**U.S. Department of Justice**
Office of Justice Programs
*National Institute of Justice*

*Research Report*

# *Department of Justice and Department of Defense Joint Technology Program: Second Anniversary Report*

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# *Department of Justice and Department of Defense Joint Technology Program: Second Anniversary Report*

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**U.S. Department of Justice**

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**National Institute of Justice**

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In 1994 the U.S. Department of Justice (DOJ) and the U.S. Department of Defense (DOD) entered into a cooperative agreement to develop technologies of value to both. This agreement, codified in a Memorandum of Understanding (MOU) and signed by the Deputy Secretary of Defense and the Attorney General, formalized and focused a longstanding ad hoc relationship. To manage this technology development program and to direct its day-to-day activities, the MOU established a Joint Program Steering Group (JPSG) that would represent both departments and be staffed with members from several agencies.

Two years have passed since the MOU was signed, but this cooperative effort has already borne fruit. Improved personnel armor and new methods for detecting concealed weapons are being demonstrated. As this joint effort begins to deliver its products, DOD and DOJ, through their respective lead agencies—the Defense Advanced Research Projects Agency (DARPA) and the National Institute of Justice (NIJ)—have directed the JPSG to produce this anniversary report.

This report consists of three parts. Part I explains how this joint technology program originated and the need for a JPSG. Part II focuses on seven technology development areas included in the JPSG program and the anticipated payoffs. Part III draws conclusions regarding program benefits.

## Part I: The Partnership Between Law Enforcement and the Military

The boundaries separating the functions of the law enforcement and military communities are clearly defined in law. The military's function is to provide for the national defense, while Federal, State, and local law enforcement agencies maintain domestic tranquillity.

Although performing different functions, law enforcement and the military perform many of the same tasks. Both law enforcement and the military operate their own judicial, police, and prison systems. Within the limits set by law, civil law enforcement and the military communities work cooperatively. For example, in communities near large military installations, military police routinely maintain offices in metropolitan police stations. The Federal Prison System incarcerates hundreds of the military's more difficult prisoners. At the same time, the Federal Prison System receives special consideration from the military in the disposition of military properties made available when domestic installations close or in locating prisons on active military installations. Often law enforcement and the military may also participate in the same missions. Such interagency efforts include waging the war against drugs, countering terrorism and espionage, and providing disaster relief.

**Benefits of Shared Technology**

DOJ and DOD have a long history of sharing technology. After World War II and the Korean War, local and Federal law enforcement agencies benefited from such technology as helicopters and handheld radios, whose development had been spurred to meet military needs. Additionally, over the years, many State and local police agencies have received surplus military equipment.

However, this flow of technology has not been one way. Law enforcement has also shared its technology with the military. For example, the current generation of "bulletproof" vests, employed both by the law enforcement and military communities, evolved from the development of body armor using Kevlar,™ which was sponsored by NIJ (then the National Institute of Law Enforcement and Criminal Justice of the Law Enforcement Assistance Administration) in the late 1960s and early 1970s. When the U.S. Marine Corps deployed to Somalia in 1995 to assist in the withdrawal of U.N. forces, it did so with an arsenal of what are termed "less-than-lethal" weapons, including a "sticky foam" developed by NIJ. The foam works much like human flypaper and is used to limit the potential for injury to bystanders and damage to property.

## Benefits of Joint Technology Development

These ad hoc technology and equipment transfers are beneficial to both law enforcement and the military. However, greater benefits result when efforts involve joint technology development in partnerships throughout the Government.

**Cost Effectiveness.** The benefits to be gained, in terms of dollars saved, is clear. For example, the recent collaboration of the National Oceanic & Atmospheric Administration (NOAA), the U.S. Air Force, NASA, and the U.S. Navy in the development of meteorological satellites will result in future satellites that will perform multiple functions. The satellites will not only help produce daily weather forecasts but also assist military and civilian pilots and military planners. Replacement satellites will last longer and will reduce the need for more satellites. This effort should produce a saving in excess of $1 billion over the next 10 years.

