SDI

Star wars research not up to scratch?

Victoria, British Columbia

THE US government is not rigorously applying the usual criteria for the assessment of scientific projects to all research proposals to the Strategic Defense Initiative (SDI). This is the nub of the allegations against SDI levelled by David Parnas, Landsdowne professor of computer science at the University of Victoria.

Parnas acquired a certain notoriety when, last June, he resigned from the computing panel of the SDI project, to which he had been appointed an adviser a

There's no money in crime—go for SDI contracts.

few months earlier. He has since become one of the most outspoken critics of SDI on technical grounds.

Parnas is due to give evidence to a sub-committee of the US Senate's Armed Services Committee this week. He says that the essence of his complaint will be that scientists seeking research contracts have discovered that "when the decisions are made by people who have a mission, they tend to give the money to the people who make the biggest promises".

Parnas is especially critical of those at universities who have taken SDI money while knowing that the project will not succeed. His resignation letter in June said that he did not believe that "further work by the panel will be useful; I cannot, in good conscience, accept further payment for useless effort".

To the criticism (by SDI) that the computing problems would have been less conspicuous if those responsible for them had made greater use of artificial intelligence (AI), Parnas says that he has been watching the advocates of AI for years and has remained unconvinced. "They make extremely false claims. They solve very simple problems, but when you look at them closely, you find that the methods do not generalize."

To Parnas, the chief problems confronting SDI are that it will never be possible to test the system properly, while the researchers will not be able to define the be-

haviour of the attacking missiles with sufficient clarity.

In his own field, Parnas says that software is the last part of a system to which designers pay proper attention. Although it may be easy to "get the bugs out of" the mechanical part of a system, design flaws in the software will come to light only years after it has been put into operation. Yet the task facing the SDI software will be formidable; on one estimate, the system will need no fewer than 10 million lines of code.

Parnas guesses that, in an SDI system, there will have to be a computer on board every satellite, in the first instance to process the raw data. "Even if you are going to do the computing in a centralized system, you are going to have to do some

computing on the satellites to reduce the amount of data you have to transmit." Yet it will also be necessary for the satellites to control their own sensors and some weapons.

Parnas is convinced that the software needed for SDI is so complicated that it cannot be expected to function reliably. He argues that there will have to be systems for handling the data from the sensors, and for computing the trajectories of hostile warheads, distinguishing them from decoys. Then it will also be necessary to determine the paths of retaliatory missiles, and to decide when they should be fired. "Software", says Parnas, is the glue that holds such systems together." He notes that both the Apollo Moon programme and the space shuttle have been delayed by software problems. He is not against military research programmes, and remains a consultant for the US Navy. Yet he is resentful that money should be channelled into what he considers to be the wasteful SDI programme, as well as the wasteful use of manpower and of computers that will be involved. **Bill Johnstone**

SDI

British role is still unclear

Washington

THE long-awaited agreement signed last week in London on British participation in the Strategic Defense Initiative (SDI) should allow British researchers to bid for a "significant" proportion of the \$26,000 million the Reagan administration wants to spend on the programme over its first five years, according to British officials. But despite British efforts to secure a commitment from the United States to at least \$1,500 million-worth of contracts, no guarantees of specific sums are mentioned in the agreement.

British/US scientific collaborations have in the past been marred by accusations that Britain has failed to secure adequate returns. The most contentious aspects of last week's agreement, those relating to intellectual property rights, were not made public by British Secretary of State for Defence, Michael Heseltine, and US Secretary of Defense Caspar Weinberger, and the exact terms are likely to remain secret. Instead, Weinberger and Heseltine agreed that collaboration would be as "full and fair" as national laws permitted, and that there would be the "fullest possible retention of benefits of participation".

When dealing with domestic companies, the US Department of Defense (DoD) waives its rights to patents arising from basic research that it supports, with the proviso that it will not subsequently have to pay royalties to the developers. It is unclear whether it will adopt the same position for foreign companies.

Closely related to the question of intellectual property rights is that of security

classification. While the majority of SDI contracts let so far have been classified, those originating from the SDI organization's innovative science and technology office — some 5 per cent of the total by value — are unclassified, and the director of that office, James Ionson, has said that unclassified research projects will not be classified retrospectively. US specialists caution, however, that the limits to permissible commercialization of research funded by DoD are uncertain at the best of times, and depend greatly on how strictly the Pentagon chooses to enforce particular cases.

Another problem for British companies is likely to be that DoD as a matter of deliberate policy will often divide up or "compartmentalize" different sections of strategically sensitive research for security purposes; the result is to make integrating the results of a research project difficult for the individual investigator.

British officials stress that participation in SDI research does not imply an unfettered commitment to building and deploying a ballistic missile defence; Britain says it stands by an agreement reached a year ago between Prime Minister Margaret Thatcher and President Reagan, in which the two leaders agreed that any deployment of such a system would be subject to negotiations.

British participation in SDI will be coordinated by a new SDI participation office established within the Ministry of Defence in London. Areas where collaboration is expected include architectural design studies, optical computing and electronic materials. **Tim Beardsley**