

## Practical implications

It is well known that a "diffraction-limited" .0001 x-ray laser has the ultimate potential of achieving about a power brightness 10,000 trillion times that of the Sun—in the range of  $10^{40}$  watts per steradian. What this means is that anything within the cone defined by the laser beam will feel like it is exposed to a star putting out 10,000 trillion times the energy of our Sun. Nuclear weapons primarily generate x-rays at a power of about  $10^{20}$  watts per steradian. Since the Livermore lens has made the x-ray laser a trillion times brighter than the H-bomb and more than a million times brighter than the Sun, an x-ray laser beam could destroy a missile booster from as far away as the Moon. While much harder targets, such as warheads within re-entry vehicles, could be destroyed within a range of one-tenth of this—10,000 miles.

In fact, it is well known in directed-energy theory that the number of targets that a laser weapon can kill increases as the inverse square of the ratio of different ranges. For example, if one x-ray laser module could kill a booster from a 100,000-mile range, theoretically it could destroy 10,000 boosters within a range of 1,000 miles. And as was demonstrated in the case of mobile cannons with grapeshot against infantry two centuries ago, targeting problems rapidly disappear in the face of such gigantic firepower potentials.

In any case, the full-scale targeting and pointing system can be deployed and tested over the coming year or so without the need of any simultaneous test of the x-ray laser itself. In this case, low-power, already-deployed space-based communication lasers would provide an adequate substitute.

## Soviet x-ray lasers?

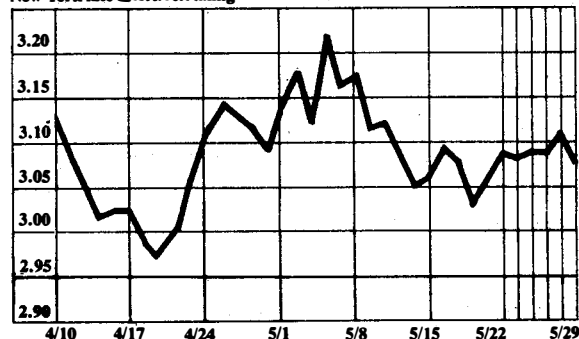
In a recent presentation to the Baltimore Conference on Lasers and Electro-Optics, Dr. Mark J. Eckart reviewed the Livermore experiments which demonstrated a laboratory-scale x-ray laser. At the end of his talk, Dr. Eckart showed the scientific papers which provided the basis for the realization of the Livermore x-ray laser. *Almost all of the papers were done by Soviet scientists.* Dr. Eckart noted that the Soviets have not published many papers on x-ray lasers since 1980, shortly before Livermore was first reported to have demonstrated a bomb-powered x-ray laser.

Most leading experts agree that the Soviet Union has led the world in work on x-ray lasers and has devoted far greater resources than the West. It is virtually inconceivable that the U.S.S.R. would be far behind. There can be little doubt that if the Soviets have perfected the x-ray laser, they will deploy it. (Given the range and demonstrated capabilities of the x-ray, it is almost impossible to detect them before they are utilized.) Therefore, it is most likely that both the United States and U.S.S.R. have within their grasp the capacity to render offensive nuclear weapons impotent and obsolete. Will the U.S.S.R. accept President Reagan's offer "to work together" on this, or will it simply attempt to deploy first and gain an overwhelming superiority?

## Currency Rates

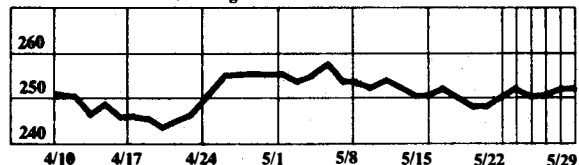
### The dollar in deutschemarks

New York late afternoon fixing



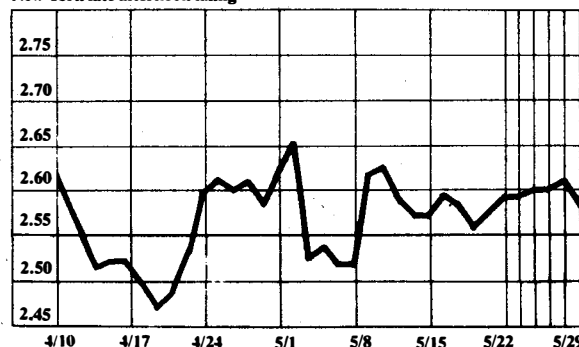
### The dollar in yen

New York late afternoon fixing



### The dollar in Swiss francs

New York late afternoon fixing



### The British pound in dollars

New York late afternoon fixing

