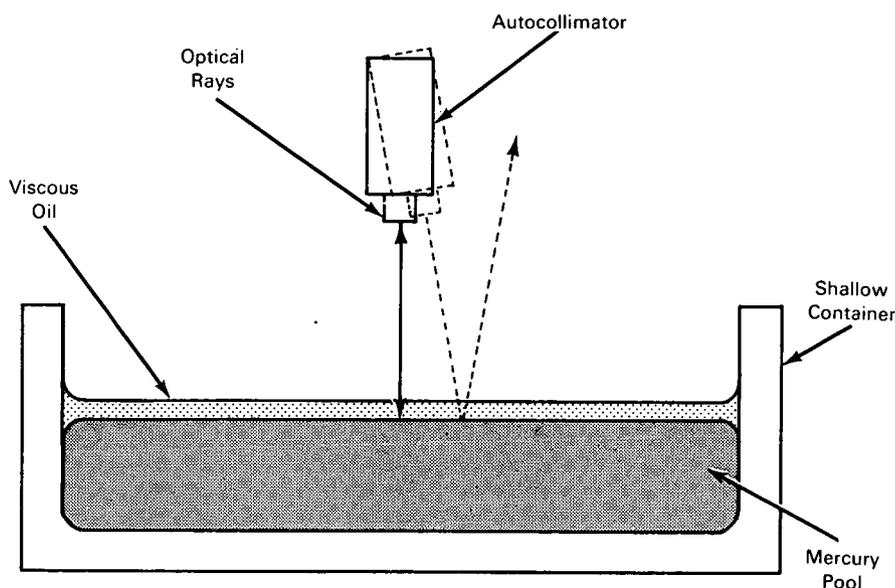


NASA TECH BRIEF



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Oil-Damped Mercury Pool Makes Precise Optical Alignment Tool



The problem: To provide a large reference reflector for the precise alignment of optical instruments. A large reflector in the form of an optical flat poses serious problems of structural rigidity and stability of support. Mercury-pool (gravity reference) reflectors are adversely affected by even the smallest vibrations in the supporting structure and suffer reflectance degradation by oxidation when exposed to the atmosphere for any appreciable period.

The solution: A mercury-pool reflector having a cover layer of high-viscosity oil that does not react chemically with the mercury. This cover layer effectively damps any turbulence imparted to the mercury by support structure vibrations.

How it's done: A quantity of triple-distilled mercury is poured into a flat-bottomed glass dish to form a pool 1 cm deep. Over the mercury is poured a commercially available, high-transparency oil with a kinematic viscosity of about 500 centistokes. If the dish is disturbed in any way, ripples set up in the mercury surface are quickly damped by the cover layer of high-viscosity oil.

Notes:

1. When the oil is first poured over the mercury, 15 to 20 minutes must elapse before all air bubbles disappear and the oil becomes totally transparent.
2. The container configuration giving the best ripple damping has vertical sides curving gently to meet the base, the radius of curvature being about 1 cm.

(continued overleaf)

3. This technique provides a gravity-reference system with the advantages of constancy within a few hundredths of an arc-second, reflectance comparable to that of an aluminized surface, and ready reproducibility in any desired location.
4. Inquiries concerning this invention may be directed to:
Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland, 20771
Reference: B65-10253

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

Source: M. P. Thekaekara
(GSFC-353)