

More secrecy on cryptography research

US academics lean towards self-restraint

Washington

Mathematicians and computer scientists in the United States will soon be asked voluntarily to submit papers on cryptography and related research to the National Security Agency before publication, to see if the agency feels they contain anything that should be kept secret.

This precedent-setting system of self-censorship is being proposed by a study group set up last year by the American Council on Education to look at the growing conflict between national security and academic freedom in cryptography research.

The proposal is something of a compromise between the Defense Department's demands for strict legislation to control the publication of research results with potential security implications, and critics who argue that there should be no restriction on the publication of non-classified research.

However, several scientists warned last week that such voluntary self-regulation could lead eventually to demands for a similar approach to research ranging from lasers to integrated circuits.

Tensions between the Defense Department's security agency and sectors of the research community have grown steadily over the past few years. They stem partly from a desire by the agency to limit the spread of knowledge about virtually unbreakable codes — and the insistence of mathematicians that since many difficult mathematical problems can provide the basis for such codes, any restrictions would have a "chilling" effect on research.

Vice-Admiral Bobby Inman, director of the National Security Agency, has argued fiercely that the free publication of research results could inhibit the agency's data-gathering capabilities. Scientists reply that the codes also have important civilian applications — such as the protection of computer data — that justify their wide dissemination.

Last year these tensions rose to the surface when a computer scientist at Massachusetts Institute of Technology, Dr Leonard Adelman, found a grant application to the National Science Foundation had been passed to the National Security Agency. The agency subsequently offered to support part of his research — but on terms which would have given it the right to determine how much should be published.

The incident caused considerable embarrassment to the National Science Foundation — which protested that it had

been seeking the views of the security agency on cryptography research applications for several years. It also pointed out that potential conflicts were being studied by the study group of the American Council on Education, set up at the suggestion of the National Security Agency to discuss ways of controlling the distribution of research results acceptable to the scientific community.

After a year's study, the group agreed at a meeting in Washington last week to propose a system leaving responsibility in the hands of scientists and journal editors by setting up a voluntary review system by the security agency.

According to the group's proposals, soon to be circulated in the scientific community, either a scientist or an editor could submit a paper to the agency for comments on whether it contains information considered to be a threat to national security.

If the agency had no objection, the scientist would be free to publish. If it did object, then the scientist could decide not to publish, proceed with publication against National Security Agency advice — or refer the matter to an independent, five-person committee. This would have two individuals named by the security agency, and three picked by the President's science adviser from a list submitted by the National Academy of Sciences.

In principle, officials of the American Council on Education hope that voluntary self-regulation — which would be introduced for a trial period — would avoid the difficulties of new legislation (which could run into constitutional problems over freedom of expression) while meeting the security agency's main

concerns.

In practice, getting the system to work will not be easy. The first step will be for the security agency to prepare a guide to the type of research projects it would expect to evaluate. If the list is too broad, agency officials admit they could end up stifling research unnecessarily; yet if it is too narrow, they fear both that they might tip off others about their principal interests, and miss potentially valuable research findings.

There is also likely to be considerable resistance from the scientific community. Only one of the study group's nine members voted against the proposal for self-censorship; this was Dr George Davida of Georgia Institute of Technology, who found a patent application intercepted by the National Security Agency three years ago, and subsequently received a letter threatening consequences if he discussed his research with his colleagues.

Several academics, however, are worried that self-regulation would create a new category of secret research, pointing out that classified research is now banned on many campuses following the anti-war demonstrations of the 1960s.

The study group's proposals are therefore likely to generate considerable heat. But the political tide is now running in its favour and those who protest at the encroachment of security agencies on individual liberties have fewer friends in Congress than in the past. Vice-Admiral Inman has been nominated as deputy director of the Central Intelligence Agency — and remains committed to the desirability of strong government controls over potentially sensitive research.

David Dickson

Committee douches nuclear energy

The British government's 1979 statement on nuclear power, like its predecessors, is a muddle. This is the opinion of the House of Commons Select Committee on Energy, published this week. The committee asks that decisions to build nuclear plants in the 1980s and 1990s should be decided on their merits and not as part of a planned programme.

On economic grounds, the committee is sceptical about the government's programme to build 15 GW of new nuclear plant by 1992. The Central Electricity Generating Board (CEGB) comes in for particularly sharp criticism. The report cites several instances where the board's evidence on costs was misleading. It criticizes the board for basing future costs on early Magnox plants without acknowledging the effects of subsequent inflation on future capital investment, and for comparing the costs of electricity generated by different types of plant by using "highly uncertain variables" such as

the average load factor of plant and future fuel and fuel cycle costs.

Most damning is the complaint that the CEGB presented international cost comparisons suggesting that a pressurized water reactor (PWR) would cost 34 per cent more to build in Britain than elsewhere. The committee says that the generating board's estimate of PWR costs are "too perfunctory" and that it is too tolerant of inefficiencies in the British construction industry. Planning permission for the first PWR plant is still to be sought. Subsequent plants will be either PWR or AGR (advanced gas-cooled reactor) depending on cost and performance.

The committee also suggests that the size of the British programme could be cut if CEGB and the South of Scotland Electricity Board reduced their planning margins for the excess capacity needed for plant failure in particularly severe winters. These have crept up to 28 and 73 per cent respectively from about 17 per cent in the

fifteen years ago.

