

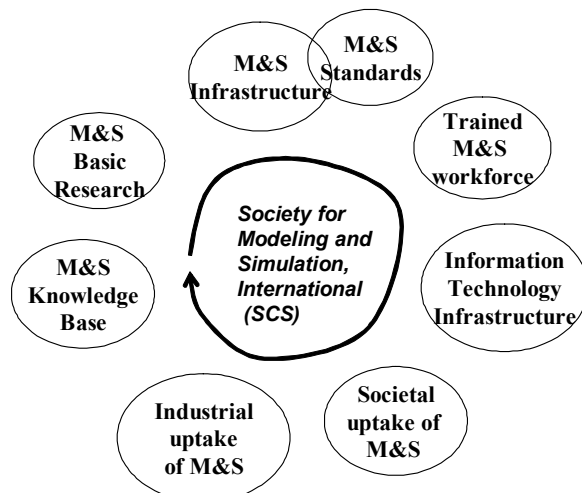
Thoughts on Strategic Directions for SCS

Bernard Zeigler
 Immediate Past President
 Society for Modeling and Simulation, International

For some years we have talked about developing a strategic plan but we have never actually developed one. As my tenure as President comes to an end, I am drawing upon the experience in office to envision the outlines of such a plan. I offer it for consideration to the new administration and to anyone with interest in the future of the Society.

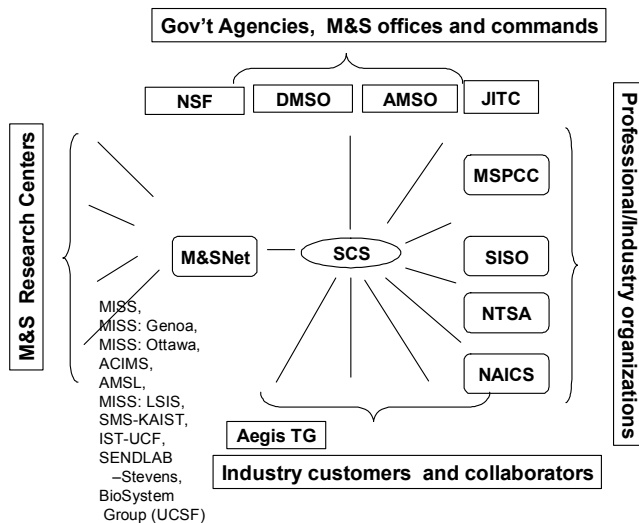
Background

In an early edition of M&S Magazine, I defined the “autocatalytic cycle” of Modeling and Simulation illustrated in Figure 1. Characterization of the various components in the cycle is replicated in Appendix 1. The idea behind this model is that all of these activities are just starting up or are currently in fairly low levels compared to where they could/should/will be. However, just as a powerful car engine gets ignited



M&S Autocatalytic Cycle

the whole cycle takes off. SCS should also claim its place at the center of M&S-related organizations as illustrated in the figure on the right. Appendix 2 enumerates some main players in this space – with no attempt to be exhaustive – these are the ones I am familiar with.



SCS at the Center of M&S Related Organizations

from a few sparks, all the components feed off each other and the whole process can fire up rapidly under the right conditions. The reason for bringing this up again is that I believe that any strategic plan for SCS should consider ways in which the “right conditions” can be brought about. In other words, SCS should be identifying the “lever” activities it can influence and working to get these key activities to high enough levels so that

the whole cycle takes off. SCS should also claim its place at the center of M&S-related organizations as illustrated in the figure on the right. Appendix 2 enumerates some main players in this space – with no attempt to be exhaustive – these are the ones I am familiar with.

Elements of a Strategic Plan

With the above as background, I propose three strategic directions for your consideration:

SCS should

- ***Work to enable M&S to take its place among the disciplines:***

To build and retain its niche in the emerging world of Information Technology, SCS should lead the effort to define the core body of knowledge, technologies and contributions to society that distinguish M&S from nearby disciplines such as computational science, software engineering and system engineering. Highlighting the key elements that M&S brings to the table will make it easier to build a membership that understands what SCS has to offer. Moreover, it will help them to promote their participation as M&S professionals in the multidisciplinary teams of the future. Understanding what M&S can, and can't do, will help decision makers decide the appropriate uses of M&S in achieving societal goals.

- ***Decide, and focus, on core activities; build and stake its reputation on these***

SCS should decide on the activities that are most natural for it to be doing and for which it can become known as the place to go for the associated products and services. Given its emerging strengths in archival publications and quality-first conferences, it would be natural for SCS to claim the high ground for being the recognized intellectual leader of M&S. In this ways, SCS can cede to others what they do best (e.g. SISO, standards development and dissemination and NTSA, large trade-style conferences). Success in this strategy all depends on the Society providing products and services that are needed and desired by other strong players in carrying out their roles.

