smelter until the power supply for it is settled, so there could be a long delay. British Aluminium, it is thought, will settle for the site at Invergordon, using electricity from the North of Scotland Hydro-electric Board. Negotiations for the contract, to last until the end of the century, are likely to be protracted, but the hydro board claims that this will not delay the commissioning of the smelter beyond 1971, the same year as Alcan.

In all this, one point has been almost entirely overlooked. Instead of an output of 240,000 tons from two smelters, the Government has now provided for an annual production of 320,000 tons, from three smelters. This side-stepped the problem of having to choose between the different companies, but has inevitably increased the concern felt by other producers of aluminium, principally those in Norway. Norway claims, not unreasonably, that the establishment of smelters in Britain involves subsidies which contravene the EFTA convention. It is bound to feel that the terms offered by the Coal Board include an element of subsidization. The Coal Board denies this, but the impression remains that Norway, and the users of coal in Britain, have been shabbily treated.

What Next for ESRO?

THE European Space Research Organization (ESRO) has at last had its first major success—the launching last month of the satellite ESRO 2 (rechristened IRIS now it is in orbit)—and has at the same time published its general report for 1967 which is a sad chronicle of all that befell it last year. Only because the report was obviously written some time before the cancellation of the TD 1 and TD 2 satellites and the crisis in ELDO, does it escape unmitigated gloom. Even so, it is clear that uncertainty about the future is ESRO's principal worry at the moment, and the organization is waiting anxiously for the meeting of the European Space Conference to be held in Bonn some time in the autumn, when it hopes that suspense will be lifted. The European Space Conference is a meeting of ministers concerned with space affairs from the various ESRO countries which last met almost a year ago, when it decided that ESRO should start no new projects for the time being at least.

That ban was imposed to give ESRO time to reorganize itself along the lines of the Bannier report, which recommended a greater delegation of authority and criticized ESRO for being too inflexible and complex for a scientific organization. This lesson has clearly been taken to heart. Last year saw the setting up of a new management structure. Replacing the clear separation between the scientific directorate and the technical directorate which was previously a feature of the organization's structure, the distinction is now between the part of the organization responsible for defining long-term policy and the part concerned with its implementation.

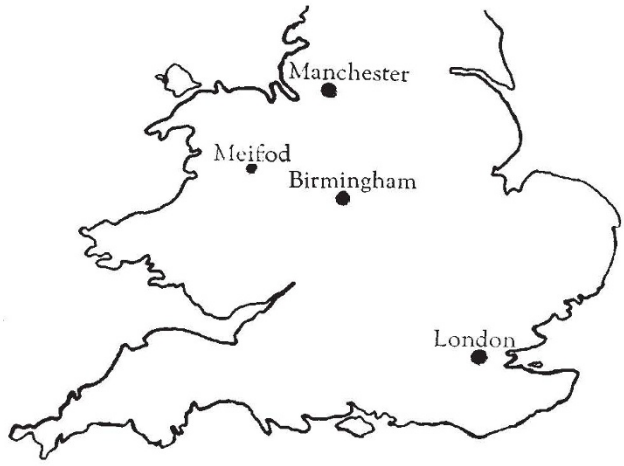
Clearly ESRO believes that the standstill imposed by the European Space Conference does not extend to thinking about new projects. Apart from detailed studies on the Large Astronomical Satellite project (LAS) and on communications satellites, it carried out a dozen feasibility studies for scientific satellites including further versions of the HEOS satellites, a solar satellite, a geostationary satellite, and a satellite with an adjustable orbit. It is also clear from the report that ESRO is concerned about its relationship with ELDO, the European Launcher Development Organization. For one thing, it is going to be more expensive to launch satellites with rockets developed by ELDO than by using the corresponding United States launchers. Another problem arguing against European launchers is that they will be larger than ESRO requires, at least in the foreseeable future. Although at first sight this seems to put ESRO in an enviable position as far as availability of launchers is concerned, the organization can hardly take advantage of this. Large launchers could only be fully utilized by combining some tens of small experiments in one satellite. Fitting together a large number of experiments in one satellite, making them compatible and incorporating all the necessary probes, solar cell panels and aerials is no mean task, as the Orbiting Geophysical Observatories developed in the United States have shown. The policy of the organization as far as launching rockets is concerned must again wait on the decisions of the European Space Conference.

It is no secret that the Italians are concerned about the way ESRO contracts are handled, and the general report admits that the policy of free tendering for contracts is not going to even out the differences in the technical capabilities of the member states. For example, up to the end of 1967 the value of contracts awarded to French industry was 38 per cent of all ESRO contracts, compared with the French contribution of 20 per cent to the ESRO budget. Italy, on the other hand, paying 11 per cent of ESRO's budget, received 7·5 per cent of the contracts. Britain receives 17 per cent of the contracts for its contribution of 24 per cent. Aware of this disparity, the organization feels it should encourage the member states to concentrate on particular aspects of space technology. Until this is achieved, ESRO seems to hope to stave off criticism by seeing that the percentage share of the contracts awarded to each member state is at least 70 per cent of its percentage contribution to the budget.

