GENERAL SESSION SUMMARIES

WELCOME and OPENING ADDRESS

Rear Admiral Fred Lewis, USN (Ret.) introduced the Congress, and his remarks are included here in their entirety.

We at NTSA have the honor of being the facilitators at this first nationwide Congress of the Modeling and Simulation industry and community of practice. I would like to thank the color guard, the band, the choral group, and CAPT Nelson Jackson for their superb performances which have given us a fitting start to this memorable occasion.

I would also like particularly to thank the Members of Congress present, as well as the sponsors, for their support and enthusiasm.

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You have already provided momentum for what will undoubtedly prove to be a landmark event. For those of you who are unfamiliar with the history of the National Training and Simulation Association, we have been dedicated for many years—since our inception, in fact—to furthering the use of modeling and simulation for military training.
During the last decade, however, we began to witness a fundamental shift in the evolution of the technology. Modeling and simulation is now becoming indispensable to much broader environments, and, as it does so, it is evolving into a nationwide M&S community—a true national enterprise. Through a series of meetings involving key stakeholders from across the community of practice over the past few years, we have attempted to define the nature and implications of this evolution. In this effort, we have been joined by the Congressional Modeling and Simulation Caucus, founded by Congressman Randy Forbes of Southeastern Virginia. Among many other initiatives, the Caucus sponsored in 2007 a Congressional resolution declaring modeling and simulation to be a critical national technology—as indeed it now is.

The culmination of these efforts to bring all the facets of the technology into a defined whole is the event which brings us together today. I want to thank each of you for attending this watershed Congress and for bringing with you the knowledge and experience of your segment of the technology for the benefit of us all. Together we will move forward to create a permanent body which can fully realize the potential of the marvelous technology of which we are all custodians, and will strongly promote efforts to cooperate, collaborate, and coordinate activities across all domains for the betterment of all.

One of Winston Churchill's less familiar quotes is nevertheless very applicable to the task ahead of us. Commenting on the importance of technology, he declared that "unless the intellect of a nation keeps abreast of all material improvements, the society in which that occurs is no longer progressing". We in America have always believed that not only keeping up with, but pioneering, technological developments are in our DNA. We are now, however, being challenged on this front from a variety of very able and nimble international competitors. Simultaneously, we face what is by now a well recognized but nevertheless troublesome shortfall in the number of scientists, engineers, and researchers entering our nation's workforce each year. Allowed to continue, these trends could for the first time threaten America's primacy in areas which are fundamental to our national security and wellbeing.

This meeting, this Congress of Stakeholders in which we are today participating is therefore timely and important. We must, with some urgency, find means of redressing the adverse technological climate we face. As we all recognize, modeling and simulation is one of the most
exciting and relevant technologies to emerge into wide use over the past decade. From relatively restricted applications a few short years ago, it now pervades our economy. Today, it is impossible to identify anything that is designed, developed, deployed or disposed of that has not been touched by modeling and simulation at some stage. But this has been more than just a dissemination of the technology into new and often unanticipated areas, as exciting as this may be. There was a time when modeling and simulation was an adjunct to other ways of doing things. We could choose between live training, for example, and a relatively straightforward version of virtual training. Each had its strengths and weaknesses, and both could contribute to a better outcome, but we had an option to substitute one for the other.

Over time, however, live training remained relatively static—after all, there is only so much you can do to change real world environments. Meanwhile, simulation evolved on a steep trajectory, becoming more faithful to its real world counterpart while incorporating features that could not or should not be duplicated in real world environments. At this point, modeling and simulation ceased being an optional method, but emerged as the clearly preferred method for many training applications. As the technology matures, this imbalance in favor of simulation will only become more disproportionate.

But we are still talking about how modeling and simulation achieved primacy in the field in which it originated—that of training to perform complex and often dangerous tasks. It was helping us to do things we could have done anyway, just not as well or safely. While it was emerging into preeminence in this area, M&S was also doing something revolutionary: it was infusing itself into new areas which had never been accessible to the technology until it reached a certain point in its development.

Now, modeling and simulation has become pervasive. More importantly, we are now at the point where we can do things we never could do before because of modeling and simulation. This is of critical importance, in my view. Up until this technological turning point, M&S only helped us do a lot of things better. Now, it does innumerable new things—groundbreaking things. We have crossed a happy technological Rubicon.

An interesting development of recent years has been the emergence of training environments which are indistinguishable from executing the mission in real life. While the following
examples stem from NTSA's background in national security, the phenomenon exists in many other training domains. The only way to train to prevent cyber attacks is to mimic cyber attacks. In such learning environments, the trainee cannot distinguish whether he or she is thwarting a real attack or participating in a mock event. This is equally true for unmanned vehicles of all sorts—the operator is either manipulating the real thing, or not, but cannot tell the difference. This little paradox comes unnervingly close to the theme of the book "Ender's Game", in which a boy discovers that the war game simulation in which he is supposed to be participating is playing out as a real event in another dimension.

This new training environment is another of simulation's recent breakthroughs, much to the benefit of our national security, among other things. In fact, the latest Administration proposals on defense restructuring, placing emphasis as they do on use of unmanned systems and on cyber preparedness, will only enhance this aspect of simulation.

With all these exciting, often unprecedented breakthroughs into new areas, you'd think that the general public, or at least the better informed segment, would by now fully appreciate the role modeling and simulation plays in their daily lives. This, however, appears not to be the case. Ask ten people what comes to mind when they think of simulation, and nine will likely answer, "oh, isn't that how pilots train?" It's like thinking of the Internet as a faster typewriter. What accounts for this misperception? I believe it stems from modeling and simulation's own success in seamlessly infusing itself into all aspects of research, technology and the economy at large. It's rather like Adam Smith's famous "invisible hand"—a force that guides things somewhat mysteriously but flawlessly from behind the scenes.

Even among those who understand the breadth and depth of simulation's role today, the technology is too often regarded as part of a larger process—a link in a chain of events rather than as a discipline and industry unto itself. This attitude that M&S is just another handy tool among many, rather than the revolutionary technology that it is, impedes, I submit, its full creative utilization.

