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What's Up MÄK

Developing Air Traffic Policy

Policymakers scramble to catch up with an industry that is growing rapidly.

UAS in Emergency Response

First responders begin to take advantage of UAS Technology.

NewsMÄKers

Check out what made ITEC 2016 great and catch up with Steve Peart in South Korea.

MÄKer Spotlight: Doug Reece in the Community

See how Doug dedicates his free time to serve his community.



Developing Air Traffic Policy in a World Populated by UAS

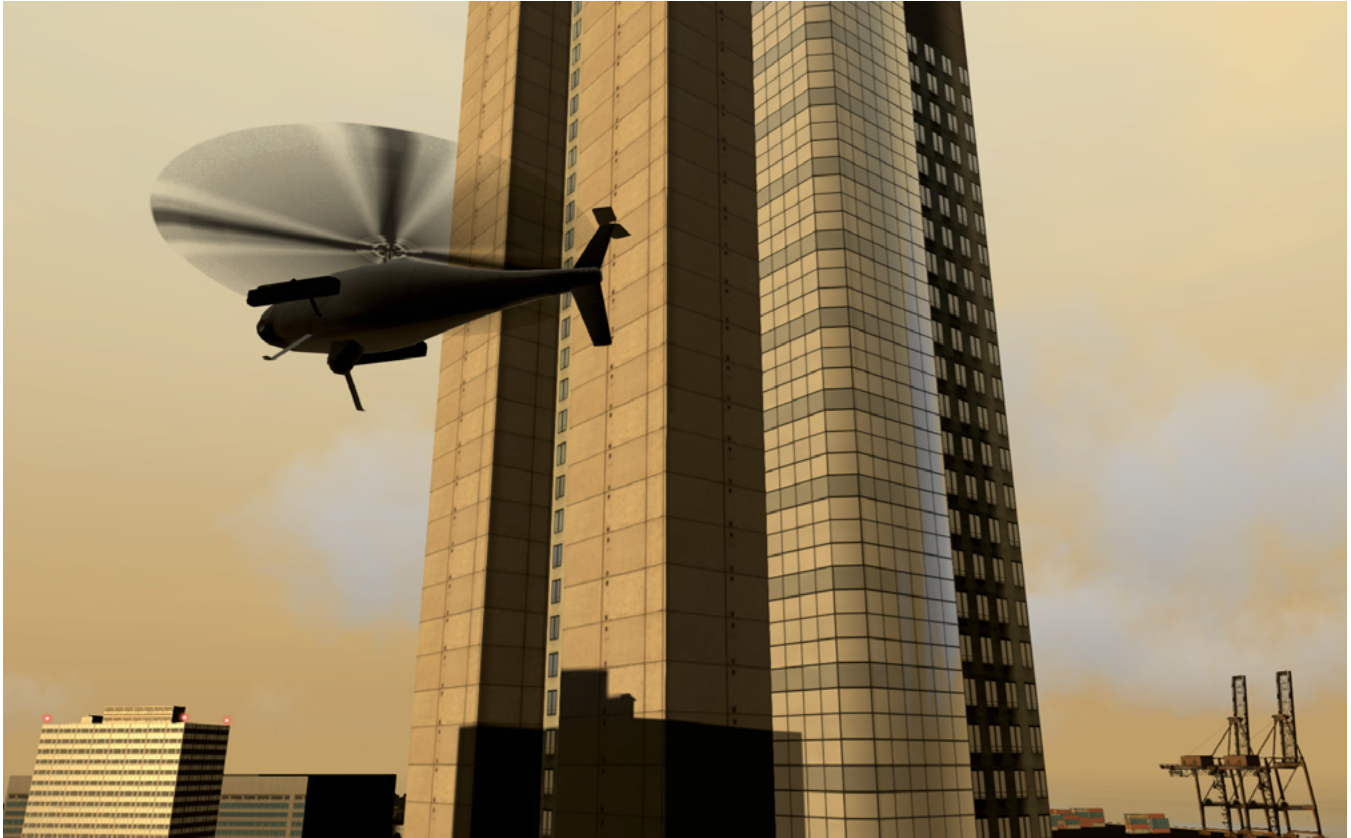
With UAS becoming more prevalent, policymakers scramble to catch up with an industry that is growing rapidly

Unless you've been living under a rock, the amount of attention being paid to Unmanned Aircraft Systems (UAS) these days has probably caught your eye. From militaries around the world using "drones" to take out terrorists, to Amazon testing UAS for commercial package delivery services, to hobbyists flying small quad-copters to take wedding pictures, unmanned vehicles seem to have unlimited uses.

