Certified Modeling & Simulation Professional Program

Management Plan

Modeling and Simulation Professional Certification Commission

Version 1.1 27 November 2012

This Management Plan describes the Certified Modeling and Simulation Professional Program organization, goals and processes. It provides the operational requirements, products, processes and responsibilities for the CMSP enterprise. The CMSP Program and this plan are controlled and executed by the Modeling and Simulation Professional Certification Commission.

http://www.simprofessional.org/

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1. Scope

The Certified Modeling and Simulation (M&S) Professional (CMSP) program exists to improve the image and cohesion of the international M&S community by providing a method to establish the professional standing of M&S practitioners.

The M&S Professional Certification (M&SPC) Commission, jointly sponsored by the National Training and Simulation Association (NTSA), the Simulation Interoperability Standards Organization (SISO) and the International Society for Modeling and Simulation (SCS), is responsible for the development and execution of the program.   NTSA provides administrative and support services to the M&SPC Commission.

This program plan makes extensive reference to the requirements and other data in the document's appendices. These are required to interpret and execute this plan. This plan explains how requirements are identified, applied and managed.

1.1.   Purpose

This program plan details the M&SPC Commission's plan of execution including operational infrastructure, concept of operations, products and operation of the CMSP program. The document's goals are to both provide clear guidance to the volunteers working within the program and make the program structure and operations completely visible to all stakeholders.

1.2.   Applicability

This program plan applies to CMSP operations, including relationships with and support of existing and future certification holders.

In this context, M&S is defined as a discipline for developing and applying technologies and products used to understanding behavior of entities in reality, including, past, possible future, or alternative realities, without direct observation of those entitles. The specific knowledge addressed by this discipline is defined by the M&S Body of Knowledge (BOK) [reference 2]. The accepted M&S BOK is expected to evolve, therefore every increment of CMSP program development will require careful and consistent coordination with the BOK development community (see www.sim-summit.org) to ensure traceability is maintained, both from the CMSP program to the BOK and from the BOK to the CMSP program.

1.3.   Approach for Revision

The M&SPC Commission retains ownership of this program plan. It may be revised by at the commission's sole discretion, without reference to present or future certification holders or any other stakeholder.

The commission intends to maintain close contact with all stakeholders, especially including current certification holders, to identify and address the then current stakeholder needs relevant to the program in future revisions of this plan.

The commission intends to revise this plan and all program products and services on an ongoing basis. The concept of operations and operational infrastructure detailed in this plan address these revisions.

1.4.   Document Overview

This document should be read as a statement of intent; a working description of how the M&SPC Commission intends to conduct the program and to maintain and update this document as the program moves forward.

This program plan, including attachments, provides the requirements for the program and describes how the program's compliance with those requirements is to be assessed. Questions regarding the interpretation of these requirements should be addressed first to the relevant committee leadership, then to the Executive Committee, then to the full Board of Directors as required.

2. Applicable and Reference Documents

1. Simulationist Code of Ethics http://www.scs.org/ethics/

2. The M&S Body of Knowledge: http://www.sim-summit.org/BoK07/index.htm

3. WK20544 - Standard Practice Certification Programs (draft): http://www.astm.org/DATABASE.CART/WORKITEMS/WK20544.htm

3. Program Overview

3.1.   Background

In 2001, a general consensus formed that while the M&S industry and market had been rapidly maturing, the state of the M&S profession was not providing a sound and reliable foundation for continued maturation. In contrast to the identity, unity and perceptible coherency of associated domains such as computational science and systems engineering, M&S was not clearly identified as a profession, actual practices were fragmented and the underlying M&S BOK was not broadly accepted. There was no generally accepted set of qualifications or functional competencies inherent in M&S, nor was there any method to officially certify M&S practitioners as professionals. The lack of guidelines for establishing professional competency made the establishment and delivery of educational programs difficult and the lack of availability of metrics and standards for functional competency made labor market transactions inefficient for both buyers and sellers of professional services.

In response to this need, the National Training and Simulation Association (NTSA), in conjunction with the Simulation Interoperability Standards Organization (SISO) and the Society for Modeling and Simulation International (SCS) established the M&SPC Commission. The commission was chartered to implement and operate an M&S professional certification program.

In June 2001, the commission implemented the certification program with an inaugural class. The initial focus was placed on defense training simulation professionals, represented at forums such as the InterService / Industry Training, Simulation and Education Conference. Following the inaugural issue of certifications, the M&SPC Commission Implementation Group continued the development of consistent professional guidelines and processes that encouraged the expansion of the program beyond the recognized limited scope of defense training simulation professionals.   The express goal of the program is to recognize M&S professionals internationally, across all domains of application.

From 2001 to 2008, the first period of operation, 250 certifications were conferred.

During this period, the certification program has been somewhat successful, but a number of opportunities to improve and revitalize the program have been identified:

1) Maintain, strengthen validity of existing certification,

2) Improve confidence in and understanding of program,

3) Improve consistency, clarity of examination,

4) Recognize wide array of needs, e.g.: M&S user, M&S acquirer, M&S manager, M&S developer, etc.,

1) Recognize domains of application, types of use and other facets of the M&S BOK (see figure 3.1-1),

2) Assure linkage to documented M&S BOK [reference 2],

3) Strengthen organization, with clear organization charters, responsibility,

4) Publish clear standards for products and processes,

5) Improve member services and

6) Improve visibility, understanding of program across the international M&S community.

Toward this end, the CMSP program plan:

1) Establishes requirements for operations, organization and products,

2) Defines processes for product development, product evaluation and operations and

3) Provides visibility into the value and significance of the certification for third parties.

M&S Applications
  • **Uses of M&S**
  • **M&S domains of application**

M&S Management and Business Practice
  • **M&S Management**
  • **M&S Workforce Development**
  • **M&S Business Practice and Economics**
  • **Industrial Development**

M&S Technology
  • **M&S Fundamentals**
  • **Related Communities of Practice and Disciplines**
  • **M&S life Cycle**
  • **M&S Representation Schema**
  • **M&S Implementation types**
  • **Tools, Techniques, Standards, Resources**

Modeling & Simulation Body of Knowledge

M&S Professional Discipline
  • **M&S Ethics**
  • **History of M&S**

Figure 3.1-1: M&S BOK Dimensions

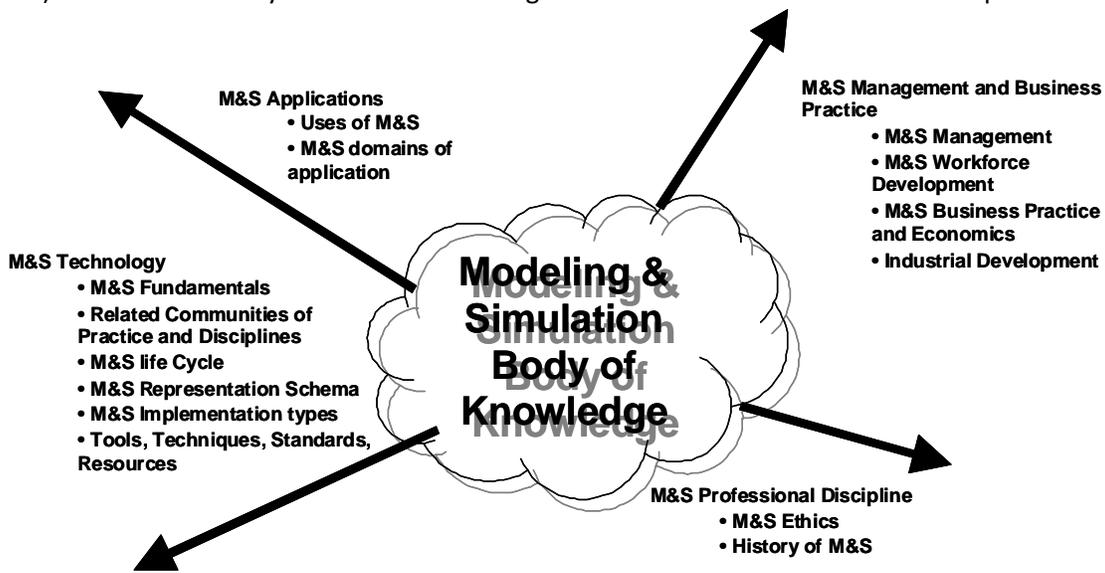## 3.2.   Program Objectives

The program exists to create an identity for and build cohesiveness across the M&S community by establishing guidelines to establish the professionalism of M&S practitioners.

