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High Resolution Structureless Telescope

Microcosm and its subcontractor, Michigan Aerospace Corporation (MAC), propose to define the architecture, technology development plan, and key system trades for a high-resolution “structureless” telescope that eliminates the roadblocks to resolution and control inherent in conventional space telescopes. The structureless telescope takes advantage of a unique combination of technologies that involve the use of light pressure from nearby free-flying control lasers to maintain the position and attitude of multiple, independent, free-floating mirror segments to a fraction of the wavelength of visible light. Preliminary analysis shows that, with appropriate controls to reduce or eliminate the environmental factors of solar wind and light pressure from the Sun, the laser generated control forces are both adequate and sufficiently controllable. Structural vibration and jitter, which limit the performance of most large telescopes, are effectively eliminated. The telescope is maintainable, expandable, and can use multiple focal plane sensors, depending on the need. The structureless telescope thus has direct applicability to a wide range of missions. This range can span from commercial and science missions that will now be able to study, for example, weather patterns in extreme detail, to military missions that will satisfy the need to transform reconnaissance into surveillance. For an Earth observation mission, the result is a telescope capable of providing continuous 0.75 – 1.2 meter (National Image Interpretability Rating Scales 5) quality imagery of any region on Earth visible from geosynchronous equatorial orbit (GEO). Alternatively, for space observations, including looking for extra-solar planetary systems, the telescope could be placed at a Lagrange point.

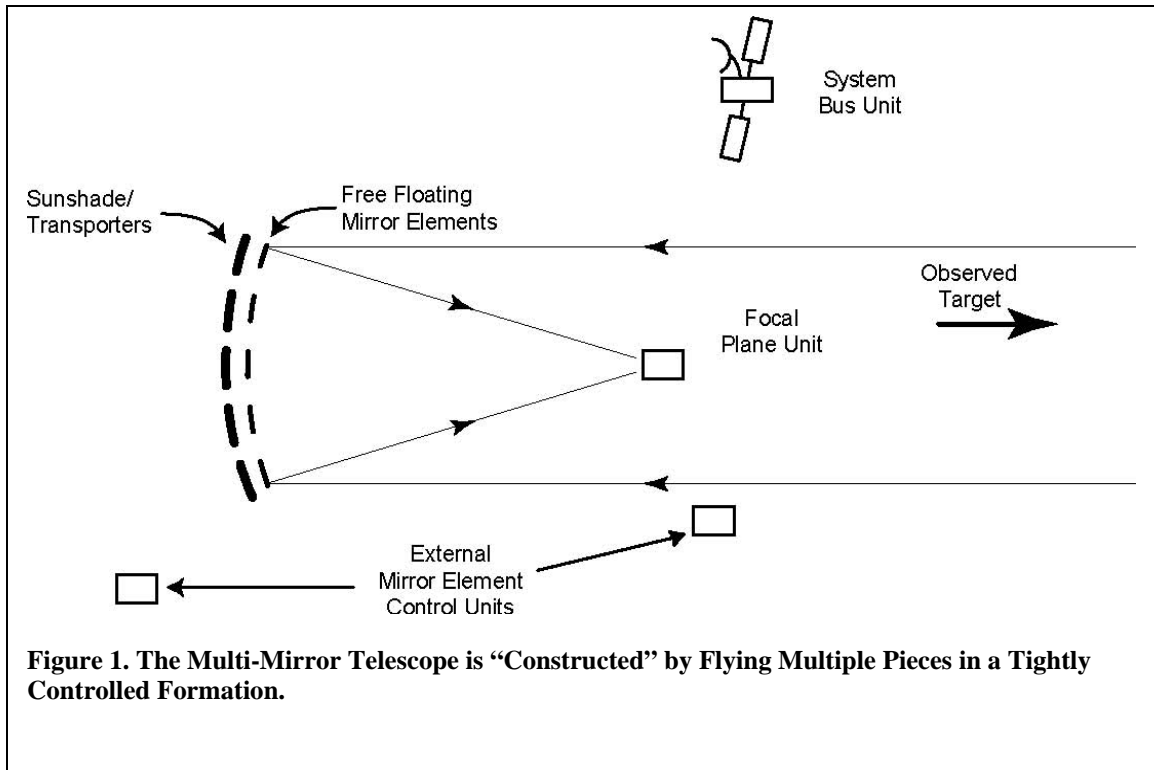


Figure 1. The Multi-Mirror Telescope is “Constructed” by Flying Multiple Pieces in a Tightly Controlled Formation.