

# Cloud-based Electronic Test Procedures, Phase I Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)



## ABSTRACT

Test procedures are at the heart of any experimental process, especially those involving novel and complex hardware. Whether these procedures are for system check-out, experimental set-up, data collection, or operating the test article, following appropriate procedures and auditing the results of these procedures brings rigor and repeatability to the experimental process. Typically, test procedures are written in Microsoft Word or Excel and then printed out. Data entry is done by pen and pencil with little to no data captured electronically. This increases the error rate in procedures and reduces efficiency. A cloud-based test procedure system provides procedures via web browsers on tablets or laptops and guides the user through the procedure step-by-step. Electronic test procedures can capture and display data automatically and provide a record of procedure performance. Common procedure elements can be re-used and shared across multiple projects and programs. Custom displays can be generated from the same procedure content for use on-board in addition to on the ground. TRAC Labs proposes to extend its existing electronic procedure system, PRIDE, to capture the unique requirements of NASA flight test projects. PRIDE is currently being used on a variety of NASA projects, including the International Space Station (ISS), and by an increasing number of commercial customers. PRIDE replaces the document-oriented test procedures currently in use with information-oriented procedures that are flexible and optimized for on-line performance. The result will be an extensible electronic test procedure system that can be utilized across all of NASA's aeronautical test facilities and programs.

## ANTICIPATED BENEFITS

### To NASA funded missions:

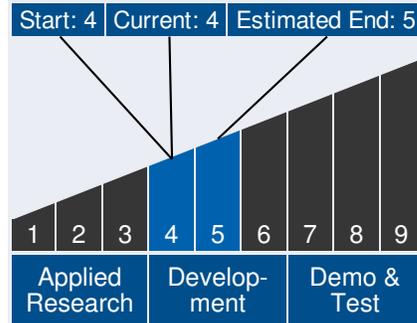
Potential NASA Commercial Applications: Our initial application of this technology will be NASA aeronautics research projects



## Table of Contents

- Abstract . . . . . 1
- Anticipated Benefits . . . . . 1
- Technology Maturity . . . . . 1
- Management Team . . . . . 1
- Technology Areas . . . . . 2
- U.S. Work Locations and Key Partners . . . . . 3
- Image Gallery . . . . . 4
- Details for Technology 1 . . . . . 4

## Technology Maturity



## Management Team

### Program Executives:

- Joseph Grant
- Laguduva Kubendran

### Program Manager:

- Carlos Torrez

*Continued on following page.*

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such as the Scalable Convergent Electronic Propulsion Technology Operations Research (SCEPTOR) project. We have already talked with NASA Armstrong Flight Research Center (AFRC) about using PRIDE and they are excited and have already been evaluating the existing software. Additional aeronautics research projects would follow. PRIDE is being evaluated for use in ground operations for the Resource Prospector robotic mission to the moon being jointly developed by NASA JSC and ARC. Ground operations personnel are currently evaluating PRIDE and this technology would potentially be able to assist them in their operations. The data logging and content re-use aspects of this technology would be immediately applicable to their project. Applications to ISS and Orion operations are numerous and we are working with NASA personnel to pursue these applications. We are also pursuing applications to NASA robotics activities including NASA JSC's R2 and R5 robots and NASA ARC's Astrobee robot.

### To the commercial space industry:

Potential Non-NASA Commercial Applications: TRAC Labs is already selling PRIDE as a commercial product with oil field services company Baker Hughes as a launch customer. Baker Hughes is field-testing PRIDE as several sites world-wide before deployment in actual operations in mid-2016. PRIDE is proving automation assistance to drilling operations. Baker Hughes has already expressed interest in licensing the new capabilities being developed in this project including data logging and content re-use. We will work with them to make sure that this project meets their requirements. TRAC Labs expects additional customers in the oil and gas industry will deploy PRIDE once it has been proven effective by Baker Hughes. TRAC Labs also sees application of this technology in the automotive manufacturing area. TRAC Labs performed a small pilot project for automotive supplier Magna (second largest in the world with 285 manufacturing facilities and over 125,000 employees) on flexible robotic assembly. This was successful, and after a tour of several Magna manufacturing facilities in North America,

#### Management Team *(cont.)*

##### Principal Investigator:

- David Kortenkamp

#### Technology Areas

##### Primary Technology Area:

Ground and Launch Systems (TA 13)

└ Mission Success (TA 13.4)

