Spinning Aperture Telescope: A novel approach to Hubble's space telescope

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Abstract

Space telescopes have produced tremendous discoveries in every discipline of astronomy. A telescope's mirror size determines how much light it can capture and how dim the objects it can view. If a rectangular "strip" mirror with a length equal to the diameter of a circular mirror is spun while imaging, its angular resolution is similar to that of a circular mirror. However, because of Menial's Law, which stipulates that the cost of a circular mirror decreases as the diameter increases to 2.8 power, a strip mirror can be just 18% of the cost of a circular reflector and is easier to pack and deploy from a launch vehicle fairing. This entails that instead of spending $100,000 on a circular primary mirror, we spend $18,000 by simply replacing it with a rectangular strip. At a modest scale (CubeSat), spinning apertures can ride shotgun with other payloads for usage on Earth and Mars. Spinning apertures on a large scale (10s of meters in length) is quite cost-effective for Ex-planet detection and characterization, according to research. In comparison to a CubeSat, our concept will use a hexagonal skeleton to increase space utilization capacity.