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ABSTRACT: *Research and development efforts in modeling and simulation are increasingly focusing on the modeling of human societies, culture, and behavior for improved gaming experiences, analytical and decision tools, training, experimentation, and many other purposes. The rapid growth in this area is creating increasing demands for data, models, tools, and techniques. To investigate the potential need for standards or best practices in this area, the Simulation Interoperability Standards Organization (SISO) has initiated the Human Social Culture Behavior (HSCB) Modeling Standards Study Group. This paper examines the opportunity for development of standards and best practices in this domain and lays out a possible plan of action for the new Study Group.*

1. Introduction

Human Social Culture Behavior (HSCB) Modeling is a growing area of focus for the M&S community. This endeavor is addressing the challenges of modeling human behaviors and organizations from the individual level through higher social and cultural structures in a variety of contexts, including warfare, homeland defense, crisis management, economics, politics and other social dimensions. The 1998 National Research Council report stated: "The modeling of cognition and action by individuals and groups is quite possibly the most difficult task humans have yet undertaken" and "developments in this area are still in their infancy" [1]. The 2008 National Research Council report, *Behavioral Modeling and Simulation: From Individuals to Societies*, raised the ante, stating that "it has become ever more clear that human behavioral modeling at all levels is critical to DoD specifically and to the nation more generally" [2, p 20].

In preparation for the Spring 2010 Simulation Interoperability Workshop (SIW), the Simulation Interoperability Standards Organization (SISO) approved a new application forum called HSCB Modeling. This forum was created as a venue for examining models, data, and integration frameworks that can help determine requirements for standardization promoting enterprise-wide integration, execution, and validation of human social, cultural, and behavioral models. Following the successful inauguration of this forum in the SIW, organizers recognized close conceptual and contextual relationships with the Crisis Management and Societal

Security (CMSS) forum. In preparation for the Fall 2010 SIW, these two venues were combined to form a single HSCB Modeling / CMSS forum. The combined forum provides a place for theoretical and technical examination of issues relating to these topics. The group may further evolve as participants determine the direction they would like to see the forum go in upcoming SIWs.

In addition to this important merger of related topics for SIW paper presentations, the success of the newly established HSCB Modeling forum led to preparation and submission of a Terms of Reference for establishment of a new Study Group, titled "the Human Social Culture Behavior (HSCB) Modeling Standards Study Group." This paper discusses the establishment of this Study Group, setting forth a vision and possible plan of action for initiating investigations into the need for standards in this rapidly growing area of simulation concern.

2. HSCB Modeling

In [3], the author provides a brief introduction to some of the challenges of HSCB Modeling as represented in recent Defense Advanced Research Projects Agency (DARPA) and Office of Naval Research (ONR) programs. Specific areas of interest identified in one Broad Agency Announcement (BAA) include: (1) understanding human, social, cultural and behavioral influences; (2) understanding and predicting adversarial behavior; (3) computational modeling and simulation to develop reliable planning tools; (4) advanced technology

development of application of human, social, cultural and behavioral science [4]. An example of a project awarded under this program is reported in [5]. Moreover, a follow-on BAA calls for design and development of tools for HSCB data dissemination and use across the DoD user environment, visualization and related tools for translating model outputs to decision-support products, and system to assess and select socio-cultural behavior models.

HSCB Modeling is a relatively new area of focus in the SISO M&S community, primarily due to its historic roots in the Distributed Interactive Simulation (DIS) standard and military modeling and simulation. On the other hand, HSCB Modeling has been a long-standing focus in the social sciences, moreso in non-military explorations than for military purposes. A major change in participation is needed to bring these communities together. The time is ripe for SISO to lead rather than follow when it comes to advancing the state of the art of HSCB Modeling SIWs provide one place for the technical interchange needed, but it will take a concerted effort by current SISO leadership and membership to create a bridge to experts in the social sciences. One area of potential common interest across those communities is identification and development of standards.

This will not be an easy process. On the other hand, there is concern that it may be too early to identify standards, that this M&S domain is too immature for identification of standards, or that standards would constrain innovation. The best case is likely to be found in a balance between structured inquiry and freedom to innovate. SISO has accepted the challenge to step into this high energy arena now and face the difficulties of grappling with a rapidly changing field, rather than "waiting until the dust settles," with the danger of being irrelevant or behind the times when standardization is needed the most. The instrument for SISO activity addressing the need for HSCB Modeling standards is through establishment of the HSCB Modeling Standards Study Group.

3. HSCB Modeling Standards Study Group Terms of Reference

The SISO Policies & Procedures manual [7] describes the establishment of Study Groups by the Executive Committee (EXCOM) to consider specific issues and to provide recommendations concerning proposed courses of action for standards development.
> "The SISO Study Group mechanism is intended to provide a wide range of flexibility. As examples, the study groups may be formed to

define key terminology, recommend modifications to SISO processes, or generate a plan for (or an initial prototype of) a proposed SISO product." [7, p 16]

Each Study Group (SG) operates under specific Terms of Reference (TOR) that identify the issues to be considered and specific questions to be addressed. The TOR designates the SG leadership, the outputs expected, and the time schedule for generation of the outputs.

