



# Counterdrug Research and Development Blueprint Update

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Office of National Drug Control Policy  
Counterdrug Technology Assessment Center



## EXECUTIVE SUMMARY

The Counterdrug Technology Assessment Center (CTAC) within the Office of National Drug Control Policy (ONDCP) is the central counterdrug enforcement research and development (R&D) organization of the U.S. Government. CTAC prepares periodic reports to provide updates on the national counterdrug R&D program to the Congress and the community at-large. This is the fifth Counterdrug R&D Blueprint Update.

In 1998, CTAC was provided with funding from the Violent Crime Reduction Trust Fund to conduct a program to transfer successful counterdrug technologies developed under federal funding directly to state and local law enforcement organizations. This blueprint update provides a progress report on the technology transfer program in Appendix C.

In 1998, ONDCP also was required to submit an Annual Report on the Development and Deployment of Narcotics Detection Technologies (P.L. 105-85). This blueprint update provides the annual report in Appendix D.

The national counterdrug R&D program supports the *National Drug Control Strategy* and its five goals:

- educate and enable America's youth to reject illegal drugs as well as alcohol and tobacco,
- increase the safety of America's citizens by substantially reducing drug-related crime and violence,
- reduce health and social costs to the public of illegal drug use,
- shield America's air, land and sea frontiers from the drug threat, and
- break foreign and domestic drug sources of supply.

CTAC seeks to advance technologies that support these goals by improving the effectiveness of law enforcement, drug interdiction and substance abuse treatment research. This is accomplished by providing leadership and coordination among 21 Federal drug control agencies and the more than 80 individual R&D projects in the national counterdrug R&D program.

### MAJOR CTAC ACCOMPLISHMENTS

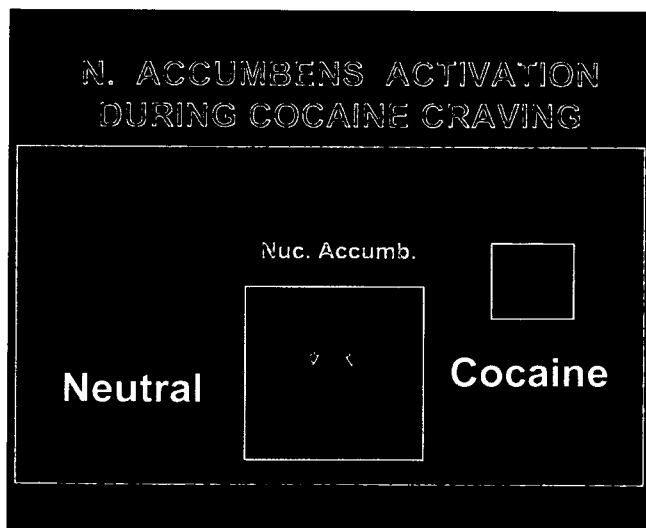
Three recent accomplishments set the stage for the next five years: (1) a comprehensive ten-year plan has been completed by the federal drug control agencies to organize our collective efforts, (2) a technology transfer program was begun to move promising successfully developed federal technologies directly into the hands of the front line officers in state and local law enforcement, and (3) a brain imaging technology initiative will provide research scientists at the National Institute of Drug Abuse (NIDA) with the tools to identify the underlying physiological causes of substance abuse -- deep within the human brain.

Ten-Year Counterdrug Technology Plan and Development Roadmap. ONDCP Director McCaffrey directed CTAC to lead the federal drug control agencies in the development of a Ten-Year Counterdrug Technology Plan and Development Roadmap to organize the federal government's advanced technology initiatives to support the goals of the *National Drug Control Strategy*. This plan was completed in July 1998 and can be updated and revised annually in keeping with our accomplishments and the changing needs of both supply and demand reduction. The plan also supports flexible regional scenarios, and it has already contributed to the plans for advanced, non-intrusive inspection technologies for deployment along the Southwest border over the next five years.

A detailed study of the technologies and infrastructure required along the Southwest border is in preparation with the U.S. Customs Service and Immigration and Naturalization Service to determine the laydown plans and optimum mix of new systems to be deployed along the entire Southwest border. An ONDCP-sponsored international technology symposium is scheduled for March 8-10, 1999 to focus on Southwest border technologies.

Counterdrug Technology Transfer Program. In 1998, Congress provided \$13 million from the Violent Crime Reduction Trust Fund to transfer successful counterdrug technologies developed under federal funding directly to state and local law enforcement organizations.

During 1998, technologies developed under federal funding to improve communications, surveillance, drug detection, and information management have been provided to over 120 state and local recipients in 33 states. Additional funding



(\$13 million) was provided under FY 99 Treasury and Postal appropriations for CTAC to continue this program.

Brain Imaging Technology Initiative. This initiative establishes NIDA regional neuroimaging centers and represents an interagency cooperative endeavor funded by CTAC, Department of Energy (DOE), and NIDA to develop new scientific tools (new radiotracers and technologies) for understanding the mechanisms of addiction and for the evaluation of new pharmacological treatments. This initiative provides new state-of-the-art high resolution positron emission tomography (PET), magnetic resonance imaging (MRI) and functional magnetic resonance imaging (fMRI) cameras at strategically located brain imaging research centers across the country. The advanced instrumentation is used to perform studies on the mechanisms and treatment of addiction, investigate smaller brain regions with the higher resolution cameras, and identify areas where PET, MRI and fMRI methodologies and strategies can experience wider use in the treatment community.

Brain imaging centers established under CTAC sponsorship in Baltimore at the Addiction Research Center and in New York at the Brookhaven National Laboratory have begun providing research scientists with the most intricate detailed observations of drug interactions within the living human brain.

## FUTURE PLANS

In 1999, plans are to continue the base CTAC R&D program to develop advancements in technology under federal sponsorship. Successful systems emerging from the base R&D program will continue to feed an ongoing transfer program to place successful developments, available to federal agencies, directly into the hands of state and local law enforcement. On the demand reduction side, continuation of the proliferation of high technology brain imaging equipment to support drug abuse research scientists is planned. The findings from the brain imaging initiative will guide NIDA's efforts in the development and testing of effective therapeutic treatments for substance abuse.

### Drug Treatment and Rehabilitation Research

Brain imaging technologies, such as functional Nuclear Magnetic Resonance, are being advanced to provide research scientists with more knowledge on the underlying causes of drug addiction. In conjunction with their findings, effective treatments for cocaine addiction are being developed and tested in the laboratory. The FY 2000 demand reduction program will support continued expansion of advanced neuroimaging research facilities and training of research teams who are devoted to studies of drug abuse and therapeutic medications. The technology will provide neuro-imaging research equipment suites and facilities with the best positron emission tomography (PET), functional nuclear magnetic resonance (fNMR) imaging, brain scan image processing and interpretation, and other noninvasive brain imaging techniques. The nation's leading university research centers (Massachusetts General, University of Pennsylvania, University of California Los Angeles, Harvard Medical School and Emory University) have been selected as sites for the use of advanced imaging technology for drug abuse treatment research. In conjunction with NIDA, CTAC is deploying educational tools and structure for research scientists to study and discover new drug treatment modalities and therapies. A set of radio isotopes specifically designed to improve PET brain scanning capabilities applicable to drug abuse also will be developed under this initiative.

The FY 2000 program will support continuing successful demand reduction programs in youth/first time offender diversion, expansion of the analytical capabilities of the National Evaluation of Substance Abuse Treatment (NESAT) computer network, and therapeutic treatments for cocaine addiction.

### Southwest Border Technology and Infrastructure

CTAC plans to continue analytical efforts in conjunction with U.S. Customs Service and

Immigration and Naturalization Service to support the deployment of advanced technology to inspect trucks, privately operated vehicles, cargo containers and railcars for illicit drugs at our ports-of-entry and border crossings along the Southwest border. High priority will be placed on further development, design, fabrication and evaluation of prototype systems using gamma-ray, x-ray and nuclear technologies for inspecting cargo, containers and conveyances including railcars.

### Technology Transfer Program

The technology transfer program has requests for state-of-the-art technology from over 223 interested state and local law enforcement organizations in 35 states. It has been observed that as state and local law enforcement becomes more efficient with managing drug-related criminal information, their valuable time is invested more effectively – and safely. For these reasons, CTAC-sponsored projects for exploiting information management capabilities will receive increased priority to transfer emerging advanced algorithms and information processing techniques to interested state and local law enforcement organizations. The Internet is being used to provide many of the perfected techniques for pattern recognition and data mining to the law enforcement users at-large. This “free-ware” is accessible through a password and technical support and training are provided through the centralized, CTAC-sponsored testbed and infrastructure support system. Testbeds established in San Diego, California; Bedford, New Hampshire; Pinellas County, Florida; Burlington, Iowa and Denver, Colorado were used last year to fully develop these algorithms and information processing techniques directly with user personnel.

### Technology Testbeds and Infrastructure Support

The technology testbed and infrastructure support program provides engineering and scientific support

for evaluation of advanced system prototypes and emerging technology. These facilities and personnel resources are used to monitor the development of new systems, to test and evaluate prototype systems, and to assist in transfer of a completed system to the end-user. Some limited training beyond that offered by the vendor is also provided by the testbed program to gather information on operability issues attendant with inserting new technology into the field.

CTAC also plans to continue supporting the Narcotic Detection Technology Assessment program led by U.S. Customs Service. This program will be expanded from test and evaluation of illicit drug vapor/particulate detection systems to include assessments of bulk detection technology (e.g., x-ray and neutron systems).

### Appendices

As in previous blueprint updates, appendices provide summary information important to fulfilling the oversight and coordination aspects of CTAC's mission. This year Appendix A provides highlights from legislative conference language from CTAC's inception. Appendix B provides the listing of priority federal agency short, medium and long term scientific and technological needs. Appendix C provides a summary of the Technology Transfer Program progress. ONDCP also is required to submit an annual report on the development and deployment of narcotics detection technologies. This blueprint update provides the annual report in Appendix D.

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# 1. INTRODUCTION

The Counterdrug Technology Assessment Center (CTAC) was established within the Office of National Drug Control Policy (ONDCP) and is the central counterdrug enforcement research and development (R&D) organization of the U.S. government. In 1998, CTAC was provided with funding from the Violent Crime Reduction Trust Fund to conduct a program to transfer successful counterdrug technologies developed under federal funding directly to state and local law enforcement organizations.

In 1998, ONDCP also was required to submit an Annual Report on the Development and Deployment of Narcotics Detection Technologies (P.L. 105-85). This blueprint update provides the annual report in Appendix D.

This fifth Counterdrug R&D Blueprint Update provides the status of the national counterdrug R&D program, descriptions of technology development and infrastructure support projects, and a summary of plans for future counterdrug R&D initiatives.

The national counterdrug R&D program supports the *National Drug Control Strategy* and its five goals:

- educate and enable America's youth to reject illegal drugs as well as alcohol and tobacco,
- increase the safety of America's citizens by substantially reducing drug-related crime and violence,
- reduce health and social costs to the public of illegal drug use,
- shield America's air, land and sea frontiers from the drug threat, and
- break foreign and domestic drug sources of supply.

The national counterdrug R&D program is based upon the premise that the introduction of advanced technologies can enhance the effectiveness of counterdrug law enforcement, strengthen substance addiction medical research, enhance interdiction and international activities, and improve the overall use and safety of personnel resources.

Last year, CTAC led the federal drug control agencies in the development of a Ten-Year Counterdrug Technology Plan and Development Roadmap. The purpose of this effort was to organize the federal government's advanced technology initiatives to support the goals of the *National Drug Control Strategy*. The plan was completed in July 1998 and can be updated and revised annually in keeping with our accomplishments and the changing needs of both supply and demand reduction. The plan also supports flexible regional scenarios, and it has already contributed to the selection of advanced, non-intrusive inspection technologies proposed for deployment along the Southwest border over the next five years. A detailed study of the technologies and infrastructure required along the Southwest border is in preparation using information provided by the U.S. Customs Service and Immigration and Naturalization Service to determine the optimum mix of new systems to be deployed.

CTAC oversees and coordinates counterdrug technology initiatives with related activities of federal, civilian and military departments. This report provides a summary of the national counterdrug R&D program. Appendix A provides highlights from legislative conference language from CTAC's inception. Appendix B provides the listing of priority federal agency short, medium and long term scientific and technological needs. Appendix C provides a summary of the Technology Transfer Program progress. Appendix D provides the annual report on the development and deployment of narcotics detection technologies.

## 1.1 Counterdrug Technology Assessment Center

CTAC's mission can be segmented into four areas:

- identify the short, medium, and long term scientific and technological needs of federal, state and local drug enforcement agencies,
- develop a national counterdrug R&D strategy that validates technological needs, prioritizes such needs according to technical and fiscal feasibility, and sets forth a plan (including budget) to test and develop the highest priority technology projects,
- implement a national counterdrug R&D program, including technology development in support of substance abuse addiction and rehabilitation research, and
- coordinate counterdrug research and development activities, identify and remove unnecessary duplication, and transfer successfully developed, federally sponsored counterdrug technologies to state and local law enforcement organizations.

The motivation to establish CTAC stemmed from an understanding that funding shortfalls existed in counterdrug R&D and that a central organization should be established. It also was recognized that CTAC-sponsored R&D projects would:

- require multi-year funding to complete,
- be directed towards advanced technology applications providing the broadest support to the various counterdrug activities of federal, state and local agencies,
- not be a substitute for projects conducted with other agencies' internal funding, and
- address gaps in technology and fulfill high priority "out of cycle" funding requirements.

CTAC began an underpinning infrastructure

support program which fosters close working relationships among federal, state and local law enforcement, prevention and treatment agencies, and the research and development laboratories from the government, academic and private sectors. With the assistance of the law enforcement community, CTAC-sponsored infrastructure support initiatives assess the technical complexity and cost aspects of planned and ongoing prototype projects. These support initiatives are performed to assure that resulting systems have a realistic initial acquisition cost, low maintenance and support costs during their operational lives, and an operational simplicity to user personnel.

The infrastructure program includes:

- operational testbeds to emulate the environment in which future systems will be required to operate,
- a team of engineers and scientists to perform analytical evaluations in conjunction with user personnel to compare technical system performance using accurate measures of effectiveness and scientific comparison criteria, and
- modern instrumentation and facilities equipped to evaluate law enforcement technology prototypes and to enhance the performance of medical research teams working in the area of drug addiction treatment and prevention.

CTAC sponsors an outreach program consisting of technical symposia and user workshops to inform law enforcement and demand reduction agencies of advanced technologies and to assist users in inserting appropriate counterdrug technologies into their daily operations.

CTAC also supports of advancements in technology to improved drug abuse prevention, treatment and rehabilitation research. In conjunction with NIDA, CTAC has provided the advancements in brain imaging needed to allow research scientists to

discover the underlying causes of substance addiction resident deep within the human brain.

