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EXECUTIVE SUMMARY

Refining the Criminal Justice Assistance Mission

The National Law Enforcement and Corrections Technology Center (NLECTC) System began to undergo significant changes in 2015, as the system and its component centers took on new shapes and forms to better fulfill its mission of delivering up-to-the-minute information that meets the needs of busy criminal justice professionals. Through face-to-face meetings and conferences; through video, social media and other virtual portals; and through electronic publications such as reports, magazines and newsletters, the NLECTC System continues to spread the word about innovations in technology. At the same time, the component centers work to gather information from the field on future technology needs. NLECTC collects information from the field and works with the National Institute of Justice (NIJ) to help inform NIJ efforts in the areas of research and development as well as identifying best practices currently in use in the field.

As it has throughout its 21-year history, the NLECTC System has provided, and will continue to provide:

- Scientific and technical support to NIJ’s research, development, test and evaluation (RDT&E) projects.
Support for the transfer and adoption of technology into practice by law enforcement and corrections agencies, courts and crime laboratories.

Assistance in developing and disseminating equipment performance standards and technology guides.

Assistance in the demonstration, testing and evaluation of criminal justice tools and technologies.

Technology information, in addition to general and specialized technology support.

Assistance in setting NIJ’s research agenda.

**Justice Technology Information Center**

The Justice Technology Information Center (JTIC) began assuming many of the responsibilities formerly fulfilled by the National Center in 2015. JTIC serves as both the initial point of entry for criminal justice professionals and other interested parties, and the clearinghouse that disseminates information to those constituents. Requests for technology, information or materials via the “Ask NLECTC” mailbox (asknlectc@justnet.org) or the toll-free line at (800) 248-2742 come through JTIC. Staff either fulfills the request immediately if it falls within JTIC’s unique areas of expertise or quickly moves it to the component center that can handle the request most efficiently.

JTIC’s unique areas of expertise include non-biased, science-based knowledge and expertise in equipment testing and standards (body armor, police vehicles, handcuffs and others). JTIC uses that expertise to:

- Conduct equipment testing programs, review and analyze testing data, and disseminate results.

- Operate JUSTNET, NLECTC’s website, and manage the system’s social media outlets, including Twitter, Facebook and YouTube.
 Manage SchoolSafetyInfo.org, NLECTC’s website dedicated to school safety news, information and technology, and related print and electronic publications on school safety.

 Disseminate print and online newsletters and bulletins, including e-TechBeat and JUSTNETNews.

 Help NIJ identify and prioritize technology needs and requirements.

You can read about the creation of JTIC on p. 5, about the Compliance Testing Program’s work in the area of stab-resistant armor on p. 13 and about the creation of the School Safe assessment app on p. 19.

**National Criminal Justice Technology, Research, Test and Evaluation Center**

The National Criminal Justice Technology Research, Test and Evaluation (RT&E) Center provides focused technology-related research, as well as testing and operational evaluations of non-forensic technologies. Both missions are intended to enhance the capabilities of state and local law enforcement, corrections agencies and courts. You can read about activities of this new center, which rolls up the missions of several Centers of Excellence, on p. 49.

**Forensics Technology Center of Excellence**

The Forensics Technology Center of Excellence (FTCoE) delivers practical and valuable technology transition and knowledge transfer solutions that bridge the gap between science and justice. The CoE works to advance forensic science within the criminal justice community through the elevation of practitioner expertise and the integration of policy and practice within the field of forensic science. You can read about several of its efforts starting on p. 37.
Justice Innovation Center for Small, Rural, Tribal, and Border Agencies

During 2015, the contract for the Small, Rural, Tribal and Border Regional Center (SRTB-RC) (which had worked with agencies that have fewer than 50 sworn staff and their officers by helping them gain access to a full range of scientific and technology-related information tailored to meet the needs of smaller agencies) came to an end. In its place, NIJ stood up a new component center, the Justice Innovation Center for Small, Rural, Tribal, and Border Agencies, which is operated by a different grantee. JIC’s mission includes identifying, evaluating and disseminating technology solutions that meet the operational challenges of small, rural, tribal and border law enforcement, courts and corrections agencies.

To fulfill this mission, JIC works to:

- Identify unmet operational needs that many SRTB justice systems share.
- Identify and rigorously evaluate new technologies or solutions to assess their effectiveness and cost-effectiveness when used by SRTB agencies.
- Support the adoption of innovations that meet the operational demands of SRTB justice systems.

You can read more about JIC and its mission.

Small, Rural, Tribal and Border Regional Center

The Small, Rural, Tribal and Border Regional Center closed during 2015. You can read a summary of its final activities on p. 53.

Legacy CoEs

Several Centers of Excellence closed out their contracts during 2015. Their final activities are detailed on p. 59.
The NLECTC System Continues Its Evolution

For the past 20 years, the NLECTC System has served the criminal justice community, reaching out through a variety of avenues to help agencies meet their technology needs. Throughout those two decades, the system has continued to evolve as the technology landscape changes. In 2015, the system reached an important point in that evolution, as the makeup of the system took a new direction when the former NLECTC-National began to morph into the new Justice Technology Information Center (JTIC).

For many years, NLECTC-National served as the information hub of the system while also managing the Compliance Testing Program (CTP) for NIJ. Center Director Lance Miller says that JTIC will continue those responsibilities, but instead of focusing on a “grassroots, bottom up” approach to spreading information, “JTIC will take a new direction, focusing on giving policymakers and decisionmakers the information and tools they need to make those important decisions on selecting, purchasing and implementing technology in their agencies.”

The new focus will include familiar methods of sharing information such as JUSTNET, the Center System website; e-TechBeat, the award-winning online magazine, which moves from a bi-monthly to a monthly
publication schedule in 2016; JUSTNETNews, the weekly email newsletter; and various social media channels. JTIC will also expand into providing information on legal and policy issues; writing articles for peer-reviewed journals published by professional associations such as the International Association of Chiefs of Police and the American Correctional Association; and adding a whole new audience by providing information targeting courts professionals.

“IT’s moved beyond just providing information through our own forums and website to being a broader “go to” resource that collects and disseminates information on technology issues from all relevant sources. If the subject-matter specialists on our staff don’t have the answers, we either go get them or point our constituents to the appropriate resources to meet their needs,” Miller says.

The NLECTC System last underwent a major restructuring in 2009, with the creation of the States, Major Cities and Counties and the Small, Rural, Tribal and Border (SRTB) regional centers targeting those specialized audiences, along with a group of Centers of Excellence (CoEs) wherein each focused on research, development, technology and evaluation (RDT&E) related to a specific NIJ technology portfolio. However, ongoing budget constraints have caused NIJ to move in a new direction, folding the RDT&E responsibilities for the majority of the technology portfolios into the National Criminal Justice Technology Research, Test, and Evaluation Center (see “Enhancing the Capabilities of Criminal Justice Agencies,” p. 49) and
evolving the SRTB Regional Center into the Justice Innovation Center for Small, Rural, Tribal, and Border Agencies (see “Identifying, Evaluating and Disseminating Information Where the Need Is Acute,” p. 53). Because the needs of the forensic community are so critical, NIJ has continued to fund the Forensics Technology Center of Excellence as the fourth center component. NIJ also funds the Criminal Justice Priority Technology Needs Initiative, a research effort to assess and prioritize technology needs across the criminal justice community, as part of the NLECTC System.
And at the center of the system stands JTIC, of which Miller says: “NIJ envisions JTIC as the centralized go-to resource for decisionmakers. We began reaching toward that goal in 2015, and in 2016, we will continue to expand and refine our efforts. There are lots of good things coming that will enhance our efforts to help the field.”

**Highlights**

The combined efforts of NLECTC-National and JTIC created a focal point for information dissemination. Requests for information and assistance are relayed to the NLECTC Center, subject-matter expert or other agency that can best meet the request. From the position of the system hub, NLECTC-National and JTIC also provided law enforcement, courts and corrections professionals with an entry portal to the system and its component centers through JUSTNET, the “Ask NLECTC” e-mail address (asknlectc@justnet.org) and the toll-free line at (800) 248-2742. These channels helped NLECTC-National and JTIC fulfill the primary mission to offer criminal justice decisionmakers many ways in which to obtain information about relevant technology and related matters of interest.

The ongoing efforts of the National Center and JTIC also support the National Institute of Justice’s (NIJ’s) standards development and implementation and its Compliance Testing Program (CTP) (for more information about these activities, see “Addressing Stab and Slash Threats” on p. 13). The CTP ensures the safety and effectiveness of several types of equipment used by the public safety community.

**EXHIBIT 3: JUSTNET WEB ACTIVITY**
Highlighted activities include:

- Wrote several original articles published in external periodicals, including:
  - “Developing the Next Generation Stab-Resistant Body Armor Standard,” which appeared in the March/April 2015 issue of *American Jails*, the magazine of the American Jail Association. Published bimonthly, *American Jails* reaches government personnel at the local, state and federal levels, as well as individuals in the private sector.
  - “Cell Phone Forensics Guidebook Focuses on Maximizing Evidence Obtained From Contraband Devices,” which appeared in the May/June 2015 issue of *Corrections Today*, the bimonthly publication for members of the American Correctional Association.

- Designed, wrote and produced six issues of *e-TechBeat*, the online newsletter of the NLECTC System. Plans call for moving to a monthly publication schedule starting in January 2016. At the end of 2015, *e-TechBeat* had 28,205 subscribers.
Managed JUSTNET, the website of the NLECTC System, which had 36,251 sessions by 25,314 users and 97,642 pageviews during the final six months of the year (after a conversion to Google Analytics changed the way site data was recorded). A major revision to JUSTNET will launch in early 2016.

Processed 89 “asknlectc” email box external request referrals and 574 internal information request referrals, as well as 131 toll-free telephone internal information referrals and 89 external information referrals.

Through the CTP, provided oversight and administration for the testing of 75 models of ballistic-resistant body armor, 22 models of stab-resistant armor and no restraints; also conducted follow-up inspection and testing of 124 models of ballistic-resistant body armor.

Provided meeting coordination, subject-matter expertise and/or technical writing/editing support for one onsite Special Technical Committee meeting on ballistic-resistant body armor and two virtual meetings on offender tracking, and for a two-day workshop on unmanned aircraft systems.

Exhibited at 26 national law enforcement and corrections conferences, distributing 10,685 items from inventory. An additional 1,225 NLECTC System publications were distributed by other agencies at seven additional conferences.

In conjunction with the Michigan State Police, conducted evaluations of 2016 model year police vehicles (14) and motorcycles (six).

Handled 364 non-conference-related requests for publications and responded to approximately 1,045 individual requests for assistance.

Designed, edited and produced three publications for NIJ or various centers within the system, two of which are still in progress.

Recorded 8,196 contacts, 1,065 transactions and 249 orders.

Processed 175 requests for access to the ASTM Standards Portal. NIJ and ASTM have opened up access to ASTM’s complete library of standards to eligible law enforcement, corrections and forensics professionals.
Coordinated 323 total (approved, rejected and new) requests for Field Search, a free software suite designed specifically for use in the field by non-technical criminal justice personnel. Field Search allows them to quickly and efficiently search a target computer and create a detailed report of findings. To date, 7,325 requests have been received and the software has been downloaded a total of 12,291 times. Certified Field Search instructors provided basic Field Search training to 114 criminal justice personnel and staff approved 284 requests for the Field Search software.

Managed the Corrections Technology Resource Center (CRTC), which provides public sector agencies with information regarding the wide variety of technologies used in correctional settings. The CTRC has a total of 776 registered users to date. The knowledgebase contains 1,307 documents.
Produced 51 issues of JUSTNETNews, a weekly summary of news from the NLECTC System, NIJ and other agencies within the U.S. Departments of Justice and Homeland Security; abstracts of mass media articles relating to criminal justice technology; and current funding opportunities and upcoming events. At the end of 2015, JUSTNETNews had 20,242 subscribers.

