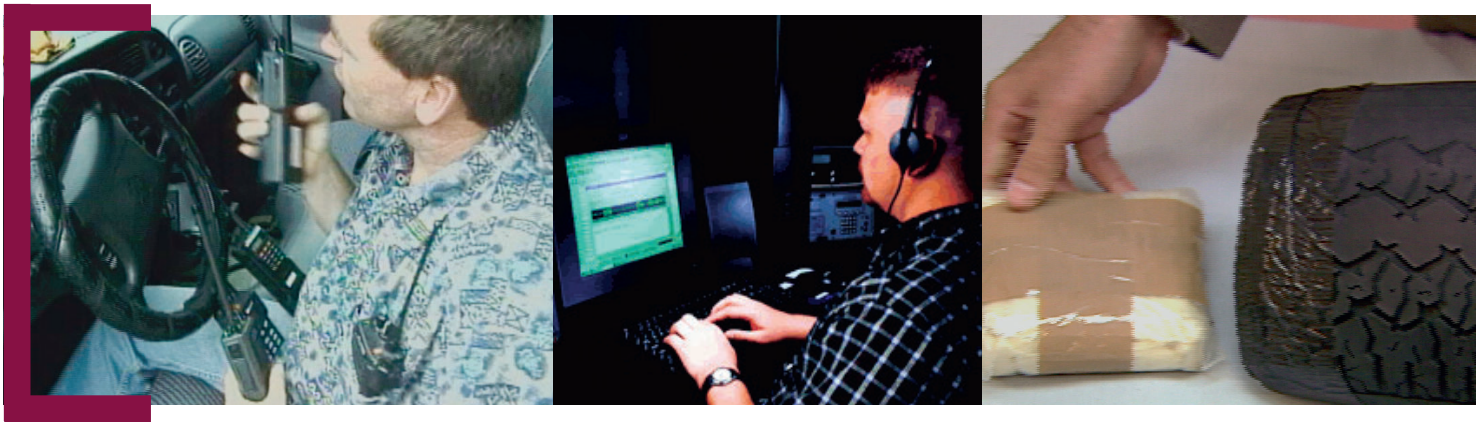

Counterdrug Technology Assessment Center Reports

Using Advanced Technology To Help Law Enforcement and Medical Science in The Fight Against Drug Crime and Drug Abuse

EXECUTIVE OFFICE OF THE PRESIDENT OF THE UNITED STATES
OFFICE OF NATIONAL DRUG CONTROL POLICY

[In this Publication:]

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[CTAC'S MISSION]

CTAC Reports *chronicles the work of the Counterdrug Technology Assessment Center, a small science organization inside the U.S. Government with wide responsibilities. In 1990, Congress created CTAC within the Office of National Drug Control Policy to coordinate the research and development (R&D) of all federal agencies experimenting with advanced technology to fight drug crime, and to use its own budget to initiate and fund R&D in prevention, treatment and law enforcement science. With strong bipartisan support from Congress, CTAC is also providing advanced tactical systems and devices to state and local law enforcement agencies. Those technologies increase police effectiveness and safety; most were originally developed under the sponsorship of CTAC, FBI, DEA, Customs, and DoD. Many of the systems and devices CTAC transfers to state and local agencies—such as night vision and wireless interoperability—are being applied to counterterrorism missions of homeland defense. On the medical front, CTAC provides advanced brain scanning cameras to some of America's top neuroscientists. They are using the powerful machines to acquire new knowledge they hope will lead to the development of medications to treat and prevent drug abuse. CTAC also sponsors an experimental first offender diversion program and state-of-the-art interactive substance abuse prevention/education exhibits.*

[The Technology Transfer Program]

Why this Program Exists

Law enforcement finds it increasingly difficult to penetrate drug crime organizations. Drug distribution gangs are based more and more on familial and village associations, and drug dealers often employ sophisticated communications technologies and devices that detect some covert transmitters used by undercover officers. In response to this threat to our country, Congress funded the Technology Transfer Program to help state and local officers in their fight against drug traffickers. Through the Technology Transfer Program, CTAC provides a wide range of overt and covert technologies-most of which had their start at CTAC or in the inventories of the FBI, DEA, DoD, Customs, and other U.S. agencies. Since the program began in 1998, Congress has appropriated $79.5 million, empowering CTAC to provide advanced devices and systems to over 3800 of America's 18,500 state and local law enforcement agencies. These technologies locate hidden compartments, allow cops to see through darkness, detect money laundering, penetrate complex drug trafficking conspiracies with digital wiretaps, communicate across agency lines in real time despite incompatible radios, track drug dealers and convert shaky, apparently useless surveillance video into clear, court-presentable evidence. Many arrests, indictments, and convictions have been credited to the technologies. Officer safety has improved as a result of the deployment of Technology Transfer Program systems and devices.

