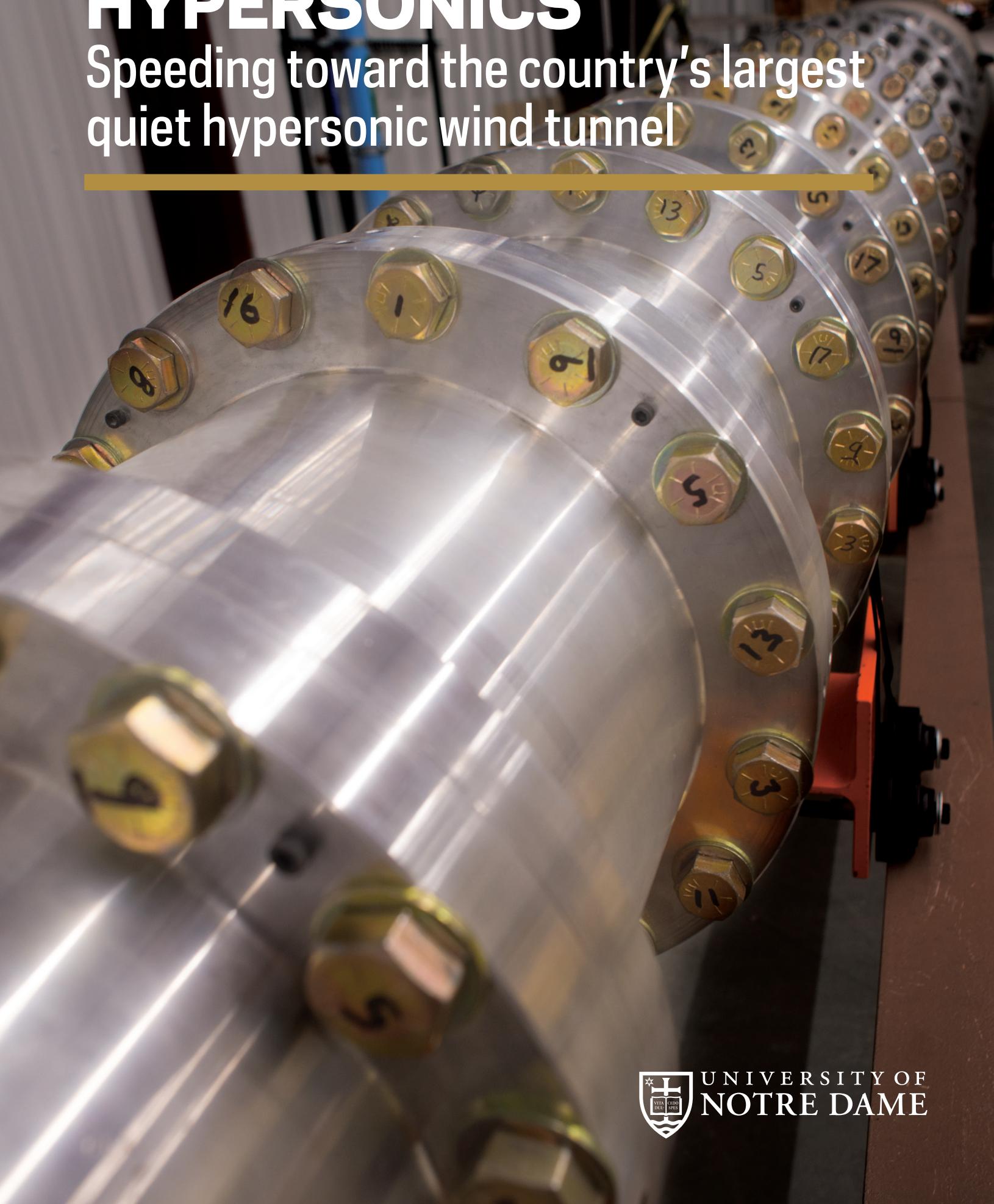


HYPERSONICS

Speeding toward the country's largest
quiet hypersonic wind tunnel



UNIVERSITY OF
NOTRE DAME

Hypersonics: Speeding toward the country's largest quiet hypersonic wind tunnel

Notre Dame researchers are building the country's largest quiet hypersonic wind tunnel. Using a proprietary nozzle design, developed in conjunction with Boeing, the nozzle diameter will be 24 inches, compared to just 8-10 inches in existing Mach 6 tunnels. The nozzle, about 25 feet long and weighing nearly 5 tons, converges to a neck and then slowly diverges in order to gain speed and prevent turbulence.

As part of Notre Dame's Institute for Flow Physics and Control (FlowPAC), most of the research in the facility will be conducted by graduate students. The team's goals include:

- Improving the community's understanding of laminar-turbulent boundary-layer transition and ability to predict aeroheating
- Reducing the risk of newly designed hypersonic vehicles
- Developing methods of controlling transition and minimizing heating

CAPABILITIES

- Low noise level offers ground testing of disturbance environment similar to atmospheric flight.
- Size
 - Open-jet test section allows tunnel to run with larger blunt models or slender models at moderate angle of attack
 - Can test full-scale models of HIFIRE-1, HIFIRE-5, or BOLT flight vehicles
 - A 6-foot-long, 7-degree half-angle cone resides now within the low-noise region
 - Permits proving of laminar-optimized geometries or laminar flow-control techniques
- Instrumentation
 - Good optical access permits a wide range of instrumentation, such as infrared thermography and pressure-sensitive paint
 - Specially designed 3-D traversing mechanism allows off-wall measurements

FEATURES

- 24-inch nozzle exit diameter
- 200-foot long, 24-inch O.D. driver tube
- Fast-acting valve upstream of nozzle throat
- Two-second run time

For more information, please see sites.google.com/nd.edu/flowpac-institute-notre-dame/

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