- ***Exploit and extend the network of existing relationships with M&S organizations***

Table 1 suggests in more detail how SCS could/should collaborate with other M&S-related organizations to clearly define the core intellectual elements of M&S and to increase the level of activity that infuses these elements. A key ingredient in these collaborations is that of support from funding agencies. SCS, often in the form of the M&SNet, could/should become a regular player in proposal development and attempt to derive a good portion of income from successful proposals. By clearly defining the strengths that it brings to the table, and truly excelling in these critical areas as claimed, SCS can effectively work with other organizations to ramp up the M&S autocatalytic cycle and achieve the financial viability it needs to survive.

Area of Concern	Mode of Collaboration	SCS participants most directly involved	Activity
Education	Take the lead	VP Education Technical Council on Education	Continue the development of the M&S Body of Knowledge Encourage development of M&S degree programs at educational institutions Develops sample curricula and accreditation process for M&S degree programs. Promote development of course material and software to introduce mathematics, programming and modeling early in educational process. Develop Ethics Course for online distribution
Professional Development	Participate in MSPCC Commission Partner with commercial entities	VP Education Technical Council on Education SCS Institutional Members	Continue the development of M&S Certification Process Promote life-long professional education, e.g. create, staff and manage regularly-offered M&S courses
Research	Promote research consortia	M&SNet	Encourage collaboration among M&S research groups and participate in developing proposals that can influence the development of the field as a whole
Knowledge Transfer	Take the lead Partner with commercial entities	VPs of Publications and Conferences	Use SCS capabilities to disseminate research, expertise, software, educational material Seek funded support for publications (follow JDMS example) Continue cooperation with SISO and other groups to reduce overlap and increase participation Encourage, and participate as appropriate, agreements to transfer research developments to commercial market and encourage distribution of new M&S tools via commercialization and affordable licensing.
Standards	Participation in SISO Standards Groups	SCS Standards groups	Develop standard implementation for DEVS Formalism in DEVS-SG This group seeks to update
Industry Codes	Participation in SISO Standards Groups	SCS Standards groups	Formalize the ad-hoc group to update NAICS and to improve its representation of M&S.

Table 1 Possibilities for Collaboration with other M&S-related organizations

Appendices

Appendix 1 – Modeling and Simulation Autocatalytic Cycle

Industrial Uptake of M&S	The fundamental visionary use of M&S in industry, as "the rule, not the exception" and as "the real-time enterprise controller" depends on the existence a credible M&S knowledge-base, infrastructure and standards.
IT Infrastructure	Information technology (IT) refers to the computing and inter-networking technology that processes and routes the flow of information much as the national highway system enables the flow of physical goods and services. M&S is the primary means to design and test the current and next generation computing and networking technologies that promise exponential increases in power. Conversely, the IT structure will drive the advance of M&S infrastructure making it possible to tackle issues in greater depth with increasing confidence in the outcomes.
M&S Basic Research	M&S technology will become a ubiquitous capability that pervades and supports all science, engineering and commercial enterprise. However, the current state-of-the-art is characterized by costly, slow, specialized tools that are highly reliant on special expertise and do not well support team-oriented collaboration. The gap between expectations for M&S and its current capabilities can only be filled by basic research in M&S and its infusion into infrastructure, standards and education.
M&S Infrastructure and Standards	Infrastructures should provide common shared repositories of development environments, tools, data, models, and best practices that persist from project to project and that can work together within the phases of a project. Standards should allow different developers to interoperate for the common good while retaining competitive advantage and property rights where appropriate. Basic research is needed to develop the frameworks to support the common standards, enable the collaborative environments and explore the multidimensional space of ownership issues.
M&S Knowledge-base	The Knowledge-base is the sum total of knowledge of theory, science, engineering and craft required for successful M&S developments. This knowledge underlies the right formulation of M&S infrastructure and workable standards. Properly archived in electronic database form, with helpful searchability attributes, the knowledge base supports continued advances though basic and applied research and development.
Societal Uptake of M&S	Societal and governmental uptake will depend on the wide-spread and viable uptake of M&S in industry with the knowledge base, standards, infrastructure and trained workforce. One manifestation will be the uptake of M&S in the Department of Defense known as Simulation Based Acquisition.
Trained M&S Workforce	The cadre of professionals ranging from specialists in M&S infrastructure to M&S researchers needed support the wide array of activities and programs that SBA entails. More and better trained workers are needed that are knowledgeable and skilled in the various aspects to jump start the industrial and DoD uptake of M&S and sustain its development.