Cop Friendly

State and local law enforcement agencies are often surprised at how easy it is for a qualified department to get high tech help from this program and how smoothly our turnkey method works: Apply, Train, Receive. Everything is included, even site-specific engineering and installation of Wireless Interoperability Systems. At our regional workshop in Charlotte, North Carolina, the Charlotte-Mecklenburg Police Department's Deputy Chief Glen Mowrey looked out at representatives of more than 200 police agencies in the audience and said, "All of us in this room understand the politics of local law enforcement budgeting. For a chief or a sheriff to go before local elected leaders and ask for more money to buy technologies instead of to hire additional officers is quite difficult." CTAC's Technology Transfer Program is NOT a grant program. There is NO transfer of money. Instead, state and local law enforcement agencies decide what they need and apply for the available systems and devices that meet those requirements. Applications are reviewed thoroughly but quickly and, as long as funds are available, technologies are purchased and scheduled for delivery and training. The Program's goal is to get the technologies deployed rapidly to help state and local authorities do the most damage possible to drug criminals and their organizations and to increase officer safety.

How to Apply:

To be considered for the Technology Transfer Program, a law enforcement agency must submit two documents: (1) An official letter signed by top management (Chief, Sheriff, Task Force Commander, District Attorney) and (2) the completed Technology Transfer Program application. The letter must (1) request participation in the Technology Transfer Program, (2) choose up to three among the listed technologies, and (3) agree to provide evaluation reports assessing the impact of the received technology on the department's drug enforcement efforts. The signed letter of request must be mailed on your agency's letterhead to the program's administrators: Electronic Proving Ground, Counterdrug Office Fort Huachuca, Arizona 85613. In addition, you may complete the Technology Transfer Program application form on-line at **www.epgctac.com.** Alternatively, you may request a catalog of the technologies available, which includes a copy of the applicaton, by calling (877) 374-2822, Monday through Thursday, 9:00 a.m. to 6:00 p.m., ET.

Applying for Advanced Counterdrug Technologies

Mandatory Training & Evaluation:

Mandatory, scheduled training, which includes paid travel and partial per diem, precedes the delivery of any of the systems and devices, and there are follow-up evaluations at 90, 180, and 270 days.

What's Available:

A full list of the systems and devices currently available from the Technology Transfer Program can be viewed on our web site **www.epgctac.com**, or a catalog detailing the available technologies will be mailed upon request by calling (877)-374-2822.

By the late morning of 9/11, many of America's counterdrug resources were quickly redirected to prevent a second wave of terrorist attacks. The role of advanced technology was crucial at our nation's borders as the primary focus shifted from stopping drug smugglers to blocking any attempt by terrorists to bring weapons of mass destruction into our country. Over the past decade, CTAC had helped federal law enforcement agencies develop high tech detectors, including VACIS, the Customs Service's Vehicle and Cargo Inspection Systems, and the handheld Mini-Buster secret compartment detector.

White House Drug Control Policy Director John Walters noted that both of those anti-smuggling technologies can lead investigators to guns, explosives or a canister of biological agents hidden behind a car panel or inside a truck tire as easily as they can direct inspectors to hidden narcotics.

[Counterdrug & Counterterror]

A Report from Dr. Al Brandenstein, CTAC's Director & Chief Scientist, ONDCP

The deployment of those technologies at border crossings made it tougher for anyone attempting to bring any contraband into our country. As proof, the government's intensified efforts resulted in a dramatic increase in seizures of drugs along the southwest border.

High tech drug crime fighting tools we've provided to state and local police since 1998 under our Technology Transfer Program were quickly adapted for counterterrorism shortly after the 9/11 attacks. Our Wireless Interoperability System had its first counterterrorism mission in Denver within days of the World Trade Center and Pentagon attacks. System performance met our high expectations, smoothly connecting the radios of responding federal, local law enforcement units, and fire department crews in response to a credible bomb threat at Denver's Federal Center. These emergency real-time communications would not have been possible prior to the installation of our system because federal, state and local law enforcement agencies typically use different, incompatible radios that can neither send nor receive across agency lines. CTAC provided wireless interoperability to Denver and its suburbs to facilitate interagency drug surveillance operations in the metro area. The system is accomplishing that mission routinely today, while it stands ready to respond to any future homeland security needs.

