

# News & Comment

## New Rockets? No Hurry, OTA Says

*Unless the United States wants to send people to Mars or deploy a space defense system, it can get by with incremental improvements in space transportation, according to a rocket buyer's guide*

A NOTE OF SOBRIETY has crept into discussions of the U.S. space program, and it has come from a surprising source—Capitol Hill. On paper, at least, Congress seems to recognize that the new austerity in government means there is no room for false starts. Decisions made in the next 2 years will set a course for space policy for the rest of the century.

The latest sign of realism can be found in a report from the Office of Technology Assessment (OTA), billed as a “buyer’s guide” to launchers, released on 27 July (“Launch Options for the Future: A Buyer’s Guide”). It was commissioned by the House subcommittee on space applications, chaired by Representative Bill Nelson (D-FL). The aim, Nelson said, is to help Congress find

thing. OTA was asked whether launchers in the pipeline will be adequate for the next two decades, or whether the government should develop radically new ones.

Right off the bat, OTA tosses the question back at Congress. It points out that ideas now being discussed, such as plans to deploy a space-based strategic defense or to send humans to Mars, would sharply increase transportation needs. These are over and above the 19 shuttle flights required for assembly of the space station, due to be in orbit by 1997. Thus, estimates of demand range from a low-growth requirement of 600,000 pounds launched to low earth orbit each year to 4 million pounds per year. “Such uncertainty,” OTA comments dryly, “makes rational choice among alternate

Three things became clear immediately, says study director Richard DalBello. First, the current fleet cannot begin to cope with the demands of a trip to Mars or a major military deployment. Perhaps with a rapid investment in new transportation systems, the United States could mount a Mars mission or a Strategic Defense Initiative—but not both.

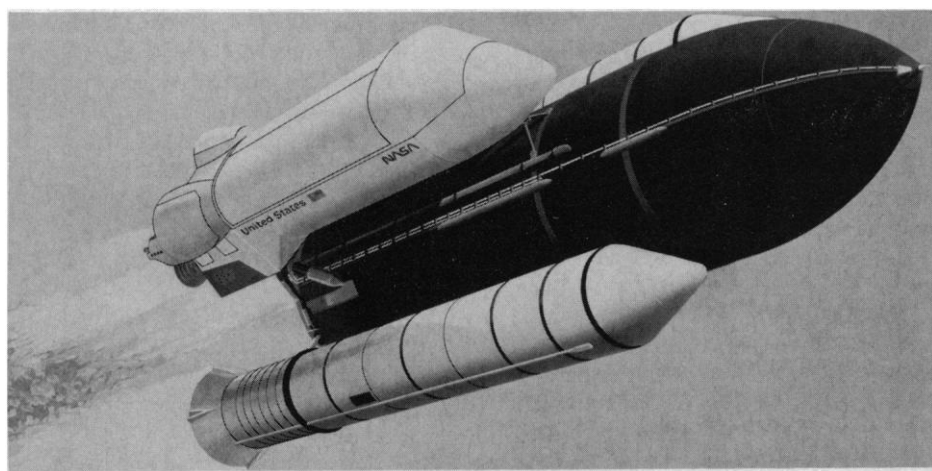
Second, if there is no rapid increase in the pace of launching (that is, no SDI or Mars trip), the economic issues are of minor importance. An entirely new rocket fleet would not be much cheaper than what exists now. This is because the development costs are about equal to the savings that would be gained in transportation. If the launch rate continues to grow slowly, as it has in the past, Congress will have to use other criteria, such as the value of innovation for its own sake, or the need for redundancy, to decide where to put its money.

Third, if it seems important to break with the past and increase the launch rate, it will be necessary to invest in new technology. OTA did not single out any as especially promising.

The most striking conclusion, therefore, is a conundrum. There will be no economic payoff from new delivery systems such as the Air Force’s “Advanced Launch System” unless the government at the same time decides to put the system to full use. And putting it to full use means buying a big package to be delivered, such as a Mars trip or SDI.

Even under the most favorable circumstances, the savings of a new system may be illusory, for the money “saved” in making each flight cheaper will be “lost” on buying an increased number of flights. It will also be lost on buying the payload, an issue OTA does not examine.

Another conclusion—a more reassuring one—is that the present fleet is fairly well suited for the agenda that NASA has laid out for itself. Even without major improvements, existing rockets should be able to lift 860,000 pounds into orbit per year, compared with 400,000 pounds on average between 1980 and 1985. This conforms to the study’s low-growth scenario. Beyond that, OTA finds that “by improving existing vehicles and ground facilities and buying more



**NASA's shuttle-C concept.** Remove the pilots and the shuttle might turn into the most efficient cargo vehicle in sight. It might be a good buy, OTA says, for space station work.

the “best buys” among a bewildering variety of transportation ideas put forward by the aerospace community.

After the shuttle disaster, it became clear that the old strategy of betting everything on one system, a policy handed down to the National Aeronautics and Space Administration (NASA) in 1982, was not wise. Both the Air Force and NASA dropped this approach and have cranked up their purchases of simpler rockets. Several types of “expendable launch vehicles,” or ELVs, are now being incorporated into a new strategy known as the “mixed fleet” plan. At the moment, the tendency is to bet on every-

paths extremely difficult.”