**Long-Term Research.** Combined technology development projects involving the military and law enforcement have spanned decades. In the 1960s the Law Enforcement Assistance Administration sponsored joint technology developments in the area of remote bomb detection. Other early joint projects included the development of riot control agents, night vision devices, and "nonlethal" bullets. More recently, the Federal Bureau of Investigation (FBI) and DARPA have worked on a number of projects, including the application of advanced computer technology to crime solving, while DEA and other law enforcement agencies have collaborated with DARPA in developing technologies to counter the flow of narcotics into this country.

**Joint Technology Improvement and the JPSG.** Federal agencies frequently collaborate to develop technology. However, the differences in cultures, missions, and applications among agencies can make joint development and transition of technology challenging. To make reasoned judgments about technology options requires an understanding of these differences that comes only with experience. In a partnership between DOD and DOJ, the most effective way of ensuring that such experience

was applied was to jointly staff a program steering group; hence the establishment of the JPSG.

Perhaps the best single example of a technology area that has been cooperatively advanced by the military and law enforcement communities is the development of body armor. Both law enforcement and military personnel wear body armor. More and more often, this includes the law enforcement officer and the ordinary soldier, as well as special purpose units such as police Special Weapons and Tactics (SWAT) teams and U.S. Special Forces. Current body armor is heavy, movement impairing, and costly, and it does not dissipate heat very well. Consequently, body armor design has had to strike a less-than-optimum compromise between level of protection and area protected. As a result, the standard issue "bulletproof" vests worn by most police and soldiers offer limited protection, especially little if any protection against rifle bullets.

In the JPSG-managed body armor development program, jointly developed technologies incorporate design preferences from both the military and law enforcement communities. One body armor effort that the JPSG is managing is development of a "bulletproof" vest with titanium or ceramic inserts that does offer some rifle and bullet protection. Designed to be worn inconspicuously as an undergarment, the vest causes minimal impairment to its wearer's freedom of movement. This "concealable" armor weighs around 8 pounds and affords handgun protection over the entire area that it covers. Inserts positioned over the heart and spine offer rifle fire protection.

**Technology Transfer.** Joint development programs such as the body armor program also ease technology transfer. New products usually require modifications when transferred from one agency to another. Such changes are due to differences in environment, operating procedures, and performance requirements. Perhaps the most commonly cited example of modification requirements is the military's requirement for "ruggedization." This includes, in certain circumstances, protecting electronic equipment against the effects of the electromagnetic pulse produced when a nuclear weapon is detonated. Very few if any law

enforcement organizations require equipment designed to such specifications.

## Law Enforcement and Military Technology Convergence: Needed More Today Than Ever

The post-Cold War era has seen a convergence in the technology needs of the law enforcement and military communities in more than just law enforcement operations. Today the Nation's more than 3,000,000 civilian law enforcement officers and soldiers, sailors, marines, and airmen find themselves performing many of the same tasks. The three facets to this convergence result from the need to (1) limit force, (2) defend against common threats, and (3) participate in common missions.

**Limiting Force.** Increasingly, the military finds itself conducting operations such as peacekeeping, in which it is confronted by an absolute mandate to apply force discreetly and then to use only the minimum amount of force necessary to accomplish a particular mission. These are essentially the same rules under which law enforcement agencies operate. Like their counterparts in the law enforcement community, military commanders find that these constraints severely limit their options and thus too often limit their effectiveness. On occasion, the severity of these constraints leaves commanders with the alternative of doing nothing or placing the lives of the involved personnel at risk.

A further consideration that affects how the military and law enforcement apply force is the greater presence of members of the media or other civilians who are observing, if not recording, the situation. Even the lawful application of force can be misrepresented to or misunderstood by the public. More than ever, the police and the military must be highly discreet when applying force.

**Defending Against Common Threats.** As more and more military technology finds its way into criminal hands, law officers today confront threats that have more and more military aspects. For example, narcotics traffickers and smugglers use bulletproof vests, electro-optic devices that enable them to see at night, and semiautomatic and even automatic weapons. In addition, law

enforcement agencies must be able to deal with the threat from international terrorism, from which the United States is no longer immune—if it ever was.

The nature of criminals and their crimes has changed as well. Although the rate of victimization has declined over the past decade, there have been surges in rates of violent crimes, especially those associated with youth.

**Participating in Common Missions.** The best examples of law enforcement and military participation in common missions are the "wars" being waged against narcotics and terrorism. This convergence of missions was illustrated by President Clinton's nomination of the Commanding General of the U.S. Southern Command to the position of Director of the Office of National Drug Control Policy. The U.S. Southern Command, headquartered in Panama, plays a key role in the effort to stop the flow of drugs from South America into the United States.

