

# Welcome to Sim City: Huntsville, Alabama, USA!

**T** rue or false: Huntsville, Alabama is one of the top three Modeling and Simulation (M&S) Centers in the United States. You'd better believe it. Huntsville has been doing M&S before it was even called that, back when people just said, "Hey, let's make a representation of one of those (model) and then show how it works over time (simulation)."

M&S technology has continued to become more mature and robust, especially with the enormous advances in computer power over the last few decades. We now have the ability to create a virtual representation of anything we might want or need before we actually build it. The implications for technology development are enormous, not the least of which is the ability to reduce overall development costs and trouble shoot engineering problems before ever bending metal to build the real article.

So, who is our company in the elite field of M&S? The simple answer is Florida and Virginia. More precisely, Orlando/Central Florida and the Norfolk/Hampton Roads-area. Each hub has its own core competency in M&S that corresponds to a main application. Orlando/Central Florida excels at virtual simulation (real person in a virtual environment) and the main application of this type of simulation is training. The Norfolk/Hampton Roads, Virginia area leads in constructive simulation (computer-based simulation where the user is an observer, not part of the simulation) which is primarily used in analytical applications such as computer 'war games'. Huntsville's forte, as you might expect, is in physics-based simulations that are used for a wide variety of engineering applications.

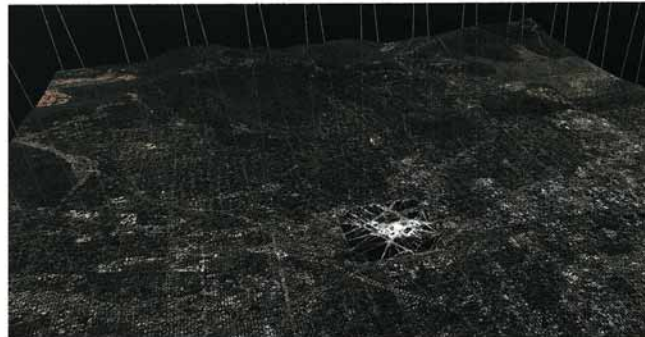
Dr. Mikel Petty, Director of UAHuntsville's Center for Modeling, Simulation and Analysis (CMSA), is uniquely qualified to comment on how Huntsville stacks up against the competition. Before coming to Huntsville, Petty was Chief Scientist at Old Dominion University's Virginia Modeling Analysis and Simulation Center (VMAS) and before that he was the Assistant Director of the Institute for Simulation and Training (IST) at the University of Central Florida.

"I started to become aware of Huntsville's M&S competencies more and more during the time I was at VMAS, but one thing Huntsville did not have was a university research center that would complement its concentration of government and commercial organizations that are doing M&S. Now we have another important piece that complements the diverse government and com-

mercial M&S capabilities in Huntsville," Petty said.

Petty started the Center in June 2006 with a staff of two – he and one other. By the end of 2007, the CMSA had 25 people on board, including nine full time researchers and a growing number of students also working on real (paid) research. The students at the center are not just paid for their work with the opportunity to work on cutting edge research, they also get free tuition plus a stipend. And, Petty said, the prospects are good for continued expansion in this year as well. The center is occupying additional space on campus and, as new research contracts roll in, the head count is going up, too.

Outside of UAH, the continued growth in the M&S industry led to the creation of the Alabama Modeling and Simulation





Huntsville/Madison County is quickly becoming one of the premier modeling and simulation centers in the United States. Whether it involves simulating missile guidance systems or city planning, modeling and simulation specialists in this community have the ability to create a virtual representation of anything for any application or situation, giving users the ability to predict outcomes and troubleshoot problems before they begin. In the simulations above, engineers with AEGIS Technologies created various simulations of Huntsville for mapping purposes.

Council (AMSC) to better organize and promote the industry locally, regionally and nationally.

In fact, the AMSC will celebrate its fifth anniversary this year and the organization is still charting its course towards a more collaborative, more visible and more organized M&S community in Alabama. Slightly older than the CMSA at UAH, AMSC provides another necessary, complimentary function to the Alabama M&S community which is primarily concentrated in Huntsville. In fact, all but two companies on the list of AMSC Corporate Members are Huntsville companies. In its most recent M&S industry survey, AMSC found that there are 80 companies and more than 6,000 individuals for whom M&S revenue was significant in the private sector. This does not include government or academia – although the Federal Government, through Army and NASA, has their own modeling and simulation capabilities as well.

Between 1995 and 2005, growth in the local M&S industry was relatively constant and accumulated to 60 percent. Bill Waite, president of AMSC and also president of Huntsville-based AEGIS Technologies, has witnessed this growth in Alabama and can further testify to Huntsville's central role.

"In this community there is more expertise, more kinds of skills and more people with these skills than any other city in the country. Huntsville is absolutely unique in its technical capacity in modeling and simulation," Waite said.

The M&S industry has developed over the last 15 to 20 years and it is starting to get more recognition thanks to organizations like AMSC. AMSC was formed to not only bring greater recognition to Alabama's significant and maturing M&S capabilities, but also to have practitioners in the field recognized as professionals with access to professional development and certification opportunities. To further its mission and the industry as a whole, AMSC is actively

involved with the National Training and Simulation Association and the Congressional Modeling and Simulation Caucus.

For the past three years, AMSC has participated in M&S Leadership Summit to discuss public policy relating to M&S. House Resolution 487, a direct result of the Summit, aims to have M&S recognized as a National Critical Technology as defined in the 1990 Defense Authorization Act. In other words, there is a growing core of government, industry and academic leaders who believe that M&S is one of the key technologies that must be developed to ensure the long-term national security and economic prosperity of the United States.

House Resolution 487 extols the virtues of the virtual. Among the many reasons given for recognizing M&S as a critical technology, there are many eye-grabbers. For example, M&S helps to preserve human life through repeatedly rehearsing simulated emergencies that otherwise could not have been practiced, including response to natural or man-made disasters, that enable more effective emergency response through the coordinated efforts of local, state and federal first responders, as well as law enforcement and other relevant agencies. Point in case, when the Super Bowl was held in Phoenix, Ariz. this year, the city was ready for any contingencies that might have arisen, thanks to M&S services provided by AEGIS Technologies.

"They wanted us to help them go through it in their heads before they might have to go through it on the streets," says Waite of the recent assistance his company gave to enhance Super Bowl security. Similarly, AEGIS and other companies in Huntsville, big and small, including The Boeing Company, SAIC, Teledyne Brown Engineering, S3, Camber, CFD Research, CAS, DESE Research, Dynetics, Raytheon, Northrop Grumman, Torch Technologies and Digital Fusion, to name a few, are assisting government and commercial customers to do such various

things as develop, engineer and test missile, space and unmanned aerial vehicle systems, improve and secure infrastructure and transportation systems, improve the quality of healthcare, as well as forecast weather and predict climate change, among many other noble pursuits.

Not surprisingly, however, aerospace and defense technology development accounts for the largest part of M&S technology utilization and development in Huntsville. Indeed, the co-location of numerous government customers located on Redstone Arsenal helps fuel the growth trajectory of the M&S industry in Huntsville and helps to distinguish the community from competition.



"Virginia and Florida are big players when it comes to training applications of M&S. However, demand for M&S capability to support defense materiel acquisition, for example through analysis, engineering and test and evaluation, is the key factor driving growth of the M&S industry in Huntsville," Waite explained.

The bottom line is that Huntsville is helping the nation's bottom line. And its companies are using M&S to create engineering designs that support the total life-cycle of a host of products that are of critical national importance and reduce the overall cost of development of those products. Now that's something to brag on.

• Ethan Hadley