OTA forged ahead anyway, sketching out seven different fleet combinations for Congress, modeled on three rates of growth. The low-growth model (3% per year) assumes that by 2010 there will be 41 large-cargo launches a year, about double the rate established just before the shuttle disaster. (The highest rate ever achieved in the United States was 73 launches in 1966. The Soviets launch 94 rockets per year on average.) The growth model (5% per year) assumes 55 launches in 2010, and the high growth model (7% per year) assumes 91 launches.

launch vehicles, the United States could easily increase its launch capabilities to 1.4 million pounds . . . per year." This "enhanced" low-growth approach would more than double the 1985 capacity, and produce enough to "support a space program with slow growth for many years." It could be done by slightly increasing the capacity of some ELVs, improving the shuttle's booster rockets, testing and possibly developing liquid boosters, using a lighter shuttle fuel tank, making ground operations more efficient, building another Titan launch pad, and using more automated production and processing facilities.

The entire "life cycle" cost of this approach would be \$110 to \$120 billion between now and 2010. For about the same price, but with greater risk, according to OTA, Congress could invest in one of several "transition vehicles." Included in this category are an unpiloted cargo version of the shuttle called shuttle-C, a greatly improved Titan rocket, or an entirely new system based on an interim version of the Air Force's Advanced Launch System.

If Congress decides to go ahead with construction of the space station next year, it might be worth buying shuttle-C just for that purpose. Its capacity is twice that of the shuttle, and it could reduce station assembly flights by seven, cutting costs by \$1.7 billion. According to NASA, that savings would more than pay for shuttle-C. But, OTA notes, NASA may well have underestimated.

Other vehicles fall into the futuristic category, to be used only if Congress is certain there will be a large increase in the launch rate between now and 2010.

Although OTA does not say so, the burden of argument seems to rest on those who think it is possible to sharply increase the amount of cargo sent to orbit. An incisive report by the Congressional Budget Office in May points out that transportation and other "infrastructure" costs already swallow the lion's share of the civilian space budget ("The NASA Program in the 1990s and Beyond"). Playing out NASA's existing programs will require large expenditures through the end of the century. According to this estimate, NASA's total budget must grow from \$9 billion in 1988 to \$16.4 billion in 2000 (constant dollars) just to cover the commitments already made. NASA had a terrible struggle climbing the first step in this long staircase this year, moving its budget up from \$9 billion to \$10 billion. It seems unlikely therefore that there will be room for any radical new departure in space transportation, unless something already on the books is dropped.

■ ELIOT MARSHALL

# War Breaks Out Over Drug Research Agency

*The National Institute on Drug Abuse had found itself in the midst of a battle over its role in the war on drugs, thanks to critical remarks by a White House panel*



*This is the sixth in a series on addiction. Next: Drug treatment programs.*

TO MANY ANXIOUS PARENTS who want their kids to "just say no," the federal agency responsible for studying the causes and consequences of drug abuse must seem an irrelevant and obscure enterprise, more concerned with manipulating the scrambled brains of drug-addled lab rats than with keeping the nation's 12-year-olds from taking their first puff of marijuana.

This frustration flared into open hostility in a report released this summer by the White House Conference for a Drug Free America. The report calls for a thorough evaluation of the National Institute on Drug Abuse (NIDA), based on "widespread concern" that "NIDA has grown into an overly bureaucratic agency that has lost sight of its mission." The report suggests that the small federal agency has completely failed "to build toward any solutions to the drug crisis."

These are surely fighting words, and researchers funded by NIDA have not taken the drubbing lightly. For their part, they countercharge that the White House report is a partisan attack on science led by zealous parents who are upset with NIDA because the institute has refused to fund their pet projects and has refused to tell their kids that marijuana is an addictive poison.

Whatever its ultimate impact, the White House report illustrates nicely the tension that arises when political agendas and moral goals are intertwined with science. The report also exposes a lingering confusion over the true mission of a place like NIDA, a mission that is defined very differently depending on whom you ask and when you ask them.

For example, some believe that NIDA should remain the quiet, but deadly serious, little research shop it has become in recent years, content to elucidate the roles of various opiate receptors and to figure out why mind-altering drugs make people feel so

good. At present, this is how NIDA sees itself: responsible for supporting scientists who want to ask questions about the "causes and consequences" of drug abuse and to evaluate the current thinking on treatment and prevention programs. To do this, NIDA funds the work of 400 principal investigators (see box).

Others, usually Washington types, would like to see NIDA throw itself headlong into policy debates, as it did in the good old days under Presidents Nixon and Carter. Of course, some people would just like to see NIDA gutted.

There are 33 government agencies enlisted in the current war on drugs, yet the White House group chose to single out only NIDA for a public whipping. NIDA is "a fourth-level bureaucracy" with 300 employees and about \$200 million a year, or "barely enough to manage its current research portfolio," according to Karst Besteman, a former deputy director at NIDA now with the Alcohol and Drug Problems Association in Washington. Why pick on NIDA? Terry Russell, general counsel for the White House conference, maintains that the report "honestly reflects what we heard around the country." Roger Meyer, a psychiatrist at the



**Charles Schuster:** NIDA's critics do not understand the slow and cautious nature of science.