The push to develop UAS technologies is in full swing. System integrators are seeking ways to convert high endurance systems developed for the military into systems for surveillance and inspection of domestic infrastructure such as pipelines and railroad lines. Companies are popping up all over the place with new systems for: bridge, cell tower, and wind turbine inspection; wedding and real estate photography; precision agriculture; and so much more. Small UAS systems are getting less expensive all the time and becoming ever more accessible. In the US, demand is pent up and waiting for the Federal Aviation Administration (FAA) rule Part 107 to open the skies to commercial applications of small UAS.



Managing the expected traffic in the skies, particularly over urban areas, is a daunting problem that is being looked at by all the stakeholders. NASA and the FAA are working on rules defining operational limitations, operator certification, and aircraft requirements. Commercial industry groups are developing credentialing programs to head off the onerous rule makers. Manufacturers and government are both working on detect and avoid algorithms. Academic and federally funded research organizations are studying the issues of traffic, engineering, and policy.



All available techniques are being deployed to address these issues, from powerpoint engineering, to modeling and simulation, to live flight testing, even including observing the behavior of the hobbyists and illegal activity by people who won't wait for the rules to settle.

At MÄK we see an increasing recognition of the need for modeling and simulation as a safe and effective way to test out the feasibility of different policies, procedures, and tactics before putting them into practice. Modeling and Simulation represents a sandbox within which experimentation and testing can take place for a nominal cost compared with live testing, or trial and error.

Developers and researchers look for a toolset capable of modeling urban and rural environments and simulating the behavior of civilian populations as well as the air traffic,

including commercial aviation and hobbyists. There needs to be the ability to model rogue actors both benign (hobbyists) and malignant (terrorists). Policymakers want to be able to visualize air space corridors, traffic flows and the weather while modeling aircraft algorithms and behaviors to study strategies for general and specific situations.

MÄK's **VR-Forces** provides exactly what they're looking for - a scalable simulation engine capable of populating an environment with air and ground traffic, as well as infrastructure (lights, etc) specific to traffic systems. There is plenty of out-of-the-box content of all shapes and sizes, from small UAS up to 747s in the air, and everything from human characters and bicyclists to fire trucks on the ground. If an out-of-the-box model needs to be modified to match local specifications, or if an agency wants to create their own from scratch, MÄK's easy-to-configure interface and open API allows for full customization of entity appearance, performance, and behavior.



VR-Forces depicts volumetric airspace regulations, giving analysts a three-dimensional perspective of air corridors and restricted spaces both predefined and dynamically created to address circumstances. Crucially, the simulation is flexible so that users can model airspace restrictions and assign behavioral impacts to the air and ground traffic accordingly. For example, response to an auto accident could be planned out to trigger policies on how the aircraft are restricted up to a defined height to provide space for UAS emergency response vehicles. Reactive tasks can be designed to redirect UAS traffic to avoid the restricted areas. At the same time, traffic on the ground within a particular radius may be setup to reduce speed to make way for first responders to access the scene more readily.

DI-Guy human character simulation can be used to add realistic people to simulations to provide subjects for surveillance operations or just to fill the environment with life.

[VR-TheWorld](#) allows organizations to develop virtual environments and share them with all participating constituents, simplifying and reducing the barrier to entry into large multi-player simulations.

With this set of tools, MÄK gives policy-makers, manufacturers and researchers a chance to catch up with an industry that has gotten way out in front of regulation. By enabling testing of likely scenarios in virtual replicas of the actual cities, we believe that VR-Forces and VR-TheWorld can help policymakers and industry shape our world into a more capable, innovative, and safe place.

Want to learn more? Have a look at the [VR-Vantage page](#), [DI-Guy page](#), or the [VR-TheWorld page](#) for more information. Are you interested in [seeing a demonstration](#)?

UAS in Emergency Response

As UAS technologies emerge, their advantages are becoming apparent to first responders. UAS are ideal for improving situational awareness because of their capability for achieving superior viewing angles. But much still needs to be learned about how to best deploy the UAS within the response team and how to coordinate operations in hectic and dangerous environments.

