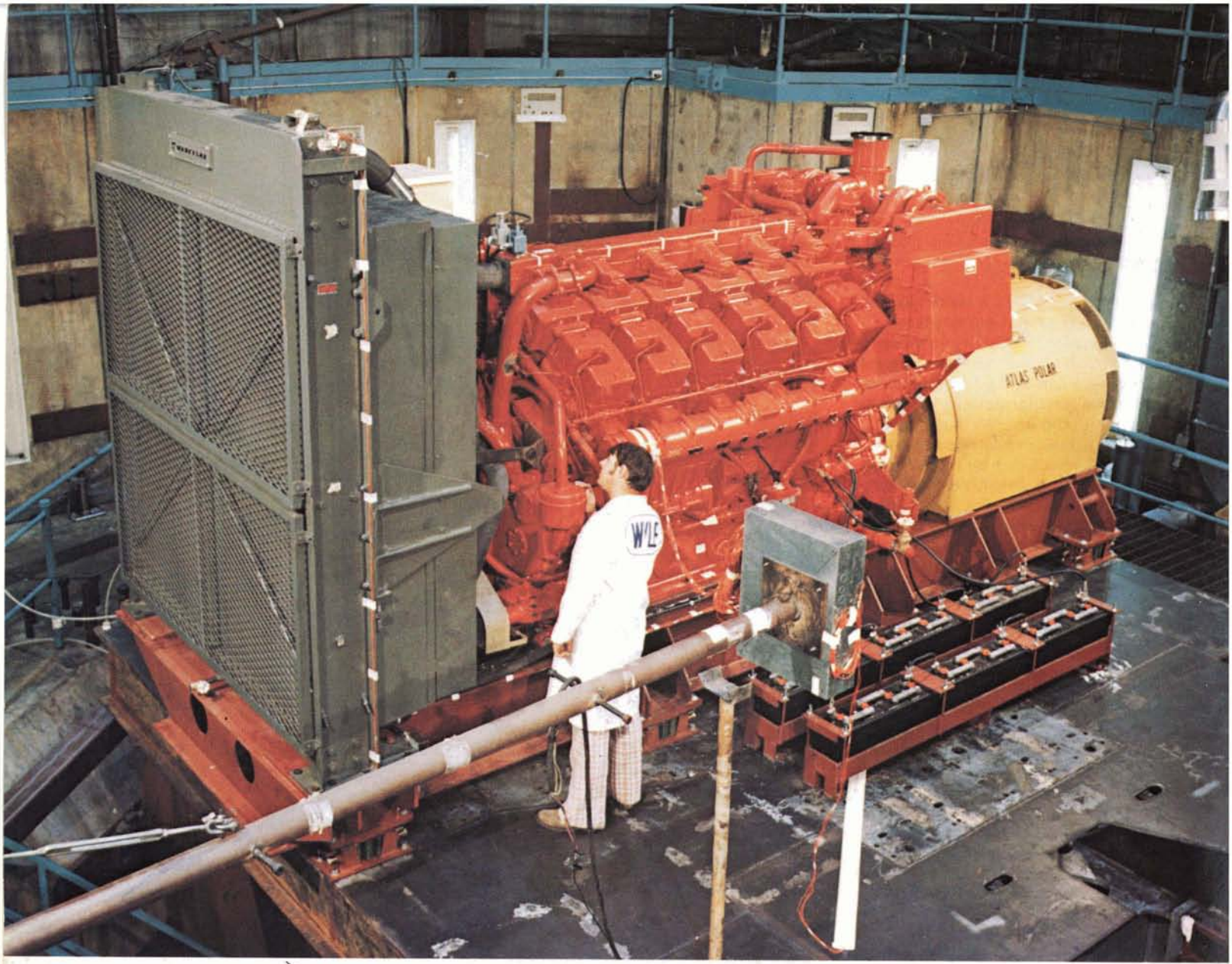
Airport Safety Aid

An airplane generates a wake like that of a ship, except that the airplane's wake is invisible. The plane's movement through the air creates—at each wing tip—a "vortex," a turbulent wind moving in a circular pattern like an air whirlpool. Large aircraft, such as commercial jetliners, produce powerful vortices which can be hazardous to small planes following closely behind. For that reason, the Federal Aviation Administration requires a five-mile spacing between large and small aircraft approaching a runway, to allow time for the vortices to dissipate. At busy terminals, this spacing requirement restricts landing operations and contributes to airport congestion.