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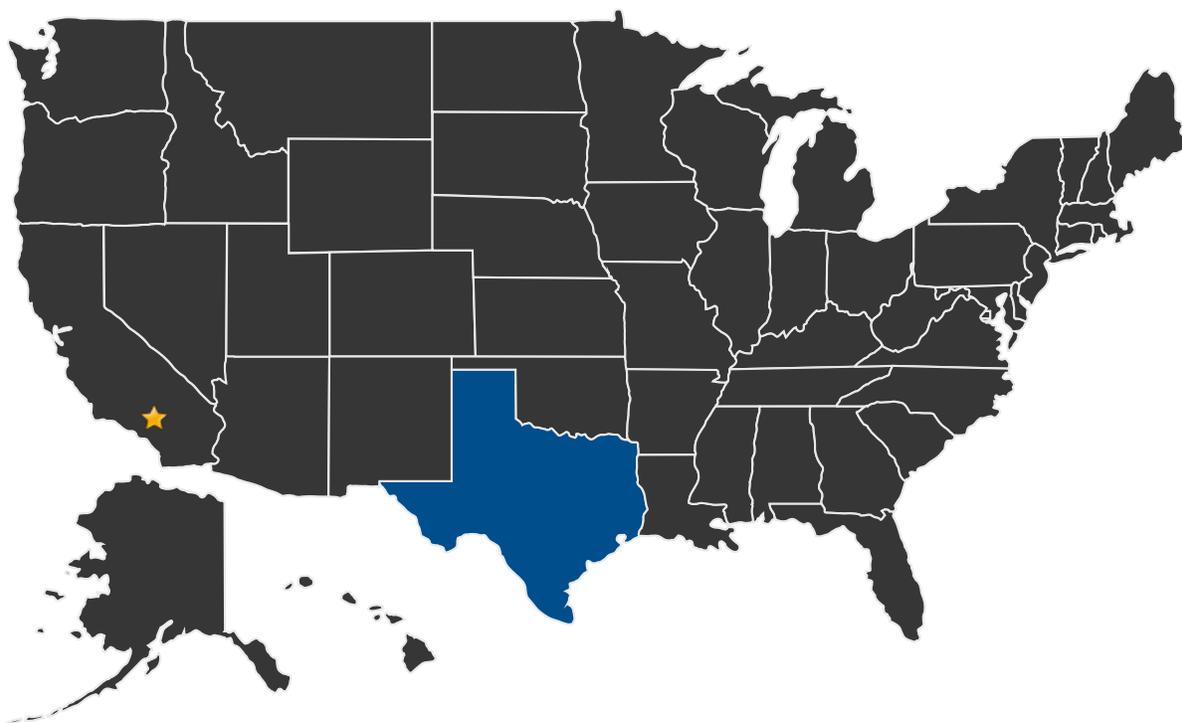
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TRAC Labs personnel are negotiating a follow-on contract for research and development. Augmented reality would be used to assign personnel on the manufacturing floor in performing their tasks and validating their work. We expect other manufacturing companies to be interested as well. Sierra Nevada Corporation has also purchased PRIDE licenses for use in their Dream Chaser program.

## U.S. WORK LOCATIONS AND KEY PARTNERS

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■ U.S. States With Work     ★ **Lead Center:**  
Armstrong Flight Research Center

### Other Organizations Performing Work:

- TRAC Labs, Inc. (San Antonio, TX)

## PROJECT LIBRARY

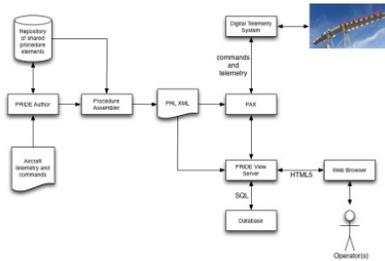
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## Presentations

- Briefing Chart
  - (<http://techport.nasa.gov:80/file/23472>)

## IMAGE GALLERY



*Cloud-based Electronic Test Procedures, Phase I*

## DETAILS FOR TECHNOLOGY 1

### Technology Title

Cloud-based Electronic Test Procedures, Phase I

### Potential Applications

Our initial application of this technology will be NASA aeronautics research projects such as the Scalable Convergent Electronic Propulsion Technology Operations Research (SCEPTOR) project. We have already talked with NASA Armstrong Flight Research Center (AFRC) about using PRIDE and they are excited and have already been evaluating the existing software. Additional aeronautics research projects would follow. PRIDE is being evaluated for use in ground operations for the Resource Prospector robotic mission to the moon being jointly developed by NASA JSC and ARC. Ground operations personnel are currently evaluating PRIDE and this technology would potentially be able to assist them in their operations. The data logging and content re-use aspects of this technology would be immediately applicable to their project. Applications to ISS and Orion operations are numerous and we are working with NASA personnel to pursue these applications. We are also pursuing applications to NASA robotics activities including NASA JSC's R2 and R5 robots and NASA ARC's Astrobee robot.