## 1.2 The National Counterdrug Research and Development Program

The national program of enforcement-related counterdrug R&D consists of 82 projects being performed by six drug control agencies with counterdrug R&D programs. (Of the 21 Federal agencies with counterdrug missions, only six agencies have formal R&D programs). Those R&D expenditures reported in the 1998 NDCS are provided in Table 1.

CTAC led the federal drug control agencies in the development of a Ten-Year Counterdrug Technology Plan and Development Roadmap to organize the federal government's advanced technology initiatives to support the goals of the *National Drug Control Strategy*.

This plan was completed in July 1998 and can be updated annually in keeping with our accomplishments and the changing needs of both supply and demand reduction. The plan supports flexible regional scenarios. A detailed study of the technologies and infrastructure required along the Southwest border is in preparation with information provided by the U.S. Customs Service and Immigration and Naturalization Service to determine the laydown plans and optimum mix of new systems to be deployed.

An ONDCP-sponsored international technology symposium is scheduled for March 8-10, 1999 to focus on Southwest border technologies.

**Table 1. Federal Drug Control Spending by R&D Function FY 1997-1999**

Agency	FY 97 Actual (\$M)	FY 98 Enacted (\$M)	FY 99 Request (\$M)
Department of Agriculture (ARS)	4.712	4.709	4.709
Department of Education	0.990	0.711	0.545
U.S. Forest Service	0.115	0.115	0.115
Department of Defense	34.073	24.794	22.458
National Institutes of Health	525.595	554.590	605.799
Bureau of Indian Affairs	1.510	1.854	1.863
The Federal Judiciary	3.184	3.465	3.713
Department of Veterans Affairs	4.400	4.570	4.730
Drug Enforcement Administration	2.911	4.299	3.906
Federal Bureau of Investigation	28.077	28.719	29.569
Immigration and Naturalization Service	0.499	0.520	0.538
Interagency Crime and Drug Enforcement	0.390	0.390	0.390
Office of Justice Programs	11.470	23.526	21.106
Office of National Drug Control Policy	18.000	17.000	17.000
High Intensity Drug Trafficking Areas	0.400	0	0
Special Forfeiture Fund	9.230	0	0
U.S. Coast Guard	0.470	0.938	0.736
Federal Aviation Administration	0.955	1.024	1.075
Nat'l Highway Traffic Safety Administration	0.240	0.250	0.300
U.S. Customs Service	5.000	5.000	4.000
<b>Total</b>	<b>652.221</b>	<b>676.474</b>	<b>722.052</b>

## 2. R&D PROGRAM SUMMARY

This section provides descriptions of the applied technology efforts that comprise the current CTAC R&D program. The CTAC R&D program fully supports the national effort outlined in the *1998 National Drug Control Strategy* to reduce illegal drug use and availability by 50 percent over the next ten years.

The five goals of the *1998 National Drug Control Strategy* are supported by thirty-two objectives. These goals and objectives reflect the need for prevention and education to protect children from the perils of drugs; treatment to help the chemically-dependent; law enforcement to bring traffickers to justice; interdiction to reduce the flow of drugs into our nation; international cooperation to confront drug cultivation, production, trafficking and use; and research to provide a foundation based on science (1998 NDCS, p. 3).

The CTAC R&D program can be separated into functional areas based on each project's application to demand reduction or supply reduction activities. Specific projects were chosen to address technology needs related to demand reduction in areas such as brain imaging technology, medications development and addiction treatment, and related to supply reduction in areas such as drug detection, communications, and surveillance. An array of operational test and evaluation activities is sponsored to evaluate off-the-shelf and emerging technology prototypes for use in the field.

Supply reduction technology generally relies on the disciplines of physical, chemical and information sciences. To support law enforcement counterdrug missions, CTAC has focused on integrating advancements in these technologies and

applying improved capabilities to tactical operations where we can use equipment to perform many of the highly dangerous surveillance and forensic data collection activities. Many of the successfully developed systems are being transferred directly to state and local law enforcement organizations under the technology transfer program discussed in Section 3.

Demand reduction technology relies upon the disciplines of biochemistry, psychology, physiology and social sciences. CTAC's thrust in demand reduction applies advancements in medical research to improve therapeutic treatment for drug abusers and information sciences technology to exchange information on successful prevention and treatment modalities among clinics networked across the nation.

### 2.1 Demand Reduction

The demand reduction technology development program supports Goal 1 and Goal 3 of the *National Drug Control Strategy*.

*Goal 1: Educate and Enable America's youth to reject illegal drugs as well as alcohol and tobacco.*

*Regional Information and Operations Network (RIONet)* - CTAC is sponsoring the Regional Information and Operations Network (RIONet) to investigate the feasibility of employing the Internet to link U.S. law enforcement agencies (primarily police departments) along the Texas/Mexico border through a high-speed, secure communications network. The system also supports drug abuse prevention programs among youth by using the Internet for elementary and secondary schools to access anti-drug campaigns sponsored by Federal, state and local organizations within the region.

*Goal 3: Reduce health and social costs to the public of illegal drug use.*

*Brain imaging technology/PET instrumentation*  
CTAC is supporting the development and proliferation of Positron Emission Tomography (PET), functional magnetic resonance imaging (fMRI), brain scan image processing and interpretation and other noninvasive imaging techniques for drug abuse research. This technology provides the best neuroimaging equipment suites and facilities available to research scientists working on drug abuse and addiction treatment and rehabilitation.

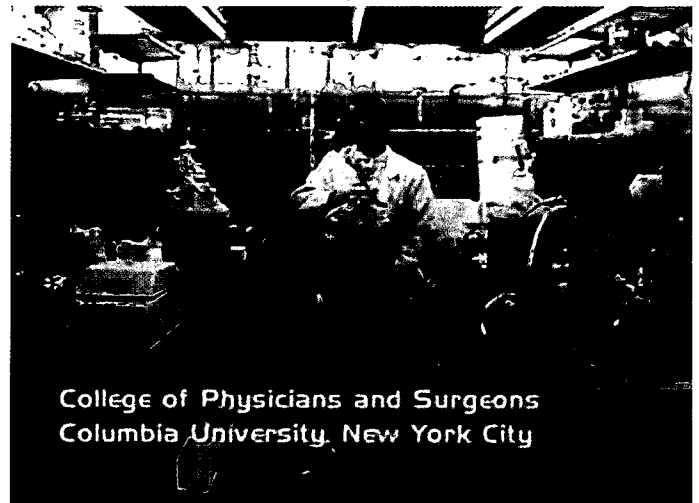
This program builds upon the success of the Addiction Research Center (ARC) in Baltimore, MD. Within a month of opening of the ARC in December 1996, the center produced extraordinarily high quality images of the nucleus accumbens and amygdala during cocaine craving.

A unique, ultra-high resolution camera is being built as part of the ongoing brain imaging technology program at the University of Pennsylvania. This program fields an innovative camera design employing a recently available scintillation material, lutetium oxyorthosilicate (LSO), which will simultaneously enable spatial resolution unsurpassed by any available commercial instrument, while also tolerating the high count rates necessary for imaging very short half-life tracers. This camera will be the first human PET scanner to benefit from LSO and represents the next generation of human PET brain scanning devices.

*Artificial Enzymes / Cocaine Antibodies* - For several years, CTAC has been sponsoring a team of research scientists at Columbia University who are synthesizing highly active protein compounds of catalytic antibodies. This anti-cocaine medication would reduce serum cocaine concentrations in the

blood and thus deprive the cocaine abuser of the behavioral reinforcing effect of the drug. The final medication would be an anti-cocaine vaccination which would destroy cocaine in the blood stream. The most potent anti-cocaine catalytic antibodies have been demonstrated to be effective in blocking cocaine in small animals.

During 1998, partially humanized versions of catalytic antibodies were synthesized indicating that it is time to accelerate the anti-cocaine immunotherapy program. The goals of the accelerated program would be to manufacture a sufficient quantity of the most promising human antibody and to complete phase I and phase II human trials by the year 2000. The cost of the accelerated anti-cocaine immunotherapy program including antibody optimization, construction and production of fully humanized antibody, including human trials would be on the order of \$6 million.

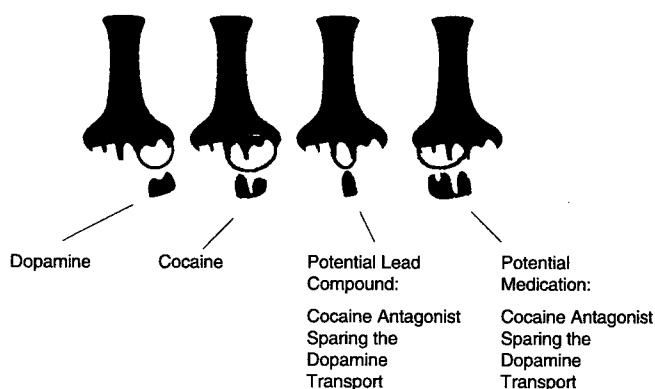


*Antagonist Drug Development* - Efforts for this project are focused on the development of a specific cocaine antagonist or partial agonist/antagonist. The antagonist therapeutic drug development program employs a novel technology based on sophisticated engineering approaches to develop either a pure cocaine

**antagonist** which will have no stimulant effects of its own but which will block the actions of cocaine or an **agonist** which has mild stimulant effects. This second approach is somewhat analogous to the use of methadone in treating heroin addicts but would be much more effective. The pure cocaine antagonist would have immediate application in treating cocaine overdoses.

So far over 11,000 NIDA compounds have been screened for binding to the cocaine site on the dopamine transporter. Current screening efforts have identified 46 compounds that significantly inhibited binding. Of these compounds, 21 were able to inhibit binding without impacting dopamine

### Potential Blockade of the Cocaine Receptor



transport. Work is continuing with the compounds identified in the primary screening. Researchers will determine the structure activity relationships around these leads and determine the optimal substitution for those compounds which bind to the cocaine binding site and have minimum impact on inhibiting dopamine uptake. The current series of compounds will be utilized to construct a 3-D model of the cocaine binding site and conduct conformational analysis on the binding chemistry. The most promising compounds will then be evaluated *in vivo* models of cocaine addiction.

*Alternative Treatments for Addiction* - CTAC-sponsored efforts at Emory University to develop medications for cocaine abusers have enabled researchers to identify and concentrate research trials on a relatively small number of compounds that may provide alternative treatments for cocaine addiction. All compounds tested so far in test tube assays were found to be stable, active at human cocaine receptors and suitable to take forward into animal studies. Animal testing will be conducted using laboratory mice which will provide an indication of the effects of candidate compounds on functional activity as well as toxicity.

The medication being sought will reduce craving and drug seeking behavior and be a first line treatment for addicts and abusers. A medication of this nature will enable treatment physicians to control the "out of control" drug seeking behavior and stabilize the addict in a treatment setting.

*Drug Evaluation Network System (DENS)* - The Drug Evaluation Network System (DENS) project provides the means to evaluate and monitor substance abuse treatment programs by tracking patients entering treatment, their characteristics and discharge status in real time. Treatment data on patients are being aggregated and organized by a central computer system using the latest database and executive information system technology and made accessible to treatment providers, researchers and managers. DENS currently links 41 treatment programs in 5 cities (Philadelphia, Chicago, New York, San Francisco and Albuquerque). Several additional sites are being added to include a more diverse set of metropolitan regions and gain a truly representative national sample. Nearly a dozen potential expansion cities have already been identified as future sites for DENS and could be active DENS participants within the next year.

The National Evaluation of Substance Abuse Treatment (NESAT) is a nationally representative, randomly selected longitudinal study of 2000 patients enrolled in treatment for drug and/or alcohol abuse at 200 programs nationwide. The study was designed to document the range of effectiveness of various treatment modalities and to identify those patient and program characteristics that are predictive of successful outcomes. During the past year, treatment programs were selected and 30 day follow-ups are being conducted for the initial patients. Six and twelve month interviews will be conducted with these initial patients.

*Non-Invasive Drug Testing Technologies* - Scientists at the Naval Research Laboratory have been working with CTAC to evaluate the use of hair, sweat, and saliva to monitor drug use. During the past year, field tests were conducted in conjunction with the Memphis City Police Department and Tennessee State Police using sweat and saliva monitoring tools in roadside investigations of driving under the influence cases. Preliminary data suggest that 35% of commercial drivers and 14% of the general driving population tested had recent contact with drugs.

*Court Diversion Programs for Juvenile Offenders* - CTAC is sponsoring a study being conducted at the Institute for Addictive Disorders at Allegheny University of Health Sciences to evaluate two models of intervention for adjudicated youth ages 14 to 17 diagnosed with problems of substance abuse or dependence. One model includes 3 months of day treatment followed by 6 months of after-school outpatient treatment. The second model includes 9 months of 5 days per week monitoring, urine testing, contingent sanctions for repeated substance use, and brief counseling. This study assesses the effectiveness of intervention early in the youth's involvement with the criminal justice system, attempting to reduce drug and alcohol abuse, criminal behavior

and recidivism without resort to the expense of incarceration. Researchers are also collecting data to determine the mix and duration of services that are most effective in adolescent substance abuse treatment.

CTAC is also supporting a diversion program established by the New Orleans District Attorney's Office for new youth offenders involved in substance abuse. A unified approach to diversion will be developed applying the lessons learned from both the Allegheny and the New Orleans approaches to address those factors unique to youth addiction and substance abuse in the corrections environment.

## **2.2 Long Range Planning, Testbeds, and Technical Support Program**

The CTAC Long Range Planning, Testbeds, and Technical Support Program addresses Goal 2 and Goal 4 of the *NDCS* and includes efforts such as technology assessments, phenomenology research, and test and evaluation of emerging and advanced systems. The test and evaluation activity includes advanced concept theoretical studies and experimental evaluations in operational testbeds of promising law enforcement support. Nonintrusive inspection system performance benchmarking efforts are also included in this program.

*Goal 2: Increase the safety of America's citizens by substantially reducing drug related crime and violence.*

*Law Enforcement Testbeds and Operational Test and Evaluation Support* - CTAC continues to sponsor operational testbeds, and instrumentation and engineering support to test prototypes in operational environments. While the Federal law enforcement agencies provide the lead for much of the testing program, many prototype tests include State and local organizations. The current testbed program concentrates on nonintrusive inspection

technologies, advancements in computer science, and benchmark evaluations of competing systems under development. Planned testbed efforts include covert tags, video stabilization, wireless intercept systems, methamphetamine laboratory analysis techniques, nonintrusive inspection systems, tactical communications systems and communications interoperability technology.

*Goal 4: Shield America's air, land and sea frontiers from the drug threat.*

*Narcotics Detection Technology Assessment Program* - The Narcotics Detection Technology Assessment (NDTA) program, is a CTAC-sponsored, community wide test and evaluation program for determining performance limitations of off-the-shelf, commercially available and emerging prototype drug detection equipment. Over 400 U.S. Federal, State and local law

enforcement agencies, in addition to several foreign governments, have requested and received technical reports of NDTA evaluations. A report on the assessment of cabinet x-ray systems was completed in 1997 and an assessment of drug vapor detection instruments was completed in early 1998.