What is clear from the report is that the European Space Conference should not delay its decision on the future of European space co-operation much longer. European space contractors, and ESRO itself, need to know what kind of projects are likely to form the basis of the organization's work in the future. The meeting in Bonn in the autumn is likely to see an end to the more ambitious projects which ESRO has been tinkering with in the past, and a return to a more realistic view of what European technical co-operation is capable of at present. The sounding rocket programme, and the setting up of the range at Kiruna, invaluable for high altitude work, are examples of the kind of project ESRO can successfully undertake. An organization working at this level, together with a few launchings of small satellites, should provide a toe-hold for European space ambitions, and ensure that the facilities built up by ESRO are not wasted.

Jodrell Bank in Wales

THE design studies for the Mark V radio telescope for Jodrell Bank are now well advanced and should be finished by the end of the year. With an assurance from the Science Research Council that the scheme will be given a measure of priority, the University of Man-



Possible site for the Mark V Jodrell Bank telescope near Meifod, Montgomeryshire.

chester has been looking for a site for the telescope within 100 miles of Manchester and has now purchased a farm near Meifod, Montgomeryshire, in the hope that the SRC will be able to supply the £5 million which will be required to construct the 400 ft steerable aerial and related equipment. The telescope is as yet included only in the forward planning of the SRC and the decision to go ahead with the scheme has yet to be made. The recent cuts in the SRC budget have delayed consideration of the scheme but, if the national economy does not take any further turns for the worse, building could begin in 1970, and the telescope could be ready for use by 1974.

The number of people employed on the Montgomeryshire site will be limited when the telescope is in use, as the Mark V will be controlled by radio link from Jodrell Bank. Electrical interference is a problem in a telescope of this type but, by building the Mark V in a low valley away from any major conurbation, Sir Bernard Lovell and his colleagues believe that interference will be kept to a minimum. The small amount of sky area lost because of the hills would be compensated for by the protection gained. Drastic building developments could upset the telescope but certainly in the near future this is unlikely, and at a meeting of the county council last week Sir Bernard gave assurances that farming activities in the district would not be affected.

In the mid-1950s a 250 ft dish was considered to be the largest that could be built, but because of advances in engineering techniques the maximum possible size is now put at 400 ft. The problems remain the same, however. Accuracy over the whole of the large area of the dish has to be maintained, and the wind still blows. The present design study provides for an accuracy of 3 centimetres over the whole area of the dish.

1967 Foot and Mouth not Airborne

THE notion that the virus which initiated the foot and mouth epidemic in Britain last year was transported from the Continent by winds is not borne out by meteorological evidence. Chapter and verse have now been published in the *Veterinary Record* (**82**, 610; 1968) by Mr C. W. Hurst of the Meteorological Office, Bracknell. Publication of this evidence was delayed in order that it could first be considered by the Northumberland Committee on foot and mouth disease (see *Nature*, **218**, 412; 1968).

Mr Hurst, who has experience of analysing airborne transfer of spores and insects, apparently decided to analyse the foot and mouth disease outbreaks in England since 1952 after discussions with Dr J. B. Brooksby and the staff of the Animal Virus Research Unit at Pirbright. He claims that with the Meteorological Office's three hourly recordings of air movements from sea level to 2,000 feet and 12 hourly recordings of winds up to 10,000 feet it is usually possible to reach fairly definite conclusions about the possibility of airborne transfer of spores, insects and virus particles on such vehicles as dust or pollen grains.

Dr Brooksby suggested that the virus which caused the first outbreak at Oswestry in October 1967 must have arrived there between the 10th and the 20th of October. But between October 5 and 25, winds were predominantly west to south-west and there is no backtrack to any possible European source of the virus. Indeed, in 1967 there was little south-easterly to easterly airflow to Britain from the continent; the only periods when there was a good flow in this direction were in February, April and June, and occasionally in May and September. The other factor which argues strongly against airborne infection in October 1967 is that the initial outbreak was isolated and occurred near the Welsh border far from the windward coasts. Windborne infections are likely to be widely scattered

Initial Outbreaks of Foot and Mouth in 1965–67 with Potential for Transfer from Continental Sources

Month/year	Area of outbreak	Dates of possible virus arrival*	Possible Continental sources	Conclusions
Oct. 1967	Oswestry, Shropshire	Oct. 10–20, 1967	Much of Continent but not N.W. France	Not airborne
Sept. 1967	Stratford, Warwicks.	Aug. 25–Sept. 3, 1967	W. Germany, Belgium, Spain	Not airborne, but Aug. 22 possible transfer from Belgium
Jan. 1967	Fareham, Hants.	Dec. 25, 1966–Jan. 5, 1967	N.W. Germany, Holland, Spain	Spain available as source
July 1966	Morpeth, Northumberland	July 4–14, 1966	,, ,, ,,	Not airborne
April 1965	Faversham, Kent	April 5–12, 1965	,, ,, ,,	Not airborne, but April 1 possible transfer from Holland

*Range suggested by Dr Brooksby, Pirbright.