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TOM WALSH: Grisly task changes all: Ann Arbor software company toils to make victim IDs possible

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BY TOM WALSH
FREE PRESS COLUMNIST

Late one night last November, Howard Cash was jarred by a revelation from the new software program his little Ann Arbor company, **Gene Codes Corp.**, had just created.

New York City hired Cash to help speed the grisly task of identifying victims from the Sept. 11 World Trade Center disaster. The software challenge was how to match DNA extracted from 20,000 pieces of human bone and tissue at Ground Zero to the list of 2,801 missing persons.

"We had the software working for the first time," Cash recalls. "I can remember being in front of the computer, matching 40 pieces of one person to the DNA from his toothbrush.

"That was a very emotional moment for me. I suddenly realized I had 40 pieces of the same guy here, the same man, and I know who it is, and at this particular moment in time, I'm the only person in the world who knows that."

After Sept. 11, New York officials vowed to identify and return as many human remains as possible to the families of WTC victims. Problem was, the collapse of the towers had burned and pulverized the bodies so badly that most could not be identified by dental records or other typical means.

This week, a year after the disaster, the New York medical examiner passed the halfway point, having identified 1,402 Ground Zero victims as of Tuesday. Most IDs have been made by matching DNA from Ground Zero remains to DNA from victims' relatives or from victims' personal effects such as toothbrushes and razors.

Thanks to Gene Codes' powerful new software and advances in chemical extraction of DNA from tiny samples, the M.E. hopes to ultimately identify 600 more victims.

Cash, 42, founded Gene Codes Corp. in 1988 with money from 11 investors, mostly relatives and friends. His aim was to make software to help scientists working on the Human Genome Project. A year ago, his laid-back outfit of 16 people and a mascot named Ripley, Cash's Congo African gray parrot, had been cruising along profitably for 39 quarters in a row.

Then came Sept. 11 and a call to service.

Gene Codes would no longer be so little, or so profitable, or so laid-back.

Dr. Robert Shaler, director of forensic biology for the Chief Medical Examiner's Office in New York, is the man who challenged Cash and Gene Codes to take on the World Trade Center project that would consume them for the past 11 months, often for 12-14 hours a day, 6 or 7 days a week.

It's hard to fathom the complexity of a computer program that sorts and compares data from three different types of DNA tests on 20,000 partial human remains, to DNA from 3,000 cheek swabs of victims' kin and 8,000 personal effects.

Shaler was so exasperated from trying to explain the software to a television reporter that he wrote an e-mail to Cash two weeks ago: "Only the people who have written complex code understand how difficult it is and (what) an extraordinary job your staff has done in providing it to us as quickly as you have."

Shaler said the TV reporter finally grasped the critical role of the software when Shaler told her that crunching DNA data that previously took two weeks now takes only five minutes using Gene Codes' MFISys, or mass fatality identification system.

Shaler and his staff continue to identify a few more victims each day. And every week Cash flies to New York with a new update of the MFISys software and trains Shaler's staff on the new tweaks. Version No. 37 was just delivered.

Sorting through the mishmash

Before disaster struck a year ago, simpler Gene Codes software products had been used by the U.S. Army and the FBI, for testing old war remains and helping law enforcement match DNA samples taken from crime scenes against the DNA of known criminals.

On Sept. 13, Cash sent e-mails offering to help in the aftermath of 9/11. Two weeks later, he met with Shaler in New York.

"I thought they wanted to ask us to donate some software we'd already written," Cash says.

Instead, Shaler showed him the whole system, the way samples were collected and stored in 16 refrigerated trailers, inspected by an anthropologist. "We found they had information in 22 different databases," Cash says. "There were things in FileMaker Pro, in Oracle, in an obscure system called DataEase. We realized, geez, this is going to be a horrible data processing problem."

Shaler asked Gene Codes to take charge of developing new software for the project. Cash said no, his little firm was too small to tackle something so immense.

"Then who do you recommend?" Shaler asked.

"I said, 'Nobody has the capacity for this,' " Cash replied.

"Well, exactly," said Shaler. "So hire who you need."

Laid-back atmosphere changes

When Cash returned to Ann Arbor, he told his staff, "We can turn this down. We're totally overmatched. We're going to be dealing with incomplete specifications, changing priorities and impossible deadlines. Everybody who needs this information needs it before we even get started. And we can't get anything wrong."

The staff said go.

Gene Codes was issued a contract Oct. 8, Cash hired a dozen new people and put nearly the entire company on the WTC project. They delivered the first version of MFISys on Dec. 13; the New York medical examiner made 55 positive IDs from DNA matches that day.

To create new software in two months -- and then crank out updates every week -- Cash had to transform his company from laid-back to high-intensity.

When he formed Gene Codes, Cash says, "I wanted to build a company that people wanted to work at. Remember the 1980s? Everybody wished they could work at **Apple**; people got to walk around without shoes, they didn't have to wear ties."

They still don't wear ties at Gene Codes, but the place is very much all business.

Sticky notes of different colors cover an entire wall in the main work room with ideas for how to improve the next software upgrades.

Programmers work in pairs, sitting side-by-side in an approach called extreme programming, constantly testing and proofreading code as it's written.

"If the computer system crashes, we can fix that," Cash says. "But if we make a wrong ID and someone has to go to a family and say, 'I'm sorry, that wasn't your mother or your son' and ask for the remains back, there's a family that will never get over that, and will hate us and curse us until the day we die.

"So, there's a level of fanaticism about quality control here."

Complicated and unprecedented

Genetic fingerprinting usually refers to matching DNA from different sources, to help identify a criminal or dead body. As new ways of extracting DNA from smaller, more severely damaged tissue are devised, the Gene Codes software is constantly updated to help tally and compare the results.

Shaler's team counts on MIFSys to identify victims by DNA matches, reunify separate pieces of individuals, and keep track of all submitted cheek swabs and personal effects. It's not uncommon for DNA from one personal effect to match up with 80 or more separate remains from the same person.

"There's never been anything of this magnitude," Cash says. "There are earthquakes, of course, but then you recover whole bodies."

Further complicating the ID process was the inevitable mislabeling of things. "There was a lot of confusion in the weeks after 9/11, a lot of things like toothbrushes came in without clear documentation."

David Relyea, a senior software engineer at Gene Codes, says the WTC project "is a real privilege and a tremendous weight at the same time."

Working weekends, holidays and late nights, especially early in the project, was very taxing.

"It's an emotionally draining project," Cash says. "Everybody has gone through a moment where the magnitude of the tragedy hits them. For many people, it's the first time they see the data with people's names attached to them."

Gene Codes has a 3-year, $10-million contract with New York, but Cash expects to bill only $3.5- to $4-million. His staff of 29 is salaried, and only in the past couple of months have they received extra pay for the extraordinary hours.

"We'll cover our costs and maybe a little beyond, but the real hit is in taking resources away from the rest of our business," Cash says, conceding that Gene Codes' long string of profitable quarters has come to an end.

When the WTC project is over, Cash says, he's not sure what's in store for Gene Codes. Nine countries have asked about ordering MIFSys, a product he hopes will never have to be used again.

"This is the most important thing I'll ever do in my professional life," Cash says. For now, that's enough.

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