professional certification for the modeling and simulation industry may be conducted in a consistent and dependable way. The Modeling and Simulation Professional Certification Commission (MSPCC) was envisioned with the mission to develop and provide the professional certification. The Implementation Group was formed to define and implement the MSPCC and establish the Modeling and Simulation Professional Certification Board (MSPCB), an element of the Commission. This paper provides a status report on the efforts of the Commission and the Board to establish and certification program for modeling and simulation professionals.

1 INTRODUCTION

The modeling and simulation profession, industry and market are rapidly maturing, yet lacked the identity, unity and perceptible coherency of associated domains such as computational science, systems engineering and training delivery. This lack of identity and the associated fragmentation of this evolving industry is an impediment to the necessary development and application of modeling and simulation technologies and practices.

In particular, the development of both the profession and the industry is inhibited by the fact that there is no generally accepted set of qualifications or functional competencies that are inherent in modeling and simulation. Additionally, there is no specific form of officially certifying professional modeling and simulation practi-

tioners. The lack of guidelines for determining professional competency makes the establishment and delivery of educational programs by both public and private education and training institutions difficult. Furthermore, lack of availability of metrics and standards for functional competency makes labor market transactions inefficient for employers, acquirers and producers of modeling and simulation systems and services.

To address this state, an Implementation Program was developed under the auspices of the National Training Systems Association to establish organizations and processes whereby professional certification for the modeling and simulation industry may be conducted in a consistent and dependable manner. The first steps in this process was the formation and implementation of *the Modeling and Simulation Professional Certification Commission (MSPCC)*. The MSPCC is the organization for developing and providing the professional certification. The Implementation Group was formed to define and implement the Modeling and Simulation Professional Certification Commission and establish MSPCB, as an element of the Commission.

The following discusses the background, formation, current state, and future plans surrounding the MSPCC and the certification process.

2 HISTORY

Several circumstances have combined to foster an understanding of the need for certification of simulation professionals. These factors include expansion and expressed desirability of establishing the identity and integrity of the simulation industry and accelerated activity in the formation of numerous organizations focused on modeling and

simulation. The formal identification of a professional cadre as a component was reinforced by discussions held among representatives of various professional societies deliberating the prudence and feasibility of such a course of action, in addition to evidence that several elements of the simulation professional constituency had been addressing the concept independently.

All evidence suggested that this was an opportunity “whose time has come” and for which acceptance had naturally evolved. The challenge in establishing a credible certification program for this complex interdisciplinary professional program was the process for program development.

The state of need and opportunity for simulation professional certification had matured to such a degree as to motivate action toward implementing such a practice. Consideration of deliberate collaborative action was initially undertaken by The National Training Systems Association (NTSA) in 1999. RADM Fred Lewis, USN (ret), Executive Director of the National Training Systems Association disclosed these seminal ideas in his Keynote Address to the Summer Computer Simulation Conference, sponsored by the Society for Computer Simulation (SCS) in July of 2000.

Subsequent discussions, including an “ad-hoc” working meeting on the 18th of September, 2000 at the University of Central Florida’s (UCF) Institute for Simulation and Training (IST), served to crystallize preliminary notions and to begin to build a constituency of interested individuals and organizations. The group discussed the “need for” and “processes involved” in establishing a Modeling and Simulation Professional. The ad-hoc group identified 5 subcommittee areas to be pursued. Those areas were:

1. Definition of Modeling and Simulation Professional; Core competencies
2. Academic; Accreditation; Re-certification
3. National Level Recognition
4. Resource Acquisition
5. Overarching Plan/ Process

As a result of the first meeting, a sense of urgency to establish the profession became clear. The subcommittees discussed ideas, which were then presented at the second meeting of the ad-hoc group on November 27, 2000, prior to the opening of Inter-service/ Industry Training, Simulation and Education Conference (I/ITSEC) held in Orlando, FL. The groups continued to meet and discuss the program further during the course of I/ITSEC (27 – 30 November, 2000).

Consequent to those meetings, it was resolved to establish the Modeling and Simulation Professional Certification Implementation Working Group. The goal in forming such an organization was to systematically define and execute a program of activity that would culminate in a

fully operational Modeling and Simulation Professional Certification Board and mark the beginning of effective certification for modeling and simulation professionals.

Accordingly, the challenge of establishing the initial operational Modeling and Simulation Professional Program within 6 months (June, 2001) was announced during the opening comments at the I/ITSEC 2000 conference.

