

than half the flights across the North Atlantic suffered substantial difficulties originating in communications or air traffic control services; it is considered that a forward scatter network would provide a partial answer to this problem, and recommended that the network be set up at the earliest possible date.

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**DAGMAR:** Measurement of groundspeed and the true motion of aircraft over the earth's surface, a longtime navigation problem, can now be made directly and accurately due to the development of a new radar aid by Defence Research Board scientists.

Known as a Drift and Groundspeed Measuring Airborne Radar (DAGMAR), the 100-pound equipment developed at the Electronics Laboratory, one of two Ottawa units comprising the Defence Research Telecommunications Establishment, fits readily into the base of the aircraft fuselage. It employs the Doppler principle, a physical phenomenon relating to the change in frequency apparent to the receiver of radio and other waves transmitted from a moving source.

Most people are conscious of this phenomenon. It is noticeable in the apparent pitch variations of the whistle of a train as the latter passes or in the apparent pitch change evidenced by a passing automobile.

The variation in pitch or frequency of vibration is directly proportional to the velocity of the sound source relative to the observer. The change in frequency therefore, is a measure of the velocity.

This principle applies equally to radio, sound and light waves. DAGMAR employs radio waves and permits measurement of an aircraft's velocity by recording the change in frequency of waves transmitted to the ground and reflected back to the source.

By directing the waves at predetermined geometric angles, both groundspeed and drift angle (deviation of the path of the aircraft from its heading) can be ascertained. A combination of groundspeed and drift angle results in a track measurement, or that of the aircraft's true motion above the earth.

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**WOOL PRODUCTION:** Canada's wool production in 1956 amounted to 8,079,000 pounds (greasy basis), up slightly from 1955's production of 8,041,000 pounds, according to the Dominion Bureau of Statistics annual report on wool production and supply. Number of sheep shorn declined slightly to 874,000 from 875,000 a year earlier and the average fleece weight to 7.3 pounds from 7.4.

Shorn wool production fell to 6,372,000 pounds from 6,446,000, but wool pulled rose to 1,707,000 pounds from 1,595,000. Average farm price of fleece wool (greasy basis) advanced to 37.8 cents per pound from 1955's 35.3 cents, boosting total farm value of shorn wool

production 6 per cent to \$2,410,000 from \$2,277,000.

Exports of Canadian wool (greasy basis) climbed 12.5 per cent to 3,594,000 pounds from 2,883,000 a year earlier and imports rose 8 per cent to 58,226,000 pounds from 53,954,000. No data on wool inventories are available, but assuming no change in stocks, domestic disappearance would amount to 62,711,000 pounds, some 6 per cent greater than 1955's total of 59,112,000 pounds.

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**CIVIL DEFENCE:** The first civil defence exercise co-ordinating organizations at the federal, provincial and municipal levels will be held on Friday and Saturday, May 10 and 11. This announcement was made by the Honourable Paul Martin, Minister of National Health and Welfare and Federal Cabinet Minister responsible for Civil Defence.

In the past, similar international exercises for Civil Defence has been held on three occasions under the code name of Alert I, II and III. By mutual agreement between Federal Civil Defence Administration in the United States and Federal Civil Defence Headquarters in Ottawa, it has been determined that by holding separate exercises, Canada's in May and the American in July, the two countries will have an opportunity to observe and discuss mutual problems on two, rather than one, annual occasion.

Canada's first national Civil Defence exercise will be held under the code name of "Co-operation I". Maj.-Gen. F.F. Worthington, Federal Civil Defence Co-ordinator, will direct the exercise while Maj.-Gen. G.S. Hatton, Deputy Federal Civil Defence Co-ordinator, will head the exercise control staff numbering 150. Federal Control Headquarters will be located at the Canadian Civil Defence College at Arnprior, Ontario, 40 miles N.W. of Ottawa. The three primary objectives of "Co-operation I" will be to train control centres staffs at all government levels; to test national Civil Defence and inter-headquarters communications systems and procedures; and to study problems which might arise in the implementation of the National Survival Plan, including its impact on government departments other than Civil Defence.

As an example of the close co-operation between the Civil Defence organizations of the United States and Canada, F.C.D.A. observers will be present at the Federal Control Centre at Arnprior and at a number of border control centres across the country during "Co-operation I". During the U.S. exercise "Operation Alert 1957" in July, Canada will assist F.C.D.A. by operating its Federal Control Centre at Arnprior and local headquarters in certain border cities. It is anticipated that Canada will also have observers attend the American exercise at F.C.D.A. Headquarters at Battle Creek, Michigan.