With an eye toward reducing the spacing requirement while assuring lightplane safety, the Department of Transportation is conducting research on the characteristics of aircraft wake. The spinoff system pictured—atop the checkerboard van in the lower photo and in close-up at upper right—is producing valuable information which will enable airport controllers to determine when it is safe for a lightplane to land. Developed by Lockheed Missiles and Space Company, Sunnyvale, California, it is called a Laser Doppler Velocimeter, or LDV.

The LDV was originally developed by NASA's Marshall Space Flight Center for use in measuring airflow disturbances in wind tunnels and in flight. Lockheed was one of the contractors working with Marshall on the LDV project, and the company has applied that experience to development of the new remote wind sensing system.

Lockheed's LDV takes advantage of aerosols normally present in the atmosphere—dust particles, for example—to reflect infrared light beamed out by a laser. The reflected radiation is picked up by the LDV, and since the aerosols move with the wind, it is possible to measure wind velocities, including aircraft wake winds and turbulence. The LDV's computer translates radiation reflected by the aerosols into graphic displays which make it possible to measure the severity of vortices generated by large aircraft and how long it takes them to dissipate. Last year the LDV was used to monitor more than 2,500 jetliner landings at Chicago's O'Hare International Airport. The LDV has applicability beyond wake turbulence research. It can be used as a meteorological tool to measure winds aloft with greater accuracy than weather balloons, or as a means of measuring smokestack pollution dispersion patterns.



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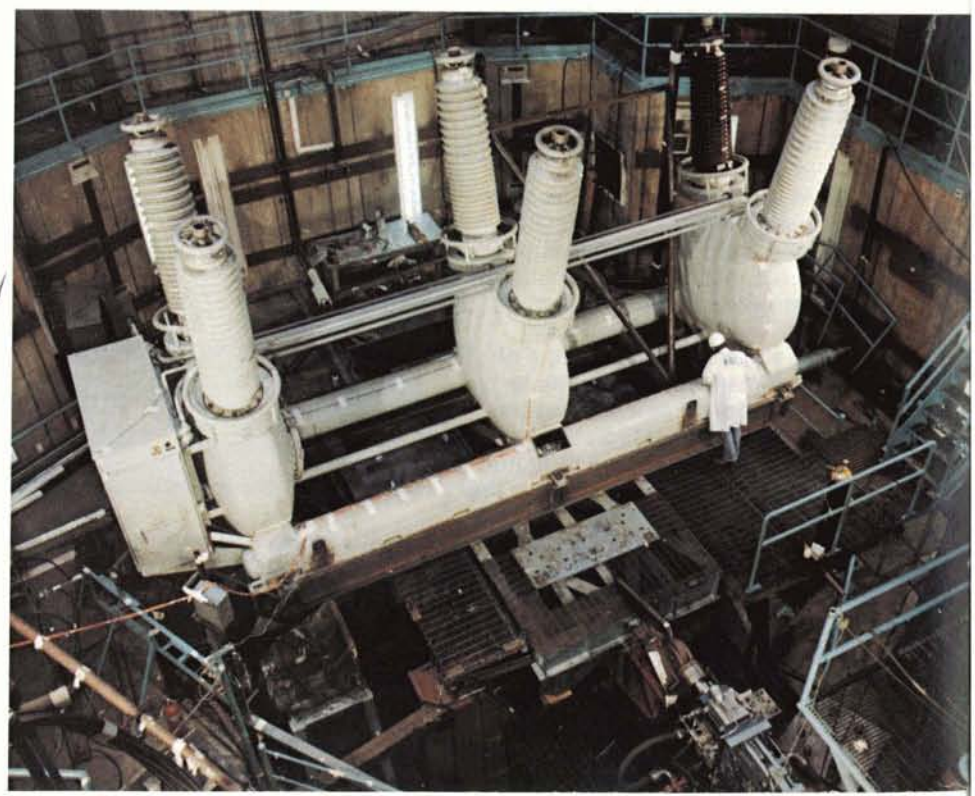

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