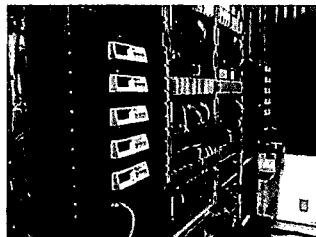
Since 1994, over a dozen different chemical-based narcotics detection systems and half a dozen cabinet x-ray systems have been evaluated under laboratory conditions. In addition to sponsoring laboratory "ideal conditions" testing, CTAC is continuing to support agencies such as the U.S. Customs Service and the U.S. Coast Guard as they

conduct controlled field tests and real-time operational assessments at ports-of-entry to determine the operational utility of current systems that have already undergone laboratory evaluations.

*Southwest Border Technology Planning* - CTAC sponsored a study to assess the impact of advanced nonintrusive inspection technology on drug interdictions and seizures at and between ports of entry along the Southwest border. The product of this study will be describe an optimum configuration of inspection and enforcement systems for consideration by the U.S. Customs Service, U.S. Border Patrol, and Immigration and Naturalization Service pertaining to the Southwest border. This study examines the application of technologies to detect, disrupt, deter, and seize illegal drugs being smuggled into the United States.

### **2.3 Law Enforcement Technology Projects**

The CTAC Law Enforcement Technology Projects address Goal 2 and Goal 4 of the *NDCS* and include individual efforts directed at general counterdrug law enforcement technologies or drug-related capabilities applicable to multiple user agencies. Development efforts are conducted by technology area experts from national laboratories, academic institutions and industry working together with federal, state and local law enforcement organizations. These projects support the development of advanced technology concepts from federal agencies such as the U.S. Customs Service, DoD, FBI, DEA and others





including state and local organizations. One example of this approach is the development of a concept to use an existing public safety communications switch in San Diego to connect up to eight federal, state and local law enforcement agencies using incompatible wireless radios. This successful interoperability concept is being cloned across the country to extend the useful life of outdated radio equipment and to improve officer safety and effectiveness through the use of a public safety switch.

*Goal 2: Increase the safety of America's citizens by substantially reducing drug-related crime and violence.*

*Information Technology Research* - CTAC assists law enforcement agencies in applying state-of-the-art tactical tools to exploit the capabilities of high-speed computer and communications networks to meet operational counterdrug technical needs. This program continues investigations into the use of computer networks and software tools for law enforcement applications.

Under this project, research scientists work directly with law enforcement professionals to identify areas which can benefit from advancements in computer technology. Software



tools under development include data mining, link analysis, and multimedia case management

applications. Four sites for these and other software tools and networks are scheduled over the next year. These sites include CTAC partnerships with state and local law enforcement agencies in Texas, Idaho, Iowa, and Colorado. Operational CTAC-developed systems are currently being used in Florida, New York, and New Hampshire. All of these projects will be available to transition advanced technology applications to other state and local law enforcement organizations.

*Financial Crimes Technology* - CTAC sponsored efforts to address financial crimes have resulted in the development of pattern detection algorithms which run on personal computers for identifying financial crimes and money laundering trends. The technology called GVA, generic visualization architecture, has been distributed to federal, state, and local law enforcement agencies to be applied to a wide variety of counterdrug financial data sets. The system exclusively uses visualization to expose patterns and trends within complex drug crime data. GVA, written in Java, will run under a wide range of existing as well as future computer platforms. Current development efforts are concentrated on providing additional features requested by agencies currently using the system. These new capabilities include support for collaborative analysis, geositional placement of data, a user's guide and improved interface screens. GVA is available to law enforcement agencies free of charge and can be downloaded from the Internet.

*Improved Tracking and Surveillance Tag* - CTAC established a test and evaluation program specifically to assess the performance of tracking and navigation systems (such as GPS based systems) as they are used in counterdrug law enforcement applications. These tests will permit analysis of how address geocoding may interfere

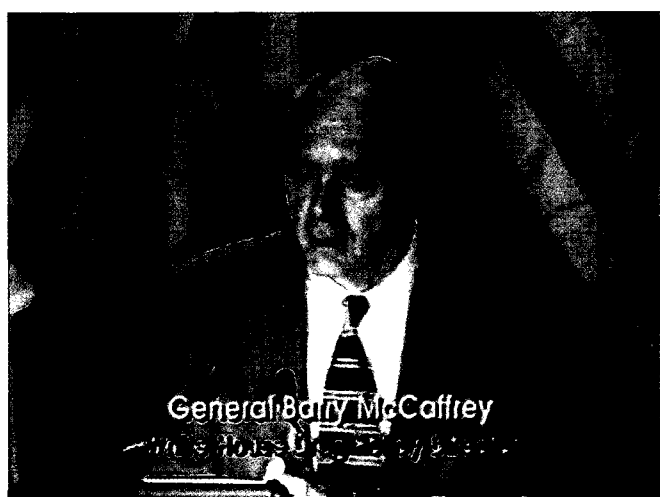
with obtaining good navigational and tracking results.

*Goal 4: Shield America's air, land and sea frontiers from the drug threat.*

**Cargo Inspection Technology** - CTAC continues to work jointly with the U.S. Customs Service to develop a family of transportable and fixed systems for nonintrusive inspection of cargo containers and other conveyances, including rail cars. This effort includes the development of a gamma ray system designed specifically for the inspection of rail cars. Initiatives regarding the development of automated targeting software for intelligent prescreening of shipping documents for suspicious cargo are also being pursued. New counterdrug technologies, such as miniaturized sensors to detect narcotic vapors using Ion Mobility Spectrometry (IMS), immunoassay, and portable gas chromatography technology will continue to be sought through solicitations such as Broad Agency Announcements.

## 2.4 Outreach

To enhance CTAC's coordination function, an outreach program was begun to bring scientists and



engineers in the development community together with those system users and law enforcement professionals within the Government involved in counterdrug operations. Each year CTAC supports a regional technology workshop series where broad-based discussions on drug abuse prevention, treatment and counterdrug law enforcement technology are taken to the experts in the field. CTAC also participates in a wide variety of activities with technical and professional associations, such as the Armed Forces Communications and Electronics Association, the International Association of Chiefs of Police, the National Sheriffs' Association, and the Fraternal Order of Police. Each endeavor targets specific audiences for participation in the counterdrug R&D program. Over the past six years, five major technical counterdrug symposia have also been sponsored by CTAC:

- **Harnessing Technology to Support the National Drug Control Strategy, Symposium, August 18-21, 1997, Chicago, IL,**
- **Counterdrug Law Enforcement: Applied Technology for Improved Operational Effectiveness International Technology Symposium, October 24-27, 1995, Nashua, NH,**
- **Drug Abuse Treatment Technology Workshop, August 15-16, 1995, Baltimore, MD,**
- **Tactical Technologies and Wide Area Surveillance International Symposium with U.S. Department of Energy, Argonne National Laboratory, November 2-5, 1993, Chicago, IL,**
- **Contraband and Cargo Inspection Technology International Symposium with National Institute of Justice, October 28-30, 1992, Washington D.C.**

The next major CTAC-sponsored technology symposium is being held March 8-10, 1999 at the Omni Shoreham Hotel in Washington, DC. The central theme for this symposium is the use of advanced technology along the Southwest border.

Regional one-day technology workshops have been sponsored by CTAC to address specific state and local law enforcement user needs and technological opportunities. The following regional one-day workshops have been held over the past two years:

- PERF/CTAC Technology Seminar, March 1996, St. Petersburg, FL,
- ONDCP/CTAC Regional Technology Workshop, April 1996, Austin, TX,
- ONDCP/CTAC Regional Technology Workshop, July 1996, St. Louis, MO.
- ONDCP/CTAC Regional Technology Workshop, October 1996, Bloomington, MN,
- ONDCP/CTAC Regional Technology Workshop, December 1996, Portland, OR,
- ONDCP/CTAC Regional Technology Workshop, April 1997, Atlanta, GA,
- ONDCP/CTAC Regional Technology Workshop, July 1997, San Diego, CA,
- ONDCP/CTAC Regional Technology Workshop, November 1997, Bedford, NH,
- ONDCP/CTAC Regional Technology Workshop, May 1998, Richmond, VA,
- ONDCP/CTAC Regional Technology Workshop, June 1998, Phoenix, AZ.

### **3. TECHNOLOGY TRANSFER PROGRAM SUMMARY**

*Goal 2: Increase the safety of America's citizens by substantially reducing drug related crime and violence.*

Since its inception, CTAC has worked with many law enforcement agencies and prosecutors to

find technological solutions to law enforcement problems unique to drug crimes and violence, and many valuable applications have been developed. In FY98 Congress established this program to transfer technologies developed with federal funding directly to state and local law enforcement agencies who may otherwise be unable to benefit from the developments due to limited budgets or lack of technological expertise.

The Technology Transfer Pilot Program matches existing technology systems with State or local law enforcement agencies in need of those technologies and funds the technology transfer. Priority is given to identifying candidates for transfer in the currently designated HIDTAs and CTAC also weighs the ability and willingness of potential recipients to share in the costs of new technology, either through in-kind or direct contributions. The technology areas available for transfer include computer based tools, communications, tracking and surveillance, and drug detection devices.

Computer Based Tools -- Commercially available products in the following areas to enhance and support counterdrug law enforcement case management and data analysis functions related to networks, electronic reports, linkage analysis, pattern recognition, financial transaction data, and criminal data search tools. Computer Based Tools areas include Information Gathering, Information Management/Storage, Information Processing, Information Retrieval, and other ADP related Operational Support Applications.

Communications -- Commercially available products in the following areas to enhance radio, telephone, wireless, and other communications between law enforcement agency personnel as well as interoperability, intercept, call tracking, wire-tap, and calling patterns.

Tracking and Surveillance -- Commercially available products in the following areas to enhance operational capabilities to monitor movement and activities of cooperative and non-cooperative targets to include mapping and geolocation, eavesdropping, video surveillance, image capture and image processing as well as advancements to basic critical components such as battery and antenna improvements. Tracking and Surveillance areas include Finding/Locating, Tracking, Video Surveillance, and Audio Collection.

Drug Detection -- Commercially available products to provide fast, reliable, and accurate determination as to the presence or use of illegal drugs under a wide range of environmental conditions. Drug Detection areas include Presence of Drugs and Use of Drugs.

Descriptive summaries are provided in Appendix C for each of the systems made available through the Technology Transfer Program. The Technology Transfer Program includes training and related support to assure that technology insertion is properly conducted. Follow-up evaluations address the overall effectiveness of each item transferred. Those items that are most successfully inserted are proliferated; conversely, those items that demonstrate substantial difficulties in transition to state and local law enforcement are removed from the program.

#### 4. FUTURE PLANS

ONDCP recently released the *Ten-Year Counterdrug Technology Plan and Development Roadmap* (July 1998). The ten-year plan outlines counterdrug technology efforts that address improving the capabilities of law enforcement agencies, including state and local organizations, and efforts that support the necessary advancements within the demand reduction

program for medical research and medical applications for reducing the effects of drug addiction and abuse. The CTAC R&D program consists of three essential elements that support both the ten-year plan and the five goals of the National Drug Control Strategy:

- R&D projects to support the development of Federal law enforcement and drug abuse treatment technology,
- technical assessments and operational test and evaluation of emerging drug detection and tactical counterdrug technology for field transition, and
- beginning in 1998, a program to transfer Federal counterdrug technology directly to state and local law enforcement organizations.

Supporting activities include a variety of regional one-day workshops, technical symposia, and ad hoc studies to promote the exchange of relevant information throughout the scientific and technical community. These outreach activities serve to reduce unnecessary duplication of effort and provide the mechanism for CTAC to oversee and coordinate counterdrug technology initiatives with related activities of other federal, civilian and military departments. This oversight and coordination effort extends to include developments in the industrial, academic and federal laboratory sectors, as well.

CTAC organized its R&D program according to five technology categories or areas of work:

- demand reduction technology,
- nonintrusive inspection technology development,
- tactical technology development,

- technical assessments and operational test and evaluation of emerging technology, and
- transfer of federally developed technology directly to state and local law enforcement organizations.

The national laboratories, private industry and academic institutions are the sources for the expertise needed for technology development efforts and have performed the research within the R&D Program. Standard and centralized test and evaluation activities performed under CTAC sponsorship are used by the law enforcement community to validate expected system performance in the field and assist in the rapid, cost-effective transfer of successful technology to the end-users.

#### **4.1 Demand Reduction**

Demand Reduction involves industry, government, and academic medicine in areas such as imaging hardware and software, neurobiology to human behavior, and fetal development to drug abuse among the aging population. An example of this broad community's interaction is demonstrated by the ongoing development and use of complex technologies such as the Positron Emission Tomography (PET) system. These increasingly sophisticated technologies are applied to improving diagnostics and treatments and to furthering the understandings at the neurochemical substrates of drug abuse. The interpretation of the brain images suggest medications treatment strategies which ultimately can lead to advances in medications development. Application of brain imaging technology has led to the testing of several candidate medications for treatment of cocaine dependence.

Demand Reduction identifies current and emerging patterns of drug use and abuse, and

determines how and under what conditions drug abuse is initiated or is avoided. Effective research delineates how drug abuse affects brain and behavior, and how to ameliorate or reverse drug abuse effects and consequences. Successful policy educates people to differentiate drug abuse from therapeutic use of medications for the spectrum of medical disorders. Ultimately, demand reduction success depends on the delivery of newly discovered knowledge and technology to many groups. In education, this requires dissemination of information to health care professionals, educators, and communities. Most important in the demand reduction area is the integration of resultant science and technology with the broader health care delivery systems. The scientific knowledge that is generated through research is a crucial element to improving the overall health of the nation through effective drug abuse treatment and prevention programs.

*In support of Goal 1: Educate and enable America's youth to reject illegal drugs as well as alcohol and tobacco.* R&D program initiatives support and highlight research, including the development of scientific information, to inform drug, alcohol and tobacco prevention programs targeting young Americans. A pilot project in McAllen, Texas, RIONET, is being performed, in conjunction with local law enforcement organizations, to evaluate the effectiveness of distant learning technologies in elementary school for prevention of drug abuse.

CTAC is supporting research tasks to evaluate the effectiveness of using the Internet to improve drug abuse prevention among the youth. RIONet, provides the basis for the system architecture and planning. Under this increment, CTAC is pursuing additional locations to assess the impact of demographics on the effectiveness of this type of program.

