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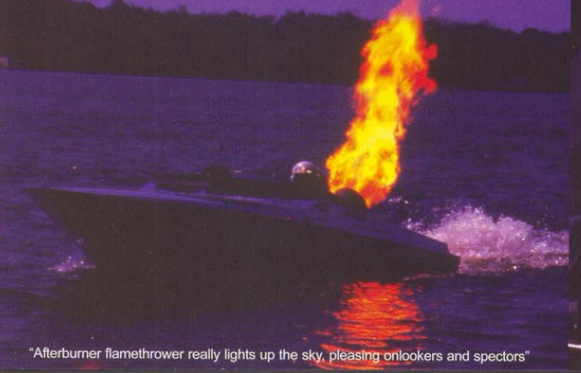
Flame Engineering!

by John Tiger Jr.

Jet Engine Guru Mark Nye's Awesome River Boat

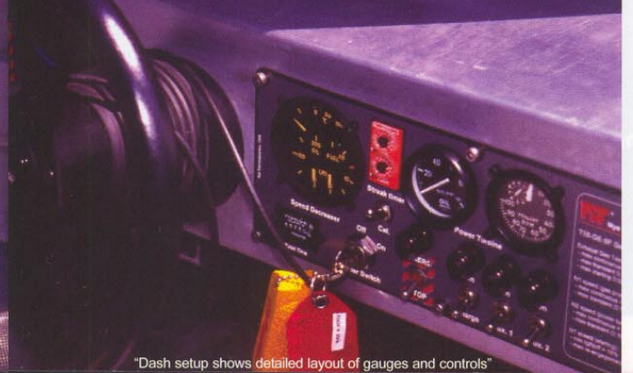
Mark Nye is a special individual. A very talented man, Nye could easily be related to that other famous Nye-Bill Nye, the Science Guy. He's an incredibly creative and innovative engineer who doesn't know the word "can't"; he simply decides a project can be done, and he does it. A jet engine specialist, Nye has long enjoyed boating but wanted the ultimate powerboat; as he puts it, "I wanted the ultimate he-man's boat, one that I could show up to any dock with and the crowd would just say 'wow-I can't beat that'". Judging by his results, he succeeded beyond his wildest expectations. Nye's toy is a specially-built 23-foot step-V aluminum Eagle Powerboats jet hull, powered by a hand-built and fitted US Air Force surplus helicopter jet turbine engine. The custom installation, fabrication and craftsmanship evident in this creation are nothing short of spectacular. What's even more amazing is that Squirt 2, as Mark fondly calls his creation, was conceived, built and launched successfully without any expensive reworks or reconfiguring-it worked right the first time out!

"Under power, Nye's Eagle turbine jet boat rides high and clean"

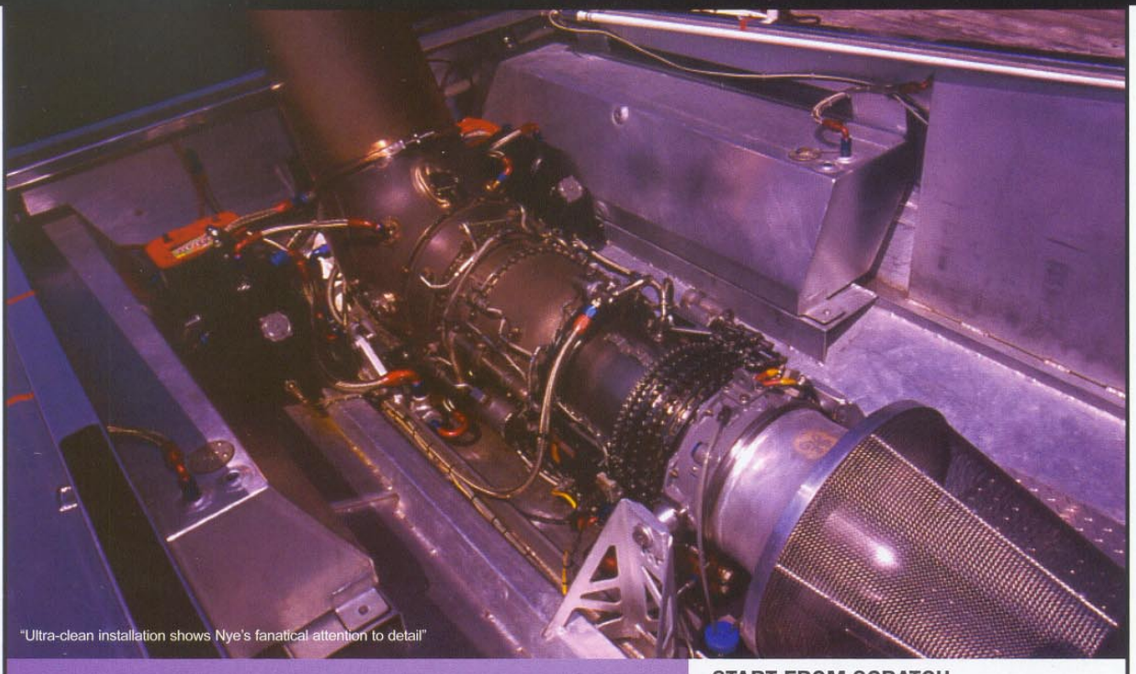


"Afterburner flamethrower really lights up the sky, pleasing onlookers and spectors"