Managed PoliceArmor.org, a Bureau of Justice Assistance-sponsored website that provides overall information on both ballistic- and stab-resistant armor for field officers, and includes links to the CTP information on JUSTNET. PoliceArmor.org had 1,580 sessions by 1,235 users and 11,938 page views in the final six months of the year.

Disseminated information to the criminal justice decisionmaker community via the JUSTNET Facebook (671 fans, 80 of them new), Twitter (606 followers, a 34.4 percent increase) and YouTube channels (13,717 views, averaging 2 minutes each). Original videos produced during the year included:

— “Protect Your School With School Safe,” a promotional video for the NLECTC System school safety app launched in October 2015.


— “Officer Kyle Russel: Saved by His Vest,” a personal story by an officer whose ballistic-resistant vest saved his life during a traffic stop.


For more information on the Justice Technology Information Center, contact NIJ Program Manager Mike O’Shea at (202) 305-7954 or by email at michael.oshea@usdoj.gov.
Addressing Stab and Slash Threats

In 2015, NLECTC staff continued work to update the NIJ stab-resistant body armor standard to address current stab and slash threats faced by U.S. correctional officers.

*Stab Resistance of Personal Body Armor, NIJ Standard-0115.00,* was published in 2000. The revised standard, which is in draft with the working title of *Stab Resistance of Personal Body Armor, NIJ Standard 0115.01,* specifies minimum requirements for stab- and slash-resistant torso armor and includes testing specific to armor designated as female armor (see “Body Armor for Female Officers,” below). The draft standard addresses body armor panels that are intended to provide protection against stab (knife and spike) and slash threats.

The draft standard will provide two performance categories for stab/slash-resistant armor to reflect different operating environments and anticipated threats:

- Commercially made weapons, typically encountered outside of controlled access facilities but also potentially a threat in jail intake area and public areas.
Improvised, or inmate-made weapons, typically encountered inside of controlled access facilities, including jails, detention centers and prisons.

The existing test blades in the standard will continue to be used as test weapons for commercial threats. NLECTC embarked on development of improvised test weapons (exemplars) to use for the draft standard, which are based on the types of improvised weapons confiscated or found within correctional facilities. The design for all exemplars to use in the draft standard was finalized in 2015.

NLECTC staff continued research on testing methods for stab and slash armor, including development of a prototype slash testing apparatus. Activities included:

- Attended meetings at the United Kingdom Government’s Home Office Centre for Applied Science and Technology (CAST). Activities included review of CAST’s redesign and technical drawings relating to the stab test drop mass system. Staff provided the UK with the information that NLECTC has developed and the methods being used. This information sharing will benefit the armor industry because adopting similar test methodologies will enable manufacturers to use common designs and streamline research and development efforts.

- Presented a workshop on the changes being made to the NIJ stab-resistant armor standard at the American Jails Association Conference in Charlotte, N.C., on April 22-23. The presentation discussed the capabilities and limitations of the body armor worn by officers and why it is important to select the correct level of protection. Participants also discussed how the standard has been updated and designed, the limitations of testing, the introduction of female-specific testing and understanding the new levels of protection and the environment they are intended to be used in.

**Body Armor for Female Officers**

Ensuring that body armor for female officers fits properly and provides adequate protection and coverage is a primary concern for the efforts to revise both the stab-resistant and ballistic-resistant body armor standards. Staff continued research on possible materials (silicone, clay) to use to represent the bust area in testing of female armor, and appropriate sizes and shapes for a representative female upper torso.
Ballistic-resistant body armor testing uses clay as a backing material to measure the impact when a bullet hits a person wearing body armor. The concept is being carried over for female-shaped ballistic body armor test methods. NLECTC staff created a mold out of pliable silicone materials to use to produce a female bust shape made of clay.

Rapid prototyping is being used to create the breast shapes on which the molds are based. For ballistic-resistant testing, NLECTC researchers determined that the probable best material for the breast form mold is silicone. The breast forms themselves are made of clay.

For creating breast forms for stab-resistant testing, researchers determined it is preferable to use a mold made out of a harder plastic material than silicone. During ongoing research, the material put into the mold to make the breast forms for stab-resistant armor testing is a soft grade of silicone.

**Highlights**

Other activities during the year included:

**ASTM International Meeting.** On January 27-28, National Center staff attended the ASTM International Meeting in New Orleans, and led a discussion related to the development of the ASTM ballistic-resistant shield standard test method. This discussion included a review of public comments received on the draft standard and determining the next steps in developing the draft. In addition, staff attended a separate ASTM E54 committee meeting as subject-matter experts regarding the development of ASTM standards related to ballistic-resistant body armor testing. This committee is tasked with a collaborative effort between NIJ and ASTM International to transition certain test methods currently contained in the NIJ standard that relate to test range setup and calibration (e.g., bullet velocity measuring equipment placement and calibration; test fixture calibration) to ASTM, where they can be routinely maintained through ASTM’s existing standards review and update process. This will allow these elements of the standard to be more efficiently and effectively updated, and allow NIJ to focus its limited standards development resources on user-defined armor performance requirements. Staff also chaired the ASTM E54 meeting relating to backface deformation measurement. As chair, staff achieved membership consensus relating to the methodology that should be adopted, and further developed relationships with U.S. Army testing labs that will benefit future development of armor-related standards.
American Jails Association Conference. Along with the Compliance Testing Program Research Engineer, the Materials Engineer attended the American Jails Association Conference in Charlotte, N.C., on April 18-22, in support of NIJ Corrections Program Manager Jack Harne. The AJA Conference is the only event of its kind specific to jails and brings together sheriffs, jail administrators, operations managers, training officers, line officers, purchasing agents and elected officials from across the country. The event provided exceptional training and professional development opportunities, in addition to networking activities. The workshop provided attendees with an understanding of the changes being made to the NIJ Stab-resistant Armor Standard (NIJ Standard 0115.00). Specifically, it looked at the capabilities and limitations of the body armor worn by officers and why it is important to select the correct level of protection, with the understanding that no armor is “knife proof.” Participants also discussed how the standard has been updated and designed, the limitations of testing, the introduction of female-specific testing, and understanding the new levels of protection and the environment in which they are intended to be used.

Laboratory Cleanup. From July 5-10, as a precautionary measure, JTIC closed the CTP lab and adjacent areas on discovery the Center had been shipped armor treated with carbon nanofibers. Fibers became dislodged during the testing process and potentially came in contact with staff and surfaces within the lab. The manufacturer had failed to disclose the nature of the material (using a trade name) on shipping the armor for testing. Due to Occupational Safety and Health Administration warnings with regard to the handling of this material, staff assessed the situation and determined a need for cleanup by a qualified vendor. Cleanup was completed on July 10, the contaminated materials were removed and destroyed, and operations continued. A notice to all manufacturers regarding potentially hazardous materials was drafted later in July, and plans call for staff to receive training and personal protective equipment in the unlikely event something similar happens in the future.

Female Body Armor. During a visit to the United Kingdom Government’s Home Office Centre for Applied Science and Technology (CAST) in July, JTIC staff reviewed how CAST makes female armor test forms. The UK has been trialing an alternative “pourable” version of plastilina modeling clay that enables easy manufacture of female test blocks.
Staff began to formalize findings related to female body armor testing into a draft journal article for NIJ’s review, with the goal being submission to a peer-reviewed journal. The article describes an equation that can be used to model a female backing material shape in computer assisted design software or mathematical modeling software. The described shapes were used as the basis for creating molds for forming clay. Armors purchased from a large body armor manufacturer were then tested on top of these clay forms at an NIJ-approved test laboratory to evaluate their suitability for incorporation into a future version of the NIJ ballistic- and stab-resistant body armor standards.

For more information on the CTP, contact NIJ Program Manager Mike O’Shea at (202) 305-7954 or by email at michael.oshea@usdoj.gov.
Protect Your School …
With the Launch of an App

As of October 2015, you can now download School Safe, the new app from the National Law Enforcement and Corrections Technology Center (NLECTC) that takes you step-by-step through your school to identify and address trouble spots. You can conduct a physical assessment of your campus — inside and out — by walking around and answering a series of simple questions using your hand-held device.

This free app, available for iPhone and iPad, helps promote awareness and foster prevention using Crime Prevention Through Environmental Design (CPTED) principles, and allows school resource officers (SROs), school administrators and other first responders to receive no-cost emergency planning assistance without leaving campus.

“Keeping schools safe is a top priority and everyone in the school community has a part to play,” says Sean Burke, president of the School Safety Advocacy Council and school safety consultant with the NLECTC System. “School Safe helps school resource officers and administrators take a good look at their schools, inside and out.
It points out trouble spots and reinforces good practices. School Safe presents the pertinent questions for you to consider as you assess the safety of your campus."

Divided into 10 sections, School Safe begins by helping users summarize a school’s demographics and assessment history, then examines various internal and external considerations. For example:

- Is student access to parking areas restricted to arrival and dismissal times?
- Are trailers/portable classrooms connected to the school’s central alarm system?
- Is exterior lighting checked on a frequent basis?
- Do visitors present a photo ID to be scanned through a records-checking system before they are issued a visitor badge that must be visibly worn at all times?
- Does each classroom have a To-Go Bag?

Users can start assessments and return to complete them at their convenience, and School Safe allows them to attach photographs. The app generates an easy-to-read report in email format that can be shared with supervising officers, school system administrators and other stakeholders. School Safe can generate assessments on multiple schools, and users can update existing assessments with new information, allowing for easy retrieval and storage in a central location.

“School Safe can be your partner in performing a thorough assessment of your facilities,” Burke says.

To receive a free copy of School Safe, visit https://www.justnet.org/SchoolSafe/ to request a code that will allow secure download to one device. The app is available only to vetted criminal justice professionals and school administrators. Requests must be made from an official agency email address, not from a personal email address.
AN APP BETA TESTER SAYS “THUMBS UP”

Cpl. Jon E. Carrier, president of the Maryland Association of School Resource Officers (MASRO), a member of the Executive Board of Directors of the National Association of School Resource Officers (NASRO) and a full-time school resource officer with the Anne Arundel County Police Department in Maryland, had the following to say about School Safe.

I found that even to an experienced school safety assessor like myself who has conducted many school security surveys, School Safe proved cost-effective, relevant and full of good questions in a format that was easily understandable and user-friendly. The end product easily translates to a printed report for the user.

As a beta tester and contributor to School Safe, I found the app easy to understand and believe it can be easily used by most practitioners.

School Safe takes into consideration Crime Prevention Through Environmental Design (CPTED) principles, and poses relevant questions for assessors. For example, it includes questions about video cameras, signage and visitor check-in systems. In conclusion, if you are a school administrator, school security director, school security officer or a law enforcement officer working in the area of school safety, School Safe is a valuable addition to your professional tools.

One of the great things about School Safe is that there were contributors from all over our country working in the area of school safety who gave feedback and opinions that helped inform the content.

Highlights

Throughout 2015, JTIC staff updated School SafetyInfo.org on an ongoing basis, keeping the calendar of events up to date, adding new resource organizations and materials, and posting 25 new success stories. Launched in February 2013 as a special edition of e-TechBeat focusing on school safety and expanded to its own domain in May 2013, School SafetyInfo.org serves as a clearinghouse of information and contacts for law enforcement and other public safety officials to prepare, respond and recover as they work to keep schools as safe as possible.

This site provides information on:

- Government organizations and publications.
- Professional associations.
- University research and resources.
- NIJ services.
- NLECTC products and services.
- Networking opportunities.
Original articles on success stories.

Reposts of news articles from around the country.