For example, how many conventional approaches to concept development, such as written descriptions, are still being used when illustrating outcomes with simulations, instead of words, would be far more dramatic and effective?
Bridging this perceptual gap is one of the challenges we face today as we determine how to advance this technology so it can play its full role as a force for national strength and security. We must bring modeling and simulation into the forefront of the nation's technological awareness so its full potential can be realized across all sectors of the nation's economy, industry and educational system.

We all recognize that any rapidly advancing technology will do so unevenly, being fully embraced by some sectors and relatively, if temporarily, neglected by others. While this is to be expected in any process involving infusion of a new technology, in the case of modeling and simulation, it impedes its full, timely utilization. An important task before us, then, is to insure that the many advantages and often unique capabilities of modeling and simulation are fully understood by all sectors of the economy, thus paving the way for even more complete utilization of the technology. Further, by uniting all institutions, organizations and individuals involved in M&S, the Coalition will aim to achieve organizational economies of scale by addressing bottlenecks through a comprehensive flow of industry-wide information while at the same time identifying and ameliorating duplication of effort.

You all have been supplied with a copy of the Charter for the Coalition which describes the organizational structure we envision as the basis to move forward. The success of this endeavor, important as it is not only to our community at large, but to our nation, hinges on the commitment and continual effort of all of us here. Today we are not participating in an event as much as inaugurating a process—a process that depends upon our dedication now and in the months and years ahead. I invite you to join in this effort to realize the vision expounded in the Charter document.

We have designed the sub-committee break-out sessions scheduled for this afternoon to be opportunities for all of you to not only address the key issues for each topic but to help in a collective way to chart the course ahead. I ask for you to consider approving the Charter, and I ask that each of you consider serving on the Coalition’s formal board or perhaps serving on a sub-committee on a continuing basis. Our vision is that our work be a continuous effort reinforced by periodic planning meetings, the first of which will convene in the fall of 2012.
Inaugural Congress – Proceedings  
6 February 2012

This Congress and the Coalition it will mandate today are the vehicles by which we will ensure that utilization of modeling and simulation matches its marvelous potential. For, as we all know, the technology itself is on a very steep developmental curve—a cascade of technology, some of which we can only dimly perceive.

All of us must do our best to insure that this explosion of potential is fully harnessed to our nation's destiny.

NMSC OPENING REMARKS and KEYNOTE SPEAKER INTRODUCTION

Dr. Linda Brent, CEO, The ASTA Group and Director of Strategic Planning, NTSA provided a few opening remarks and the introduction of the keynote speaker. Her remarks are summarized below.

Good morning! I too would like to welcome you to this Inaugural Congress of this new organization – the National Modeling and Simulation Coalition. A few words about the logistics of the day. For this afternoon, you will be asked to join the initial meeting of a committee of your choice, which have been described in your program. The objectives of these initial committee meetings to establish common ground, identify key issues, and begin to define an action plan for the Coalition. I would also draw your attention to your program. In it you will find bios for the speakers, the agenda for the meeting, and a membership form at the end of your program to join the Coalition. I would ask each of you to consider membership in this new organization, and be a part of this national movement.

I have an additional request of you today. We each bring to this Coalition leadership across our individual disciplines. We have each applied technology, modeling and simulation to support our work efforts across education, manufacturing, health sciences and medicine, defense, energy, transportation, and workforce development, among others. We speak in different languages, we have used modeling and simulation differently, we even may define it differently. However, at some level, there is commonality among us. At some level, by defining a common language and some common ground, modeling and simulation can address even more issues facing our nation, and can support in even more ways the technological advances...
of our nation. We can drive innovation by applying best practices in modeling and simulation discovered by each of us from our own perspective to other disciplines and domains. We can educate our future workforce using modeling and simulation and to provide safety, security, and leadership for our country. It is with these thoughts that I ask each of you to approach this day – to approach this movement. Find the common language, find the common ground, and find ways we can work together to advance our country through technology in modeling and simulation.

And who better to help us to set the stage for this discussion than our first keynote speaker this morning. Since the early days of the Obama administration, Aneesh Chopra has served as the nation’s first Chief Technology Officer of the United States. In this position, Mr. Chopra has led efforts across all domains and disciplines to further the application of, and effectiveness of technology, modeling and simulation. His detailed bio is found in your program. His excitement and diligence regarding what is going on around the country is best communicated through his words. Please welcome, Aneesh Chopra.

KEYNOTE ADDRESS

Mr. Aneesh Chopra, Assistant to the President of the United States and the U.S. Chief Technology Officer

The thrust of Mr. Chopra’s remarks focused on regaining, in his words, the “MOJO” of U.S. Manufacturing. With the increasing cost of manufacturing, the President has charged DARPA to come up with ways to reduce the manufacturing time by 80%. Mr. Chopra related the accomplishments of Victor Garcia, an immigrant and employee of a trucking company, who worked independently to respond to a Defense Advanced Research Projects Agency (DARPA) Challenge to design a specialized car, a Combat Support vehicle, in three weeks time. This was an example of tapping into America’s manufacturing expertise for better results in time and money. Further, it demonstrated how Modeling and Simulation (M&S) can be employed to secure economic growth and prosperity.
The President’s strategy for American Innovation addresses five major areas of concern as well as opportunities for M&S:

Cost and expertise barriers for small and medium business.

- “Lab to Market” opportunity to commercialize National Labs’ experience to solve industry problems.
- New market opportunities to apply M&S tools in medical device regulation, real-time manufacturing operations.
- Emerging methodologies like parallel algorithms, cloud computing, uncertainty quantification.
- Need for integrated (multi-disciplinary) curriculum.

M&S in manufacturing provides growth in business, not just in reduction in costs. It offers the possibility of more jobs. In preparing the work force for the future, STEM education offers an important “Building Block” for innovation.

Mr. Chopra encouraged the NMSC to emphasize their participation, a belonging so that everyone can play. He gave an example of an Autodesk “Starter Kit” which would employ cloud-based M&S tools to offer low-cost computing capacity. The idea is to develop an overall spirit of open innovation to grow manufacturing jobs.