Finally, the commitment to proceed was briefed at a meeting which included broad representation by NTSA, SCS, and SISO professional societies, the DoD and military services’ M&S organizations, and the UK MOD Synthetic Environment Coordination Office. All of the attendees were invited to participate in the effort and expand participation. Tasks were assigned to establish a DRAFT version of a Program Plan document and to pursue actions associated with a variety of issues. These issues had originally been pursued by the ad hoc working group and thereafter would be subsumed into the scope of this Implementation Plan.

The Draft Plan was reviewed at the next meeting on December 12th, 2000, in conjunction with the Winter Simulation Conference. Revisions to the plan were incorporated and it was posted for review and comment by January 1, 2001. A web site and reflector were established to facilitate the review of program materials. Following the meeting, it was recommended that additional names and addresses be included in the review/input to program materials. Action was also taken to pursue representation by relevant professional organizations and to obtain nominations for the initial “Implementation Group”. The Implementation Group consisted of 16 people plus a secretariat and representatives from the international community. The “Implementation Group” sought participation and input from all sources. The Implementation Group was charged with establishing the inaugural program and processes for program expansion.

The Implementation Group was responsible for establishing a nine-member certification board. Those who were involved in the Implementation Group were also be considered eligible for selection to the certification board. If selected, that member would be removed from the Implementation Group. If members are removed through selection to the certification board, the Implementation Group may nominate/select additional members to maintain 12 - 16 members plus the secretariat and international representation.

Meetings continued during the Western Multi Conference in Phoenix on January 8 through 10, 2001. Significant progress was made in defining the profession of Modeling and Simulation and the initial Implementation Group was constructed. An exam subcommittee and certification program testing requirements were also established. The draft implementation plan was reviewed and revised accordingly.

The initial Implementation Group was selected by participants in the development of the program. The partici-

pants recognized the need for a balance between the inclusion of many perspectives and the need for a few to focus action. All of those who are involved continue to have access to program documentation and are encouraged to submit comments and recommendations. The Implementation Group is a smaller business/action oriented group to guide implementation. The group was charged to select the initial Certification Board and governing processes. The group was not automatically grand-fathered into the certification program, by virtue of solely being members of the Implementation Group.

The Modeling and Simulation Professional Certification Commission is comprised of two elements. During approximately the first two years of operation, those elements are the Implementation Group and the Certification Board. The Implementation Group will then be dissolved with the Certification Commission being comprised of a Commission Oversight Council and the Certification Board.

2.1 Objectives for the Implementation Program

The objective of the Implementation Program was to set the course to accomplish the mission and vision of the Certification Commission and to achieve satisfactory initial operation of a Modeling and Simulation Professional Certification Board, providing sustained certification of Modeling and Simulation professionals. The Implementation Program and Group will exist for approximately two years. Implementation program, activities will include:

- Establishment of the initial Modeling and Simulation Professional Certification Board competent to execute associated programmatic guidance. COMPLETE
- Establishment of the initial Program Guidelines for the Modeling and Simulation Professional Certification Board. The Board shall operate in accordance with their Program Guidelines. These guidelines are to be sufficiently explicit, detailed and well ordered to provide guidance to the Board during and following dissolution of the implementation group after approximately 24 months of operation. All relevant policies, processes and organizational relationships will be documented in the Program Guidelines. Any such agreements that are required to document inter-organizational relationships which are necessary to facilitate the operation of the Certification Board in executing its responsibilities shall be established.
- Establishment of processes for selecting/replacing Certification Board Members.
- Establishment of the Modeling and Simulation Professional Certification Board as a “not for profit” organization.

- Establishment of policy(ies) on “Grand-fathering” of certification. COMPLETE
- Selection of initial certification criteria. COMPLETE
- Establishment of initial forms/documentation requirements for certification. COMPLETE
- Selection/empowerment of an Organization to support certification administration. COMPLETE
- Initial setting of certification and re-certification fees. While initial resources will be required for implementation, it is envisioned that the program will ultimately be self-sustaining through fees and other income. COMPLETE
- Selection of logo/letterhead and copyrighting of necessary materials/titles. COMPLETE
- Develop and establish International aspects of the program.
- Pursuit/establishment of relevant NAIC/SIC industry codes in support of the profession.
- Establishment of a Certification Commission Oversight Council

While the Implementation Group is the voting body to establish the program, significant input will be expected from the Certification Board who will have to abide by the established processes. Ideas and opinions will also be solicited from the profession at large.