*In support of Goal 3: Reduce health and social costs to the public of illegal drug use.* R&D program initiatives support and highlight research and technology, including the acquisition and analysis of scientific data, to reduce health and social costs of illegal drug use. Brain imaging technologies, such as functional Nuclear Magnetic Resonance, are being advanced to provide research scientists with more knowledge on the underlying causes of drug addiction. In conjunction with their findings, effective treatments for cocaine addiction are being developed and tested in the laboratory.

The FY 2000 demand reduction program will support continued expansion of advanced neuroimaging research facilities and training of research teams who are devoted to studies of drug abuse and therapeutic medications. The technology will provide neuro-imaging research equipment suites and facilities with the best positron emission tomography (PET), functional nuclear magnetic resonance (fNMR) imaging, brain scan image processing and interpretation, and other noninvasive brain imaging techniques.

The nation's leading university research centers (Massachusetts General, University of Pennsylvania, University of California Los Angeles, Harvard Medical School and Emory University) have been selected as sites for the use of advanced imaging technology for drug abuse treatment research. In conjunction with NIDA, CTAC is deploying educational tools and structure for research scientists to study and discover new drug treatment modalities and therapies. A set of radio isotopes specifically designed to improve PET brain scanning capabilities applicable to drug abuse also will be developed under this initiative.

The FY 2000 program will support continuing successful demand reduction programs in youth/first time offender diversion, expansion of the analytical capabilities of the National

Evaluation of Substance Abuse Treatment (NESAT) computer network, and therapeutic treatments for cocaine addiction.

## **4.2 Nonintrusive Inspection**

*In support of Goal 4: Shield America's air, land, and sea frontiers from the drug threat.* R&D program initiatives will support and highlight research and technology, including the development of scientific information and data -- to detect, disrupt, deter, and seize illegal drugs in transit to the United States and at U.S. borders. Nonintrusive inspection (NII) technologies and advanced automated targeting systems are being developed by Customs and Coast Guard to improve inspection of cargo and conveyances at our ports of entry.

The NII systems will lead, within the next five years, to a "family" of NII systems that would satisfy the national goals for achieving the levels of inspection necessary to deter drug traffickers from using ports of entry. The national goal can be met by employing any or all levels of NII from intelligence-based automated targeting systems to high energy x-ray inspections to physical off-load and examination.

The largest development projects in NII technology address the ability to conduct inspections of the large number of trucks, sea containers, and rail cars entering the country each year, along with their associated cargo. Automated targeting systems to identify suspicious shipments, X-ray and other inspection systems, and new supporting infrastructure will have a large impact on improving the quality, intensity and flexibility of inspections of conveyances and cargo.

### **4.3 Tactical Technologies**

*In support of Goal 2: Increase the safety of America's citizens by substantially reducing drug related crime and violence.* R&D initiatives strengthen Federal law enforcement capabilities to combat drug-related violence, disrupt criminal organizations, and arrest and prosecute the leaders of illegal drug syndicates through the development of advanced technology tools. The tactical technologies effort supports development of advanced techniques and concepts for drug detection, location and monitoring of clandestine methamphetamine labs, surveillance, tracking, and communications technologies for daily operations. These technologies are also candidates for transfer to state and local law enforcement organizations with similar requirements.

### **4.4 Infrastructure Support**

The *ONDCP Ten-Year Technology Plan and Development Roadmap* identified the need for test and evaluation support activities to assess the technical and operational utility of emerging technologies and prototype systems. This CTAC program element provides testbeds, instrumentation and engineering support to perform testing of prototype systems in operational environments. All CTAC-sponsored tactical and Nonintrusive Inspection (NII) technologies will be tested and evaluated in realistic operationally law enforcement testbeds. Federally-sponsored tactical and NII technologies qualified as mature by the T&E testbed program will be made available to state and local law enforcement through the technology transfer program.

CTAC also sponsors international technical symposia, and leadership conferences and workshops to gather the latest developments in prevention, treatment and counterdrug law enforcement technology for world-class research

scientists and user experts to discuss the advancing state-of-the-art. Regional one-day workshops are also conducted to match the technical requirements and needs of state and local organizations for counterdrug technologies available from the transfer program. CTAC also plans to continue the Outreach Program consisting of one-day regional workshops and a larger scale international technology symposium. One-day regional workshops are scheduled for Houston, TX; San Diego, CA; and New York City, NY. The international symposium is scheduled for March 8-10, 1999 at the Omni Shoreham Hotel in Washington, DC. The symposium focuses on technology applications for the Southwest border.

### **4.5 Technology Transfer Program**

This initiative strengthens local law enforcement's efforts to combat drug-related violence, disrupt criminal organizations, and arrest and prosecute the leaders of illegal drug syndicates. The initiative continues the program initiated in FY 1998 to transfer advanced counterdrug technology directly to state and local law enforcement agencies. Technology projects and procedures for applying for a project available to transfer are listed in a Technology Transfer Fact Sheets Brochure which is updated periodically. As tactical and NII technologies for daily operations support are successfully tested in the Testbed program, these technologies will become systems to be included in the transfer program

By the end of FY 1998, the Congressionally directed technology transfer program had requests from state and local law enforcement agencies totaling over \$28 million. The FY 1999 technology transfer program will be applied to satisfy these requests. It is anticipated that CTAC's Outreach program will continue to result in a large number of additional requests for the transfer of advanced drug crime technology.





## APPENDIX A -- APPLICABLE LEGISLATION

The following highlights from applicable legislation summarize Counterdrug Technology Assessment Center appropriations, functions, and roles.

### **P.L. 100-690 of November 18, 1988 - Anti-drug Abuse Act of 1988**

"There is established in the Executive Office of the President the 'Office of National Drug Control Policy'."

"There shall be at the head of the Office of National Drug Control Policy a Director of National Drug Control Policy."

"Each Federal Government program manager, agency head, and department head with responsibilities under the National Drug Control Strategy shall transmit the drug control budget request of the program, agency, or department to the Director at the same time as such request is submitted to their superiors (and before submission to the Office of Management and Budget) in the preparation of the budget of the President submitted to the Congress under section 1105(a) of title 31, United States Code."

"The Director shall--

(A) review each drug control budget request transmitted to the Director...;

(B) certify in writing as to the adequacy of such request to implement the objectives of the National Drug Control Strategy for the year for which the request is submitted; and

(C) notify the program manager, agency head, or department head, as applicable, regarding the Director's certification..."

"There is established in the Treasury of the United States the Special Forfeiture Fund which

shall be available to the Director of the National Drug Control Policy without fiscal year limitation in such amounts as may be specified in appropriations acts."

"The President of the United States shall direct the Office of National Drug Control Policy, established in title I of this Act, to develop a comprehensive plan for utilizing no fewer than eight existing facilities of the Department of Defense, the Department of Justice, the Department of Energy, National Security Agency, and the Central Intelligence Agency, to develop technologies for application to Federal law enforcement agency missions, and to provide research, development, technology, and evaluation support to the law enforcement agencies of the Federal Government."

### **P.L. 101-510 of November 5, 1990 Counter-Narcotics Technology Act of 1990**

"There is established within the Office of National Drug Control Policy, the Counter-Drug Technology Assessment Center. The Center shall operate under the authority of the Director of National Drug Control Policy and shall serve as the central counter-drug enforcement research and development organization of the United States Government."

"There shall be at the head of the Center the Chief Scientist of Counter-Drug Technology. The Chief Scientist shall be appointed by the Director of National Drug Control Policy from among individuals qualified and distinguished in the area of science, engineering, or technology."

"The Director, acting through the Chief Scientist, shall (a) identify and define the short, medium, and long-term scientific and technological needs of federal, state, and local drug enforcement agencies, including advanced surveillance, tracking, and radar imaging; electronic support measures; communications; data fusion, advanced computer systems and artificial intelligence; and chemical, biological, radiological (including neutron, electron, and gravitation) and other means of detection; (b) in consultation with the National Institute on Drug Abuse, and through interagency agreements or grants, examine addiction and rehabilitation research and the application of technology to expanding the effectiveness or availability of drug treatment; (c) make a priority ranking of such needs according to fiscal and technological feasibility, as part of a National Counter-Drug Enforcement Research and Development Strategy; (d) oversee and coordinate counter-drug technology initiatives with related activities of other federal, civilian, and military departments; and (e) under the general authority of the Director of National Drug Control Policy, submit requests to Congress for the reprogramming or transfer of funds appropriated for counter-drug enforcement research and development."

"The authority granted to the Director under this section shall not extend to the award of contracts, management of individual projects, or other operational activities."

"Beginning with the budget submitted to Congress for fiscal year 1992 pursuant to section 1105 of title 31, United States Code, the President shall submit a separate and detailed request relating to those federal departments and agencies having responsibility for counter-drug enforcement research and development programs."

"Subject to subsections (d) and (e) of section 1502 of Title 21, the Chief Scientist shall select and appoint a staff of not more than ten employees with specialized experience in scientific, engineering and technical affairs."

"The Director of the Advanced Research Projects Agency shall, to the fullest extent possible, render assistance and support to the Office of National Drug Control Policy and its Director."

**P.L. 102-141 of October 28, 1991 -  
Treasury, Postal Service and General  
Government Appropriations Act, 1992**

"For activities authorized by Public Law 100-690, to be derived from deposits in the Special Forfeiture Fund, \$20,000,000 shall be transferred to the Counter-Drug Technology Assessment Center of the Office of National Drug Control Policy for counter narcotics research and development activities and for substance abuse addiction and rehabilitation research to remain available until expended."

**Conference Report to Accompany H.R.  
2622 of October 2, 1991 - Making  
Appropriations for the Treasury  
Department, the U.S. Postal Service, the  
Executive Office of the President, and  
Certain Independent Agencies, for the  
Fiscal Year Ending September 30, 1992,  
and for Other Purposes**

"Prior to the obligation of these funds, the conferees expect to be notified by the chief scientist on how these funds will be spent. The conferees also expect to receive periodic reports from the chief scientist on those priority research and development requirements identified by the Center."

**P.L. 102-393 of October 6, 1992 - Treasury, Postal Service, and General Government Appropriations Act of 1993**

“For necessary expenses of the Office of National Drug Control Policy; for research activities pursuant to title I of Public Law 100-690; ... of which no less than \$900,000 and five full-time equivalent positions shall be made available for the Counter-Drug Technology Assessment Center; ...”

“For activities authorized by Public Law 100-690, ... of which \$15,000,000, to remain available until expended, shall be transferred to the Counter-Drug Technology Assessment Center for counternarcotics research and development projects and shall be available for transfer to other Federal agencies and departments; ...”

**Conference Report to Accompany H.R. 5488 - Treasury, Postal Service, and General Government Appropriations Act of 1993**

“The Committee is pleased with the plan prepared by the Office of National Drug Control Policy (ONDCP) and its Counterdrug Technology Assessment Center (CTAC), to solicit innovative research and development projects in the areas of drug enforcement and demand reduction technology.

However, the Committee is concerned about dedicating funds to proposals which may not perform as expected. Therefore, the Committee directs CTAC to develop milestones and criteria, similar to that used by the Department of Defense, to measure accomplishments against stated goals.

Additionally, the Committee is concerned that CTAC may fund research and development on

items for which agencies have no plans to purchase when development is complete. Therefore, the Committee believes that before funds are committed to research and development of a prototype nature, there should be written commitment on the part of the ‘client’ agency that funds will be included in future budget requests to purchase the developed item.”

**P.L. 103-123 of October 28, 1993 - Treasury, Postal Service, and General Government Appropriations Act of 1994**

“For activities authorized by Public Law 100-690; ... of which \$7,500,000, to remain available until expended, shall be available to the Counter-Drug Technology Assessment Center for counternarcotics research and development projects and shall be available for transfer to other Federal departments or agencies.”

**P.L. 103-329 of September 30, 1994 - Treasury, Postal Service, and General Government Appropriations Act of 1995**

“For necessary expenses of the Office of National Drug Control Policy; for research activities pursuant to title I of Public Law 100-690; ... of which \$3,100,000 shall be available for ballistics technologies; ... of which \$8,000,000, to remain available until expended, shall be transferred to the Counter-Drug Technology Assessment Center for counternarcotics research and development projects and shall be available for transfer to other Federal departments or agencies.”

**House Committee Report 103-534 to  
Accompany H.R. 4539 - Treasury, Postal  
Service, and General Government  
Appropriations Bill, 1995**

“The conferees have included \$3,100,000 to expand testing of new ballistics technologies. The ... additional testing should focus on the ability to coordinate among multiple jurisdictions.”

“The conferees have provided \$8,000,000 for research and development activities of CTAC in fiscal year 1995. Of this amount, \$500,000 is provided for a nonintrusive inspection system assessment and engineering tradeoff study.”

**Conference Report to Accompany H.R.  
4539 - Treasury, Postal Service, and  
General Government Appropriations Act of  
1995**

“The Anti-Drug Abuse Act of 1988, Public Law 100-690, was amended during 1990 to provide for the establishment of a Counter-Drug Technology Assessment Center within the Office of National Drug Control Policy. This office is authorized to serve as the central counternarcotics enforcement research and development organization of the U.S Government. The law provides for the appointment of a chief scientist ... to make a priority ranking of scientific needs according to fiscal and technological feasibility as part of the national counterdrug enforcement research and development strategy.”

“The committee expects multiagency research and development programs to be coordinated... through the Counter-Drug Technology Assessment Center in order to prevent duplication of effort and to assure that whenever possible, those efforts provide

capabilities that transcend the need of any single Federal agency.”

“The committee believes that CTAC should work closely and cooperatively with the individual law enforcement agencies in the definition of a national research and development program which addresses agency requirements with respect to timeliness, operational utility, and consistency with agency budget plans. CTAC should develop a true blueprint for the program to include identification and assignment of priority projects, expected results, and funding projections .... This effort should be led by CTAC with input, review and consensus from the agencies. The national blueprint shall also include a rationale for allocation of funding among demand, supply, and State and local efforts.”

**P.L. 104-52 of November 19, 1995 -  
Treasury, Postal Service, and General  
Government Appropriations Act of 1996**

“For necessary expenses of the Office of National Drug Control Policy; for research activities pursuant to title I of Public Law 100-690; ... of which \$16,000,000, to remain available until expended, shall be available to the Counter-Drug Technology Assessment Center for counternarcotics research and development projects and shall be available for transfer to other Federal departments or agencies; and of the funds made available to the Counter-Drug Technology Assessment Center, \$600,000 shall be transferred to the Drug Enforcement Administration for the El Paso Intelligence Center.”

**P.L. 104-208 of September 30, 1996 - Treasury, Postal Service, and General Government Appropriations Act of 1997**

“For necessary expenses of the Office of National Drug Control Policy; for research activities pursuant to title I of Public Law 100-690; ... \$35,838,000, of which \$19,000,000 shall remain available until expended, consisting of \$1,000,000 for policy research and evaluation and \$18,000,000 for the Counter-Drug Technology Assessment Center for counternarcotics research and development projects of which \$1,000,000 shall be obligated for state conferences on model state drug laws: Provided, That the \$17,000,000 for the Counter-Drug Technology Assessment Center shall be available for transfer to other Federal departments or agencies.”

