Scientists will predict Northern Lights show

Scientists at the University of Alaska's Geophysical Institute have reported that they will be able to forecast accurately when electrical phenomena called the northern lights will occur in the polar region and how intense they will be.

The ability to predict this, they said, is important because the aurora borealis, or northern lights, disturb the polar ionisphere, disrupting radio communications and casuing navigational difficulties.

Radar facilities and satellite performance also are affected by the electromagnetic disturbances. When such disturbances are very intense, they induce spurious currents in powerline systems, particularly in Canada and the northern United States where violent auroral displays occur.

Dr. S. I. Akasofu, who headed the reserach team, said some of the operational problems of such facilities can be avoided if a proper forecast can be issued. Communication centers, he said, will have enough time to plan for communication blackouts and program around the disruptions that will be caused by auroral activity. Dr. Akasofu, a professor of geophysics, reported the resaerch results to the National Science Foundation's (NSF) Division of Atmospheric Sciences which funded the study.

The Alaska research team's work builds on 20 years of study of the earth's electromagnetic environment by space physicists in the United States and other countries.

Scientists now know that the aurora is a gigantic electrical discharge phenomenon — like a huge neon sign — from 60 to 300 miles high in the polar atmosphere. This discharge is driven by a powerful natural generator in the sky, one providing as much as a hundred billion watts —more than 100 times the total annual U.S. electric power consumption.

The celestial generator, called the magnetosphere, is formed by the interaction of the solar wind, a hot gas streaming from the sun, and the earth's magnetic field.

"It has long been known," Dr. Akasofu said, "That solar and auroral activity are generally correlated. We now understand the basic physics behind this correlation. We have found that a particular combination of three factors controls the efficiency of the generator and thus the intensity of auroral activity. The three factors are the solar wind's speed and both the magnitude and orientation of the magnetic field carried by the solar wind."

On the basis of their finding, Dr. Akasofu said, the research team is confident that when a presently planned satellite, the third International Sun-Earth Explorer, takes its position in the solar wind in August and starts sending back data accurate forecasting of both occurrence and intensity of major auroral activities will be possible about two hours before they start.