

In addition, the SDI report announced a number of successful technology demonstrations at the national scientific labs and by industries, which change the expectations of both the feasibility and timescale of building an effective layered anti-missile defense. The most spectacular breakthroughs have been on the Advanced Test Accelerator at Lawrence Livermore Laboratory, a 50 million-volt electron-beam accelerator. This machine has "demonstrated that charged-particle [electron] beams can be guided by a laser-created channel in a low-pressure environment such as the earth's upper atmosphere, [without] bending caused by the earth's magnetic field. . . . This success has implications for charged-particle beam weapons for use at altitudes from 85-600 kilometers."

As the laser can guide the electron beam in the ATA, so the electron beam can amplify a laser in the same channel, making an "electrically powered" Free Electron Laser. Extremely powerful beam pulses have already been generated by the Free Electron Laser, at microwave wavelengths. The program's goal is now to scale this technology to higher, visible-light wavelengths needed for anti-missile defense.

Similar achievements are reported from Los Alamos and Oak Ridge National Laboratories, which are working together on the Neutral Particle Beam Accelerator, whose use will be to destroy electronic circuits on ballistic missiles. Both labs, developing different stages of the accelerator, have achieved significant current levels for up to five-second bursts, using small, lightweight devices.

Meanwhile at Picatinny Arsenal, an electromagnetic projectile accelerator, or "rail gun," has shot dense clouds of small metallic particles at speeds of 40 kilometers per second, and at five "refires" in half a second. Now about 20 meters long, if this rail gun can fire at such speeds from space down at boost-phase missiles, it can destroy them either with particles or with small rocket projectiles.

All of the SDI tests are technically "demonstrations," since the devices involved have different sizes, weights, power levels or materials characteristics than actual prototypes. They can clearly demonstrate the working principles by which the layered anti-missile shield will function. Multiple simultaneous series of such tests, conducted by many firms and labs with innovative or competing approaches, could rapidly converge on actual prototype development. This is the current stage of the Soviet anti-missile defense program; it is the stage they demand the U.S. SDI never enter.

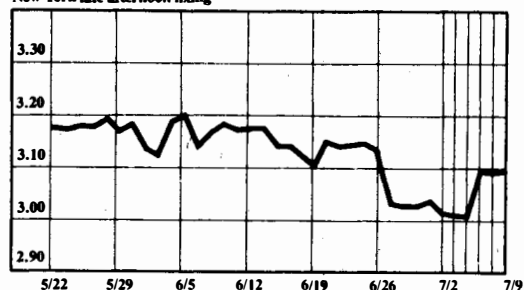
Such an accelerated approach would take a larger budget, but more importantly, defense mobilization credits, at long terms and low rates of interest, for firms and labs which wanted to demonstrate their capabilities for later development and production contracts.

By contrast, this latest status report shows that the SDI program, starved of funds by Congress and with no backup credits to stimulate its industrial base, is overseeing only a single major experiment for each area of anti-missile defense technology.

## Currency Rates

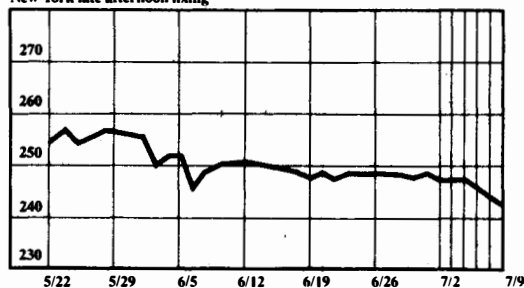
**The dollar in deutschemarks**

New York late afternoon fixing



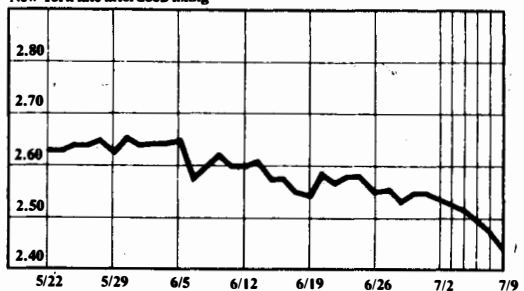
**The dollar in yen**

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

