



Home Office
Scientific
Development Branch

HOSDB: An Introduction

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Scientific
Development
Branch



HOSDB is...

- > THE HOME OFFICE SCIENTIFIC DEVELOPMENT BRANCH
- > A UNIQUE TEAM OF SCIENTISTS AND ENGINEERS APPLYING TECHNOLOGY TO THE FIGHT AGAINST CRIME

The Home Office Scientific Development Branch (HOSDB) aims to ensure that our customers stay at least one step ahead of the criminal. We provide technical, operational and policy support to all areas of the Home Office, UK police forces, the Security Services and other government departments.

HOSDB is based at two sites in the UK; at Sandridge, Hertfordshire and Langhurst, West Sussex. Our development work is conducted both in-house and through our extensive links with industry and academia.

HOSDB is probably unique; we know of no other organisation in the world that conducts such a wide range of work in 'policing' technology. To further benefit UK policing, we work closely with selected law enforcement organisations across the world to share the risks, costs and benefits of complex technologies.

With 23 technical programmes and over 150 current projects serving almost every branch of policing and law enforcement, our work is diverse and exciting. You'll find some examples of how we support our customers in the following pages.

HOSDB employs over 200 scientists and engineers from numerous technical disciplines. They combine the knowledge of real operational problems with the technical skills to solve them.



● Sandridge,
St Albans

■ Langhurst,
Horsham



We provide unrivalled technical advice

› OUR SCIENTISTS GIVE IMPARTIAL AND ACCURATE TECHNICAL ADVICE TO MINISTERS, OUR COLLEAGUES IN GOVERNMENT AND THE POLICE. OUR CUSTOMERS TELL US THIS IS ONE OF OUR MOST VALUED ROLES.



Graham Smith,
team leader

Staff profile: HOSDB's Firearms & Protective Equipment team

“My team advises police forces, policy makers and Ministers on the most appropriate weaponry and protective equipment for the police to use. We have a police advisor on our team, on secondment from the Metropolitan Police, to ensure we focus on police needs. We work with other national and international organisations, which add their own expertise to our work, such as the Defence Science and Technology Laboratories at Porton Down and the National Institute of Justice in the US.

“One of the most satisfying things about working at HOSDB is seeing your work become a reality. We can watch officers in action and say: ‘I helped the police get that piece of equipment’. A good example of this is the taser, an electrical stun device. We tested everything from its accuracy and reliability to its performance under extreme conditions. Our work on tasers led to their current operational trial and to a number of enquiries from police forces and governments around the world.

“The work we do helps reduce injuries to the police and the public. It increases the number of police on the beat at any one time and it increases the morale of officers by ensuring they have the correct equipment to do the job.

“The nature of our work means that we interact with the police regularly, at ACPO meetings or on visits to forces. So we get to talk with police officers at all levels from Chief Constable to PC, giving us a privileged insight into the problems they face.”



Over the years HOSDB has published an array of techniques to develop fingerprints on exhibits retrieved from scenes of crime. Our Fingerprint Manual is used in every fingerprint lab in the country and many abroad. We also advise on equipment and laboratory design.



The new Home Office HQ is protected by the latest vehicle bollards developed by HOSDB. Our expertise has been applied to protect the building against terrorist threats.

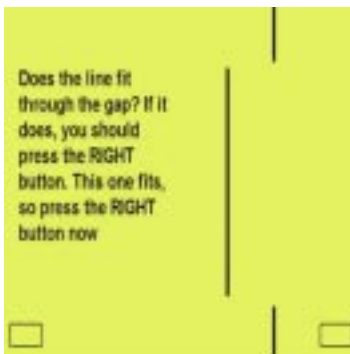


Overseen by the Security Services, we carry out extensive security audits on important economic and strategic sites in the UK.

We develop new technologies

› OFF-THE-SHELF EQUIPMENT IS NOT ALWAYS AVAILABLE TO SOLVE OUR CUSTOMERS' PROBLEMS. SO HOSDB WORKS IN PARTNERSHIP WITH UNIVERSITIES AND INDUSTRY TO DEVELOP NEW EQUIPMENT AND TECHNIQUES, SUCH AS SOPHISTICATED DEVICES FOR ELECTRONIC SURVEILLANCE.

