



## ⊕ Modular Rake of Pitot Probes

**Individual probes can be replaced more easily than was possible before.**

*John H. Glenn Research Center, Cleveland, Ohio*

The figure presents selected views of a modular rake of 17 pitot probes for measuring both transient and steady-state pressures in a supersonic wind tunnel. In addition to pitot tubes visible in the figure, the probe modules contain (1) high-frequency dynamic-pressure transducers connected through wires to remote monitoring circuitry and (2) flow passages that lead to tubes that, in turn, lead to remote steady-state pressure transducers.

Prior pitot-probe rakes were fabricated as unitary structures, into which the individual pitot probes were brazed. Repair or replacement of individual probes was difficult, costly, and time-consuming because (1) it was necessary to remove entire rakes in order to unbrazed individual malfunctioning probes and (2) the heat of unbrazing a

failed probe and of brazing a new probe in place could damage adjacent probes. In contrast, the modules in the present probe are designed to be relatively quickly and easily replaceable with no heating and, in many cases, without need for removal of the entire rake from the wind tunnel.

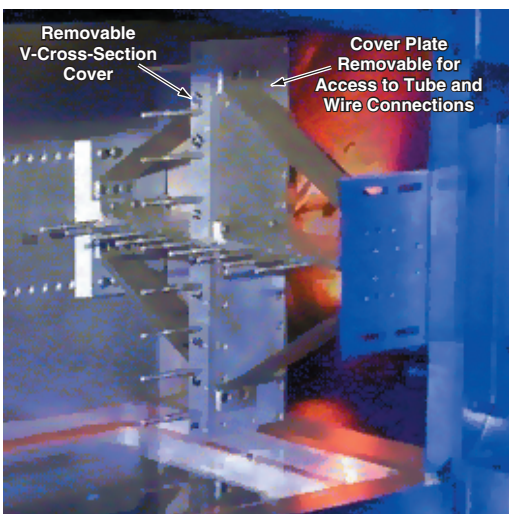
To remove a malfunctioning probe, one first removes a screw-mounted V-cross-section cover that holds the probe and adjacent probes in place. Then one removes a screw-mounted cover plate to gain access to the steady-state pressure tubes and dynamic-pressure wires. Next, one disconnects the tube and wires of the affected probe. Finally, one installs a new probe in the reverse of the aforementioned sequence.

The wire connections can be made by soldering, but to facilitate removal and in-

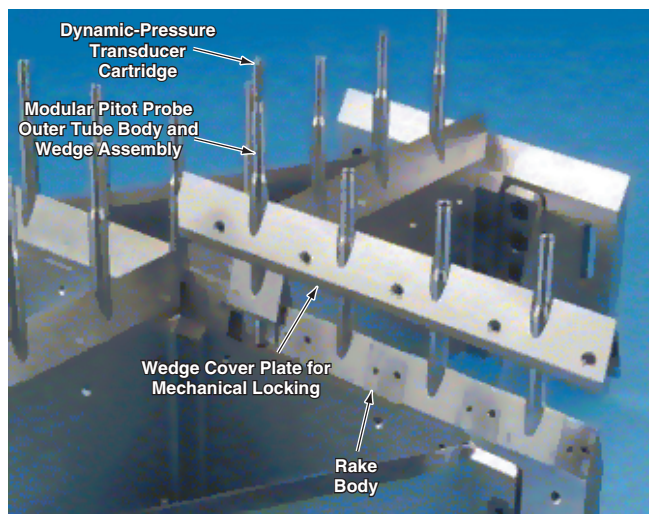
stallation, they can be made via miniature plugs and sockets. The connections between the probe flow passages and the tubes leading to the remote pressure sensors can be made by use of any of a variety of readily available flexible tubes that can be easily pulled off and slid back on for removal and installation, respectively.

*This work was done by Timothy A. Dunlap of Glenn Research Center, Michael W. Henry of QSS Group, Inc., and Raymond P. Homyk of Zin Technologies. Further information is contained in a TSP (see page 1)*

*Inquiries concerning rights for the commercial use of this invention should be addressed to NASA Glenn Research Center, Commercial Technology Office, Attn: Steve Fedor, Mail Stop 4-8, 21000 Brookpark Road, Cleveland, Ohio 44135. Refer to LEW-17272.*



RAKE INSTALLED IN WIND TUNNEL



ENLARGED VIEW OF PART OF RAKE WITH COVER LIFTED OFF

Each Probe Module in this probe rake is held in place by a wedge bracket under a V-cross-section cover plate. The wires and tube for connection to each probe are reached by removing one of the flat access cover plates.

## ⊕ Preloading To Accelerate Slow-Crack-Growth Testing

**Testing time can be reduced substantially with little effect on results.**

*John H. Glenn Research Center, Cleveland, Ohio*

An accelerated-testing methodology has been developed for measuring the slow-crack-growth (SCG) behavior of brittle materials. Like the prior method-

ology, the accelerated-testing methodology involves dynamic fatigue ("constant-stress-rate") testing, in which a load or a displacement is applied to a specimen at

a constant rate. SCG parameters or life-prediction parameters needed for designing components made of the same material as that of the specimen are cal-