At an overall level, these three shared needs suggest that the roles of traditional law enforcement and the military are changing and that the tactics, technologies, and tools of use to one may be of use to the other.

### Interagency Agreement

The potential benefits of a joint development program became clear to officials in DOD and DOJ, as well as to Congress, in 1993. The overlap of technology needs had been noted by a senior working group (SWG) convened by DARPA in 1993 to assist in formulating a program to develop technologies to enhance the effectiveness of U.S. forces engaged in Operations Other Than War (OOTW). These kinds of operations involve providing humanitarian assistance, peacekeeping, countering the flow of drugs into the United States, and countering terrorism. This initiative was prompted by events in Somalia and elsewhere. The SWG and DARPA noted many common technology needs between civilian law enforcement operations and OOTW.

Congress and senior officials in both DOJ and DOD moved DARPA and NIJ toward establishing a formal partnership agree-

ment. In June 1993, the Attorney General sent a letter to DOD and the Central Intelligence Agency (CIA) suggesting collaboration on technology development. In July 1993, Congress initiated language directing the establishment of an interagency working group, which included DOJ and DOD, to look to the development of dual-use technologies. This was prompted by the recognition of the effect of defense downsizing on the industrial base and the effort to reduce Federal expenditures and by apparent interest within the administration to "reinvent government" by eliminating unnecessary redundancies. In hearings before the House Armed Services Committee's Subcommittee on Research and Technology that year, the DOD Director of Defense Research and Engineering endorsed establishing joint technology development with DOJ. Also at these hearings, key NIJ and industry officials testified about the value such a partnership might produce.

NIJ reorganized in 1994 by elevating its Division of Science and Technology to full office status and establishing a Law Enforcement and Corrections Technology Advisory Council (LECTAC) consisting of 85 representatives from Federal, State and local law enforcement agencies. At that time, LECTAC identified law enforcement technology needs for NIJ and noted that many of these needs were pertinent to the military.

**Memorandum of Understanding.** The clear benefits of this partnership led to the execution of an MOU between DOJ and DOD on April 20, 1994. Highlighting the importance attached to this MOU was its execution by the Attorney General and the Deputy Secretary of Defense and the presence of the Vice President, the Secretary of the Treasury, and the Director of the Office of National Drug Control Policy at the signing ceremony. This MOU set in motion the development and enactment of the technology program described in Part II of this report.

The MOU calls for the establishment of an extendable 5-year program in which a JPSG, jointly staffed by DOD and DOJ representatives, manages daily operations and a high-level interagency Senior Review Group sets policy. Members of the JPSG have been drawn from DARPA, NIJ, the FBI, the Bureau of Prisons, and the U.S. Army. The JPSG works at any point along

the research, development, and acquisition (RDA) spectrum so that it can support demonstrations of existing technology as well as development of totally new and unique technologies.

On October 1, 1994, the JPSG was established at DARPA in Arlington, Virginia. The Chairman, from DARPA, and Deputy Chairman, from NIJ, co-manage the program. Congress appropriated $37.5 million in Fiscal Year 1995 to support the MOU. Of this, $26 million was made available for JPSG-sponsored projects.

The execution of the MOU set in motion what would become an important series of briefings and information exchanges between DARPA and NIJ. These sessions were used to define agency priorities, capabilities, and department interest. During these sessions, similarities in DOJ and DOD technology needs were apparent. At the same time, many agency-specific requirements were examined. This reaffirmed the view that the agencies need to collaborate in joint development of technology, rather than for one simply to develop the technology independently for direct transfer to the other.

**JPSG Technology Plan.** The Senior Review Group approved the technology plan submitted by the JPSG in March 1995, 6 months after the JPSG was formed. The plan represented extensive research and coordination by the JPSG within the law enforcement and military communities. Essentially, the JPSG examined technology priorities submitted to it by both communities, identified overlapping technology needs not being pursued, and formulated a plan to address them.

# Part II: The JPSG Program

The JPSG program focuses on seven main areas of technology development.

