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Modeling, GEOINT Converge

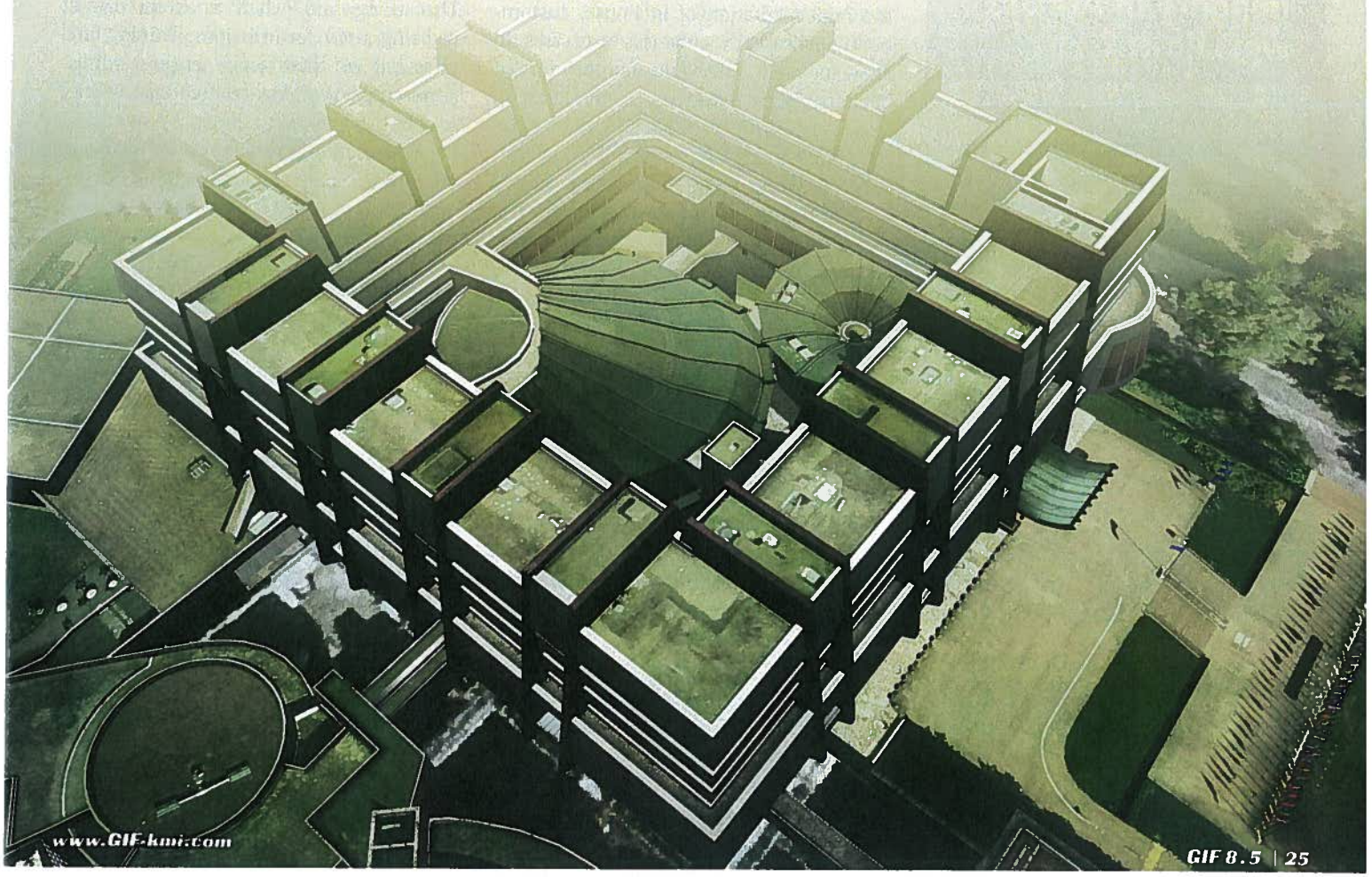
VIRTUAL ENVIRONMENTS PROVIDE A SAFE AND SECURE SETTING FOR THREAT ANALYSIS, REHEARSAL AND AFTER ACTION REVIEW FOR ALL MISSION TYPES.

BY SCOTT ALLMAN

Imagine the possibilities if you could visualize your destination, down to a bench on a street corner, before you go there. That's precisely what a group of geospatial modelers from Huntsville, Ala., did—visit Strasbourg, France, without ever going there.

While 3-D technology has certainly progressed within the past few years, the new forefront is higher fidelity at the ground level, using photorealistic textures that provide not just something beautiful to look at, but also higher accuracy that can be utilized when not connected to the Internet/intranet—accuracy that's portable. Enter the world of modeling and simulation.

When the M & S industry converges with the world of geospatial intelligence, the seemingly slow 3-D renderings and worlds of the past take on new life when they're given the ability to run in real time on common PC platforms that require no bandwidth over the Internet and can run compressed and resident databases on a standard laptop.



