B75-10227

NASA TECH BRIEF

Langley Research Center

New Aircraft Instrument Indicates Turbulence Intensity

A new aircraft instrument has been developed at Langley Research Center which measures aircraft response to turbulence in a form that is useful, meaningful, and accurate. Aircraft accelerometers, at present, measure turbulence peaks but do not indicate the level of acceleration over a period of time. The use time period of this turbulence intensity indicator is adjustable, and it thus provides the pilot with a continuous average indication of the intensity level of turbulence encounters instead of a recording of the level of isolated occurrences of particularly severe accelerations.

The adjustable averaging-time feature enables the pilot to see large values of accelerations over a short time or smaller accelerations over a longer period of time. This allows the pilot to evaluate his flight conditions more accurately and with greater consistency. Safety and comfort can be improved as changes in turbulence intensity are readily seen, and altitude or flight direction can be changed to areas of lesser disturbance.

This turbulence indicating system consists of an accelerometer, an indicator, and the necessary electronic circuits for summing and averaging the accelerations. The accelerometer is mounted near the aircraft center of gravity and measures total response of aircraft motion. These motions are (root mean square) averaged over a selected period of time, and the values are presented on a standard 3-inch (7.6-cm) instrument that has a scale of 1 to 10. The required electronic circuitry is mounted inside the instrument case, and a control knob, to select any time period from 2 to 20 seconds, is mounted on the face of the intensity indicator. Repeater indicators may be installed elsewhere, such as for the copilot and the observer.

This type of turbulence intensity indicator can be useful in all types of aircraft, large and small. It also can be used in sailplanes (gliders) and rotary-wing (helicopter) aircraft. The turbulence intensity meter can be applied to vehicles other than aircraft where a real-time readout of motion intensity is desired. It could be directly applied to trucks, trains, buses, or industrial equipment. With minor modifications to internal time constants, the instrument could be used for industrial applications to monitor vibration levels of machinery.

Note:

No further documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
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Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

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Categories: 03 (Physical Sciences)
02 (Electronics Systems)
01 (Electronics - Components and Circuitry)