School SafetyInfo.org had 5,037 sessions by 4,118 users who looked at 14,912 pages (in the final six months of the year after a switch to Google Analytics changed the way statistics are reported.) Staff processed 182 requests for the School Safe app.

Success stories originally posted on the site are periodically republished as volumes in the Sharing Ideas and Resources to Keep Our Nation’s Schools Safe! series. Printed copies are available for distribution at school safety conferences, and all three volumes in the series are available for download on SchoolSafetyInfo.org. Staff created Volume 3 prior to the July 2015 conferences of the National Association of School Resource Officers and the School Safety Advocacy Council.

In addition to attending those two conferences, staff also attended and exhibited at the Alabama Law Enforcement Agency’s Virtual Alabama School Safety Summit in January; the National Charter Schools Conference in June; the Maryland Association of School Resource Officers Conference, also in June; and the Texas School Safety Conference in July. More details on these events can be found in the Outreach chapter on p. 23.

For more information on JTIC’s school safety-related efforts, contact NIJ Program Manager Mike O’Shea at (202) 305-7954 or by email at michael.oshea@usdoj.gov.
Helping Houses of Worship Plan for Safety and Security

Reports of mass shootings and other threats to public safety monopolize the headlines. Houses of worship have been targeted along with malls, military recruitment centers, schools, theaters and other gathering places. NIJ, through the NLECTC System, is currently creating an app that will help houses of worship (HOW) evaluate facilities and create plans for preventing attacks and other catastrophic events.

Development of Security and Safety Planning for Houses of Worship, which will be released to law enforcement agencies for distribution to houses of worship administrators, leaders or lay members, began in April 2015. Although there are many useful guides and templates and a great deal of information already available, there is no tool that will actually help create a draft plan for a campus based on the team’s answers to questions. The Security and Safety Planning app, which will help HOW develop a customized safety and security plan, is scheduled for beta testing in mid-2016. The app will address human-caused, technological, natural, active threat and medical risks, and plans call for it to operate in a similar manner to well-known tax preparation software.
applications. That is, it will ask questions about a campus; some will not pertain, while others indicate risks that will require more attention. The safety and security team working on a specific HOW plan will be asked to assign a weighting factor based on assessment of the potential consequence of risk. The app uses these answers to help determine a priority list. For example, a facility may frequently lose power, but this may not represent a serious risk. Likewise, other events would truly be catastrophic but the probability of their occurrence is so small they may rank very low. Safety and security team formation, task descriptions, operational plans and incident reports are just some of the additional features planned. The team can include campus maps with locations for electrical panels, water valve shutoff, surveillance cameras, emergency egress routes, rally points, fire alarm stations, AED and first-aid supplies.

“We have all seen over the past few years how some of the places traditionally thought of as safe havens are no longer places of refuge. For years, we have generally thought of our homes, schools, workplaces and houses of worship as places where we could feel safe and free from worry of harm. This is no longer the case,” says Todd Coleman, NLECTC consultant and subject-matter expert in the area of HOW security.

A recent study conducted by the FBI (A Study of Active Shooter Incidents in the United States Between 2000 and 2013, 2014) looked at 160 active threat/shooter incidents. Further, statistics indicate an alarming rate of increase in active shooters each year of that 13-year period. During that time, 486 people were killed, with another 557 wounded. The FBI reports that only 21 of the 486 (4.3%) were killed at houses of worship; however, in the June 2015 incident at Emanuel AME, nine people died (43 percent of the number killed in the previous 13 years). Although many debate the reasons for the alarming increase in active shooter incidents, no one can debate that more people are dying as a result of active threats in locations traditionally thought to be safe locations, especially in HOW, Coleman says.

“Houses of worship present an interesting challenge when it comes to providing safety and security. Unlike schools, where visitors are expected – even required – to register their presence on campus, houses of worship are inviting facilities that encourage both members and visitors to bring their troubles and burdens. At times, it can be difficult to discern whether a member or visitor is seeking fellowship and a place to worship or wants to harm others. Making this discernment can be very challenging,” he says. Dylan Roof, who confessed to
the shootings in Charleston, joined the Wednesday evening Bible study for an hour before he began to kill those in attendance.

Maintaining safety and security at HOW goes well beyond preparing for the eventuality of an active threat incident. The security team must also consider natural hazards, technological hazards and other human-caused threats. How to conduct a thorough review that will help them prepare for various types of hazards, including an active threat, is well documented by the Federal Emergency Management Agency (Guide for Developing High-Quality Emergency Operations Plans for Houses of Worship, June 2013). This guide identifies the process for evaluating hazards or threats and a campus’ vulnerability to them, and also assesses the magnitude of the risks associated with each threat. FEMA suggests that the team can calculate risk mathematically by assigning a magnitude to the threats to which they feel most vulnerable. For example, a campus in the southeastern United States may have an occasional snowstorm, but the magnitude of risk from this type of weather is very small. On the other hand, large-scale damage due to a tornado may be very likely. If a house of worship is located near a train track, it may face a high risk of derailment of a railcar containing hazardous materials.

The team should also consider medical risks. Whether a HOW has an aging population of members, a large group of newborns or many youth members, every age group can present its own medical risks. Heart attack, stroke, diabetes, anaphylaxis, choking, seizures and fainting are some of the most serious and potentially life-threatening situations that may require immediate medical intervention. Evacuation of special needs children and adults in an emergency situation can be difficult if not thoroughly planned and practiced. Trained personnel who are equipped with appropriate medical equipment can help provide prompt medical care until local emergency medical services arrive.

“Although no plan can ever cover every detail, this tool is envisioned to provide a great start to help a newly developing team or supplement the work of an established team. It will give the team the basis to develop a strategy for addressing the most critical risks in a logical fashion. The draft safety and security plan will serve as a great tool to use to help local law enforcement and emergency response groups work together with houses of worship to plan for future drills, exercises and potential responses,” Coleman says.
While the app is in development, JTIC staff have researched online resources and created a page of links on JUSTNET, the NLECTC System website (https://www.justnet.org/Houses_of_Worship.html)

For more information on JTIC efforts related to HOW safety, contact NIJ Program Manager Mike O’Shea at (202) 305-7954 or by email at michael.oshea@usdoj.gov.

Highlights

Throughout the year, the various centers that make up the NLECTC System spread the word about technology innovations and answered questions from the field by exhibiting, presenting and attending a variety of events, and presenting a number of webinars and trainings. A summary follows.

January

County Sheriffs of Colorado Conference. SRTB-RC staff attended/exhibited/presented at the County Sheriffs of Colorado Conference on January 7-8, in Loveland.


February

NIJ Grantees Meeting. On February 17, the FTCOE facilitated an NIJ Grantees Meeting titled, “It’s a Small World – How Collaboration Leads to Innovative Research.” The meeting reflected how NIJ-funded research affects forensic applications throughout the world. Held as part of the annual meeting of the Academy of Forensic Sciences in Orlando, Fla., the event drew 116 live attendees.
Alabama Law Enforcement Agency’s Virtual Alabama School Safety Summit. JTIC staff exhibited and presented at the Virtual Alabama School Safety Summit in Orange Beach on February 23-24. The presentation and booth publications concentrated on school safety and the upcoming release of the School Safe app. The presentation and exhibit booth resulted in numerous requests for school safety information and publications, both at the conference and via follow-up requests.

Rural Conferences. SRTB-RC staff attended/exhibited/presented at the following conferences in February 2015:

- Tennessee Chiefs of Police Training Conference.
- Oklahoma Sheriffs and Peace Officers Conference.

March

Rural Conferences. SRTB-RC staff attended/exhibited/presented at the following conferences during March 2015:

- Utah Chiefs’ Conference, St. George, March 23-25.
- Texas Chiefs’ Conference, Galveston, March 30-April 2.

April

U.S. Department of Homeland Security, Science and Technology Directorate, First Responders Resource Group Meeting. On May 12-14, the JTIC Outreach Coordinator participated in a DHS S&T FRRG meeting. Part of the meeting was spent creating an executive summary for DHS regarding the lack of an unmanned aircraft system response policy for state and local law enforcement. Work was also done on statements of objectives for the following four technology gaps:

- Firefighter personal protective equipment that addresses toxins from new construction, combustibles and environmental elements.
- New capture and restraint system.
- Improved protective headgear.
Sensor monitoring and medical issues protocols.

Rural Conferences. SRTB-RC staff attended/exhibited/presented at the following conferences in May 2015:

- Law Enforcement Support Office Conference (1033 program).
- Texas Regional School Safety Training on Bullying and Social Media Safety.

May

American Society of Crime Lab Directors Symposium. FTCoE staff gave a poster presentation capturing the synopsis of the Familial DNA Searching: Current Approaches report at the ASCLD Symposium on April 26-30, in Washington, D.C. The poster was well received and sparked significant discussion about the high-level recommendations and summary of the project. Also, the FTCoE director presented an overview of the history, capabilities and objectives of the FTCoE. In addition, the FTCoE supported a presentation on current approaches to resolve sexual assault by Dr. Jack Ballantyne of the University of Central Florida, where he highlighted his current work with the successful Y-STR extended collection period for sexual assault evidence.

End Violence Against Women International Conference. FTCoE staff presented a workshop discussing the specific findings from the Organizing and Transferring Sexual Assault Nurse Examiners, Sexual Assault Forensics Examiners and Sexual Assault Response (SANE/SAFE/SART) Knowledge and Best Practices project at the End Violence Against Women International Conference on April 7-9, in New Orleans. The workshop presented evidence-based recommendations combined with extensive agency-specific discussion from the attendees.

Technology Transition Workshop: Cognitive Factors in Forensic Decision Making. On April 7-8, NIJ and the FTCoE sponsored a technology transition workshop titled “Cognitive Factors in Forensic Decision Making.” This workshop provided forensic examiners with training by cognitive experts, with a goal of recognizing and minimizing bias in forensic science. The FTCoE sponsored two additional workshops on April 26-27 in conjunction with the American Society of Crime Laboratory Directors meeting in Washington, D.C.

Ohio Police Chiefs Annual Conference. JTIC staff exhibited at the Ohio Police Chiefs Association annual conference in Columbus from April 26-28. Staff informed attendees about
the latest public safety technologies and applications, and also collected feedback from stakeholders to identify technology gaps and public safety technology needs.

**Rural Conferences.** SRTB-RC staff attended/exhibited/presented at the following conferences in April 2015:

- Texas Chiefs’ Conference, March 30-April 2, Galveston.
- International Law Enforcement Educators and Trainers Association, April 10-15, Wheeling, Ill.
- Northeastern Regional Conference on School Safety & Bullying, April 29-30, Hampton, N.H.

**June**

**AFCEA International.** On June 9, staff attended the AFCEA International meeting, where presentations by Marc Caplan from the U.S. Department of Homeland Security Office of Science and Technology and James Burch of the Police Foundation discussed emerging law enforcement-focused technologies, how government is facilitating their use, and barriers to adoption and how these barriers can be eliminated. All panelists briefed attendees on the challenges facing their agencies and their hopes for the future of such technologies as:

- Chemical, biological, radiological and nuclear and GPS sensors for postal vehicles.
- Integrating wearable sensors into uniforms for law enforcement that transmit information such as health data and impact detection.
- Heads-up displays for first responders allowing them access to the Internet of Things, including “things” like floor maps, resources, health data from imbedded sensors in responder’s gear, site data and interoperable communications, and data channels for all agencies involved in an incident response.
- Creating governance and interoperability standards for new technology, thus allowing all similar technologies to work together seamlessly.

National Charter Schools Conference. JTIC staff exhibited at the National Charter Schools Conference in New Orleans, La., on June 22-23. Visitors to the booth received preview information on School Safe, the forthcoming NLECTC school safety assessment app, and referrals to SchoolSafetyInfo.org and the new Volume III in the Sharing Ideas and Resources to Keep Our Nation’s Schools Safe! series.