**P.L. 105-61 of October 10, 1997 - Treasury, Postal Service, and General Government Appropriations of fiscal year ending September 30, 1998**

“For necessary expenses of the Office of National Drug Control Policy; for research activities pursuant to title I of Public Law 100-690; ... \$35,016,000, of which \$17,000,000 shall remain available until expended, consisting of \$1,000,000 for research and evaluation and \$16,000,000 for the Counterdrug Technology Assessment Center for counternarcotics research and development projects: *Provided*, That the \$16,000,000 for the Counterdrug Technology Assessment Center shall be available for transfer to other Federal departments or agencies.”

“For activities authorized by Public Law 103-322, to remain available until expended, which shall be derived from the Violent Crime Reduction Trust Fund, as follows:

(1) As authorized by section 19001(e), \$131,000,000; ... of which \$20,200,000 shall be available to the Office of National Drug Control Policy, including \$13,000,000 to the Counterdrug Technology Assessment Center for a program to transfer technology to State and local law enforcement agencies, ...”

**Conference Report 105-284 of September 29, 1997 [to accompany H.R. 2378] Treasury, Postal Service, and General Government Appropriations for the fiscal year ending September 30, 1998**

“The conferees provide \$13,000,000 to the Counterdrug Technology Assessment Center (CTAC) of the Office of National Drug Control Policy (ONDCP) to establish a program for transferring technology directly to State and local law enforcement agencies. Since its inception, CTAC has worked with many law enforcement agencies and prosecutors to find technological solutions to critical law enforcement problems, and many valuable applications have been developed. The conferees direct that this new funding be used to initiate a pilot program to transfer these technologies directly to State and local law enforcement agencies who may otherwise be unable to profit from the developments due to limited budgets or a lack of technological expertise. The conferees direct CTAC to initiate this program under the direction of the Chief Scientist, ONDCP, with the advice of experts from State and local law enforcement, and in cooperation with High Intensity Drug Trafficking Area (HIDTA) programs to identify the technologies to be transferred and locations to be served. The conferees expect that priority will be given to identifying candidates for transfer in the currently designated HIDTAs, and expect that CTAC and HIDTA will also weigh the ability and willingness of potential

recipients to share in the costs of new technology, either through in-kind or direct contributions. The conferees also direct the Chief Scientist to submit a report to the Committees on Appropriations evaluating the performance of the program not later than 18 months for the date of the first transfer, as well as a strategic plan for countrywide deployment of technology. Additionally, the Chief Scientist is directed to consult with the Committees on Appropriations prior to the obligation of these funds to ensure that the money appropriated is going toward providing State and local law enforcement agencies access to counterdrug technology and not unreasonable administrative or otherwise unintended purposes.”

**Conference Report 105-789 of October 7, 1998 [to accompany H.R. 4104] - Treasury, Postal Service, and General Government Appropriations for the fiscal year ending September 30, 1999**

“For necessary expenses of the Office of National Drug Control Policy; for research activities pursuant to title I of Public Law 100-690; ...\$48,042,000, of which \$30,100,000 shall remain available until expended, consisting of \$1,100,000 for policy research and evaluation and \$16,000,000 for the Counterdrug Technology Assessment Center for counternarcotics research and development projects, and \$13,000,000 for the continued operation of the technology transfer program: *Provided*, That the \$16,000,000 for the Counterdrug Technology Assessment Center shall be available for transfer to other Federal departments or agencies:”

“The conferees expect the multiagency research and development programs to be coordinated by the Counterdrug Technology Assessment Center (CTAC) in order to prevent duplication of effort

and to assure that, whenever possible, those efforts provide capabilities that transcend the need of any single Federal agency. Prior to obligation of these funds, the conferees expect to be notified by the chief scientist on how these funds will be spent. The conferees also expect to receive periodic reports from the chief scientist on the priority counterdrug enforcement research and development requirements identified by the Center and on the status of projects funded by CTAC.”

**P.L. 105-85 of November 18, 1997 National Defense Authorization Act for fiscal year 1998**

(a) Report Requirement. -- Not later than December 1st of each year, the Director of the Office of National Drug Control Policy shall submit to Congress and the President a report on the development and deployment of narcotics detection technologies by Federal Agencies. Each such report shall be prepared in consultation with the Secretary of Defense, the Secretary of State, the Secretary of Transportation, and the Secretary of Treasury.

(b) Matters To Be Included. -- Each report under subsection (a) shall include -

- (1) a description of each project implemented by a Federal agency relating to the development or deployment of narcotics detection technology;
- (2) the agency responsible for each project described in paragraph (1);
- (3) the amount of funds obligated or expended to carry out each project described in paragraph (1) during the fiscal year in which the report is submitted or during any fiscal year preceding the fiscal year in which the report is submitted;
- (4) the amount of funds estimated to be obligated or expended for each project

described in paragraph (1) during any fiscal year after the fiscal year in which the report is submitted to Congress; and  
(5) a detailed timeline for implementation of each project described in paragraph (1).

**Conference Report 105-825 of October 19, 1998 [to accompany H.R. 4328] - Making Omnibus Consolidated and Emergency Supplemental Appropriations for Fiscal Year 1999**

“For necessary expenses of the Office of National Drug Control Policy; for research activities pursuant to title I of Public Law 100-690; not to exceed \$8,000 for official reception and representation expenses; and for participation in joint projects or in the provision of services on matters of mutual interest with nonprofit, research, or public organizations or agencies, with or without reimbursement; \$48,042,000, of which \$30,100,000 shall remain available until expended, consisting of \$1,100,000 for policy research and evaluation, and \$16,000,000 for the Counterdrug Technology Assessment Center for counternarcotics research and development projects, and \$13,000,000 for the continued operation of the technology transfer program: Provided, That the \$16,000,000 for the Counterdrug Technology Assessment Center shall be available for transfer to other Federal departments or agencies: Provided further, That the Office is authorized to accept, hold, administer, and utilize gifts, both real and personal, public and private, without fiscal year limitation, for the purpose of aiding or facilitating the work of the Office.”

“The conferees agree to provide \$2,500,000 for ONDCP, instead of \$14,000,000 as proposed by the House and no funding as proposed by the Senate. \$1,000,000 of this funding would cover the costs of continuing support for Model State

Drug Law Conferences, as proposed by the House. \$13,000,000 proposed by the House for continued funding for the technology transfer program run by the Counterdrug Technology Assessment Center will instead be funded in the ONDCP Salaries and Expenses account, as proposed by the Senate.”

“The conferees agree to provide \$48,042,000 for the Office of National Drug Control Policy (ONDCP) as proposed by the Senate, instead of \$36,442,000 as proposed by the House. This includes \$13,000,000 to continue the technology transfer pilot program managed by the Counterdrug Technology Assessment Center (CTAC). It also includes \$17,942,000 for ONDCP operations, as proposed by the Senate, \$16,000,000 for the basic CTAC program, and \$1,100,000 for policy research of which \$100,000 is to be used for evaluating the Drug-Free Communities Act, as proposed by the Senate. The conferees agree to modify language governing the authority of ONDCP to accept and use gifts. The conference agreement separately funds \$1,000,000 for Model State Drug Law Conferences through the Violent Crime Reduction Trust Fund.”

“The conferees expect the multiagency research and development programs to be coordinated by the Counterdrug Technology Assessment Center (CTAC) in order to prevent duplication of effort and to assure that, whenever possible, those efforts provide capabilities that transcend the need of any single Federal agency. Prior to obligation of these funds, the conferees expect to be notified by the chief scientist on how these funds will be spent. The conferees also expect to receive periodic reports from the chief scientist on the priority counterdrug enforcement research and development requirements identified by the Center and on the status of projects funded by CTAC.”

## APPENDIX B -- COUNTERDRUG SCIENTIFIC AND TECHNOLOGICAL NEEDS

The Counterdrug Technology Assessment Center (CTAC) authorization required CTAC to “identify and define the short, medium, and long-term scientific and technological needs of federal, state, and local drug enforcement agencies.” Each agency was requested to provide a prioritized list of counterdrug scientific and technological needs for their respective agency. This appendix provides a summary of all counterdrug scientific and technology needs reported within the federal government for Fiscal Years 1997 and 1998. The needs are shown by agency.

Since the priority and scope of requirements are so broad, an interagency working group for technology (IAWG-T) was established as recommended in the *Ten Year Counterdrug Technology Plan and Development Roadmap*, July 1998. This working group has been formed as part of the Science and Technology Committee and is charged with developing links between agency needs, individual programs, the *Strategy* goals, the technology development roadmap, and the desired outcomes for each of the 21 drug control agencies. Specific technology-related performance targets will then be established by the IAWG-T for each agency technology initiative.

### *Department of Defense*

#### Top Priority

Stopping go-fast boats from a standoff without lethal force

OTH radar technology: detection/tracking of small maritime craft

OTH radar technology: improved tracking, reduced positional inaccuracy, reduced clutter

Long-range detection of go-fast boats from aircraft

Advanced tagging of air and maritime craft

Rapid location of drugs “secreted” onboard maritime vessels

Rapid detection of drugs in cars, without removing occupants

Non-intrusive inspection of railroad car

Counterdrug intelligence analysis

Computer “data mining” for threat targeting

Ultra-wide area, ocean surveillance of maritime

movements

Wide area surveillance of US border

Podded radar for export

#### Priority

Wide area airborne surveillance to detect drug labs

Geographic info systems for border analysis

Standoff identification of marijuana in occupied vehicles

Wide area surveillance to precisely identify marijuana crops

Low cost wide area airborne surveillance of river smuggling targets

Airborne “tagging” of targets

Rapid, safe detection of “swallowed” and body-carried drugs

#### Low Priority

UAVs

Communications



Tactical Weather prediction

Night vision technology

Long standoff detection of drugs on aircraft

## ***U.S. Coast Guard***

### **TACTICAL TECHNOLOGIES**

#### **Short term needs**

Improved surveillance sensors for maritime (including aviation and unmanned aerial vehicle) use: radar, acoustic, high resolution night vision, LLTV, IR, other electro-optical systems

Portable, less-than-lethal capability to control or disable fleeing vessels

Improved communications systems to share data across platforms, including tactical picture, from multiple sensor inputs: voice, data, imagery, tactical situation information

#### **Medium term needs**

Unmanned aerial vehicles which can be operated from large cutters at sea

Information and decision support systems

Track recording capability sufficient to reveal land/sea/air/ drug trafficking routes

Ability to retrieve and fuse information from heterogeneous databases, including text

Identification of potentially suspicious activity and of aggregate patterns and trends from large databases by linking together relevant information and by search for similar (versus identical) information

Decision support systems to improve effectiveness of searches. e.g., pattern recognition and profile development systems for targeting suspect vessels and traffickers

Mobile push to talk low probability of intercept communications

#### **Long term needs**

Improved sensors (better, cheaper, lighter, smaller, more power efficient)

Unmanned aerial vehicle which can be operated from small cutters at sea

High performance database systems which allow for aggregate queries on arbitrary criteria

Advanced data tools:

Software to automatically extract information from text and populate databases

### **NON-INTRUSIVE INSPECTION**

#### **Short term needs**

Accurate signatures for detectable illicit drug emissions in operational environments for physical and chemical detection

Portable/transportable capability to detect and classify drugs and contraband in vessels, compartments and containers of all sizes

Portable/transportable capability to detect false compartments or other anomalies in vessels, compartments and containers of all sizes

#### **Long term needs**

Improvements to non-intrusive tools for drug detection and space accountability (better, cheaper, lighter, smaller, more power efficient)

### **WIDE AREA SURVEILLANCE**

#### **Short term needs**

Improved target detection, sorting, classification, tracking and identification, including Over-the-Horizon detection and tracking

Improve the capability to correlate multiple sensor inputs into one presentation

Automatic sorting and tracking (legitimate vs suspect targets)

Develop AUV applications with a multi-sensor package (> 1000 nm)

Satisfy airspace control concerns for UAVs

Command and control workstation that integrates surveillance, tracking, analysis and map image data and includes communication interface with other computer information systems and voice communications networks

#### Medium term needs

Develop track recording sufficient to reveal patterns and changes to patterns and routes used by drug traffickers on land, sea and in the air. Integrate this capability with graphical information systems.

Automatic integration of all source databases

Significantly improve the positional accuracy of OTH and ROTH to 1-2 nm

#### Long term needs

Improvements to wide area surveillance tools for drug detection and space accountability (better, cheaper, lighter, smaller, more power efficient)

### ***Central Intelligence Agency***

Improved tracking and locating systems for use outside the US Against containers, vehicles and personnel

Interception of traffickers communications

Tools to locate and analyze information in the disparate databases that exist in different government agencies

### ***Agricultural Research Service***

Herbicidal eradication of narcotic crops  
Biological control of narcotic plants

Estimation of illicit narcotic crop production - update Peru and Mexico

### ***Federal Aviation Administration***

Non-intrusive inspection of people, baggage and cargo using both trace and bulk techniques

Testing and determining appropriate standards for emerging and commercial contraband detection technologies

### ***Federal Bureau of Investigation***

Integrate a GPS tracking capability with a two-way paging system

Passively determine whether a targeted vehicle has passed particular pre-determined points.

