



HADAR: Heat Assisted Detection and Ranging

A passive, dual-detector Heat Assisted Detection and Ranging (HADAR) system offers up to 90% accuracy for enhanced 3D imaging in harsh environments, outperforming traditional sensing technologies.

Researchers at Purdue University have developed a new heat assisted detection and ranging (HADAR) method for imaging in harsh, sooty environments. Unlike current technologies, HADAR is a passive system it does not send out waves to detect targets, which in turn allows for higher efficiency. In addition, HADAR has infrared cameras with an atmospheric transparency window of eight to fourteen micrometers, whereas traditional LIDAR that uses visible light scattering and RADAR that uses radio waves have infrared windows of no more than two centimeters. The Purdue University approach uses two HADAR detectors for enhanced detection, each having a parallax algorithm that senses objects such as satellites, people, and debris relative to detector position. The detectors implement thermal radiation to measure the size of nearby objects. For settings such as military and defense, firefighting, or hazy road conditions, LIDAR resolves images with less than one percent accuracy, whereas HADAR can achieve accuracy up to ninety percent.

Advantages:

- Enhanced detection range
- Inconspicuous
- Operates in harsh environments
- Distinguishes between similar shapes
- High resolution 3D readout

Potential Applications:

- Imaging
- Satellites

Technology ID

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Category

Aerospace & National
Security/Defense, Electronics, &
Surveillance Technologies
Robotics &
Automation/Perception &
Sensing

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-Aerospace

-Defense

-Firefighting

-Autonomous vehicles

TRL: 5

Intellectual Property:

Provisional-Patent, 2019-12-06, United States | NATL-Patent, 2020-12-06, Canada | EP-Patent, 2020-12-06, Germany | PCT-Gov. Funding, 2020-12-06, WO | NATL-Patent, 2020-12-06, Europe | NATL-Patent, 2022-05-22, United States | CON-Patent, 2024-11-04, United States | EP-Patent, N/A, United Kingdom | EP-Patent, N/A, Switzerland

Keywords: HADAR, heat assisted detection and ranging, passive imaging system, thermal sensing, infrared cameras, atmospheric transparency window, enhanced detection range, high resolution 3D readout, defense imaging, autonomous vehicle sensors, 3D Imaging, 3D Visual Exploration, Computer Engineering, Efficient Detection, Electrical Engineering, Electronic Device, Firefighting, Heating, Human Heat Recovery, Lenses, Mechanical Engineering