The M&SPC Commission's vision is to be:

An international community of Modeling and Simulation professionals that values the accomplishments of individuals and provides an environment that:

1) Encourages and stimulates individual professional growth in Modeling and Simulation

2) Promotes the development and application of Modeling and Simulation

The M&SPC Commission's mission is:

> To develop and maintain a certification program for simulation professionals recognizing standard levels of knowledge and functional competency for the certified professionals and the industry.

The M&SPC Commission organization principles are:

1) Transparency – Open process, clear values

2) Quality – Traceability to requirements and M&S BOK [reference 2]

3) Confidence – Certified Professional is knowledgeable

4) Ethics – Clear standards endorsed and enforced

The key approach to accomplishing these program objectives is through a vibrant program supporting an active community of M&S professionals.

3.3. Program Update Schedule

The program is intentionally designed to evolve in response to evolution of stakeholder needs and the M&S BOK [reference 2]. To achieve this evolution, the CMSP program operates on the quadrennial cycle illustrated in Figure 3.3-1.
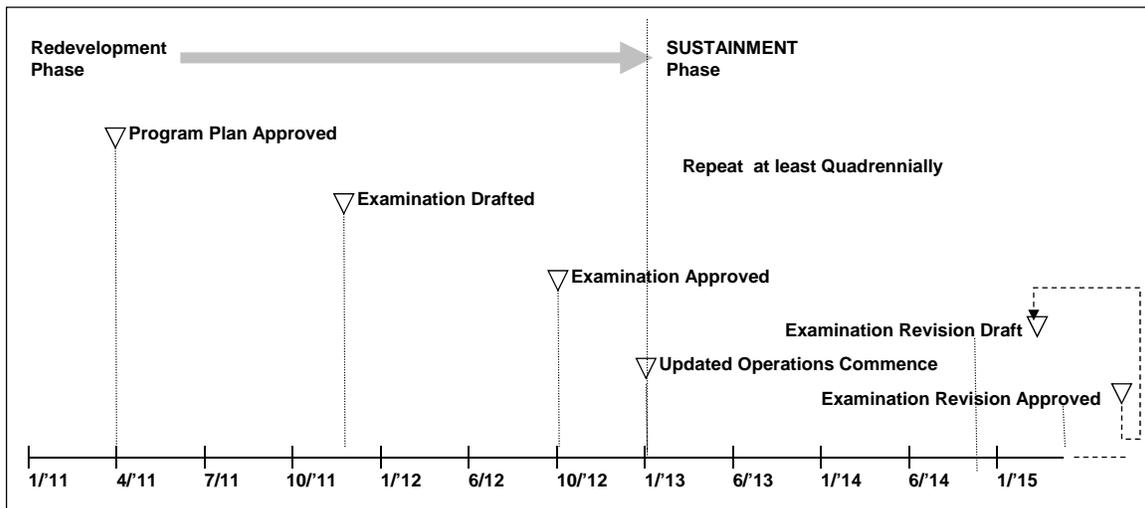
Figure 3.3-1: Program Schedule

3.4.   Relationships with Other Organizations

NTSA is recognized for hosting and strongly supporting the CMSP program since its inception. NTSA has provided much of the drive and resources required to sustain and operate the program. The program is not yet financially independent and continues to require support from NTSA.

SISO and SCS are joint sponsors of the program and provide volunteer members and organizational support. While it is essential that the M&SPC Commission retain organizational independence, the sponsoring organizations are representatives of the overall M&S community and so the M&SPC Commission is responsible to those organizations to ensure that the certification program is conducted in a way that is consistent with the approved program mission and goals.

4. Program Practices

4.1.　　Business Practices

The program exists to launch and sustain a user driven, broadly collaborative, persistent and productive program of activity wherein members of the M&S community-of-practice may continue to identify and support M&S professionals and to do so with an authoritative, consensus based M&S BOK [reference 2] and set of operational competencies that define, de facto, the M&S profession and industry.

The program intends to provide professional assurance through general compliance with the WK20544 - Standard Practice Certification Programs [reference 3]. This draft standard is intended to provide requirements for certificate programs, which indicate that an individual has participated in coursework and has demonstrated attainment of established learning outcomes, rather than certification programs such as the CMSP program, which indicate an individual is qualified to work in a particular professional field. Therefore, while the draft standard provides useful guidance, not all of it is applicable. Appendix B details the CMSP program's compliance with the draft standard where it is relevant and appropriate and provides rationale for the exceptions. Where the program is intended to be compliant with the standard, the applicable section of this plan is identified.

The M&SPC Commission generates, maintains and enforces such requirements as seem best suited to serve its stakeholders and to engage in continual process improvement of that service.

It is essential that the M&SPC Commission be actually and visibly financially stable to ensure confidence in the program. Program finances, or the finances of the sponsoring organization, shall be available for public review.

The M&SPC Commission may enter financial and other agreements with sponsoring organizations for the purpose of promoting the CMSP program and its certifications. All such agreements will be publicly disclosed.

The M&SPC Commission will enter no commercial agreement that creates an actual or perceived conflict of interest between the commercial agreement and the goals, mission, or practices of the M&SPC Commission or CMSP program.

The M&SPC Commission intends to be financially self-sufficient and independent from the influence of any other government or private agency and to be responsive solely to the interests of the stakeholders.

All committee members and officers of the commission will avoid situations that create a real or perceived conflict of interest between their activities and the goals, mission, or practices of the program. Members and officers are required to identify all such actual and potential conflicts at the time of their appointment and again annually during their time of service. Measures taken

to abate such conflicts may range from simple acknowledgement and disclosure, to recusal, to resignation or removal from office.

This configuration of this program plan and other program documents will be managed so that a clear program baseline is maintained at all times. Each document will be identified by title, version and date.

Other program products that depend on the CMSP program requirements, such as examinations, will identify the specific version of the requirements document to which it relates.

Program requirements are re-evaluated against evolving stakeholder needs, both as part of the regular quadrennial review cycle and as needed to address urgent issues as they are identified.

Any needed changes identified by the periodic audit, or during normal use, will be incorporated into an update to this document in accord with the defined change management process.

The M&SPC Commission does not require candidates, committee members or officers to hold membership in any organization or group to qualify for the certification. The requirements for a candidate to be certified as an M&S professional are exactly as defined in this document and no additional requirements, constraints, or preferences are to be applied.

The program will be administered in accordance with US public law and regulations and the laws and regulations of the state of Virginia.

The M&SPC Commission intends to comply with the Americans with Disabilities Act. Applicants are encouraged to contact the Executive Director if they identify any access issues, or if they require special accommodations.