In developing new technologies, we often act as a broker between commercial manufacturers and our customers. For example, HOSDB experts specified the requirements for new radio alarms that would process and deliver reliable alarm information to police command centres. The five resulting systems are already proving effective in reducing repeat burglary.



With drug driving on the increase, HOSDB is partnering with universities and other organisations to see if a roadside impairment test can be developed for police use.



We worked with a commercial company on tools to improve the integrity of evidence collected from audio surveillance operations. Our customers are now using several new products that also save them space, money and time.



HOSDB designed the chequered 'battenburg' livery on police patrol vehicles. Battenburg improves the visibility and recognition of police vehicles, increasing the safety of police officers and the public.

CASE STUDY: FAST FINGERPRINTING WITH IRIS



Recording large numbers of developed fingerprints is time consuming for police. Backlogs of treated exhibits form, waiting to be photographed. To solve this problem, HOSDB scientists designed an Integrated Rapid Imaging System, known as IRIS. The system captures and displays images on screen in less than one second. Forces giving IRIS rave reviews include Cleveland, Essex and Merseyside Police.

The Forensic Science Service is using an IRIS machine in their Lambeth laboratory, where they carry out fingerprinting for HM Customs & Excise. IRIS's special filters make it simple to reveal fingerprints on banknotes and adhesive tape from money laundering and drug trafficking cases. Another major advantage is that IRIS links directly to NAFIS, the National Automated Fingerprint Identification System, to deliver rapid results.

IRIS dramatically increases the productivity of fingerprint laboratories:

- › South Yorkshire Police reduced its photographic processing time from 3 days to 10 minutes
- › Thames Valley Police's lab performance improved by 50% when using IRIS, particularly on their serious crime evidence
- › Using IRIS has even enabled police to get an identification whilst the subject was still in custody

Frontline support for major events

› WHETHER A PARTY POLITICAL CONFERENCE, THE FA CUP OR THE GRAND NATIONAL, HOSDB'S TECHNICAL SUPPORT TEAMS ARE OUT WORKING ON FRONTLINE JOBS ALL YEAR ROUND. OUR NATIONAL TECHNICAL SUPPORT UNIT (NTSU) PROVIDES HANDS-ON TECHNICAL SUPPORT FOR SECURITY OPERATIONS. IN 2004 WE SUPPORTED OVER 40 MAJOR EVENTS AND SPECIAL OPERATIONS.

We hold a central stock of the latest search and surveillance equipment that is provided to police forces on request. This avoids all forces having to keep complex and expensive equipment. Over £1 million of equipment was deployed at the last Commonwealth Games, comprising over 100 different technologies. Our specialist advice is vital: our engineers know how to operate the equipment, what it can do and how get the best out of it.



HOSDB has recently deployed an innovative x-ray scanner that reveals items hidden below clothing without the need for an intrusive hands-on body search. It has been successfully used to target gun, knife and drug crime in several major cities.

CASE STUDY: PARTY POLITICAL CONFERENCES



Tight security is crucial at the main Party Political Conferences, held annually by the Government of the day and the Leading Opposition Party. Whether in Blackpool, Bournemouth or Brighton, we advise the event planning team. Security measures for each conference require lengthy and complex planning between many organisations.



HOSDB provides the most sophisticated and expensive equipment to achieve the required level of 24/7 security surrounding the conference venues. This ranges from electronically-stabilised binoculars and perimeter sensors to thermal imagery and remote control surveillance equipment. In addition, the very latest explosives detection, x-ray screening and weapons

detection technologies are provided as part of the overall security strategy. At every event, HOSDB works to our customers' requirements. If a technical solution is not commercially available, we can customise equipment in-house.



Our state-of-the-art thermal imaging equipment can detect people at long range by their body heat, even if they are unconscious. Grampian Police recently used it to locate a missing person lost hiking in the Cairngorm Mountains.



At the massive Eastbourne airshow, HOSDB deploys CCTV for crowd safety, to help Sussex Police look out for pickpockets and bag snatchers among the quarter of a million visitors crowding the beach.

We set the standards

> WE SET THE TECHNICAL STANDARDS FOR A WIDE RANGE OF EQUIPMENT FROM POLICE PROTECTIVE BODY ARMOUR TO BOMB SHELTER AREAS. IT IS IMPERATIVE THAT POLICE AND SECURITY EQUIPMENT IS FULLY EFFECTIVE.

