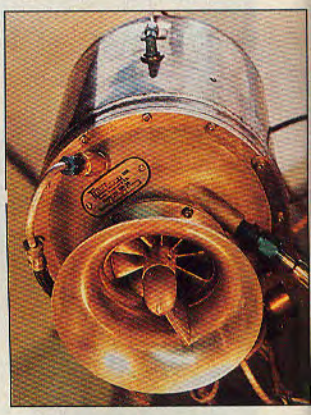
Mini Jet Laboratory Designed for Schools



The small jet engine, weighing 10 lb., will be used for demonstrations and experiments.

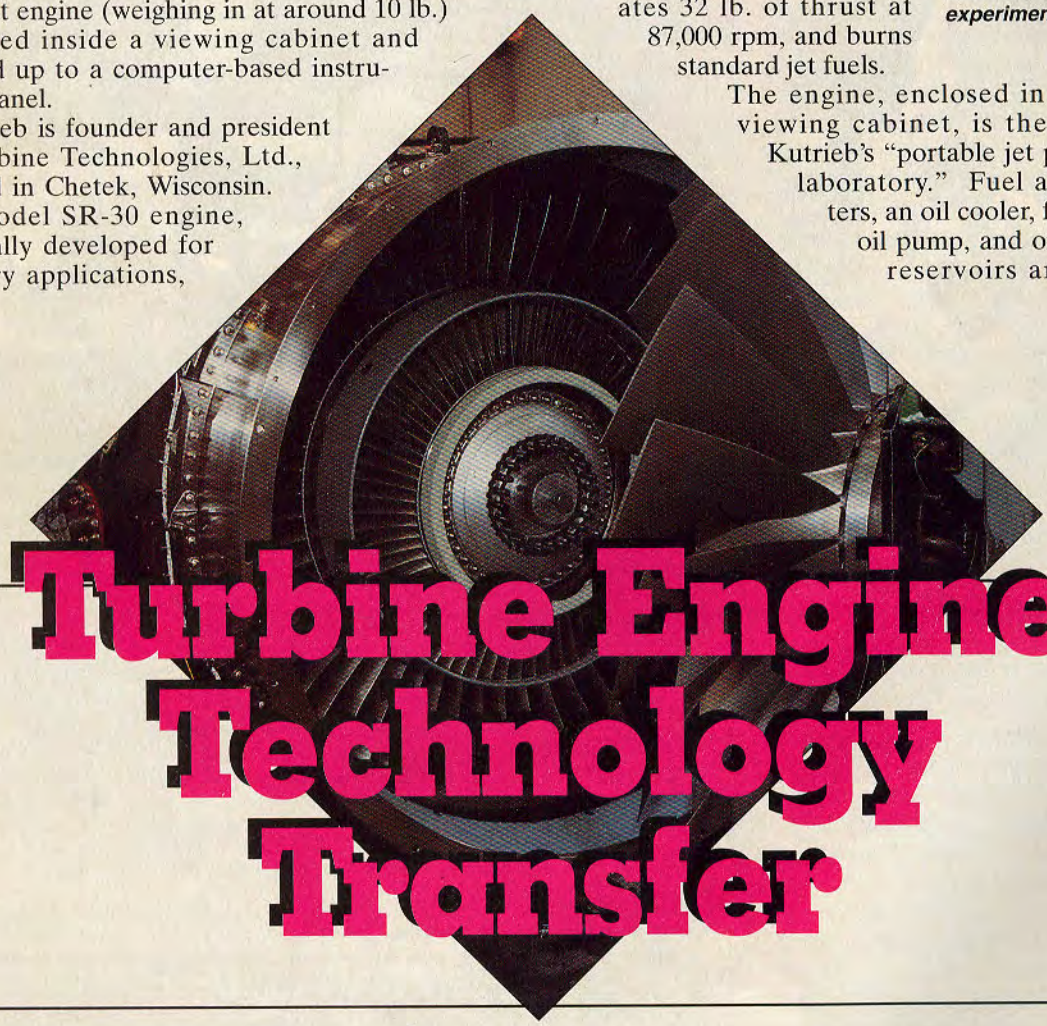
Hundreds of universities and technical schools offer courses in thermodynamics, fluid dynamics and jet propulsion theory, but only a relative handful can provide much in the way of hands-on experience for their students, say, in the form of an actual operating turbine engine that can be started, run up and studied to test out the classroom theory.