Even before 9/11, these were already challenging times for those of us who are applying science to the fight against drug abuse and drug crime.

Congress created CTAC to coordinate the diverse federal law enforcement research and development program in 21 agencies and to undertake independent R&D. We invested carefully, putting relatively small amounts of money into the hands of innovative scientists whose work held the promise of breakthroughs in our quest for more effective law enforcement, prevention, and treatment.

I came to this post from the Defense Department's Advanced Research Projects Agency (DARPA) where I managed research into Counterdrug, Counterterror, and Special Operations. Since then, a number of previously classified systems developed at DARPA have been adapted for state and local police by CTAC sponsored scientists.

Helping Local Police

Since 1998, our Technology Transfer Program has been putting advanced systems and devices

into the hands of state and local law enforcement agencies in all 50 states. They are some of the same technologies used by the DEA and the FBI. Thus far, more than 3800 of America's roughly 18,500 police and sheriffs' departments have received one or more of the CTAC-selected and tested technologies including night vision, contraband detectors, digital wiretap, wireless interoperability, and video stabilization systems, plus a collection of covert devices and systems.

It's great to watch smart cops undergo our mandatory training, grab a piece of high tech gear like the Mini-Buster hidden compartment detector and quickly begin doing damage to drug traffickers. It is even more gratifying to know that the same officer using the same gear could find a bomb and ruin a terrorist's plan.

"The Mini-Buster helps us find lots of drugs coming in from Mexico and cash heading back. We are also on the lookout for possible terrorist devices concealed inside innocent looking vehicles." reports Chief Carlos Garcia in Brownsville, Texas. The photos at the top of this page show his officers taking down a drug courier's pickup after a Mini-Buster read unexplained differences in density under the same panel.

Tomorrow's Technologies

CTAC-sponsored researchers are at work right now on next generation systems including experimental non-intrusive cargo inspection technology which, if it works, will not only reveal the presence of contraband in a shipping container, but will also identify the contents—dope, explosives, or the harmless cargo described in the manifest—without going through the expense and delay of having to open containers and examine contents by hand.

Another powerful new piece of advanced police technology we are field testing would make a wide range of investigative information available to narcotics officers in their vehicles and on their laptops as they arrive at crime scenes or surveillance locations.

CTAC's Federal Partners

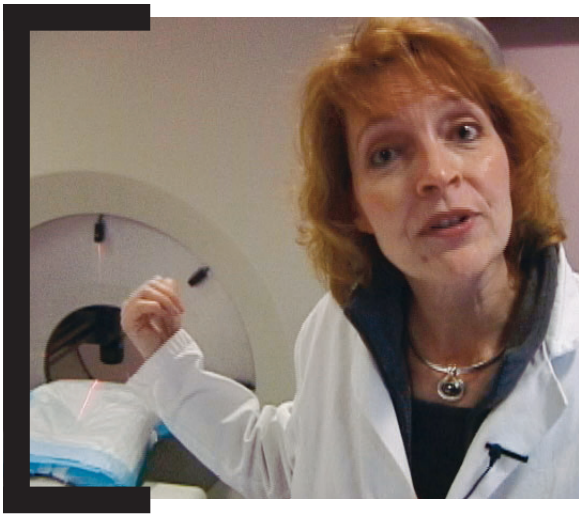
Much of our law enforcement R&D work is done in collaboration with other agencies. The DEA is our partner in the development of the Wireless Interoperability System in Colorado and the FBI had the tactical lead in the creation of our Video Stabilization System which electronically converts otherwise useless, unstable surveillance video into clear, court presentable evidence.

Helping Medical Researchers

Another important part of CTAC's mission is to provide advanced neuroimaging systems to America's brain researchers focused on drugs of abuse issues. Today, CTAC-funded medical research is underway to help scientists who work with the National Institute on Drug Abuse (NIDA) to discover all they can about the brain and its role in the processes of addiction. Our goals in building a national network of a dozen state-of-the-art brain imaging centers is the same as our investment in police technology: help save lives and protect the nation's quality of life.

These Functional Magnetic Resonance Imaging (fMRI), Positron Emission Tomography(PET), and Single Photon Emission Computed Tomography (SPECT) cameras we are providing are being used to unlock mysteries of the brain that have long stood in the way of the development of medications and therapies for preventing and treating drug abuse. We're intensely focused on finding a

Brownsville PD Chief Garcia working with US Border Patrol agents



Dr. Childress with her new CTAC-provided PET camera at the University of Pennsylvania in Philadelphia

cocaine vaccine or at least a way to reduce the impact of cocaine addiction with a medication that does for cocaine addicts what methadone does for heroin addicts: blocks the high and gives them the opportunity to live decent lives.

