

Composite Nacelles

The principal products of Rohr Industries, Chula Vista, California are nacelle systems, the aerodynamic structures surrounding an aircraft engine, and pylons, structures that connect the engine to the aircraft either under the wing or projecting from the fuselage. The photo, an exploded view of a nacelle system, shows typical Rohr-manufactured products.

In manufacturing jet engine nacelles, engineers are turning more and more to composite materials, comprised of non-metallic ingredients such as epoxy and graphite fibers, that are lighter yet stronger than the metals they replace. Jamie Abbott, senior thermodynamicist with Rohr, states that his company is near the point of producing an all-composite jet engine nacelle. Rohr is conducting extensive research toward that end.

The most commonly used composites can tolerate heat up to 350 degrees Fahrenheit, but beyond that temperature they lose strength. Since the nacelle embraces a jet engine operating at high temperature, heat flow is a major concern.

To predict heat flow patterns, Rohr acquired a specialized computer program—called TRASYS—from NASA's Computer Software Management and Information Center (COSMIC) at the University of Georgia (see opposite page). Developed at Johnson Space Center, TRASYS aids in predicting how much heat will be generated and how fast it will be dissipated under different conditions.

By using the TRASYS program, Rohr saves on nacelle design costs. The basic nacelle design can easily be modified to adjust for different engines, frames and mounts without extensive testing of heat distribution patterns.

