

# Bush calls for missions to the Moon and Mars

■ Congress says budget not available

■ Space station a stepping stone to planets

## Washington

COMMEMORATING the twentieth anniversary of the day when the Apollo 11 astronauts made the first ever landing on the Moon, US President George Bush proposed in Washington last week to "commit ourselves anew to a sustained programme of manned exploration of the Solar System and ... the permanent settlement of space". He instructed the National Space Council, headed by Vice-President Dan Quayle, to determine "money, manpower and materials, the feasibility of international cooperation" and "report back to me as soon as possible with concrete recommendations to chart a new and continuing course to the Moon and Mars and beyond".

But these words, delivered on the steps of the Smithsonian Institution's National Air and Space Museum to a large gathering of astronauts, were no sooner out of the president's mouth than he was attacked by congressmen for failing to explain where the money for a massive manned space programme could come from. "There is no such thing as a free lunch", said House of Representatives majority leader Richard A. Gephardt (Democrat, Missouri), "We got more words, I don't hear any 'how to do it', that's what we really need". Even as the president spoke, the National Aeronautics and Space Administration (NASA) was fighting to keep Congress from cutting \$700 million from the 1990 budget for the manned space station Freedom, in a House of Representatives debate that eventually appropriated \$12,300 million for NASA, \$1,000 million less than the White House had asked for.

A major announcement from the president was widely expected, given the symbolic significance of the twentieth anniversary of the lunar landing and the weeks of rumour that the vice-president had developed plans for a major commitment to a mission to the Moon without consulting senior administration budget officials.

At the anniversary celebration, the astronauts who spoke before the president clearly hoped that he was about to echo President John F. Kennedy's 1961 speech that began the race to the Moon.

"Perhaps we are at the starting line [for a planetary initiative]", said astronaut Edwin "Buzz" Aldrin, one of the three Apollo 11 crew. But the president avoided going as far as Kennedy had, while giving manned space exploration the strongest

support that NASA had heard in years.

NASA's Office of Exploration is already charged with assessing the technology needs for Moon and Mars missions. The president's announcement is likely to hasten its requests for funds and to direct it to a three-stage approach; with, as the president said, the space station Freedom for the coming decade, permanent occupation of the Moon in the next century, followed by a manned mission to Mars. Other plans under consideration, including a direct flight to Mars from a more distant space station, appear to have been rejected in favour of gaining experience at a lunar base before an attempt at Mars.

To fulfil these goals stretching into the next century, NASA would have to begin by developing a new class of heavy-lift boosters capable of delivering 300,000-lb payloads to the space station. These boosters would carry the materials necessary for in-orbit assembly of the spacecraft that would shuttle back and forth between the Moon and the space station. A Moon base might consist of no more than a small science laboratory; or it might be developed into a full-scale industrial base if lunar soil can be processed to extract oxygen to power spacecraft. If that proves possible, then a lunar base makes sense as a stepping-stone to the planets. Otherwise, it would almost certainly be cheaper to go direct to Mars from a space station in high Earth orbit.

No-one has a definite price for manned exploration of the planets, but a figure of \$100 thousand million to reach the Moon and \$400 thousand million for the Moon and Mars have been given by NASA

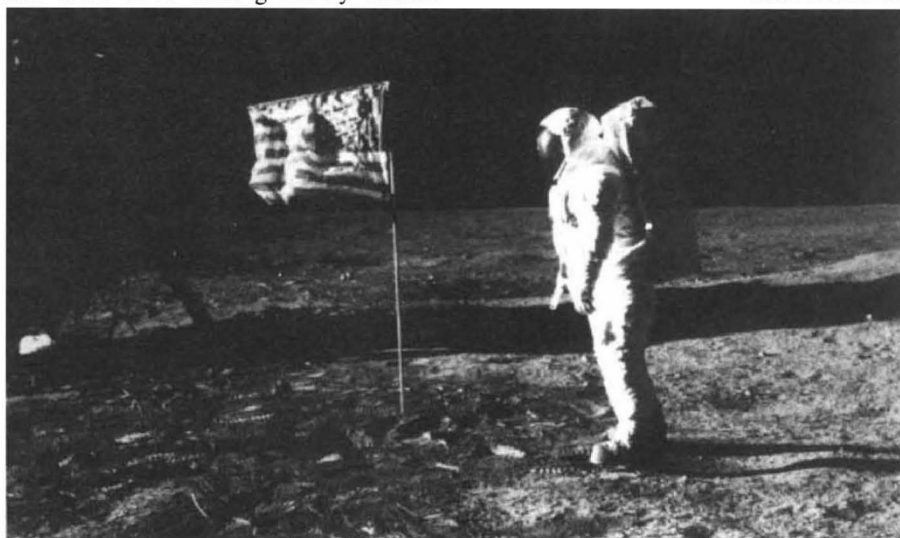
researchers. Over a 30-year period, accommodating these extra programmes would require NASA's present \$11 thousand million a year budget to be increased two- to threefold. But even at \$30 thousand million a year, NASA's budget would be a little less, as a percentage of the total federal budget, than at the height of the Apollo project.

But as Gephardt pointed out, times have changed since the days of the Apollo programme; the rapid growth of the 1960s has gone and the problems of the trade deficit and foreign competition mean that the "\$25-\$50 thousand million a year" needed for a full manned programme could not be found in a constrained budget.

Despite the president's rhetoric — "the only footprints on the Moon are American footprints" and "it is America's destiny to lead" — Congress has worldly matters to consider. At a hearing of the Senate subcommittee on science, technology and space earlier the same week, Senator Al Gore (Democrat, Tennessee), the chairman, pointed out that in the race for space of the 1990s the goal is no longer military superiority or technological prowess but "market share, new products, new industries" in an increasingly crowded market place for space services. Gore asked for a "viable budget" before "another spectacular".

Even the role of the space station, the first step in any manned return to space, seems still unclear. Bush said the "space station will also serve as a stepping-stone to the most important planet in the Solar System, planet Earth..." and went on to back the use of space to monitor the Earth's environment. But the \$30 thousand million space station, already delayed by budget uncertainties, is designed primarily as a laboratory for microgravity research. Its low, equatorial orbit makes it unsuitable for most Earth observation and its initial configuration is not designed for the factory assembly of Moon-bound rockets.

**Alun Anderson**



Edwin "Buzz" Aldrin on the Moon, 20 July 1969.