

Weapons in space

High frontiers*Washington*

America should exploit its lead in technology over the Soviet Union to pursue an aggressive space-based military and industrial strategy that would provide a "technological end-run" around the Soviet military threat, according to a report published last week by the Heritage Foundation, a conservative Washington think-tank.

Describing a scheme for integrating various space-based technologies, from orbiting battleships capable of shooting down Soviet nuclear missiles to vast solar-power satellites, the report suggests that exploiting what it calls the "high frontier" of space could solve many of the nation's industrial and energy problems while providing effective military defence.

Both the political and the technical communities in Washington are sceptical of the proposal. Many question its technical feasibility; others claim that the projected cost of \$50,000 million over 10 years is unrealistically low.

However, the Heritage Foundation hopes that its proposals will capture the imagination of those in Congress and the Administration prepared to back an ambitious, space-based military strategy, and it suggests that in the long term it could prove much cheaper than developing nuclear weapons.

The general approach has some influential support. Last week, for example, Dr Richard DeLauer, Under-Secretary of Defense for Research and Engineering, told members of Congress that he believed the Soviet Union could be deploying laser weapons in space as early as 1983, and might have elaborate space battle-stations by the 1990s.

Such speculation was dismissed as "non-sense" by several members of the Defense Science Board, who claimed that an operational Soviet space-based laser was at least ten years away. However, Defense Secretary Casper Weinberger last Thursday quoted Dr DeLauer in support of the Administration's request for sharply increased defence expenditures to offset the Soviet lead in areas such as laser weaponry. (President Reagan is asking for \$433 million for research into laser weapons for the fiscal year 1983, compared with about \$340 million this year, and only \$165 million two years ago).

The Heritage report suggests a three-layered defence against a Soviet missile attack. The first would consist of 432 satellites orbiting the Earth, each carrying conventional heat-seeking rockets, and capable of detecting and destroying a Soviet missile soon after launch. This would be backed up by satellites with more advanced weaponry capable of intercepting re-entry vehicles in mid-course. Finally US missile silos would be protected

by non-nuclear projectiles capable of blowing up incoming warheads.

Heritage officials claim this scheme would both defend the United States against Soviet missiles with a 95 per cent chance of success, and could protect Western Europe against intermediate-range missiles. Their report encourages the development of space-based industrial processing and of the solar power satellite, enthusiastically endorsed by many leading aerospace companies but reported on sceptically last year by both the National Academy of Sciences and Congress's Office of Technology Assessment.

Assessment of the technical feasibility of the proposed programme varies widely. There is general support for some of the less radical technology that would be involved, such as the missiles used for silo protection, but greater doubt about the advanced systems needed to detect and destroy Soviet missiles.

Other uncertainties surround management, cost and political acceptability. On the first, the foundation suggests a dedicated national effort comparable with the Manhattan Project which, it claims, could have an operational system in place within five or six years. On cost, it estimates a total of \$50,000 million, of which \$35 million would be redirected from other areas of the defence and intelligence budgets, and the remainder from the National Aeronautics and Space Administration. General Daniel Graham, who was military adviser to Mr Reagan during the 1980 election campaign and is a former director of the Defense Intelligence Agency, headed the nine-member panel which put together the report. He admitted that this figure might be unrealistically low, but added that "even if we are 100 per cent under, we are offering a strategic bargain".

The whole proposal, however, raises arms control problems that may mean indefinite delay. For example, it would fuel Soviet criticism that the space shuttle is essentially a military programme. The satellites might also be accused of violating the UN Space Treaty, signed by both the United States and the Soviet Union in 1967, which prohibits the stationing of weapons of mass destruction in space.

Finally any hint of a shift in military and strategic planning away from the MAD doctrine would resurrect the heated technical debates of the late 1960s over the adequacy of defence measures, at that time over anti-ballistic missiles. Critics such as Dr Kosta Tsipis of the Massachusetts Institute of Technology and Dr Richard Garwin of IBM have been quick to point out that any space-based weapons system based on sophisticated communications is highly vulnerable to enemy attack.

General Graham said that a copy of the report had been passed to the Office of Science and Technology Policy, which is preparing a report on the future of the American space effort, and whose director, Dr Jay Keyworth, has been keen

to explore ways of exploiting the capability of the space shuttle. Dr Keyworth, however, is not expected to show much sympathy for the more radical technical proposals being suggested by the Heritage Foundation. He has already resisted congressional pressure to build and operate high-energy laser battle-stations for space defence against ballistic missiles. Orbiting battleships are unlikely to gain more approval — although they may get on to the list of advanced military technologies which is expected to appear on the Agenda of the new Science Council. **David Dickson**

Bangladesh conference**Fertile minds***Dacca*

Agricultural and rural development were dominant themes at the conference of the Bangladesh Association for the Advancement of Science held in February at Joydebpur, twenty miles north of Dacca. The conference was opened by Justice Abdus Sattar, President of Bangladesh, who urged scientists to bend their energies towards self-sufficiency in food, population control and the development and exploitation of indigenous resources.

Professor A. K. Aminul Huq, this year's president of the association, pleaded in his address for the planned development of manpower to meet the needs of the domestic agricultural industry and of those "man-power importing countries" in which people from Bangladesh find jobs. He said more use should be made of agricultural wastes as a source of energy and pleaded for more government support for science and technology, given the enormity of the problems with which these professions can assist.

More immediate assistance with agricultural development is likely to flow from an agreement now reached between the government and the Saudi Fund for Development. The fund will provide US\$80 million — part grant, part low interest loan — towards the cost of the Chittagong fertilizer factory, which should be completed in 1985.

This project will cost \$467 million, and the plant will have a daily output of 1,000 tons of ammonia fertilizer and 1,700 tons of urea fertilizer. It has been financed by the Asian Development Bank, the Overseas Economic Corporation of Japan, the Abu Dhabi Fund for Arab Economic Development, the Canadian International Development Agency and the Islamic Development Bank.

When signing the most recent loan agreement, the managing director of the Saudi Fund for Development, Mr Mohammed Abdullah Al-Sugair, said that he would be recommending that the fund should be more sympathetic to the needs of Bangladesh. The fund is supporting six projects at a total cost of 727 million Saudi rials (£116 million). **M. Kabir**