



Technology Opportunity

Estimating and Controlling a Global Radius of Curvature for Segmented Mirrors

Scientists at NASA's Marshall Space Flight Center have patented a system that provides a global radius of curvature (GRoC) estimation and control system (GRoCECS) for segmented telescope mirrors. Sensing and controlling a segmented mirror's GRoC is necessary to increase resolution and ensure the best possible image quality when the mirror is a primary component of a telescope or beam director. Prior techniques involve placing sensors on mirror edges; however, edge sensors either do not provide sensitivity to the GRoC model at all or provide sensitivity at inadequate levels. In contrast, Marshall's system works by exploiting a special set of mirror boundary conditions and the mirror's influence functions to accurately estimate and control the segmented mirror's radius of curvature. This control makes it possible not only to improve image quality but also to impose a required wavefront correction on incoming or outgoing light.

Benefits

- **Accurate:** Provides sensitivity that increases with the number of mirror segments, greater than that provided by traditional methods
- **Effective:** Utilizes all the information available from the edge-sensor subsystem to yield estimates of all the states of the segmented mirror
- **Efficient:** Senses degrees of freedom, not observable by an edge-sensor system, without the need for additional hardware metrology systems

Commercial Applications

- Ground-based or space-based telescopes with segmented primary mirrors
- Beam directors that use segmented mirrors for directed energy weapons
- Segmented mirrors used for beaming power to and from space

Licensing and Partnering Opportunities

This technology is part of NASA's technology transfer program. The program seeks to stimulate development of commercial uses of NASA-developed technologies. NASA is flexible in its agreements, and opportunities exist for licensing and joint development. MSFC is interested in a partnership to commercialize the technology.

Patents

U.S. Patent Number: 7,050,161

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