Maryland Association of School Resource Officers 2015 Conference. JTIC staff exhibited at the MASRO 2015 annual conference June 25-26, in Annapolis, Md. Visitors to the booth received preview information on School Safe and referrals to SchoolSafetyInfo.org and the new Volume III in the Sharing Ideas and Resources to Keep Our Nation’s Schools Safe! series.

National Sheriffs Association Annual Summer Conference. On June 29-30, JTIC staff exhibited at the 2015 NSA Summer Conference in Baltimore. Visitors to the booth expressed a great deal of interest in the gyroplane loaned by Queen Anne’s County (Md.) Sheriff’s Office that was formerly part of the NIJ Law Enforcement Aviation program, and also asked for information on body-worn cameras and unmanned aircraft systems. Referrals were provided to the new BJA Body-Worn Cameras Toolkit (https://www.bja.gov/bwc) and to the NLECTC publications, A Primer on Body-Worn Cameras for Law Enforcement and Body-Worn Cameras for Criminal Justice: A Market Survey.

Rural Conferences. In June 2015, SRTB-RC staff attended/exhibited/presented at the following conferences:

- Montana Sheriffs’ and Peace Officers’ Conference, June 9-12, Missoula.
- Georgia Jail Association Conference, June 21-25, Savannah.
- National Sheriffs’ Association, June 29-30, Baltimore, Md.
July

National Association of School Resource Officers. JTIC staff exhibited at the 2015 NASRO Conference in Orlando, Fla., July 5-8. Attendees expressed significant interest in the upcoming release of School Safe, the NIJ school safety assessment app, saying it was something they had long needed and would be interested in using.

Pennsylvania Chiefs of Police Association. JTIC staff exhibited at the Pennsylvania Chiefs of Police Annual Conference July 13, in Hershey. Visitors to the booth expressed interest in the upcoming revisions to the ballistic- and stab-resistant body armor standards and in information on body-worn cameras.

Texas School Safety Conference. JTIC staff exhibited at the Texas School Safety Conference in Corpus Christi July 6-8. Attendees expressed significant interest in the upcoming release of School Safe, saying it was something they had long needed and would be interested in using.

Body-Worn Camera Industry Days. JTIC staff exhibited at the Body-Worn Camera Industry Days in Chantilly, Va., on July 14-15, which were sponsored by the Prince William and Fairfax County police departments. Staff distributed numerous NLECTC body-worn camera primer and market survey publications, as well as promotional cards for the BJA Body-Worn Camera Toolkit.

Airborne Law Enforcement Association Annual Expo. JTIC staff attended the Airborne Law Enforcement Association’s Annual Expo in Houston, July 14-17. This expo showcases the technology and uses of manned and unmanned aircraft for public safety. Working with the International Association of Chiefs of Police, staff interviewed subject-matter experts in the field of unmanned aircraft systems for use in a future collaborative video for law enforcement practitioners looking to develop UAS capabilities for their agencies.

School Safety Advocacy Council Conference. JTIC staff exhibited at the School Safety Advocacy Council’s annual school safety conference in Henderson, Nev., July 27-28. Attendees expressed significant interest in the upcoming release of School Safe, saying it was something they had long needed and would be interested in using.
August

**International Association for Identification.** The FTCoE exhibited at the 100th Anniversary Annual Educational Conference of the International Association for Identification on August 2-8, in Sacramento, Calif. It was a record-breaking year for the IAI with approximately 1,700 registered attendees and 125 exhibitor booths.

**National Association of Women Law Enforcement Executives Annual Conference.** JTIC staff exhibited at the NAWLEE Annual Conference on August 5-9, in Hartford, Conn. NIJ and NIST staff gave a presentation on current initiatives related to female-specific body armor.

**2015 Midwest Security & Police Conference/Expo.** JTIC staff exhibited at the 2015 Midwest Security & Police Conference/Expo August 15-19, in Tinley Park, Ill. The event is the only trade show in the Midwest showcasing the latest products and services for security and law enforcement professionals. Staff gave an overview presentation on the NLECTC System and its services.

**2015 International Homicide Investigators Association Symposium.** JTIC staff exhibited at the 2015 International Homicide Investigators Association Symposium August 17-21, in Washington, D.C. The symposium is designed to provide educational training to federal, state, local and international homicide investigators; supervisors; police chiefs and sheriffs; crime analysts; forensic scientists; prosecutors; coroners; medical examiners and other professionals involved in the investigation of violent crimes and deaths. This training includes the latest techniques and methodologies in solving crimes against persons.

**Massively Parallel Sequencing: Validation and Applications.** On August 19, the FTCoE hosted the fourth live webinar in a four-part series on MPS. In this fourth webinar, Validation and Applications, participants discussed potential validation requirements to derive resolutions to pending issues of MPS implementation, including legality and CODIS considerations. Successful examples of MPS application and lessons learned from previous technology platforms were discussed and considered to determine next steps for forensic adoption. A total of 69 users registered for this event and 45 attended.

**Statistical Methods for Forensic Decision-Making.** On August 24, the FTCoE held Statistical Methods for Forensic Decision-Making, a technology transition workshop, in conjunction with
the Impression Pattern and Trace Evidence Symposium in San Antonio, Texas. Dr. Stephen L. Morgan, professor of chemistry and biochemistry at the University of South Carolina, led the workshop. The goal was to disseminate practical knowledge of how to carry out meaningful statistical analyses for impression, pattern and trace evidence. The course used simulations to illustrate statistical principles without lengthy derivations and discussed statistical applications in trace evidence. A total of 50 individuals registered and the workshop had 43 attendees.

FBI Allele Frequency Amendments. On August 25, the FTCoE facilitated a live event for the American Society of Crime Laboratory Directors on the FBI Allele Frequency Amendments. The event focused on technical discussions related to the amendments. The goal of the presentation was to assist quality managers, DNA technical leaders and forensic scientists to provide timely assessment, correction, notification, reporting and documentation. This webinar provided for a technical discussion of the issue by the authors of the FBI’s Erratum. It also included presentations by a quality manager and a technical leader on how they have handled the issue in their laboratories. A total of 399 users registered for this event and 248 attended.

Impression, Pattern and Trace Evidence Symposium. On August 25–27, NIJ and the FTCoE sponsored the Impression, Pattern and Trace Evidence Symposium in San Antonio, Texas. The symposium brought together practitioners and researchers to enhance information-sharing and promote collaboration among the impression, pattern and trace evidence, law enforcement and legal communities. During this three-day event, nine interactive workshops, two keynote addresses, four plenary sessions, 36 poster sessions and 52 oral presentations, by a total of more than 100 presenters, took place. Topics included the latest developments and novel approaches to fingerprint, shoeprint and tire tread evidence, questioned documents, bloodstain pattern analysis, biometrics, firearms/toolmarks, digital photography, fibers, paint, tape and other types of evidence as well as addressing error rates, testimony, interpretation/reporting, case studies and technology applications. More than 400 individuals took part in the program either in person or online. The FTCoE also facilitated a live online presentation of the symposium. Attendees were offered nearly 25 hours of presentations. During the large general sessions, online attendance averaged approximately 160 concurrent attendees, and during the Blue and Green Track sessions, each track averaged approximately 80 concurrent attendees. Overall, 458 users registered for the virtual event and 355 attended.

2015 Virginia Chiefs of Police Annual Conference. JTIC staff exhibited at the Virginia Chiefs of Police Annual Conference August 30-September 1 in Williamsburg.
Intelligence Specialists Conference. The JTIC subject-matter expert on unmanned aviation systems, a subcontractor, gave a presentation at the Intelligence Specialists Conference held in Columbia, S.C., on August 25. Comments included: “Dynamic speaker who knows the subject matter” and “Best class of the conference.”

Rural Conferences. SRTB-RC staff attended/exhibited/presented at the following conferences in August 2015:

- Alabama Chiefs of Police Conference, August 3-5, Orange Beach.
- New Mexico Sheriffs’ Conference, August 17-19, Ruidoso.

September

Statistics and Applied Mathematics in Forensic Science Opening Workshop. On September 1-2, the FTCoE facilitated online attendance for the SAMSI Opening Workshop. This workshop provided an overview of the core topics relevant to the forensics program, which is devoted to the development of methodological, theoretical and computational treatments of statistical and applied mathematical analysis and modeling with applications to forensic science and forensics practice. Speakers addressed specific challenges presented by forensic work focused on pattern evidence, its analysis, the challenges for its interpretation and its presentation in court. The event had 146 registered users and 69 attendees.

Familial DNA Database Search System: Hardware/Software Integration. On September 16, the FTCoE hosted Familial DNA Database Search System: Hardware/Software Integration. The Familial DNA Database Search System is a newly developed, fully web-enabled secure database search system to allow for DNA profile comparisons including those that define familial relationships. This system was developed in collaboration with practitioners from the Denver Police Crime Laboratory, computer programmers from DRC Computers in Silicon Valley and researchers from the University of Colorado-Denver, Department of Mathematics. The system evaluates genotypes derived from the CODIS STR markers with statistical ranking based on a likelihood ratio (LR). The method was compared to the SWGDAM-recommended method of Expected Match Ratios (EMR) and Estimated Kinship Ratios (EKR) through multiple simulated familial searches. The event had 148 registered users and 66 attendees.
The Basics of Error Rates in Pattern Evidence. On September 30, the FTCoE hosted The Basics of Error Rates in Pattern Evidence. One of the Daubert prongs of admissibility for scientific expert testimony is the known or potential error rate of a technique. Thus, examiners are often asked about the discipline error rate on the stand. This lecture described some commonly reported error rates for pattern evidence and demonstrated how to calculate them. The goal of this presentation is for attendees to understand the most commonly calculated error rates and be able to calculate them themselves. The event had 154 registered users and 82 attendees.

Maryland Chiefs and Sheriffs Association Annual Seminar. JTIC staff exhibited at the Maryland Chiefs and Sheriffs Association Annual Seminar in Ocean City on September 14. Attendees expressed interest in information on ballistic-resistant body armor and body-worn cameras.

2015 National Native American Law Enforcement Association Annual Conference. JTIC staff exhibited and presented on the NLECTC System at the National Native American Law Enforcement Association Annual Conference September 21-23, in Las Vegas. Attendees expressed interest in technology that could help them deal with substance abuse issues.
Continuing to Spread the Word About Cutting-Edge Technology

A new technique for testing gunshot residue...advances in sexual assault testing...issues surrounding familial searching: these are the subjects of three of the many projects the NIJ Forensics Technology Center of Excellence (FTCoE) completed during 2015, all of which helped spread the word about advances and innovations in the field of forensic technology.

Gunshot Residue Analysis Featured in New FTCoE Report Series


At the end of a hectic week, have you ever looked at a newly published report, and wished someone would read it for you and tell you what’s important?
The FTCoE has launched a new series called Research in Brief that does just that, and the series starts off by telling the field about changes coming in the analysis of gunshot residue that can increase its evidentiary value in court.

Organic Gunshot Residue Analysis for Potential Shooter Determination is an 18-page PDF available for download on the FTCoE website. It distills the results of two phases of evaluation and several lengthy reports into what FTCoE Director Jeri Ropero-Miller plans as the first in a new series, a series that will break down key research and evaluation components and findings into “something that the field can digest easily and quickly.”

“A lot of our technical evaluation reports have a plethora of information, and that’s great for some researchers, but for the practitioner who just wants to know the nuts and bolts, going through the tech report can be cumbersome,” Ropero-Miller says. “For example, with this report, a gunshot residue analyst might want to read the technical report, but law enforcement agencies just want to know why the field is shifting from using inorganic alone to also analyzing for organic gunshot residue. This report tells them what they need to know.”

