

Reagan assailed by laser weapon lobbies

Hawks say go: doves argue caution

Washington

An early confrontation seems to be brewing between the Administration of incoming president Mr Ronald Reagan and members of the scientific community concerned with international arms control over plans to develop laser weapons for use in space.

Key congressional Republicans are said to have been told by members of Mr Reagan's transition team for the Defense Department that he wants to increase research and development on the use of lasers to destroy incoming ballistic missiles. One report claims that an early launch of the National Aeronautics and Space Administration's space shuttle will test an aiming device for a space-based laser, a project code-named Talon Gold.

But these rumoured plans are coming under strong attack from scientists who claim that laser weapons systems would not only be extremely costly and of dubious technical value, but that an accelerated research programme could upset the chances of negotiating an agreement over how such weapons should be controlled.

Speaking at last week's meeting of the American Association for the Advancement of Science (AAAS) in Toronto, for example, Dr Richard Garwin, chief scientist at IBM's Thomas Watson Research Center, claimed that excessive emphasis on directed-energy space weapons diverts funds and talent from more serious and more effective threats.

Mr Reagan's quoted views are compatible with a report from the science and technology subcommittee of the Senate Commerce Committee, which says that if rumours of an impending commitment by the Soviet Union to develop laser weapons are to be taken seriously, then there should be a significant increase in support for the Defense Department's research programme in the area.

The Senate committee admits that there is an "unsettling" diversity of opinion within the US scientific community about the technical and economic feasibility of high-energy lasers in a wide variety of potential applications, including defence, but it points out that the present Department of Defense budget allocations for high-energy laser research are not sufficient to achieve operational weapons as early as would otherwise seem possible. An increase in funds and commitment by the department would, it says, "significantly accelerate the achievement

of directed energy weapons systems", a view apparently shared by leading members of Mr Reagan's defence transition team.

The Senate report provides some insight into the controversy about US efforts in laser weapons research that has simmered within the Pentagon for several years. The controversy surfaced in 1979 with reports in *Aviation Week* that the Soviet Union had begun to build a large high-energy laser at Sary-Shagan, a weapons testing area near the Chinese border, and that this appeared to be the first step towards a full-blown laser weapons system able to destroy both satellites and incoming missiles.

Defence officials have been divided on how to respond. Some — in particular, Dr William Perry, Under-Secretary of Defense for Research and Technology — have played down the potential threat, arguing that the gap between theory and practice was so large that the Soviet Union was unlikely to have a weapons system in operation until the 1990s, and rejecting claims that the Soviet Union had a significant strategic advantage in this area.

Others in the Pentagon have been dissatisfied with this reaction, and have been pushing for an aggressive laser weapons research programme, demanding substantial increases over the current \$215 million a year being devoted to the high-energy laser research, primarily in the Air Force and by the Defense Advanced Projects Agency.

The dominant thinking within the Carter Administration has been that the main emphasis should remain on research. The report of the Senate committee — apparently now in agreement with Mr

Reagan's advisers — is that research alone is not enough, and that "a balance between technology development and weapons system development" is needed.

The committee suggests, for example, that a special office be created within the Department of Defense to manage and direct the overall high-energy laser programme of the department, rather than distributing its research and development efforts across the different services. And it endorsed a bill introduced by Senator Howell Heflin of Alabama to create a National Laser Institute to coordinate all laser research and development.

Fears that such enthusiasm may be allowed to flourish relatively unbridled under the new administration are prompting the members of the arms control community to argue strongly that the national security implications of even an accelerated research programme should be carefully considered.

In a recent report from the department of physics at the Massachusetts Institute of Technology, Kosta Tsipis and Michael Callahan point out that, over and above the severe technical and economic hurdles facing the development of a full laser weapons system, even a research programme could be upsetting to strategic arms limitation talks, since it would be difficult to tell whether the research was for defensive or offensive purposes.

In his paper to AAAS, Dr Garwin argued in a similar vein that space-based lasers would be highly vulnerable to attack by anti-satellite rocket vehicles, which could be developed with a fraction of the resources required to install the space weapons.

