

SWEDEN

Probing the ionosphere

Representatives from six European countries met in Kiruna, North Sweden, last month to inaugurate the EISCAT project for research into the Earth's higher atmosphere. Wendy Barnaby reports

THE aim of the \$21 million EISCAT (European Incoherent Scatter Facility) project, which scientific organizations in Britain, Finland, France, Norway, Sweden and West Germany are sponsoring, is to learn more about the chemical, physical and dynamic processes which the solar wind induces in the Earth's ionosphere. The dual frequency high power radar system which will be used is expected to be built in three years' time, and the project will run for at least ten years after that. Britain, France and West Germany will each contribute about a quarter of the initial financing, and the rest will come from the Scandinavians.

As a method of exploring the ionosphere, incoherent scatter involves beaming radar waves there to cause the free electrons of the ionosphere's plasma to operate as antennae and

'scatter' radio signals, which are then monitored by receivers on earth. These signals are rich in information about the properties of the ionosphere and the processes going on within it. The EISCAT facility will operate from VHF (224 MHz) and UHF (933.5 MHz) transmitters at Tromsø, Norway. The signals will be picked up from electrons at heights between about 80 and 2000 km in the ionosphere by a VHF receiver at Tromsø and UHF receivers at Tromsø, Kiruna (Sweden) and Sodankylä (Finland). They will then be passed to the Geophysical Institute at Kiruna, the project's headquarters, for analysis.

Solar-terrestrial physics will undoubtedly be extended by what the analyses will reveal. One member of the EISCAT Council, Dr F. Horner (UK), has explained that the movement of ionization, the density of electrons, the temperature of ions and electrons, structural changes in the ionosphere and neutral atmosphere, and the ionospheric source of the solar wind will all be further clarified. One of the main topics for investigation will be aurora, and the way in which they

are formed by ionization. The facility is being built in high latitudes specifically to make such studies possible. There will be no immediate practical applications of the research, Dr Horner said, although in the long term it will increase understanding of radio communications. It will also throw light on the ways in which the earth's climate is affected by ionospheric conditions.

Although EISCAT is not the first incoherent scatter project, it is by far the most sophisticated. Teams in Peru and Alaska, for example, have already probed the lower ionosphere with radar waves of 1–10 MHz. The British Science Research Council made the last observations in its project MISCAT (multi-static incoherent scatter) as late as last August; this involved the transmission of waves of 400.5 MHz to obtain electron and ion temperatures in a region 100–400 km within the ionosphere. The data obtained is still being processed at the Appleton Laboratory, Slough, and the University College of Wales, Aberystwyth, and is also expected to yield information about the drift velocities of the ions. For the British scientists, therefore, EISCAT is a logical extension of the SRC's work. □

BRITAIN

Engineering a royal society

THE Council of Engineering Institutions (CEI) wheeled on its biggest gun at its tenth anniversary celebration—Prince Philip the retiring president—in the hope of generating badly-needed momentum towards unity in the engineering community.

The Prince, having eloquently exhorted engineers to stick together, launched a new concept—a Fellowship of Engineering, to recognise eminence in the profession; but the idea of a sort of Royal Society for engineers was not without a sizeable band of sceptics.

CEI's problems have multiplied in recent months as engineers, worried about their professional status, their salary, and their public relations, have begun to doubt that CEI was doing enough for them. Meanwhile CEI is suffering from internal strife: its largest members, the Mechanicals, Electricals and Civils, are trying to reform its voting structure, which at present gives equal weight to every one of the fifteen constituent institutions. For lack of progress, the Electricals last December served notice that they would pull out of CEI in a year's time. Unsurprisingly,

the press has now latched on to the woes of CEI in a big way.

Many engineers have looked to CEI to produce some sort of national academy of engineering whose members would be widely recognised as outstanding and whose opinion might be sought by the government. The notion that the government might seek technical advice from professionals not in the Civil Service is a bit outmoded these days, and the need for yet more marks of distinction in engineering doesn't seem entirely obvious when an engineer of distinction can already trail a string of initials like MSc, CEng, FICE, FIMechE, FIGasE, FInstF, MIEE, MICHemE after his name. But FEng is now to be the prize to cap all prizes. Excepting FRS, of course. The Royal Society has been a bit of a problem, because it already has seventy or so on its books with at least nominal engineering qualifications. Proponents of the Fellowship of Engineering want very much the FEng to have equal "status" with FRS; and some would even like the Royal Society to stop electing engineering fellows so as to

prevent FEng from being a sort of failed FRS.

There are others, notably the Mechanicals and Electricals, who also worry about the "failed FRS" image through the association of the Fellowship with CEI, "or any body which may replace it". They argue that CEI or its successor will necessarily be of lower technical status, being "mainly concerned with the mundane day-to-day activities of the average member". They would have preferred the Royal Society to have been more extensively involved, preferably as a co-founder and thus as a guarantor of high standards and continuity. This has not happened; invitations have gone out to the 70 FRS's and to 70 other distinguished engineers to become Fellows of the CEI, and the Royal Society simply says that it has learnt of the initiative with satisfaction.

This new mark of distinction thus suffers at the very beginning from dissent about its parent body. This will take a much more serious turn if the Electricals really do pull out of CEI. There will be anxious searching through CEI's mail these next few days in the hopes that a large fraction of the first 140 (the ultimate number is to be 1000) accept their invitations. □