



In the Pursuit of Justice and Closure, Twenty Years Later



By Carl Walter Public Safety | November 1, 2018

Twenty years later and Traci Pittman Kegley's whereabouts and the cause of her disappearance remain a mystery.

But when a new investigative lead came in, investigators decided to conduct a large-scale coordinated search across a more than 300-acre property in rural Alabama with the hopes of finding the remains of a young mother who went missing on April 26, 1998. This lead prompted a focus on real-time geographic information system (GIS) technology to better support the investigation's operational requirements.

On the day she vanished, Traci's car was found abandoned on the side of Old Georgia Road outside

Key Takeaways

- Law enforcement uses GIS to manage a large-scale multi-agency investigation
- A system approach ensures coordinated efforts
- Investigators stay on the same page using a shared framework and tools

Wetumpka, Ala., with her two-year-old daughter still inside and unharmed.

No witnesses ever came forward about the events that led to the young mother's white Geo Storm being abandoned with her child unattended. Traci's personal belongings, including a purse and identification, remained behind.



There is a \$10,000 reward being offered from the governor's office, \$10,000 from the family, and an additional \$1,000 from CrimeStoppers for any tips that lead to a conviction on this case.

The family and authorities assume foul play because she wouldn't have left her daughter that way. Adding to this fear, witnesses reported an argument between the victim and unidentified persons at a gas station the afternoon prior to the car's discovery, but no definitive clues ever surfaced.

In the hope of resolving the 20-year-old disappearance, crime investigators applied the real-time tracking capabilities of GIS to comprehensively search a 300-acre property.

Relentless Follow Up

When the new lead came in, law enforcement officers believed it was credible. They spent months planning to canvass an identified property and potential crime scene and relied on an unprecedented level of realtime mapping technology to orchestrate the efforts of personnel from more than 20 agencies. Many of the officers involved in the search were around at the time of the victim's initial disappearance and remained eager to solve this case for the family and the community.

The mother of the missing woman, Linda Pittman, spoke to the local television news during the search, relaying the wish that everyone who cares about her missing daughter could see the technology being used to find evidence.

Initially, the size of the property and the time that had passed gave law enforcement some pause. However, the location of the property-near the abandoned car and the gas station where witnesses reported seeing the victim involved in an argument-proved too compelling not to pursue. The law enforcement objective was to find human remains, a key step in proving a crime and finding a culprit.

"The last thing we want is for the family to be victimized twice," said Capt. Joe Herman of the Alabama Law Enforcement Agency (ALEA), the search commander on the case. "So, by not doing something that we should be doing, or by forgetting it and not doing anything, then I feel that the family becomes a victim a second time."

Gathering Resources

Investigators obtained a search warrant issued after a circuit court judge found probable cause that a crime was committed and that items connected to the crime were likely to be found at the property. Next, Capt. Herman presented facts about the case to conferences of the Sheriff's Association and the Alabama Association of Chiefs of Police. These briefings drew interest from local officers and from others across the state.

"There is a lot of mutual aid in Alabama," Capt. Herman said. "So, if something bad happens, everybody pretty much comes to everybody's aid. But something of this scale has never been done before."

Investigators aspired to assemble more than 200 searchers to canvass this large property and ensure nothing was missed. They also reached out for a variety of other specialized capabilities including cadaver dog and handler teams trained in locating and recovering buried human remains.

In further preparation, Capt. Herman called authorities in nearby states to see if anyone had experience with a crime scene of a similar search size. He found that nobody had undertaken anything similar.

"Our search operations in Alabama are usually on a smaller scale," said Ty Gober, retired battalion chief with Birmingham Fire & Rescue Service, and the coordinator for the ground search. "Normally we're looking for Alzheimer's patients that wander away from home or a lost child at a state park. This case required a gridded search over a large area."



Law enforcement personnel from more than 20 agencies volunteered their time to aid the search.

Next, Capt. Herman made a call to Alabama's Fusion Center, a collaborative effort between local law enforcement and multiple federal agencies that provides resources, expertise, and information sharing capabilities with the goal of maximizing the ability to detect, prevent, apprehend, and respond to criminal and terrorist activity.

