

The radar dome is a distinctive feature of the weather ship Quadra. The Canadian vessel is fitted with what is probably the most powerful rain-detecting equipment in the world.

world, capable of scanning an area 150 miles in radius. Photographs of the weather patterns picked up on *Quadra's* radar screen will be examined to better understand the evolution of tropical rainclouds and to estimate the amount of rain that falls from them. The photographs will also be transmitted every 15 minutes throughout the exercise to the Dakar headquarters. This information will be used in planning the operations of 12 specially-instrumented aircraft involved in the experiment, as well as for short-term weather predictions.

Many other very specialized meteorological sensors will be used on the Canadian ship. A tethered "blimp", 34 feet in length, 12.5 feet in diameter and filled with 2,500 cubic feet of helium will be used to carry aloft special wind, temperature and humidity sensors that will be used to explore the details of the lower 3,000 feet of the atmosphere. Other helium-filled balloons will carry instruments up to altitudes in excess of ten miles. As they rise, they will telemeter back to the ship information on temperature, humidity and pressure and the balloons will be tracked by an omega radio-positioning system to deduce wind speed and

direction. These balloons will be launched every three hours throughout the experiment. The total lift of these 800 balloons would carry over 5,000 pounds into the air.

Use of data

Data obtained by the *Quadra* during the three-month exercise is expected to fill 2,400,000 feet of magnetic tape. This information will be validated and put on tape at Environment Canada's Atmospheric Environment Service headquarters in Toronto and then forwarded to world data centres in the Soviet Union and the United States for use in subsequent scientific programs.

GATE co-ordinator of Canadian scientific programs, Dr. Rao J. Polavarapu, of the Atmospheric Environment Service, Toronto, describes the experiment as "an expedition of unprecedented scale and complexity that will test the ability of many nations to work together in a co-ordinated attack on a scientific problem of global importance".

Canada, as a member of the World Meteorological Organization and fully committed to the Global Atmospheric Research Program, recognizes the importance of international co-operation in scientific undertakings.

"Further progress in long-range weather prediction for northern latitudes, as well as the tropics, depends on finding answers to many riddles posed by the complex energy-exchange processes linking the tropical oceanic heat sources to global circulation," Dr. Polavarapu explained recently.

Cost and benefit to Canada

The cost of Canada's involvement in the GATE program this summer is in the area of \$1 million, much of which is for operating expenses.

"As we will have full access to all the data, the direct benefit to Canada is immeasurable" says Dr. A.E. Collin, director-general of the Marine Science Directorate of Environment Canada's Fisheries and Marine Service and the Canadian member of the international Tropical Experiment Board, which designed GATE.

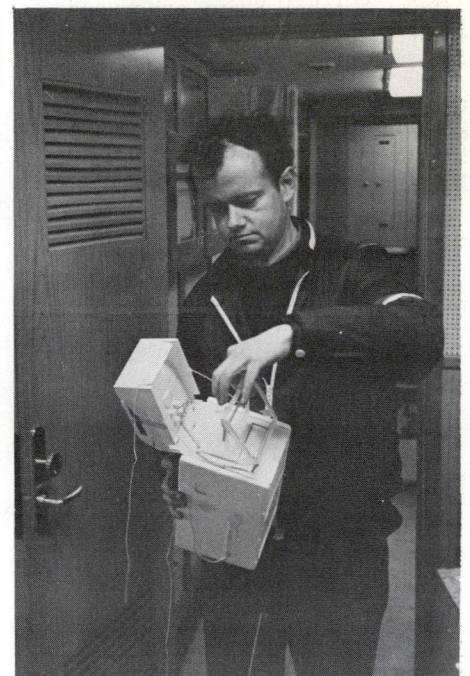
"*Quadra* will be the best-instrumented ship in the whole fleet and will provide the master data commu-

nications link," Dr. Collin stated. "It is the best possible contribution we could make to GATE and this is readily acknowledged by the other countries taking part."

The *Quadra* is due to arrive at Dakar June 16, following a 7,500-mile trip from Victoria via the Panama Canal. On both the outward and return trips, ocean scientists from the Marine Sciences Directorate, Pacific Region, will conduct experiments. One will attempt to assess the ocean's role in absorbing carbon monoxide released into the atmosphere by the burning of fossil fuels, while the other will concentrate on assessing the extent of oil pollution in the Pacific Ocean.

The GATE exercise, which is divided into three main phases, each about three weeks in duration, starts June 27, July 27 and August 29. Between phases the *Quadra* will return to Dakar, where some 1,000 people will be billeted to handle the land-based operations.

The Canadian weather ship leaves from Dakar September 27 and is due to arrive at Victoria October 23.



*Michael Webb of the Atmospheric Environment Service, Toronto, shows a radio-sonde that is attached to a free-floating balloon for recording data on temperature, humidity and pressure in the upper atmosphere. Some 800 balloons will be released from *Quadra* during the GATE exercise.*