CASE STUDY: POLICE BODY ARMOUR

Police officers want protection that is both effective and wearable. We achieve this by encouraging manufacturers to produce body armour to HOSDB standards, derived from the police's own requirements and our knowledge of the likely threats. HOSDB is recognised as a world leader in the production of stab resistance standards - the HOSDB stab standard has been adopted by the US National Institute of Justice and is highly regarded in a number of other countries.

We produced the standard following an intensive investigation to find out how a human stabs, using instrumented knives and 'translating' this information into a repeatable mechanical test. We publish details of body armours that meet the HOSDB compliance test and we also advise police forces on how to select body armour that meets their requirements.



CASE STUDY: DETECTING EXPLOSIVES

Since the 1970s HOSDB has built a worldwide reputation for its work on detecting terrorist weapons and bombs. Most scanning equipment in UK airports has been tested by us to assess its effectiveness against real threats. We play an active role in testing and developing new equipment as it comes onto the market or, in some cases, before. This provides the police, the Department for Transport (DfT) and the Security Services with independent, objective evaluations of the many types of drug, weapon and explosive detectors. HOSDB recently

worked with DfT to trial a new explosive detection portal at Heathrow Airport, not only to obtain scientific data, but also to gauge the public's reaction. Beforehand, HOSDB staff tested the detection capabilities of the portals with real explosives, under safe conditions. Members of staff were invited to play the role of suicide bombers and walk through the portal to see if they were detected. The trials are undertaken with the full co-operation of the manufacturers as it is in their interest, as well as the Home Office's, to increase passenger safety.



We were the first organisation in the world to devise a test to assess the performance of CCTV cameras. The Rotakin test is now an international standard. We are currently setting standards for 'intelligent' CCTV systems.



We have the only length of prison wall outside of a prison, which we use to test a range of perimeter alarms, wall toppings and fence cladding, to detect and delay escapers. Our work helps maintain the exceptionally low level of escapes from prisons.



The results of our work on perimeter security are used to protect some of the most sensitive and economically important sites in the UK. We examine a wide range of doors, walls, locks and glazing to assess their vulnerability to attack.

We find new uses for technology

› WITH FEAR OF CRIME A MAJOR CONCERN, THE NOVEL USE OF EXISTING SCIENCE AND TECHNOLOGY IS IMPORTANT TO HOSDB. WE AIM TO MAKE THE GREATEST IMPACT ON CRIME BY USING IT WELL.

CASE STUDY: SAFER SCHOOLS AND HOSPITALS

The Safer Schools and Hospitals initiative applies technology to reduce crime and the fear of crime where patients, pupils and staff are most vulnerable.

Parents at Wylde Green Primary in Sutton Coldfield were concerned about the risk of child abduction following high profile cases in the media. The school now has a 'pupil safety badge' system to help teachers protect very young children who are unused to being

at school. This electronic safety system monitors the movement of pupils between buildings. If a teacher is present then nothing will happen. However, if a child strays alone, the system identifies the door the child passed through and sends an alert to staff via radios. Under the same initiative, an anti-climb security fence has replaced the low picket fence to protect the school from repeat vandalism and attempted arson.

CASE STUDY: PREVENTING PRISON SUICIDES

The faster the response to a suicide attempt, the greater the chance of survival. HOSDB has been evaluating a Life Signs Monitoring System for HM Prison Service. The system uses low power microwave sensors to detect movement within prison or safer custody cells. It operates on the theory that if all movement ceases for a set period of time, then

breathing has ceased, and an alarm attracts prison or police officers to that cell. By providing an early warning, first aid can be administered within seconds. The latest system is being trialed in cells at HMPS Eastwood Park and is in effective day-to-day use in cells at Hertfordshire Constabulary.

CASE STUDY: HI-TECH COMMUNITY POLICING

HOSDB has a unique partnership with Nottinghamshire Police to reduce crime and reassure the public. In the first joint operation, hundreds of clubbers were screened using hi-tech equipment in a crackdown on drugs and weapons. Such equipment has traditionally been used to fight serious crime and

terrorism, and Nottinghamshire Police has become one of the first forces to use it to tackle community policing problems. The equipment provided by HOSDB included a sophisticated computerised archway metal detector, a baggage x-ray machine and an electronic drugs analyser. We also trained officers in its use.