The electricity generating boards are not the only organizations to be criticized in the report, however. Criticisms of the Nuclear Installations Inspectorate, the independent body responsible for nuclear safety, made in Parliament last year, is reiterated. The inspectorate needs to put more effort into assessing the PWR, a design new to Britain, says the committee. Two aspects of PWR design, the integrity of the pressure vessel and problems of two phase flow in the water coolant, call for highly specialized inspectors which the inspectorate lacks. The committee recommends that the inspectorate takes on an ultrasonics expert for testing pressure vessels and that the government remedies, by means of legislation if necessary, the inspectorate's difficulty in attracting suitably qualified staff because of uncompetitive salaries.

The UK Atomic Energy Authority (UKAEA) is criticized for past bad advice to government. The committee recommends that its role as adviser to government on nuclear policy be given to the Chief Scientist's office at the Department of Energy. The UKAEA, it says, should confine itself to research on future nuclear options such as the fast breeder reactor and fusion.

One example, in the committee's opinion, was the recommendation not to consider the Canadian CANDU reactor as a possible option. The committee clearly believes that the CANDU reactor offers certain advantages over both the AGR and the PWR but realizes that the government is too committed to its present plan for an about-turn now. Instead, it asks for a study of CANDU before a final commitment to the PWR is made.

Judy Redfearn

European Community

Research compared

Brussels

The European Community seems to have taken fright at the gap between Europe and the United States and Japan in spending on research and development. In his first speech to the European Parliament last week, the president of the European Commission, Gaston Thorn, said that in 1981 the Commission will give priority to research and development that will improve the Community's competitiveness with Japan and the United States. The latest assessment of research spending shows that in Europe as a whole, research and development expenditure accounts for 1.9 per cent of Gross Domestic Product, compared with 2.3 per cent in the United States and 2.0 per cent in Japan. If defence research is excluded, the figures are 1.7 per cent, 1.7 per cent and 2.0 per cent, indicating Japan's present dominance by this yardstick.

What, asked Vincent Ansquer, a French member of the European Parliament, can the Commission do? The answer seems to

be that the Commission will hope to increase its own research spending in the next few years from 1.6 per cent to 2.0 per cent of the combined research and development budgets of the member states.

Constitutionally, the Commission is less able to influence national expenditure directly but is working on a series of studies which are to be summarized as guidelines for a common research and development policy due to be presented at the Council of Ministers in June this year.

Community research and development expenditure is assessed each year in a report by the Scientific and Technical Research Committee (CREST). Comparisons between member states have been quite influential in the past; for example, they prompted the French government to make substantial increases in its research budget in both 1979 and 1981. The latest report, still being finalized, will say that between 1979 and 1980, member governments' expenditure on research grew in real terms by at most 0.4 per cent.

During the whole of the 1970s, it is now clear, growth rates were highest in West Germany, Ireland and the Netherlands, with France, Italy and the United Kingdom below average. In 1980, Italy emerged at the top of the growth table, with an increase of 20 per cent in real terms of its research and development budget.

The CREST report uses information about the objectives of government expenditure in 1970-79 to infer changing priorities. Throughout the Community, government support for "the general promotion of knowledge", still the largest item, is declining. In stark contrast to government declarations, however, European governments seem to have allowed research contributing to industrial productivity and technological development to fall proportionally.

Increased proportions of national budgets have been spent on the exploration of the Earth and the atmosphere, the planning of the human environment and the protection and improvement of human health. The widely acknowledged need to reduce European dependence on imported energy seems not to have received its due — over the 1970s, real expenditure increased by a mere 0.4 per cent and actually decreased by 1 per cent immediately after the increase of oil prices in 1973-74. Energy research, nevertheless, has an important role in Italy and Germany, while in Denmark and the Netherlands most government expenditure continues to be "on the general promotion of knowledge".

The influence of defence research expenditure on the pattern of research in individual countries is catalogued in the CREST report. The disparity between the United Kingdom and its partners stands out. Thus British expenditure on defence research grew from 41 per cent of the government's budget in 1970 to 53.3 per cent in 1979. Only France comes anywhere

near this proportion, with 35 per cent of the government's budget going to defence research in 1979. In the same year, Germany spent 11.7 per cent on defence research and the other six member countries little or nothing. The report does point out, however, that defence research brings industrial spin-off.

The outlines of the committee's picture remain clear enough. Research spending by Community governments is now increasing after the trough in 1978 but still falls short of American expenditure. (The Japanese statistics are incomplete.) In money terms, research and development expenditure in the United States in 1979 was about 1.3 times greater than the corresponding figure for the nine members of the Community. The good news, though, is that in 1980 (according to forecasts of US federal agencies) American government expenditure may have declined while that in Europe remained constant. **Jasper Becker**

Toxic chemicals

UK regulations

The long awaited and potentially contentious draft regulations by which the British government will require the notification of new chemicals were published by the Health and Safety Commission on Wednesday (18 February). The provisional timetable for discussion allows until July for comment, in which case the regulation could become law before the deadline of 18 September laid down by the European Commission. But Brussels, in this as in other matters, is running late and may not be in a position to make its 1979 directive binding on all member states until next year.

The draft regulations are substantially more stringent than the proposals described in the commission's discussion document published in 1977. The principle that they should apply only to new substances remains, but outline notification will now be required for substances manufactured or used in quantities of less than 1 tonne. Chemical manufacturers will now also be required to provide information about biodegradability, thus meeting one of the criticisms of the earlier proposals by environmentalists. One measure of the increased stringency of the draft regulations is that the estimated cost of testing a new chemical is now given as £45,000.

The proposed regulations for the United Kingdom are more stringent than those required by the European Community in that they apply to chemical intermediates as well as to products supplied to others. This is one of the points on which British chemical manufacturers are likely to concentrate in the coming months, but there will also be complaints that the proposed regulations allow the Health and Safety Executive to pass on to other European authorities information about