MMSIC Team Completes First Ever Evaluation of Advanced Modular Manikin, Phase 1

In the spring of 2015, the TATRC’s Medical Modeling & Simulation Innovation Center (MMSIC) was assigned a new mission: to provide independent assessments and evaluations of maturing training technologies identified as critical and relevant to improvements in medical training effectiveness. These include, but are not limited to, modeling, simulation, training, performance enhancement and skills retention. The initial customer is the Joint Provisional Project Office for Medical Modeling & Simulation (JPO-MMS). Assessment and evaluation services may become available more broadly.

The first project requested for evaluation was the Advanced Modular Manikin (AMM), Phase 1 Research and Development (R&D). Perhaps you have heard about some kind of “new manikin” project, an “advanced” platform or training system so advanced that it can accommodate “both current and future peripherals”, such as a range of procedural heads, necks, arms, hands, legs, and skins, that have not even been developed yet! It’s true! That futuristic concept, the AMM, is for joint services training. The AMM is envisioned to be an agile technology platform that allows optimal configuration of almost any kind of manikin for any training purpose. The initial prototype will be a general purpose manikin. Eventual purchasers can configure future AMM manikins and devices to suit their specific needs.

The AMM was conceived in 2013 by the TATRC “Med-Sim” team and the Joint Program Committee-1 (JPC-1), Medical Training and Information Sciences. The concept was driven by training gaps, such as flexible training systems customizable to specific curricula and objectives, standardized architecture supporting plug and play of training scenarios, head-to-toe untethered training systems transportable via various military transports, capability to support hand-offs among military medical teams, and an interoperable training platform to support both combat casualty care and fixed facility training.

The AMM research vision resulted from an “opportunity-driven” R&D model. It drew on dozens of years of military and industry experience of being “close to the customer”. Customers include, but are not limited to, educators, trainers, and managers supporting Combat Casualty Care or “fixed facility” training missions. Dr. Thomas Talbot (University of Southern California, Institute for Creative Technologies), Chief Scientist for the MMSIC under contract, is recognized as the conceptual architect of the AMM. Dr. Talbot had this to say as he reminisced about the long hours of concept thinking, “the Advanced Modular Manikin is one of many groundbreaking initiatives I’ve been fortunate to be involved with at TATRC. The AMM evaluation we just completed is a fitting capstone to my seven year period at TATRC.”

The Request for Proposal (RFP) for the AMM was posted by the US Army’s Medical Research Acquisition Agency in June 2013 and identified desired capabilities. The funding source is the Defense Medical Research & Development Program, and programmatic responsibility is that of the JPC-1. In September 2014, based on the recommendation by a selection review committee of the proposals submitted, research contracts were awarded to four (4) organizations. Dr. Kevin Kunkler, Portfolio Manager for the JPC-1 Medical Simulation and Information Sciences Research Program, Medical Simulation and Training, noted “JPC-1 works diligently to address clinical and functional gaps, needs, and requirements, when identified, and to best identify technologies that may align to close identified gaps in training capabilities. We understood that the AMM is an aggressive and ambitious goal. However, we realized that such advancements were needed to address the different and severe injuries that the military healthcare providers encounter to deliver safe and high quality care under extreme conditions to the dedicated men and women in the DoD and for humanitarian care.”

Shortly after the RFP was announced, but in an unrelated action, the Director of Research and Development Policy & Oversight OSD (Health Affairs) chartered a Capabilities Based Assessment (CBA) for “Combat Casualty Care Training Technologies (C3TT)”. Two “deliverables” were released 28 May 2015: 1) draft Joint Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy Change Recommendation (DCR), and 2) draft Initial Capabilities Document (ICD).

The JPO-MMS expressed interest in the AMM as a candidate for transition into the Military Health System (MHS). Anticipating potential acquisition, COL Daniel Kral, TATRC Director, charged TATRC’s MMSIC team to accomplish three critical tasks, to: 1) conduct a Users Needs Assessment (UNA), 2) develop a Concept of Operations (CONOPS), and 3) facilitate a Scientific Evaluation of Phase I results.

The TATRC’s MMSIC planned and conducted the UNA in the spring of 2015. A 10-section, mixed methods survey instrument, based on the stated technical and functional capabilities in the AMM RFP, was designed, developed and distributed to a group of eighty-nine Subject Matter Experts (SME). The SMEs represented the active and influential Medical Modeling and Simulation (MM&S) advisory groups in the MHS, such as instruction and training, training program management, research and development, and acquisition program management. Thirty-nine were judged complete for evaluation and analysis, a 44% rate of return.

Key findings and major themes were identified, affirming the need for an AMM technology as described in the RFP. A detailed evaluation and analysis was provided in the Main Body of the UNA, which was approved on 13 August 2015. Drawing on his 20 years of experience as an educator and leader of several simulation centers, MMSIC’s Research Scientist, Mr. Geoff Miller, noted as he thought of the AMM’s potential impact: “The concept of developing a truly ‘universal, interoperable human-patient simulation platform’ has the potential to revolutionize medical modeling and simulation. Common standards, open-source architecture and a focus on interoperability will allow future innovation to be crowd-sourced, accelerating new ideas, modules, peripherals and interfaces in and far beyond the current standard, meeting the ever increasing demands of not only the MHS, but the larger medical and healthcare education, patient care, and...
To ensure end user input, the MMSIC team convened a Joint Services AMM CONOPS Workgroup, 17-18 December 2015, Fort Sam Houston, Texas. Approximately 40 SMEs participated. Mr. Miller, assisted by Ms. Rebecca Lee, project officer, employed a Nominal Group Technique, which generated, recorded, clarified, and ranked concepts identified. The MMSIC team has completed the final draft Joint Services AMM CONOPS. As of this writing, it is under review.

A formal Peer Review Scientific Evaluation of Phase I was facilitated by the MMSIC team on-site at TATRC's Prototype and Integration and Testing Laboratory (PITLAB), Fort Detrick, MD, 1-5 February 2016. The MMSIC developed the technical and educational evaluation instruments and hand-selected educational and technical evaluators, all SMEs in the field. Formal presentations and interactive live demonstrations were given by the awardees. The overwhelming response of government participants was that the AMM evaluation was successful. Formal reports were written, to assist the Government as it determines whether to invest in a Phase II effort to develop a “training prototype.”

The long-term goal is to obtain the DoD’s first-ever interoperable, standardized manikin-based training platform. Harvey Magee, MMSIC Lab Manager, noted “The AMM initiative is a monumental undertaking. Many agencies have key roles: JPC-1, the Congressionally Directed Medical Research Program, TATRC, and JPO-MMS. It is not the place of the R&D community to force technology on the users. The AMM is only a technology to deliver a capability to support the trainers. It is the DoD’s dedicated trainers, with many and varied missions at all levels of care, who conduct the training!”

On a fee-for-service basis, the TATRC MMSIC is now maturing its plan and processes to offer their assessment and evaluation services to other organizations.