4.2.   M&S Community Relationship Practices

The CMSP program and the M&SPC Commission recognize that the diversity of the M&S community is a key strength. The program welcomes participation from all members of the M&S community, without regard to their nationality, race or gender or to the type of industry they work in, the kind of things they simulate, the methods by which they develop or apply M&S, our how they apply M&S.

The program recognizes the members of the broad M&S community as stakeholders. More specifically, stakeholders include those who develop or use M&S, as well as those who manage, employ and or educate those users and developers.   Current holders of the certification are stakeholders, as are potential future holders; who may wish to use this program for career guidance. Figure 4.2-1 provides a high level view of the stakeholders involved in the program and their relationships.

Table 4.2-1: CMSP Stakeholders needs and relationships

	Educational Institutions	M&S Professionals	Industry/ Government	MSPCC BOD
Educational Institutions		Teach, Prepare	Deliver Innovation	Shape Body of Knowledge
M&S Professionals	Attend		Deliver solutions	Leverage , Apply
Industry/ Government	Request Progress, Equipped Professionals	Employ to meet needs		Define need for professionals
MSPCC BOD	Measure Outcomes	Certify	Certified Professionals	

The program endorses and promulgates the Simulationist Code of Ethics [reference 1]. Any certification holder may submit ethics questions, issues, or concerns to the Ethics Subcommittee and, if not satisfied with the finding of the Ethics Subcommittee, may appeal to the M&SPC Commission Board of Directors.

The M&S BOK [reference 2] exclusively, and in it entirety, defines the knowledge upon which the core, technical and management examinations are based.

4.3. Candidate Qualification and Evaluation Practices

The program recognizes candidates for certification as stakeholders.

The program is open to all interested individual who meets specific entry criteria.

The program has sole responsibility to determine any candidate's eligibility for the certification and will not outsource, subcontract, or delegate that decision in any way.

Candidates must formally express their request for certification by submitting a current, completed application, including fee. The application form will be prescreened to ensure that the applicant appears qualified. The fee will be refunded only if a candidate is determined to be clearly unqualified, or if the program made a significant error during the screening process. An examination instance may be requested by and provided to the candidate any time after the application has been validated, meaning it has been determined to both be credible and meet program requirements.

Additionally, to achieve certification, a candidate must:

1) Demonstrate combined education and experience of:

   a) Associates Degree in a relevant discipline and eight (8) years of experience,

b) Bachelors Degree in a relevant discipline and six (6) years of experience,

c) Masters Degree in a relevant discipline and five (5) years of experience or

d) Doctoral Degree in a relevant discipline and three (3) years of experience.

2) Present three letters of recommendation from certification holders (preferred) or recognized senior practitioners of the M&S profession,

3) Formally subscribe to the M&S Simulationist Code of Ethics [reference 1] and

4) Complete the examination instance given them, return it within 30 days and obtain a passing score on all required sections, as defined by the examination instructions.

Once an application is accepted, there is no limit on the time an applicant may wait prior to ordering an examination. If the candidate fails to qualify, meaning that they did not obtain a passing score on every required section, the candidate may request a re-examination. After a minimum of 60 days after the candidate is notified of the less than passing score, the candidate may request and be issued a different instance of the examination. If the candidate fails to obtain a passing score on the second examination, the candidate will be informed that they failed to qualify for the certification. The candidate may appeal that decision. If the evaluation committee approves the appeal, the candidate may be given a third opportunity to take the examination. No candidate will ever receive the same examination instance twice. Failure to pass an examination will not result in a refund of fees.

Candidates for initial certification must pass the form of the examination current at the time of their application, unless a waiver is requested and granted.

4.4.   Certification Practices

The certification is awarded to an individual based on the documented qualification of that individual and may not be transferred. The certification can not be awarded to an organization or institution.

Each certification awarded will be documented on a standard form containing:

1) The name of the certification holder,

2) The name of the certification issuer,

3) A description of the scope and significance of the certification,

4) The title and acronym that the holder is entitled to use,

5) The date the certification is effective,

6) The date the certification will expire,

7) A declaration that the Issuer retains ownership of the certification and

8) A statement that the certification may be revoked by the issuer if the application was fraudulent or the holder otherwise violates the ethics provisions of the program.

Figure 4.4-1 illustrates the integration of these practices into the initial certification award process.
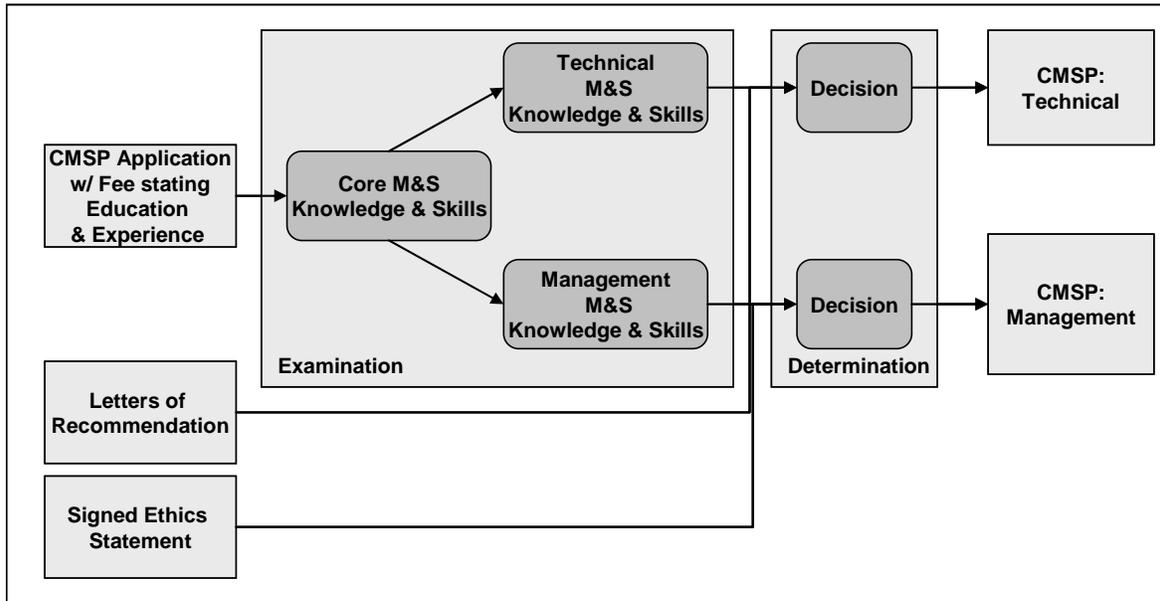

Figure 4.4-1: CMSP Initial Certification Award Process

4.5. Examination Practices

There are two forms of the certification: technical and management.

Initial award of certification requires successful completion of an examination as part of the requirements described in section 4.3,

The examination is designed to measure mastery of specific knowledge and skills.

The examination for the CMSP Technical Certification measures mastery of knowledge and skills within two areas: core and technical.

The examination for the CMSP Management Certification measures mastery of knowledge and skills within two areas: core and management.

4.6. Certification Holder Practices

The program recognizes holders of the CMSP certification as stakeholders.

The program does not qualify holders for employment or indemnify employers of certification holders.

The certification is granted for a period of four (4) years.

Holders of the Certification may renew their certification via submittal of a renewal application and fee, subject to demonstration of:

1) Formal re-subscription to the M&S Simulationist Code of Ethics [reference 1],

2) Documentation of a minimum of 275 Recertification Units (Appendix E)

Appropriate recertification activities include formal education (both teachers and students in degree granting or continuing education programs), participation in or leadership of technical conferences or seminars, publications, etc. The method for computing Recertification Units are contained in Appendix E. The intent of measuring Recertification Units is to ensure that applicants for re certificate are actively engaged and participating in the profession. The Evaluation Committee will adjudicate the suitability of any questionable renewal candidate's Recertification Unit documentation.

