

Science & Technology

Latest SDI report: the tests Shultz wants to stop at Geneva talks

by Paul Gallagher

Soviet-State Department rumors of a "Geneva deal" to limit the Strategic Defense Initiative solely to research, have emerged just as the SDI Office had announced a series of tests and technology demonstrations of ballistic missile defense for this summer, "to convince the Soviets to accept the concept," in the words of SDI Director Gen. James Abrahamson. If the tests are not stopped to appease the Soviets, over the next 90 days SDI will demonstrate laser tracking of missiles from the ground and from space, high-power laser focusing at long distance, warhead interceptions in the upper atmosphere, and other missile defense requirements.

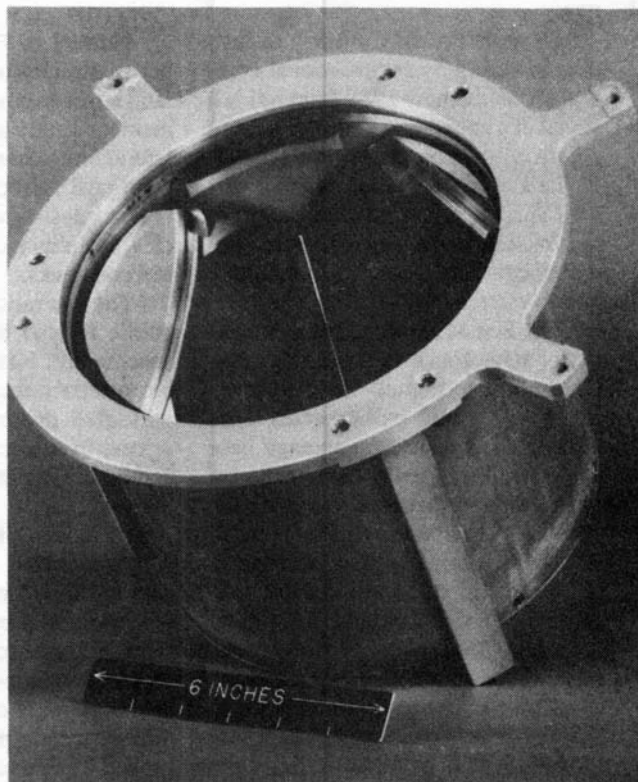
Since President Reagan decisively turned back Democratic presidential candidate Walter Mondale's attack on the SDI in the final days before the 1984 election, the Soviets and all their friends in Congress and elsewhere have demanded that the SDI be barred from any active testing and demonstration phase, and limited to endless research. Visible tests and demonstrations build massive citizen enthusiasm, industrial interest, and grudging acceptance from even the ivory towers of university scientists.

These imminent tests are outlined in "SDI: A Technical Status Report," submitted by Abrahamson's office to Secretary Weinberger at the end of June. The report was the basis for a classified briefing to a large group of industrial representatives and lab scientists on July 11, held by the Department and American Astronautical Society, ironically in the Dean Acheson auditorium of the State Department.

Photographs and drawings within the report illustrate the tests which will occur this summer and fall (if the appeasers do not stop them), and the rapid laboratory experimental progress of the SDI, which is making them possible.

- Following up the June, 1984 demonstration of interception of a warhead in space, this summer "fully guided tests of a small radar homing interceptor against nonballistic-missile targets" within the upper atmosphere, will demonstrate capabilities for the terminal phase of a layered ABM defense.

- From the Hawaii site that tracked the Shuttle with a spot of laser light, ground-based lasers will track Navy rockets rising much more rapidly, to much greater altitudes (400 miles) than the Shuttle. This will demonstrate both the tracking of the laser, and compensation for atmospheric disturb-



A retroreflector like that attached to the Space Shuttle for June's successful High-Precision Tracking Equipment, which received and reflected a ground based laser beam.

ance of the beam. The ground-based laser tests will then be repeated from aircraft. The required pointing accuracies have already been demonstrated at Hawaii for low power; these tests will be at "high average power."

- A large, flat mirror has been built, and is being tested, which is only one-tenth the density and weight of the mirror of NASA's space telescope, and "meets the requirements for space relay mirrors."

- A new test series is planned of firings of the large MIRACL chemical laser at White Sands, which has several Megawatts of power; its tests are already demonstrating "our ability to focus the laser beam onto a small spot at long range."

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.

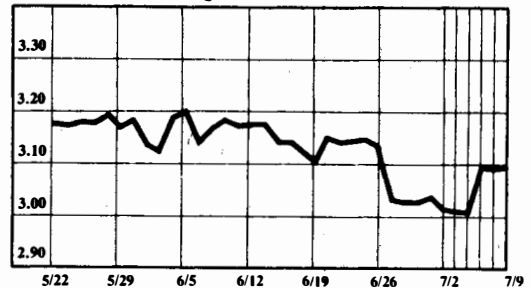
Such an accelerated approach would take a larger budget, but more importantly, defense mobilization credits, at long terms and low rates of interest, for firms and labs which wanted to demonstrate their capabilities for later development and production contracts.

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

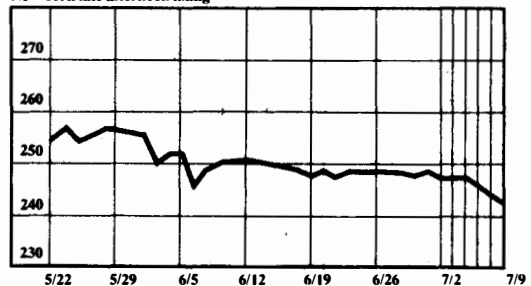
The dollar in deutschemarks

New York late afternoon fixing



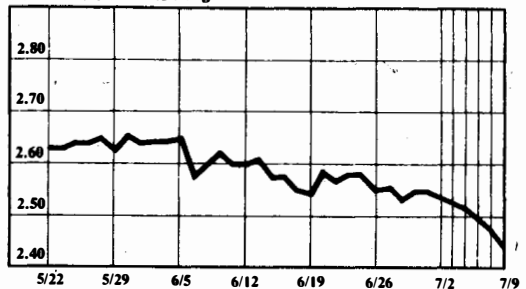
The dollar in yen

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