Appendix 2– Modeling and Simulation Organizations Relevant to SCS Strategic Plan (Alphabetical Listing with description and relation to SCS)

Acronym	Organization	Description
Aegis TG	AEGIS Technologies Group	Aegis TG is an institutional member of SCS, and a leader in the development of the field toward a recognized discipline, industry and market. Aegis TG, under founder Bill Waite has organized a summit meeting of all organizations with significant interest in M&S, included government, industry and academic, in which SCS played a major organizational role. Aegis TG has led the formulation of the M&S Body of Knowledge, a particular cut at the M&S Knowledge-base (see M&S Autocatalytic cycle).
AMSO	Army Model and Simulation Office	AMSO provides the vision, strategy, oversight, integration, training and management of Model and Simulation activities across all M&S domains and environments. AMSO has to be singled out as the leader in M&S integration within its culture. Dell Luncford is the factor behind the funding and establishment of the JDMS as an SCS publication. The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology is a quarterly referenced archival journal devoted to advancing the practice, science, and art of modeling and simulation as it relates to the military and defense.
DMSO	Defense Modeling and Simulation Office	DMSO “is the catalyst organization for Department of Defense (DoD) modeling and simulation (M&S) and ensures that M&S technology development is consistent with other related initiatives. The DMSO performs those key corporate level functions necessary to encourage cooperation, synergism, and cost-effectiveness among the M&S activities of the DoD Components.”
JITC	Joint Interoperability Test Command	JITC is concerned with testing interoperability of joint information systems – those of all Department of Defense (DoD) services and agencies as well as those of coalition forces (U.S. and other countries). M&S is critical to achieving its mission and vision.
M&SNet	McLeod Modeling and Simulation Network	M&SNet is a consortium of co-operating independent organizations active in research, education, and knowledge dissemination in the modeling and simulation (M&S) domain. It was established in 2003 by the Society with Tuncer Oren as the first Director. The M&SNet aims to provide an organizational structure that will serve to integrate and enrich, within its organizations, modeling and simulation activities throughout the world. The M&SNet provides a framework within which organizations interested in M&S can interact, share expertise, and work on problems of common interest. As one of the founding members, ACIMS shares the mission of M&SNet to foster professionalism in modeling and simulation, thereby advancing the art and science of M&S, applying M&S in all domains where it is applicable, and disseminating M&S-related knowledge.
M&SPCC	Modeling and Simulation Professional Certification Commission	Under the auspices of the NTSA, M&SPCC is responsible for the development and provision of professional certification to simulation specialists. Certification creates an identity for, and builds cohesiveness across the M&S community by establishing guidelines for determining professional competency. SCS, has been a major contributor to the work of the Commission. For example, it was responsible for the development of the fundamental theory part of the professional certification exam.

NAICS Ad-Hoc M&S Organization	North American Industry Classification System (NAICS) Ad-Hoc M&S Organization	This group seeks to update NAICS and to improve its representation of M&S. Led by, Vince Amico (SCS Hall of Fame inductee), a group of M&S organizations has submitted a request to the Census Bureau to establish a new code (541390) to recognize Modeling and Simulation Services as a distinct subcategory of the Professional, Scientific and Technical Services Sector of the NAICS. The request states that the M&S industry "is comprised of establishments primarily engaged in project assignments that provide consulting and technical assistance to others in applying complex mathematical models in the design, development, testing, use and support of the artificially duplicated real life situations that make up simulation applications." The request also urges a change of the description of "educational services" to recognize that simulators in various virtual and real combinations provide interactive instruction and/or training in a wide variety of subjects.
NTSA	National Training Systems Association	NTSA represents and promotes the interests of the training systems and services industry and provides venues to communicate the full capability and broad characteristics of the industry, such as the The Inter-service/Industry Training, Simulation and Education Conference (I/ITSEC).
SCS	Society for Modeling and Simulation International	Established in 1952, SCS is a nonprofit, volunteer-driven corporation. SCS is the principal technical society devoted to the advancement of simulation and allied computer arts in all fields. The Society organizes meetings of regional councils, sponsors and co-sponsors national and international conferences, and publishes archival journals and general information magazines. During my tenure, SCS has expanded its mission to include the advancement of education by creating a Vice President for Education.
SISO	Simulation Interoperability Standards Organization	SISO was originally concerned with standardization of networked simulation technology. Now, as the arm for simulation standards of IEEE, it is concerned with the development of standards for many aspects of M&S. SISO and SCS are moving toward increased cooperation such as co-locating their conferences and seeking to enhance each other's outreach. On aspect in this cooperative activity is SCS participation in the SISO-sectioned group for DEVS standardization led by Gabriel Wainer and the organization of a continuing standards session by Peggy Gravitz.