

**Aids to Air Navigation.**—Radio aids to air navigation are provided from coast to coast and from the United States border to the Arctic along the airways used by the many Canadian airlines, United States airlines flying over Canadian territory, and Canadian and United States military aircraft. To construct and maintain these many facilities, trained engineers and technicians are located at six district offices: Moncton, N.B.; Montreal, Que.; Toronto, Ont.; Winnipeg, Man.; Edmonton, Alta.; and Vancouver, B.C. The large communication stations at Gander, Nfld., are under the administration of the Moncton office.

**Radio Ranges.**—The principal radio aid to air navigation provided by the Department of Transport is the radio range. These stations, located approximately every 100 miles along airways, provide specific track guidance to pilots by means of audible signals. The signals may also be used for the purpose of obtaining direction finding bearings from the aircraft. In addition, radiotelephone communications are provided between the ground and aircraft by means of which pilots may obtain weather and other information concerning the safety of flight. There are now 93 stations in operation. Work has commenced on the establishment of additional radio ranges to serve the airports at Terrace and Nanaimo, B.C.

**Radio Beacons.**—These stations provide radio signals with which pilots may use their direction finding equipment to obtain relative directional bearings to assist in the navigation of their aircraft. Sixteen of these stations are now in operation, new ones having been established at Embarras, Alta., and Laberge, Y.T. The radio beacons at Prince Albert and Embarras are equipped with radiotelephone facilities to provide communications to and from aircraft. Surveys have been completed for a beacon facility to be installed at Eon, Que., to replace the Mecantina radio range destroyed by fire in the summer of 1952. Additional radio beacons at Hope, Terrace, Kitimat, and Mill Bay in British Columbia, and at Beaverlodge, Sask., are in various stages of planning or construction.

**Fan Markers.**—These facilities, operating on very high frequencies, provide a pilot with an indication of when he is directly overhead. Normally, they are placed on an airway to inform the pilot when he may safely lose altitude after passing high terrain or to indicate accurately the distance from an airport. Eleven of these stations are now in operation.

**Station Location Markers.**—These facilities are similar to fan markers except that the signal radiated is such that aircraft may receive the same indication irrespective of the direction of flight. They are installed at the same location as a radio range to enable a pilot to determine when he is exactly over the station, thus obtaining definite indication of position. Station location markers are installed at all radio range sites except Killaloe, Ont.

**Direction Finding Stations.**—A direction finding station for determining the bearing of aircraft from the station is in operation at Cape Harrison, Nfld.

**Instrument Landing Systems.**—Instrument Landing Systems provide radio signals which, when received by special radio equipment aboard aircraft, permit pilots to approach airports for landing during periods of very low visibility. An installation normally consists of a localizer transmitter providing lateral guidance to the runway, a glide path transmitter providing slope guidance to the approach end of the runway, two marker transmitters providing distance indications from the runway at approximately four and one-half miles and 3,500 ft. from the runway, and a low-power radio beacon (compass locator) to assist in holding procedures