The various residues produced when a firearm is discharged are referred to as gunshot residue (GSR), and in current forensic practice, this term refers to particulate residue, including inorganic metal oxides, found on suspected shooters. Current methods rely on an examination of the elemental composition and morphology of inorganic residues. Organic gunshot residue (OGSR) arises from stabilizers that keep the explosive charge from igniting prematurely. Traditional laboratory and field tests relying on traditional, inorganic residues may be limited by factors such as environmental contamination. OGSR chemicals are less subject to environmental interferences.

For many years, GSR analysis was based on the detection and analysis of microscopic particles formed from metals found in the primer that are ejected after a firearm is discharged. These inorganic particles—lead, barium and antimony—can adhere to skin, clothing and other nearby materials when a gun is fired. Although chemical techniques for the detection and analysis of inorganic GSR have improved significantly since the 1990s, lead, barium and antimony are not specific to firearms, which is a limitation when interpreting GSR and reaching conclusions based on the inorganic materials. This has led to more interest in alternatives to analyzing the OGSR found in propellants. Studies are underway to establish the feasibility of using OGSR for the analysis to determine if someone fired a gun.
Organic Gunshot Residue Analysis for Potential Shooter Determination summarizes the results of an extensive evaluation of emerging approaches for the detection of gunshot residue based on organic materials in that residue. In summary, the research found the following:

1. The typical components of organic GSR include diphenylamine (DPA), ethyl centralite (EC), dimethyl phthalate (DMP), 2-nitrodiphenylamine (2NDPA) and 4-nitrodiphenylamine (4NDPA).

2. OGSR residues should be detectable on skin for many hours after a firing event of as few as one or two gunshots.

3. OGSR residues are not lost to secondary transfer [to another person or object]. Residues remain detectable for 12 to 24 hours, with the mechanisms of loss being evaporation and skin permeation. The degree of loss varies from compound to compound.

4. Existing pharmaceutical models can be used to estimate loss from the skin due to evaporation and permeation as a function of the compound and time elapsed.

5. Hand swab samples are stable for approximately two weeks when stored at -20° C. After this period, significant degradation of some of the more volatile compounds is evident. Thus, OGSR samples have a holding time limit.

6. The ability to detect specific OGSR compounds collected from hands at some time post-firing depends on the time elapsed, evaporative loss, loss to skin permeation, sampling efficiency, storage conditions, sample preparation and instrumental method.

7. The variation of persistence among OGR compounds may lead to a viable method to estimate the time since deposition (i.e., time interval between a firearm discharge and the sampling event).

8. The performance of any instrument as a screening device is generally dictated by the hand swabbing technique, not any inherent limitations with the instruments. Both collection of GSR from the subject and extraction into an instrument are important variables.

9. It is recommended that standard reference samples (OGSR-impregnated swabs) be prepared for proficiency testing and other quality assurance/quality control purposes.

10. X-ray fluorescence (XRF) was examined in this study as a technique to screen hand swabs for the presence of metals associated with GSR (lead, barium, antimony). Because XRF is a non-destructive analytical method, it may be combined with other methods in the field or laboratory in sequence to produce effective screening. Lead is the most useful target element for XRF. Barium screening was found to be ineffective, and antimony appeared in only a very few positive samples. GSR detections based only on lead may be subject to false positives.

11. Although it is possible to perform ion mobility spectrometry (IMS) analyses in the research laboratory, significant work remains before IMS can be employed reliably in the field for OGSR screening purposes. The key development needed is a large population study and generalization of pattern-matching algorithms for differentiating shooters from non-shooters, along with an associated probability.

12. Differential mobility spectrometry is a promising alternative to IMS for OGSR detection, though additional work is required before a full validation study can be done.
Conducted by Dr. Suzanne Bell and a team from West Virginia University for the FTCoE, the first two phases of testing and evaluation (for more details, see sidebar, “Organic Gunshot Residue Analysis: Results and Conclusions”) looked at how adding the collection and analysis of OGSR could supplement and enhance current practices and increase the value of GSR evidence in court. That work now moves into Phase III, developing standard protocols and procedures for collecting and analyzing evidence, as well as determining which instruments currently in use will produce the best results. Several labs are already on board to assist with this phase of the project by working with real-world samples.

To access the report, go to https://forensiccoe.org/Our-Impact/Advancing-Technology/Reports/Organic-Gunshot-Residue-Analysis-for-Potential-Shooter-Determination.

FTCoE Promotes Awareness in the Sexual Assault Response Community


It took the young woman, still frightened, a week to report what had happened. Five days longer than the department’s usual 48-hour timeframe for collecting samples for a sexual assault kit (SAK).

Fortunately, the detective assigned to the case worked closely with the area forensics lab, and knew that recent advances in DNA technology might still provide valuable evidence from the woman’s collected samples. It was evidence that, months later, led to a conviction. Unfortunately, this is not always the case for many victims.

In 2014, the FTCoE undertook a special initiative focusing on systemic challenges that impede the investigation of criminal sexual assaults in the United States. Goals included creating an awareness of resources and ensuring that existing research, information, knowledge and best practices are available and accessible to sexual assault nurse examiners, sexual assault forensic examiners and sexual assault response teams (SANE/SAFE/SART), and other practitioners dedicated to improving the response to sexual assault.

The project included an extensive literature review; a meeting with federal stakeholders to conduct an educational assessment of SANE/SAFE/SART training programs; a meeting with sexual assault response researchers, practitioners and stakeholders to develop a landscape
analysis of best practices and training curricula; an online policy forum focusing on the
development of best practices, and emerging techniques and approaches; and the publication
of Organizing and Transferring SANE/SAFE/SART Knowledge and Best Practices: Final Report.

Dr. Patricia Melton, senior research forensic scientist, says that a key takeaway for law
enforcement is that the development of Y-STR research means that viable DNA evidence can
be collected possibly as long as 10 days after the assault took place. Y-STR analysis localizes
DNA analysis only to the Y chromosome, which is present only in males. Although not as
statistically powerful as traditional short tandem repeat (STR) analysis, Y-STR analysis has the
ability to provide DNA results under conditions in which traditional STRs fail.

“A lot of agencies have a 48-hour rule on collecting evidence, and that no longer needs to be
the case,” Melton says. “I hope law enforcement agencies will look at the recommendation
and the evidence we cite [recommendation p. 19; discussion on p. 7, p. 14]. The longer the
period of time, the less likely you are to obtain evidence, but we do have some new tools in our
toolbox. Five or 10 years ago, collecting samples 10 days after the fact was not on anybody’s
radar. The bottom line is when in doubt, collect evidence if you are able.”

Recent NIJ-supported research clearly demonstrates the functionality of collecting sexual
assault kit evidence beyond 48 hours and the subsequent success of obtaining Y-STR results

Melton says that forensics professionals are well aware of these technology advances, but
sometimes that information doesn’t make its way to the persons conducting the investigations
or the professionals collecting the evidence, therefore it is important that information flows
fluently between disciplines.

Helping agencies be aware of the need to institute evidence-based changes in their policies
and procedures, and to share awareness of best practices was a key goal of the project, and
the timely delivery of the report and the archives of the other components should help the
FTCoE and the sexual assault response practitioner community achieve that goal. (See sidebar,
“Recommendations and Strategies,” for related information.)

In addition, the FTCoE is dedicated to assisting with the adoption of those best practices
and policies. In collaboration with Rachell Ekroos, a sexual assault nurse examiner, the
FTCoE has begun work on a standardized terminology glossary that will lay the groundwork for a larger centralized repository of resources, thereby supporting one of the presented recommendations.

*Organizing and Transferring SANE/SAFE/SART Knowledge and Best Practices: Final Report, can be accessed from [https://rti.connectsolutions.com/p6quq6euyx2/](https://rti.connectsolutions.com/p6quq6euyx2/).*

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**RECOMMENDATIONS AND STRATEGIES**

Organizing and Transferring SANE/SAFE/SART Knowledge and Best Practices: Final Report offers four recommendations and strategies for implementing them that resulted from the FTCoE Special Initiative Focusing on Sexual Assault:

**Recommendation 1: Create awareness of the availability of evidence-based best practices for use in guidelines.**

**Strategy:** Conduct more research to establish evidence-based best practices for procedures that were traditionally only anecdotally determined. Provide a mechanism for the dissemination and create awareness of these derived best practices. Some example research questions to corroborate best practice within the SANE/SAFE/SART community are included under Recommendation 3.

**Recommendation 2: Provide a system of communication, collaboration, education and knowledge transfer that can be maintained and updated.**

Although several previous programs have released excellent educational components that, at the time, were effective, no mechanism was implemented for long-term maintenance of these items when location and funding becomes obsolete — both in content and functionality.

**Strategy:** Develop an educational outreach system that is created with input from professional organizations vested in SARTs (e.g., nursing, law enforcement, victim services, legal); is easily accessible to medical, forensic, and criminal justice practitioners on a variety of platforms; and has the fluidity to be updated over time. Training across multiple disciplines on victim-centric care for survivors of sexual assault is critical.

**Recommendation 3: Develop evidence-based best practices for the collection and processing of sexual assault forensic evidence.**

**Strategy:** Assist in the development of consensus documents based on peer-reviewed research, with input from practitioners, to derive best practices for evidence collection during the sexual assault examination.

**Recommendation 4: Provide outreach and resources for development of policies that will maintain high-quality performance over time.**

**Strategy:** Initiate the development of this repository by first creating a centralized glossary with a focus on establishing a common terminology for practitioners associated with the response to sexual assault. This would be a pilot project that will lay the foundation for a larger repository containing additional literature, education, training, best practices and policy development resources.

Familial DNA Project: Engaging Stakeholders, Sharing Opinions


Is it a powerful tool that can develop investigative leads? Or is it an invasion of privacy?

The answer to those questions about familial searching (FS) has puzzled professionals working in the field of DNA identification for a number of years. Thanks to a series of webinars and a report produced by the National Institute of Justice (NIJ) Forensic Technology Center of Excellence (FTCoE), criminal justice professionals now have access to current information that can help them decide how their agency answers those questions.

FS is an additional search of a DNA profile in a law enforcement DNA database conducted after a routine search results in no profile matches. FS involves a two-phase process conducted to develop investigative leads for the purpose of potentially identifying close biological relatives of the source of an unknown forensic profile obtained from crime scene evidence, based on the concept that first-order relatives — such as a sibling or parent/offspring — often will have more alleles of their DNA profiles in common than those of unrelated individuals.

The first phase of FS produces a candidate list from the DNA database ranked by likelihood ratio estimates supporting the specified relationship compared with the alternate hypothesis of being unrelated. The second phase of the process typically uses additional genetic testing to confirm or refute the potential relatedness. (Adapted from Familial DNA Searching: Current Approaches, FTCoE, 2015, p. 2, https://rti.connectsolutions.com/p49lz1rzbpi/).

In states that allow the technique, its use has brought several investigations to successful conclusions and jury trial convictions (including that involving California’s “Grim Sleeper” serial killer in 2010, http://www.nytimes.com/2010/07/09/us/09sleeper.html?_r=0), wherein no legal challenges were made to its use. In addition, Familial DNA Searching: Current Approaches notes that data from FS conducted in Denver and California indicate that FS has a better success rate than search comparisons performed with the FBI’s Combined DNA Index System (CODIS) (discussed on pp. 20-21).

