Pilots no longer have to wing it

Oxnard company's video system helps pinpoint locations from the air

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April 9, 2006

A small Oxnard company has fine-tuned a mapping program that helps pilots pinpoint locations, much like car navigation systems guide drivers.

AeroComputers Inc. has been creating devices since 1993 that map the ground below a pilot, with information such as street names or topography flashing on a video screen in the cockpit.

Law enforcement, public safety, military and other pilots — some flying airplanes, but mostly helicopters — use the maps for tasks such as patrols, car chases, search and rescue and fire mapping.

AeroComputers President and founder Mark Gassaway has one installed in his Cessna 185 Skywagon II, which shares the hangar that houses the company headquarters at Oxnard Airport.

The Cessna is equipped with a gimble camera — a black sphere that hangs off the side and can be rotated in various directions from a joystick inside the cockpit.

Near the pilot's seat is a screen for viewing video from the camera and information from maps from AeroComputers' main product, the UltiChart 5000.

Hanging over the Skywagon is another plane, about the size of the small Cessna, that Gassaway built when he was in his teens.

His love of flying is one reason the Oxnard company exists today. The company supports his flying habit and provides a product pilots need.

Programmers put complex data and maps into software that is installed in black boxes -— about the size of a loaf of bread — that are assembled on site. The boxes house the UltiCharts, which are used in helicopters and airplanes to help pilots track where they are on a map.

Before the UltiChart, pilots used Thomas Guides, small tabloid books full of maps.

"Those are still out there. We have those as a default in every helicopter," said Sgt. Tim Hagel of the Ventura County Sheriff's Department.

But it's difficult to make sense of a Thomas Guide map when flying above the streets, particularly at night, he said.

"You're trying to find a location, spinning that map 360 degrees," Hagel said.

With the UltiChart, a flick of a switch shows the helicopter's location on a map, with the ability to pinpoint a location on the video screen, including street names.

Being able to type in an address and get directions on how to fly there, instead of looking it up in a map book, makes a big difference, said Santa Barbara County Sheriff's Department Crew Chief Jon Simon.

"It's easier as you're flying to look at a map that moves on the screen than looking at a paper chart," he said.

Gassaway said there is "a lot of math" built into the system. The same is true for the program that identifies the location of something a pilot is tracking via camera, such as a suspect's vehicle.

'Smart' equipment

"We make very sophisticated equipment smart," Gassaway said. "We're taking technology and making it useful for a very difficult environment."

Commands are executed with a single

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keystroke on a small keyboard. The maps are designed to be easy to read and interpret.

If it wasn't easy to use, people would go back to their map books, Gassaway said.

After all, law enforcement officers pursuing a vehicle or firefighters circling a wildfire have other things on their mind than how to use the system.

"The essence of what we're doing is making all this information accessible to our customer base, which has another job to do," said Bruce Schubert, software development director.

Schubert joined AeroComputers about seven years ago. An experienced fire mapper and programmer, he started doing contract work for the company and then became a full-time employee.

He liked that the UltiChart was a special application for public safety.

Gassaway remembers showing the first system to the Los Angeles County Sheriff's Department.

The sheriff was impressed by the potential, but there were plenty of things that needed to change.

"We spent a year and a half flying in the back of their MD500 helicopter learning why what we had wouldn't work and how to make it work," Gassaway said.

Upgraded three times

The department bought the very first UltiChart and has upgraded the fleet three times with newer versions, Gassaway said.

The units aren't cheap. An UltiChart runs from the mid-$30,000s to $60,000, depending on the data. The cost reflects the effort that goes into each box.

AeroComputers brought in close to $2.5 million last year.

Putting the mapping data, even parcel data, into the UltiCharts is a painstaking process that means each box is customized to the organization using it.

The company needs to create maps for new customers. The programming doesn't end, either. Common changes such as a new housing development or intersection mean the mapping systems have to be updated.

"That's where the opportunity and anxiety comes from," Gassaway said. "It is a customized system. That's a benefit for us, because it's a niche market. At the same time, it's a lot of work."

Gassaway said there has been competition, but it's a difficult field for competitors.

"It's easy to move in and do something new and innovative," he said. "It's hard to keep it going."

Hagel said AeroComputers' products are made to interface with the computer systems in helicopters and airplanes, giving the company an edge.

"It's the lead, it really is," he said. "It sets the bar."

The Ventura County Sheriff's Department has used AeroComputers' product for the past 10 years. The department sold its patrol helicopter, but plans to install the UltiChart in its rescue helicopter, Hagel said.

Aids in firefighting

One benefit of the device is that it can be installed in a helicopter in about 15 minutes, he said. The department installs it in a firefighting helicopter during the fire season. Using software in the UltiChart, a pilot can fly the perimeter of a wildfire, land at an emergency camp and hand over information to make maps of the burn zone.

Departments also use AeroComputers' topographical maps, which are particularly helpful for search and rescue missions.

"The amount of maps in that one computer system would fill an entire room stacked 6 feet tall of topo maps," Hagel said.

Simon, the Santa Barbara crew chief, said the maps are helpful when flying search and rescue in the backcountry because they show the trails and canyons.

Street maps also are helpful in unfamiliar areas.

"We're the only law enforcement air unit

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in the county," said Simon. "We don't know every street in the county."

When Hurricane Katrina struck, the Los Angeles County Sheriff's Department and California Highway Patrol sent helicopters to help. Equipped with UltiCharts, the helicopters were able to navigate areas using addresses on the maps where the streets were underwater and no longer visible.

The box design hasn't changed much since 1993, but the insides have changed dramatically, Gassaway said.

New technology has led to boxes with larger hard drives and processing speeds, more incorporation of video and a new device that uses digital video recording technology to record the data and images from the flight.

"I see the business as one that's not going to go away," Gassaway said.

With increasing demand for border security and homeland security, there is increasing demand for mapping systems.

New uses discovered

There are also the new applications that are just being discovered.

Up to two years ago, the feature that shows the latitude and longitude on the mapping system was just another feature without much use, Gassaway said.

Then cell phones equipped with GPS came out. And 911 calls from those types of phones started coming in from people who were lost or stranded.

With the latitude and longitude feature, law enforcement could type in the coordinates and pull up the location on a map.

Other markets just opening up for the UltiChart include utility pipeline maintenance management and newsgathering.

As Gassaway put it, you might soon be able to watch the car chase on the news and know where the car is on the map.

Surveillance application

Though the company focuses on helicopter customers, Gassaway said some clients use UltiCharts in airplanes for surveillance. There also has been some interest in using the devices in unmanned aircraft.

AeroComputers will expand beyond its hangar location to occupy about 3,000 square feet of space near the restaurant at Oxnard Airport. Gassaway expects that move could be made by the end of the year. AeroComputers will continue to occupy the 1,500 square feet in the hangar as well.

Gassaway said he thinks the company, which has about 12 people now, could have about 20 in a couple years if things really start to take off.

"Then that will probably be too small," he said, referring to his staff. "It depends — a lot of big contracts could come our way. If they do, things will change dramatically."

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