Tactical command centers are also finding value in UAS as a remote intelligence, surveillance and reconnaissance asset. Having “eyes on the scene” can play a significant role particularly in rapidly-shifting scenarios where one straight-forward incident, such as a building fire, turns into a more complicated incident, such as a chemical spill or a civilian panic. Training is required to effectively add the UAS into cross-organizational response teams.

The Challenge:

First responders and command center staff have limited time for training. Both need to maximize the learning from specialized training events that occur infrequently and to increase the frequency of training. Simulation offers opportunities to add complexity to training scenarios by modeling situations that are too dangerous to set up safely or would otherwise require too many role players to make the situation realistic. Simulation also provides the opportunity to reduce the size of a training exercise by using artificial intelligence (AI) to play out most of the action, thus increasing the possibility of conducting more frequent training events.

The MÄK Solution:

VT MÄK offers commercial-off-the-shelf (COTS) modeling and simulation software to develop UAS trainers for emergency response, backed by a company focused on customer support with an “engineer down the hall” philosophy.

VR-Forces provides a simulation engine that can add UAS operations into emergency response scenarios. Training can take place inside simulated obstacle courses to teach close-range maneuvering or inside of full-scale simulation to experience planning and movement through an obstacle rich urban environments.



VR-Forces brings to life real scenarios, including fire emergencies, police activity, rescue operations, and natural disasters. Specific training can be constructed to deal with special events, including parades or VIP visits. The possibilities are endless, and VR-Forces makes it simple to construct scenarios full of people, vehicular traffic, and importantly for UAS operations, air traffic from both commercial aviation and hobbyists.

VR-Vantage and **SensorFX** provide simulation of UAS sensor payloads providing video feeds of the simulated environment from the perspective of the UAS. Trainees can learn tactics for maneuvering to optimal positions to observe an event and look for particular cues, such as using infrared sensors when analyzing a burning building or seeking out traversable access points.



[VR-TheWorld](#) provides base data and a tool for collecting geographic terrain data, which is then served to the training simulators. With VR-TheWorld, trainees can familiarize themselves with the airspace above, and practice on, a virtual environment of their own city.

Learn more about how customers are using MÄK's simulation products for UAS operator training. Check out our [UAV training](#) use case, as well as the products featured in this story: [VR-Forces](#), [VR-Vantage](#), [SensorFX](#), and [VR-TheWorld](#).

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On the 23rd of May, KCEi hosted a seminar attended by over 60 Aerospace and Defense systems integrators in South Korea. The seminar included a presentations by MÄKers Steve Peart and Bob Holcomb, Principle Engineer. [Get more information about the seminar.](#)

ITEC 2016 went very well, and we were excited to meet many of our customers at the show. MÄKer Felix Rodriguez [gives a full report](#) on what we saw, what we learned, and how MÄK customers will benefit.

We'll be exhibiting at several shows in June. Come see what what we're bringing and who to look for at the [Conference On Simulation and Military Technology 2016](#), and [TSIS 2016](#)!

MÄKer Spotlight: Doug Reece, Community Superhero

Doug Reece, Principal Software Engineer at MÄK, is a tremendous credit to his community in Orlando. He works on Habitat for Humanity projects through his church, which participates in building about a house a year. On these projects, he gets involved in light carpentry, painting, and moving dirt. A few years ago, Doug traveled to D'Iberville, MS, to build a new house for a resident whose home was destroyed by hurricane Katrina. He assisted in wiring the home with power and phone service.

Doug has also helped in his church's work with Family Promise of Greater Orlando. Family Promise provides temporary housing for families that find themselves without homes for various reasons, and need a few months of social service support to get back on their feet.

The Boy Scouts also benefit from Doug, who has been a scoutmaster or assistant scoutmaster with troop 613 in Orlando for 14 years. He teaches merit badges and helps out with camping and instruction in the troop, and teaches scoutmaster training courses for the local district. Last year, he took a group of scouts backpacking on the Appalachian Trail. He is planning another trip this year, and it looks like it will become an annual tradition! He also went with his son's troop as an adult leader on their backpacking trip in the Sierras in California, where they hiked part of the John Muir Trail.



We hope we've piqued your interest in getting to know the MÄK team! Stay tuned to our [blog](#) and [Twitter](#) to get the latest on MÄK happenings!