Opponents of FS, including the American Civil Liberties Union, have concerns that searching for suspects among the DNA profiles of relatives in a DNA database constitutes an invasion of
privacy and violates the Fourth Amendment, arbitrarily creating two classes of people: relatives of convicted persons, who are subject to FS, and other people, who are not (http://www.aclu-il.org/familial-dna-testing-raises-serious-privacy-and-civil-rights-concerns/, http://acluva.org/7381/aclu-wary-of-familial-dna-searches-in-virginia/; http://www.nyclu.org/news/grave-civil-rights-risks-plan-use-dna-evidence-%E2%80%98familial-searching%E2%80%99-nyclu-warns). Some opponents of FS have suggested protective measures to address these concerns should FS be employed. This topic was heavily discussed within the 2014 FTCoE webinar series by the panelists, including those who oppose FS.

The FTCoE-facilitated webinar series focused on various FS policies and practices, and took an even-handed approach to exploring both sides of this discussion. The webinars covered technical considerations, legal challenges, comparison with other types of DNA searches and implementation ramifications, resulting in the above-referenced Familial DNA Searching: Current Approaches, which captures the discussions and thus attempts to answer some of the policy questions.

To bring those experts to the table, the FTCoE put on one webinar per month over a four-month block beginning in May 2014. Each webinar lasted two hours and drew more than 100 participants, and was facilitated by the University of North Texas Health Science Center, with Dr. Bruce Budowle and Rockne Harmon, a retired California prosecutor who played a key role in that state’s adoption of the technique, serving as consultants and discussion leaders. The questions asked mainly related to policy — even when the questions came from the scientific community. For that reason, the FTCoE brought together representatives from the scientific, legal and law enforcement communities as webinar panelists. Panelists were a cross-section of professionals that included some who were experienced in the use of FS, some who were new to its use and some who do not use it.

According to the report (p. 22), that groundwork includes the following considerations:

- For agencies who decide to apply FS, practices and policies exist that can serve as guidance models to ensure that the proper balance of personal privacy and the needs of the state can be met.
More investigative leads can be developed based on the current demonstrated FS successes.

Formal internal laboratory review committees should be implemented to (1) assess the statistical significance of FS results, (2) properly handle the disclosure of FS results to investigating agencies, (3) train investigators on the meaning of the results and (4) emphasize the legal and proper conduct restrictions on how the information can be applied in a criminal investigation.

If no true biological relatives of the perpetrator are identified via FS, states should establish provisions in FS policies that allow laboratories to revisit the profile and perform FS again in subsequent years, as thousands of new sample profiles are uploaded to these databases.

To access the archived webinars and the report, visit https://forensiccoe.org/Our-Impact/Advancing-Technology/Reports/Familial-DNA-Searching-Current-Approaches.

Highlights

In furtherance of its mission to provide current research and information to the forensic professional community, the FTCoE performed the following in 2015:

- Hosted 74 online presentations and knowledge transfer events on a variety of forensic technologies and capabilities, delivering more than 20,000 content hours to the forensic community.

- Disseminated NIJ-funded research, and delivered technology assistance and Web-based technology transfer workshops to more than 10,000 registered practitioners.

- Showcased the FTCoE and disseminated NIJ-funded research through workshops at the 2014 American Academy of Forensic Sciences (AAFS) Meeting in Orlando in February; End Violence Against Woman International Conference during April in New Orleans, La.; International Symposium on Human Identification in Grapevine, Texas, in October; and International Association of Chiefs of Police during October in Chicago. Hosted Web-based training and dissemination of grantee presentations that were attended by more than 500 participants.
Hosted five Forensic Technology Working Groups (Standard DNA, Non-Standard DNA, Instrumental Analysis - Controlled Substances and Toxicology, Impression and Pattern/Trace Evidence and Crimes Scene and Medicolegal Death Investigation) on September 15-16 in Arlington, Va.

Convened the Forensic Optical Topography Working Group Meeting in partnership with the National Institute of Standards and Technology (NIST) March 17-18 at the NIST campus in Gaithersburg, Md., and published a report created from discussions at the meeting.

Published and disseminated 10 reports:


- One landscape study: Demystifying MIST - Landscape Report for DNA Mixture Interpretation Software Tools.


- Four FTCoE Activities Reports: 2014 FTCoE Activities: Executive Summary, 2014 FTCoE Activities: Infographic, FTCoE Conference and Meeting Exhibitions Overview and FTCoE: Activities and Deliverables 2011 (Q4) -2015 (Q1).

Facilitated and coordinated efforts for the national response to sexual assault, including:

- Sexual Assault Kit Process Map Working Group, January 2015.

- Development of forensic medical sexual assault glossary with more than 500 terms.

- Online seminar hosted by Duquesne University: Sexual Assault on Campus, May 2015.

- SAFER Subcommittee Meeting and Process Map Working Group, August 2015.
Presented “Organizing and Transferring SANE/SAFE/SART Knowledge and Best Practices” at EVAWI in April 2015 and at IAFN in October 2015.

Provided technology assistance to Y-STR, Cheminformatics and FROG-kb database projects. The Y-STR database added more than 2,300 new haplotypes in 2015 and averaged more than 1,300 searches per month. It is comprised of 35,295 samples with a complete 11-marker SWGDAM core haplotype. The Cheminformatics database, forensicDB, currently has 3,234 records representing approximately 6,722 spectra and was visited by more than 1,200 users in 2015. FROG-kb was accessed by 3,336 visitors with 28,741 total hits and has been actively adding new SNPs and allele frequency tables to ALFRED, giving priority to forensically relevant polymorphisms. Number of markers increased from 663,887 to 664,138, and populations from 720 to 723 with an increase in allele frequency tables from 37,064,633 to 37,099,004.

Helped NIJ stand up a portfolio approach for NIJ’s research investment. The R&D Portfolio Review and Transition Support identifies, plans for and executes transition support ranging from knowledge transfer to IP management to partnerships. To date, the FTCoE has processed more than 412 active and inactive R&D projects, and evaluated in greater depth the technology adoption potential of 37 projects. More than 20 received support or presentation as success stories to enable greater awareness and adoption; four of these remain active.

Hosted a four-part online panel discussion concerning current approaches in massively parallel sequencing (MPS). This four-part webinar series addressed the challenges that confront implementation of a MPS system into the crime laboratory, including training and education on fundamentals of the chemistry, functionality and genetic marker systems; validation criteria and study design; policy and data procedure developments related to CODIS operations; and perceived admissibility and privacy issues. It convened experienced and knowledgeable subject-matter experts from across the country, and has been attended in the live and archival formats by nearly 400 participants.

Co-sponsored, with NIJ, the Impression, Pattern and Trace Evidence Symposium (IPTES) on August 15-17 in San Antonio, Texas. The symposium was specifically designed to bring together practitioners and researchers to enhance information-sharing and promote collaboration among the impression, pattern and trace evidence, law enforcement and
legal communities. The symposium provided unique educational opportunities for forensic examiners in the disciplines of impression, pattern and trace evidence. During this three-day event, nine interactive and motivating workshops, two keynote addresses, four plenary sessions, 36 posters and 52 oral presentations by more than 100 presenters, and including interactive panel discussions, were shared with attendees.

- Hosted three Technology Transition Workshops for a total of four days of training, one two-day event (April 7-8) at the RTI campus in Research Triangle Park, N.C., and two one-day events in conjunction with the American Society of Crime Laboratory Directors meeting (April 26-27) in Washington, D.C. Nearly 100 practitioners received training through this best practices workshop topic. The event provided forensic examiners with training by cognitive experts (Dr. Itiel Dror) to recognize and minimize bias in forensic science.

- Hosted two full-day Technology Transition Workshops for a total of two days of training; one event (August 24) in conjunction with the Impression, Pattern and Trace Evidence Symposium (IPTES) in San Antonio and, the second event in conjunction with the Society of Forensic Toxicology meeting (October 19) in Atlanta. Nearly 100 practitioners received training through these best practices workshops on Statistical Methods for Forensic Decision-Making. The workshops, led by Dr. Stephen L. Morgan, were tailored to the attendees’ areas of expertise in impression and pattern evidence and toxicology.

- Facilitated Working Groups on Lean Facility Design (LFDWG) at the Johnson County Sheriff’s Department Criminalistics Lab in Olathe, Kan., in June and August 2015. This special initiative will provide guidelines on how to incorporate Lean concepts and techniques into new or reconstructed forensic facilities to improve lab performance through space and resource allocation, process changes and future growth technical changes.

For more information on the Forensic Technology Center of Excellence, contact NIJ Program Manager Gerald LaPorte at (202) 305-1106 or by email at gerald.laporte@usdoj.gov.
The Johns Hopkins University Applied Physics Laboratory (JHU/APL, www.jhuapl.edu), in partnership with the JHU Division of Public Safety Leadership (http://psl.jhu.edu/), has established the National Criminal Justice Technology Research, Test, and Evaluation Center (RT&E Center) in Columbia, Md., to conduct focused RT&E activities to inform NIJ’s technology research, test and evaluation efforts to enhance the capabilities of state, local, tribal and territorial criminal justice agencies. The RT&E Center also supports NIJ’s efforts to develop and share knowledge with practitioners, policymakers and researchers regarding technologies or technology-related issues for purposes of improving criminal justice policy and practice. The activities of this center vary from year to year depending on the needs of NIJ’s science and technology RT&E efforts.

The RT&E Center is staffed by JHU/APL, the JHU Division of Public Safety Leadership and the JHU Bloomberg School of Public Health (http://www.jhsph.edu/). The center conducts multiple concurrent projects using a core management team and project-specific scientists.
and engineers working in coordination with criminal justice end users and additional subject-matter experts.

**Highlights**

Since its inception, the RT&E Center has completed the following projects:

- Performed a comprehensive market survey titled *Location-Based Offender Tracking Technologies*. An offender tracking device is a homing device that individuals under house arrest or parole are often required to wear. This survey of offender tracking systems (OTS) hardware and software will assist public safety and criminal justice practitioners who may be considering the acquisition and implementation of OTSs.

- Conducted a characterization evaluation of AMP’s *ShieldRAY Tripwire Detection Device* (ShieldRAY TDD™) to determine its operational characteristics. The laser-based devices underwent characterization testing to determine functionality and safety for an operational environment. Staff compared measurements to manufacturer claims and U.S. Food and Drug Administration (FDA) regulations.

- Executed a study to evaluate the technical and operational use of datacasting in support of law enforcement. Datacasting enables the encoding and transmission of data within the currently unused part of the digital television (DTV) signal. The study assessed the technical capabilities and limitations of datacasting as a technology, identified potential uses of datacasting to support law enforcement and evaluated the ongoing use of datacasting at an operational site.

- Conducted a literature review to better understand how a law enforcement vehicle’s visibility markings, paint schemes and emergency lighting packages can make the vehicle more visible and identifiable by an approaching motorist. By understanding the factors involved when a motorist is required to rapidly identify law enforcement vehicles in real-world settings under various environmental conditions, law enforcement agencies can better design markings, paint schemes and lighting packages to increase awareness and recognition of the vehicle and potentially reduce the likelihood of a collision.
The following projects were in progress at the end of 2015:

- A white paper discussing the RT&E Center's findings regarding how geospatial analytics are used with offender monitoring systems to support community supervision practices at state and local levels within the United States. The wide variation that occurs and the degree to which such systems have been implemented successfully provided the basis for making a qualitative assessment of the relative advantages and limitations of using geospatial analytics systems to develop actionable information for use by corrections, probation and parole officers.

- A market survey identifying commercially available offender monitoring analytics for use in community supervision programs will serve a follow-on to the white paper findings discussed above. These systems, which have been used in a wide variety of applications with varying degrees of success, record the geospatial movements of eligible offenders every few minutes and the resulting data are monitored at least daily by probation and parole officers to ensure that offenders comply with the terms of their arrangements. The information acquired can also be used to track individuals and monitor their habits, enabling the identification of social networks, the definition of mobile exclusion zones to help protect former victims and crime scene correlation.

