The following technologies are of interest to NASA in the remote sensing subtopic “passive optics.” Passive optical remote sensing generally requires that deployed devices have large apertures and large throughput. NASA is interested primarily in instrument technologies suitable for aircraft or space flight platforms, and these inherently also prefer low mass, low power, fast measurement times, and a high degree of robustness to survive vibrations in flight or at launch. Wavelengths of interest range from ultraviolet through the far infrared. Development of techniques, components and instrument concepts that can be developed for use in actual deployed devices and systems within the next few years is highly encouraged.

Technologies and components that are not clearly suitable for use in high throughput remote sensing instruments are not applicable to this subtopic. Technical and scientific leads at NASA have given careful consideration to the technology areas described below, and responses are solicited for these topics.

1) Stiff actuator technology designed to produce precisely controlled motion of large (> 1.0 cm diameter) optical elements intended for use in tunable Fabry-Perot and Fourier Transform Spectrometer (FTS) instruments. Motion ranges of particular interest include 20–60 µm, 1–2 mm, and 3–5 cm. Techniques applicable to very cold temperature.

2) Technology leading to significant improvements in capability of large format (> 1 inch diameter), very narrow band (~1 full-width at half-maximum), polarization insensitive, high throughput infrared (0.7–15 µm) optical filters.

3) Large format (> 1 inch diameter) high-transmission far infrared filters. Technology and techniques leading to filters operating at wave numbers between 500 and 5 cm⁻¹ with FWHM less than 2 cm⁻¹ are of immediate interest, though technology leading to very high transmission edge filters (long and short pass) is also solicited. The filters must be capable of operating in a vacuum at cryogenic temperatures.

4) High performance four-band two-dimensional (2-D) arrays (128x128 elements) in the 0.4 – 2.5 µm wavelength
range with high quantum efficiencies (60%–80% or higher) in all spectral bands, low noise, and ambient temperature operation.