Science & Society

DOD revises its space policy

In recent years, the Department of Defense (DOD) has depended on NASA space shuttles as the primary vehicles for launching its payloads into space. In fact, only last August President Reagan said NASA's space shuttles should be dedicated at least in part "to payloads important to national security and foreign policy" (SN: 8/23/86, p.116). But no more. As of Feb. 4, Defense Secretary Caspar W. Weinberger adopted a revised policy on U.S. military use of space, which states that it is DOD policy to use unmanned launch vehicles for its missions whenever possible. Although the formal document describing this and other changes to DOD's space policy is classified, an unclassified summary was released last week.

According to Philip H. Kunsberg, assistant deputy undersecretary of defense for policy, DOD's revised launch strategy is chief among changes in its new space policy. Kunsberg, who declined to comment on how the Challenger disaster affected the new launch policy, said only that the agency will be seeking a more "varied approach" in its launch options. In particular, he says, there's interest in stimulating the growth of a commercial space-launch industry that DOD can use "when appropriate and necessary." At present, such a commercial launch capability does not exist (SN: 12/21&28/85, p.392). But citing the President's interest in developing one, Kunsberg reported last week that the Air Force is "formulating contractual provisions that would enable it to make available DOD launch facilities for commercial purposes." It is to be one of DOD's first steps toward launching a commercial alternative to NASA.

DOD's new policy also formally mentions for the first time the agency's interest in actively exploring roles for a "military man-in-space" program. From a cost-benefit standpoint, unmanned missions usually make more sense, Kunsberg says. However, he adds, because "the Soviets have exploited men in space extensively for military purposes," there is "a strong suspicion" that the U.S. military might also find potentially useful roles for manned missions. Kunsberg not only declined to speculate on what such roles might entail, but also said he was not at liberty to describe what military roles Soviet cosmonauts now play.

Faster approval for some drugs

Responding to the recommendations of a presidential task force on regulatory relief, the Food and Drug Administration (FDA) announced last week that it would propose a change in its rules for experimental drugs so that those showing promise could be made available to terminally ill patients.

Normally, experimental drugs can be used only to treat patients who are participating in FDA-approved clinical trials. But under the proposed change, any persons with "immediately life-threatening and other serious diseases for which no alternative therapies exist" would also be permitted treatment with these investigational drugs. Says FDA Commissioner Frank E. Young, the new policy would essentially formalize the ad hoc procedures recently used to speed the experimental drug AZT to AIDS patients (SN: 1/24/87, p.56).

Chemical warfare commission erred

According to a new General Accounting Office (GAO) study, the short-lived Chemical Warfare Review Commission, established two years ago to advise the administration (SN: 2/9/87, p.84), violated several requirements for such presidential panels. The most important include failure to account for its funds and failure to keep detailed records or minutes of meetings. As a result of the latter, GAO reports "we could not review the Commission's activities or trace the process that led [it] to [its] conclusions" to resume production of these weapons. On the basis of GAO's findings, Congress is trying to recover some consultant fees GAO believes were misspent.

Technology

Packing more memory into silicon

One measure of progress in microelectronics is the number of bits of data that can be stored in a single computer memory chip. Only seven years ago, that number was 64,000 bits. This year, manufacturers are just starting to produce commercial quantities of "dynamic random-access memory" chips that can each hold a million pieces of data (SN: 3/2/85, p.135). But researchers already have the next target in sight. At last month's International Solid State Circuits Conference in New York City, Japan's Nippon Telegraph & Telephone Corp. (NTT) grabbed the spotlight with a prototype design for a 16-megabit memory chip. Such a chip would have room for the equivalent of about 64 pages of newspaper text.

NTT's experimental memory chip crams about 40 million circuit elements into a space about half the size of a postage stamp. Its features are so small that it would take more than a hundred of the chip's 0.7-micron circuit lines to match the width of a human hair. To save space, some of the circuit elements lie in microscopic trenches etched in the silicon and others are stacked one on top of the other. Retrieving a bit of data from one of the chip's storage cells takes about 80 billionths of a second.

Meanwhile, engineers at the IBM Corp. in Essex Junction, Vt., have developed a high-speed 4-megabit chip (see photo) with circuit lines as narrow as those on the NTT chip. Although it has only a quarter of the NTT chip's storage capacity, the IBM memory can be fabricated on the same production line now being used to manufacture IBM's 1-megabit chips. This demonstrates, say IBM researchers, that their chip will likely be relatively easy to manufacture on a large scale.

Each storage cell in a dynamic random-access memory chip consists of one capacitor and one transistor. Data are stored as the presence or absence of electric charge on a capacitor's surface. In the IBM design, each capacitor is created by etching a deep, narrow hole into the silicon, coating the hole's side walls with an insulator and then filling the hole with an electrically conducting material. A bit stored in one cell can be retrieved in only 65 nanoseconds. Like the NTT chip, the IBM operates on a single 3.3-volt power supply instead of the 5-volt supply required by earlier memory chips.

IBM

Getting the bugs out of packaging

With its hard plastic case from which an array of metal legs protrude, the typical integrated circuit chip looks a lot like an armored insect. Such chips plug into boards carrying printed wires that connect the various chips needed for a computer or some other electronic device. The trouble with this arrangement is that the packaging method, though convenient, limits the number of leads that can be fitted to a package and the potential speed of electronic circuits. "System performance," says Hyman Levinstein of AT&T Bell Laboratories in Murray Hill, N.J., "now depends as much on the connections between the chips as it does on the design of the chips themselves."

To overcome this problem, Bell Labs researchers have developed a packaging technique in which integrated circuits are mounted directly on silicon wafers. Chips are no longer packaged individually, and each silicon wafer, with a wiring pattern laid down on its surface, replaces a conventional circuit board. This allows more "wires" to be squeezed into a smaller space. Furthermore, leads don't have to be only at the edges of a chip. As a result, devices can have 200 or more input and output leads. In addition, chips made in different ways from different materials can be positioned on the same wafer.