

**Contract No:**

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## Robot Deployable Air Sampling Development Suite

SRNL R&DE received funding for a seedling LDRD in late August 2018 to begin development of a modular air and environmental suite for remote deployment that can be integrated with other Robotic Operating System (ROS) compatible sensors. The Clearpath Jackal robotic research platform with on-board ROS computer and hardware to facilitate rapid solution development and demonstration was identified and procured, Fig 1. Several air and environmental sampling sensors of common interest to DOE facilities, e.g. pH, Nitric Acid Concentration (NO<sub>x</sub>), humidity, temperature, air velocity, were identified for the suite, however time did not allow for their purchase.



*Fig 1-Clearpath Jackal robotic research platform with on-board Robotic Operating System (ROS) computer*

**Awards and Recognition -** N/A

## Intellectual Property Review

This report has been reviewed by SRNL Legal Counsel for intellectual property considerations and is approved to be publically published in its current form.

## SRNL Legal Signature

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**Signature**

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**Date**

## Robot Deployable Air Sampling Development Suite

### **Project Team**

**SRNL:** Jean Plummer (PI),  
William Wells, Richard  
Minichan

***Thrust Area:*** ES

***Project Start:*** August 2018

***Project End:*** Sept 2018

***Budget:*** FY18 Funding: \$35k

Proposed FY19 Funding: \$60k

Many areas exist within the DOE EM complex where it is desired to obtain a better understanding of the environment through the use of sensors. Many of these areas are hazardous and/or inaccessible to humans requiring the development of capabilities and technologies to remotely access these areas for monitoring. Often it is desired to understand the air quality and basic environmental parameters of these inaccessible areas. The focus this LDRD was to identify and procure air and environmental sampling sensors of common interest to DOE facilities such as pH, Nitric Acid Concentration (NO<sub>x</sub>), humidity, temperature, and air velocity. Additionally, it was desired to procure a robotic platform as a basis developing a remotely deployable air sampling suite.

### **FY2018 Objectives**

- Identify and procure the foundation components to develop a robotic deployable Air Sampling Suite.
  - identify and procure air and environmental sampling sensors of common interest to DOE facilities such as pH, Nitric Acid Concentration (NO<sub>x</sub>), humidity, temperature, and air velocity
  - Procure a robotic research platform with an on-board Robotic Operating System (ROS) computer and hardware configuration to facilitate rapid solution development and demonstration.

### **Introduction**

This seedling was funded in late August with proposed scope occurring in both FY18 and FY19. Even with a limited amount of time in FY18 available, much progress was made towards the objectives.

### **FY2018 Accomplishments**

- Procurement and receipt of the Clearpath Jackal robotic research platform for development, Fig 2.
- Collaboration with SRNL AD on identifying high functioning cost effective NO<sub>x</sub> sensors.



**Fig 2 – Procured Clearpath Robotic research platform in 781-A outside view (left) on-board computer and electronics to facilitate rapid development and sensor hosting**

## Future Directions

- Complete identification and procurement of high value air and environmental sensors for suite
- Package sensors into a deployable suite and mount on robotic platform
- Develop data collection system and software for remote viewing and storage.

**Total Number of Post-Doctoral Researchers - 0**