"Our initial involvement centered on gathering aerial imagery for when this incident took place and to show change over time," said Jared Bostic, deputy Geographic Information Officer for the state of Alabama. "The more we learned about the investigation, and what the case agent was trying to achieve, the more we talked about using the real-time capabilities of GIS to track the search as it unfolded."

Following All Leads

The victim's friends and family recall an outgoing and friendly young woman. They stand vigil on a Facebook page that monitors any new details about the case with regular reminders that, "somebody knows something" and "behind every missing person is a trail of broken hearts."

With the new lead, investigators vowed to conduct a synchronized and thorough search that left nothing unturned on the property.

"We try to let the public know we never forget," said District Attorney Randall V. Houston, who serves Elmore, Autauga and Chilton Counties in Alabama. "As long as there are leads to follow, we're going to follow them."

Starting with a Map

As the largest search ever undertaken in the region in terms of area to scan and miles to walk, the project required a great deal of preparation. It also involved a new focus on real-time geographic information system (GIS) technology to better support the investigation's operational requirements.

The property in question is in a remote forested area of the state, approachable only by dirt roads with a tall fence ringing its perimeter. "We didn't have a way to get on the property to scope it out because of the fence," said Capt. Herman. "We tried a couple of fly-overs with an airplane and helicopter, but we weren't really getting it because we didn't want to get too close and alert them."

The GIS team at the Alabama Fusion Center, those responsible for mapping and intelligence analysis, compiled aerial and satellite imagery from when the victim went missing in 1998 up until the present. They used this to identify, geolocate, and display all available information about the land (i.e. dirt roads, paths, streams, ponds, and structures) on a digital map.

"One of the first things we wanted to identify was any known structures on the property," said Bostic. "That detail was essential for the SWAT team who were the first to go in and clear the property."

Systematic Preparations

Searchers used the Incident Command System (ICS) to organize and manage the event. ICS provides a framework for the command, control, and coordination of large investigations. The ICS hierarchy allows personnel from multiple agencies to perform effectively as distributed teams. ICS integrates the information gathered to keep everyone informed and focused on the shared goal–in this case the shared goal was to find evidence of Traci Pittman Kegley's disappearance.

"ICS facilitated the coordination and accountability of everybody in a scalable and flexible way," said Marieke Fendley, Emergency Management Coordinator at the Alabama Emergency Management Agency. "It informed the incident action plan, which provided a timeline of each day of work, the assignments, the resources, and the rhythm and structure that everyone followed."

In the pre-planning phase, investigators used GIS to collect multiple sources of information about the identified property. Multiple teams digitized search grids to manage the process of canvassing the massive swath of land. Investigators presented their data in a variety of GIS web mapping applications on



Drone imagery gave the searchers an accurate and up-todate basemap of the property.



The cellular on wheels (COW) from FirstNet, built with AT&T, provided a reliable network in an area that has spotty cellular

computers, tablets, and phones. This gave everyone involved a shared situational awareness and a way to visualize what they were walking into.

Alabama law enforcement also reached out to <u>FirstNet</u>, the wireless broadband network for first responders. FirstNet, built with AT&T, provided a Cellular on Wheels (COW) truck as well as 160 cellphones, enough for each of the searchers. Another COW came in from Southern Linc. Together these trucks blanketed the area with a robust wireless signal where none existed before.

The call also went out to cadaver dog teams-dogs trained to sniff out human remains-and 15 teams



Many deer were encountered on the property.

responded from as far away as Maryland. Cadaver dogs use their 250 million smell receptor cells (compared to 5 million for humans) to detect all five stages of human decomposition on both land and water, and these sensitive noses would be needed.

"They don't lie to you," said Jen Morgan with Southwest Panhandle Search and Rescue K-9 from Panama City, Florida. "It's black and white to them, it's either there or it's not there."

Commanding the Scene

As the first teams arrived on the Sunday of the weeklong search–immediately following the "all clear" signal from the SWAT team–they encountered a challenging scene.

"It was covered with deer that were sick and dying," said District Attorney Houston. "They had eaten most of the vegetation, which was fortunate for us because it made it easier for our ground teams to get in there. However, it was littered with carcasses and bones."

The mapping team immediately got to work flying a drone over the full extent of the property.

"The drone captured imagery of the existing conditions, giving us a brand-new and accurate basemap to conduct the search," Bostic said.