### Concealed Weapons Detection

Concealed weapons—principally handguns and stabbing and edged weapons—pose a major threat to military and law enforcement personnel. Existing detection systems, mainly metal

detectors, have limited ranges and high false-alarm rates; they are also obtrusive and thus easily circumvented. Further, low-metal-content handguns and non-metallic stabbing and cutting weapons make effective detection challenging.

**NIJ Program.** Recognizing this problem, NIJ initiated a program in January 1995 to develop better ways to detect concealed weapons. This program is pursuing three technology development approaches: (1) passive millimeter wave (MMW) sensor, (2) active low-frequency magnetic sensor, and (3) magnetometer. Underscoring the importance of this problem, the JPSG has undertaken a program that complements this NIJ effort and that is closely coordinated with it.

**The JPSG Program.** The JPSG intends to develop safe, affordable and, inasmuch as possible, inconspicuous systems that can detect from more than 30 feet away weapons with little or no metal content as well as those made of metal. Initial efforts are focusing on developing stationary devices, much like the metal detectors found in airports. Such devices might be used to protect courts and, in today's environment, even schools. Development of smaller, handheld versions will also be explored.

In June 1995 the JPSG selected four approaches for development, based on the recommendations of a board of military and law enforcement users and technical experts. These technology approaches consisted of the following: (1) an x-ray sensor, (2) a sensor system combining passive MMW and infrared (IR) cameras, (3) a sensor system combining ultrasound and radar sensors, and (4) a low-frequency magnetic sensor. The ultrasound portion of the ultrasound-radar technology approach may lend itself to being carried by a soldier or police officer in a unit much the same size as a bullhorn.

All of these technologies produce images. Figure 1 shows a person with a 22-caliber "Saturday night special" (see arrow) concealed under his clothes. The photograph was taken using one of the technologies that employs low level x-rays. The radiation exposure needed to make this picture is equivalent to spending approximately 5 minutes in the sun. Figure 2 was taken with an MMW camera. It shows a person with two automatic pistols concealed under his clothing—one metal and one ceramic (see arrows). Figure 3 was taken with an IR camera. Again, it shows a person with a concealed automatic pistol (see arrow).

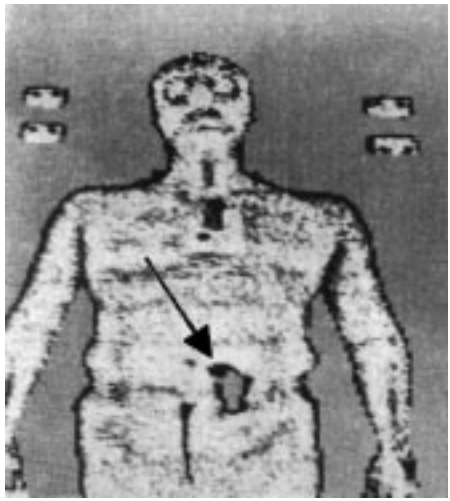

*Figure 1*

The x-ray picture was taken with a system that will be demonstrated in two corrections facilities over a 6-month period. The first facility had a system installed in May 1996. A suitable location for the second system is being sought.

*Figure 2*

Component-level demonstrations of the other technologies were completed by December 1996. The results of these demonstrations are being evaluated. Additional funds will be sought to further develop successful technologies.

The JPSG program manager runs both NIJ and JPSG programs. He is supported by the NIJ National Law Enforcement and Corrections Technology Center (NLECTC)–Northeast, which acts as his technical agent for both efforts, providing staff and technical support. The NIJ and

JPSG program efforts complement each other in that they are looking at different approaches to this challenging problem.

*Figure 3*

**Limited Effects Technology (LET)**

Today military rules of engagement, legal constraints, and policy, which are driven by considerations of the potential for injury to bystanders and unintended damage to property, may restrict the use of force. Both civilian law enforcement agencies and the military need more options for stopping fleeing suspects and for handling and containing crowds. The JPSG is sponsoring a number of efforts in this area. A key consideration in each of these efforts is that the technology be legally and socially acceptable.

**Stopping Fleeing Individuals.** To stop individuals, the JPSG is sponsoring development of a ballistic device—a gas-launched, wireless, electric stun projectile with a self-contained power supply. The projectile adheres to clothing and imparts a strong electric shock. A successful demonstration of a prototype was demonstrated in August 1996.

