

## ANSWERS BLOWING IN THE WIND

The U-M North Campus is a veritable treasure trove of technological wonders, and the Department of Aerospace Engineering is no exception. One of these wonders is the wind tunnel facility, tucked away in the Francois-Xavier Bagnoud Building. Visitors are welcome to check out the facilities, but don't expect them to whirl up the machines for you—it can cost \$150 an hour to run a wind tunnel (and that's cheap by wind tunnel standards).



Ismael Mangia



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THE 2' X 2' SUBSONIC WIND TUNNEL REACHES WIND SPEEDS OF 130 MPH AND IS USED EXCLUSIVELY BY AEROSPACE ENGINEERING STUDENTS FOR INDIVIDUAL CLASS PROJECTS. A STUDENT BUILT THE GENERIC AIRPLANE MODEL TO TAKE FORCE MEASUREMENTS.

AN UPSTREAM VIEW OF THE TEST SECTION OF THE 5' X 7' TUNNEL.



Courtesy of College of Engineering



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THE EXTERIOR OF THE SUBSONIC LOW TURBULENCE 5' X 7' WIND TUNNEL.

Run by the Gas Dynamics Laboratories, a group of aerospace engineering professors, technicians and students, the University's 10 wind tunnels are used to research how wind and other forces affect an object. "You can test anything that requires testing under wind conditions," explains Tom Griffin, the supervisor of laboratory services in the aerospace engineering department.

The idea behind the wind tunnel is that resistant forces over an object are the same whether air is blown over the object or if the object is moving through air. So researchers can test how a vehicle, for example, responds to wind forces simply by blowing air over, around and under the vehicle in a controlled test environment. Michigan's wind tunnels have been used to minimize drag on an Olympic-sized bobsled, to efficiently cool buses, and to test an experimental plane launched from the wing of a B-52.



Courtesy of College of Engineering

While the wind tunnels vary in size and type, they all possess some basic similarities. Structured as a duct or pipe, each tunnel features equipment that either pulls air through or recirculates air in the tunnel. In the middle of each tunnel is a test section, where the object being tested (or a model of it) is placed. The test sections of Michigan's wind tunnels are as big as five feet high by seven feet wide or as small as two inches wide by two inches high. The wind tunnels are equipped with balances and test instrumentation that measure the aerodynamic characteristics of the object and the field around it.

THE TEST SECTION OF THE SUBSONIC 5' X 7' WIND TUNNEL IS USED TO TEST A MODEL OF A FORMULA RACE CAR.

Aerospace engineering junior Mike Vostrizansky, who works at the laboratories and gives tours of the facilities, says that some of the University's wind tunnels boast test sections that can get up to Mach 5 speed winds. And what are those wind tunnels used for? Vostrizansky explains: "You can test re-entry into the atmosphere." It is aerospace engineering, after all.