Panel: Visionary Perspectives on Modeling and Simulation

Concluding the morning was a panel on Visionary Perspectives on M&S moderated by Dr. John Sokolowski of VMASC, Old Dominion University. Each panelist gave a brief presentation. After all presentations a general Q&A period followed.

Dr. Jim Davis, UCLA and Smart Process Manufacturing Leadership Council (SMLC)

The SMLC is concerned about making things and streamlining the time and thought spent in the manufacturing process. “Smart manufacturing is the first structural shift since Henry Ford
launched the economic power of “mass production”. We are entering an era where the very fabrication of physical things is revolutionized by emerging materials science. The Internet is evolving into the “cloud” – a network of thousands of datacenters any one of which makes a 1990 supercomputer look antediluvian. From social media to medical revolutions anchored in metadata analysis, wherein astronomical feats of data crunching enable heretofore unimaginable services and businesses, we are on the cusp of unimaginable new markets” (JAN 30 Wall Street Journal: THE COMING TECH LED BOOM, Mark Mills & Julio Ottino)

21st Century smart manufacturing is the dramatically intensified application of manufacturing intelligence using advanced data analytics, modeling and simulation to produce a fundamental transformation to transition/new product-based economics, flexible factories and demand-driven supply chain service enterprises. The question has been asked, if smart manufacturing is such a smart idea why aren’t more companies using it? Here is a challenge for the M&S Coalition (NMSC).

Dr. David Gaba, Stanford Medical School

Many facets of simulation are used for medical applications, even the employment of actors but they don’t like being stuck by needles. Although actors are the best simulators, for practical reasons, mannequins are most widely used in medical simulation. A new industry for health care simulations has been established as a result of the increased developments in M&S. The Society for Simulation in Healthcare (SSH) membership has increased from 180 in 2004 to over 3500 in 2012. In a review of how well simulation works in health care there has been insufficient time to follow the development. M&S in health care is still considered new so the data has not been well-researched. The filed needs capital investment and better technologies. It is admitted that organizational factors are an impediment. Ultimately, the public will be the driver for progress.

Mr. Robert Gehorsam, Image Metrics

Mr. Gehorsam presented an action video depicting a highly developed reality representation, the basic point showing the sheer amount of computing power – an enormous network infrastructure. The video signifies the following points:
Inaugural Congress – Proceedings  
6 February 2012

- Immersion/Collaboration/Learning (left seat/right seat)/Simulation at a Human Scale/  
  Tremendous Compute Power at a Consumer/Commercial Level/ Accessibility/Cultural  
  Acceptance/ Ubiquity

Then the question is asked, “What’s Your Opinion?”

Possible responses:

- This is irrelevant and it’s probably risky to assume anything else.
- This is interesting and may have applicability in some way, but needs more study to  
  prevent the wrong lessons from being learned.
- It’s time the M&S community got on the good foot and embraced this wholesale.

**Dr. Sridhar Kota, White House Office of Science and Technology Policy**

Dr. Kota’s discussion points focused on National Initiatives in M&S and on future opportunities.  
He discussed the following points:

- Modeling and Simulation is a priority for the current administration
- Administration is establishing National M&S Centers for different manufacturing sectors  
- Large sized manufacturers are currently making extensive use of M&S technology in the  
  manufacturing process – current administration will focus on sharing similar M&S tools  
  with small and medium sized manufactures so they may also benefit from benefits of  
  M&S technology

Share common challenges:

- Greater use of statistics to capture and verify real world activity
- Software scalability – the ability to apply existing M&S software programs to large scale  
  projects
- Validation and Verification of existing M&S software solutions
- Seamless fusion of real time data with M&S models
Future Opportunities include the following:

- Participation in Public/Private partnerships with Federal Laboratories
- Application of off-line M&S activity into the workplace
- Improvement in availability of complex systems

**Mr. Tom Lange, Global Capability Organization, Proctor and Gamble**

Mr. Lange provided an interesting background of a very successful company with $80 billion in annual sales and $11 billion in profits. Founded in 1837, the company is in the business of managing contradictions, and has successfully managed their revenue growth with profit to produce dividends for the last fifty-five years. For instance, in materials: strong but soft/stretch but not break/breathe but contain/break not tear/never leak but open easily. Creative design drives sales but makes it harder to pack. M&S has helped P&G maintain their edge in the industry, and may help provide solutions for what’s ahead: to tackle more complex problems more completely, to solve larger equation sets, to do parametric studies vs. point estimate calculations and to utilize a “Turbo Tax” analysis in shaping more decisions. Mr. Lange sees M&S behind improving everyday life.

**Dr. Ajit Sachdeva, American College of Surgeons**

► Enduring winds of change reveal:

- National imperatives to enhance the quality of medical/surgical care and improve patient safety.
- New accreditation standards in medical/surgical education.
- Evolving requirements for licensing and certification.
- Monumental advances in surgical education, training, and assessment.

► Use of simulation in surgical education and training, especially improvement in surgical outcomes, and enhancement of patient safety and comfort:

- Standardization of education and training.
Achievement, affirmation, and maintenance of proficiency, leading to expertise and mastery.

► New directions in simulation-based surgical education and training to evaluate the impact on performance and patient care outcomes.

► Innovative simulation-based education and training to promote excellence in surgical care.

► American College of Surgeons (ACS) model for verification of surgical knowledge and skills.

► The total number of ASCS accredited education institutes went from 10 in 2006 to 65 in 2011.

There are unique opportunities in simulation-based surgical education and training, particularly reduction in liability costs with a view toward a national collaboration across different fields to take simulation-based activities to the next level with the pursuit of collaborative research and development projects.

