

Since many of the Division's facilities are not duplicated elsewhere in Canada, it is part of the working policy of the Division to assist manufacturers with the testing of a great variety of products.

National Aeronautical Establishment.—The National Aeronautical Establishment conducts aeronautical research to meet the needs of military and civil aviation, working in co-operation with the Canadian aircraft industry; it also carries out its own research program. Its studies therefore centre around problems of aerodynamics, aircraft structures and materials, and flight mechanics. It has the only development wind tunnel facilities in Canada and is thus equipped to handle most of the industrial or military aircraft developments of the foreseeable future. Aerodynamics research from low speeds up to about $4\frac{1}{2}$ times the speed of sound is carried out in the wind tunnels; considerable attention is being given at present to low-speed problems of vertical and short take-off aircraft. Other studies include work on the aerodynamic characteristics of high-thrust propellers, on wings with submerged fans and on wings immersed in powerful slip-streams. The research on structures and materials involves investigation of aircraft accidents, the theory of structures, fatigue and fracture, flight loads statistics and aircraft hydraulics. The flight mechanics program covers research on flight safety and flying stability and control, the development of a crash position indicator for locating crashed aircraft, atmospheric physics, anti-submarine magnetometry, and the avoidance of aircraft collisions.

A growing and highly diversified program of assistance to smaller industries is developing, the work relating mainly to product development, product improvement or testing. Concerning aircraft utilization, efforts have been directed toward those areas of national activity where aerial methods might offer economies in cost or improvements in effectiveness, such as agricultural applications, forest fire fighting, aerial logging, high sensitivity magnetic surveys, precipitation physics, and studies of atmospheric turbulence.

Radio and Electrical Engineering.—The work of this Division includes electrical engineering problems of interest to industry and fundamental research in electrical science. The Division co-operates with the Armed Services and associated industries in designing, producing and evaluating new equipment.

The engineering program includes studies of corona loss and radio interference from extra-high-voltage direct-current transmission lines, rocket telemetry, antenna development, electromedical instrumentation, electronic aids to navigation, and high-frequency standards. The Division maintains the best-equipped antenna laboratory in Canada and provides considerable assistance to Canadian industry in the development and manufacture of new antennas and radomes. Examples of recent developments by the Division are a compact transistorized marine radar for use by pleasure craft and fishing vessels, an underwater crash position indicator for locating submerged aircraft, an area display electrocardiograph showing the time variation of heart voltage between 70 points on the body, and a creative tape recorder much in demand by electronic music studios. A highly mobile counter-mortar radar designed by the Division went into commercial production in 1961.

Fundamental studies are carried out in the fields of radio astronomy, upper atmosphere research, electron physics, and solid state physics. At the Algonquin Radio Observatory in Algonquin Park, Ont., a radiotelescope having a parabolic reflector 150 feet in diameter has been in operation since mid-1966 and has proved to be the best of its size in the world.

Space Research Facilities.—The function of the Space Research Facilities Branch of the National Research Council is to develop and provide facilities to meet the needs of the upper atmosphere and space research programs of Canadian scientists in universities and government agencies (see pp. 417-419). At present its work is restricted primarily to the use of sounding rockets. The major facility is the Churchill Research Range which is operated for the benefit of Canadian and American scientists and has a joint Canadian-American funding. It has capabilities for launching many kinds of sounding rockets and