At the University of Pennsylvania's Addiction Treatment Research Center in Philadelphia, a team led by Dr. Anna Rose Childress is using a CTAC-sponsored PET brain camera to find out how to turn down the intense craving some people have for drugs. In her initial imaging studies, Dr. Childress found that videos of cocaine triggered craving and activity in the brain's circuits, which usually respond to the promise of normal rewards like food and sex. With support from a grant from the National Institute on Drug Abuse, Dr. Childress is currently testing whether Baclofen, a common anti-spasm drug, can dramatically blunt both the craving and the brain activation to cocaine cues.

CTAC's advanced technology initiatives are supporting the courageous work of law enforcement officers, the genius of medical scientists, and the creativity and dedication of drug abuse prevention educators and treatment experts.

Encouragingly, a paraplegic cocaine user who takes Baclofen for his paraplegia-induced muscle spasms, found the medication also dramatically reduced his cocaine craving. PET scans with this patient showed elimination of his brain 's response to the cocaine video when he was taking Baclofen. The CTAC sponsored camera, which is designed to meet the requirements of this specialized research, is expected to tell the Childress team if the neurotransmitter dopamine is released during cue-induced craving in humans—critical information for developing effective anti-craving medications.

Not only do their institutions promise to conduct drugs of abuse research (which always had low prestige because of the stigma of drug abuse), but they also pledge to train the next generation of researchers.

New Knowledge, New Warning

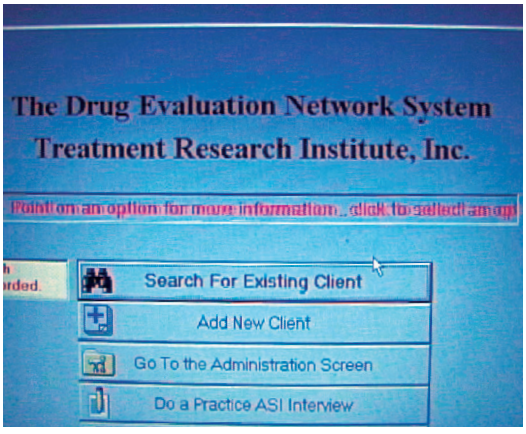
One of the first CTAC-provided brain cameras went to a team of medical scientists led by Dr. Nora Volkow at Brookhaven National Laboratory in Upton, New York. They have used the machine to examine the brains of former methamphetamine addicts. The recovering drug abusers had been off meth for as long as 11 months and may have believed that their bodies and brains had escaped lasting injury, but what Dr. Volkow and her team discovered is chilling. Reported in the American Journal of Psychiatry, their study, funded by NIDA, says the brains of long term meth users appear permanently changed, leaving the recovering addicts with impaired memory and reduced physical coordination. Dr. Volkow told us her team was surprised to see from the PET camera images, that the subjects' brains showed the same kind of swelling normally associated with physical trauma, like the effect of radiation used to treat a tumor.

Helping Treatment Providers

One of the most interesting information technologies we've supported is DENS, the Drug Evaluation Network System, a computer connection to treatment center admissions and drug court intake data from around the country.

Dr. Volkow with brain images of long-term meth users, Brookhaven National Laboratory, Long Island, NY

DENS is designed to give policy makers early warning of drug abuse trends and also offers treatment center operators intake methods that sharpen their ability to serve their patients—helping them to quickly surface and respond to patients' issues that contributed to their decision to abuse drugs. This means more positive impact in the time allotted for treatment.



Helping Educators

Next year our state-of-the-art, interactive traveling education exhibits will present some of the hard science on drug abuse and drug crime to junior and senior high school students. These mobile exhibits are designed to help students see the negative effects of drugs of abuse and help them make conscious choices not to get involved with drugs.

