

# COMPARISON OF ENCLOSED SPACE DETECTION SYSTEM WITH CONVENTIONAL METHODS\*

Stephen W. Kerchel, Vivian M. Baylor, and Leo E. Labaj  
Oak Ridge National Laboratory  
P.O. Box 2008  
Oak Ridge, Tennessee 37831-6011  
(423) 574-5278

## ABSTRACT

Enclosed Space Detection System (ESDS) is a fast, inexpensive, and reliable device for detecting human occupants hidden in vehicles. Operation requires less than two minutes. ESDS is used to foil attempts at smuggling illegal aliens, terrorists, and escaping prisoners. It is being tested at nuclear weapons facilities and has been operated at several prisons and international border crossings.

ESDS is the first practical electronic alternative to physical searches of vehicles for hidden passengers. At critical checkpoints, a thorough physical search of a single fully loaded truck requires a team of from two to six people, and may take as long as eight hours. Despite this level of security, experience has shown that the search can occasionally be foiled. Due to the enormous time and expense of thorough physical searches of vehicles, they are seldom conducted at any but the most critical of locations, simply leaving many sites vulnerable to crime and terrorism.

Prior to the development of the ESDS, the only other effective alternative to physical search was the use of specially-trained canines, which can be vastly superior to the physical search in both time and accuracy. However, as discussed in this paper, canine inspection is not really a competitive substitute for ESDS because canine reliability (80% at most) is not as high as that of the ESDS (99%+), while the costs, training requirements, and operator skill needed are significantly higher with canines than with the ESDS. In addition, the ESDS has straightforward self-diagnostic tests to ensure the system is operating correctly; such tests are not currently available with either canine or human inspectors. ESDS offers an attractive supplement or alternative to meet current security requirements for vehicle searches at portals at government, nuclear, industrial, and other facilities where concealed persons may pose a threat either by entering or leaving.

## 1. INTRODUCTION

The Enclosed Space Detection System (ESDS) is a fast, inexpensive, and reliable device to detect human occupants hidden in enclosed spaces in vehicles.<sup>1</sup> Vehicle inspection requires less than two minutes. Cost is approximately 3% of that of conventional methods. (Appendix I) Operation does not require specialized training. ESDS is sufficiently reliable that it eliminates the

---

\*This research was performed at OAK RIDGE NATIONAL LABORATORY, managed by LOCKHEED MARTIN ENERGY RESEARCH CORP. for the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-96OR22464.

### DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

**COMPARISON OF ENCLOSED SPACE DETECTION SYSTEM  
WITH  
CONVENTIONAL METHODS\***

Stephen W. Kercel, Vivian M. Baylor, and Leo E. Labaj  
Oak Ridge National Laboratory  
P.O. Box 2008  
Oak Ridge, Tennessee 37831-6011  
(423) 574-5278

To be presented at the  
13th Annual Security Technology Symposium  
Virginia Beach, Virginia  
June 9-12, 1997

**MASTER**

\*The submitted manuscript has been authored by a contractor of the U.S. Government under contract No. DE-AC05-96OR22464. Accordingly, the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U.S. Government purposes.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED *jcp*

---

\*This research was performed at OAK RIDGE NATIONAL LABORATORY, managed by LOCKHEED MARTIN ENERGY RESEARCH CORP. for the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-96OR22464.