- A study to provide a comprehensive overview of technology used in the United States and other nations to prevent and mitigate criminal acts of violence in both public and private K-12 schools in response to the congressionally directed Comprehensive School Safety Initiative.

- A study to provide an operational evaluation of the Performance Management Information System (PMIS) developed by the RAND Corporation for corrections personnel. Working in collaboration with the Broward County (Fla.) Sheriff’s Office, the study will report on the performance of the system itself and the methods used in its implementation, and provide observations and recommendations for future implementations of the system.

- An independent assessment of the StarChase system. StarChase, a commercial-off-the-shelf system, contains a compressed-air launcher mounted behind the grille of a police vehicle. This launcher has a laser targeting capability and discharges an adhesive
projectile/tag containing a GPS module, which then transmits coordinates back to law enforcement entities in near real-time via a digital roadmap.

■ A market survey of communications systems that focuses on currently deployed systems and technologies used or in development by U.S. government departments and agencies (e.g., the U.S. Department of Defense, NASA) that may have applicability to law enforcement communications. The survey will gauge these systems’ scope and maturity, and determine their usefulness for the law enforcement community and potential constraints on domestic use.

■ A technical and operational evaluation of advanced radio technology demonstration systems for law enforcement. Engility Corporation, working under a grant from NIJ, conducted demonstrations of technologies developed by four universities in the areas of spectrum agility, bandwidth aggregation, LMR voice interoperability and smart/reconfigurable antenna technology. The RT&E Center seeks to determine the potential value of the demonstration systems for further research, development and integration.

■ A comprehensive market survey that identifies contraband detection systems available for use in the corrections community. Technologies capable of effectively detecting contraband represent a current and evolving need in the corrections community.

■ An analysis of the University of Houston-developed video analytics system, Multiple Person Re-identification Using Part based Spatio-Temporal Color Appearance Model.

■ An operational evaluation of small, unmanned aerial systems for use in crash scene reconstruction.

■ An operational evaluation of the Chicago Police Department’s pilot predictive policing system.

For more information on the RT&E Center, contact Director Bill Ford, NIJ Office of Science and Technology Research Division, at (202) 353-9768.
Technology makes significant contributions to the effectiveness, efficiency and safety of the criminal justice system. Work to develop new technologies — and to find new ways of using existing technologies — can improve the efforts of law enforcement, the courts and corrections agencies in many ways. However, the development and application of technology in these sectors can be challenging. For a variety of reasons, this challenge is felt most acutely in small, rural, tribal and border (SRTB) areas.

The NLECTC System includes a center to help agencies in SRTB areas identify and implement technology to improve their functioning: the Justice Innovation Center for Small, Rural, Tribal, and Border Agencies (JIC). The former Small, Rural, Tribal, and Border Regional Center (SRTB-RC) was transferred to the RAND Corporation in 2015 and renamed the Justice Innovation Center. The new JIC has as its mission to identify, evaluate and disseminate information on technology solutions that meet the operational challenges of SRTB communities.
To accomplish its goals, JIC has begun work to gather information on the challenges facing SRTB agencies, find technology solutions that may address those challenges and evaluate those technology solutions in real-world situations. These activities will provide actionable guidance to SRTB agencies for prioritizing, planning and implementing technology.

JIC’s first year was spent examining technology use in each of the three criminal justice areas (law enforcement, courts and corrections) and in all four sectors of interest — small, rural, tribal and border. JIC researchers combed the literature to identify research that demonstrated the needs of these agencies and reviewed reports providing examples of agencies using technology to solve some of their biggest challenges. Very little work has previously been done in this area; many existing studies have focused on large, urban agencies, leaving SRTB agencies without the vital guidance they need. JIC’s search pointed to a significant knowledge gap.

JIC researchers also reached out to practitioners across the country to get firsthand information on their challenges and hear stories of their technology successes that might be shared with other agencies facing similar issues. They also learned about attempts to use technology that didn’t quite work, but still provided important lessons on using technology in a criminal justice organization. From these in-depth interviews — staff spoke with nearly 150 sheriffs, judges, court staff, jail administrators, probation office directors and others in more than 30 states — JIC pulled together a picture of how technology is being used, how it could be used and how to implement its use in SRTB criminal justice agencies.

To dive deeper into understanding the needs of SRTB agencies and identify technology solutions, JIC convened an advisory panel meeting in December 2015 at RAND’s Arlington, Va., offices. The advisory panel brought together 35 individuals representing law enforcement, courts, institutional corrections and community corrections agencies in small, rural, tribal and border areas. Several experts in the field also joined the advisory panel meeting to provide their input. Exhibit 7 provides information on the representation from each criminal justice agency type and sector.

JIC partners from Arizona State University, representatives from the National Institute of Justice and outgoing members of the SRTB-RC also attended the meeting.
Participants were divided by agency type into small discussion groups. On the first day, JIC researchers facilitated extensive discussions with participants on the challenges or issues facing agencies like theirs and potential technology-based solutions or strategies to address those issues. On the second day, JIC presented participants with a list of the issues they had discussed and solutions they had identified during the first day’s group discussions. Participants used a method previously developed at RAND to rank the solutions identified by participants in order of importance.

Following the meeting, participants were emailed a second survey that presented the results of the solution-ranking exercise. Participants were then asked whether they would change the priority of any of the solutions. As of the end of 2015, JIC researchers were analyzing the results of the advisory panel discussions, solution-ranking exercise and follow-up survey. These results will be presented in the JIC Year 1 report in early 2016.

Results from the advisory panel meeting will be used to identify technologies that JIC will evaluate in its second year of funding. These evaluations will examine the costs and benefits associated with agencies’ adoption of new technologies, considering acquisition costs, staff time, training requirements, system operation and maintenance costs, safety improvements and performance outcomes.

Once technologies have been selected for evaluation, JIC staff will recruit agencies willing to participate in research implementations of the technology. These evaluation projects will be designed to provide important information that can be used to guide other agencies’ decisions.
on what technology to use, what pitfalls to avoid and what improvements they might get from the technology.

**Highlights**

Other highlighted activities during the year included:

- Attended 14 conferences, workshops, symposia and training sessions to introduce JIC to relevant audiences, present on JIC’s planned work and network with agency leaders from SRTB sectors. The schedule included the following:
  
  
  - National Association for Court Management, Lost Pines, Texas, February 2015.
  
  - Academy of Criminal Justice Sciences, Orlando, Fla., March 2015.
  
  
  
  
  
  
  
  - Guam Workforce Development Training, Tumon, Guam, June 2015.
  
— Maryland Chiefs of Police and Maryland Sheriff's Association, Ocean City, Md., September 2015.


- Developed a database of relevant literature that will be available on JUSTNET. The database contains information on nearly 160 journal and magazine articles, reports and briefs about technology use in SRTB agencies.

- Worked with JTIC staff to design a JIC presence on JUSTNET and develop a new logo for the center. This will help JIC to have consistent branding for activities and products, and staff will continue to refresh the JIC pages with a new look and new content.

- Conducted interviews with individuals from 147 agencies in SRTB sectors on their greatest challenges, technology needs and suggested solutions. Interview data were transcribed, coded and analyzed for the JIC Year 1 report.

- Began planning for Year 2 pilots, including a study of time use in all three agency types in SRTB areas.

Small, Rural, Tribal and Border Regional Center Highlights

Staff from the predecessor contract to JIC, SRTB-RC, worked on activities to close out that award during 2015. Highlights follow.

SRTB-RC completed the evaluation portion of the Law Enforcement Aviation Technology Program. Agencies that had participated in the program continued to support NIJ through technology demonstrations and with special projects. Most noteworthy was the participation of the Somerset (Ky.) Police Department’s and Queen Anne’s County (Md.) Sheriff’s Department’s gyroplanes in the North American Aerospace Defense Command (NORAD) Falcon Virgo exercise to evaluate the early warning system’s ability to detect slow-flying aircraft at low altitudes in restricted airspace. This particular exercise was the direct result of a Florida postal

Aircraft from the program were displayed at the Joint Base Andrews Air Show in September 2015 at the request of NORAD. They also supported NIJ through displays at the National Sheriffs’ Association and the International Association of Chiefs of Police conferences.

Other activities included:

- Distributed 7,661 informational CD/DVDs of which 5,722 were directly related to school safety.
- Responded to 588 individual requests for assistance with the Law Enforcement Support Office’s 1033 program.
- Attended/presented or exhibited at 26 conferences, including:
  - International Association of Chiefs of Police.
  - National Sheriffs’ Association.
  - International Law Enforcement Educators and Trainers Association.
  - Airborne Law Enforcement Association.
  - FBI National Academy Associates Conference.
  - National School Safety Conference.
- Hosted three Regional Anti-bullying and School Safety trainings:
  - New England.
  - Texas.
  - Tennessee.

For more information on the Justice Innovation Center, contact NIJ Program Manager Mike O’Shea at (202) 305-7954 or by email at michael.oshea@usdoj.gov.
On behalf of the National Institute of Justice (NIJ), the Criminal Justice Priority Technology Needs Initiative is carrying out a research effort to assess and prioritize technology needs across the criminal justice community. The fundamental goal is to enable innovation in the U.S. criminal justice community – from incremental changes in the way agencies do daily tasks, increasing their efficiencies and solving their current problems to transformational changes that make it possible for them to do entirely new things or accomplish objectives in new ways.

The Initiative includes five major efforts:

- **Assessing community and institutional corrections needs.** As part of this effort, the Initiative held a Corrections Advisory Panel in the Washington, D.C., area on May 19-22, 2014, to identify and prioritize needs across the corrections sector. Participants included corrections professionals from more than 20 agencies from across the country. This panel resulted in the publication of a 2015 report,
Examining future technology needs in law enforcement. A Law Enforcement Futuring Workshop took place in the Washington, D.C., area on June 22-25, 2014, to explore how key trends in society and technology could challenge law enforcement agencies. Participants crafted possible future scenarios and explored technology requirements under different future conditions. This workshop resulted in the publication of a 2015 report, *Visions of Law Enforcement Technology in the Period 2024-2034: Report of the Law Enforcement Futuring Workshop*. A second technology workshop in September 2015 discussed how law enforcement can best leverage future communications capabilities anticipated to be fielded over the next 10 to 15 years, while mitigating potential risks. A report will be released in summer 2016.

Identifying criminal justice needs regarding digital evidence. The Initiative held a technology workshop in the Washington, D.C., area on June 28-29, 2014, that focused on issues around the collection, analysis, search and use of digital evidence. Participants identified and prioritized technology needs focused on increasing effectiveness of criminal justice agencies with respect to digital evidence and its use in court proceedings. A report from this meeting can be found at http://www.rand.org/pubs/research_reports/RR890.html.

Assessing the implications of Web 3.0+ technologies for criminal justice. A planned technology workshop will focus on the potential implications of Web 3.0 and future information technologies for criminal justice practice. Participants will look forward approximately five years to discuss what Web and Internet-related technologies are likely to be available (either freely or commercially) to the public, law enforcement and criminals, and to assess the potential impact of those technologies. A report from this meeting can be found at http://www.rand.org/pubs/research_reports/RR928.html.

Examining technology issues in the court system. Initiative staff continue to carry out foundational research and outreach related to identifying technology issues related to court operations and functioning. A Court Advisory Panel meeting took place in May 2015, and a report is expected to be released in mid-May 2016. This research is intended to support a future Courts Advisory Panel to broadly identify and prioritize court technology needs.
Improving school safety. A school safety technology workshop took place in the Washington, D.C., area in April 2015. The Role of Technology in Improving K-1 School Safety, a report from this meeting, will be released in March 2016.

In addition to the two reports mentioned previously, the Initiative produced a third report in 2015, High-Priority Information Technology Needs for Law Enforcement. More details on those three reports follow.

