That Reagan is enthusiastic about space defense is obvious. After all, it was he who called for the study last 23 March, when, pretty much on his own (with some prompting from an old science adviser, Edward Teller), inserted the idea in a tv speech as a daring departure from the generation-old strategy for deterring nuclear war by deploying nuclear weapons, a concept known as "mutual assured destruction" or, more simply, MAD. Reagan's proposal, which was quickly dubbed "Star Wars" by the news media and just as quickly ridiculed by the arms-control establishment, "was for us to see if there is not a defensive weapon that can stop this race in offensive weapons throughout the world that can render maybe a system of horrifying weapons obsolete," he later explained at his news conference.

Par with Apollo. According to Pentagon officials, Weinberger has recommended that the President should adopt the most expensive option in the Fletcher report. Under it, the bill for FY 1985 would be $2.6 billion—a long leap from the $700 million appropriated for ballistic-missile defense R&D in FY 1983. The cost of the proposed expenditures through FY 1989 would be roughly on a par with the Apollo program that produced six landings on the moon. Members of Congress from both parties, concerned about Defense spending and budget deficits, are likely to wage a fierce battle over any Star Wars program reaching for the moon. Moreover, critics of such programs, among them mainly physical scientists and defense strategists, argue that a "Maginot Line in the skies" is unworkable, unprotectable and unsettling (PHYSICS TODAY, August, page 17).

For its part, Fletcher's Defensive Technologies Study Team admits that it took "an optimistic view of newly emerging technologies and with this viewpoint concluded that a robust, multitiered ballistic-missile defense system can eventually be made to work." Organized last June under National Security Study Directive 6-83, the team examined work in progress on directed-energy weapons and deliberated with experts at the National Academy of Sciences. The report urges the rapid development of an advanced tracking and pointing system for a nuclear-bomb-driven x-ray laser, which is under study at Lawrence Livermore Laboratory as a possible defense against a massive salvo of some 1000 missiles. It also assigns high priority to large, deployable space optics, imaging radar for a 60-GHz acquisition and pointing system and a Saturn-5-class booster rocket capable of placing payloads of 280 000 lbs into space orbit.

The President's official science adviser, George A. Keyworth II, offered a technical case for Reagan's optimism in a speech to the Washington chapter of the Armed Forces Communications and Electronics Association on 13 October. Consider, he stated, "recent advances that compensate for atmospheric dispersion in laser beams, in conjunction with adaptive optics—mirrors that can be pointed electromechanically like phased-array radar—to permit operation of high-power space lasers on the ground. That could permit us easier operation of complex, expensive components." Along with this, progress has been made in ultrashort laser pulses that destroy "by impulse rather than through thermal effects of slower-acting continuous beams" and in traditional non-nuclear "terminal ballistic-missile defense technology that we believe may be extrapolated to the needs of a midcourse intercept system." Somewhat surprisingly, Keyworth ruled out any "critical role" for nuclear weapons in the new defense scheme. "First of all, I'm not sure that the uses proposed for nuclear weapons in space couldn't be performed with nonnuclear technology," he said. "More important, the American people are not likely to enthusiastically support the placement of nuclear weapons in space."

Keyworth's remarks, in effect, set the tone for the Reagan Administration's FY 1985 budget request to Congress. "It's important to give R&D a reasonable amount of time to explore some of the less well-developed technical options. . . . Our goal now is to keep building momentum for the program," Keyworth observed, "[and] to cast as broad a net as possible [for] good ideas, credible proposals and good people. My strong hope is that we'll attract creative organizations and bright young people into this defense initiative . . . the kind of talent that flocked to defense work in the '40s and '50s." —IG

Light source decoupled from NCAM

Not unexpectedly, a special panel appointed hurriedly last March by the Department of Energy to review the proposed National Center for Advanced Materials at Lawrence Berkeley Laboratory has found the concept flawed "by combining two weakly related and mutually interfering components in a single package—namely, materials R&D and the advanced light source." This conclusion strikes at the heart of the concept, which was included in the Reagan administration's FY 1984 budget to Congress as a "highest priority" item under the sponsorship of the President's science adviser, George A. Keyworth II (PHYSICS TODAY, June, page 17).

Soon after NCAM was announced, academic and industrial materials scientists bombarded members of Congress and editors of journals with angry blasts. They complained that the project lacked the customary peer review, challenged the effectiveness of a centralized research facility that could overwhelm individual investigators seeking competitive grants and criticized the relevance of the synchrotron light source, particularly if it were to be built at Berkeley. Anticipating questions about such concerns at a budget hearing before the House Science and Technology Committee last March, Alvin W. Trivelpiece, director of the Department of Energy's Office of Energy Research, announced he had named a peer group to review the technical and programmatic aspects of NCAM.

The panel, under the chairmanship of Albert Narath of Sandia National Laboratory, sent Trivelpiece a preliminary report on 10 June and a final report 31 August. In the June report, the Narath panel argued against including a 1.3-GeV soft x-ray synchrotron radiation source as the centerpiece of the new lab, though it recommended spending $9.3 million early in FY 1984 to construct a surface-science and catalysis facility. "As originally proposed, NCAM was to consist of three laboratories (Surface Science and Catalysis, Advanced Materials Synthesis and Advanced Device Concepts) along with the synchrotron light source—in all, an $84-million project over a 5-year period. The panel approved, as part of the NCAM initiative, a $13.4 million upgrade of the Stanford Synchrotron Radiation Laboratory and its planned x-ray source. Using the June report of the Narath panel as its guide, Congress sliced DOE's request for $25.9 million to only $3 million for NCAM construction in FY 1984. It left uncut the request for $9.1 million for operations and equipment (PHYSICS TODAY, August, page 45).

Establishing a materials center at Berkeley "offers exciting opportunities for significant advances in this technologically important field," says the August report, issued in mid-October. But the light source needs to be considered separately because its size and cost are likely to cause "an unacceptable program imbalance." In response to this finding, DOE has set up a new panel to look only at synchrotron radiation sources over the next ten years. This group, headed by Peter Eisenberger of Exxon and Michael Knotek of Sandia, had been requested to report back by November, in time to affect DOE's FY 1985 budget. Meanwhile, the Narath panel suggests renaming NCAM as the Berkeley Center for Advanced Materials to reflect its more modest operation. —IG□