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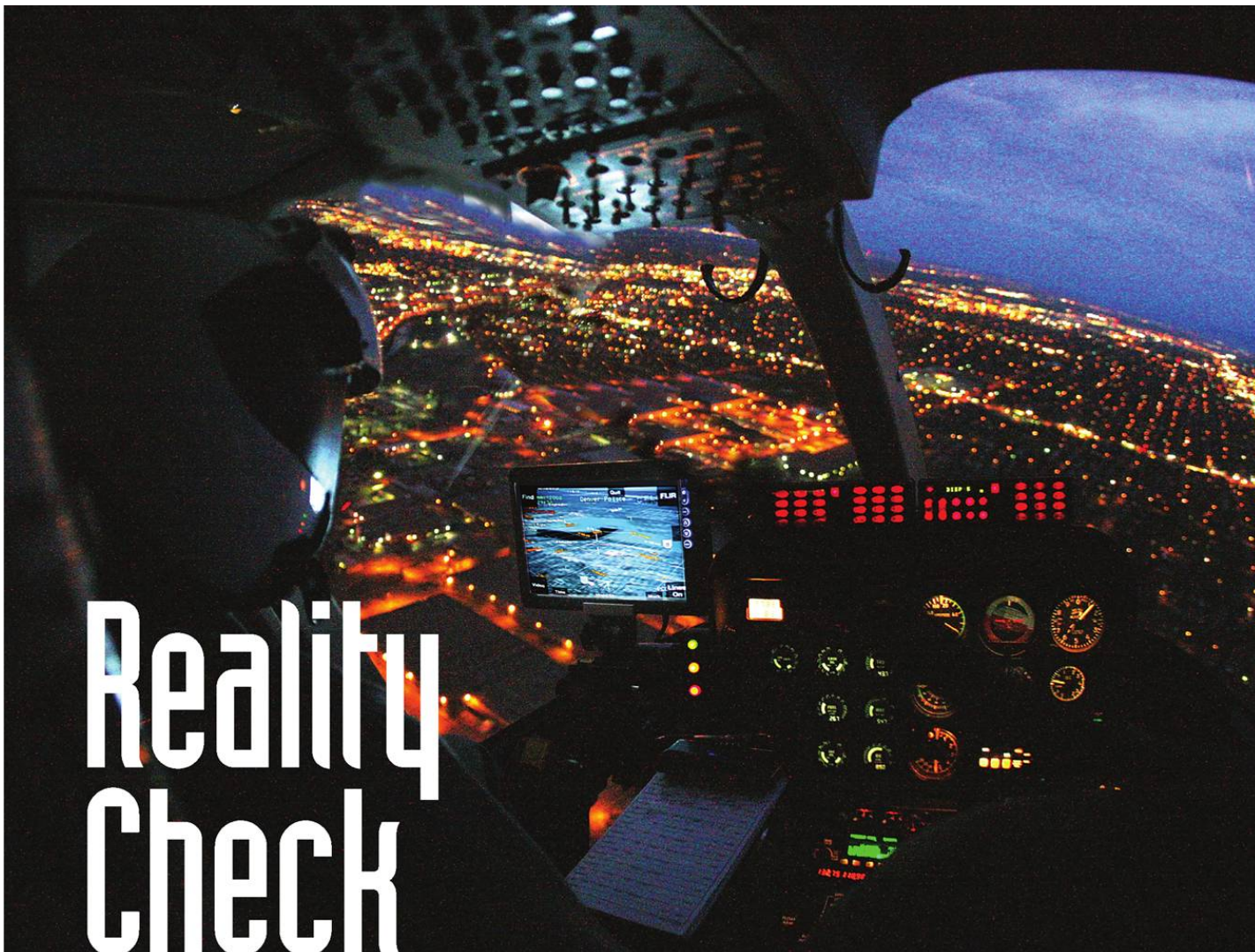
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Reality Check

THE PARAVION AUGMENTED REALITY SYSTEM COMBINES MOVING MAP AND LIVE FEEDS TO REDUCE WORKLOAD, HASSLE AND ERRORS IN IDENTIFYING EXACT LOCATIONS OF THE LIVE IMAGERY.

Story by Jen Boyer | Photos by Glenn Grossman

ARS is a next-generation mapping system designed specifically for law enforcement needs. It marries GPS-linked moving-map technology with live video feed.

Imagine a high-stakes pursuit on a moonless night. The 911 call reports a suspect shot a victim and is on the loose in an urban neighborhood. The helicopter, already in the air, is the first on scene. You are the observer, juggling between the moving map and forward-looking infrared (FLIR) image to direct the pilot to the right block, when, suddenly, the live video screen shows the infrared image of a man jumping over a fence and into bushes behind a house.