Fostering Innovation in Community and Institutional Corrections: Identifying High-Priority Technology and Other Needs for the U.S. Corrections Sector

U.S. corrections agencies manage offenders confined in prisons and jails and those who have been released into the community on probation and parole. Corrections agencies face major challenges from declining budgets, increasing populations under supervision, problems of equity and fairness in administering justice, and other concerns. This report draws on published literature and new structured deliberations from a practitioner Corrections Advisory Panel to frame an innovation agenda. It identifies and prioritizes potential improvements in technology, policy and practice in both community and institutional corrections.

Key Findings

Corrections technology and practice can be represented as five main categories:

- Facility operations and population services.
- Person-worn equipment and weapons/force.
- Information and communications.
- Vehicles.
- Doctrine, tactics, management and behavioral knowledge development and training.

The Corrections Advisory Panel identified 19 high-priority needs for community corrections and 29 for institutional corrections. Most of the top-tier needs fell under one of two main categories: (1) information and communications, and (2) doctrine, tactics, management and
behavioral knowledge development and training. Examples of high-priority technology needs included deception detection, new illegal drug detection tools, automated translation tools, various scanners and detectors for detecting weapons and other contraband materials, and policies for analyzing offender social media use.

The elements that make up the innovation agenda and the requirements to meet them vary considerably. They include:

- **Develop and improve technology.** The corrections enterprise needs new technologies to meet its specialized needs.
- **Adapt technology to the corrections environment.** Although some existing technologies can meet corrections needs, tools must address the complexities of community and institutional settings as well as sensitivities and legal concerns.
- **Perform research and analysis.** Some needs from both working groups require developing new knowledge to guide practice.
- **Validate tools.** There was a clear call for assistance in demonstrating that some existing tools actually do what they say they do.
- **Change organizations’ policies and practices.** Policymakers and decisionmakers can build incentives into grant and other mechanisms to shape behavior, but outside forces can only facilitate — not execute — new innovations.

**Recommendations**

Although institutional and community corrections each have their own particular requirements, innovation in a number of areas could contribute to improving performance across the sector. Examples include improvements in information-sharing, automated translation tools, staff training and social media monitoring.

The advisory panel identified some needs with much broader implications, including questioning how requirements for restitution affect the ability of offenders to successfully reintegrate into society and not return to prison (in the community working group), and the
need to develop much broader alternatives to incarceration for categories of offenses or offenders (in the institutional working group). Although some such changes made it into the top-tier needs, others did not, in part because of concerns about the likelihood of making such fundamental changes successfully.

**Visions of Law Enforcement Technology in the Period 2024-2034: Report of the Law Enforcement Futuring Workshop**

The objective of this workshop was to identify high-priority technology needs for law enforcement based on consideration of current and future trends in society, technology and law enforcement over a 10- to 20-year time period. During the workshop, participants developed sets of future scenarios, constructed pathways from the present to alternative futures and considered how law enforcement use of technology might affect these pathways. They then identified technology needs (including training and changes in policies or practice) that, if addressed, could enable pathways to desirable futures, or prevent or mitigate the effects of pathways to undesirable futures. The output included 10 future scenarios and 30 technology needs. The technology needs fell into three general categories — technology-related knowledge and practice, information sharing and use, and technological research and development — and were placed into three priority tiers.

**Key Findings**

**Scenarios generated.** The most desirable futures envisioned by workshop participants included ones in which society comes to term with large amounts of formerly private data being widely available and ones in which network-centric policing is widely used. Desirable scenarios, but less desirable than the above, included ones in which law enforcement operations are increasingly militarized.

Undesirable scenarios included ones in which police are overwhelmed by duties such as responding to natural disasters. Another set of undesirable scenarios was associated with a “do nothing” approach, in which law enforcement fails to keep up with the rapid pace of technology and becomes less effective as a result.

**Technology needs identified.** Workshop participants identified 30 technology needs with general themes focusing on improving the sharing and use of information, improving law
enforcement's knowledge of technology and how to use it, and development and fielding of various affordable new technologies.

**Workshop conclusions.** Positive steps to address identified needs in technology, policy and practice must be taken to avoid paths to futures that workshop participants identified as undesirable. The literal “do nothing” path was seen as leading to highly undesirable futures, and even the “do just enough to stay afloat path” was seen as leading to poor outcomes.

Because technology and society will continue to evolve, moving to and staying on paths to futures that the participants identified as desirable will require continuing action to establish and retain public support, and law enforcement practitioners to effectively meet technology-based challenges.

**High-Priority Information Technology Needs for Law Enforcement**

This study reports on strategic planning activities supporting NIJ in the area of information technology, collecting and analyzing data on law enforcement needs and offering potential solutions through technology assessment studies, extensive outreach and liaison activities, and subject-matter expert panels. By looking across the top-ranking needs, the authors identified 11 cross-cutting themes in total. These themes are further grouped into three overarching keynotes — a broad need to improve the law enforcement community’s knowledge of technology and practices, a broad need to improve the sharing and use of law enforcement-relevant information and a broad need to conduct research, development, testing and evaluation on a range of topics. The latter category includes research on both the “nonmateriel” side of technology, including policy and practices, and more traditional technical development.

**Key Findings**

- **Law enforcement’s knowledge of IT and its dissemination can be improved.** A wide range of efforts have been undertaken to disseminate technology information to law enforcement practitioners. A strong desire for help in technology use and management remains, implying needs for improvement in technology dissemination and education.

- **Sharing, displaying and using information effectively is a major challenge.** Enabling the sharing of information across law enforcement systems is a difficult problem —
technically, organizationally and commercially. Information-sharing efforts to date have had limited coverage and can be inconsistent with each other. Further, it is difficult for new developers and users to learn about all of the available information-sharing tools and technologies. Tools that display situational awareness information to law enforcement users at all levels are lacking. In addition, there is a need to improve mechanisms for communicating with the public.

**Additional areas need research and development.** There is a need to improve the following:

- Systems for monitoring and protecting the health of officers, including both their physical and their mental health.
- Security, privacy and civil rights policies for using IT.
- The affordability of law enforcement IT systems across their entire life cycle.
- Identification of promising practices that can leverage IT effectively to reduce crime.
- IT (along with supporting training and policies) to help law enforcement respond to major incidents.
- The use of a range of deployable sensors. These include body-worn cameras, field biometrics, electronic evidence collection systems and video surveillance systems.

**Recommendations**

1. A federal coordinator for technology-related outreach should be designated. This coordinator would work with various offices to develop and monitor a dissemination strategy capturing who will do what, for whom and when. This coordinator should maintain and monitor a master list of outstanding needs and development tasks to address them, and should also capture which information-sharing projects are addressing the required tasks and disseminate all gathered information in a strategic plan.

2. Work on providing common operational picture/dashboard displays to law enforcement officers should be undertaken.
3. Communications between the public and law enforcement should be improved.

4. The emotional state and physical health of officers should be monitored.

5. Federal efforts to provide tracking systems for responders during major events should be undertaken.

For more information on the Criminal Justice Priority Technology Needs Initiative, contact NIJ Program Manager Steve Schuetz at (202) 305-7663 or by email at Steven.Schuetz@usdoj.gov.
During 2014, three Centers of Excellence completed their contracts with the National Institute of Justice. Their accomplishments for the year follow.

**Corrections Technology Center of Excellence**

The CX CoE served as the authoritative resource in the NLECTC System for both practitioners and developers with respect to technologies that support both institutional and community corrections. The center leveraged a wide array of the multidisciplinary research units of its host agency, the University of Denver, to further its mission.

The CX CoE helped transition technology from the laboratory into use by first adopters in the corrections community. Before closing on Sept. 30, 2015, the CX CoE supported NIJ’s research, development, test and evaluation activities during that calendar year as follow:

- Completed an operational evaluation of hand-held cell phone detector devices at the Pennsylvania Department of Corrections State Correctional Institution at Chester (SCI-Chester). Four devices were tested: two RFDs (PocketHound™ and WolfHound Pro™), one NLJD (Orion 2.4™) and one FMD (MantaRay™). The
high-level goals of the evaluation were to determine the extent to which the devices could identify and locate a hidden cell phone, the time required to detect the contraband and the impact of false alarms. Researchers also explored whether the technology allowed for more efficient searching as measured by time. The report presents details on how the test and evaluation was conducted, and raises issues to consider when acquiring and implementing hand-held cell phone detection device technologies. Criminal justice professionals can obtain copies on request by emailing asknlectc@justnet.org.

- Supported professional associations such as the American Probation and Parole Association (APPA) and the American Correctional Association (ACA) primarily through participating in their respective technology committees. Staff presented workshops at the ACA Winter and Summer Conferences on issues related to managing contraband cell phones.

- Responded to 43 requests for technical assistance.

- Contributed content for articles appearing in professional journals, including *e-TechBeat; Corrections Today*, the ACA journal; and *Perspectives*, the APPA journal.

- Managed the Offender Tracking Standard Special Technical Committee (STC) and its efforts to develop the first standards and testing program for offender tracking system technologies. The test methods outlined in the current draft standard were validated. Results are being incorporated into final drafts of the performance standards and test methods, the selection and application guide, the certification program requirements and refurbishment program requirements.

- Worked with a number of developers to assist in the transfer of technology to early adopter agencies.

- Completed a Global Reference Architecture (GRA) Service Specification Package (SSP) specific to the transfer of offender tracking information between systems. The SSP, officially titled the Offender Tracking Record Transfer Service Specification, has been submitted to the Global Standards Council for consideration for adoption as a reference specification.
For more information on the projects and programs in NIJ’s correctional portfolio, contact NIJ Corrections Program Manager Jack Harne at Jack.Harne@usdoj.gov, phone (202) 616-2911.

**Sensor, Surveillance, and Biometrics Technology Center of Excellence: Contactless Fingerprint Assessment (Round 2)**

In April 2015, the SSB CoE completed research into contactless fingerprint technology for criminal justice and defense. The work investigated cross-device performance and interoperability across a range of devices, and is a follow-on effort to previous work involving contactless fingerprint data published on the National Criminal Justice Reference Service (https://www.ncjrs.gov/pdffiles1/nij/grants/245146.pdf). The work was sponsored by Defense Biometrics & Forensics and involved four tasks:

- Contactless Fingerprint Data Minutia Marking.
- Analysis of Contactless Fingerprint Minutia Deviations.
- Contactless Fingerprint Data Collection (Round 2).
- Analysis of Contactless vs. Contact Fingerprint Data (Round 2).

**Weapons and Protective Systems Technology Center of Excellence**

The Weapons and Protective Systems CoE remained open at the end of December 2015, using a three-month no-cost extension to finish work in the following areas:

- **Duty Uniform Field Assessment.** A number of law enforcement agencies are wearing and providing field data on uniforms designed to resist bloodborne pathogens. WPSTC will produce a final report when all input has been received and laboratory testing is complete.

- **Officer Line-of-Duty Injury Study.** WPSTC is working to resolve discrepancies and inaccuracies identified in the injury data, with the final analysis and report pending.
During more than 20 years of service to the criminal justice community, the National Law Enforcement and Corrections Technology Center (NLECTC) System, through its component centers, has fulfilled an ongoing mission to provide information on technology development and innovation to the criminal justice community. As the NLECTC System continues to evolve and move forward, it will continue to connect decisionmakers in the law enforcement, courts and corrections communities with the latest information on NIJ’s RDT&E portfolio and other relevant technology developments. The efforts of the NLECTC System inform and support NIJ in its mission to identify best practices and sponsor research and development that will benefit the criminal justice community and address its most pressing needs.

The look and feel of the NLECTC System began a new period of evolution and change in 2015 that will continue in 2016, and throughout, the component centers will continue to play a crucial role in enabling NIJ to help law enforcement, corrections, courts and other criminal justice agencies address their technology needs and challenges.