High altitude turbulence sought by Operation "coldscan"

During the last few years aeronautical engineers have gathered considerable data on atmospheric turbulence encountered by aircraft flying in the troposphere, the layer of the earth's atmosphere below about 35,000 feet.

The National Aeronautical Establishment of the National Research Council of Canada is one of a number of research bodies seeking methods to reduce the menace that this invisible and sometimes violent phenomenon presents to aircraft operating at subsonic speeds in the troposphere. This work includes the use of a specially instrumented T-33 jet aircraft.

Turbulence research by NRC is being conducted by the Flight Research Section of the National Aeronautical Establishment. Work in the troposphere is well established and the section now has expanded its program to cover turbulence occurring at altitudes in excess of 40,000 feet.

This step has been taken in anticipation of the imminent arrival of supersonic aircraft which will operate at altitudes of 65,000 to 75,000 feet. High altitude turbulence occurring in clear air and encountered suddenly by these aircraft travelling at upwards of 1,400 miles per hour will be disconcerting to passengers, will complicate the pilot's task and will impose heavy stresses on the aircraft.

Part of the turbulence studies with the T-33 at altitudes up to 40,000 feet involved the use of an infrared sensing device that can detect atmospheric temperature changes ahead of the aircraft. This device, manufactured by Barnes Engineering Company of Stamford, Conn., was installed in the T-33 at the request of the U.S. Federal Aviation Agency.

A. D. Wood, Head of NAE's Flight Research Section, says that no one is yet certain that turbulence in clear air is always accompanied by temperature variations. However, the T-33 experiments show that temperature variations of three to seven degrees Fahrenheit usually indicate the presence of turbulence.

Mr. Wood says the experiments demonstrate the possibility of developing a sensor that would provide pilots of subsonic aircraft with three to four minutes' warning that they are approaching an area in which they can expect to encounter clear air turbulence. Pilots would have 30 to 40 miles in which to warn passengers and possibly to take some other action, such as reducing speed, altering course or changing altitude.

The new work which has been undertaken by the Flight Research Section to accumulate information on turbulence at altitudes in excess of 40,000 feet is being conducted in co-operation with United States Air Force Air Weather Service. This co-operative program, called "Coldscan", involves tests with a turbulence instrumentation package built by NRC and includes a seven-channel FM magnetic tape memory recorder. The instrumentation has been installed on a U.S.A.F. RB-57F aircraft of the 58th Weather Reconnaissance Squadron at the Kirtland Air Force Base in New Mexico. This aircraft is one of the few planes which operate routinely above 40,000 feet. →

The turbulence instrumentation package is located in a compartment in the upper mid-fuselage section of the RB-57F.

Les instruments de mesure de la turbulence sont placés au milieu du fuselage du RB-57F.