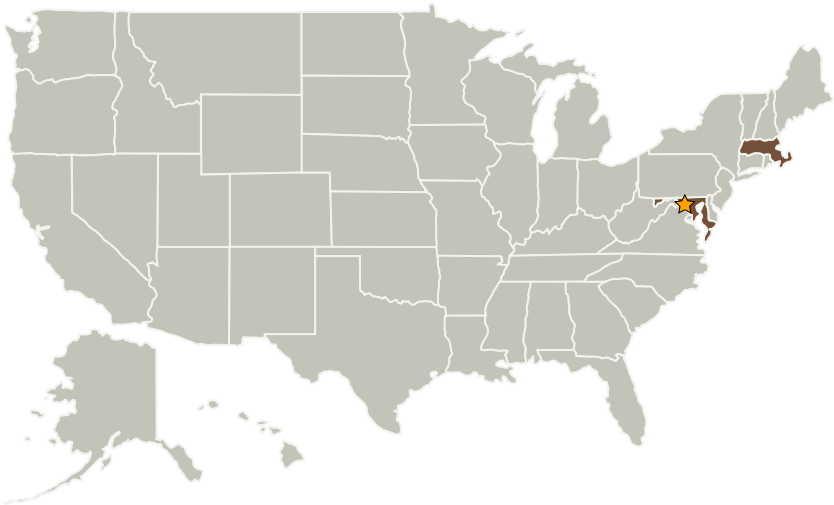
Fast Readout for Large Area Photon-Counting Infrared Detectors, Phase I

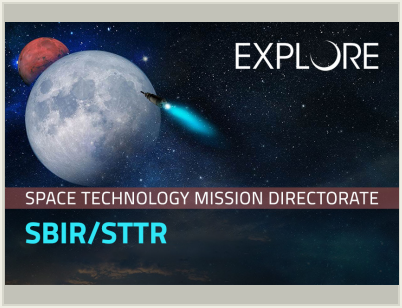
Completed Technology Project (2006 - 2006)

Project Introduction

Many NASA space and Earth programs in the infrared range 1060-1550 nm are limited by the detector performance that require long exposure time due to their low sensitivity and/or high noise. Efficient, single-photon counting in the infrared providing short exposure time and large area for increased photon utilization at the output aperture of the optical system would enhance the quality of observations in traditional applications such as lidar, imaging, optical communications, and space observations. We propose to develop readout circuits of infrared photon-counting detectors that will enable large-area detectors with extremely short integration time, will decrease their noise by one order of magnitude as compared to conventional detectors, and will result in higher detection efficiency for single-photons from 1064 to 1550 nm. In Phase 1 we will develop readout integrated circuits (ROIC) and demonstrate the performance enhancement of infrared photon counting detectors. Phase 2 will integrate the detectors and ROICs into a single package to result in large arrays with three-dimensional imaging capability.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
aPeak, Inc.	Supporting Organization	Industry	Newton, Massachusetts

Primary U.S. Work Locations	
Maryland	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  └ TX08.1 Remote Sensing Instruments/Sensors
    └ TX08.1.1 Detectors and Focal Planes