

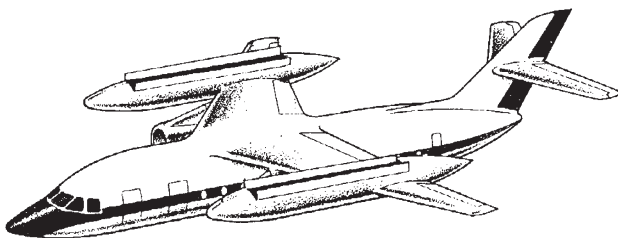
Ambleside in the heart of the national park. Apart from the incongruousness of such a road which would be dual carriageway in parts, the Friends feel that it may become unnecessary when heavy goods traffic and motorists bound for Scotland start to use the new M6 motorway extension which will by-pass the Lake District.

## AVIATION

### Taking Off for the Eighties

By the end of the year the Ministry of Technology should be in a position to decide what encouragement to give to the proposed types of vertical take-off and landing (VTOL) aircraft designed for inter-city links on a European scale for the 1980s. About £50,000 has already been spent by the ministry on studies of various aspects of future VTOL civil operations and rather more is likely to be spent in the current year. A lot more than the flying craft is involved in adopting this system of getting from A to B. Where are the vertical landing craft to land in city centres? Will the noise they make doing it be acceptable in a built-up area? Will the air traffic control features be compatible with control procedures for the conventional aircraft which they will supplement rather than replace? Will the passenger demand for faster inter-city travel be sufficient to justify not only the high cost of development but the higher fares predicted for the service? Definition on all these points is being sought in parallel with ministry assessment of three design submissions of craft from industry. Hawker Siddeley Aviation, Westland Helicopters, Ltd, and the British Aircraft Corporation were invited to present their ideas, and reports several inches thick which were delivered to the ministry at the turn of the year are still under study.

FAN LIFT AIRLINER



Hawker Siddeley Aviation fan-lift VTOL configuration. Eight lift fans are carried in each wing pod for vertical flight.

At the completion of this process it would be expected that one or more of the more promising design proposals would be subsidized by MinTech to the point of detailed feasibility. A decision on whether to go ahead on the system as part of a total travel network for Europe for the 1980s is not required till 1971. Possibly the most critical factor is the actual supply of suitable sites in city centres. A metropolitan VTOL port requires a minimum area 1,000 metres in diameter which is free of noise-sensitive institutions such as schools and has good ground transport connexions. Such sites do not hang about on the market long. London is a particular problem. Surrey Docks has just joined the two other possible candidates—Kings Cross goods yard and Nine Elms (already earmarked for the new Covent Garden). But will any of these still be available when MinTech

comes to take decisions in maybe 18 months time? It is pointed out that it is no part of MinTech's task to implement a VTOL inter-city service and that no commitments have yet been made.

The aircraft proposals divide into two categories—rotorcraft and fan-lift aeroplanes. The Westland proposal employs the same power units for lift and forward flight, namely rotors that are turned through 90° by a tilting wing. One of the Hawker Siddeley proposals also employs rotors—the unconventional controlled circulation rotor originally developed by the National Gas Turbine Establishment, Pyestock. Two of these would be used for the lift phase only; they are folded and stowed for forward flight and this is the most problematic aspect of the design. This configuration would be expected to be faster than the tilt rotor craft and to have a more modern image.

Hawker Siddeley has studied fan-lift for 10 years and makes use of it in what appears to be the most attractive of the proposals put forward. The fan-lift engine is a specialized form of jet engine in which the axis is at right angles to the direction of flight and so provides thrust for vertical ascent. As with the company's other submission, separate power plants are employed for forward and vertical flight. Such an airliner might be faster than VTOL, has a very modern image but would have high maintenance cost and fuel consumption.

BAC has limited its proposals to various ways of shortening the take-off of its conventional aircraft, so that its submission is a STOL rather than a VTOL proposal. The airliners in view are all in the 100-passenger bracket.

At present, largely through Hawker Siddeley's development of the military VTOL, the Harrier, and Rolls-Royce work on specialized "lift" engines, Britain is considered to have a respectable world lead in VTOL. But there is much activity in both France and Germany, and there would seem an excellent argument for joint European development here. The weakest aspect of MinTech's sensible "phased approach" strategy is that little headway has been made in discussion with our European neighbours.

Meantime, as the results of the half dozen or so background studies come in, a valuable body of facts previously unavailable is being built up. They will be of interest much beyond the immediate VTOL terms of reference, particularly those carried out at Southampton and Leeds Universities on traffic patterns and passenger attitudes. Altogether 30,000 individual journeys have been analysed by Southampton and 10,000 questionnaires collected by Leeds. Neither report has yet been published.

## SCIENCE RESEARCH COUNCIL

### Equality for Engineering

By creating separate engineering and science boards the Science Research Council had set engineering on a manifestly equal footing with science, Professor Sir Brian Flowers told the Institution of Electrical Engineers in London last week. Moreover, by placing the interdisciplinary sciences of metallurgy, computing science, polymer science and materials under the aegis of the Engineering Board, the Science Research Council had clearly indicated which way it wanted university research to develop.