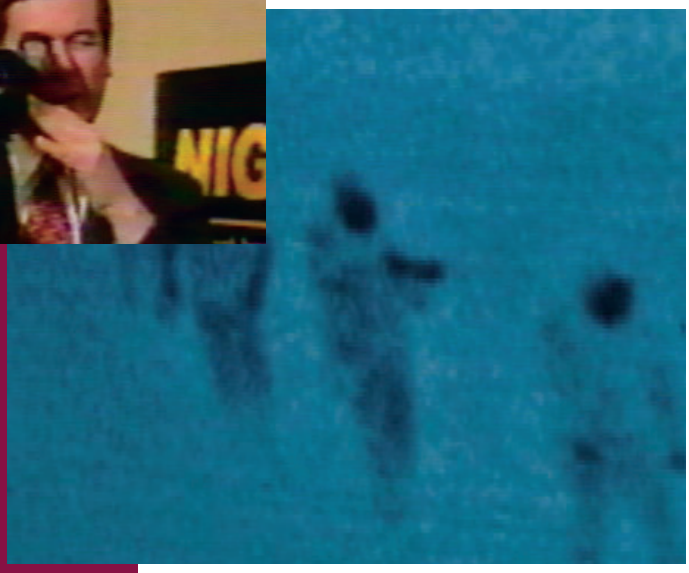
Answering the Skeptics

During my nearly 11 years at ONDCP's CTAC, friends outside government have often asked me, if the persistence of the drug crisis didn't make me doubt the focus of our efforts. When I would reply by describing some of our technologies and our R&D programs and goals, they would say something to the effect of, "Well, let's see if it ever works in the real world."

I understood their skepticism but knew that with the right leadership and support, we could make advanced technology an even more effective partner in this struggle. I am pleased to report that the federal government's investment in counterdrug research and development is paying off across the horizon of science: we've deployed systems that locate drugs or bombs hidden in trucks, cars, trains and shipping containers; we have night vision cameras and other devices that reduce the risks for cops working drug cases; and we provide doctors with technology, enabling them to delve deeper than ever into the workings of the human brain to develop counterdrug medications. Their collective efforts hold the promise of a better future.

Since 1996, CTAC has been hosting State and Local Advanced Technology Workshops for police across America. At first we listened to city, county, and state law enforcement officers and learned about their technology needs. Then, we reported our findings to Congress. Congress then directed CTAC to arm local law enforcement with advanced technology to fight drug crime. We crafted the turnkey program of high tech assistance, training, and followup called the Technology Transfer Program. Our Workshops continue today but are largely recast as a way to help state and local agencies apply for the systems and devices. The program continues to evaluate new, fully tested technologies, adding some available technologies each year. Below is a scene from a Workshop in St. Louis.

[Winning with the Technology Transfer Program]



Digital wiretap system slams drug dealers in Oklahoma and New York. Overwhelming evidence presented to defense attorneys results in guilty pleas.

- Cuts paperwork by 90 per cent
- Reduces staff requirements

Tracking and Surveillance System leads California State Task Force to hundreds of kilos of cocaine and tons of marijuana

- System designed for FBI tracks numerous vehicles simultaneously
- Same version available through Technology Transfer Program

Thermal Imager Strips Away Darkness

- Marijuana grow houses taken down: Pierce County, Washington Sheriff's officers routinely obtained warrants prior to Supreme Court ruling mandating warrants
- Arrests in plain sight: midnight boat delivery from Mexico to dealers in Texas yields major seizure, arrests by local police using thermal imager
- Officer Safety improved: Mexican drug cartel gunmen stopped threatening officers on the U.S. side of the border after Brownsville, TX PD received thermal imager from CTAC and publicized the capability

Across America, most local, state, and federal agencies are on incompatible radios and cannot communicate with one another. This existing CTAC system solves that problem, which became a national priority after 9/11.

Lt. Smith juggling portable radios

[Wireless Interoperability to the Rescue]

- Computer-based system smoothly connects all radio systems: digital, analog, VHF, trunked, and cell phones
- All engineering, installation, hardware, software, training and initial maintenance provided by CTAC
- Participating agencies supply central dispatch base and antenna, radios
- System available through Technology Transfer Program
- After 9/11 attack in NYC destroyed police radio towers on top of the World Trade Center, CTAC added satellite phone component to guarantee communications

Denver metro Wireless Interoperability System had been up for less than a month, linking feds and locals for drug surveillances. Three days after 9/11, Denver Federal Center received a credible bomb scare. The system quickly tied in responding federal and local law enforcement with fire department crews heading to the scene. Smooth communications reduced stress and increased effective management of the situation.

For planned surveillance operations involving multiple agencies, Wireless Interoperability means no more juggling portable radios to keep in touch with participating agencies.

As for getting instant support from other agencies for a suddenly breaking, unplanned surveillance opportunity, "What was impossible is now easy," according to Lt. Jim Smith, commander of the Boulder County, Colorado Drug Task Force and a major player in the development of the Denver metro CTAC system.

Earlier versions of CTAC's Wireless Interoperability System were installed in San Diego, Imperial Valley and Los Angeles County, California as well as in Brownsville, Texas.

