At the Speed of HOLLYWOOD

Rapid DNA identification system helps military and civilian law enforcement agencies track criminals and victims

DNA evidence is not only vital in criminal investigations and counter-terror operations, it's also endlessly fascinating for fans of television crime shows. Unfortunately, the DNA samples that might take an actor a few minutes to run on TV can take real-life forensic labs anywhere from six to 24 months to process.

In 2011, U.S. Special Operations Command issued a Small Business Innovation Research contract in an effort to speed up the timeline for DNA identification. That contract — to develop a mobile rapid DNA identification unit for non-technical users —

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was awarded to ANDE Corporation, at the time known as NetBio. With the SBIR under its belt, the company developed a system that allows military or law enforcement personnel to work directly in the field. In approximately 90 minutes, ANDE can process a broad range of samples, including small blood stains; handled objects such as bottles, cups, and weapons; and tissues including muscle, liver, bone, and teeth.

The ANDE instrument is about the size of a microwave oven, needs only electricity to work, and does not use fragile materials or supplies that require refrigeration. Users collect a DNA sample from a handled object or weapon with the Radio-Frequency Identification (RFID) enabled swab, insert the swab into a protective tube affixed with a unique bar code, then lock the swab into the system's cartridge. The cartridge can hold a maximum of five samples at a time, and includes the chemical agents needed to process the samples. In under two hours, ANDE returns a DNA ID, sometimes called a DNA fingerprint, tracked via the RFID chip and matched against a local, state, military, or disaster victim database.

Richard Selden, ANDE founder and chief scientific officer, said, "Rapid DNA is designed to overcome the primary limitation in conventional labs—the months required to generate a DNA ID. The labs are inundated with samples, and by enabling non-scientists to process DNA quickly, ANDE is bringing actionable results to the places that need them most: the police station, the battlefield, the border, and the disaster site."

ANDE's success in bringing the technology to market resulted from creating a product based on the needs of potential end customers.

"We worked closely with Special Operations Command (SOCOM), the Federal Bureau of Investigations (FBI), and Department of Homeland Security (DHS) to incorporate their specific requirements, instead of building a product in a vacuum and hoping someone would need it" said Selden.

SOCOM, DHS, and the FBI subjected ANDE to rigorous in-field performance assessments and pilot studies over a period of five years. The resulting feedback helped ANDE fine-tune the system's ease of use, transportability, and automatic database connection. The feedback also allowed ANDE to address related challenges facing public safety authorities, including chain of custody of samples, protection of privacy, and policy issues, significantly reducing barriers to the adoption of Rapid DNA technology.

"The SBIR had a substantial impact on the company and, even more importantly, on societal safety," said Selden.

Law enforcement agencies around the country are adopting mobile rapid DNA identification methods like the ANDE system. In a 2017 Memorial Day shooting, the Miami Beach police successfully used ANDE to process DNA evidence from a recovered handgun. They found a match with an individual already in custody.

The SBIR program was critical in taking the technology from a simple idea to a working system deployed across the country, Selden said.

"The SBIR had a substantial impact on the company and, even more importantly, on societal safety," said Selden. "The [contract] enabled us to expand the utility of the system, with major military and civilian applications in law enforcement, border and port protection, human trafficking prevention, and disaster victim identification. The SBIR program provides a tremendous benefit to our country, allowing small companies to pursue big ideas."

NetBio, Inc. (ANDE Corp.)

Modernization Priority: Biotechnology

Waltham, MA • SBIR contract: H92222-11-C-0030 • Agency: SOCOM • Topic: H-SB09.1-001, Low Cost and Rapid DNA-Based Biometric Device