The JPSG is also sponsoring development of eyesafe laser dazzler devices to disorient individuals; a vehicular laser surveillance and dazzler system was demonstrated in June 1996.

Law enforcement and military personnel need less lethal, faster acting pyrotechnic devices such as flash-bang grenades, smoke grenades, and so on. The JPSG is funding a program to develop such devices.

**Crowd Control.** Both law enforcement and military representatives advising the JPSG have agreed that using sound to control crowds shows promise but that the precise effects of such a technology have not been well documented. As a result, the JPSG is sponsoring a study to determine these effects.

Further development and funding may be sought in the area of LET after current projects are completed in December 1997 and the results are evaluated.

**New Body Armor**

*Figure 4*

The performance of the jointly developed, concealable body armor, discussed earlier in this report, was much better than anticipated. The design goal was that the vest areas covered by inserts would stop bullets from a Russian AK-47 assault rifle at a range of 328 yards. In testing, the armor stopped these bullets at around 190 yards. The insert areas of this vest should offer protection from "cop killer" bullets, as well. The size and position of the inserts were chosen to minimize the likelihood that its wearer would be killed instantly, while still allowing the armor to be inconspicuous and "wearable." Figure 4 shows a body armor prototype worn by a soldier at the U.S. Army Natick Research, Development, and Engineering Center, both with and without his uniform blouse.

In addition to developing concealable body armor, the JPSG is developing improved outergarment body armor. The JPSG program has demonstrated ceramic inserts as alternatives to those currently used in the military's Ranger Body Armor, with a resulting weight savings of around 30 percent. The JPSG is also supporting the use of new materials in the development of an entirely new outergarment body armor that offers protection from a 30–06 armor-piercing bullet, at about a 40-percent weight savings over current body armor offering a similar level of protection.

Another challenge being undertaken is development of a helmet weighing less than 5 pounds that stops handgun bullets and offers limited protection from rifle fire. The current Kevlar™ helmet, issued to the military and used by police SWAT teams, is not designed to offer handgun or rifle protection. The proposed

helmet will consist of a titanium shell with a Kevlar™ variant liner. Figure 5 shows both the liner and the shell of a prototype of this helmet. (The shell does not conform totally to the liner because excess material resulting from its manufacture has not yet been trimmed.)

*Figure 5*

The new inserts for the Ranger Body Armor that the JPSG developed are being evaluated for the U.S. Special Operations Command. Concealable armor is of great interest to law enforcement. The U.S. Secret Service has placed an order, and the FBI is evaluating prototypes. Eleven prototypes were ordered by the U.S. Army for use in Bosnia. The helmets and outergarment body armor may be found useful for hostage rescue work and SWAT teams in general.

**Medical Technologies**

The JPSG is sponsoring a limited demonstration of the application of telemedicine to the provision of medical services to remote locations. Telemedicine is the practice of health care delivery, diagnosis, consultation, and treatment using interactive video, audio, and data communications. While telemedicine technology is fairly mature, its deployment and utilization are still low.

This demonstration is being conducted in Federal penitentiaries; the technology can help them better fulfill the responsibility for providing full-time, comprehensive medical care to prisoners. In many places it is difficult to find specialists or those willing to treat prisoners either inside or outside prison walls. Telemedicine affords an excellent opportunity to extend the range of health care inside prisons and jails while avoiding costly and potentially dangerous trips to local hospitals.

DOD requires the same kind of access to medical information from remote areas, both in war and in operations other than war,

such as providing humanitarian relief in Rwanda, giving disaster assistance to the victims of Hurricane Andrew, or detaining large groups of foreign nationals. This telemedicine capability can provide medical care to deployed personnel and, as the mission dictates, to the local populace, detainees, and others.

The JPSG, in collaboration with the U.S. Bureau of Prisons, DOD, and the U.S. Department of Veterans Affairs, operates telemedicine suites in the Federal penitentiaries at Lewisburg, Pennsylvania, and Allenwood, Pennsylvania, the Bureau of Prisons' Federal Medical Center at Lexington, Kentucky, and the Veterans Health Administration Medical Center in Lexington, Kentucky (see figure 6). There is also the potential for DOD to adopt this technology to small or remote installations and disaster relief missions.