Our award-winning Chipping of Goods initiative shows how electronic tagging can reduce property crime in the supply chain. Global partners such as Dell, Woolworths and Unilever also discovered the business efficiencies to be gained from 'chipping' their goods.

Training that takes you out of the ordinary

> RECENT WORLD EVENTS HAVE INCREASED THE DEMAND FOR TRAINING IN PHYSICAL SECURITY. AT ITS STATE OF THE ART TRAINING CENTRE, HOSDB DELIVERS A RANGE OF PRACTICAL COURSES TO GOVERNMENT DEPARTMENTS, THE MILITARY AND INDUSTRY.



The focus of our training is on security technology and protective measures, including CCTV, detection systems and how to carry out comprehensive security surveys. We are always developing new courses to equip our customers with the knowledge to fight organised crime and terrorism.

Most training takes place at our Langhurst site, near Horsham in Sussex, with its extensive



indoor and outdoor facilities. The style of training is very hands-on, allowing students to understand the theory and view products before testing them. All the syndicate rooms are linked to cameras in the grounds so our delegates can carry out live audits in different lighting conditions to test the performance of the cameras.

This kind of practical training is simply not available elsewhere.

HOSDB staff have a wealth of experience from their work in the field. We provide accredited trainers to pass on this knowledge at the National Specialist Law Enforcement Centre (NSLEC). Their courses help police officers to become both competent and confident in using hi-tech equipment.



Recent attendees have said:

“YOU CAN'T GO TO A HOTEL AND DO THIS KIND OF COURSE.”

“WHERE ELSE CAN YOU SEE SO MANY FENCES AND WALLS IN ONE PLACE?”

“THE HOSPITALITY WAS GREAT, AND THE ADVICE COMPREHENSIVE, BUT THE OPPORTUNITY TO TEST PRODUCTS MADE IT FOR ME.”

CASE STUDY: VIDEO EVIDENCE



With the huge number of CCTV installations in the UK, video is playing an ever increasing role in crime investigation, from petty theft to terrorist attacks. Police forces receive thousands of hours of video recordings. Yet there are no standard procedures or training programmes that cover the best ways of handling them. HOSDB runs regular imaging workshops for police involved in processing video evidence, to demonstrate equipment and share best practice. This is supported by our comprehensive manual on video processing equipment and techniques. With the technology in this area changing rapidly, our customers trust HOSDB to keep them abreast of developments.

The future

› AS YOU WOULD EXPECT FROM AN ORGANISATION AT THE FOREFRONT OF THE FIGHT AGAINST CRIME, WE ARE CONSTANTLY MONITORING NEW TECHNOLOGIES THAT MIGHT BENEFIT OUR CUSTOMERS.

We work closely with universities and industry to scan for new technologies. Intelligent Transport Systems, for instance, will have a significant impact on many aspects of policing over the next 10 years and beyond. We also provide expert evaluations to the Engineering and Physical Sciences Research Council (EPSRC) on proposals to their Crime Technology Programme, assessing them on their novelty, feasibility and potential impact.

Of course, we also conduct applied research of our own. For example, we have begun a large project on hyperspectral imaging of x-rays for security applications and we are using acoustic techniques for screening people. Our scientists are developing a roadside screening device to detect drug drivers, using beams of laser light to analyse saliva.

Collaborative projects are an important way of working for HOSDB. We have joined forces with universities and commercial companies to look at the use of terahertz radiation to visualise and specifically identify explosives and drugs hidden under clothing. We are also exploring the use of micro engineering to miniaturise explosive detection systems.

We don't keep our discoveries to ourselves. HOSDB publishes technical reports on a diverse range of technologies from the effectiveness of fence toppings to the chemistry of fingerprints.

We give technical advice not only on what happens today but also on what might be possible tomorrow.

The latest equipment from many of the world's leading security and policing equipment suppliers is displayed each year at the HOSDB Exhibition. The 2005 event was the most successful ever, with over 150 exhibitors and over 2,000 visitors.



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HOSDB publication 10/05