

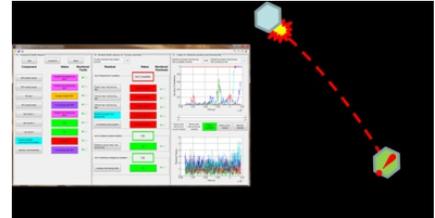
# Framework for the Design and Implementation of Fault Detection and Isolation, Phase II Project

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



## ABSTRACT

SySense, Inc. proposes to develop a framework for the design and implementation of fault detection and isolation (FDI) systems. The framework will include protocols which define how to work with an end customer so that an FDI system may be developed for a wide range of autonomous satellite, rocket, air, land, and underwater vehicle missions. The framework will define what kinds of data and information are needed a priori in order to design the FDI system, what kinds of mission requirements can be answered with the system, and how the system should be implemented in order to meet those requirements. The framework will also include the procedure to facilitate the efficient integration of our FDI methodology into both existing and planned systems. Clearly defining the FDI design process through this framework will make the technology more accessible to mission designers and lower the cost of implementation, providing more opportunities to apply this technology. The efficacy of the framework will be confirmed by designing and implementing collocated and non-collocated FDI systems for a representative satellite mission. The framework will also include introductory tutorial material designed for mission planners.



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## ANTICIPATED BENEFITS

### To NASA funded missions:

Potential NASA Commercial Applications: SySense, Inc.'s FDI methodology complements traditional system failure detection schemes and can provide additional safety and performance margins to any satellite or spacecraft mission. A clearly defined design framework will ease the burden of integration into existing and planned missions or systems.

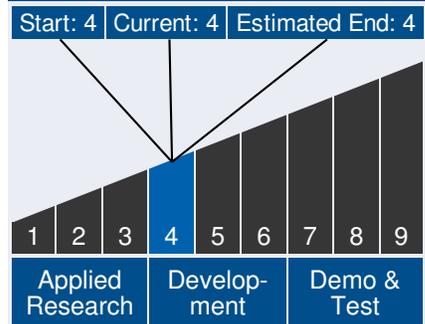
### To the commercial space industry:

Potential Non-NASA Commercial Applications: SySense, Inc.'s FDI methodology complements traditional system failure detection schemes to provide additional safety and performance

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## Technology Maturity



## Management Team

### Program Executives:

- Joseph Grant
- Laguduva Kubendran

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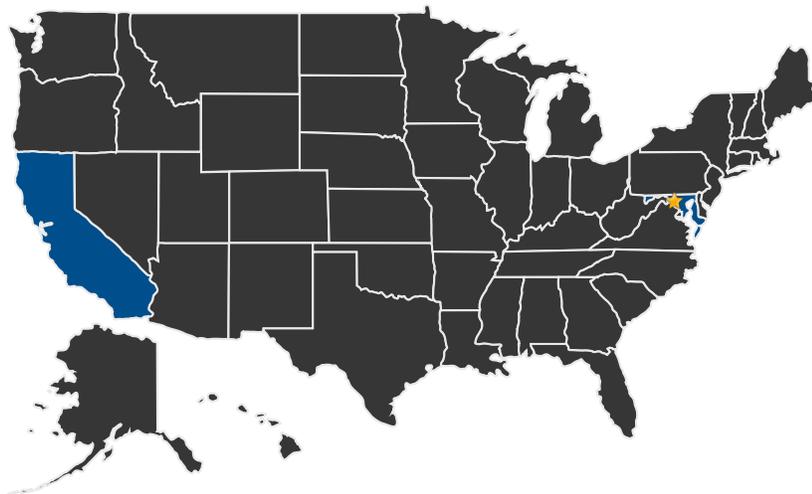
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margins to any system that can be modeled, eg. power grids, chemical refineries. A clearly defined design framework will serve as a marketing tool for the benefits and capabilities and to also ease the burden of integration into exiting or planned systems.

## U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States  
With Work

★ **Lead Center:**  
Goddard Space Flight Center

### Other Organizations Performing Work:

- SySense, Inc. (El Segundo, CA)

## PROJECT LIBRARY

### Presentations

- Briefing Chart
  - (<http://techport.nasa.gov:80/file/23046>)
- Final Summary Chart
  - (<http://techport.nasa.gov:80/file/23802>)

### Management Team *(cont.)*

#### **Program Manager:**

- Carlos Torrez

#### **Project Manager:**

- John Van Eepoel

#### **Principal Investigators:**

- Sung Kang
- Emmanuell Murray
- EMMANUELL  
MURRAY MURRAY

### Technology Areas

#### **Primary Technology Area:**

Robotics and Autonomous Systems (TA 4)

└ System-Level Autonomy (TA 4.5)

└ System Health

Management (TA 4.5.1)

└ Onboard Real-Time

Fault Detection,

Isolation, and Recovery

(FDIR) (TA 4.5.1.1)

#### **Secondary Technology Area:**

Communications, Navigation, and Orbital Debris Tracking and Characterization Systems (TA 5)

└ Position, Navigation, and Timing (TA 5.4)

└ Sensors and Vision

Processing Systems (TA

5.4.3)

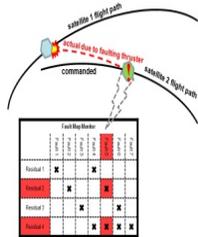
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## IMAGE GALLERY



*Framework for the Design and Implementation of Fault Detection and Isolation, Phase II*

## Technology Areas (cont.)

### Additional Technology Areas:

Communications, Navigation, and Orbital Debris Tracking and Characterization Systems (TA 5)

└ Position, Navigation, and Timing (TA 5.4)

└ Relative and Proximity Navigation (TA 5.4.4)

## DETAILS FOR TECHNOLOGY 1

### Technology Title

Framework for the Design and Implementation of Fault Detection and Isolation

### Potential Applications

SySense, Inc.'s FDI methodology complements traditional system failure detection schemes and can provide additional safety and performance margins to any satellite or spacecraft mission. A clearly defined design framework will ease the burden of integration into existing and planned missions or systems.