

RESEARCH PAYS OFF



The Oregon Department of Transportation

Aeronautics Division



Problem

Accurate information on aircraft activity at nontowered airports is needed by airport owners and operators as well as planners and administrators charged with planning, funding, and development of the airport system. There are more than 15,000 airports in the United States, 400 of which have Federal Aviation Administration air traffic control towers. Unlike these towered airports where air traffic controllers keep continuous activity tallies, most nontowered airports have no accurate usage records. Obtaining accurate aircraft activity counts provides a variety of benefits. If benefit-cost analyses are performed on the basis of accurate information on facility use, investment decisions can be made with more confidence. Design criteria, which may significantly affect development and operating costs, can be applied more efficiently. Even when decisions are made on the basis of forecasts rather than current conditions, accurate base data are necessary to forecast activity reliably.

ACOUSTICAL AIRCRAFT COUNTER PROVIDES DATA FOR INVESTMENT DECISIONS



Aircraft activity counter.

Solution

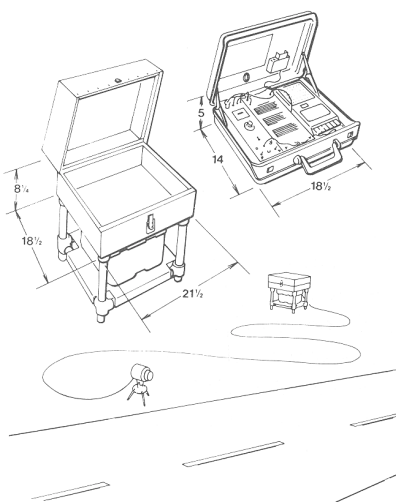
In 1975 the FAA, in cooperation with the Oregon Department of Transportation, Aeronautics Division, undertook a program to develop an inexpensive method to count aircraft activity at nontowered facilities. An aircraft activity counter was developed from this \$10,000 research effort. The counter is designed for obtaining reliable field data on aircraft activity at small, nontowered airports.

The counter fits in a small attache case and is placed in an insulated weather-resistant aluminum field case for transport or outdoor use. The basic unit is battery operated. The components include a rugged, variable reluctance microphone (a high-quality, all-weather microphone) connected to amplifiers. The amplifiers are connected to instruments that measure the sound level (the relative decibel rating of the takeoff noise of an aircraft). This is recorded on tape and then registered on a digital counter or a microprocessor. Take-off noise activates the tape recorder, which remains turned on for approximately 4 seconds, allowing about 15 departures to be recorded for each minute of tape time. In addition to automatically recording the total number of departures within predetermined time frames, classification of aircraft types can be made by persons trained to listen to the tapes. Present research is focused on automating the interpretation and classification of the "noise" tapes. The counter was tested for one year at New England airports, in cooperation with state aviation authorities, at a cost of \$50,000 to the FAA. Thus the up-front cost to the government was \$60,000.



Application

The acoustical counter is relatively easy to use and is suitable for most small airports. Some training is necessary to operate the counter and determine its optimal location near the runway. Because the counter is self-contained and weather resistant, it may be left at an airport for several weeks to count operations continuously. The counters originally cost \$2,000, but improved features increased the cost to about \$5,000. In 1985 Oregon reported that it used the counter to take week-long sample counts 4 to 12 times a year at each airport, depending on the activity level of the airport. These sample counts cost an average of \$1,200 per airport. This cost includes



RENS aircraft activity counter model AAC-10.

wages and mileage expenses, supplies, maintenance and repair of the counters, allocated capital costs of the counter, interpretation of the recorded tapes, data processing and analysis, and management of the program. Other states have reported similar costs. To visually obtain data on detailed aircraft type (single engine, multi-engine, turbine, etc.) and time of day requires 24-hour observation and is relatively expensive. Using an acoustical counter, together with a statistically sound method of estimating aircraft operations from sample counts, annual estimates of operations with a known degree of precision can be developed.

Benefits

Sizable investments are being made to upgrade the national airspace system. To ensure the efficient allocation of scarce resources, it is essential that the FAA develop and use the most accurate and reliable data bases possible. Although other methods to estimate aircraft activity have been used, they always involved a trade-off between accuracy and data collection costs. The FAA developed a low-cost aircraft counter with minimal initial investment that provides federal and state officials with accurate and reliable activity counts at nontowered airports. As a result, the quality of the data available for investment decisions improved significantly.

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Suggestions for "Research Pays Off" topics are welcome. Contact Crawford F. Jencks, Transportation Research Board, 2101 Constitution Avenue, N.W., Washington, D.C. 20418 (telephone 202-334-2379).