

# NASA SBIR/STTR Technologies



NNX12CA19C Optoelectronic Infrastructure for RF/Optical Phased Arrays

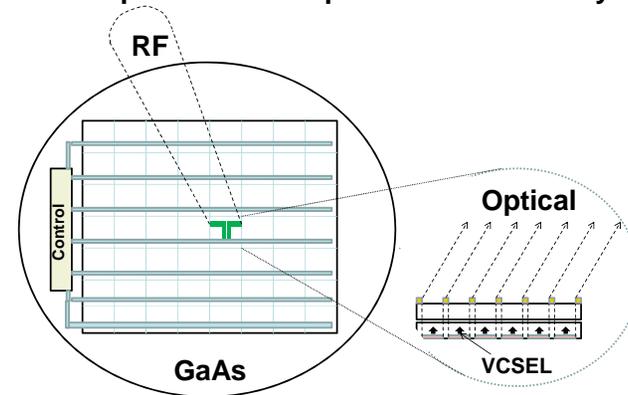
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## Identification and Significance of Innovation

- Optoelectronic integration enables optical distribution and collection of RF carrier + data to/from all elements
- 2D VCSEL array provides optical output from center of RF array enabling a common RF- optical aperture
- TTD of RF signals achieved with microresonators to produce slow light
- Optical beam steering by VCSEL bias control and detectors for return signals

**Expected TRL Range at the end of Contract : 6.5**

RF-Optical Shared Aperture Phased Array



## Technical Objectives and Work Plan

### Technical Objectives

- Develop POET platform towards phased array component demo
- Determine the parameters for steered VCSEL beam
- Demonstrate the high speed electronics in POET required for system control

### Work Plan

- Develop POET (Planar OptoElectronic Technology) to implement RF generation and controlled optical delay
- Develop high density VCSEL arrays to produce coherent emission with steering capability
- Determine/demonstrate device structures for optical delay, VCSEL arrays
- Combine RF generation and optical emission within a single chip

## NASA and Non-NASA Applications

### NASA

- Satellite sensors in the Ka and Ku band for terrain mapping and surveillance
- POET circuits for laser and RF communications, internal satellite fiber optics, RF photonics and AD conversion, high speed systems
- POET imaging devices for visible, MWIR, LWIR, THz
- Multiple RAD-HARD high speed interfaces

### Non-NASA

- Data comm, FTTH, LANS, Active Optical Cables, high speed servers
- Digital signal processors, FPA's

## Firm Contacts

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**NON-PROPRIETARY DATA**

# RF-Optical Shared Aperture Phased Array