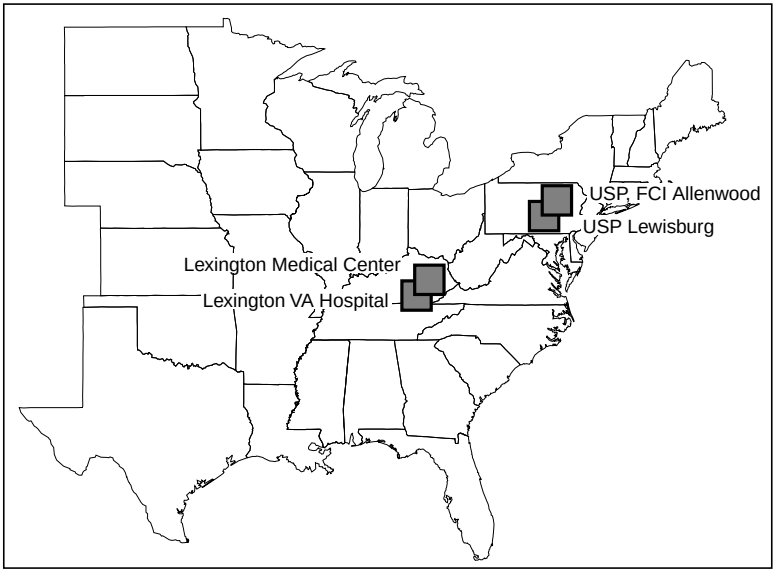


*Figure 6*

## Information Sharing During Crises

Both the law enforcement and military communities respond to crises. However, the effectiveness of their response is often limited by the inability of the participants to easily and securely communicate and share information. The JPSG is addressing

this problem by taking advantage of advances in civilian- and government-sponsored information and communications technologies. The JPSG plans to demonstrate an interagency crisis management system that provides the capability to readily and securely communicate and share information among agencies. Using the existing commercial communications infrastructure (i.e., the World Wide Web and cellular communications) and communications security technology developed under the sponsorship of the National Security Agency (NSA), this information management system should demonstrate the following:

- A crisis management center providing real-time situation awareness of the location of deployed forces, crowd locations and densities, threat areas, and potential locations of probable suspects. The system includes the capability to transmit images.
- Access to and sharing of relevant information through computer systems with "firewalls" to assure the required level of privacy and security. Access will be based on the recipient's information needs, authorized level of access, and parent organization.
- Automatic update of significant events to deployed personnel as well as decisionmakers.

Data exchange and retrieval will be accomplished through the Information Support for Law Enforcement (ISLE) integrating architecture. The NSA-sponsored FORTEZZA encryption device will be employed to provide privacy and authentication. The telecommunications portions of this system will be provided by leveraging the DARPA Global Mobile (GloMo) Communications Program.

Demonstrations of a crisis management testbed, involving law enforcement and military agencies, were completed in October 1996. NIJ's National Law Enforcement and Corrections Technology Center–Rocky Mountain is supporting this effort by conducting a study to determine the interoperability requirements of law enforcement agencies involved in crisis management.

## Locating Sniper Fire

Locating and neutralizing snipers is a need of both the military and law enforcement communities. Unfortunately, the main means used today for gunfire detection—the human ear and eye—are highly inaccurate. The JPSG intends to develop and demonstrate an affordable sniper detection system that can detect and locate a sniper to within a 10-foot by 10-foot area, in urban as well as rural environments, and at ranges greater than half a mile.

Locating a sniper in urban environments is challenging because manmade structures cause echoes, complicating detection by acoustic means, and hide visual cues such as muzzle flashes. Another major technical challenge is motion compensation for sniper detection systems that are mounted on moving vehicles or worn by soldiers or police officers. Although mobile systems are more technically challenging, they offer inherently greater flexibility than fixed-site systems.

*Figure 7*

This sniper detection effort focuses on developing systems that can be (1) carried by and put in place by hand, (2) worn, and (3) mounted on vehicles. Technologies being explored employ acoustic, IR, integrated IR-acoustic, and integrated IR-laser sensors. Figure 7 shows portable acoustic systems that were demonstrated at the Camp Pendleton, California, test site in May 1996. Six prototypes of the best performing acoustic systems from the Camp Pendleton demonstration will be fabricated and provided to the military, potentially for use in ongoing operations such as those in Bosnia.