David Dickson

European science portfolios still for grabs

Brussels

The division of portfolios among the new members of the European Commission last week has left scientific research in the dark. The next few days should give the *cabinets* of the principal commissioners, Etienne Davignon and Ivor Richard, the new British commissioner, a chance to sort out their division of responsibilities.

So far it seems that Davignon, a Belgian viscount, will be taking over responsibility for all energy and industrially related matters, while Ivor Richard will take over the rest of research, science and education. This will involve some reshuffling of the bureaucracy, but nobody is prepared to predict what effect these changes at the top will have on policy.

Davignon, now entering his second four-year stint as commissioner in charge of industrial affairs, has become one of the most powerful figures in Brussels through his handling of the steel crisis. He takes over responsibility for energy from the now

departed German, Guido Brunner, and has already made it clear that he aims at a tough energy-orientated policy to revive European industry.

His chief interest in research is likely to be the development of energy-efficient technology, alternative energy sources and research aligned with industrial innovation. A notable advocate of Community programmes in telematics (the marriage of chip technology and telecommunications) and bioengineering, it is doubtful whether, with the broadening of his responsibilities, he will have much time to devote to the poorer aspects of Community research programmes.

This leaves Ivor Richard in charge of the joint research centres, education and training, which will tie in neatly with his responsibility for employment and social affairs. Another new commissioner, Karl-Heinz Narjes from the right-wing German CDU party, has been given undefined portfolios for industrial innovation, nuclear safety and environment and consumer pro-

tection. Narjes, like Davignon a lawyer by training, is regarded as being for nuclear power and, with little in his past to suggest that he will be particularly radical in his approach to environmental issues, his coming is regarded with some apprehension.

Ivor Richard's past experience in the Labour government includes the post of parliamentary under-secretary of state for defence in 1969–70 and deputy spokesman on foreign affairs between 1972 and 1974. He was the British ambassador to the United Nations from 1974 to 1979. Previously he had been a Council of Europe delegate and, during the same period, 1965–69, had been with the West European Union.

The new commissioners as a whole are largely right-wing men with legal backgrounds. They include nobody with previous experience in scientific affairs. It may be an advantage, however, that Richard, without any other major responsibilities, will be in a position to give his full attention to promoting the interests of his directorates-general. Davignon is certainly keen to increase the Community's influence on the industrial research programmes of the member states. It will clearly be some time before the new Commission settles down and begins to exert an appreciable influence on Community policy; undoubtedly the immediate problems associated with the budget and the form of the Common Agricultural Policy will take precedence for the time being.

Jasper Becker

Nucleotide sequences

Too many banks?

The US National Institutes of Health (NIH) and the European Molecular Biology Organization (EMBO) seem well on the way to founding a computerized bank of nucleotide sequences, but would-be competitors have not yet withdrawn from the field. The joint NIH/EMBO plan springs from meetings in Bethesda (Maryland) and Heidelberg last year, both of which acknowledge that nucleotide sequencing techniques now in use are likely to generate more information than can be assimilated informally.

For the time being, nucleotide sequences are being collected at EMBO headquarters in Heidelberg by Mr Greg Hamm. Other centres interested in the collection of nucleotide sequences include the George Washington University, Washington DC, where Dr Margaret Dayhoff plans to broaden the scope of her collection of amino acid sequences; the Los Alamos Scientific Laboratory; and Professor Richard Grantham's CNRS *Laboratoire de Biometrie* at Lyon.

The work now being carried out at Heidelberg is regarded as a necessary preparation for an eventual long-term decision by EMBO and NIH. It is by no

means certain that the two institutions will continue to collaborate, although such an arrangement is seen as a potentially valuable precedent. In the meantime, the Heidelberg collection is being compiled and made available informally.