**Congressional Commentary**

Congressman Randy Forbes concluded the morning session offering positive comments about the NMSC while asking attendees to help in getting more Congressional Members interested in M&S and the M&S Caucus. He had high marks for this first Congress as well as the impact of I/ITSEC to galvanize attention to the benefits of M&S. He highlighted the U.S. House of Representatives Resolution 487 which recognizes M&S as a national critical technology and what that means to the Nation. Congressman Forbes acknowledged the need for more focus on medical simulation while recognizing big challenges ahead with the reduction in defense funding. He stated that a Blue Ribbon M&S Commission will be established to review M&S efforts in each government agency. The purpose will be to determine how M&S can increase coordination among agencies, specifically how DoD is employing M&S. Further, the Commission will evaluate how M&S helps efficiencies in departments, especially DoD. He commented that in Congressional Hearings he continues to hear the comment, “acceptable risk” – he added that as we look at DoD cuts, we must consider the risk of loss of people.
Panel: Establishing a Collaborative National Action Plan

The afternoon panel discussion on Establishing a Collaborative National Action Plan was moderated by Dr. Michael Papay, Northrop Grumman. Each panelist gave a brief presentation. After all presentations a general Q&A period followed.

Mr. John Kenney, TRAX International

Mr. Kenney’s remarks addressed solving tomorrow’s energy challenges with M&S today.

His company, TRAX, has established a line of business bringing M&S to the energy sector. Today, TRAX employs high fidelity energy process modeling – Duke Energy is a major customer. The U.S. has huge deposits of natural gas and coal will still be around for a long time. The country uses M&S to build large weapons systems, so why not use the same approach for new power plants, nuclear included. We must use M&S to simulate power plants for the future – plant design and existing plant modifications; power grid and micro grid simulation and design analysis; carbon capture modeling to verify performance; increased use in regulatory design and implementation; and cloud-based simulation. Solar and wind are not a reality today as major replacements for current plants. We need to determine how to live off of the grid for six months. A significant problem in the energy field is in getting cooperation from government labs.

Mrs. Nancy Conrad, Innovative Nation

Mrs. Conrad is the wife of the late Astronaut Pete Conrad. She advocates giving children a MOONSHOT opportunity in innovation. Her discussion focused on the vision for creating a movement for innovation among our K-12 population. Her efforts in this regard have created a national movement, and reach children in many countries as well. Check CONRADAWARDS.ORG to learn more about her organization’s program in 42 states and 9 countries.
Dr. George B. Adams, Director, Manufacturing HUB, Purdue University

The Manufacturing HUB (ManufacturingHUB.org) brings a new way of delivering simulation and stimulation cooperation. Through its NANO HUB.org marketplace data is brought to the table. The manufacturing HUB value proposition is **EASY**

- Your web browser is your gateway.
- A standard GUI for every application.
- No software to install.

And it is **ENABLING**

- Publish software and educational content.
- Receive quantitative usage data.
- Run interactive apps in the cloud.
- Share sessions, live or asynchronously.
- Access the broader manufacturing community.

The slides from this presentation can be found on the MNSC website.

Dr. Richard Satava, University of Washington

There is no new methodology to validate technology; maybe M&S can assist. Not all science is explainable by the scientific method. Science is evolving – so must the scientific method. Simulation is the gateway to creativity and the pathway to the future, but simulation needs to be separate, not part of the company IT department. There are a wide variety of possibilities with M&S, particularly in health care. Having patients’ specific data allows practice on a virtual image, not the actual patient.

- Simulation in healthcare is in infancy, small but becoming robust – needs to develop a marketplace and business plans.
- Major barrier is lack of funding (no dedicated federal funding) – requires proportion of CMS supplement.
2\textsuperscript{nd} barrier is lack of national coordination (breaking silos) role for NMSC.
3\textsuperscript{rd} barrier is re-inventing the wheel – need collaboration within medicine and outside industry.

The slides from this presentation can be found on the NMSC website.

\textbf{Mr. Frank DiGiovanni, Office of the Deputy Assistant Secretary of Defense (Readiness)}

The question is how to achieve a national M&S action plan. In working an issue there must be recognition of the importance of the big problem that takes precedents over personal/local loyalty. The common imperative is important. The world is flat from a technology imperative. In citing the Gulf oil leak – lots of people had an idea of how to stop it but no national way to simulate a solution. There is a need for a National Center. M&S is the only way to view a layered, complex situation. Fiscal realities are driving the understanding to be more efficient.

\textbf{NOTE:} All detailed presentations by speakers may be viewed at:

http://www.ndia.org/Resources/OnlineProceedings/Pages/21C0-NationalModelingSimulationCoalitionInauguralCongress.aspx

\textbf{Standing Committee Report}

The following are summaries from the standing committee meetings that were held during the Inaugural Congress event. There are five standing committees that have been established: Technology, Research and Development; Education/Professional Development; Business Practice; Industrial Development; and Communications/Outreach. Their reports follow.
NMSC Technology, Research and Development Standing Committee Meeting Summary

Purpose of the Meeting / Activities Completed

The purpose of this meeting was several-fold. It included the following:

- Identify individuals interested in this standing committee area
- Propose possible topics of interest for the committee to explore
- Identify specifics of these topics and identify other topics of interest
- Identify personnel interested in a leadership role for this standing committee

Summary of Issues Discussed / Findings by the Committee

The standing committee chairs proposed two topics for consideration by this group. The first topic concerned a discussion on the need for and purpose of modeling and simulation standards and how those standards would benefit the many areas that modeling and simulation touched. The second topic revolved around the modeling and simulation body of knowledge and the required content for that body.

The meeting attendees discussed several aspects of M&S standards. Highlights of this discussion included:

- The importance of M&S reuse and interoperability to avoid unnecessary duplication and development costs. The DoD M&S Coordination Office website – www.msco.mil – was offered as an existing resource.
- The different levels of interoperability (an example would be the levels of conceptual interoperability as defined by Andreas Tolk at Old Dominion University).
Business models that would incent reuse and standardization.

The idea of what knowledge and intellectual property a simulation contains vs. its specific implementation. The design of the model is more important than its actual implementation. The content of a model is much more readily adaptable to multiple uses than a specific implementation of that content.

We should move forward with shared design and repurposing rather than focusing on reuse.

How should the community incentivize this type of sharing?
Goal: create a HUB for M&S knowledge and info sharing that would share knowledge and designs that people have developed so that others can adapt these to other purposes.