Figure 4.6-1 illustrates the integration of these policies into the certification renewal process.
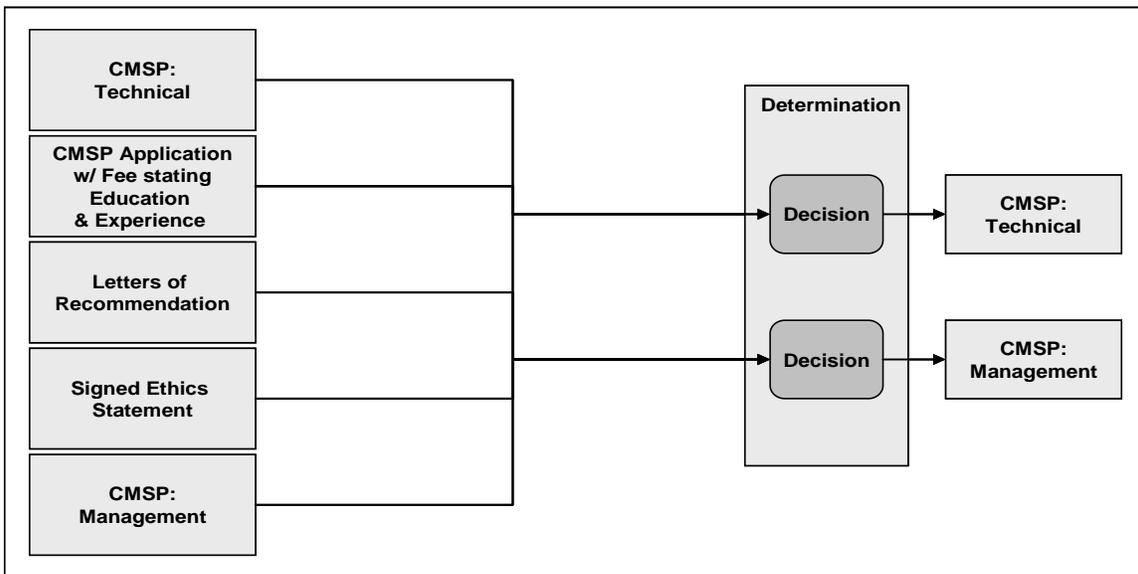
Figure 4.6-1: CMSP Certification Renewal Process

4.7.   Sponsoring Organization Relationship Practices

The decision to award, deny or revoke a certification is solely that of the M&SPC Commission and all such decisions will be made exclusively according to the then current version of this plan and other governing program documents and based only on the information provided in a validated application. No sponsor or other person or agency outside of the CMSP program may cause, decide to, or influence a decision to award, deny, or revoke a certification.

Sponsoring organizations and the CMSP Program must jointly disclose financial and in-kind support provided to the program. The disclosure must be complete and accurate and must demonstrate that such support is not intended to and in fact does not exert undo influence upon the program. The contributions, roles and organizational affiliations of volunteer committee members and officers, whether or not they are compensated for their support of the CMSP Program by their organizational affiliations, must be publicly disclosed.

The sponsoring organizations of the M&SPC Commission indemnify every person who is, will be or has been a member of the Board of Directors, Executive Committee or any other committee against all costs and expenses (including attorney's fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by or imposed upon him or her in connection with or resulting from any civil action, suit or proceedings to which he or she may be made a party by reason of his or her being or having been a member of the Executive or other Committee and operating within the scope of their authority. This indemnification does not include gross negligence or clear, intentional, malicious violation of published CMSP program policy.

Organizations may become sponsoring organizations with the approval of both the M&SPC Commission Board of Directors and the proposed sponsoring organization's governing body. Any professional or industrial association or society which becomes a sponsor will be recognized as a sponsor on the M&SPC Commission website, may appoint a member to the M&SPC Commission Board of Directors and will be asked to provide financial support to the M&SPC Commission.

5. Program Organization

The M&SPC Commission executes the CMSP Program. It is responsible to the stakeholders to

1) Administer and oversee the program,

2) Ensure that the program operates according to approved plans and processes and

3) Ensure that it supports the approved vision, goals and ground rules.

Stakeholders include government agencies, academic institutions, industrial concerns and technical and industrial organizations that use, develop, teach the development or use of, or make decisions based on; models and simulations. Future applicants are also stakeholders in that the process can be used to support career planning for M&S professionals

Figure 5-1 illustrates the organization. Subsequent paragraphs explain the functions performed by these organizational elements.
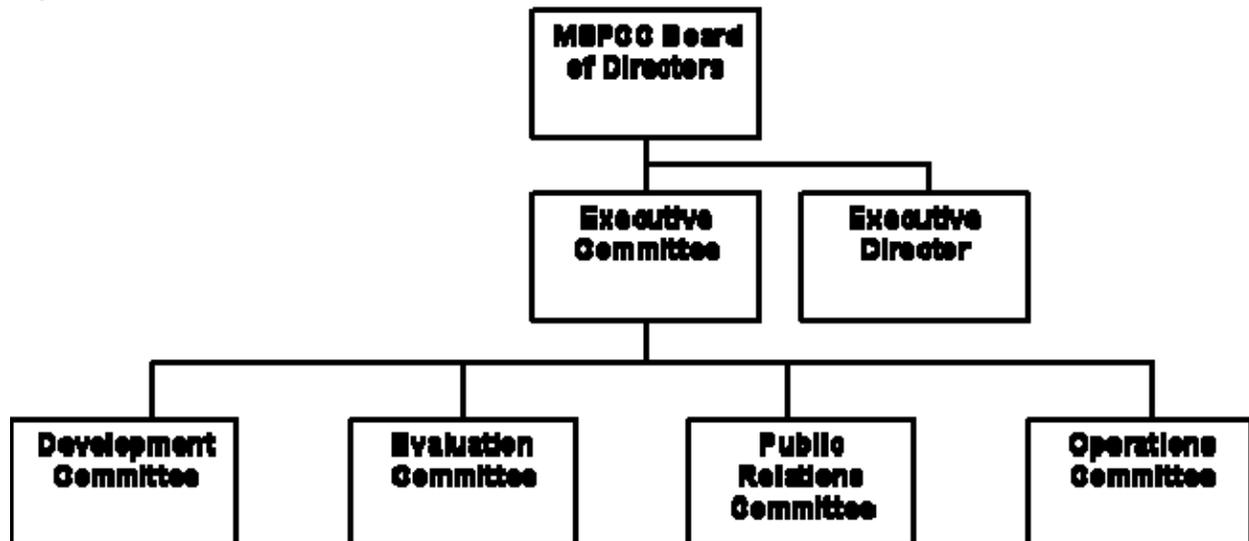
Figure 5-1 M&SPC Commission CMSP program Organization

5.1.   M&SPC Commission Board of Directors

The M&SPC Commission Board of Directors has overall responsibility for the CMSP program. This program plan communicates the organizational direction of the board, defines the organization policy, operations and top level processes.

The M&SPC Commission is the actual certification issuer; the M&SPC Commission Board of Directors is responsible to the sponsoring organizations and other stakeholders to ensure that the program objectives are being met in a manner consistent with the organizational principles.

The board will meet at least quarterly and will meet in person at least once per year. A majority of board members must be present to form a quorum. A quorum is required to make any formal decisions.