Following the Spring 2010 Simulation Interoperability Workshop (SIW), an HSCB Modeling Standards Study Group TOR was prepared and submitted for review and approval by the SISO EXCOM. The TOR identified a large number of attendees at that workshop who had indicated their interest in the establishment of this group. Minor comments were received from the review and incorporated into an update to the proposal. The proposal was approved and a kick-off meeting for the SG was scheduled for the Fall 2010 SIW.

For ease of reference, much of the SG TOR is provided below.

Title:
Simulation Interoperability Standards Organization (SISO) Terms of Reference for the SISO Study Group on: Human Social Culture Behavior (HSCB) Modeling Standards

Proponent Name(s) and Contact Information:
Organizations willing to be named as sponsors for the Study Group included: the United States Department of Defense Modeling and Simulation Coordination Office; the Virginia Modeling, Analysis, and Simulation Center; the Naval Postgraduate School Modeling, Virtual Environments, and Simulation Institute; Office of the Secretary of Defense, Office of the Director, Defense Research and Engineering; the Office of Naval Research; and the US Army Training and Doctrine Command Analysis Center, Monterey. Leaders from all these organizations are identified by name in the TOR. Numerous proponents from the SISO community at large also stepped forward during and following the Spring 2010 SIW indicating a willingness to participate in the Study Group (these were also named in the TOR but are omitted from this paper).

Rationale:
Human Social Culture Behavior (HSCB) Modeling is a growing area of focus for the M&S community at large. HSCB modeling addresses the challenges of modeling human behaviors and organizations from the individual level through higher social and cultural structures. Addressing the individual and organizational human

dimension in warfare, homeland defense, crisis management, economics, politics and other social dimensions is arguably the greatest challenge facing modeling and simulation today: "The modeling of cognition and action by individuals and groups is quite possibly the most difficult task humans have yet undertaken" [1].

An initial sponsor of the HSCB Modeling Standards Study Group is the SISO HSCB Modeling / Crisis Management and Societal Security (CMSS) Forum.

Tasks:
The following tasks will be performed:
- Bring together M&S and subject matter experts to investigate the need for standards for HSCB Modeling to promote common understanding, information sharing, model interoperability, common data formats, and other areas as determined to be important to this area of study.
- Establish a SG reflector and file sharing space to promote collaboration and communication within the group.
- Schedule and conduct regular meetings to discuss requirements for HSCB modeling standards.
- Establish tiger teams and working groups to address particular aspects of the study questions when additional detail or specialized research is needed.
- Establish recommendations for next steps for the topic within SISO.
- Provide support to other SISO SGs and PDGs potentially related to the topic (i.e., leveraging existing SISO standards, such as Base Object Model and Military Scenario Definition Language).
- Become and remain cognizant of other organizational efforts to research and address HSCB Modeling standards and practices and make every possible effort to make contact with such organizations for the purpose of expressing interest in their efforts and findings, potential collaborations, and in sharing the findings of the efforts of this study group.
- Provide to the SAC an annual report by September 2011 detailing the progress and activities from the previous year and the goals for the following year (e.g., continue the SG, transition to a Standing Study Group, transition to a Product Development Group, etc.).

Products:
The HSCB Modeling Standards SG will develop a Study Group Final Report describing research performed by the SG to determine the need for standards in this area of

M&S and recommendations for the development of any needed standards in this area.

Performance Period:
The performance period for the HSCB Modeling Standards Study Group will be one year from launch of the SG at the Fall 2010 SIW.

4. Areas of Consideration for HSCB Modeling Standards

Given the importance of this area of modeling, the number of disciplines involved, and the variety of applications, one can envision the need for standards to provide a basis for common understanding and information sharing. A conceptual foundation needs to be established that can bring the M&S and social science communities together. The outcome may be taxonomies of social science terms, modeling approaches, data sources and kinds of data, and other dimensions of the study space. Establishing common terminology will then allow possible standardization of metadata, modeling techniques and processes, data sources and data, and frameworks for integrating models and data. Existing and emerging SISO standards, in current form or through extension, may prove effective in addressing these areas of concern (e.g., see [8,9]). Early planning in the SG can address which of the above areas to investigate, depending on the interest and expertise of the SG membership.

5. Next Steps

The most significant next step will be the kick-off of the SG in the Fall 2010 SIW. Attendance and participation by SISO members and other workshop attendees will be a significant indication of the viability of this group as it begins its tenure. The basic roadmap for initial activities of the group has been described above, but will ultimately be prepared and agreed upon by the SG membership. Interested individuals are invited to participate in the SG activities. We also expect to work closely with the SISO HSCB Modeling / CMSS Forum to invite and promote speakers and papers for the Spring 2011 SIW to further articulate, promote, and report on the SG activities.

6. Summary

The SISO community has a tremendous opportunity to carefully consider the need for standards in the rapidly growing area of HSCB modeling. The launch of the new HSCB Modeling Standards Study Group is a significant way to build interest and participation in this area of work. We encourage SISO membership involvement in

the SG and invite comment and advice in moving this activity forward.

7. References

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Disclaimer

The opinions expressed in this paper are those of the author and not necessarily those of the Naval Postgraduate School or any of its sponsoring organizations.

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