Several persons indicated an interest in a leadership role for the standing committee.

### Action Items and Timeline

The following action items were agreed upon by this committee. No specific timeline was established for these items:

- Send the existing draft Body of Knowledge to the committee meeting attendees.
- Recruit volunteers to work on M&S information hub website concept.
- Recruit new committee chair and permanent committee members.

### Next steps

The committee is pursuing the following steps:

- Contacting volunteers for committee leadership positions.
- Emailing committee attendees to solicit their future participation.
- Schedule next meeting of the committee.
Education and Professional Development (EPD) Standing Committee Meeting Report

Purpose of the Meeting / Activities Completed

During the inaugural event of the National Modeling & Simulation Coalition (NMSC) on Monday 6 February 2012, the Education and Professional Development (EPD) Standing Committee met for the first time. Thirty-three individuals from across academia, government, industry and societies participated discussing their issues with respect to M&S education and professional development.

The initial guidance for the EPD Committee was:

This committee is focused on establishing common educational standards, curricula, professional certifications, guidelines for the profession, and an M&S body of knowledge. This committee will address the national-level needs to ensure the education, development and training of an M&S workforce that can meet the science, technology, engineering and mathematics (STEM) requirements of our nation.

During the discussions, the participants felt the scope for just the STEM areas was too restrictive. They believed it should be expanded to other groups, such as Human Resources, Business, Health, etc.

Some initial questions posed to the committee members to shape the discussions were:

- What does it mean to be a M&S Professional?
- What is the current state across M&S domains?
- What’s common across M&S domains?
Summary of Issues Discussed

The discussion of issues and findings are divided into six areas. These six areas could become sub-committees to the EPD Standing Committee and are listed below.

- Common Language / Taxonomy
- M&S Domains / Usage
- Available M&S Education
- M&S Training Levels
- Awareness / Branding / Outreach
- Framework / Roadmap

Summary of Issues Discussed

In each of the six areas, many questions were raised that merit further consideration. Findings and questions in each of these areas are enumerated below.

**Common Language / Taxonomy**

- A common language or taxonomy is needed for M&S. The community is using the same words, but depending on the domain or organization, these words have different definitions.
- The M&S community needs to understand the boundaries in educating the M&S workforce.
- Since there are no M&S NAICS codes, there is no M&S Industry. We need to define the M&S Workforce and a value proposition for that M&S Workforce; i.e., what are the benefits of doing M&S?
- DoD has started developing an M&S Body of Knowledge. What is the current status?
- What is the state of the current Certified M&S Professional (CMSP)? How does it compare to where we need to go for the M&S Workforce?
- What is the theory of modeling? Why should we model?
- What is the theory of simulation? Why should we simulate?
Need standardization across simulation centers.
What is the gap / disconnect between supply and demand?

**M&S Domains / Usage**

- There are many people developing simulations, but there is no common methodology.
- Questions were asked on what the M&S Domains were, where was M&S being used?
- Recommend developing an education and training program to cover a “core” M&S capability, and then recommend additional areas dependent on the M&S Domain.

**Available M&S Education**

- A question was asked where the current M&S-related education programs were. Discussions stated that there are only a few schools with M&S programs (i.e., Naval Postgraduate School, Old Dominion University, University of Central Florida, etc.), but there are over 40 with the M&S-related Computational Engineering programs.
- What about M&S accreditation? It seems to be only with the graduate-level programs. What about bringing to bachelor’s-level programs?
- There is no simulation in the undergraduate programs.
- General evidence / metrics are needed to demonstrate effectiveness of M&S in educational process.

**M&S Training Levels**

- M&S training is a continuum. It should start in the K-12 level, get more specialized in the trade / undergraduate / graduate schools, and continue as professional development in the workforce.
- The discussion stated we need to educate the M&S workforce, but what is that workforce? An example was the M&S Community, Educators, and Managers.
- Another question was how do we get M&S into education programs in colleges to teach educators? Some institutions have simulations, equipment and technology, but educators have not been trained. Additionally, there are no known standards and protocols for teaching M&S to educators.
A recommendation was to bring M&S Mentors in the classroom until educators were trained. But where will the mentors come from? (One recommendation was PEO STRI.) Managers should be trained about M&S – a familiarization, but not doing M&S. There should be core M&S knowledge – whatever that is. What is the spectrum of M&S levels? One recommendation was awareness, practitioner and expert. Another question asked was what are the attributes and skills necessary to be a successful M&S Practitioner? What about developing a matrix of M&S training and education for each domain? Need to replace the slow & expensive learning with faster methods; consider a better way of delivery method to individuals; it is an interdisciplinary knowledge with some commonality threads.

**Awareness / Branding / Outreach**

- A question was asked on what the brand of M&S would be?
- What about the EPD Committee being a “clearing house” to show M&S benefits – where “clearing house” would need to be defined?
- A question was asked how we could eliminate the “fear factor” of M&S?
- We need the ability to advertise and tell stories about M&S, not just provide lists.

**Framework / Roadmap**

- A framework or roadmap for going forward needs to be developed.
- Work with the other 5 areas (potential EPD Sub-Committees) to develop a near-term, mid-term, and long-term framework or roadmap for developing the M&S Workforce.