The outstanding technical problems are more concerned with molecular biology than with computer technology. Storing, retrieving and comparing nucleotide sequences stored in computer language can be tackled with existing programs, but decisions have yet to be made about the criteria by which sequences should be considered authentic, while the problems of merging incomplete sequences with each other, and of accommodating and authenticating variations, will entail something like a critical evaluation of data in molecular biology.

The NIH/EMBO plan assumes that nucleotide sequences will eventually be made available to all suitably qualified scientists, but also supposes that the effective management of a sequence repository will require the continuing presence of a small group concerned with the analysis of sequence data.

Professor Richard Grantham's plans are similar. His bank is said to contain all published sequences of more than 150 nucleotides, but tRNA and 5S rRNA sequences are not included because of their variability. At the end of September, the Lyon bank included 200 mRNA sequences together with 10 complete genome sequences and 100 untranslated sequences. A description of the bank and a list of its contents can be had free of charge from Université Lyon 1, 69622 Villeurbanne Cédex, France.

It is hoped that the future of the NIH/EMBO project will be decided early this year, after consultations with other interested parties. One of the potentially contentious issues is that of whether bodies such as EMBO and NIH should centralize an activity recognized to be essential but traditionally left to individual research workers relying on grants from similar bodies.

Polish pollution

Smelter shuts down

Poland's new Ecological Society has won a major triumph in its battle to halt pollution in Krakow — a ministerial promise that the Skawina aluminium works, one of Poland's two major producers of the metal, will be closed down entirely. The campaign against the Skawina works has been going on since the society was founded last September.

The post-war industrialization of Krakow, beginning with the building of the giant Lenin steel mills at Nowa Huta, has brought major pollution problems. By the end of the 1970s, Krakow, which lies in a hollow with little natural circulation of air, annually received an estimated 95,000

tonnes of dust and 70,000 tonnes of sulphur dioxide a year from Nowa Huta to the east, and 33,000 tonnes of dust and 33,000 tonnes of sulphur dioxide from the Skawina complex (a coal-fired power station and aluminium plant) to the south-west. Ecologists working on the former Royal Forest of Niepolomice some 20 km from Krakow had to recommend measures such as aerial spraying with lime to neutralize the acid rain.

Outside the technical journals and reports, little was published on the problem, although the local population could see for themselves the outpourings of smoke (new electrostatic precipitators were constantly being promised) and there were increasing fears of the health hazards of locally grown vegetables. The first real public hint that there was an even greater gas hazard than that of sulphur dioxide came in the autumn of 1979, with the revelation that gold art treasures in the Wawel Castle museum were becoming corroded.

A year later, however, the new Ecological Society, whose membership includes representatives of the "interested public" as well as experts, was demanding a "truthful report" on Krakow's monuments and environment including public health issues. The society's memorandum, published in the Krakow newspaper *Gazeta Poludniowa* of 20 November, demanded in particular that all processes emitting fluorine and hydrogen fluoride must be shut down until this hazard could be eliminated. In fact, both the Skawina works (the main source of fluorine pollution) and the Nowa Huta steel mill were already scheduled for modernization — at costs of 120 million zloty (£2 million) and 7,500 million zloty (£125 million) respectively. Preliminary work on these projects, it was promised, would begin during 1981.

But the debate continued and was taken up by the national television network. By the end of December, the Minister of Metallurgy, Zbigniew Szalajda, had agreed to a partial cut-back in production, and ordered 35 obsolete electrolysis tubs to be taken out of service. The Mayor of Krakow, Josef Gajewicz, increased the number to 160, cutting hydrogen fluoride emission by 60 per cent and aluminium production by almost half. On 5 January this year, the minister told the press that Mayor Gajewicz's action would produce a "very difficult situation" for manufacturers requiring aluminium. Ways would have to be found to step up production from Poland's other smelting plant at Konin. The ministry's plans for the future of the Skawina plant, he said, would be outlined shortly. Two days later, after a meeting with community representatives and journalists in Krakow, the minister announced that, "taking into account all the circumstances, the demands of the community and the economic aspects", the plant would be closed and the project "totally abandoned".

Vera Rich