As the drone was flying, advance teams set up a forward operation base on the property and a command center at a Volunteer Fire Department



Cadaver dog teams from far and wide aided in the search.

facility a few miles down the road. They staged allterrain vehicles, a portable toilet, bottled water, and other provisions on the property. Large screen televisions, Wi-Fi, and an Operations Dashboard went up at the command center, giving a quick view of progress as the search progressed.

All was set to begin the search on the next day, a Monday, with 85 to 115 agents, officers, and deputies more than 20 agencies arriving each day, volunteering their time to assist the search.

Real-Time Reports

As searchers checked in, each received a smartphone which allowed the command center to see each person's location in real time. The phones also contained a simple survey application with pull-down menus searchers used to photograph and detail suspicious points of interest during the search.

The instant any of the searchers sent a report, it would pop up within the command center for leadership to see exactly what was happening in real time. Out on the property, each team member marked their discoveries using the app and a flag.

"We always use toilet paper to flag because the first time it rains it's gone," said Chief Gober. "When you look through the woods you can see those flags and tell exactly where you've been." "Everybody could see that they were on the map, whether they were a dog handler, a law enforcement officer or a fireman," said Jay Moseley, director of the Alabama Fusion Center. "It helped teamwork because they could see that we're all important enough to be on that situational awareness map."

The real-time awareness also provided safety assurances.

"We've got some mean snakes down here and the weather got warm enough that week to bring them out of hibernation," said Ricky Roberts, Battalion Chief of the Training Division at the Prattville Fire Department and the safety officer for the search. "I was concerned that we would lose somebody. Live tracking gave me peace of mind, knowing where everybody was all the time."

The gridded property map helped each team track progress and pick up where they left off after taking breaks.

"We knew at the end of every day, or any time I wanted to know, how much property we covered, what was covered, and what had not been covered," Capt. Herman said.

Some Completion

As investigators closed their search of the 300 acres, looking for the remains of Traci Pittman Kegley, a young mother who went missing more than 20 years ago, they felt they had pored over the entire area. This extensive search applied a new level of real-time GIS technology to coordinate all activities and ensure their efforts were comprehensive.

While the team was reflective about what they had learned, they were quick not to claim too much.

"She's still missing, so we're not beating our chest over this," said Moseley. "We felt so confident that we covered the land that we wanted to show the family."

The family was at the center of the minds of all the searchers.

"These folks are just really nice people, and I know it's been frustrating for them," said District Attorney



The volunteers filled the command center during daily briefings.

The Searchers on the Scene

The searchers included the Alabama State Bureau of Investigations, Elmore County Sheriff's Office, Opelika Police Department, Lee County Sheriff's Office, Tallapoosa County Sheriff's Office, Autauga County Sheriff's Office, Prattville Police Department, Wetumpka Police Department, Prattville Fire Department, Blount County Sheriff's Office, Auburn Police Department, Chilton County Sheriff's Office, Alabama Emergency Management Agency, Esri, Haynes Ambulance, and CrimeStoppers. The Southwest Panhandle Search & Rescue K-9 worked to bring in fifteen cadaver dog teams from as far north as Maryland and as far south as Sarasota,

Houston. "The family was thoroughly impressed and so appreciative to see the number of people involved and the technology brought to bear."

The victim's mother told television reporters that her emotions had been up and down over the past 20 years, so she thought she could keep them in check. However, she said she was affected by the number of people who demonstrated how much they care.

Some Hope

On Thursday, the final day of the search, cadaver dog teams had swept the whole property and searchers had covered every last inch of ground.

"It was amazing to get the real-time picture of where all the searchers had been," said Chief Gober. "We were able to see a couple of holes caused by the terrain and it allowed us to go back and collect full coverage."



The search team spreads out to canvass the pond perimeter.

The only ground left to cover was a five-acre pond where a cadaver dog had sensed something. Four dive teams made a difficult dive and brought up some possible evidence.

"You have to understand that the pond where we found this was almost completely full of deer bones," District Attorney Houston said. "There were thousands of deer on that property, and a lot of them died in the water. So, I'm fairly confident that what we're going to have is going to be deer bones, but forensics couldn't identify it at the time, so we sent it to the lab."