Lakewood, CO tower. Lakewood PD hosts Denver Metro System

[Training Against Drugs and Terror]

Meeting in Orlando in the last week of March, 2002, almost 800 state, county, and city narcotics police officers from 49 states received Technology Transfer Program training in the use of counterdrug systems and devices that can also help them deter acts of terrorism in their own communities. Many officers attending the largest training in CTAC's history said counterterrorism is now their first priority and they are working closely with Federal agencies.

Research and development for next-generation counterdrug systems and devices is underway in private industry, at other federal agencies (whose work in this area CTAC coordinates), and at CTAC's Test Beds.

[Law Enforcement Research & Development]

The Communications and Sensors Test Bed

- Surveillance and Tracking Sensors
- Communications Intercepts
- Facial Recognition Software

The Information Technology Test Bed

- Partnered with FBI's Information Resources Division
- Creating and evaluating powerful advanced case management systems
- Systems detect crime patterns, analyze crimes

CTAC also sponsors

- Non-intrusive inspection research to develop a neutron probe that can quickly detect contraband in sacks of grain and other commodities
- Chemical research to render useless for drug dealers the ammonia rich fertilizers they often steal from farmers to "cook" methamphetamine
- Testing with the Coast Guard of a number of small UAV video transmitting surveillance drone aircraft to assist in narcotics enforcement operations

[DENS— Drug Evaluation Network System]

PHOTO BY J. DEVALLANCE

National Drug Control Policy Director John Walters in drug impacted inner city Philadelphia neighborhood en route to acclaimed Project HOME treatment center

Digital, Virtually Real-Time Information for Policymakers and Treatment Providers

DENS Ends the Guesswork and Helps Heal

- Tracks Drug Use Patterns Across America
- Analyzes new intake prisoner/patient info transmitted digitally to DENS from drug courts and from local, state and federal drug treatment centers
- Patients' privacy protected
- Gives treatment centers software that speeds effective evaluation of new patients' needs resulting in more effective treatment in less time
- Integrates ONDCP's new Random Access Monitoring of Narcotics Abusers (RAMONA) system, expected to give policy makers much more accurate count of hard core drug abusers
- Created by highly regarded treatment experts Herb Kleber, MD of Columbia University in New York and Dr. A. Thomas McLellan of the University of Pennsylvania's Treatment Research Institute in Philadelphia, where DENS is based
- Future DENS output: Evaluating effectiveness of wide range of treatment modalities and programs within context of evolving drug abuse trends.

From left to right:
Dr. McLellan
Dr. Kleber
Treatment Center Administrator Using DENS

[Medical Research]

Unlocking the Mysteries of the Brain that Stand in the Way of Treatment and Prevention

Photo by Juanita James

From left to right: Dr. O'Brien, Dr. Karp, Dr. Childress, Director Walters, Dr. Brandenstein

Good reasons to smile at dedication of new PET camera, University of Pennsylvania, Philadelphia, April 4, 2002.

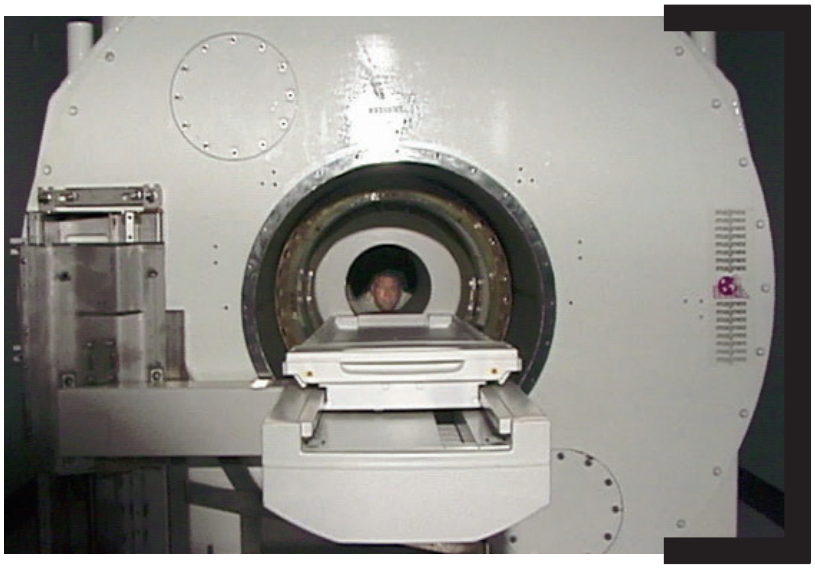
Prominent neuroscientists Dr. Anna Rose Childress and Dr. Charles O'Brien, now have the specialized brain scanner they need to develop medications to control craving in cocaine addicts. This new PET camera developed by Dr. Joel Karp's UPENN design team has a highly innovative array of 18500 detectors that can localize human brain activity to within 3.5 millimeters. With the accuracy available from the new PET camera, Dr. Childress can determine exactly where in the brain a therapeutic medicine is having its effect. Developing medications to alleviate the harmful effects of drugs of abuse is a top priority for White House Drug Czar John Walters and is supported by the National Institute on Drug Abuse (NIDA). CTAC Director Dr. Al Brandenstein runs Walters' program providing technologically innovative, state-of-the-art brain scanners to major US research institutions specifically to work on drugs of abuse.