Capability to perform reliable direction finding on emerging digital wireless transmissions

Ability to automatically transcribe in real-time, spoken English and several other languages

Development of improved water-based recovery technologies

### ***National Institute of Justice***

Non-intrusive, man-portable, hand-held, small rugged chemical analysis instruments for on-site preliminary and confirmatory analysis in drug-related investigations

Automated screening methods which are inexpensive and more specific for target substances

Standardization of drug use testing devices that account for sensitivity, efficiency, collection methods, as well as, precision and portability effectiveness of sampling methods

Validation of drug use testing devices that includes field testing and is based on thorough studies of performance sensitivity, efficiency, precision and portability effectiveness of sampling methods

A frequently updated database containing field test results, standards for drug use devices and the results of the validation studies that is made available to state and local law enforcement agencies through distribution of published documents or Internet access

### ***U.S. Customs Service***

Non-intrusive inspection system for railcars

Development of advanced marine interceptor vessel hull design

Stopping go-fast boats from a standoff without lethal force

Covert detection and tracking of maritime targets of interest in or around river and coastal areas

Computer "data mining" for land border, airport, and seaport threat targeting

Hand-held bulk currency detector

Miniaturized covert tagging and tracking devices

Improved x-ray and gamma-ray detector technology

Rapid non-intrusive techniques to identify contraband in car trunks (without opening)

A small, inexpensive bioassay device that would detect the presence of drug vapors

A vapor detection system to detect the presence of drug filled pellets ingested by swallowers

System to track high-interest maritime targets via the integration and display of multiple source information

### ***Drug Enforcement Administration***

Requirements in Blueprint Update of September 1996 are sufficient

### ***National Institute on Drug Abuse***

Expansion of brain imaging technology and positron emission tomography (PET) facilities

Reduction of cost and size of accelerator and associated targetry used for PET

Improved anatomic and neurochemical information accessed through functional magnetic resonance imaging and magnetic resonance spectroscopy

## APPENDIX C - CURRENT TECHNOLOGY TRANSFER LISTING

### Introduction

Since its inception, CTAC has worked with many law enforcement agencies and prosecutors to find technological solutions to law enforcement problems unique to drug crimes and violence, and many valuable applications have been developed. In FY98 Congress established this program to transfer technologies developed with federal funding directly to state and local law enforcement agencies who may otherwise be unable to benefit from the developments due to limited budgets or lack of technological expertise. The conference language is clear on the intent of the program and is included here for reference:

“The conferees provide \$13,000,000 to the Counterdrug Technology Assessment Center (CTAC) of the Office of National Drug Control Policy (ONDCP) to establish a program for transferring technology directly to State and local law enforcement agencies. Since its inception, CTAC has worked with many law enforcement agencies and prosecutors to find technological solutions to critical law enforcement problems, and many valuable applications have been developed. The conferees direct that this new funding be used to initiate a pilot program to transfer these technologies directly to State and local law enforcement agencies who may otherwise be unable to profit from the developments due to limited budgets or a lack of technological expertise. The conferees direct CTAC to initiate this program under the direction of the Chief Scientist, ONDCP, with the advice of experts from State and local law enforcement, and in cooperation with High Intensity Drug Trafficking Area (HIDTA) programs to identify the technologies to be transferred and locations to be served. The conferees expect that priority will be given to identifying candidates for transfer in the currently designated HIDTAs, and expect that CTAC and HIDTA will also weigh the ability and willingness of potential recipients to share in the costs of new technology, either through in-kind or direct contributions. The conferees also direct the Chief Scientist to submit a report to the Committees on Appropriations evaluating the performance of the program not later than 18 months for the date of the first transfer, as well as a strategic plan for countrywide deployment of technology. Additionally, the Chief Scientist is directed to consult with the Committees on Appropriations prior to the obligation of these funds to ensure that the money appropriated is going toward providing State and local law enforcement agencies access to counterdrug technology and not unreasonable administrative or otherwise unintended purposes.”

The Technology Transfer Pilot Program matches existing technology systems with State or local law enforcement agencies in need of those technologies and funds the technology transfer. Priority is given to identifying candidates for transfer in the currently designated HIDTAs and CTAC also weighs the ability and willingness of potential recipients to

share in the costs of new technology, either through in-kind or direct contributions.

The Technology Transfer Program includes training and related support to assure that technology insertion is properly conducted. Follow-up evaluations address the overall effectiveness of each item transferred. Those

items that are most successfully inserted are proliferated; conversely, those items that demonstrate substantial difficulties in transition to state and local law enforcement are removed from the program. The technology areas available for transfer include computer based tools, communications, tracking and surveillance, and drug detection devices. The following systems are offered under the current Technology Transfer Program.

## **Systems Available for Transfer**

### *Miniaturized Covert Audio "Bugging" Device*

This device is a secure, miniaturized transmitter with voice privacy, low probability of detection (VPLPD) capabilities. The remote receiver will monitor and support the recording of VPLPD transmissions. The device can be worn inconspicuously during operation and it can defeat both detection and eavesdropping devices while providing robust performance characteristics even in severe multipath environments.

### *Voice Intercept Monitoring and Recording System for Title III Investigations*

This system greatly improves the Title III surveillance process by automating the data collection, review and analysis processes via a PC-based database management system (DBMS). The system digitally records the telephone conversations plus any short notes typed by the monitor/operator. The recorded conversations are then available for later review as well as for transcription. Important parameters describing the call (e.g. date, time, person called) are also added to the database. As an option, the investigators can, with assistance from utilities within the system, review suspect calling habits and derive

associations to formulate a case. The system takes the form of a local area network (LAN) system and allows simultaneous monitoring of multiple, separate telephone conversations. This system is an integrated package consisting of hardware and product training. A typical configuration consists of one server, two dial number recorders, and ten audio workstations, providing a capability to monitor twelve lines simultaneously.

### *Data Locator System*

This software package provides capabilities for secure exchange of electronic mail, database input and extraction, and police intelligence analysis information over a standard Internet connection. The system is comprised of a multilevel database access system, a secure communications module, and an integrated package of standard data exchange formats. This system is an integrated package consisting of hardware, software, cryptographic cards, and product training. A typical configuration consists of a server computer, client PCS, custom software, and Internet accessibility.

### *Surface Residue Drug Test Kit*

These disposable wipes are used to identify trace amounts of drug residue. Wipe kits are available for the detection of cocaine, opiates, amphetamines, and cannabis. To use the kits, an officer wipes the swab across the surface to be tested, inserts the tab in a vial of clean water and color changes to indicate the presence of drugs are visible within approximately two minutes.

### *Cellular Phone Billing Records Analysis*

This PC-based system is used to analyze cellular phone traffic from telephone company

billing records. It selects phone calls for inclusion in its database by applying criteria to identify suspect clone phones and other appropriate criteria. Other pertinent data such as information from phone directories, subpoenas, or other approved sources may also be stored in the database. The system contains both a graphical user interface (GUI) for display of phone traffic patterns and various toolkits for processing, updating, searching and visualization of relationships extracted from the database. The system is an integrated package consisting of hardware, software, and product training. A typical configuration consists of computers and custom software

#### *Portable Contraband Detection Kit*

This kit consists of a "Buster" contraband detector which indicates differences in density encountered when moved across a surface and is useful in discovering hidden compartments; an ultrasonic range finder which measures distances up to 90 feet within 1 inch accuracy and is useful for detecting false walls or bulkheads; a flexible fiber optic fiberscope which contains a portable light source for remote viewing inside inaccessible spaces such as fuel tanks; and other assorted steel probes, extension mirrors with flashlights, and pocket pencil probes for probing or viewing around or behind obstacles. This product is a self-contained kit consisting of a carrying case, hardware and product documentation and instructions.

#### *Money Laundering / Suspicious Financial Transaction Detection Software*

This project focuses on providing a visualization tool used to help analysts understand complex data systems deployed in counterdrug interdiction efforts. This includes

scenarios dealing with money laundering, telephone tolls, trafficking events and drug networks. This CTAC sponsored effort is being conducted in conjunction with the State Attorney General's Offices in Arizona, Texas and Utah in addition to FinCEN, the Defense Information Systems Agency and others.

The system is accessible through the Internet, is based on non-proprietary Java code, and can run on a variety of platforms including SUN, PC, HP, and Macintosh. The developer uses the Internet to post system upgrades and obtain user feedback. System upgrades are then available for downloading by end-users and users are encouraged to provide comments back to the developer. Most of the system modifications to date have been user driven. Current efforts will continue toward the development of a more comprehensive user's guide and tighter coupling to database systems. The technology transfer product resulting from this project is a non-proprietary software package designed to identify underlying patterns and trends associated with many aspects of money laundering and drug crime.

#### *Command and Control Vehicle Tracking - NAVTRACK Air-Ground Surveillance Management System (AG-SMS)*

CTAC originally sponsored the development of this system as an airborne system for information, navigation, and command and control. This technology provides the ability to track and locate both field units (friendly assets) and suspects (targets) using a variety of remote sensors. Systems incorporate Differential Global Positioning System (DGPS) technology to improve positional accuracy. Target position and other information is relayed to a stationary or mobile base station via VHF/UHF radio,

cellular, Mobitex or satellite communications. Tracking and other information is graphically displayed and archived on a moving map display at the base station. The software also permits remote commanding of the sensor and a variety of features to enhance overall covert surveillance operations. The system is augmented with a database application to manage information relating to the units being tracked. AG-SMS is an integrated package consisting of software, hardware and system training and support. Use of this technology significantly enhances surveillance effectiveness; reduces departmental operating costs, personnel resource demands, and improves officer safety.

*Secure Messaging and Investigative Image Information Transmission System (SMIITS)*

CTAC sponsored the development of SMIITS to provide a capability for police departments to upload, search, and distribute images using wireless transmission. SMIITS uses a secure web browser to handle the transmission of images and messages between field and police headquarters. It includes encrypted e-mail messaging (text and pictures), and an image case management tool for the storage, searching, and distribution of images and text. Images and text can be uploaded and searched from all field units. The system can be used to share images and text data between two field units as well as between the field and headquarters. This CTAC sponsored effort is being conducted in conjunction with the New York City Police Department.

*Command and Control Vehicle Tracking - Signcutter*

CTAC is sponsoring Project Signcutter to provide law enforcement officers with an ability

to track and locate both field units and suspects using a system based on Global Positioning System (GPS) technology and dedicated radio or cellular telephone infrastructures. The generated data on position information can be graphically displayed to both field units and a central base station. The fully integrated system package consists of the base unit, tags, and all of the supporting software. This pilot project is being conducted with the Pima County Sheriffs' Office in Pima County, AZ. Currently, the system is operational for monitoring LEA assets. Current efforts are focused on integrating non-cooperative tags. The existing system is based on the 800 MHZ radio infrastructure. Future efforts will concentrate on cellular and/or satellite wireless communications technology. The product resulting from this project is a complete turn-key system consisting of the base station, tags, and software.

*Miniaturized Video Surveillance System - Small Look*

CTAC originally sponsored the development of this system for the FBI. This technology consists of a miniature, solid-state electronic camera system and video processing circuitry. It features low power consumption for prolonged battery life and captures, processes, and stores hundreds of digital picture images in nonvolatile memory. The fully integrated system package available for transfer consists of hardware, software, and product training.

*Suspect Pointer Index Network (SPIN)*

SPIN is a relational database application used for the entry, retention and analysis of multimedia data (images and text) supporting counterdrug operations, general case investigations, and crime analysis requirements.

Users at nodes throughout a given jurisdiction, e.g., state, local or regional centers, enter suspect and case data based on a wide choice of criteria. Supervisor oversight is provided for all records entered into SPIN and all information about user system access is logged and retained. SPIN can be operated in a standalone or networked environment. If networked, data may be uploaded over wired or wireless links to a central server, which is queried for matching suspect data. This system enables users to enter and query for detailed information on cases and events. Different types of users are granted access to different system capabilities based on password control. In addition to text entries search and retrieval, SPIN also provides an ability to include image data as part of the application, e.g., suspect mug shots. Because of its unique design and open architecture approach, SPIN can use a full range of external links to related applications. A complete data search capability is included.

#### *Tactical Video Communications System (TVCS)*

The system is designed to transmit video and voice from a law enforcement team in a threat area to a command post in a safe zone where the experience of senior operators can be pooled to both enhance the effectiveness of the team and reduce the risk involved. The TVCS transmits live color video from a forward threat zone back to a command post. The present system combines a 2.4 GHz radio, which transmits the video signal, and a Motorola Sabre radio, which maintains voice communication links and interfaces with present communication resources. Video repeaters are used to extend range and to extend the radio signal around steel enclosures that would normally block transmission. Present range is approximately 1 mile in open terrain and approximately 200 yards through buildings or a steel ship with one/two repeaters.

#### *Tactical Speech Collection and Analysis System (TACSCAN)*

CTAC sponsored the development of TACSCAN for the DEA as an enhanced real time voice recognition system. Voice sample sets are stored on the TACSCAN's hard drive. The speaker source is collected from any audio input (radio, microphone, tape recorder, etc.) and fed directly into audio port on the TACSCAN laptop computer. TACSCAN's algorithms identify the speaker by performing comparisons between the voice samples and speaker source. The system stores up to 25 individual voice samples. To achieve a typical 95 percent positive identification rate, it is recommended that a minimum voice sample of 20 seconds be obtained for each speaker of interest. System can also be used for call screening, speaker detection and location. The system is based on a UNIX Berkeley Software Distributions (BSD), X-Windows operating system that can operate on either laptop or desktop computer.

#### *Infrared (IR) imaging surveillance system -- Thermal Imagers*

This system provides night vision capabilities by identifying heat sources, instead of relying on light, and generate real-time video pictures in all lighting conditions, including total darkness. The handheld unit is a lightweight, uncooled thermal imaging device that operates using a 6-Vdc rechargeable camcorder battery. The device can detect a human out to 2400 feet using the standard 75-millimeter focal length lens. The lens has a focus range from 8 feet to infinity. The handheld device can also be mounted on a tripod, has VCR-compatible output jacks, and has an external RS-232 serial control port. A vehicle mounted version of the system enhances night vision for mobile patrols and surveillance.



The vehicle version has several mounting, monitoring, and control options for various configurations.

#### *Handheld Narcotic Vapor Detection System*

The Vapor Tracer weighs less than 8 pounds and is capable of detecting and identifying extremely small quantities of narcotics or explosives. The system works by drawing a sample of vapor into the detector where it is heated, ionized, and identified. Up to six substances at one time can be selected for detection from a field of more than 40 narcotics, including cocaine, heroin, opium, PCP, Methamphetamine, THC, MDMA, and most explosives, including TNT, NG, RDX, PETN, EGDN, DNT, and HMX. Operator points the nozzle of the device toward the object or area to be sampled and presses a trigger. The sample is drawn into the detector, analyzed, and identified, usually in seconds.

#### *Surveillance Video Enhancement System - Video Stabilization*

The video stabilization system, designated the VFE-100, developed by the David Sarnoff Research Center is an electronic video stabilization system that digitally stabilizes each frame of black and white video. Since the system does not rely on stabilization of the camera platform, the video can be stabilized electronically after it is recorded. The system can also support real time video stabilization by transmitting the video signal to the stabilization equipment located at a remote site. The next generation of this system, the VFE-200, will provide improved image enhancement and will process color video.

#### *Computer-based Interagency Radio Communications Switching System*

This radio interoperability project is being conducted in the Imperial County California area. The system hardware is located at the Imperial County Sheriffs' Office and can connect up to 24 public safety agencies in Imperial County without changing to a common frequency (The hardware for BORTAC II can accommodate add-on cards to support up to 96 agencies). The agencies are connected to a central radio system via dedicated phone lines. The commercial software installed at the hub allows the connection of up to 16 of the phone lines into a conference call so that the mobile radios on different frequencies can communicate directly.

The predecessor to the BORTAC II system, the BORTAC I, is currently operational in San Diego at the 911 operations center and has supported ongoing drug raids and apprehensions, including support to the apprehension of a kidnapper at the U.S. - Mexico border. There are 13 agencies presently connected through the BORTAC I. BORTAC II hardware has been purchased, and component diagnostics have been completed. Facility modifications to meet BORTAC II infrastructure requirements are still underway. The system became operational in June of 1998. Future plans include efforts to connect the BORTAC II to the BORTAC I by linking the hubs of each system which will facilitate capabilities for inter-county operations and provide an ability for hand-off of operations between agencies at changes in jurisdiction.