At these meetings the committees and Executive Director will brief the board about their status and issues and provide status of their assigned action items. The board will provide policy direction and will assign action items to address the identified issues.

The board charters the four standing committees, the Executive Committee and the Executive Director. The board may establish ad hoc committees as required to address issues and opportunities as they arise. The committees are provided with a charter describing their roles and responsibilities at the time they are formed. This charter will also state the planned period of performance for the committee; i.e. the time period allocated for them to perform their assigned duties.

The members of the board are nominated by the sponsoring organizations. The nominees and all volunteers are to be selected to represent a cross section of the M&S community stakeholders and to be free from bias. The board elects its chair from among its members. The board chair appoints the Executive Committee chair.

Except for the Executive Director, the members of the board and of all committees are volunteers. Volunteers receive no compensation from the MSPC Commission for their services. A volunteer may withdraw from their service at anytime, without notice, should they find themselves unable or unwilling to continue to perform their duties.

Because the members are volunteers, it is unusual for the organization to remove anyone from office. However, the board may remove any member for sufficient cause by a 2/3 majority vote. Sufficient cause would include a significant failure to comply with organizational ethics standards, significant, repeated, or flagrant violation of M&SPC Commission policy, or consistent and sustained failure to provide support, such as a sustained failure to attend meetings, or a continued failure to respond to requests for status. Simple failure to perform volunteer duties over a reasonable period (e.g. less than 90 days) due to other commitments is not normally sufficient cause for removal. It is expected that members will themselves identify such a conflict and arrange for a substitute or replacement.

The Board of Directors appoints the chair of the Executive Committee who in turn appoints from two to six additional members to two year terms. They may be reappointed for one additional term. If a member of the Executive Committee is unable to complete their term for any reason, the chair may appoint a replacement, whose term will be the remainder of the original appointee's term.

5.2.   Executive Committee

The Executive Committee is chartered by the Board of Directors to perform the following functions:

5) Administer the program according to this program plan,

6) Review the efficiency and effectiveness of this program plan, utilizing information provided by the evaluation committee and other sources,

7) Identify areas for improvement as potential changes to this program plan and take action to change the plan and improve the program,

8) Review results of program audits and reviews and take positive action to address identified issues and concerns,

9) Submit changes to this plan to the Board of Directors for approval prior to any change of operations,

10) Award and revoke certifications in accord with program policy, as described in this plan,

11) Maintain minutes of its meetings and forward them to the Board of Directors,

12) Designate officers as needed to perform these functions,

13) Prepare for board approval an annual program budget, including a fee structure that is fair, reasonable and consistent with that of other, similar programs,

14) Lead the board chartered committees and Executive Director to execute the program. The Executive Committee retains responsibility for all decisions made by the committees and therefore the power to overrule those decisions,

15) Designate the chairs of the committees and ensure that such nominees are professionally qualified,

16) Conduct an annual review to ensure all committee and committee members remain professionally qualified. It is preferred that committee members and officers are holders of the certification, but as a minimum they must be widely recognized as authoritative and respected practitioners of the M&S profession,

17) Approve standing and ad hoc committee membership as nominated by the committee chair,

18) Meet virtually or in-person at least once per month. A majority of the Executive Committee constitutes a quorum,

19) Maintain minutes of its meetings and forward them to the board,

20) Provide program direction to the Executive Director who performs day to day operations of the program,

21) Implement the policies established by the Board of Directors to award and revoke certifications,

22) Establish an Ethics Subcommittee to both enforce the program's ethics and conflict of interest policies and provide anonymous support to members with ethics questions or concerns. Possible actions to address ethics questions or concerns include:

a) Direct responses to person(s) raising the question or concern explaining the Ethics Subcommittee's disposition,

b) Direct responses to the persons affected by the complaint explaining the complaint and disposition and

c) Changes if any to the status of the certification of any parties.

23) Provide responses to complaints or concerns, normally via an ad hoc committee appointed to investigate and make actionable recommendations to the Executive Committee and

24) Prepare and maintain Executive Committee charter for board approval that acknowledges all of these responsibilities; identifies the team membership and identifies any internal assignment of roles and responsibilities,

5.3.   Standing and Ad Hoc Committees

All committees may form internal teams and recruit members as required to accomplish their responsibilities. The committee chair ensures each member is professionally qualified.   Committee membership is subject to review and approval by the Executive Committee.

At least the leadership of every committee will meet at least monthly and prepare progress reports for the Executive Committee and Board of Directors.

All committees will provide updates to the program artifacts for which they are responsible, as defined in section 6, in accord with the quadrennial program cycle described in section 3.3 of this plan, or as required.

All committees will prepare and keep current a charter document for approval by the Board of Directors that acknowledges all of these responsibilities; identifies the team membership and identifies any internal assignment of roles and responsibilities, including any internal team structure.

All committees will conduct their operations in accord with the then current version of the program governing documents. If a program document contains requirements that the committee can not, or feel they should not, execute; the committee will provide recommended changes to the document prior to release (preferable) or in the form of a Problem Report/Change Request as described in the program configuration management plan

5.3.1. Development Committee

The Board of Directors charters the Development Committee to conduct the following functions:

1) Develop and maintain a bank of examination questions and answers as required to populate the examination structure,

2) Develop examination structure and method by which questions from the question bank are composed to develop specific examination instances. This method must:

a) provide a trace from the candidate to the examination instance given to a candidate,

b) ensure examination questions are traceable to the M&S BOK content [reference 2] and

c) Allocate questions to examination instances and types (e.g. core, technical or management),

3) Perform coordination with M&S BOK [reference 2] development community members to ensure BOK development meets CMSP program needs,

4) Recommend for Executive Committee approval the areas of M&S BOK selected by the committee to represent the needs of the stakeholders in depth, breadth and structure of the knowledge to be assessed by the examination questions,

5) Prepare, process, provide status of and respond to change requests / problem reports,

6) Coordinate, obtain Executive Committee approval for and implement approved changes in design, requirements, processes, or other artifacts.

7) Develop and maintain requirements for the CMSP program products (Appendix C). Coordinate changes with other committees and obtain Executive Committee approval prior to release,

8) Ensure that each requirement identifies the verification technique to be used by the evaluation committee to establish the product's compliance with that requirement,

9) Upon approval, release all changes to Operation Committee and support implementation as required and

10) Develop, maintain and publish a plan describing and controlling the program's configuration management process which:

   a) Supports both periodic and as required configuration audits to be performed by the evaluation team,

   b) Provides a means to document the then current program baseline by identifying the governing program documents by title, version and release date,

   c) Insures that the current released version is conveniently and publicly available and

   d) Provides a managed, traceable, auditable process for program document changes to be requested, implemented and released.

