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LASER FOCUS

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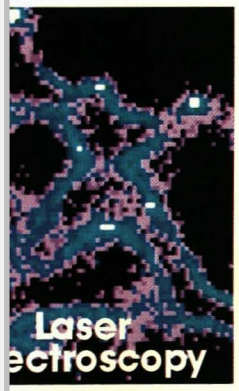

Laser
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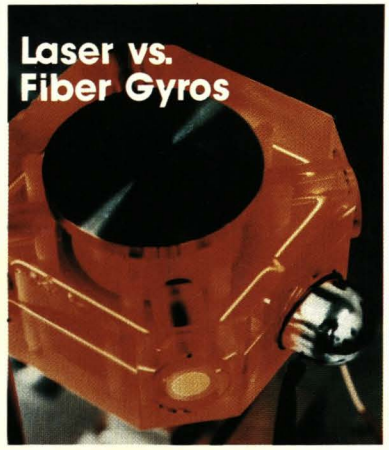
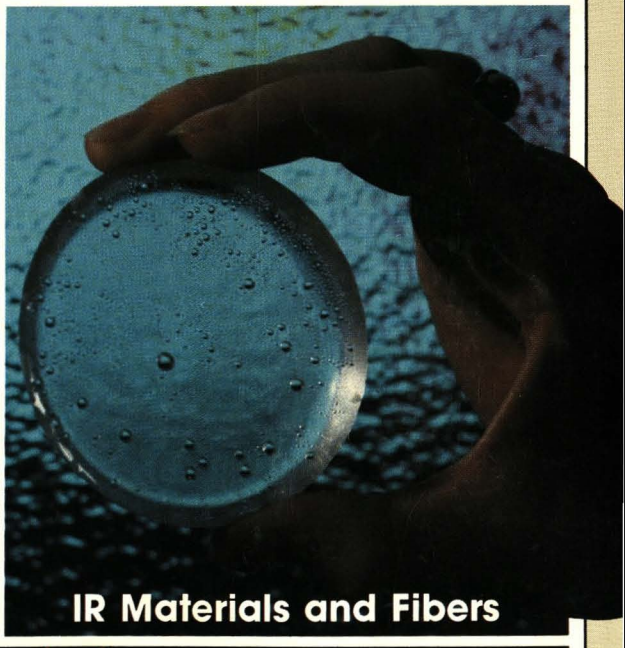
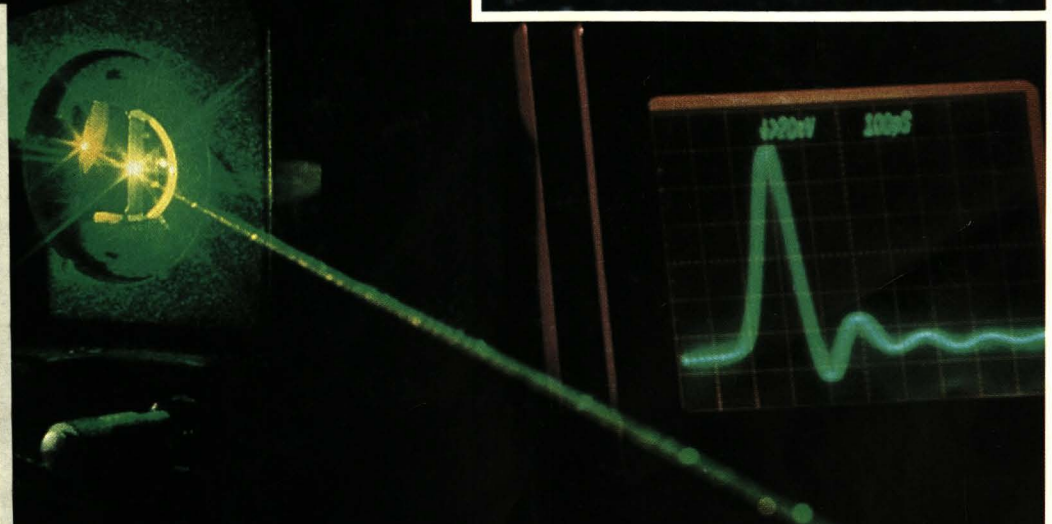


Laser vs.
Fiber Gyros



IR Materials and Fibers



FOCAL POINT

COST CONSIDERATIONS FOR INDUSTRIAL EXCIMER LASERS

By GARY K. KLAUMINZER

As industrial applications for excimer lasers are developing, designers are beginning to address the issue of cost. This issue is complicated because there are no "industrial" excimer lasers on the market today, so no user or manufacturer can accurately predict the costs for a given application. But we can identify the major cost elements and give rough estimates based on output power and level of usage. In doing so we find that maintenance costs—labor and replacement parts—exceed capital costs for most excimer lasers, and that fuel gas costs are small by comparison. The following analysis covers lasers from 10- to 200-W average power, and includes capital, maintenance, and fuel gas costs for each per kilowatt-hour of operation.

The editors recommend the detailed analysis in this article as a model for the discussion of cost issues. These issues, however, are never cut-and-dry. Readers should bear in mind that capital and component costs and reliability may be difficult to evaluate and will change as the technology advances. This will in turn affect the conclusions to be drawn.

GARY K. KLAUMINZER is president of Questek, Inc., 44 Manning Road, Billerica, MA 01821.

Capital costs

The most visible cost for any laser is the initial cost to purchase. Figure 1 shows the cost per watt as a function of output power for a number of commercial excimer lasers designed for scientific applications. The 200-W laser does not exist yet, but the cost is extrapolated from the 100-W laser. The output power is for 248 nm (KrF); the same laser gives lower power at 193 nm (ArF), 308 nm (XeCl), and 351 nm (XeF), with the weakest about 50% that of KrF.

For the next generation of excimer lasers designed for industrial applications, the capital cost per watt should decrease as application-specific designs are produced in higher volume. A rough estimate of cost per watt for 1988 is shown by the dashed line.

Maintenance cost

Excimer lasers require routine maintenance to change fuel gas, clean optics, if necessary, and otherwise check system performance. This analysis ignores such maintenance and focuses on the cost to replace major components in the laser which have "worn out." Each component is analyzed independently to determine a service interval, although in practice a preventive maintenance schedule will group