NASA STTR 2007 Phase I Solicitation

T7.01 Optical Detector Arrays with Unusual Geometrical Shapes for Lidar and Passive Remote Sensing Applications

Lead Center: LaRC

Innovative or improved concepts are solicited for the development of detectors and detector arrays formed into unusual shapes. Of immediate interest are detector formats with cylindrical symmetry, where the detecting surface is on the curved portion of a cylinder and extends entirely (or nearly entirely) around the circumference of the cylinder. The detecting element need not be continuous, but could be a series of discrete elements. The ultimate goal of this solicitation is the development and production of a stacked array of cylindrical detecting elements.

NASA has interest in developing PV or PC IR detector arrays, but is especially interested in the development of visible/NIR photon-counting detectors constructed in a stacked cylindrical format. The stacked arrays should be sensitive across a broad spectral range. If cooling is required, the contact point to the cooler must be at one end of the array stack.

Arrays eventually employed will have a small size (cylindrical diameter ~ 1 centimeter or less, total length ~ 2-5 centimeters) and a moderately large number of axial elements (~ 32-128.) Fill factor of the array should be optimized to have as little non-detector surface area as possible. Electronics required to read the devices should also be developed as part of the project unless these are readily obtainable elsewhere.

Ultimately these detectors will be used as part of novel lidar systems and passive IR/visible spectrometers.

Proposals should describe the expected sensitivities/efficiencies of the proposed devices in terms of signal levels and wavelength dependencies. Limitations on the eventual size and power requirements of fully developed devices should be indicated in the proposal along with a discussion of any potential environmental constraints on their operation.