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High-tech plane aids in atmospheric study

By [Dwayne Pickels](#)
TRIBUNE-REVIEW

Tuesday, August 3, 2004

It's what's inside that counts -- and measures, weighs and analyzes.

There is no first-class section aboard the G-1 Gulfstream that has been parked lately on the apron at Arnold Palmer Regional Airport. There are no flight attendants passing out pretzels and half-cans of soda.

But the flying lab has been tricked out with \$3 million to \$4 million worth of atmospheric-monitoring equipment. And the team of U.S. Department of Energy scientists that fly it and run that high-tech gear grasps the importance of its mission.

"We think we're doing something useful for society," said lead researcher Peter Daum of Brookhaven National Laboratory in Upton, N.Y. "Before we can make policy decisions, we need to understand a little better what is going on in the atmosphere."

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The research plane has been stationed at the Unity Township airport since July 20 and will remain through Aug. 15 while its crew samples local skies for the International Consortium for Atmospheric Research on Transport and Transportation.

At a glance, it barely stands out among other aircraft on the field. The twin-turbo-

prop's exterior is fairly typical, except for a few probes mounted on the nose cone and fuselage.

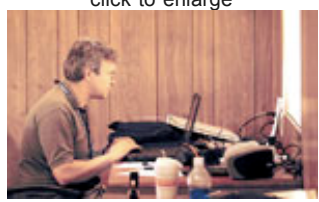
Photo Gallery

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[Mike Alexander \(front\) and Tom Jobson](#)
S.C. Spangler/Tribune-Review

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[Tom Jobson](#)
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Those devices funnel atmospheric samples inside, where researcher-scientists such as Mike Alexander and Tom Jobson, of Pacific Northwest National Laboratory in Washington, run the air through devices that include mass spectrometers.

"This is one of the first ones that has ever flown on an airplane," Alexander said of a particle analyzer -- a complex system of dials, switches and lights on panels mounted over circuits and wires connected to laptop computers.

Hoses and valves channel air into the machines, which determine size, density and composition of air molecules as the plane flies at various altitudes. Other devices track navigational data "so we know where all the readings came from," Daum added.

The sensitive equipment stands up well to normal and even bumpy flight conditions.

"We've been lucky so far," Jobson said. "We haven't had any hard landings."

The team has a study range of about four hours or 400 miles, Daum said.

It is commonly flown at lower levels of about 1,500 feet because of the "boundary layer" created by temperature inversions that hold the particles the scientists are seeking -- aerosol -- beneath a 3,000- to 5,000-foot ceiling.

Aerosol particles, such as sulfur compounds, are the result of emissions from cities and fossil-fuel-burning power plants and increase the amount of sunlight that clouds reflect back into space, he said.

"We look at urban areas, like Pittsburgh, starting upwind and flying downwind to see how the properties change. We might do the same thing over a power plant," Daum said. "Whatever's emitted from the surface will be constrained to that layer, like a lid on a pot."

Aerial research teams also are operating out of New Hampshire, New York and Ohio, as well as England, France and Germany, Daum said. A sea-based craft is doing similar work along the northern Atlantic coast, and several ground-based collection posts also have been established, including a local site.

Argonne National Laboratory's Environmental Research Division set up monitoring equipment last month on the south campus of Indiana University of Pennsylvania in Indiana County to study the chemical composition of aerosols and ground-level ozone.

The hope is that the colossal study will provide a better picture of how aerosol pollutants from the northeastern United States affect climate and air quality as they spread over the north Atlantic Ocean -- information that would improve the planet's long-range climate forecasts.

But collection of the "very technical" data began last month and has so far yielded no startling air-quality revelations, Daum said.

"Nothing's hit us in the face yet."

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