



## Sniffing for trouble *an industry is born*

*Explosives may be out of sight, but they do smell! Police forces using the latest generation of vapour detection equipment can sound the alarm after finding just a few molecules of the vapours from bomb-making materials found in 'home-made' bombs or improvised explosive devices, IEDs.*

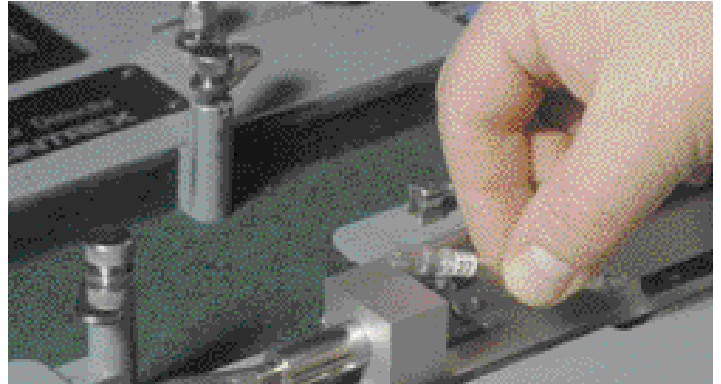
The trace-element techniques employed by such equipment — gas chromatography and ion mobility spectrometry — have been well established fixtures in chemical laboratories for decades. But it took a dedicated research effort to refine this capability for explosives detection, and design a portable instrument that could be handled by a police officer or customs officer.

That effort began at the Canadian Police Research Centre. Chemist Lorne Elias remembers being approached by the organization in the 1970s, when he was working on equipment that could detect the presence of pesticides in the air. It was an era when aircraft hijackings and bomb threats were becoming common, and law enforcement officials wanted a means of addressing these problems.

Devices that could identify vapours from TNT dynamite — one of the most popular of explosives — were already on the market. But after examining these products, Dr. Elias concluded that the National Research Council could do much better. The CPRC managed and financed the construction of six working prototypes, called the 'NRC Blue Box', a much more sensitive and comprehensive Explosives Vapour Detector (EVD), which is about the size of a small suitcase.

By the late 1970s, these EVDs were offered to the RCMP, which immediately put them into action. When then US President Ronald Reagan and Pope John Paul II came to Canada in the 1980s, every venue they visited was first swept with the the 'NRC Blue Box' for potential IEDs. The reputation of the technology was well established by 1985, when a terrorist bomb planted on an Air India flight in Canada brought down the plane off the coast of Ireland. That tragedy led Transport Canada to make the EVD-1 (created from Dr. Elias's 'NRC Blue Box') a standard feature of the security measures employed at Canadian airports.

Meanwhile, the technology was evolving. The original EVD-1 sucked air like a small vacuum into a small cigarette sized chamber, where a gas chromatograph or GC analysed it for explosive vapours. The process, while reliable, took over two minutes to analyze. A different technique



*“Our group was the lead group worldwide that got the whole trace detection ball rolling. It was a great help to us to have these six NRC 'Blue Boxes' built before they went into commercial production.” — Dr. Lorne Elias*

using Ion-Mobility Spectro-metry or IMS, simultaneously sampled, analysed the speed of ions broken down from the suspect compound achieving the same result instantaneously.

Today both systems remain in use, as IMS technology cannot detect the presence of some forms of plastic explosives, such as C4, which have become explosives of choice used by today's terrorists. IMS technology has become an instrument for the 'war on drugs' by identifying illicit drugs such as heroin, cocaine and the new designer drugs.

Since the dramatic terrorist events in New York and Washington in 2001, companies manufacturing EVDs have found a steady demand for their wares. Dr. Elias and his NRC colleagues laid the foundation for this technology, setting a standard that was welcomed by police eager to keep pace with rapidly changing conditions for their work. He recalls how important it was to find the support for putting this technology in the hands of police as soon as possible, so the value of the concept could be proven.

THE CANADIAN POLICE RESEARCH CENTRE (CPRC) IS A PARTNERSHIP BETWEEN THE ROYAL CANADIAN MOUNTED POLICE (RCMP), THE CANADIAN ASSOCIATION OF CHIEFS OF POLICE (CACP) AND THE NATIONAL RESEARCH COUNCIL OF CANADA (NRC) — [www.cprc.org](http://www.cprc.org) 