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Biohazard Detection and Security of Critical Transportation Infrastructures

FINAL REPORT
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16. Abstract

This project utilizes the expertise of transportation professionals to develop an advanced CBRN monitoring and response management system for critical infrastructures such as transit hubs, airports, and marine terminals.

A concept model will be planned and designed for the use of a novel Anthrax detection technology in a selected critical facility. The project will designate the appropriate site, design the proper packaging and ruggedization for the device, and most importantly develop the protocols for integration of data into the facility's existing Incident Management Systems (IMS) for providing the appropriate emergency response. The second phase includes the physical determination implementation and testing of the system, conducted in the designated facility. A complete package, including monitoring hardware, IMS protocols, and software, and results of evaluation programs will compose the final product of the project.

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ABSTRACT:

The primary objective of this project is to advance existing capabilities in providing security for critical transportation infrastructures against CBR (Chemical, Biological and Radiological) threats. The project will bring experts from the New Jersey Department of Transportation (NJDOT), the Port Authority of NY/NJ in partnership with the Center for Advanced Infrastructure and Transportation (CAIT) at Rutgers University to develop an advanced and integrated CBRN monitoring and response management system for critical infrastructures such as transit hubs, airports and marine terminals.

In the first phase of the project, which is covered in this proposal, the team will plan and design the concept model for the use of a novel Anthrax detection technology in a selected critical facility. The project will designate the appropriate site, design the proper packaging and ruggedization for the device, and most importantly develop the protocols for integration of data into the facility's existing Incident Management Systems (IMS) for providing the appropriate emergency response. In the second and the final phase of the project, the physical implementation and testing of the system will be conducted in facilities designated and designed for in phase one. Furthermore, efforts will be made to extend the integration protocol to other CBR threats. A complete package including monitoring hardware, IMS protocols and software, and results of evaluation programs will constitute the final outcome of the project.

INTRODUCTION

There is a need for protecting and securing critical infrastructure against chemical, biological, and radiological threats. The National Science Foundation is looking for a bio-attack detection device that will aid in rapid deployment in first response applications.

OBJECTIVE

The National Science Foundation objectives have led us to identification of two major objectives. The first is to develop an advanced system for early detection of bio-attacks in locations most vulnerable to terrorist attacks. This is to advance existing capabilities in providing security for critical transportation infrastructures against CBR (chemical, biological, radiological) threats. The second objective is the development of coordinated and integrated incidence management system which communicates with existing security preparedness, and is capable of timely collection of real or quasi-real time data from remote sensory devices.

TESTING PROGRAM AND METHODS

The project was focused on the identification of an advanced detection technology for sensing of biohazards, such as anthrax spores, in transportation-like hubs and facilities. The research process included the formation of partnerships between private industry, university, and government agencies for potential implementation of the technology.

Tasks included seeking practical safety and security guidelines from agencies involved in ensuring safety of transportation hubs and first responders to biohazard emergencies. This included the design and development of a preliminary emergency response simulation software tool to act as a protocol in linking sensor detection information to existing response protocols of transportation hubs.

The next step was the development of plans for a full scale implementation in the context of a pilot project to be proposed to the National Science Foundation as the second phase of this work. The proposed project will utilize the existing partnerships to designate a site, design a ruggedized sensor assembly, implement sensor hardware, adapt the developed software interface to the sites emergency response protocol, and evaluate system performance.

CONCLUSION

We identified and helped further develop an advanced anthrax detection technology for potential use in transportation hubs. A team was assembled consisting of industry, university and agency partners to work together in further development of anthrax detection technology and also providing real and practical guidelines for final implementation. A simulation of a site identified by the NJ State Police emergency response team was developed. The simulation was used for modeling and simulation of evacuating people from the designated site upon activation of security alerts. The structure of technological expertise needed for protection of transportation related facilities against anthrax threats was created.

Training and development occurred in the forms of assisting first emergency responders with know-how about advanced anthrax detection technologies. In addition, first emergency responders were updated on evacuation protocols of designated facility. University/industry researchers were also educated through interaction with agency partners about the real need and immediate future deployment potential of an advanced anthrax detection system.

Outreach to local and state emergency response professionals and informing them about state of the art technologies in anthrax detection also occurred.