#### **Progress**

The technology transfer program has requests for state-of-the-art technology from over 223 interested state and local law enforcement organizations in 35 states. It has been observed that as state and local law enforcement becomes more efficient with

managing drug-related criminal information, their valuable time is invested more effectively – and safely. For these reasons, CTAC-sponsored projects for exploiting information management capabilities will receive increased priority to transfer emerging advanced algorithms and information processing techniques to interested state and local law enforcement organizations. The Internet is being used to provide many of the perfected techniques for pattern recognition and data mining to the law enforcement users at-large. This “free-ware” is accessible through a password and technical support and training are provided through the centralized, CTAC-sponsored testbed and infrastructure support system. Testbeds established in San Diego, California; Bedford, New Hampshire; Pinellas County, Florida; Burlington, Iowa and Denver, Colorado were used last year to fully develop these algorithms and information processing techniques directly with user personnel.

## **Plans**

An engineering analysis is being performed to identify the strong and weak points of the program. Feedback from each agency that received equipment will assist in determining the ability of State and Local organizations to integrate federally developed technology into their counterdrug operations. Improvements in training and support will be identified to make the program more effective. A report to Congress will be prepared for Spring of 1999.

# APPENDIX D - ANNUAL REPORT ON THE DEVELOPMENT AND DEPLOYMENT OF NARCOTICS DETECTION TECHNOLOGIES BY FEDERAL AGENCIES

## Introduction

This appendix has been prepared to satisfy the reporting requirement for an annual report on development and deployment of narcotics detection technologies included in the National Defense Authorization Act for fiscal year 1998 (P.L. 105-85). The reporting requirement states:

“(a) **REPORT REQUIREMENT.** - Not later than December 1st of each year, the Director of the Office of National Drug Control Policy shall submit to Congress and the President a report on the development and deployment of narcotics detection technologies by Federal Agencies. Each such report shall be prepared in consultation with the Secretary of Defense, the Secretary of State, the Secretary of Transportation, and the Secretary of Treasury.

(b) **MATTERS TO BE INCLUDED.** - Each report under subsection (a) shall include -

- (1) a description of each project implemented by a Federal agency relating to the development or deployment of narcotics detection technology;
- (2) the agency responsible for each project described in paragraph (1);
- (3) the amount of funds obligated or expended to carry out each project described in paragraph (1) during the fiscal year in which the report is submitted or during any fiscal year preceding the fiscal year in which the report is submitted;
- (4) the amount of funds estimated to be obligated or expended for each project described in paragraph (1) during any fiscal year after the fiscal year in which the report is submitted to Congress; and
- (5) a detailed timeline for implementation of each project described in paragraph (1).”

## Project Descriptions, Agencies and Funding

Table D-1 provides those reporting elements specified in items (1), (2), (3), and (5) for narcotics detection technologies under development. Allocations for FY 1999 were not available at the time this report was prepared, so FY 1999 funding levels will be shown in the annual report submitted in December 1999. Table D-2 provides summary information on those narcotics detection technologies deployed by the U.S. Customs Service. Figure D-1 shows where the narcotics detections systems are being deployed by the U.S. Customs Service.

**Table D-1. Narcotics Detection Technologies Recently Developed or Still Under Development**

Agency	Project Title/Short Description	FY 97 (\$K)	FY 98 (\$K)
US Customs Service	Rail Gamma Prototype - Develop a prototype gamma ray imaging system to detect contraband in rail cars <i>Prototype due 4Q FY99</i>	0	400
US Customs Service	Rail Gamma Tests - Evaluation of Cesium and Cobalt radioisotope sources for application to railcars <i>Project completed</i>	46	50

Agency	Project Title/Short Description	FY 97 (\$K)	FY 98 (\$K)
US Customs Service	Mobile Truck X-Ray - Development of a second version of the mobile truck x-ray system <i>Prototype deliveries 4Q FY99 and 1QFY00</i>	100	1,700
US Customs Service	Thermal Probe - A long soldering-iron device with a tip mounted heat source to probe imported "tar pots" for contraband <i>Field testing to be completed by 2Q FY99</i>	2	5
US Customs Service	Gamma-Gamma Resonance - Support to the FAA for the gamma gamma resonance baggage inspection system <i>Under development</i>	10	90
US Customs Service	Potassium (K-40) Detector - Support to Revenue Canada for a joint potassium-40 detection system for marijuana and tobacco products <i>Under development</i>	0	144
US Customs Service	Piezoelectric Resonance Detector - Investigation of the piezoelectric resonance characteristics of cocaine hydrochloride <i>Project discontinued. Piezoelectric resonance for cocaine hydrochloride not sufficient for detection</i>	30	25
US Customs Service	Performance Index Quotients (X-Rays) - Development and test of image quality device to determine the penetration capability, resolution, and quality of radiographic images <i>Project complete. Devices in use</i>	70	0
US Customs Service	SAW Immunoassay - proof-of-concept demonstration of a surface acoustic wave filter to a biological immunoassay tag to identify cocaine vapors <i>Progress review meeting scheduled for 4Q FY98</i>	25	50
US Customs Service	Forced Air Canine Sampling - Development and evaluation of application of canines to sea and land cargo containers through positive air expulsion <i>Review field data 1Q FY99</i>	0	25
US Customs Service	Currency Training Aids For Canines - Development of improved training aids for canines in the currency detection program <i>Conduct field evaluations 1Q FY99</i>	0	90
US Customs Service	Plasma ARC Narcotics Destruction - Development, test and evaluation of a plasma arc system to safely and effectively destroy more than 300 lb/hr of seized narcotics. <i>Initial prototype tests due 1Q FY99</i>	550	850

Agency	Project Title/Short Description	FY 97 (\$K)	FY 98 (\$K)
US Customs Service	Handheld Thermal Imager - Test and evaluation of thermal imagers to detect thermal gradients in inbound sea and land containers to indicate the presence of secreted drugs <i>Project completed - Not successful</i>	80	0
US Customs Service	Evaluation of Trace Detection Systems - Support costs for the test and field evaluation of several IMS trace detection systems <i>Tests in 1Q FY99</i>	250	0
US Customs Service	Dry Phase Immunoassay - Completion of a dry phase immunoassay film badge for detection of the presence of narcotic vapors - <i>Initial tests 2Q FY99</i>	50	0
US Customs Service	Revenue Canada Technology Exchange - Support of an R&D exchange program with Revenue Canada <i>Ongoing project</i>	100	0
US Coast Guard	Technology for Vessel Search - Surface Acoustic Wave - Improve Coast Guard's narcotic detection capabilities through experimentation and analysis of cocaine characteristics (ARPA funding of \$75K prior to FY97) <i>Completion 2QFY98</i>	0	0
US Coast Guard	Boarding and Search Equipment - Improve Coast Guard existing equipment and procedures to introduce new technologies. <i>Completion 4QFY99</i>	200	200
US Coast Guard	Vessel Search via Low Energy Imaging Techniques - Ultrasonic - Improve inspection of vessel tanks at sea to determine contraband detection (\$175K prior to FY97) <i>Completion 4QFY00</i>	0	175
US Coast Guard	Shelf Technology Program - Improve Coast Guard's capabilities to detect, identify and localize illicit material and cargo while minimizing adverse impact to legitimate maritime commerce. <i>Completion 4QFY98</i>	75	75
Department of Defense	Enhanced Canines - enhancing drug detection by canines through understand, evaluate and apply (1) olfaction thresholds and signatures, (2) performance limitations, (3) variables that decrease performance, (4) selection, training and maintenance enhancements, and (5) sound basis for certification, quality assurance and generalization <i>FY97/98: Validate absolute and discrimination thresholds for heroin, cocaine and other illicit drugs; effects of extraneous odors; and frequency of training</i>	482	0

Agency	Project Title/Short Description	FY 97 (\$K)	FY 98 (\$K)
Department of Defense	<p>Mobile System Integration - Demonstration of multiple systems at ports-of-entry. Successful systems will be integrated with Customs/FAA activities involving stream of commerce inspections.</p> <p><i>FY98: Complete demonstrations of individual system, conduct port-of-entry modeling, and complete test plan for controlled performance assessments and integrated field demonstrations involving air and sea cargo streams of commerce</i></p>	1,326	1,383
Department of Defense	<p>Small Package Inspection - Conduct evaluations on several commercially available state-of-the-art, small package x-ray systems to determine their ability to inspect smaller packages for the presence of illegal drugs and contraband.</p> <p><i>FY98: Stream of commerce testing and continued data collection</i></p>	42	25
Department of Defense	<p>Automated Screening Equipment and Systems (Demand Reduction) - Development of an automated sampling system and specimen container to reduce cost and enhance military drug testing capability which processes over 3 million samples annually.</p> <p><i>FY98: Complete development of system/specimen container prototype</i></p>	650	675
Department of Defense	<p>Mobile Detection System - Development of next generation mobile non-intrusive inspection systems. Investigate backscatter and transmission imaging techniques for rapidly inspecting cars and trucks. Includes development of mobile x-ray, pallet x-ray, gamma ray transportable system for inspecting cars and trucks, and high energy x-ray system for inspecting maritime containers.</p> <p><i>FY98: Completed prototype development and testing of transmission capable mobile truck x-ray; completed testing of gamma-ray system; and scheduled testing of sea container prototype.</i></p>	3,151	2,183
Department of Defense	<p>Technology for Locating HCL Labs - Develop and demonstrate technology for locating HCL laboratories in Colombia. Technologies being explored include: ELINT detection, optical and FLIR signatures, specialty radars, multi-/hyperspectral imaging.</p> <p><i>FY99: Select and demonstrate fieldable technology options</i></p>	449	205
Dept of Agriculture	<p>Narcotics crop plant identification and chemistry</p> <p><i>Ongoing</i></p>	398	398

Agency	Project Title/Short Description	FY 97 (\$K)	FY 98 (\$K)
Dept of Agriculture	Cannabis detection in concealed areas not accessible to remote, aerial, sensors <i>Ongoing</i>	275	275
CTAC	Detection of Drugs in Hair, Sweat and Saliva - For drug testing applications, a research team led by the Naval Research Laboratory is evaluating using a subject's hair, sweat or saliva for monitoring drug use under a variety of conditions. Such issues as passive exposure, false identification of drug use, and matrix bias among individuals are being considered to evaluate the best biological matrix to use in developing a noninvasive drug testing alternative to urine. With this year's funding, CTAC plans to complete development of a prototype system to integrate the detection of illicit drugs in the hair and sweat of a subject with geositional sensor and communications subsystems for transmission of positional and drug abuse status data to a remote location. <i>Completion in FY98</i>	200	150
CTAC	Drug Phenomenology Research - a team of engineers and scientists perform analytical evaluations in conjunction with user personnel to compare technical system performance using accurate measures of effectiveness and scientific comparison criteria <i>Ongoing</i>	250	225
CTAC	Narcotics Detection Technology Assessments - CTAC plans to continue supporting the Narcotic Detection Technology Assessment program led by U.S. Customs Service. This program will be expanded from illicit drug vapor/particulate detection systems to include assessments of bulk detection technology (e.g., x-ray and neutron systems). <i>Ongoing</i>	1,805	3,905
CTAC	Testbeds in Support of Technology Evaluations - during FY 1997, a series of tactical technology testbeds were deployed. Many of the prototype systems developed under CTAC funding were evaluated at these locations. <i>Transitioned to Technology Transfer Program FY98</i>	4,705	3,025
CTAC	Southwest Border Technology and Infrastructure Study - a study was sponsored to determine the optimum mix of advanced technologies to interdict drugs along the southwest border <i>Completed in FY99</i>	0	735

Agency	Project Title/Short Description	FY 97 (\$K)	FY 98 (\$K)
CTAC	Cargo Inspection Technology - A low-cost fast-throughput system was developed to inspect tanker trucks and rail cars at U.S. border crossings. The system uses large, highly efficient gamma-ray detectors which make it possible to scan the tanker truck with a very low intensity gamma-ray field. <i>Completed in FY98</i>	0	1,500

**Table D-2a. Types of Narcotics Inspection System Elements Currently in Use**

<p><u>Intelligent Screening</u> Automated Intelligence Systems and Suspect Databases Automated Targeting Systems Passport Readers Dogs</p> <p><u>Technology Assisted Inspections</u> Gamma Backscatter Devices (Busters) Gamma-Ray Systems (Relocatable, Transportable) X-Ray Systems (Fixed Truck, Mobile Truck, Light Pallet, Baggage and Mail) Range Finders Fiberoptic Scopes Drug Particle Detectors Narcotic Detection Sprays and Wipes Dielectrometers Biosensors Probes</p> <p><u>Physical Examination</u> Medical X-Ray Banned Substance Recovery Unit Hand-held Devices and Tools</p>
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The narcotics inspection systems being installed along the Southwest border for the detection of drugs and other contraband are listed in Table D-2b. Table D-2c provides a status of equipment acquisition and facility preparation under Operation Hard Line and DoD funding for the U.S. Customs Service Truck X-Ray program. The listing includes those equipment currently in use as well as the truck x-ray systems planned for deployment over the next two years. Figure D-1 shows where the existing and planned truck x-ray systems will be deployed along the Southwest border.