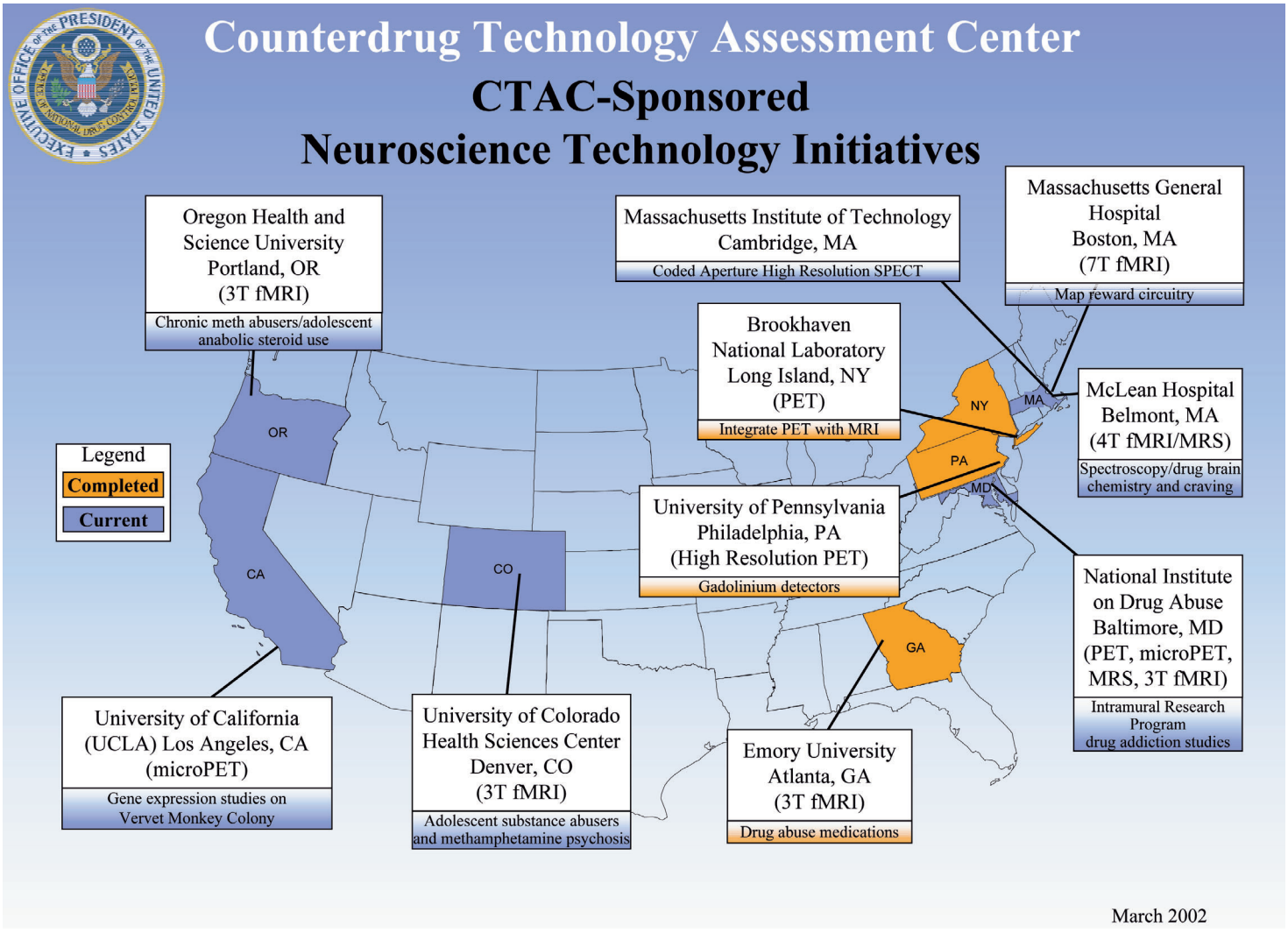
Edward, (photo below), a paraplegic and a cocaine addict, reported to Dr. Childress that Baclofen, the drug he takes to control muscle spasms, also lets him control his cocaine craving. Dr. Childress is pursuing that lead vigorously and her work with Edward was featured on the recent PBS series on the human brain. Dr. Childress' new, CTAC-sponsored PET camera was specifically designed to facilitate her NIDA-funded craving studies.

