

Automated Low-Gravitation Facility Would Make Optical Fibers

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A report describes a proposed automated facility that would be operated in outer space to produce high-quality optical fibers from fluoride-based glasses, free of light-scattering crystallites that form during production in normal Earth gravitation. Before launch, glass preforms would be loaded into a mechanism that would later dispense them. A dispensed preform would be melted, cooled to its glass-transition temperature rapidly enough to prevent crystallization, cooled

to ambient temperature, then pushed into a preform tip heater, wherein it would be reheated to the softening temperature. A robotic manipulator would touch a fused-silica rod to the softened glass to initiate pulling of a fiber. The robot would pull the fiber to an attachment on a take-up spool, which would thereafter be turned to pull the fiber. The diameter of the fiber would depend on the pulling speed and the viscosity of the glass at the preform tip. Upon depletion of a preform, the robot

would place the filled spool in storage and position an empty spool to pull a fiber from a new preform. Pulling would be remotely monitored by a video camera and restarted by remote command if a break in the fiber were observed.

*This work was done by Dennis S. Tucker of **Marshall Space Flight Center** and Phillip J. Williams and Patrick A. Tobbe of *Dynamic Concepts*. Further information is contained in a TSP (see page 1).
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