

## US space programme

**NASA plans a space station. . .***Washington*

THE National Aeronautics and Space Administration (NASA) is urging the United States to take its next historic step in space — the construction of a permanent manned space station that could become the centre of a space-based manufacturing industry as well as the jumping-off point for manned trips to the Moon and Mars.

Under the guise of a "modest" planning exercise, NASA has lobbied assiduously to make the space station the centrepiece of its activities to the end of the century and beyond. The agency has told the White House that a space station is the logical sequel to the shuttle and offers the best prospects for maintaining American leadership in space. It seems likely that President Reagan will agree.

Space stations have come and gone from NASA drawing boards for more than two decades. In the 1960s, plans for a space station were pushed aside by the Apollo Moon programme and in 1970 lack of political support forced NASA to drop the concept of a space station in favour of the shuttle. The agency's administrator, James Beggs, now wants an all-out effort to launch the first elements of a space station by 1991, which he estimates could cost less than £9,000 million.

Until recently, much of NASA's planning effort has been devoted to finding potential users for the space station, but in recent months agency officials have become less coy about the technical details. What has emerged is not a single large space facility but a network of manned and unmanned platforms, laboratories and satellites linked by a new generation of orbital transfer vehicles.

The vanguard of the space station in 1991 would consist of a main base at an orbital inclination of 28.5°. With a crew of six to eight, the base would include two or three pressurized modules for research and development, with a volume of about 120 cubic metres. A separate unmanned platform would be placed in polar orbit. By the end of the century, the space station would be expanded to provide space for a crew of 12 to 18 and the polar station might be turned into a manned facility.

These plans are so tentative, however, that NASA only recently lifted a self-denying ordinance banning the publication of drawings of the proposed station. A NASA official told Congress last week that at the end of meetings with foreign countries interested in the space station, all doodles had been carefully destroyed.

The ostensible reason for NASA's reluctance to define its plans is that it wants to be sure that it has the best possible design before it is committed to specific pieces of hardware. Another reason, not publicly stated, is that the agency expects to find it easier to win political friends for the space

station while the station's capabilities and uses are still somewhat vague.

The Department of Defense (DOD), for example, has so far refused to enthuse about the military uses of a space station. Richard DeLauer, Under Secretary for Defense for Research and Engineering, told a recent NASA symposium that the Pentagon had been unable to identify a single military function that could be done better by a space station than by an unmanned spacecraft. DOD is nevertheless deeply involved in hypothetical discussions about the station's design, enabling NASA to argue that a space station could make great contributions to national security.

According to Beggs, the space station could ultimately evolve into a command post or operations centre for DOD, as well as a storage facility and a base from which military satellites could be serviced. Later, Beggs adds, there would "probably" be two stations, one in polar orbit primarily for DOD use and one in equatorial orbit (the 28.5° main base) primarily for NASA.

NASA is using a similar manoeuvre to overcome the scepticism of the US space science community. The National Academy of Science's space science board has been drawn into the space station planning process and asked to consider how space scientists could exploit a space station if one were to be built. The board has not, however, been asked (by NASA) whether it believes there is a scientific justification for investing in a space station in the first place. If it were to be asked, the answer would almost certainly be no. Although it has so far observed a prudent

public silence, the board has been working on a policy statement spelling out its belief that money for space science could be better spent. The draft statement complains that current budget levels support only a small fraction of existing mission possibilities for space science and that "few" disciplines in the life sciences and none in the physical sciences need a manned space station at present. In the long run, the statement concludes, a space station could provide a "significant opportunity" for some disciplines, but space science is still just beginning to learn how to use the capabilities of the shuttle.

The National Academy of Science's space applications board has been less hostile, but also fears that by committing itself to an enormous engineering project like the space station, NASA will be forced to divert money from applications to pay for the inevitable cost overruns in development.

Despite the scepticism of some groups, Beggs believes that the White House will give the project its blessing within the next 6 to 12 months. The senior interagency group responsible for space policy is expected to receive a recommendation from its space station working group by November. Chaired by NASA, the space station group is likely to argue that without a single big engineering project like the station, NASA will be unable to maintain its preeminence in space. The Soviet Union, NASA has been pointing out, has already developed an entirely automated resupply unit for its Soyuz 7 vehicle, and recently attached a propulsion unit that will be able to move the craft into new orbits.

It will not be entirely plain sailing, however. The president's science adviser, George Keyworth, has maintained a

**. . . Soviet union almost there?**

In pressing for a space station, the US space agency is following the path taken by the Soviet Union. The Soviet space programme has long been committed to the idea of establishing a permanently staffed orbital station, and in 1976, a leading space-planner, Academician Georgii Petrov, talked about a staff of 100 people, with some twenty or thirty cosmonauts on board at any one time.

The new Soviet space "tug" launched on 27 June as *Cosmos-1443*, and now operating as part of a manned orbital complex with *Salyut-7* and *Soyuz-T*, marked an important step in the Soviet programme.

The new craft, with a length of 13 m, maximum diameter more than 4 m and mass (including return module) of 20 tonnes, is the largest cargo spacecraft ever launched to rendezvous with a *Salyut* station. It has more than 2.5 times the cargo space of its forerunner, *Progress*, and, unlike *Progress*, has its own power source — a solar cell of area 40 m<sup>2</sup>. The return module allows up to 500 kg of

"useful cargo" — photographic film, semiconductor materials produced in space, equipment for reuse in ground-level control experiments — to be sent back.

The early recovery of film will be of particular importance to the Earth resources survey, which, a *Pravda* article stressed last week, makes a major contribution to the "practical character" of the manned orbital programme. Any suggestion that it could also be useful for military reconnaissance would, of course, be hotly denied by the Soviets who consistently contrast the "peaceful" aims of their space programme with the "military" aspects of the US space shuttle.

Not everyone abroad, however, accepts the Soviet assurances. The *Cosmos-1267* craft, used to supply and enlarge the *Salyut-6* station, and subsequently used to effect a re-entry burn when the complex had finished its useful life, was believed by a number of US analysts to have been armed with anti-satellite homing devices.

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