**Action Items and Timelines**

- By 2 Mar: Schedule monthly EPD Comm meetings
- By 30 Mar: All sub-committees and leads identified
- By 30 Mar: A nucleus is formed for each sub-committee
Inaugural Congress – Proceedings  
6 February 2012

- By 30 Mar: Provide comments on proposed charter changes with rationale to EPD Committee Chair
- 4 May: Agree on updated EPD Committee Charter
- After all Mtgs: Post minutes on NMSC web-site
- After Sub Mtgs: Post sub-committee minutes on NMSC web-site

Next Steps

- Schedule monthly meetings
- Determine location on NMSC web-site to store EPD Committee material for sharing
- Identify Sub-Committees, Leads and Members (looking for that balance among academia, government & industry) – March tasks
- Research available information (with respect to each sub-committee) – April tasks
- All the overall and sub-committee action plans culminate in
- September – Each Sub-Committee reporting results / next steps to other team leads
- October – Summarizing to report results / next steps at the 2nd NMSC Meeting

Schedule of Upcoming Meetings

The first teleconference meeting is tentatively scheduled for March 13. Subsequent monthly meetings will be scheduled with the concurrence of the full committee.
Industrial Development Standing Committee Report

Purpose of the Meeting / Activities Completed

The Industrial Development Standing Committee of the National Modeling and Simulation Coalition met as one of the breakout sessions from 3:30 pm to 5:15 pm. Meeting was chaired by Dr. Thomas Mastaglio assisted by Mr. De Voorhees and Captain Nelson Jackson (ret). Following an introduction regarding what is industrial development in the context of M&S and a review of key issues from previous Leadership and Sim Summits, committee objectives, the discussion agenda, and framing questions were presented. Introductory material was covered in about 10 minutes after which a group discussion on the framing questions, other ideas, and issues for the NMSC in the context of Industrial Development was conducted. The group identified which issues to address and actions to be taken by the committee and coalition to promote M&S as a national business sector. Twenty eight delegates from the Congress attended this session.

Summary of Issues Discussed

The following issues were discussed in group session:

- Should we collectively promote the use of M&S in new application areas and business sectors?
  - How can we (industry) do that collectively through NMSC?
  - Do we need help from the government? Who? How?
  - Is some other type of trade organization needed to represent M&S business interests?
  - How do we accomplish this and maintain competitive separation/IP/customer relations?
Inaugural Congress – Proceedings
6 February 2012

What resources or support does industry need in order for us to “develop” (i.e., expand customer base, create and provide innovative products)?
  o Workforce development support
  o Standards
  o Federal government recognition of the “industry” – NAICS code approval

Is there a universal value proposition to justify use of M&S? If not, are there strong success stories, endorsements, or methods to predict ROI?

What constraints on the industry are imposed by the listing of M&S on United States Munitions List Part 121?

Is the M&S Blue Ribbon Commission proposed by Congressman Forbes an initiative which the NMSC should support?

Can better industry access to M&S tools and data be provided?

Findings by the Committee

The committee did not have sufficient time to develop specific detailed findings at this session. We did identify the following issues for further discussion and action at either the Standing Committee or Coalition level:

  ● The committee agreed on a definition of M&S Industrial Development as “the extension of the use of modeling and simulation into new industry sectors”.
  ● The Coalition needs to promulgate an image of M&S; market what we do, capture success stories and TELL THEM in the national media
  ● The Coalition should support the M&S Blue Ribbon Commission being proposed by Congressman Forbes
  ● The committee proposes development of a publicly accessible compendium/library of models
  ● The committee needs to investigate how to better protect IP for M&S products, tools and processes
  ● NMSC needs to strongly support efforts to get an M&S NAICS approved
Action Items and Timeline

The committee identified the following action items for the committee to pursue in the immediate future:

- Recruit Standing Committee Leadership to serve for the longer term in lieu of the Interim Board member; use the latter in an advisory capacity
- Develop a list of Standing Committee Members willing to participate in meetings on a recurring basis
- Conduct Standing Committee meetings as monthly teleconferences
- Develop an action plan by October meeting to address the major issues identified above.
- Focus each Standing Committee meeting on the use of M&S in a specific industry area to facilitate sharing of information between and across business domains

Next Steps

The Standing Committee will take the following steps to accomplish the above actions items:

- Appoint a permanent Chairperson and alternatives
- Identify all interested Standing Committee Members
- Schedule Monthly Teleconferences
- Begin to formulate a long term Action Plan to be finalized by October 2012

*Schedule of upcoming committee meetings if established:* Still to be determined
I. Purpose of the Meeting and Activities Completed
The fundamental purpose of the meeting was to initialize operations of the NM&SC Standing Committee on Business Practice. To that end, meeting proceedings entailed coverage of subject areas indicated in the following outline:

A. INTRODUCTION
   1. M&S Business practice Context
   2. Need and Opportunity

B. CHARGE to the COMMITTEE
   1. Scope of the Committee
   2. Candidate Agenda Topics
   3. Expected Committee Output

C. DISCUSSION
   1. Protocol / Forms and Invitation to Comment
   2. Discussion of Participants
   3. Compilation of Input, and Capture of Prospective ACTIONS

D. SUMMARY CONCLUSION
   1. Conclusions / Recommendations
   2. Actions and Next-Steps
   3. Out-Brief

Introduction to the Business Practice agendum focused on the facts of current M&S business practice environment; the “Challenge Question” posited for the attendees’ consideration; and suggestions for possible progress during the initial committee meeting.

Features of the M&S business environment considered to be salient to establishment of the Committee’s shared precepts, intentions and expectations included the following assertions:

- There exists, de facto, an M&S Business Practice
  - After all, organizations do buy and sell Modeling and Simulation products and services.
- The M&S market is inefficient
Information and transaction opportunities are not readily available, consistent, or effective.

There are no stoppers to creation of systematic and efficient M&S business practice, but there are difficulties, namely:

- M&S is ‘not-quite-an-industry’,... that is, modeling and simulation is still an emerging discipline, with a growing professional workforce, an increasingly self-conscious industrial identity, and progressively fruitful markets.
- Still, it’s not entirely clear who all the buyers and sellers are, and what products and services are available.
- Markets are balkanized (that is largely stove-piped and insulated according to application domain...; and transactions are thereby inhibited.
- Making the ‘business case’ for M&S is more difficult than expected.

Still ‘Where there’s smoke’... there is opportunity.

Finally, by systematic collaboration, we can improve M&S Business Practice!

The need and opportunity for improving M&S Business Practice may be summarized by postulating a ‘Challenge Question’. Given that:

- M&S is important to the Nation’s security and economic and social well-being, and that
- The economics of M&S influences successful business practice,

...we want:

- Growth in product / service value-offerings
- High productivity, quality, and efficacy
- Effective marketing sales and distribution
- Big, accessible, robust, efficient, receptive markets
- Efficient economic tools and techniques.