Media Megaphone

The search effort involved a lot of media outreach to encourage people to come forward with an eyewitness account or a memory of something suspicious they had seen around the time of the victim's disappearance.

"We set up daily briefings for the media at 4 pm, and we would give them a piece to put on TV," said Capt. Herman. "The area around the command post is a very small community and when we arrived we brought in large towers, ATVs, landed helicopters, and brought in a lot of resources. Everybody wanted to hear something about what we were doing every day."

Television spots highlighted the work of cadaver dogs and volunteer searchers, and the capabilities of the mapping technology used in the command center.

"The amount of attention it gave the case after all these years brought people forward, and we got more



One of the cadaver dogs sensing at the bow of the boat.

information than we had before we started," District Attorney Houston said.

Sharing the Capability

Law enforcement and search and rescue personnel at the scene shared their appreciation for how far technology has come since the initial search started 20 years ago.

"I'm not a technical guy, I put people in jail for a living," Capt. Herman said. "In 26 years, I've never walked away from a search feeling more confident that we covered everything we needed to cover. We only had one shot at this."

The GIS tools aided in both thoroughness and efficiency of the search, investigators said.

"We had planned on being there a full week," said Bostic. "We were able to search the entire property completely within four days."

Many searchers have shared details with peers about how maps, apps, and real-time capabilities aided the effort.

"I want to go around and have a meeting with the sheriff of every county and the police chief in every town to tell them if something like this happens again, here's the resource that should be applied," Capt. Herman said.

ALEA is applying the coordinated use of GIS for security at schools and large public events such as the upcoming governor's inauguration.



Web GIS enabled the rapid setup of a command center using laptops, large monitors, and mobile apps.

Family Still in Focus

Throughout the in-depth examination of the 300-acre property, everyone involved maintained clarity about the purpose of the search.

"The sole goal was to try to give that family closure," Chief Gober said.

The investigation is ongoing. Data and details found during the property search could still be a help if ever there is a trial.

"There's nothing we want more than to give her parents an answer," District Attorney Houston said. "So, we're going to continue to work it."

Explore the many ways that <u>GIS supports public safety</u> with smarter situational awareness.

About the Author: Carl Walter, Esri's Homeland Security Industry Manager, joined Esri in 2010, after 20 years of increasing responsibility in law enforcement and intelligence operations. He is the former director of both the Boston Regional Intelligence Center, a designated US intelligence Fusion Center, and the Bureau of Intelligence and Analysis at the Boston Police Department. *E-mail:* cwalter@esri.com

Applying Real-time Tools to Daily Operations

Leaders at the Alabama Law Enforcement Agency work tightly with Alabama's Fusion Center which uses a geographic information system (GIS) on a daily basis to support crime investigations and to help prevent, prepare for, and respond to disasters (both human-made and natural) and other public safety issues. This was their first effort using GIS as a backbone for real-time situational awareness, made possible in this rural area thanks to the highbandwidth dedicated signal provided by <u>FirstNet</u>.

Extending GIS to this cold case investigation was something they could largely handle themselves.

After compiling available imagery of the property to perform pre-operational planning requirements, they flew a drone to capture near real-time imagery, and used <u>Drone2Map for ArcGIS</u> to automate image processing and produce high-resolution 2D and 3D products for analysis and visualization.

FirstNet provided a Cellular on Wheels (COW) truck to blanket the area with a robust wireless signal where none existed before. They also provided 160 cellphones, enough for each of the searchers.

The Esri apps that were added to the phones included <u>Workforce for ArcGIS</u> for tracking the location of each searcher, <u>Survey123 for ArcGIS</u> for quick and intuitive reporting of items of interest using simple dropdown menus, and <u>Explorer for ArcGIS</u> for viewing the items of interest. In addition, <u>Operations</u> <u>Dashboard for ArcGIS</u> provided a one-glance view of items of interest and the tracks of the searchers on large monitors at the command center to quickly update anyone on the status of the search.

"The more we learned about the intentions of the investigation, the more Director Mosley and I began exploring the available GIS resources," said Jared Bostic, deputy Geographic Information Officer for the state of Alabama. "We already had the tools at our fingertips and it was a great opportunity to explore putting real-time applications to use."