5.3.2. Evaluation Committee

The Board of Directors charters the Evaluation Committee to conduct the following functions:

1) Review all program artifacts, including this plan, to ensure that they satisfy the stated requirements, in accord with the provided verification method. For program artifacts that do not satisfy their requirements, prepare clear Problem Report /Change Requests to enable the Development Committee to recognize and correct the problem,

2) Provide updates to the program artifacts for which they are responsible in accord with the quadrennial program cycle described in paragraph 3.3 of this plan, or as required,

3) Support Executive Committee review in support of any appeal,

4) Conduct special examination of candidates as requested by the Operations Committee, including review of requests for waiver of any program requirements and requests for a third testing opportunity,

5) Provide written feedback to any candidate's appeal, indicating the resolution of the appeal, the basis for resolution and (if the appeal is rejected) specific steps the participant may take which would be likely to lead to the candidate earning the certification in the future,

6) Evaluate specific preparatory courses against the provided standard for those courses where the provider has requested M&SPC Commission endorsement and

7) Conduct a quadrennial review of the overall program to ensure that it is providing value and operating in accord with its vision, goals, principles and plans, such that:

   a) A formal report of the results of the review is provided to the Board of Directors,

   b) Written feedback as to the cause and recommended solution of any evaluation findings to the Development Committee,

   c) All aspects of the program are reviewed over the four year period, meaning the quadrennial review may be broken into four annual reviews,

   d) The assessment of the program's value constitutes an internal audit of the program assessing the compliance of the program processes, practices and artifacts with the provisions of this document and all other program governing documents – especially the program's satisfaction of its stated goals and objectives,

   e) The evaluation assesses, as a minimum:

      i) Certification holder statistics including number of exams passed/attempted, number of holders executing/requiring renewal and penetration into the target population,

      ii) Survey of stakeholder's prior and emerging needs and the program's ability to meet them and

      iii) Evidence of the certification program's value.

5.3.3. Operations Committee

The Operations Committee is normally chaired by the Executive Director. The Board of Directors charters the Operations Committee to conduct the following functions:

1) Accept and process initial or renewal applications,

2) Ensure the confidentiality of applicant's personally identifiable information, in accord with the sponsoring organizations' privacy policies,

3) Maintain all program data so that it can not be lost, stolen or damaged; either by natural events, accidents, or malicious attacks, in accord with the sponsoring organization security policy,

4) Assess (prescreen) applications against program requirements to ensure the application meets the program's requirements, and that the applicant appears to be qualified,

5) Reject applications with clear omissions and errors,

6) Refer a random sample of and any questionable applications and waiver requests to Evaluation Committee,

7) Issue proper examination instance (e.g. an examination composed from the question bank, according to the examination structure, that complies with the applicants specified options) to the applicant and track response (new only). Maintain traceability between applicant and examination instance(s),

8) Accept and score completed examinations (new applications only),

9) Assess documentation of Recertification Units against the requirements (renewal applications only),

10) Refer completed application and results to evaluation committee if compliance with program requirements is not clear or as a random sample,

11) Maintain records of examinations attempted and completed (including exam version) and certifications issued, for at least 5 years after expiration of certification, or determination of failure to qualify,

12) Provide feedback to applicant,

13) Provide means for candidate to appeal to Evaluation Committee and, should they desire to do so, to escalate their appeal to executive committee and to entire Board of Directors,

14) Issue certification to successful applicants,

15) Provide means for certification holders to ask ethics questions and place ethics complaints,

16) Refer requests for ethics support & enforcement to the of the Executive Committee Ethics Subcommittee and facilate a prompt, thorough review and ensure the privacy of holder is respected,

17) Operate and maintain the M&SPC Commission website, database and information system providing means for applicants to apply for, qualify for and receive certification in accord with the top level design and requirements provided by the Public Relations Committee and approved by the Executive Committee,

18) Accept and document comments, complaints and suggestions from all stakeholders and forward to Executive Committee,

19) Administer program and provide assigned member services,

20) Collect and report metrics,

21) Keep membership, certification and test records,

22) Establish and maintain online a publicly available record of the status of certification holders (e.g. name of certification holder, type of certification, award date, expiration date),

23) Collect and refund fees.

24) Keep careful, complete and auditable records of all monies received or expended,

25) Perform configuration management of program documents, including this plan, the configuration management plan, the approved certification form, etc., in accord with the configuration management plan, such that

   a) The current program baseline and the set of documents that define it are maintained.

   b) Changes to the documents are managed to ensure traceability is maintained to the documented reason for each change,

   c) Each document is identified by title, version, and date,

26) As needed, contract with external agencies to perform committee duties subject to NTSA financial processes and procedures and retaining full responsibility for CMSP quality, content, or scope in the M&SPC Commission and

27) Ensure compliance with the Americans with Disabilities act by referring any candidate who is physically unable to utilize the standard form of the exam to the Evaluation Committee for special examination.

5.3.4. Public Relations Committee

It is the responsibility of the Public Relations Committee to ensure that the program is represented to the public and to certification holders in a fair, factual and accurate way. Openness, transparency and visibility are key elements of the program and the Public Relations Committee has the principal responsibility to provide these elements. The Board of Directors charters the Public Relations Committee to conduct the following functions:

1) Provide communication to certification holders and to the M&S community,

2) Issue and distribute news releases,

3) Create and distribute handouts, posters and exhibits,

4) Solicit and support accurate, high quality informational, tutorial and technical presentations regarding the program in forums attended by members of the M&S community and

5) Provide the requirements for and top level design of the program website. This website is the principal mechanism by which the program satisfies its many requirements for public disclosure, allows the public to verify the valid and current holders of the certification and describes the qualifications and behaviors that can be expected of certification holders.

6. Major Products

Table 6-1 itemizes the major products and services created by the program. The indicated products and services must be provided. There is no need or desire that each product is provided as a stand-alone document. The committees responsible to produce the products should do so in a way that minimizes the number of documents and avoids unnecessary duplication of information. A "*" after the product name indicates that Appendix C provides detail requirements for the product.

Table 6-1 Products

Product	Description	Produced By	Approved by	Revision Frequency
Program Plan	Defines the organization, products and processes of the program, including verification, and validation requirements	Executive Committee	Board of Directors	Quadrennially or more frequently, as needed
Budget	The budget for operating the program	Executive Committee	Board of Directors	Annually
Committee Minutes	A record of discussions, decisions and tabled items for each committee meeting	All	All	Prepared for each meeting
Core, Technical and Management Knowledge and Skills Question Bank*	The M&S knowledge and skills, both common and specific to the respective CMSP certification type, captured as a set of questions and problems with solutions and references	Development Committee	Executive Committee	Quadrennially or more frequently, as needed
Examination Structure *	The architecture by which elements of the question bank are selected and composed into an examination, contained in Appendix C.	Development Committee	Executive Committee	Quadrennially or more frequently, as needed
Preparatory Course Standard	Standards guiding the development of courses to prepare candidates to successfully complete the examination	Development Committee	Executive Committee	Quadrennially or more frequently, as needed
Preparatory Course Standard Evaluation Report	Assessment, including approval/rejection of the Preparatory Course Standard on the basis of relevance to the exam and stakeholder needs	Evaluation Committee	Executive Committee	Quadrennially or more frequently, as needed
Stakeholder Needs	A description of stakeholder needs deemed relevant to the program	Evaluation Committee	Executive Committee	Quadrennially or more frequently, as needed

Product	Description	Produced By	Approved by	Revision Frequency
Waivers & Appeals responses	Program responses to candidate appeals and waiver requests	Evaluation Committee	Executive Committee	As needed
Program Evaluation (internal audit)	The documented evaluation of the program efficiency and effectiveness against stakeholder needs	Evaluation Committee	Executive Committee	At least Quadrennially or as needed. May be performed as four annual partial evaluations.
Application	The form and process used by candidates to express interest in obtaining the certification or recertification	Operations Committee	Executive Committee	Quadrennially or more frequently, as needed
Certification	The actual technical or management certification award	Operations Committee	Executive Committee	As needed
Promotional Materials	Brochures, pamphlets, articles, web sites, etc, explaining and promoting the program	Public Relations Committee	Executive Committee	As needed
Appeal	The form and process for candidates to appeal the initial result of their application for certification	Operations Committee	Executive Committee	As needed
Problem Report / Change Request	The form and process used by committee members and stakeholders to report problems, concerns (including ethical concerns), or suggested changes and to track their disposition	All Committees	As assigned	As needed
Configuration Management Plan and Process	The document and process used to manage documents within the program and to ensure a consistent and continuous program baseline	Development and Operations Committees	Executive Committee	Quadrennially or more frequently, as needed
Website and information System	The publicly available system through which program information is published and automated interactions are conducted.	Development and Operations Committees	Executive Committee	Quadrennially or more frequently, as needed