The ‘Challenge Question’ to the committee was therefore:

What are YOU going to do to improve M&S Business Practice?

The Business practice Standing Committee then resolved to:

- Establish CONSENSUS on Committee intention and strategy,
- Identify TOPICS for Business Practice Committee agenda,
- Define ACTIONS for immediate execution’
- Seed a prospective Committee PROGRAM PLAN,
• COMMIT to M&S Business Practice improvement, and
• REPORT results to NMSC Plenary.

Finally, by way of indicating the potential scope of the committee’s deliberations and activities, and introducing candidate topical agenda components for the committee; consideration was given to the Business Practice Committee’s relationship to the other Standing Committees of the NMSC and their own likely topical agenda items. To illustrate the consequences for the Business Practice Standing Committee, a few topics associated particularly with business practice perspective, for which interest and appetite is already well established, were identified and characterized.

The nominal suite of topics expected to be considered for address within NM&SC is indicated in the figure following in which the position of the topic in relation to each of the Committee perspectives is indicated by their proximity to axes in a quad-chart.

Figure 1 – Prospective agenda topics for NM&SC standing Committees are indicated by the entries in the quad chart, where proximity of topic-titles to independent committee topical perspectives are intended to be suggestive.
Particular topics suggested for consideration by the Business Practice Standing Committee are shown in the table of Figure 2. Each of those topics was illustrated during the meeting by one of more concrete examples or suggestive images.

<table>
<thead>
<tr>
<th>AGENDA TOPICS</th>
<th>COMMENTARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model of M&amp;S Market</td>
<td>Buyers, Sellers, Products, Services comprise markets.</td>
</tr>
<tr>
<td>Application Domain Perspective</td>
<td>Market headroom and balkanized domains characterize application domain discrimination.</td>
</tr>
<tr>
<td>Regulations and Industrial Identity</td>
<td>Industrial and professional codes such as NAICS are wanted.</td>
</tr>
<tr>
<td>Enterprise Posture</td>
<td>Enterprise Concepts-of-Operations influence and are influenced by Business Practice.</td>
</tr>
<tr>
<td>Cost-Effectiveness of M&amp;S</td>
<td>Systematic ROI metrics are available to measure, and control M&amp;S economic impact.</td>
</tr>
<tr>
<td>Business Case Specification</td>
<td>A ‘business case’ is an expression of how some practice may be perceived as appropriate by the relevant stakeholders and so support their judgment to commit to the practice.</td>
</tr>
<tr>
<td>M&amp;S as a Knowledge Industry</td>
<td>M&amp;S is a knowledge industry - Information/Knowledge commerce is special</td>
</tr>
<tr>
<td>Influence Vectors</td>
<td>What might we do? Congressional Commission, etc.</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
II. Summary of Issues Discussed
Discussion by Business Practice Standing Committee attendee / participants occupied the majority of the committee meeting. Committee discussion was recorded in two complimentary forms. First, a designated amanuensis recorded individuals’ comments together with subsequent conversational exchanges and provisional resolutions. Secondly, Committee attendees were invited to complete and submit a survey form on which they were invited to register a) their interest in subject-matter topics; b) potential committee action, activities, and program plan elements, and c) and their own personal or institutional commitment to participant in pursuant NM&SC efforts.

Discussion during the Meeting was wide-ranging and constructive. All results of discussion transcription will be posted to the Business Practice Standing Committee collaborative environment workspace for reference and subsequent use in defining the Committee’s agenda, ACTION-ITEMS and Program Plan. The table that follows indicates the tenor and focus of discussion topics as recorded.

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>PROSPECTIVE ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OUTREACH</strong></td>
<td></td>
</tr>
<tr>
<td>• Financial Modeling application</td>
<td>Approach Community of Practice</td>
</tr>
<tr>
<td>• Clinger-Cohen Act leverage</td>
<td>Application to M&amp;S procurement</td>
</tr>
<tr>
<td>• Appreciation of Peculiarity of M&amp;S by CIOs</td>
<td>Industry cultivation</td>
</tr>
<tr>
<td>• M&amp;S in biomedical product lifecycle</td>
<td>Industry cultivation</td>
</tr>
<tr>
<td><strong>COLLABORATION</strong></td>
<td></td>
</tr>
<tr>
<td>• Modeling, Simulation, data differentiation</td>
<td>Coordination with Technology Committee</td>
</tr>
<tr>
<td>• Discrimination of Simulation use: analysis, training, etc.</td>
<td>Coordination with Technology Committee</td>
</tr>
<tr>
<td>• Lexical consistency</td>
<td>Coordination with Technology Committee...</td>
</tr>
<tr>
<td></td>
<td>with respect to Body of Knowledge Index</td>
</tr>
<tr>
<td><strong>MARKET CHARACTERIZATION</strong></td>
<td></td>
</tr>
<tr>
<td>• Buyer – seller perspectives</td>
<td>Market Model(s)</td>
</tr>
<tr>
<td>• Variety across market sectors</td>
<td>Market Model(s)</td>
</tr>
<tr>
<td>• Differential market maturity, entrepreneurial posture, etc.</td>
<td>Market Model(s)</td>
</tr>
<tr>
<td>• Product vs. service value offering</td>
<td>Market Model(s)</td>
</tr>
</tbody>
</table>
Survey forms were distributed during the meeting and accepted at closure of the proceedings whereby participant attendees could provide input on matters for which sufficient time was not available to be voiced during the meeting event. In many cases, topics thus identified amplified, complemented or otherwise augmented topics offered during preliminary briefings or discussed aloud during the meeting. In some cases the matters raised were original. In addition, several of the survey forms captured expressions of interest to participate in future NM&SC activities. The survey instrument employed is illustrated in Figure 4 below. Survey results are being transcribed and will, likewise, be posted to the Business Practice Standing Committee collaborative workspace.
Figure 4 – Survey form used to solicit from meeting attendees a) topics of interest, b) recommended activity and c) offers of participation in the Business Practice Standing Committee of the NM&SC.

