

strive to avoid "distorting" market forces "through indiscriminate subsidies for alternatives that cost more than imported oil now and offer no short-term to mid-term likelihood of being economically competitive."

The Reagan plan seems coy about discussing specifics, though actions by the new administration offer strong clues as to how this philosophy is being interpreted. Reagan proposals would cut direct federal support for solar technologies, alcohol fuels, biomass and urban-waste systems \$2.2 billion over the next five years. The plan says steadily increasing oil prices, precipitated by the complete decontrol of oil and oil-product prices on January 28, can be counted on to encourage private investors to finish developing the more viable of these technologies. The same goes for five major synthetic-fuels development projects—including the SRC-I and SRC-II plants.

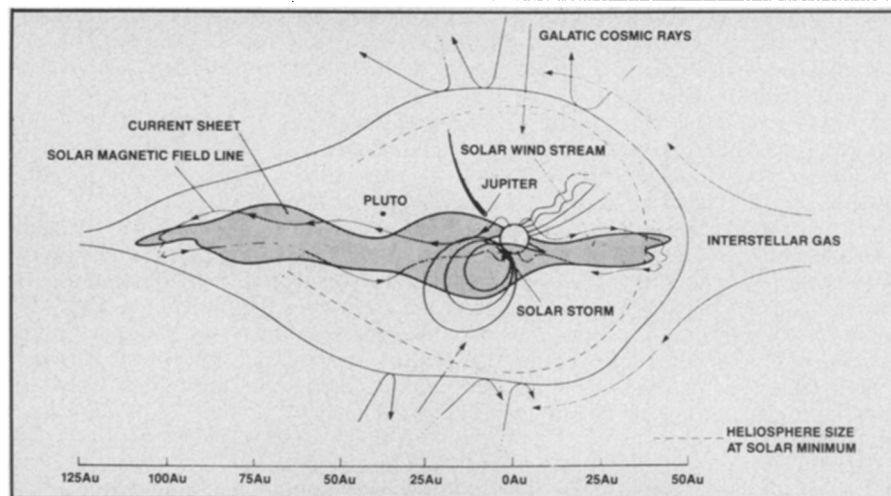
Energy conservation programs will also see retrenchments. Over the six-year period ending in 1979, household energy consumption fell 14 percent, commercial energy consumption (per square foot) dropped 18 percent, and industrial efficiency (measured in output per unit of energy consumed) rose 12 percent. As a result, there is little need for the government to continue most energy-conservation demonstration programs, the administration says. Private investors have been given sufficient incentives to step in and take over. At least, that's the justification given for withdrawing federal support for programs such as those to develop high-efficiency consumer products, advanced automotive engines, efficient industrial processes and electric and hybrid vehicles.

Regulatory reform is one of Reagan's highest priorities. This administration has already revoked regulations involved with oil pricing. The energy-policy statement adds that another 75 of the remaining 150 individual rulemaking activities pertaining to energy have been targeted for modification, rescission or withdrawal. Details are to be spelled out later.

Finally, "efforts to step up domestic energy production are too important," the plan says, "to be frustrated by inadequate access to the mineral wealth of our own land." Therefore, leasing policies will be changed to "guarantee" that energy resources on federal lands — an estimated 60 percent of all U.S. energy resources — will be explored and produced at a pace consistent with national needs, environmental concerns and the public interest. Environmental and economic impacts of these changes could prove substantial. For example, those announced last month increase the pace and acreage of lease offerings for oil and gas drilling on the outer continental shelf. They also permit all tracts in a given region to be covered, for the first time, by a single environmental-impact assessment. □

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## Pioneer 10: Where no probe has gone before



Heliosphere at solar maximum, inferred from Pioneer 10 and other spacecraft data.

Nothing else made on earth has come even close to traveling as far from home as a little probe named Pioneer 10. Launched on March 2, 1972, it took the first close-up look at Jupiter 21 months later, and has since been on its way out of the solar system. Last Sunday, July 26, the craft passed its "silver AU" — a point 25 Astronomical Units or 3.75 billion kilometers from the sun, 25 times as far away as earth.

Three other spacecraft are also outward bound, but all are still relatively close to their home star. Pioneer 11 was launched barely a year after its predecessor, but after passing Jupiter it headed back across the solar system to an encounter with Saturn, so that it is only 10.5 AU from the sun. The more recent Voyager 1 and 2 probes are at 10.2 and 9.4 AU respectively.

Pioneer 10 thus finds itself in the least-explored reaches of space, where virtually everything it measures is a new discovery. The solar wind, for example, was expected by some researchers to slow down far from the sun, yet it apparently does not. Also, the lines of the interplanetary magnetic field, rather than lying in smooth spirals, turn out to be tied in knots, possibly by variations in the charged particles pouring forth from the sun. Still a mystery is the location of the heliopause, the boundary between the sun's gigantic magnetosphere and the interstellar wind — a vastly enlarged version of the interaction between the solar wind and the magnetic field of Jupiter. Some researchers now guesstimate it to lie perhaps 50 to 100 AU out, but clues are essentially nonexistent. One such would be a major increase in the number of charged particles, such as one might find just inside the sun's magnetic "bow shock," but any signs of such a possible long-distance build-up are now masked by the present high level of solar activity.

For the four outward-bound spacecraft, the great exodus from the solar system (as defined by the orbit of the outermost

known planet) will occur in a two-year rush at the end of the decade. The Voyagers, traveling faster, will have caught up, opening the way when Voyager 1 crosses Neptune's orbit (part of which is outside of Pluto's elliptical path) in November of 1988. For the rest, Pluto's orbit is the "edge": Pioneer 10 in June of 1989, Voyager 2 in September 1990 and Pioneer 11 the following month. By that time the data bank on *outer* outer space will have grown considerably, though the heliopause may be an elusive goal. The thermonuclear batteries powering the Pioneer transmitters may become too weak a year or two later, but even the more powerful signals from the Voyagers may depend on continual improvements in NASA's deep-space tracking network if they are to relay the word from the real magnetospheric boundary between the sun's domain and interstellar space. □

## Mexican panda pup: Second time around

More calm than last year, Ying-ying, the 7-year-old female panda at the Chapultepec Zoo in Mexico City, gave birth to her second pup and the second panda ever born outside of China. The gestation period was 126 days and labor took half an hour. A year ago the anxious new mother accidentally crushed her first-born when it was 8 days old. Now zoo officials are taking care that mother and pup are not disturbed; the animals are being viewed only over closed circuit television. The zoo reports that Ying-ying holds the pup to her chest and feeds it when it cries. Ying-ying weighs 275 pounds and the officials estimate the newborn is 9 inches long and weighs 3.2 ounces. The pup appears smaller than last year's short-lived female, so zoo officials guess it is male but will not be certain for six months. □

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