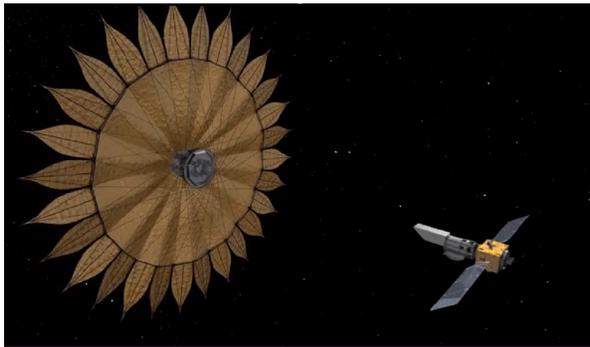


**Starshade Assembly Enabled by the Deep Space Gateway Architecture.** J.M. Grunsfeld<sup>1</sup>, N. Siegler<sup>2</sup>, and R. Mukherjee<sup>2</sup>, <sup>1</sup>NASA GSFC-Emeritus (john.m.grunsfeld@nasa.gov), <sup>2</sup>JPL/Caltech.

**Introduction:** A starshade is essentially an external coronagraph which nulls the bright light from a distant star to reveal an otherwise hidden planetary system. With a starshade, it may be possible to obtain the spectrum of an earth-sized planet in the habitable zone around a nearby star in emission, even with a relatively small telescope. The technical challenge is to produce a device which can reduce the ‘glare’ from the host star by a factor of  $10^{10}$ . Recent progress has shown that unique flower-like shapes can perform this function, but for large future telescopes they must be constructed at a scale nearing 100 m with micron-thick edges. All current designs are examining the engineering of highly complex deployment mechanisms to attain these requirements and fit in a conventional rocket fairing.



**Figure 1. Starshade with notional telescope**

**Gateway Assembly:** We present an alternative approach: assembling a starshade with support from the Deep Space Gateway (DSG) architecture. The DSG will have the benefit of a robust cis-lunar transportation system, an orbit which is favorable to sending spacecraft to deep space, robotics, and spacewalking crews. In the time frame of the DSG, NASA is planning to launch a “starshade-ready” Wide Field Infrared Survey Telescope (WFIRST), which requires an ~30m starshade. Assembling a starshade at the DSG from large pre-fabricated solid parts provides a major simplification of the design and may reduce the cost, resulting in achieving the WFIRST starshade science sooner. We present the concept of how a starshade might be assembled and deployed to deep space as a partner to enhance the science of future space telescopes.