DEFENCE RESEARCH

Draper Laboratory at Crossroads

from our Special Correspondent, Cambridge, Massachusetts

THE future of the special laboratories, chiefly engaged on defence research, is still in doubt even after the faculty meeting at Massachusetts Institute of Technology which considered, on March 11, a proposal that their connexion with the institute should be severed. The view that the Lincoln Laboratory, which is largely owned by the Department of Defense, should eventually go its own way seems to be accepted. The position of the Draper Laboratory is more in doubt, if only because of the possibility that it might usefully be converted to civil work. Opinions among the faculty at MIT on this proposal are still very much divided.

Dr R. H. Miller, dean of the engineering school at MIT and head of the laboratory, is confident that the Draper Laboratory still has a useful part to play in the work of MIT. In an interview last week, he said that it would be a misfortune both for the laboratories and for the institute if the connexion were severed. It seemed to him likely that the laboratory would be able to sustain its rate of growth for the past few years without violating the new rule that none of the special laboratories should take on projects intended to lead to 'new operational systems intended for deployment as military weapons', although much, of course, would depend on the extent to which this restriction would make the laboratory less valuable as an innovator to potential customers in the Department of Defense.

Over the years, the scale of operations at the Draper Laboratory, which is largely concerned with the development of control systems for rockets, missiles and other devices, and which has most recently been involved with the system for landing Apollo spacecraft on the Moon, has grown substantially. In 1963, expenditure was less than \$30 million but had grown by 1969 to \$54 million. At present the laboratory has more than a hundred projects on hand, many of them much smaller than the Apollo project, which brought the laboratory \$20 million. For the year immediately ahead Dr Miller thinks that the laboratory's budget will be anything between \$40 and \$60 million, depending on whether proposals now being discussed with potential customers are eventually placed at MIT. Although it is clear that the new work on the Safeguard ABM system and the Multiple Independent Re-entry Vehicle warheads on which the Department of Defense is working could bring new business to the laboratory, Dr Miller says that there are also on the horizon proposals to develop a control system for the space shuttle on which NASA has set its heart (and on which only engine development will cost real money in the year immediately ahead) and the development of better guidance systems for air transport. What the Draper Laboratory would like to do for air transport is to exploit the techniques which have been worked out in other connexions for real time computation. Further ahead are ambitions for applying the same principles to the control of other forms of transport and work is indeed already under way on the design of control systems for the fast ground transportation projects for the east coast corridor which are being sponsored by the Department of Transportation. One

obvious difficulty in the years immediately ahead is, however, that the Department of Transportation is likely to have its hands full with the conversion of the NASA Electronics Research Center, also on the MIT campus, to a research laboratory of its own—it will be some time before the Department of Transportation could help substantially to keep the Draper Laboratory operating on the scale to which it has become accustomed.

While waiting for these ships to come home, the Draper Laboratory has only a comparatively weak case to make for retention within the orbit of MIT. Dr Miller emphasized this week that the laboratory's uniqueness rests on the way in which it is able to carry through the design and development of new control systems to the point at which a customer, the Department of Defense for example, can put them directly out to tender. Even the laboratory's critics acknowledge that its success in doing this at a time when the tasks concerned seemed beyond the reach of private industry has contributed markedly to the development of military weapons in the United States. Professor Miller also argued that the laboratory provides experience for young staff engineers which is the equivalent of the internships served by practising doctors—an opportunity to acquire a high order of skill in advanced engineering. Roughly half of the recruits to the laboratory staff come from industry and half from the universities. In a field in which skilled labour is exceedingly mobile, Dr Miller has the impression that the laboratory staff tends to stay on longer than the staff of comparable establishments in private industry. Altogether, more than fifty of the 800 qualified people in the staff of 2,000 are members of the faculty at MIT.

The tenuous connexion between the academic work of the engineering department at MIT and the work of the Draper Laboratory as such is one of the points at which the divestment lobby aims its attack. (Among students at MIT, there is perhaps stronger feeling about the character of the work at the Draper Laboratory and its involvement with defence research.) In 1969, the Draper Laboratory spent as much on research as the academic part of MIT (\$55 million each) with the Lincoln Laboratory spending \$67 million on research. Teaching at the MIT campus is by comparison a modest sum—\$40 million. In recent years, there seems to have been a tendency for the Draper Laboratory's contribution to research of an academic character to decline. The number of research assistants on its payroll decreased from 41 in 1963 to 17 in 1968, although it does seem possible that these figures understate the real contribution of the laboratory to teaching because of the way in which it may help graduate students not directly on the payroll. Among senior members of the faculty, however, the academic connexion is not nearly strong enough to deny the case for separation.

A less serious but possibly rather more practical consideration is that the Draper Laboratory does contribute ill-defined but possibly large sums of money to the overheads at MIT—one estimate is that contributions to the library and similar facilities amount to more than \$4 million a year. One senior member of the faculty said last week that it seemed a fine thing at the time, but that it may have been unwise to allow too close a connexion to develop between the Draper Laboratory and the institute.