These virtual environments provide a safe and secure setting for threat analysis, rehearsal and after action review for all mission types.

A single, seamless, environment rapidly provides first-person views of any area of interest. This allows the analyst to view the battlefield, plan disaster response protocols, and run action-driven scenarios for embassies, public events, intelligence operations and commercial developments.

Obvious benefits are rapid analysis and a greater situational awareness in a more intuitive interface than a 2-D map or electronic map display. 3-D analysis such as line-of-sight, fields of view, distance measurements, the ability to send and share geomarkers, and simulated sensor views provide a unique perspective and chance to collaborate that no other "flat map" can provide.

How are these ultra-high fidelity cities made? In the case of Strasbourg, the ninth-largest city in France, there was no obtainable data, so everything had to be created from scratch. One of the benefits of creating a geospecific virtual city is that the byproduct of the processes involved is new updated GIS data. AEgis Technologies has a streamlined and optimized set of processes for the development and viewing of complete virtual environments.

The ultra-high fidelity model of Strasbourg, France, had to be constructed from scratch. [Image courtesy of AEgis Technologies]

COTS Toolsets

Use of COTS toolsets for repeatable and nonproprietary processes, combined with the implementation of in house, custom-built applications, enhances processes to allow for rapid, extensible and open format datasets. AEgis makes use of the latest in unclassified imagery sources, rapid terrain development and GIS toolsets.

Data extracted, via imagery, utilizes one swath of imagery that has low nadir, and several swaths of imagery that are high off nadir—typically, an off-nadir variable that is over 14. Header data from the imagery is imported for shot location, and pixel variables are defined across building rooftops to define aerial shape features. With this data combined, building heights are derived. Building height accuracy is entirely based upon image pixel accuracy, projection and use of ground controls.

Also during this process, two to 24 sets of non-orthorectified, off-nadir imagery can be imported to virtually "paint" textures across building sides. While this is becoming somewhat commonplace within the visual simulation world today, there are several downsides to this process. Primarily, this depends on imagery resolution. The higher the resolution of the imagery, the more representative this process becomes.

Coming from the visual simulati industry, the term "representative" not used lightly. That term is imperati because it is vital for its very nature— terms of how it scales into reality and acc racy. When oblique textures are placed on the sides of buildings, there is always a hi degree of inaccuracy.

With stretched textures, especially tall cultural features towards the base, ar moving upwards, missing sections may l present due to line of sight obstruction That being said, when a virtual datas is being used for mission planning ar rehearsal or Intelligence purposes, mi represented or undocumented inaccuraci may be detrimental to the final usage.

The solution is to combine off-nadir ae ial with ground photography obtained v open sources, video technology, GPS can eras or even non-geotagged photograph sources. Blending these two methoc together is vital when creating a seamles virtual environment.

So whether you're "flying" 500 mete above the city, or walking down the street reading the sign of a coffee shop, if yo correctly represent "real" data in a virtu world, you believe you're there. ★

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security enterprise made up of not only national players, but also this whole network of state and local fusion centers, which then reach out and have their own networks with local law enforcement, public health and other communities. That will be critical to us not just in the counterterrorism arena, but in all kinds of preparedness and response scenarios. We need the fusion centers to have situational awareness, domain awareness of what's going on in their areas, and share that with us, so that we can operate as a team. I think we're growing that capability and it's working very well.

I want to make clear, however, that the state and local fusion centers belong to the state and local governments, so it is not for me to mandate how they should operate and exactly what they should do, except in as much as we share with them collegial desires and goals on what capabilities they should all have, and help them get there. They're all a little bit different, because they are set up by their respective governments. Some of them are focused only on counterterrorism, and some are focused on what we call 'all crimes all hazards.' They're all unique, and we're trying to establish relationships and bring everyone up to a baseline level. We're guided by a document that was put out by the program manager for the information sharing environment, which was established by the White House to address information sharing across the government in the wake of 9/11. The baseline capabilities document lays out the minimal capabilities we think everyone should have. But it's a suggestion, and our job is to work with them to achieve those mutual goals.

Secretary Napolitano has said that she wants the fusion centers to be 'centers of analytic excellence,' and for them to grow to the point that they can add value to the information they hold and then share that with the network and everyone else. We're working toward that as well. We provide a lot of training to the fusion centers, because that's one area in which we can really help. We train them in analysis, reporting and protecting the civil rights and liberties of Americans, to make sure that everything that is done at the fusion centers is in accordance with the law, and that everyone understands how to protect constitutionally protected activities. We take that very seriously, and that's one of the main services that we can provide.

Q: Especially since the Christmas Day 2009 attempted airline attack, there has been a lot of talk about "connecting the dots." What is your overall approach to this goal, and what roles do you see for both technology and policy/culture/organization?

A: First, I will say that I don't know anyone in the intelligence community who doesn't hate the phrase 'connecting the dots.' It's well-meaning, and it has become shorthand for something that we all understand, so I don't expect that people will stop using it. But many of us think that it trivializes the problem that we're facing. I think that the challenges are technology,