Wolfgang Kutrieb would like to narrow that gap between theory and practical laboratory experience. His answer is a compact, comparatively low-cost training device that uses a fully operational turbojet engine (weighing in at around 10 lb.) mounted inside a viewing cabinet and hooked up to a computer-based instrument panel.

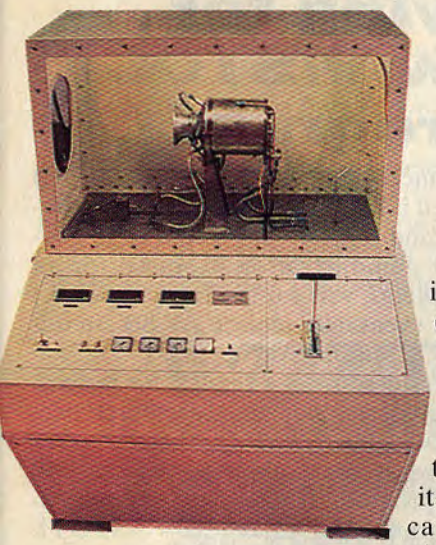
Kutrieb is founder and president of Turbine Technologies, Ltd., located in Chetek, Wisconsin. His model SR-30 engine, originally developed for military applications, features a single-stage centrifugal compressor and diffuser, a reverse flow combustor can, single-stage axial vane guide ring, and turbine wheel. In other words, it's a simple, straightforward turbojet engine in miniature.

The SR-30 measures 11.75 inches in length and 6.75 inches in diameter, generates 32 lb. of thrust at 87,000 rpm, and burns standard jet fuels.

The engine, enclosed in a vented viewing cabinet, is the heart of Kutrieb's "portable jet propulsion laboratory." Fuel and oil filters, an oil cooler, fuel pump, oil pump, and oil and fuel reservoirs are tucked



Turbine Engine Technology Transfer



into an accessory cabinet located beneath the control and instrument console.

Instrumentation includes digital readouts indicating rotational velocities, thrust and exhaust gas temperatures; mechanical gauges for engine pressure ratios, oil pressure and air start pressure (the engine is started using shop air); an annunciator panel, throttle and control switches.

Kutrieb points out that for years engineering schools have used miniature robots to avoid the high cost of full size robots in teaching the fundamentals of robotics. He wanted to apply the same principle to teaching students about turbine engine technology in a hands-on environment.

He says his mini laboratory can be used to set up numerous demonstrations and experiments, such as measuring air velocity at the inlet and exhaust ends of the engine; measuring temperatures at various places in the engine; performing heat transfer studies; performing sound level measurements; performing static and dynamic thrust studies; monitoring fuel flow versus thrust; and comparing theoretical versus actual engine parameters.

Kutrieb says he started his company for the sole purpose of designing and building these miniature gas turbine engines. His northern Wisconsin engineering and manufacturing plant fabricates all parts in house, even the most complex vacuum-cast components.

His engine designs have been used in military drones and remote piloted vehicles and various research efforts, but Kutrieb believes one of the best applications may be as a teaching aid because of the engine's comparatively low cost. He estimates the price of the laboratory installation described above at around $34,000. At this writing, the company has placed two mini labs in service, including one at Japan's National Defense Academy in Tokyo.

For more information on the training module, contact Wolfgang Kutrieb, Turbine Technologies, 430 Phillip St., Chetek, Wisconsin 54728, telephone 715-924-4876.

Rolls-Royce Claims World's Biggest Test Cell

Rolls-Royce has reached the mid-way point in construction of what the company is calling the world's biggest turbine engine test bed. The test cell is being developed primarily to house and test Rolls-Royce's Trent engine, a 70,000 lb. thrust (and higher) member of RB211 line being developed for the new generation of twin engine extended range airliners such as the Boeing 777 and the Airbus A330. When completed late in 1993, the test bed will be used to evaluate the Trent as well as IAE V2500 and Rolls-Royce Tay engines.

The test facility is located at the company's primary manufacturing facility in Derby, England. The building itself is well over 300 feet long and will be able to handle two of the big (about ten

The Rolls-Royce test cell is being built to test the 70,000-lb. thrust Trent version of the RB211.