Appendix A: Terminology & Acronyms

Appeal: A written request made to the certification issuer by a primary stakeholder for reconsideration of any adverse decision made by the certification issuer related to the certification scheme or certification program process (Definition based on "appeal" from ISO/IEC 17024)

BOK: Body of knowledge. The general set of information associated with a given profession, the set of things a practitioner of that profession might know. Not all practitioners need (or can) hold the entire body

Certificate program: A non-degree-granting structured learning experience that is designed to meet specific and pre-determined learning outcomes and for which individual achievement of intended learning outcomes is measured

Certification: The document (letter, card, or other medium) awarded to certification holders that designates the successful completion of a certification program

Certification holder: An individual who has been issued a certification after successful completion of a certification program's requirements

Certification issuer: The legal business entity or government agency, or operating unit thereof, which has ultimate responsibility for administering a certification program and issuing certifications to individuals successfully completing the certification program

Certification program plan: The documented plan by which the Certification issuer develops and administers the certification program, including the essential elements of analysis, program design, development, implementation and evaluation

CMSP: Certified Modeling and Simulation Professional. The title given to holders of the certification – the designated acronym for the CMSP program

Complaint: A request, other than an appeal, made to a certification issuer, for corrective action relating to the activities of that issuer or regarding its certification holders

Confidentiality: The mandatory process performed by the certification issuer to insure that the certification holder's Personally Identifiable Information is protected. The right of the holder to such protection

Configuration Control: See Document Control

Conflict of Interest: Conflict between a committee member's or office holder's CMSP program responsibilities and any other interests and obligations of the member or officer

Continuing Education Units: A credit awarded for contact hours of continuing education

Designation: The title or trademarked label that a credential holder is granted to use (Based on ISO/IEC 17000)

Designation acronym: The abbreviated title, usually the acronym form of the designation, which a certification holder is granted to use, e.g. "CMSP", or "Certified Modeling and Simulation Professional"

Document control: The mandatory process by which a certification issuer manages the configuration of the program documents, including baseline identification, version identification and change control

Internal audit: A process conducted by the certification issuer to ensure that they are following their own processes and that those processes comply with industry guidelines

NTSA: National Training and Simulation Association. An organizational sponsor of the M&SPC Commission and provider of operational capabilities

M&SPC Commission, MSPCC or M&SPCC: Modeling and Simulation Professional Certification Commission. The agency that owns and operates the CMSP program

M&S: Modeling and Simulation. The profession practiced by developers, users, leaders and teachers of modeling and simulation applications and technologies

M&S BOK: Modeling and Simulation Body of Knowledge. The BOK held by the M&S profession

Records control: The mandatory process by which a certification issuer keeps records regarding the holders of their certification and the qualifications they demonstrated to obtain it

Recertification Units (RU): The units by which renewal applicant's lifetime learning commitment and continued involvement in the profession is measured. The criteria for computation of Recertification Units are contained in Appendix E

Security: The mandatory process that ensures that program information, including certification holder information, is protected from loss, theft or damage, whether from natural events, accidents, or malicious attacks

SCS: The International Society for Modeling and Simulation. An organizational sponsor of the M&SPC Commission

SISO: Simulation Interoperability Standards Organization. An organizational sponsor of the M&SPC Commission

Stakeholder: Any person, group or organization with an interest in, or who may be affected by the certification program

Appendix B: Compliance

This appendix will be updated at a later date, to show the CMSP program's compliance with accepted certification program standards.

Appendix C:CMSP product requirements

C 1 Introduction

This Appendix specifies requirements that must be met by certain CMSP Program products. Process requirements, as distinct from product requirements, are established in the relevant sections of the CMSP Program Plan. Currently, three CMSP products are included in these requirements; others may be added in the future. Those products are:

1) Questions; individual questions that will be stored in the question bank and selected to form examination instances. Question requirements are conditions that must be met for individual questions to be included in the CMSP Examination question bank.

2) Question bank; the collection of all available questions. Question bank requirements are conditions that must be met for the question bank to be considered sufficient as a source for the creation of examination instances.

3) Examination instance; a subset of the questions in the question bank forming a specific CMSP examination created for a specific candidate. Examination instance requirements are conditions that must be met for an examination instance to be considered suitable for examining a candidate's status as a CMSP.

Requirements statements given as "shall" are mandatory requirements and must be complied with. No product which fails to comply which "shall" statements is acceptable. Requirements statements given as "should" are recommendations or guidance and should be complied with unless there is an overriding reason not to. However, products that do not comply with "should" statements may be acceptable.

C 2 Question requirements

Each question shall be of exactly one of the following types: multiple choice, true/false, or essay.

1) Multiple choice questions shall be in one of the following forms:

   a) Discrimination: "What <feature> discriminates <or> distinguishes <class membership> from <alternative class membership>?"

   b) Membership: "What <feature(s)> is /are exhibited by <class>?"

   c) "What <class membership> leads to <feature(s)>?"

   d) "What <class membership> <or> <application> <or> <historical association> tends to suggest <technology> <or> include <feature>?"

   e) Inference: "Given <circumstance> or <evidence> what <conclusion> <or> <supposition> should be drawn?"

2) Each multiple choice question shall include one correct answer and three plausible but incorrect answers. Neither the correct nor the incorrect answers shall be "trick" answers depending on unique or obscure exceptions or precise parsing of the answer syntax. Rather, they should depend on a thoughtful, reasoned response. "All of the above" and "None of the above" should be avoided unless a useful question can not be otherwise constructed.

3) Multiple choice questions shall be solvable without sophisticated software or computational capability. The problem shall be readily solvable with, at most, a normal desktop computer and common software such as Microsoft Excel.

4) True/false questions shall be in the following forms:

   a) "True or False: Every <member of this class> exhibits <this feature> <or> uses <this technology> <or> has <this attribute>."

   b) True or False: This <feature> <or> <technology> <or> <attribute> is normally observed in <members of this class>."

   c) Each true/false question shall have one correct answer (i.e., either true or false). Questions where a reasonable argument could be made for either a true or false answer should not be phrased as true/false questions. True/false questions should assess the candidate's ability to differentiate between alternatives that are significant to the M&S profession.

   d) Each true/false question shall be solvable without sophisticated software or computational capability. The problem shall be readily solvable with, at most, a normal desktop computer and common software such as Microsoft Excel.

5) Essay questions shall be in the following form:

   a) "Based on your understanding of <context> and <specific situation>, what would be the best <course of action> if your goal(s) were <goal(s)>?"

   b) Essay questions shall be used only used to elicit candidate responses about subjects that are too abstract to be assessed by multiple choice or true/false questions.

   c) Although essay questions are not normally considered to have a single correct answer (such a question should instead be expressed as a multiple choice or true/false question), each essay question shall include an answer key, indicating the elements that must, should, or may be addressed in a successful answer and an indication of the level of compliance with the key to assess that the answer is acceptable.

