

New form of radar improves detection capabilities

A University of Toronto professor is perfecting a form of radar that will improve icebreaking in the Arctic.

The new method, developed by Keigo Iizuka, professor of electrical engineering, is called Step Frequency Radar (SFR). It uses a unique scanning system that will tell icebreaker captains the thickness of the ice they are contending with and help them to chart more practical courses.

Instead of using one radio frequency as in conventional radar, Professor Iizuka's radar, directed at the ice, transmits and receives 32 individual frequencies. Each frequency gives particular information which is processed through a computer. SFR also scans the ice horizontally and vertically. "The more dimensions we check, the more accurate the information," said Professor Iizuka.

Computerized process

A computer processes an image picked up by the radar onto the screen of an oscilloscope. In addition, numerical information is analyzed to determine ice thickness. Currently, the new method can

determine the thickness of ice up to 4.8 metres, the maximum thickness an icebreaker can negotiate. The radar system may potentially be built into a unit that could be easily carried on helicopters used by icebreaker crews to examine the surrounding ice.

Besides determining ice thickness, SFR can find objects hidden under ice or soil. Conventional radar picks up details about metal objects best but SFR can now find plastic objects, which is of some significance, said Professor Iizuka, now that water pipes and gas pipelines are increasingly being made out of plastic.

Professor Iizuka predicted that eventually the new radar will be of use to oil companies setting up rigs in the Arctic. "Oil companies cannot build on the permafrost. SFR would tell them how far they have to drill before they can find a rock base for their platforms," said Professor Iizuka.

The research is being funded by the Ontario government, the National Research Council of Canada, and the federal government.

Bus company flourishes

Ontario Bus Industries of Mississauga, Ontario is carving out a niche for itself in Canada's \$100-million intermediate transit bus market.

Ontario Bus Industries and its repair and refurbishing arm, Ontario Bus and Truck Industries Limited, have grown by 25 per cent each year since 1978. This year it will sell about 130 of its 30- and 35-foot *Orion* buses for about \$100,000 each.

The company will produce ten or 11 fuel-efficient *Orions* a month. Its \$2-million-a-year repair and refurbishing business is flourishing and expansion of its 135-employee work-force is imminent.

"For the cost of a new bus (about \$125,000) a customer can get four refurbished buses that will stay on the road from four to eight more years," said Tim Corbet, the company's general manager.

About 230 *Orions* are being used in communities from Barrow, Alaska to Corner Brook, Newfoundland. The company has licensed an American firm TMC Greyhound to produce the *Orion* in the United States.

Tropical haven opens

A year-round tropical haven is now one of the displays at the National Museum of Natural Sciences in Ottawa.

The Gallery of Plant Life is a new permanent exhibit gallery dealing with the evolution, biology and occurrence of plants. It features luxurious plantings of mosses, ferns, evergreens and flowering plants. Colourful exhibit topics are highlighted by original artwork, photos, audio-visuals and models.

The exhibition hall was specifically designed to accommodate a large number of living plants of various kinds and sizes. These specimens are arranged in exhibit plantings to demonstrate the general characteristics of major groups such as the ferns, cone-bearing evergreens, and flowering plants. They were selected to include plants with diverse growth forms such as trees, shrubs, herbs, vines, epiphytes and succulents; some of special interest such as carnivorous plants are also represented.

Lamps aid growth

The successful growth, indoors, of the numerous plants is owing to an overhead system of high intensity grow-

lamps which provide as much as 1,000 to 2,000 foot candles of light in certain areas. Large cylindrical terraria which house succulents, carnivorous plants and epiphytes on artificial cork trees are provided with their own lighting system.

The plant lighting throughout the hall is automatically controlled, with the daylight lighting simulated at night. A rooftop greenhouse, directly above the hall,

serves as a propagation and rejuvenation centre for old or unhealthy plants from the hall or other exhibition areas, and can also be used to provide additional seasonal plants for various museum functions.

The exhibit is divided into five main sections: Evolution, Biology, World Vegetation, Plants of Canada, and Plants and Man.



The Gallery of Plant Life provides museum visitors with a lush botanical environment.