You won't take your eyes off the house where you saw the suspect ducking into the bushes, for fear of losing him. And, you didn't have time to identify the street before the suspect was spotted. You zoom out and ask the pilot for help. The pilot looks to where you point on the screen, glances at the map, then looks outside to see if the street block can be identified. Meanwhile, ground units are on

scene asking where you and the pilot saw the suspect...

For years, airborne law enforcement teams juggled video screens and maps as they followed the action below. For some, this meant looking between two video screens, one with moving-map technology and one with the live image, or even screen-in-screen video on one monitor. For others, there was only the live image and a trusty map book. Either way, it was an increased workload that affected the whole onboard crew.

Now, there is a better, and arguably safer, way.

A NEW VISION

Earlier this year, brand new technology came on the market that does away with the multi-tasking by marrying GPS-linked moving-map technology with live video feed



from the helicopter's camera, and sends it all to one touch-screen monitor. The result is a menu of viewing options that never again leaves a law enforcement observer questioning a street name, structure's address or even what is located in a dark patch. And, it allows the pilot's attention to remain on flying the aircraft.

Developed by Paravion Technology Inc. of Ft. Collins, Colo., and Churchill Navigation of Boulder, Colo., the new Augmented Reality System (ARS) Next-Generation Mapping System is packed with options designed in direct response to law enforcement needs.

The ARS has three main viewing options. The first is the regular video image as viewed from the helicopter's camera. The second is that video image overlaid with vector, parcel and geographical information system (GIS) data — street names, addresses and even landmarks are identified. The third is an option to switch to an orthoview, which provides satellite imagery with all vector data slaved to the live video. This latter feature greatly aids in identifying terrain during night flying.

With these three options, the system can offer a number of valuable features, including directing the camera to zoom into a specific address, identifying the address of a parcel with the touch of the screen on the image, and providing distance and bearing information to a parcel.

"It's custom-made for law enforcement," said detective Jay Castrodale, chief pilot and maintenance officer for the Denver Police Department (DPD) air support unit. Paravion approached the DPD in mid-2005 with the request to test and improve the ARS prototype with Denver's operations. As a part of the work, Castrodale's team made suggestions for improvements and features, all of which were granted. "It's like having a third person in the aircraft," remarked Castrodale. "We have less than half the workload now and we're responding to the needs of the ground units faster, with more detailed information than ever before. They can't believe how quickly we give them what they need now."

According to Paravion, this is only the beginning. The latest upgrade included downlink capabilities, to feed exactly what the ARS screen shows in the

helicopter to the ground units, including mobile command posts, department intranet servers and even the multi-agency command center. This creates a very valuable tool in times of emergencies.

CREATING THE FUTURE

Paravion is no stranger to moving map technology or law enforcement. It installed moving map systems for years, and, after several conversations with customers, the company realized it was high time for a better product.

"There had to be a better way than dual screens, or screen-in-screen map and video image views, and we knew just who might be able to design such a product," said Scott Holst, sales and marketing director for Paravion. The company teamed up with Churchill, which had already developed a ground-based system that used synthetic as well as stored satellite imagery for mapping. "These guys have been around since before Silicone Valley was on the map," said Holst. "They really know their stuff and we knew they'd

LEFT The synthetic view is calibrated to the camera view to show the parcel of land (highlighted) and the address of that parcel in the upper left corner in red. Additional target information is also shown in the upper left with the closest street to the crosshairs in white along the bottom.

ABOVE The Diamond Back touchscreen monitor is seen with street, address, parcel and additional information shown over a live video image.

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Paravion has been working closely with Denver PD's air support unit, which flies a single Bell 407, to help develop the ARS.

have the know-how to put all the elements together."

The result of this teaming was ARS. The system consists of a touch screen monitor, inertial measurement unit (IMU) and military grade computer. In all, it's less than 23 pounds of equipment. Currently, ARS is available to work with FLIR Systems' Ultra 8000 series, and the L-3 Wescam MX-15 or gimbal with onboard IMU. Additionally, it can be calibrated to most any camera system.

The price tag starts at \$110,000 US for the FLIR Systems version and \$85,000 for the Wescam version (since it has the IMU already built-in). For either price, the ARS comes

with all vector data (streets and borders) for the entire United States, for U.S. customers; or large sections of Canada, for Canadian customers; as opposed to the limited cities and counties typically sold with moving map technology. Local parcel and GIS data are also loaded from the customer's database free of charge. The price also includes high-level support from Paravion, including a site visit after installation to ensure all local parcel information is installed and the vector data is calibrated with the live image.

For all its participation and willingness to fly with interested parties wanting to see the ARS in action, the DPD recently received a fully functional version of the system, which it uses every day. DPD has also gotten the system approved by various U.S. federal agencies, to fly the ARS in preparation for its use during the Democratic national convention this year.

The DPD has taken many prospective customers around the patch to test the new technology. And, already, many agencies have written the system into their budgets, while a handful of others, local and federal, are seriously considering this valuable new product.

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