2.2 The Certification Plan

An initial single level of certification, focused on the mid-level, was established for program inauguration. Seven criteria for certification were identified.

1. Math
2. Science
3. Computing
4. Psychology/Human Factors
5. Relevant Years of Work Experience
6. Letters of Recommendation
7. Continuing Education

In defining the profession and interdisciplinary aspects of a modeling and simulation professional, it was determined that an examination would add significant value as confirmation of other evidence presented for certification. An examination sub-committee was created to develop the processes and initial exams. The subcommittee developed a matrix of knowledge that may be used in developing exams. Items I-IV above will be incorporated into the examination requirements.

At the February 21, 2001 VTC meeting of the Modeling and Simulation Professional Implementation Group, a Work Experience Criteria Subcommittee was created.

The Work Experience Criteria Subcommittee reviewed available resources and provided guidance to the Implementation Group in defining relevant work experience. It was concluded that experience criteria should be used as the initial screening of applicants to assure professional competency and that the exam would be the mechanism for confirming applicants adequate proficiency in the required body of knowledge. Once professional competency was established, the Certification Board would invite the applicant to take the Certification Examination. An applicant may be denied the opportunity to take the examination if the Certification Board deems the experience cited as insufficient.

On April 13, 2001, the committee met at the National Training Systems Association Headquarters in Arlington Virginia to review the body of knowledge and examination criteria and process. It was determined that "... a simulationist performs or is involved in one or more of the following activities:

- Discovery, design and development of basic simulation principles and methodologies
- Design, development, and manufacture of simulation and simulation-based product and analysis.
- Management and integration of simulation into programs, projects and enterprise wide development plans
- Integration of simulation into the decision processes of managers and leaders."

Further the report recognizes that "...this view of a simulationist may broadly establish what they do, it does not necessarily inform on the general capabilities required to perform those activities. More importantly, this view does not identify the specific core body of knowledge which defines and distinguishes a simulationist."

The report identifies "... that there is a core body of knowledge that anyone claiming to be a simulationist or holding a degree with simulation as part of its title should know to an appropriate level. This simulation core consists of an inner or foundation core grounded in a model-based discipline such as physics, engineering, human behavior, or biology. The other aspects of the inner-core include competency in the use of empirical based methodologies (i.e., statistics and experiment design) and competency in computer technology and computer science."

"The simulation and modeling outer-core consists of the three areas of discrete systems simulation, continuous systems simulation and real-time systems simulation. These three areas should be familiar and conceptually understood by a simulationist. The degree or depth of knowledge in each area will vary depending on the specialization and domain of the problems pursued....it is necessary that all simulationists receive sufficient education in these three areas to provide a common basis to fa-

ilitate communications, cooperation, and methodical exchanges within the diverse community."

The implementation group established a process to identify an initial cadre of professionals that epitomize the profession and the body of knowledge. This cadre of known professionals, "Greybeards" was invited to take the first exam, become the "plank holder professionals" and add to/ further identify the body of knowledge for the profession. The implementation group and board will build on the advice of those experts in refining the body of knowledge, certification and exam process. The "Greybeards" were not be limited to the DTSP community to maintain a wide perspective. To gather a broad community perspective, the established process encouraged a selection of nominees split between industry, academia, government and organization affiliation. Duplication in the nomination process was expected. All nominees required and received a "second" confirmation of their nomination. The implementation group recognized that the established process restrictions imposed would miss including professionals who fit the certification criteria. To correct this deficiency and further broaden the community each of the "Greybeards" were invited to nominate four additional professionals that they felt met the certification criteria, before the application process is opened to the public.

The implementation group met again on 7 May 2001 to review/ establish the Certification Board Nomination and initial exam nominees processes. Forms necessary to support the processes were identified and created. The program timelines were updated accordingly. The website www.simprofessional.org was reviewed. Future program development will use the web site as a communication tool.

The Annual Meeting of the Modeling and Simulation Certification Commission was conducted 28 November 2001. The history of implementation along with the organization to include the implementation group, certification board, exam subcommittee and transition to an oversight council and exam status were reviewed. July 2002 was selected for the end of the initial exam processes and the start of open enrollment. The exam subcommittee will meet in March to review examination and evaluation processes.

3 UPDATE

The process of developing the Certification Process continues. At this time the committees are continuing to develop the examination and certification processes. Materials for the exam have been solicited from the simulation community. At this time, there is still much work to be done. Volunteers are needed to help in the development and implementation of the certification process. Those interested should contact the authors to aid in the ongoing process.

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