**ARIBO Industrial Hygiene Inspection Program**

## Executive Summary

## The ARIBO for Industrial Hygiene (IH) program is a partnership with TARDEC Ground Vehicle Robots (GVR), Fort Knox Industrial Hygiene Office, and the U.S. Military Academy. West Point cadets, through an engineering design project, will design and modify ground mobile robots (e.g., PackBot 510) with industrial hygiene sensors and data acquisition equipment under the supervision of TARDEC GVR and industrial hygiene inspectors from Fort Knox and West Point. The Fort Knox IH team will assist with the design, standardization, deployment and supervision of the ARIBO IH inspection bots.

## Macintosh HD:Users:coreyclothier:Google Drive:ARIBO:IH Pics:iRobot roll out:iRobot FasTac with WMD package and radio modem .JPGSponsoring Agency

## TARDEC GVR and Fort Knox Industrial Hygiene Office

## Project Description

The robots will support the IH mission to reduce soldier and employee exposure to environmental factors and stresses including: chemical (e.g., liquid, particulate dust, fumes, mist, vapor and gas), physical (e.g., electromagnetic radiation, temperature, ambient pressure, noise, vibration and ionizing radiation), and biological (e.g., agents of infections diseases, insects, mites, molds, yeasts, fungi, bacteria and viruses). Industrial hygiene is an integral part of installation force protection and is an important component of an installation’s planned response.

The immediate benefit of these systems is a substantially reduced risk for the inspector. In some respects, it is a force multiplier since it can be sent into a hazardous environment, parked, and allowed to collect data autonomously. This allows the inspector to perform other tasks. Sending a robot into a potentially hazardous environment is faster and safer than equipping and decontaminating a human.

## Functional Specs

* Provide remote sensing capability for chemical/biological/radiological agents
* Provide environmental data about the incident site (e.g., weather data, video)
* Vehicle and sensor package must be able to withstand weather and decontamination effects
* Provide a graphical user interface for the operator that allows control of the robot, video display, and sensor readings

## Performance Specs

* Vehicle must be user controlled with the ability to be recovered if necessary
* Sensor data must be provided in real time to the operator
* Vehicle must be able to navigate in indoor and outdoor environments
* Video stream should be recorded for playback and it should include audio.

## Constraints

* Use Packbot 510 robot platform and Operational Control Unit (OCU)
* Use existing Packbot communications systems

## Deliverables

One Packbot 510 robot equipped with IH sensors and associated software package for use in initial field testing beginning June 2014.

## Envisioned Uses

This system is an initial proto-type. The system is to be tested and then improvements made to the system. Future expansion includes the design of modular sensor packages that are situationally dependent, network-based remote control, and autonomous functionality.

## Cadet skills Required:

* Electronic design and implementation
* Network design and implementation
* Network communications
* Graphical User Interface design
* Sensor characterization and software driver development
* Linux, C++, Python programming skills

**Estimated Number of Cadets Required:**

* 5-7 cadets (2 EE, 2 CS, 1 IT, 1 Chemistry, 1 Mechanical Engineer)

## Sponsor Contact Information

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