Filtered Whistle May Tell Altitude

Aviation

Difficulties in the construction of apparatus for telling the height of a moving airplane were described by Lieut. Leo P. Delsasso, U. S. Naval Reserve, physicist in the University of California at Los Angeles.

The maintenance of regular schedules by commercial fleets now requires flying in all kinds of thick weather. The ground may be out of sight, but the pilot must know his clearance.

The barometer, time-honored altitude gauge, falls short of satisfaction on at least two counts. In the first place, it measures altitude from sea level, not from the ground, and thus gives scant information in mountainous country. Furthermore, natural air-pressure conditions may change during a single flight so much that the barometer dial setting is thrown off as much as 500 feet, or in exceptional cases 1000 feet or more.

The sound-resonance method of altitude detection, developed in the Navy some years ago by Lieut. Delsasso and others, is regarded as the best prospect. When used in ordinary navigation, the depth of the sea bottom is readily measured from a vessel.

If a loud, sharp sound be emitted downward from a flying airship, its return echo may easily be received and timed with proper chronometric apparatus. From the known speed of sound in air one may calculate the distance to earth. This scheme works fairly well with a lengthy craft such as the Graf Zeppelin, where the delicate sound receiver can be mounted far from the noise of motors. With the airplane, however, the noise of operation is so great that the pilot finds it almost impossible to analyze the echo returning from the earth. He is unable to tell which returning sound is the tell-tale signal.

Research in progress in Lieut. Delsasso's laboratory indicates that a sound filter will solve the difficulty. A very sharp sound—preferably one generated by a whistle—is chosen to give one simple frequency of vibration, but in great amplitude or intensity. Such a selected sound is sent downward from the plane, and its echo received in apparatus adjusted to receive the least possible direct sounds from the nearby motors.

In the receiving apparatus the desired sound is built up by a suitable resonator which does not respond to the miscellaneous motor noises. The extraneous sounds may then be damped considerably without loss of the specific sound which is desired.

The use of such a sound filter and detector would have prevented a disaster like that suffered some time ago near Beaumont, Calif. In this accident the pilot, headed for the Colorado desert, was flying blind in a fog. He missed the San Gorgonio Pass and collided directly with the mountain barrier at one side. With proper sounding equipment he could have measured his distance to the ground below, or to possible obstructions on either side, according to the direction in which he might set his instrument.

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Stock Planes Perform Well

Aviation

By Capt. Thomas Carroll

Capt. Carroll is test pilot for the Daniel Guggenheim Safe Aircraft Competition.

Although the rigorous test routine of the Guggenheim Safe Aircraft Competition demands highly specialized designs, a number of manufacturers have quite intelligently entered stock model airplanes which quite unexpectedly have shown very excellent performance under the rules of the competition.

It is hardly to be expected that many or possibly any of these types will actually meet the full program of qualifying tests, but it is indicative of the high quality of the American design.

Among these types should be mentioned the Command-aire, Bird and the Kitty Hawk. Some of these little airplanes, which incidentally generally fall into the low price class, have all the performance in the way of carrying ability and high speed that could be possibly required of them. That their structures are strong and durable is assured by the Department of Commerce approved type certificate.

In addition, their characteristics in stability and maneuverability, particularly in slow speed flight, are exceptionally good. Due to careful adherence to the best in wing design they do not, when pulled up to speeds bordering on the stall, show a tendency to whip off into a spin or any such other dangerous or uncomfortable condition, but may be maintained in a slow speed condition with very good control throughout.

The competition is sometimes criticized on the grounds that too great stress is placed on this slow-speed requirement. But the tests have as their purpose the discovery of airplanes that can be brought into small fields, should emergency demand, in relative safety, and that under the guidance of an average pilot will not be on the verge of a dangerous stall and spin. The stock types are demonstrating their ability to do this, and they deserve almost as much credit from the practical aviation viewpoint as will the probable winning types, with intricate gear and expensive modification.

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An aircraft camera which can be operated with one hand enables the pilot of a plane to take pictures.

Penguins are dying by thousands along the South African coasts, apparently from some epidemic disease.

Models Help Engineers

Engineering

Engineers will have more freedom in the creation of economical and beautiful forms of construction as a result of a method of design using elastic models, reported by Prof. George E. Beggs of Princeton to the National Academy of Sciences.

Continuous girders and trusses of buildings, arches, arch dams, tunnels, suspension bridges and other such structures are what engineers call "statistically indeterminate" and can not be designed with the use of the simple formulae that serve for simpler structures of more conventional type. Elaborate mathematical methods have been developed for such indeterminate structures, but even these methods are often inadequate and impractical.

With a view to eliminating tedious calculations, Prof. Beggs has made transparent models in which the stresses and strains are shown by the motion of the various portions of the models measured under the microscope. In this way a large structure can be built in miniature and its safety of construction can be determined with assurance and without the necessity of long and intricate computations. Prof. Beggs also reported that he is able to predict the nature of the structural action within hitherto unknown kinds of construction.

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