Results of the survey are being compiled for allocation to topic identification, Action-Item specification, and programmatic planning use. Twelve responses were captured during the
meeting and the survey will continue to be used as Committee growth, evolution and socialization continues. All such input will be devolved to EITHER action-items OR THE Business Practice Committee Program Plan.

III. Findings by the Committee During the Meeting

Determinations and findings of the Committee made during the first meeting included the following:

1. Committee will pursue NAICS code approval.
2. Committee will coordinate U.S. House of Representative M&S Caucus and Office of Secretary of Defense on establishment and conduct of M&S Congressional Commission pertaining to M&S enterprise business practice.
3. Committee will analyze M&S markets to identify and advocate exemplary business practices.
4. Committee will collaborate with Technology Committee to clearly identify, discriminate and characterize M&S types, uses, and applications domains.
5. Committee will address particularly focus on government, education and healthcare application domains to see how disruptive / evolutionary business practices will admit to M&S market incursion.
6. Committee will address the apparent difficulties of articulating the value to M&S.

IV. Action Items established and timeline

Action-items are being compiled together with a time-phased schedule that will be posted to the collaborative environment, circulated to committee members and coordinated with other Committees NLT 31 March 2012.

V. Next Steps

Next steps anticipated in initializing the Committee program in concert with other committees and the N&SC master agenda include:

- Posting of committee members contact information to the collaborative environment
- After-action message to Committee members pursuant first meeting acknowledging participation and inviting their accessing the collaborative environment.
- Creation of ACTION-ITEM database table on the collaborative environment
Inaugural Congress – Proceedings
6 February 2012

- DRAFT of Business Practice Committee program plan and schedule and posting to the collaborative environment
- Completion of compilation of comments captured during first meeting and surveys received to date into Action-Item Database and or program plan

VI. Schedule of upcoming committee meetings if established
TBD.
Communication, Outreach, Public Awareness Standing Committee Report

The standing committee on Communications, Outreach, Public Awareness (COPA) met as a break-out session during the Inaugural Event of the National Modeling and Simulation Coalition (NMSC) held at the L’Enfant Plaza Hotel in Washington, DC on February 6, 2012. This meeting was the organizing event to identify interested participants and to set an agenda and actions to be accomplished by the next NMSC meeting planned for October, 2012.

Purpose of the Meeting / Activities Completed

This committee is focused on communicating a consistent, well-articulated message across all M&S disciplines and to provide outreach for the priorities established by the NMSC.

The specific purpose and activities of the Interim COPA Committee discussed during the inaugural meeting were to:

- Organize and solicit volunteer committee members from each sector/domain
- Identify the wide range of NMSC users for outreach
- Define current opportunities for outreach across NMSC sectors
- Develop an outreach strategic plan and goals for NMSC and for the COPA
- Develop specific outreach actions and implementation plans
- Create and leverage existing internet information sharing platforms where possible to get the NMSC message out. The NMSC Board, other standing committees and sponsors need to understand the overall mission and goals of the organization and work with the COPA committee to communicate on the gradually widening user base to reach the national attention that we hope to achieve. It was observed that other committees will
need to depend on COPA in order to get the message out to their particular areas of interest.

**Summary of Issues Discussed**

What are the core message, tag line, and mission statement to compel folks to join the NMSC? What is the value proposition, or stated another way, what do members and sponsors receive to make their resource investment worthwhile? The Charter is not written in stone, so we may need to change it over time. The committee agreed that we cannot sell outreach and communication for the NMSC and other committees unless we have the right **mission statement** in the Charter. Currently the Charter lacks the purpose and sizzle. Does not have the “why?” and answer the value added question of, what is in it for me as an individual or a corporation if I belong to other organizations? How do we need to craft a value proposition for other organizations first, so they can assist with the NMSC outreach?

The NMSC is missing a clear mission statement to support the value added from individual and corporate members and sponsor.

- It was observed in the COPA Committee that meeting attendance was not a representative sampling of the desired NMSC member base. This is largely because of the dominant number of event attendees from the Defense Sector. Need to see more participation beyond the DoD community as represented in the Inaugural Event.

- As a separate issue, it is difficult for Government attendees to associate with NMSC in leadership roles – due to legal conflict of interest considerations. We need industry and academic partners to help promote the NMSC outside of government. Inaugural Event attendees and speakers represent a broader cross section of M&S; however, there are only a small number of attendees here today that are faced with doing the outreach efforts for the rest of the 247 folks in attendance today.
Findings of the Committee

The NMSC does not have a clearly articulated mission statement to form the basis of the COPA Committee’s outreach effort. A tag line and marketing material should be developed to convey the value added for individual M&S practitioners, government, industry and academia to participate.

Initial activities for the committee include the recruiting of a wider base of volunteers to participate. Also need to form bridges to the NMSC leadership and other standing committees in a cross cutting manner.

Determine the value proposition(s) appropriate for NMSC and also for each unique M&S sector.

Action Items and Timeline

- Identify committee members, and confirm leadership positions with the Board. March 9, 2012.
- Appoint specific committee leadership and membership for Board approval. March 16, 2012.
- Collaborate with and receive outreach needs/inputs from other standing committees. March 27, 2012.
- Solidify the NMSC customer base and extend to the National–Level for outreach across sectors and organizations. April 13, 2012.
- Develop draft outreach strategy with goals. June 8, 2012.
- Complete final outreach strategy and implementation plan and secure funding for October NMSC Event outreach actions. August 17, 2012.
- Work with sponsoring organization(s) to increase public awareness for NMSC and the October Event. Continuous.
- Conduct standing committee meeting. October, 2012.
Next Steps

- Build roster and contact committee members for individual or corporate NMSC membership.
- Establish monthly telecom dates with agenda discussion to accomplish the update actions and timeline. (First Tuesday of each month.)
- Work with NMSC Board to identify marketing tools, literature and funding.

Schedule of Upcoming Meetings

- Outreach Committee meetings and the monthly telecom conducted the first Tuesday of each month and as needed to accomplish committee action plan.
- Face to face committee meeting will be conducted in conjunction with the October 2012 NMSC event.