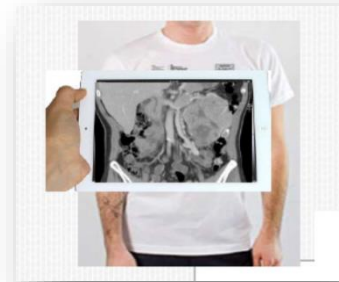


EXECUTIVE SUMMARY

DARPA-BAA-16-46

Proposal Title:



High Resolution RF/Microwave Imaging Through High Scattered Media

How to Overcome Diffraction Limit for Good Penetrating RF/Microwave Signals

Lead Organization: **Planar Monolithics Industries Inc.** USA, SMALL BUSINESS
www.pmi-rf.com

Other team members:

HUA, Inc. 2354 Fairchild Drive, Suite 1B28, **USAF Academy**, CO 80840, USA, SMALL BUSINESS

Prometheus Inc. 21 Arnold Ave. Newport, RI 02840, USA, SMALL BUSINESS

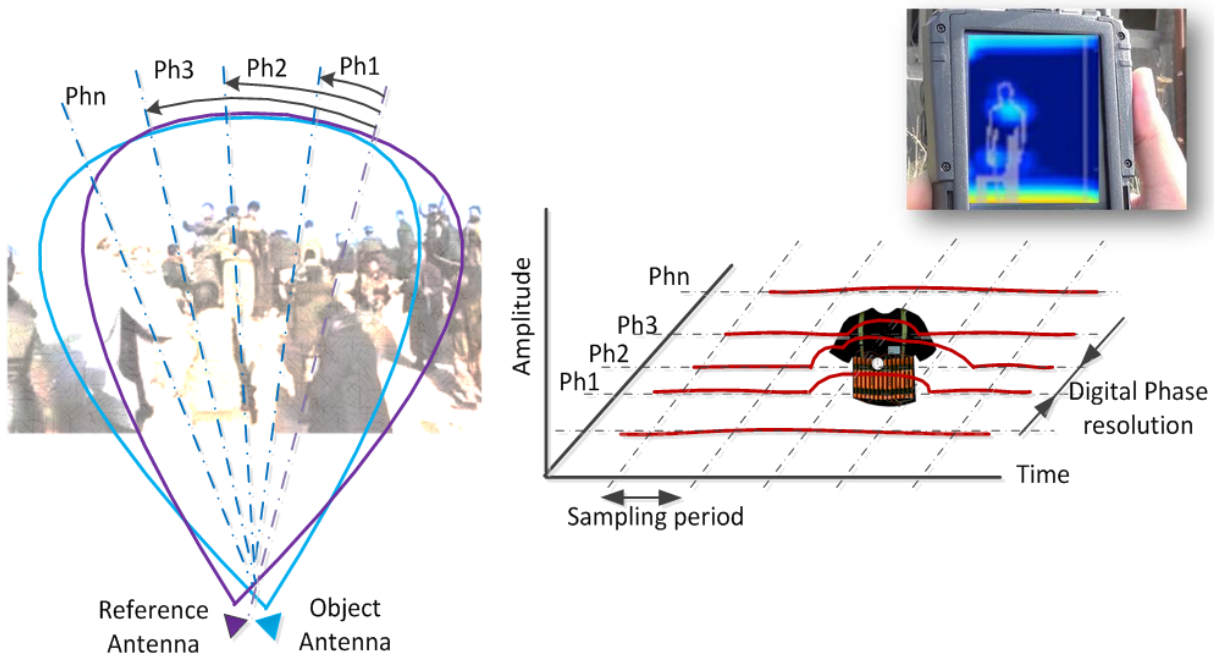
Technical Point of Contact: Dr. Pavlo Molchanov,
7311F GROVE ROAD, FREDERICK, MD 21704 USA • PHONE: 301-662-5019 • FAX:
301-662-2029
(Email: pmolchanov@pmi-rf.com Tel: 301-662-5019

Administrative Point of Contact: Elizabeth Flores
7311F GROVE ROAD, FREDERICK, MD 21704 USA • PHONE: 301-662-5019 • FAX:
301-662-2029
Email: liz@pmi-rf.com, Tel: 301-662-5019



Optical waves scattering by clouds, rain, dust, smoke and snow. RF/Microwaves provide good penetration, but image resolution limited by diffraction.

- Proposed novel imaging technique will provide all weather **high-resolution imaging** and **recognition** capability for RF/Microwave signals with good penetration through highly scattered media: **fog, snow, dust, smoke**, even **foliage, walls and ground**;
- **Image resolution** in proposed imaging system is **not limited by diffraction** and will be **determined by processor and sampling frequency**;
- Proposed imaging system can **simultaneously** cover entire sky, 360° by azimuth and elevation for **multiple targeting** and can be **multi-frequency**;
- Directional antennas in imaging system can be close positioned and installed on small aircraft or **distributed** around protected border or object;
- **Non-scanning monopulse** system allows dramatic **decrease in transmitting power** and at the same time **increased imaging range** by integrating 2-3 orders more signals than regular scanning imaging systems;



UWB Software Defined Receiver coupled with the object antenna can record real time **digital hologram** which consists of amplitude and phase information of the diffracted RF/Microwave signals. Information about **shape of object** is contained within the electromagnetic phase front and can be restored from recorded digital hologram. Spectrum signature will provide information about **material of object**.