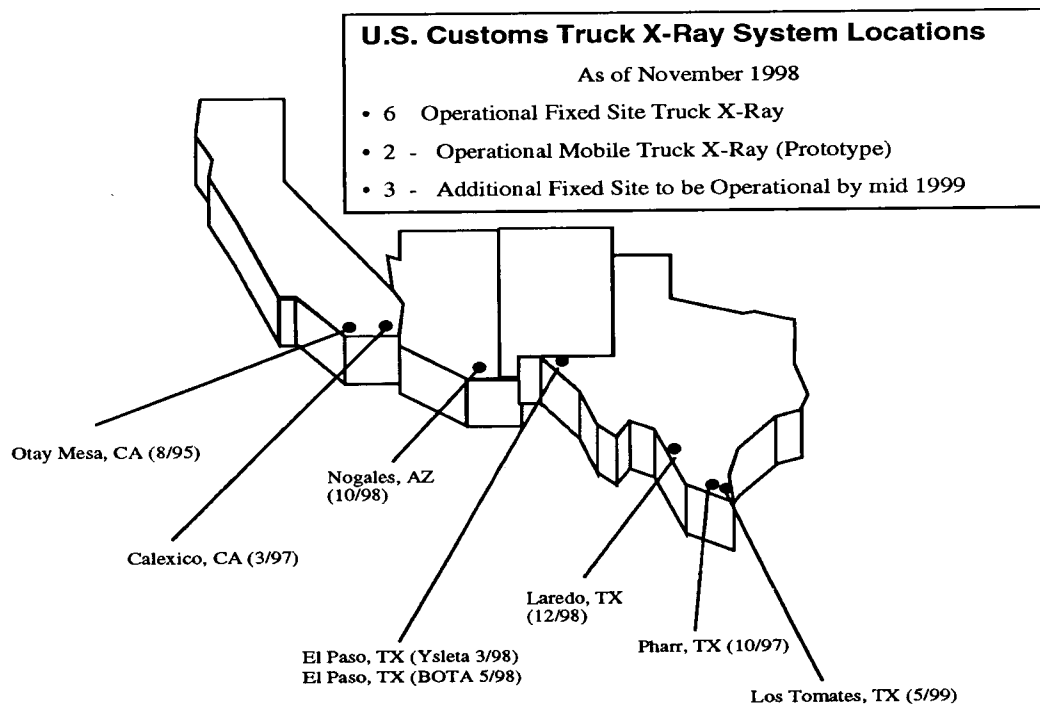
**Table D-2b. Customs Technology Deployed on Southwest Border  
(Source: U.S. Customs Service as of 11/13/98)**

<b>Equipment Type</b>	<b>Arizona</b>	<b>California</b>	<b>Texas</b>	<b>Total SW Border</b>
<b>TECHNOLOGY ASSISTED INSPECTIONS</b>				
<b>X-ray systems</b>				
Light Pallet X-Ray: (X-Ray 101-XL)	4	5	12	21
Mobile X-Ray Van: (X-Ray 101-Van)	3	13	14	30
Truck X-Ray: (X-Ray TXRS)	1	2	3	6*
Mobile Truck X-Ray: (X-Ray MTXRS)	0	0	1	1*
Parcel X-Ray: (X-Ray 101-GT)	0	9	4	13
Mail X-Ray: (X-Ray 101-GTA)	0	3	2	5
(X-Ray 50-L)	0	0	3	3
Gamma-ray system (Prototype at El Paso TX)	0	0	1	1
<b>PHYSICAL EXAMINATION</b>				
<b>Hand held devices</b>				
Gamma Backscatter (Buster)	114	64	183	361
Contraband Detection Kit	11	1	36	48
Fiberoptic Scope	20	10	76	106
Laser Rangefinder	3	8	47	58
IonScan Particle Detector	0	8	6	14
Dielectrometer	6	6	14	26
<b>TOTALS</b>	<b>162</b>	<b>129</b>	<b>402</b>	<b>693</b>

\* For locations see Figure D-1

**Table D-2c. Status of U.S. Customs Service Truck X-Ray Program (Oct 1998)**

Site	X-Ray Equipment	Site Design	Facility Preparation	Systems Integration	Systems Testing	Systems Acceptance
Otay Mesa	Delivered	Complete	Complete	Complete	Complete	Operational 8/95
Calexico	Delivered	Complete	Complete	Complete	Complete	Operational 3/97
Pharr	Delivered	Complete	Complete	Complete	Complete	Operational 10/97
Ysleta	Delivered	Complete	Complete	Complete	Complete	Operational 3/98
BOTA	Delivered	Complete	Complete	Complete	Complete	Operational 5/98
Nogales (DoD)	Ordered	Complete	Complete	Complete	Complete	Operational 10/98
Laredo (DoD)	Ordered	Complete	Started 6/98	10/98	12/98	12/98
Los Tomates	Ordered	Complete	Started 8/98	3/99	5/99	5/99
Laredo #4	Ordered	Started 9/98	7/99	5/00	7/00	7/00



**Figure D-1. Planned Deployment of Truck X-Rays by U.S. Customs Service**

## NARCOTICS DETECTION SYSTEMS DEPLOYED / CURRENTLY AVAILABLE

The following paragraphs provide a description of narcotics detection systems currently available for use. The listing was derived from the DoD-sponsored Counterdrug Technology Information Network available to the general public on-line at website "ctin.com."

**Tech Title:** "Mini-buster" Contraband Detector

**Tech Description:** This technology is a suite of contraband detector search products, which includes:

- A "Buster" detector which indicates the difference in density encountered when moved across a surface; useful for uncovering a hidden compartment
- An ultrasonic range finder which measures distances up to 90 feet within 1-inch accuracy for detection of false walls or bulkheads
- A flexible fiber optic fiberscope which contains a portable light source for remote viewing inside inaccessible spaces such as fuel tanks
- Other assorted steel probes, extension mirrors with flashlights, and pocket pencil probes for probing or viewing around or behind obstacles

**Tech Title:** AS&E's Body Search X-ray Inspection System

**Tech Description:** AS&E's Body Search X-ray Inspection System uses backscatter X-ray imaging of the human body to quickly, safely, and effectively screen for drugs, weapons, and explosives concealed on the body.

**Tech Title:** Chemical Microsensor

**Tech Description:** This device is a hand-carried system used to detect drug particles. The suspect particles are collected on a disposable filter, heated (pyrolyzed) to decompose the particles into their chemical vapor by-products. A thin, selective coating that has an affinity for the target pyrolysis products covers the SAW transducer.

**Tech Title:** Contraband Detection in Cargo Containers

**Tech Description:** A passive radiation detection system based on measuring the natural K-40 gamma ray emissions from plant contraband such as tobacco, marijuana, and hashish was field tested at the Philipsburg land border crossing between Quebec and Vermont in October 1996, for a 2 month period. The monoenergetic K-40 gamma rays of 1.45 MeV were detected using large-volume sodium iodide (NaI) crystals mounted on either side of the inspected cargo container. Data was collected for a wide range of contraband, tobacco and marijuana, were performed. Numerical analysis of the spectral data and the appropriate selection of key spectral features from the energy spectra has shown that the cargo can be classified into several categories based on the presence of a radionuclide in the cargo, as well as from the attenuation of the normal background radiation due to the cargo itself. The field test results indicate a high success rate for positive detection of K-40 simulant and the true contraband.

**Tech Title:** Detection of Drugs, Crops, Chemical Compounds, Currency, and Contraband

**Tech Description:** This PFT tracer technology and its relatively high vapor pressure provides the unique ability to permeate closed doors, windows, containers, and technologies. Once a location reaches steady state, the actively emitting tracer marked item will provide vapor traces that are detectable in the vicinity (even temporarily following removal of the tracer marked item). By extending the detectable

life of the PFT tracer materials, Tracer will provide a unique tool for law enforcement in the numerous applications including non-invasive inspection of locations and cargo under surveillance. The ability to mix several compositions of PFTs and then selectively detect such mixed interference or contamination (an important evidentiary consideration). It is possible to envisage applications for future encapsulated PTs, where tracer release is intelligently triggered either by presence of the contraband itself, or when an item has been tampered with.

**Tech Title:** Adapting FAA Certified CTX Technology to Detect Narcotics

**Tech Description:** This project addresses how CTX technology can be adapted from its initial explosive detection application to identify concealed narcotics. A plan was presented at the ONDCP Symposium in 1997 which describes the adaptation of the CTX to automatically detect drugs as well as indicating a possible development path for automatically detecting cash.

**Tech Title:** Fixed Site Truck X-Ray System

**Tech Description:** This system was specifically designed to detect drugs and other contraband hidden within compartments, structural cavities, walls, and other areas in small vehicles and empty trucks. The system uses two medium-energy x-ray sources (450 KeV each) to provide conventional transmission and low atomic weight side/backscatter detection modes. The system has demonstrated the effective and efficient inspection of cargo vehicles, including trailer trucks and trailer-mounted cargo containers, for illicit drugs, currency and other contraband.

**Tech Title:** High Energy Cargo Container Inspection System

**Tech Description:** The DoD Counterdrug Technology Development Program Office sponsored the development of a mobile inspection capability for 44-foot sea cargo containers. The system, a high energy 2-6 MeV X-ray integrated on a sea container transporter, is totally self-contained and, if successful, will enable rapid inspection of the containers without impeding the flow of commerce. It is available in a mobile configuration or as a fixed site system.

**Tech Title:** Integrated Optic Sensor for Drug Detection and Identification

**Tech Description:** This technology consists of a prototype integrated optic (IO) sensor system applicable to drug detection and identification. The sensor technology is based on an integrated optic (IO) interferometer (i.e., an optical system on a chip) that has proven to be extremely sensitive as a chemical sensor. The unique design of the integrated waveguide interferometer provides a system capable of detecting picograms (femtomoles) of an analyte or alternatively concentrations in the part-per-billion range. Furthermore, the technology offers a compact package applicable to a variety of drug monitoring/detection scenarios.

**Tech Title:** Ion Mobility Spectrometer Technology

**Tech Description:** Ion mobility spectrometers are a classic means of analyzing and identifying chemical substances. The substance to be analyzed is broken down into ionized components, the components are accelerated through an electric and/or magnetic field, and the ions are physically dispersed according to their mass/charge ratio. Measurements of the dispersion identify the target substance.

**Tech Title:** Mini-Raman Lidar

**Tech Description:** The mini-Raman lidar system (MRLS) can be used to look for chemicals resulting from narcotics or other illegal drug processing, and accidents involving hazardous materials on any surface (e.g., ground, buildings, clothing, vegetation) as well as airborne chemicals. Chemicals are identified through analysis of the Raman scattering generated by laser illumination of the target area.

**Tech Title:** Mobile Truck X-Ray

**Tech Description:** • System developed to detect contraband hidden in the walls of trucks, cars, other vehicles. Operated by Customs Inspectors and National Guard personnel. Extension of the fixed site X-ray located at Otay Mesa Commercial Facility. Transmission and Backscatter images. Operating Voltage 450 kV. Capability: Empty cargo containers and lightly packed trailers.

**Tech Title:** Non-Intrusive Detection of Drugs Using Neutron Transmission

**Tech Description:** A pulsed fast-neutron transmission spectrometer has been used to determine presence of contraband drugs in sealed suitcases. A pulsed 'white' neutron source was created by allowing a pulsed beam of 5 MeV deuterons to impinge on a thick beryllium target.

**Tech Title:** Prototype Cocaine Vapor Detectors

**Tech Description:** The Department of Defense Counterdrug Technology Development Program has sponsored the evaluation of three prototype vapor detectors for their ability to detect cocaine vapor emanating from seized cocaine hydrochloride (HCl) bricks. The detectors were based on ion mobility spectrometry, field ion spectrometry and fast gas chromatography with surface acoustic wave detection. Evaluations were conducted using environmentally sustained laboratory and controlled operational conditions, the temperature range of 77-158 degrees F (25-70 degrees C) with relative humidity in the range of 5-20 percent.

**Tech Title:** Self-propelled Non-Intrusive X-ray Inspection System

**Tech Description:** This technology describes a novel non-intrusive X-ray inspection system that is mobile and self contained (carries its own power source, etc.). This system does not require any dedicated space, can move to different locations within large operations, such as port facilities, and can perform inspections under its own power without touching or moving the container/vehicle. Furthermore, the elevation of the X-ray source and detector can be varied, permitting the inspection of containers on the ground or a chassis; and truck-borne cargo.

**Tech Title:** Small Package Inspection Systems

**Tech Description:** Small Package Inspection Systems are designed to inspect passenger baggage, expedited courier parcels, and break-bulk cargo. Two advanced commercial x-ray systems have completed this evaluation. These systems include an advanced x-ray computer tomographic system, and a single energy x-ray transmission/backscatter imaging system. A third system, a dual-energy x-ray transmission/backscatter system is scheduled for assessment.

**Tech Title:** VACIS - A Versatile Gamma-Ray Vehicle

**Tech Description:** With this gamma-ray imaging system, individual photon counting is utilized to achieve an image rapidly, yet with a low-level radiation field. The choice of Cs-137 or Co-60 gamma rays provides penetration capability

corresponding to 2 and 4 MeV x-rays, respectively. The use of the largest detector possible, consistent with the resolution required for the image, makes it possible to achieve scan speeds of 1-60 mph; Very high-speed electronics have been developed for the high gamma-ray count rates and the high-frequency sampling times that are required for the high-speed range.

**Tech Title:** Vapor Constituents of Illicit Cocaine HCI as Delivered Through an Olfactometer

**Tech Description:** To better understand the role of vapor constituents emitted from illicit cocaine HCI during olfactory detection by trained dogs, two types of vapor delivery systems were utilized, Single Source Olfactometer (SSO) and Multi-Source Olfactometer (MSO). The SSO serially dilutes a single odorant through multiple dilution stages thus allowing the operator to choose a particular concentration level to be delivered. The MSO is a unique testing procedure where by the canine is allowed to choose which odorants or mixtures of odorants smell similar to the compound of interest. As a result, threshold concentrations and a vapor signature of illicit cocaine HCI sample based upon canine recognition may be proposed. Since both designs utilized the same illicit cocaine HCI sample and vapor generation cell, it was determined that protocol for this experiment would not have to be duplicated for each design. The focus of this study is to identify and quantify major vapor generation cell of the olfactometer and GC/MS techniques. A summary of the data from an illicit cocaine HCI sample will be presented.

**Tech Title:** Detection of Cocaine on Currency

**Tech Description:** The Office of the Texas Attorney General, Financial Crimes Division (FCD) is using an enzyme immunoassay surface drug detection kit during money laundering investigations to determine the presence of cocaine contamination on the surface of currency in Texas. The examination utilizes the AccuPRESS Surface drug Test Kit, available from DETEC, Inc. Subsequent to the field test of the currency, the evidence is submitted to Quest Diagnostics Incorporated, Baltimore, Maryland, for an independent gas chromatography/mass spectrometry (GS/MS) analysis. A qualitative and quantitative confirmation for cocaine, heroin, or other narcotics contained in the evidence sample is subsequently received.

**Tech Title:** Accu-sorb Saliva Collector

**Tech Description:** The Accu-sorb Saliva Collector component can be used with diagnostic testing kits or in laboratory for a wide range of testing applications. The collector is made of our proprietary Hydrophilic Foam component and Special Collection Tube component, which provides a collector that is efficient, easy to use and cost effective.

**Tech Title:** Visualine™ II - Urinalysis Testing

**Tech Description:** The Visualine™ II tests which have FDA approval to market are: Cocaine, Morphine, Cannabinoids (THC), Benzodiazepines, and Methamphetamine. The tests are composed of preformulated dry reagents arranged on a porous membrane support in a convenient cassette. The tests are simple to use and easy to read, with results in five minutes. The tests are based on the latest technology and have been evaluated in clinical trials at a major university.

**Tech Title:** DrugWipe

**Tech Description:** Sweat from individuals in a drug treatment program, collected by a simple forehead wipe, can detect cocaine use/exposure at twice the rate as hair analysis and at a substantially higher rate than can be obtained from urinalysis. Likewise, in a randomly selected population, sweat testing showed twice the detection rate for cocaine use/exposure than did hair analysis.













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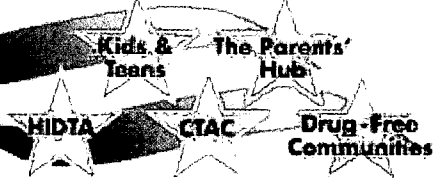
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