2) Each question shall be categorized into exactly one of three certification types:

   a) Core

   b) User/Manager

    c) Developer/Technical

3) Each question shall be categorized into exactly one of five difficulty levels:

    a) Very easy (1.0)

    b) Easy (2.0)

    c) Moderate (3.0)

    d) Difficult (4.0)

    e) Very difficult (5.0)

4) Each question shall be categorized into one or more of fourteen topic areas:

    a) History of M&S

    b) M&S practice /ethics

    c) M&S fundamental concepts

    d) Related communities-of-practice and disciplines

    e) M&S life-cycle

    f) M&S representation schemas

    g) Types of simulation implementation

    h) Tools, techniques, standards and resources

    i) Types of use of M&S

    j) Domains of use of M&S

    k) Management of M&S

    l) M&S workforce development

    m) M&S industrial development

    n) M&S business practice and economics

5) Each question shall be based on a source that is written, publicly available and considered by community consensus to be authoritative on the subject of the question.   The source shall be cited for each question, though ordinarily not within the question (see exception below), but rather as an adjunct to each question. The citation shall identify the source and should provide a page number or other specific location within the source where the question and its answer

can be found. The question should not directly quote the source. In the event of conflict among authoritative sources, the question should elicit the correct answer by providing context, which may include indentifying the source.

6) Each question of any type shall deal with significant (as opposed to trivial) aspects of the topic area and community within which it has been categorized. No question shall be excessively specific to a niche application.

7) No question of any type shall be specific to any particular company, product, military service, or nation.

C 3 Question bank requirements

1) For each combination of certification type and topic area, the question bank shall contain at least 20 distinct questions. (This implies at least 3 x 14 x 20 = 840 questions.)

2) The question bank shall contain at least 1,000 total questions.

C 4 Examination instance requirements

1) Prior to producing an examination instance for a specific CMSP candidate, the candidate self-selects exactly one certification type and exactly eight topic areas.   For each of the candidate-selected topic areas, an examination instance shall contain at least 10 questions from among those questions categorized as within both that topic area and either the candidate-selected certification type or the Core certification type.

2) An examination instance shall contain 100 questions.

3) The average difficulty level of the questions within an examination instance shall be no less than 2.5 and no greater than 3.5.

C 5 Definitions

1) Definitions of the replaceable tokens (e.g., <feature>) in the question requirements

2) Definitions of the certification types in the question requirements

3) Definitions of the difficulty levels in the question requirements

4) Definitions of the topic areas in the question requirements

5) Definitions of the communities in the question requirements

Appendix D: Verification and Validation Strategy.

It is expected that the program will conduct continuous improvement, meaning that problems and suggested improvements will be documented and addressed as they are identified. The Evaluation Committee will assess each change to insure program quality, consistency and compliance is maintained.

However, periodic review of the program as a whole is needed to ensure that the overall program is working together to comply with its own practices and processes and is meeting the needs of its stakeholders.

The CMSP program will be verified by comparing all program processes, organizations, activities and artifacts against the requirements placed upon them by this document, including appendices. This review is conducted every four years. It is expected that the compliance assessment will be divided into four, more or less equal, parts, so the one quarter of the assessment may be performed each year. The assessment team will prepare a formal report documenting their findings, including a problem report/change request for each problem found.

The program plan, i.e. this document, will be assessed by comparison to applicable sections of WK20544 - Standard Practice for Certification Programs [reference 3] to ensure that all areas that have been found by ASTM international (formerly known as American Standards for Test and Materials) to be essential elements of a professional certification program have been addressed. The Evaluation Committee will compare this plan to the requirements, note the section providing compliance in the right hand column of the table in Appendix B and document any requirements with which the program is non-compliant in a problem report/change request. This review will be repeated each time the plan is updated.

Requirements for key program elements, primarily the examination questions, answers and structure are provided in Appendix C. Each requirement or group of requirements includes a description of the verification technique to be used for that requirement. The Evaluation Committee will apply the specified verification technique to assess each key product against its requirement(s) and record the all issues or failures in problem reports / change requests. The reports and requests will be given to the development team so that they may correct the problem or incorporate the requested change.   This review will be repeated for the affected products with each release of an updated product or update to this document. It is expected that this review will be both thorough and collegial.

Appendix E: CMSP Recertification Requirements

E 1 Requirements / Guidelines

1) 275 recertification units (RU) are required over 4 years to re-qualify actively employed certification holders. Retired certification holders require 20 RU to re-qualify. (Upon appeal, exceptions to the RU requirements may be granted for illness, unemployment and other exigent circumstances.

2) Four years after receiving certification or recertification, certification holders must apply for recertification. The submitted recertification application form must document the holder's RU, and include the required fee. Once the CMSP program has validated the RU, and received the fee, the holder will be formally recertified, and will retain the right to be identified as a certified M&S professional. The recertification application need not document the details of the RU calculation, but the CMSP program may request additional supporting data without cause (e.g. randomly).   The application does need to contain the recertification candidate's pledge that the submitted RU data are correct as well as their renewed pledge to comply with the Simulationist Code of Ethics [reference 1].

3) Unless otherwise specified, one cannot earn double points by applying any single activity to more than one category. For example:

   a) A person whose regular duties include teaching can get points for either "Employment" or "Teaching", but not both.

   b) A full time employee who takes a company-offered/sponsored course on company time as part of regular duties can only get points for "Employment" (not "Education" too).

   c) Credit, however, can be earned for part-time work. (i.e., a research associate can earn credit for teaching a class).

E 2 Employment

Category	Explanation/Examples	RU Credits (max 60/year)
Full time	Employment must be relevant to BOK. No employment RU may be earned during periods of unemployment.	5 RU/month
Part time		5 RU/month prorated on the basis of hours worked per week divided by 40 hours.

E 3 Publications

Category	Explanation/Examples	RU Credits (max 60/year)
Peer Reviewed Journal	Credit for paper may be claimed	

	once during recertification period. Work must apply to BOK	
First Author		15
Second Author		10
Third Author		5
Online Transactions, Magazine		3

E 4 Professional Society Participation

Category	Explanation/Examples	RU Credits (max 60/year)
Officer/Chair	Work must apply to BOK. RU are awarded per position, per year	15
Committee Leader/Chair		10
Committee Work, Committee member		5
Individual Membership		3

E 5 Education

Category	Explanation/Examples	RU Credits (max 60/year)
Instructor	Courses must apply to BOK. Course must be completed during the recertification period. Students of on-site work sponsored/related training may not earn RU, since this is considered part of normal "employment."	
College course (including audited)		10 per 3-semester credit course
non-College course		2 per 8-hour day
Student		
College		5 per 3-semester credit course
non-College course		1 per 8-hour day

E 6 Conferences

Category	Explanation/Examples	RU Credits (max 60/year)
Attendance	Courses must apply to BOK. Course must be completed during the recertification period. Students of on-site work sponsored/related training may not earn RU, since this is considered part of normal "employment."	1 per conference day
Publishing/Presenting –		
Primary Author or Presenter or Panel Member		8 per paper
2nd or 3rd Co-author/Co-presenter		2 per paper
Best Paper or Keynote speaker		Additional 2
Organizing Committee		
Conference Leader/Chair		20

Conference / Executive (Sub) Committee Leader		15
Conference / Executive Committee Member		10
Conference Subcommittee Member		5

E 7 Continuing Education Units

Category	Explanation/Examples	RU Credits (max 60/year)
CEU from accredited agency	Any training which applies to BOK, which is eligible for CEU credits, but not described above. Note that 1 CEU = 10 contact hours for IACET	2 per CEU

Appendix F: Revision History

Revision	Date	Reason for change
New	12 June, 2009	Initial release
1.1	27 November, 2012	Update for use on website