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# NASA TECH BRIEF

## Marshall Space Flight Center

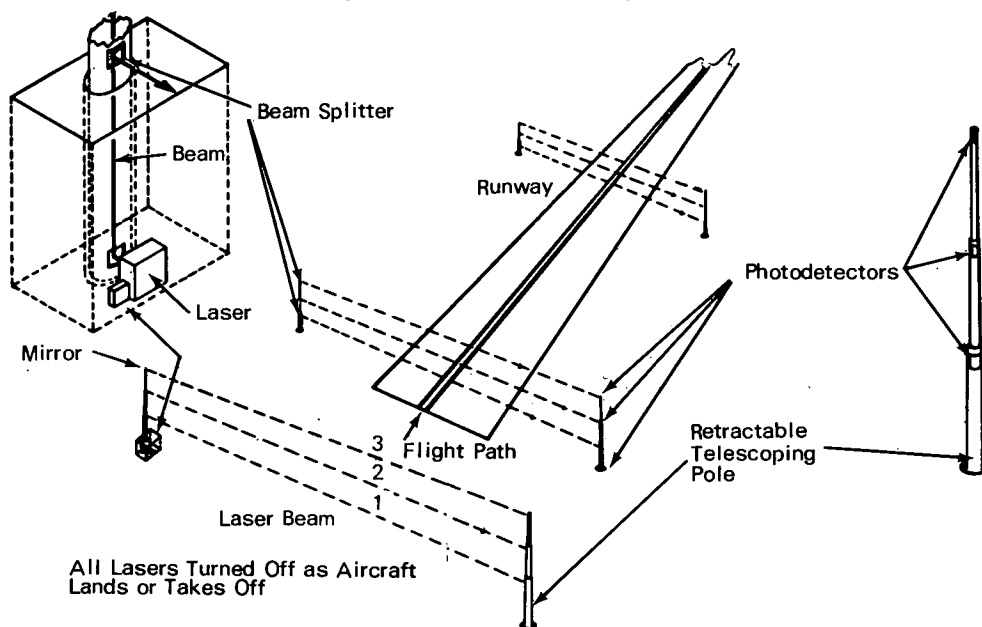


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### Laser Net: A Concept for Monitoring Wingtip Vortices on Runways

A proposed laser net can be used for monitoring the wingtip vortices created over a runway by a moving airplane. These vortices can cause unsafe flying conditions for several minutes after an airplane has

the path of the aircraft to photodetectors on the opposite side of the runway. A vortex wake passing through one or more of the beams in the net is detected by continuously monitoring the difference



Schematic of a Laser Net Laser-Schlieren Monitoring System for Airport Runways

taken off or landed, and appropriate warnings must be issued to provide more efficient and safer use of a runway. Although in time the vortices will decay and move off the runway, uncontrollable variables such as crosswind speed can influence the duration of the vortex hazard.

The laser net (see fig.) consists of a network of laser beams passing over the runway. The net requires towers or poles (rigid or telescoping) positioned along the runway. The laser beam is directed across

between two rms values of the composite signal, one averaged over a much longer period of time than the other. The path of the beam from the laser to the detector is a straight line only when the air is undisturbed. If, during transit from laser to detector, the beam encounters disturbances characterized by density gradients, the laser beam will be deflected from its undisturbed path, and the magnitude of the deflection can be related to the magnitude of the density gradients encountered. A

(continued overleaf)

go/no-go decision for takeoff and landing can then be made from a visual display of the laser beam deflections.

**Note:**

The following documentation may be obtained from:

National Technical Information Service  
Springfield, Virginia 22151  
Single document price \$3.00  
(or microfiche \$0.95)

**Reference:**

NASA-TM-X-64525 (N70-42182), Laser Net:  
A System for Monitoring Wingtip Vortices on Runways

**Patent status:**

This is the invention of a NASA employee and a patent application has been filed. Inquiries concerning license rights may be made directly to the inventor, Mr. Buford Harold Funk, Jr., Marshall Space Flight Center, Huntsville, Alabama 35812.

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