Mapping CTAC's plan to arm American brain researchers with state-of-the-art technology to develop counterdrug medications and new knowledge leading to better prevention and treatment ▶

World's Most Powerful Brain Scanner for Use in Human Beings Provided by CTAC to Massachusetts General Hospital is on Historic Mission

Principal Investigator Prof. Hans Breiter, MD, (inside machine during its installation), plans to use the giant 7-Tesla fMRI to undertake a project of epic proportions, "Mapping the Circuitry of Human Motivation and Reward." Dr. Breiter hopes to get answers to questions about treatment and prevention that require unprecedented access to the innermost workings of the human brain. Until this machine was created (under the guidance of MGH's Dr. Bruce Rosen), such access was theoretical, only.





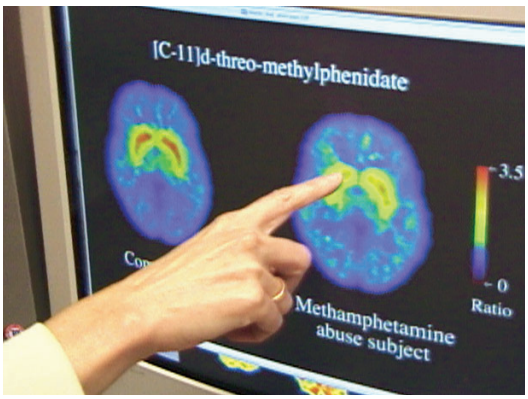
[Medical Research]

"Amped up! Angry!

Misunderstanding people!

Them misunderstanding me!"

That is how this young methamphetamine addict described some of the changes in her brain that she believes the drug has induced. What she did not know was while she was taking the drug in the streets, researchers at Brookhaven National Laboratory led by Dr. Nora Volkow were making an important and chilling discovery. Working with Dr. Linda Chang and using a CTAC sponsored PET camera, Dr. Volkow documented long-term brain damage in methamphetamine users and suggested that this drug-induced brain damage may lead to early onset of the symptoms of Parkinson's disease.



Dr. Volkow's discoveries with the PET camera include the observation that differences in individuals' natural brain chemistry may lead to addiction in some people who try drugs once, while sparing others the horrors of being addicted. She used her PET scanner at Brookhaven to test the brain response of 23 healthy young men to the legal stimulant, Ritalin. About half of those men had lower D2 dopamine receptors in their brains. They were the same subjects who said the Ritalin experience was pleasurable, suggesting, said Dr. Volkow that, "people with fewer dopamine receptors may take drugs to activate pleasure circuits in the brain which could be one of the factors that predisposes a person to drug abuse."

The CTAC sponsored Primate Micro PET brain scanner was built by Dr. Simon Cherry (looking through the bore of the machine) to meet the research requirements of UCLA Prof. Edythe London, a pioneer in the neuroscience of addiction.

She will use the brain scanner, “to explore gene expression in monkey brain regions crucial to the reward effects of cocaine and other drugs. For the first time, the links between drug abuse and brain function will be linked to the expression of certain genes that can then be monitored externally. The implications for the development of counterdrug medications could be very significant.”

When we fight drugs, we fight the war on terror.

— President Bush

VACIS uses gamma rays to quickly probe trucks and trains for bombs and drugs

President Bush watches VACIS scanning trucks at border with Mexico

[Message from The Director]

John Walters, Director, Office of National Drug Control Policy

CTAC's Director Al Brandenstein and I began formulating the broad vision of how we might best bring advanced technology into the fight against drug abuse and drug crime more than a decade ago. It is very gratifying for me to see how far along CTAC has come in carrying out that vision.

One of CTAC's missions is to test and evaluate technologies other federal agencies are considering purchasing for their use in the fight against drugs. After carefully testing the Vehicle and Cargo Inspection Systems, CTAC gave the U.S. Customs Service a very positive review and the government purchased them.

These remarkable machines are at work today at major ports of entry, scanning cargo containers, trucks and trains, looking for contraband of all kinds, including drugs and weapons of terror. In late March of this year, President Bush went to the border at El Paso and watched a VACIS machine in operation.

For more information regarding ONDCP and CTAC, please visit our Website at www.whitehousedrugpolicy.gov