

US defence research

Will Congress cut SDI?

Washington

AN apparently unending series of exposures of fraud and waste in the Department of Defense (DoD)'s procurement division, coupled with anxiety over the federal budget deficit, is prompting Congress to take a tough line with defence spending this year. One of the casualties is likely to be the Strategic Defense Initiative (SDI), President Reagan's programme of research into anti-ballistic missile defences. Non-SDI research, however, is blooming.

The President's request of \$3,700 million for SDI in fiscal year 1986 (which began on 1 October) has been rudely refused by the House of Representatives, which has offered a mere \$2,500 million. The Senate has not finally made up its mind, but the figure of \$2,960 million has been urged by a committee. (The figure in 1985 was \$1,400 million.) Despite the apparently large increase from 1985, the SDI organization is far from happy, and has made plain to Congress that support at the level that now seems likely will lead to delays of a year or more to key demonstrations.

But if strategic defence research is now in question, other basic research supported by DoD is likely to increase substantially in 1986. This budget item request (known as line 6.1 to insiders) was \$971 million, which is likely to be met or even exceeded. Last year the figure was \$860 million. Historically, roughly half of the 6.1 budget, and some of the more applied 6.2 research, has been spent in universities. The increase for basic research continues a trend established more than ten years ago. This year, however, the Department of Defense has a new pot of money for university research that it is asking to have filled, the University Research Initiative (URI). Responding to widespread concern about the state of science education and research at US universities, the department went to Congress to ask for \$25 million for URI in 1986; the programme would support fellowships and the like at DoD laboratories as well as university research in risky but potentially profitable areas such as materials and structures, fluid mechanics, biotechnology, communications and optical networks. Congress was so impressed with the proposal that a Senate committee voted a total of \$100 million for URI (and DoD has quickly decided that it will, after all, be able to use the lot). This is on top of a \$30 million per year university instrumentation programme and \$500 million of direct research support last year. Even Colonel Donald Carter, acting head of DoD's research and advanced technology division, one of whose jobs is to drum up support for DoD university research on Capitol Hill, admits that

"we're doing quite well this year". But the House of Representatives has so far agreed only to the original request for \$25 million; a compromise will be worked out with the Senate next month.

Universities, despite their perpetually uneasy relationship with DoD because of friction over the issue of research secrecy, are not unnaturally delighted that DoD is "taking the university research infrastructure seriously", according to Robert Rozenzweig, president of the Association of American Universities. But the high-principled association still objects to the addition of inoffensive sounding amendments to other legislation, including DoD appropriations, that seek to provide funds for specific research projects or facilities at particular institutions, usually within the constituencies of the sponsors of the legislation.

Pork-barrel legislation has a distinguished history in the United States. Some 34 projects were supported in this way between 1983 and 1985, according to data

compiled by the association. But Rozenzweig and Robert Clodius, president of the National Association of State Universities and Land-grant Colleges, say that if allowed to proceed unchecked, direct funding of research facilities which circumvents peer-review procedures will "undermine the very system that has made our research enterprise the envy of all other nations". The presidents are lobbying congressional committees to eliminate all pork-barrel amendments.

Among the beneficiaries of current proposed pork-barrel amendments (in a number of different bills) are: Syracuse University (\$12 million); Oklahoma State University (\$1 million); Rochester Institute of Technology (\$11.1 million); Northeastern University (\$13 million); University of Nevada (\$3.5 million); University of South Carolina (\$4 million); East Michigan University (\$2 million); University of Missouri (\$450,000); New York University (\$2.6 million); Tufts University (\$1 million); and Pennsylvania State University, the University of Minnesota and Massachusetts Institute of Technology (each to receive one-third of \$1.7 million).

Tim Beardsley

Japanese audiotechnology

Renoir returns from the dead

Tokyo

IF you want to hear about the Impressionist school of painting, who could be better to listen to than Pierre Auguste Renoir who, along with Monet, was its most famous exponent? The only problem is, of course, that Renoir died in 1919. But thanks to a little modern computer technology this proves to be a trifling objection — at least in Japan.

To help advertise a major exhibition of the Impressionists being held in Tokyo until the middle of December, callers can hear about the philosophy of Impressionism from Renoir himself by dialling Tokyo 320-3000. The voice is the product of the Japan Acoustics Research Laboratory and its construction relies both on the ability to analyse and manipulate sound patterns with the aid of computers and the ability to predict fundamental voice characteristics through knowledge of an individual's anatomy.

According to the institute's director, Dr Masumi Suzuki, many of the major characteristics of a voice are governed by the structure and shape of the oral and nasal cavities and the resonances they produce in air set vibrating by the vocal cords. Of course, regional accents and the like are not shaped only by such parameters, but the characteristics that enable one to recognize a voice independently of its accent are. The structure and shape of the oral and nasal passages can themselves be measured relatively easily from an X-ray. Where such data are not available, they can be predicted with less accuracy from de-

tailed measurements of the face and neck.

Once the details of the vocal tract are available, simulation proceeds through use of a computer model. A human voice is input (reading French in Renoir's case) and analysed spectrographically. A computer model of the effect of the different resonances produced in different regions of an individual's vocal tract is then used progressively to modify spectral components of the input voice. The result, in Renoir's case, is a new voice that still, according to native French speakers, is perfectly accented French but has (lacking evidence to the contrary) acquired the characteristics of Renoir's voice.

But the "science" of voice analysis does not stop there. If a voice can be predicted from a face, why not a face from a voice? Some researchers have had a try with one of Japan's most wanted criminals, the self-styled "man with 21 faces" who extorts money from confectionery manufacturers by placing poison in bars of their chocolate on sale in supermarkets. All that is known about him is the sound of his voice on tapes and recorded calls. Despite the production of a portrait based on his voice, however, his arrest has moved no closer.

Patriotic Americans are not forgotten either in famous historical figures whose voices have been brought back from the dead. One can hear Abraham Lincoln proclaiming "Fourscore and seven years ago our fathers brought forth on this continent a new nation . . .", in tones to which his high and slightly bent nose apparently contributed a great deal. **Alun Anderson**