Planned future NASA Missions in astrophysics, such as the Single Aperture Far-IR (SAFIR) telescope, James Webb Space Telescope (JWST, [http://www.jwst.nasa.gov/](http://www.jwst.nasa.gov/)), Terrestrial Planet Finder (TPF, [http://planetquest.jpl.nasa.gov/TPF/tpf_index.cfm](http://planetquest.jpl.nasa.gov/TPF/tpf_index.cfm)) missions: Coronagraph, External Occulter and Interferometer, ATLAST, Life Finder, and Submillimeter Probe of the Evolution of Cosmic Structure (SPECs), and the UV Optical Imager (UVOIR) require 10 - 30 m class cost effective telescope observatories that are diffraction limited at wavelengths from the visible to the far IR, and operate at temperatures from 4 - 300 K. The desired areal density is 1 - 10 kg/m². Static and dynamic wavefront error tolerances to thermal and dynamic perturbations may be achieved through passive means (e.g., via a high stiffness system, passive thermal control, jitter isolation or damping) or through active opto-mechanical control. Large deployable multi-layer structures in support of sunshades for passive thermal control and 20m to 50m class planet finding external occulters are also relevant technologies. Potential architecture implementations must package into an existing launch volume, deploy and be self-aligning to the micron level. The target space environment is expected to be L2.
fully develop a technology and infuse it into a NASA program.