In October 1996 a portable, integrated IR-acoustic system was demonstrated at Camp Pendleton. This will be followed in April 1997 by an integrated IR-laser system demonstration also at Camp Pendleton. The integrated IR-laser system tracks a bullet in flight based on the heat caused by friction as the bullet passes through the air. The bullet's track is then used to determine its three-dimensional trajectory. Based on this information, the system can determine the exact location of the sniper. This system will effectively locate snipers even when they employ advanced tactics and special devices such as silencers and flash suppressors to conceal their location.

Demonstrations of sniper detection systems that are worn are scheduled to be completed by the summer of 1997.

**Locating and Tagging Individuals and Property**

Locating, identifying, and monitoring the movement of individuals, vehicles, and containers are important law enforcement and military functions. However, the technologies currently available to perform these functions do not work as well as they should. With better technologies, emergency medical care might be delivered faster, movement of contraband tracked more accurately, and stolen property located more precisely.

The JPSG program will demonstrate these locating and tagging technologies, relying heavily on ongoing related DARPA efforts in electronics miniaturization and packaging, especially of navigation technologies such as Global Positioning Systems, and in reduction of power consumption. The two major efforts in the program are Soldier 911 and tagging.

**Soldier 911.** This technology provides the capability to locate, identify, and track the movement of individuals and vehicles by using a device about the size of a brick. The device can be handheld, attached to the harness system that a soldier uses to carry his other equipment, or mounted in a vehicle or aircraft. Figure 8 shows a

*Figure 8*

Soldier 911 unit. Soldier 911 can be programmed to provide an early warning signal to individuals, vehicles, and aircraft when approaching a dangerous area. It also has the ability to emit a distress or "911" call—hence the name "Soldier 911." When an individual with a Soldier 911 system gets in trouble, he can call for help by simply pressing a button. The resulting distress call automatically provides the coordinates of the location of the signal's origin to the station receiving the call.

Soldier 911 could also be called Law Enforcement Officer 911. The JPSG sponsors portions of this ongoing DARPA program because of its obvious value to law enforcement, particularly in operations at or near the U.S. borders or in other remote locations.

Soldier 911 is being demonstrated with U.S. forces in the former Yugoslav Republic of Macedonia and in the Republic of Korea.

**Tagging.** The second JPSG effort in this technology area is a 12-month effort to develop and demonstrate a family of miniature, low-cost, wireless, modular devices that can locate, identify, and monitor the movement of selected individuals and other mobile objects.

### Other Efforts

In addition to the seven groups of technologies described above, the JPSG is also sponsoring studies in the following four areas: interactive simulation and training, perimeter security, small mobile sensors, and detection of explosives. These efforts are studies, rather than programs, because while there is a consensus that work needs to be done in these areas, sufficient information was not available to develop a coherent, structured program.

The objective of each of these studies is to better define the problem and, if warranted, to enable an appropriate program to be developed. Additionally, these studies will in themselves provide useful products. The perimeter security study, for example, will produce for security managers a single source document that lists available intrusion warning systems and devices and their capabilities and limitations.

## Part III: Program Benefits

The JPSG program has proved a remarkable success. In less than 2 years it has already produced a number of technology prototypes:

- A Soldier 911 system.
- An alternative ballistic insert for the Ranger Body Armor System.
- A concealable body armor.
- A laser surveillance and dazzler system.
- A concealed weapons detection system.
- A telemedicine suite tailored for application in a corrections environment.
- Fixed site and portable sniper detection systems.

From DOJ's perspective, the joint technology partnership has opened doors to new technologies. DOD has gained a greater access to the law enforcement community and an understanding of its needs. New avenues to move technologies to and from private industry have also been opened to both partners. Ultimately, the future of this partnership will depend on the value and importance of the technologies that the JPSG produces.

With the initial technology plan well established, the JPSG has begun to develop a new plan that builds on the old. Among the new technology areas being considered are vehicle stopping; noninvasive drug detection; punctureproof and flexible, nonpermeable gloves and puncture- and cut-resistant personnel armor; explosives detection; and simulation for training, planning, and analysis.

Inquiries for more information or submissions of concepts for consideration by the JPSG may be sent to jpsg@snap.org on the Internet or to:

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