

ments into the upper atmosphere during the long Arctic night. The launchings paved the way for the extensive operations that took place at Red Lake. Winter conditions proved helpful in the Red Lake operation since tourists and prospectors and mosquitoes flood the region during the summer.

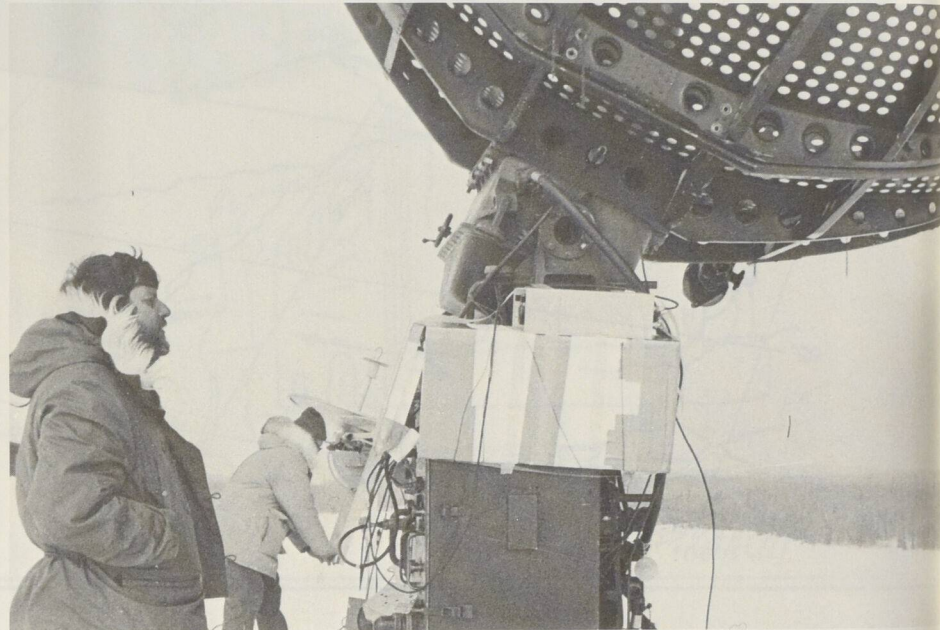
The Red Lake launch in terms of numbers alone was a significant exercise for the rocket team. When the researchers had drawn up their final plans for the event, 35 rockets were scheduled to be sent aloft over a seven-day period. This meant much more than simply "touching a match to the fuse." Some vehicles were timed to match satellites passing overhead, while Canada's Black Brant VA was to fly during the period of totality, holding a position to allow instruments to view the sun during the eclipse. "It is one thing to launch a rocket to a specified altitude and keep it within the impact area, as we did at Churchill and the other sites," says Tarzwell, "but it is something else to put a window in that rocket, send it more than 100 km into the atmosphere and say, 'look at the sun and don't turn your head!' That was the problem we faced."

For the Black Brant flight, "tossing the stone" with the required accuracy was partly solved by the installation of a guidance system recently developed in Sweden. A sounding rocket's flight path is partially determined by the launching ramp, and placing a guidance system in the rocket booster has the effect of extending the ramp length from a few metres to several kilometres. With this system, both flight accuracy and the predicted point of

impact are improved. Its efficiency was demonstrated by the operations team after the launch; the recovery team was directed to the impact point of the Black Brant booster to within a few metres. Recovery of the rocket body was hampered only by the fact that the point of impact was the centre of a river bed.

The Black Brant was one of many types of vehicle launched at Red Lake. Instead of a neat, uniform group of rockets, the international team prepared and fired a range of models and sizes from the 2-m long Astrobees and Lokis to the 9- and 10-m long Nike

A telemetry antenna receives a last-minute visual inspection before the rockets are launched. (Photo: James Walker)



Exhaust from the first rocket of a group illuminates the remaining probes encased in launch shrouds waiting to go aloft. (Photo: NASA)

Orion and Tomahawks. Each has its own characteristics and idiosyncracies, and the launching mechanisms and methods were as unique as the rockets. When this variety is combined with the many kinds of delicate experiments carried aloft, some idea of the potential problems become evident. Despite this, the process went smoothly and no serious hitches developed. With continuing advances in rocket technology, the NRC launch team expects to be even better prepared when the next total eclipse in Canada occurs in 2024 A.D. □

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On inspecte une dernière fois une antenne télé-métrique avant le lancement des fusées. (Photo: James Walker)

Les gaz d'échappement de la première d'une série de fusées illuminent les autres véhicules que l'on s'apprête à lancer. (Photo: NASA)

