

there are no further plans for manned spaceflight until the first tests of the space shuttle, at present little more than a gleam in the eye. The optimists say that could be in 1976 or 1977. For the planetary scientists in the West, the cancellations have come just when appetites have been stimulated by the first two collections of samples. According to Dr Findlay "all scientists would regard the chief loss is the danger, the probability in fact, that we will not get our first order scientific answers about the Moon from the Apollo programme".

It is implicit in this that the elimination of Apollos 15 and 19 will give NASA more elbow room when the Skylab programme is under way in November 1972. It seems a poor swap, however—people are hard-pressed to give a scientific justification for the Skylab programme that will compare with the value of a visit to a lunar rille, for example. NASA's decision hurts because it has brought home to people that science has never been high on the agenda for manned space flight. Following the ructions during Apollo 11 when the lunar scientists complained of being too far from the action, science has had a hey-day in the Apollo programme. The traverses that the Apollo 13 astronauts would have followed were carefully thought out, and people have had a merry time thinking up experiments that could be carried on later flights. Now after little more than a year the real state of play has been brought home. "There is almost nothing in manned space flight I would justify on the basis of science. Science is an adjunct to manned flight", the acting administrator of NASA, George Low, is reported as saying. To be fair, however, NASA's continual searching for new fields to conquer which appears to be behind the Skylab project and the shuttle is as much as anything to appease a Congress that is unenamoured of space activities.

DEFENCE

Arms Race Soldiers On

by our Washington Correspondent

AMERICAN spy satellites orbiting over the Soviet Union have spotted 18 new sites at which construction of SS-9 missile silos has begun. Since the giant missile is usually deployed in groups of six, this raises from 220 to more than 300 the number of SS-9s being deployed by the Soviet Union, Dr John S. Foster, director of Defense Research and Engineering, announced last week. The new silos, first detected in July, represent a renewal of the Soviet SS-9 programme which, whether coincidentally or otherwise, has been kept on ice since the Strategic Arms Limitation Talks (SALT) began in November last year.

The SS-9 missile is a large launching vehicle carrying either a single warhead of 25 megatons or three warheads each of five megatons. Its deployment is alarming to the United States since it is regarded as capable of destroying Minuteman missiles in their hardened silos and as such is a first strike weapon. (The smaller but more accurate multiple warheads which the United States will begin deploying in its Minuteman III missiles are, like the SS-9, silo-busting weapons). Dr Foster's announcement about the Soviet resumption of the SS-9 programme was made, as it happened, a day before representatives of the Senate and the House of Representatives met to discuss the two chambers'

different versions of the defence procurement authorization bill which includes the funding for the anti-ballistic missile (ABM) or Safeguard System. Despite Dr Foster's announcement the Senate's position on Safeguard, which allows work on ABM systems to begin at only two more sites in addition to the present two, prevailed over the House's version which would have allowed the Administration's request to expand the ABM system to six more sites, making eight in all. This proposal would have provided a blanket defence of the United States against a "light" missile attack, such as the Chinese may soon be in a position to mount. In the Senate the Chinese defence aspects of Safeguard were killed off at the committee stage before the bill had reached the floor of the House.

In the Senate debate (see *Nature*, 227, 770; 1970) the spokesmen for the Administration made much of the argument that expansion of the Safeguard system to two additional sites would serve as a bargaining counter in the SALT talks. The Soviet redeployment of the SS-9 is also seen as an attempt to gain more leverage at the SALT talks. Last week Ambassador Gerard Smith, the chief US negotiator, was briefing the House subcommittee on national security policy on the progress of the SALT talks and the prospects of trading away the respective bargaining counters. Meanwhile, the Air Force is requesting approval for a \$1,000 million programme to harden its 1,054 Minuteman sites, presumably as an insurance policy against the ABM system either not working or being traded off.

ENVIRONMENT

Senate wins Clean Car Race

by our Washington Correspondent

AMERICANS may be able to breathe again if a bill passed by a 73 to nil vote in the Senate last week becomes law. In a list of measures far more stringent than those called for by President Nixon, the Senate has set out to bring the major sources of air pollution under control by 1975. The most controversial demand is that, beginning in 1975, all new cars must meet the exhaust emission standards which the Administration had proposed should be met only by 1980.

The Senate bill also requires certain industries to install in all new factories and extensions to old ones the most advanced technology available for reducing air pollutants. An important general measure is the provision for national air quality standards setting levels protective of health for the major known air pollutants. These are particulates, sulphur dioxides, hydrocarbons, carbon monoxide, photochemical oxidants and nitrogen oxides, which together account for more than 98 per cent by weight of all air pollution.

Passage of the bill is a triumph for Senator Edmund S. Muskie, chairman of the subcommittee on air and water pollution, but the extent of his final victory will depend on what compromise is reached with the House of Representatives which earlier this year passed as mild a bill as President Nixon had asked for. The present legislation is the third attempt to make air polluters desist since the Clean Air Act of 1963, but it departs from the philosophy of its predecessors by setting standards and letting industry develop the technology to meet them. The previous attitude has