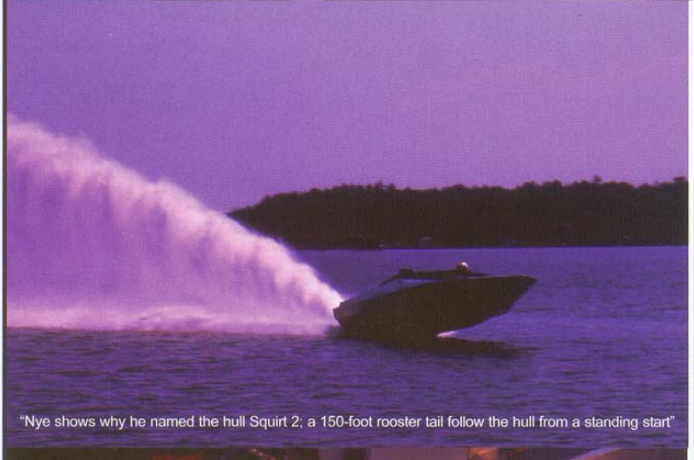
"At the helm, Nye dons his flight helmet and radio communicator in preparation for a test run"



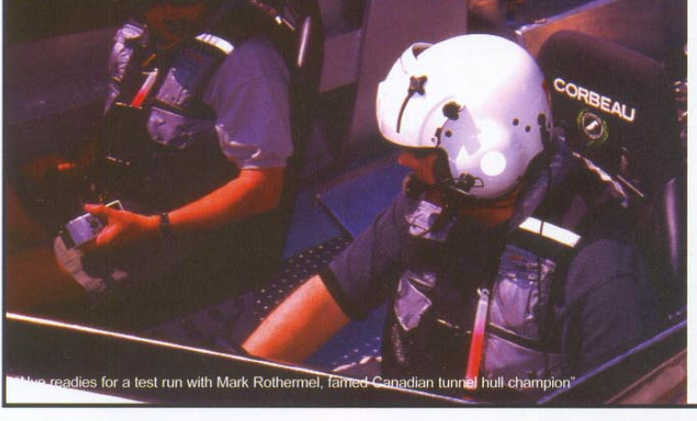
"Dash setup shows detailed layout of gauges and controls"



"Ultra-clean installation shows Nye's fanatical attention to detail"



"Nye shows why he named the hull Squirt 2; a 150-foot rooster tail follow the hull from a standing start"



"Nye readies for a test run with Mark Rothermel, famed Canadian tunnel hull champion"

START FROM SCRATCH

Nye go t the idea for his radical ride after studying jet turbine engines and hull designs over a period of several years. His experience with turbines makes him something of an expert in their theory of operation and application-so much so that he was called on to appear as an expert on The Learning Channel's highly popular Junkyard Wars television show. The episode, which features Mark and crew building a jet vehicle from scratch, will appear in spring 2003.

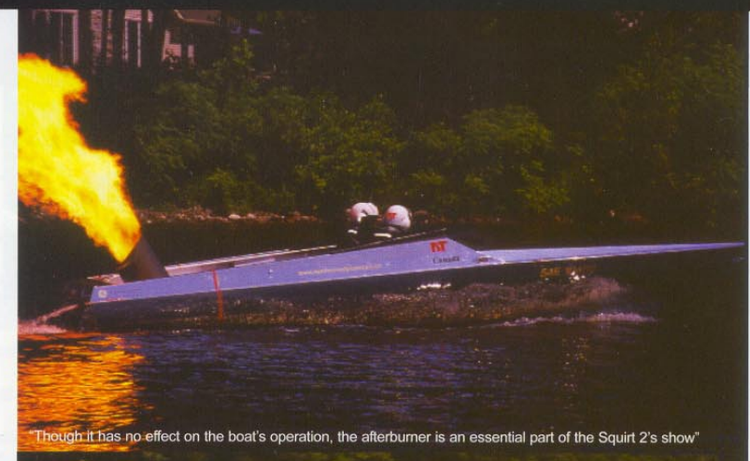
Nye built a low-budget version of his current ride in 1999 using a 19-foot fiberglass hull and an Allison T63-A700 jet engine that weighed only 135 pounds (750 pounds less than the 454 Chevy big-block it replaced). Squirt, as the boat was nicknamed, was a complete success and drove Mark to build his dream boat, Squirt 2.

Nye contracted with Eagle Powerboats, builders of custom aluminum V-hulled river racing craft, to build to his specifications a custom 23-foot step-V hull with custom bulkheads and stringers to accommodate his jet turbine engine. This new engine is a General Electric T58-GE-8F turbine that weighs just 350 pounds, yet produces 1,370 horsepower at 6000 rpm, with about 1,200 foot-pounds of torque. Nye's company, Nye Thermodynamics (www.nyethermodynamics.ca) had to custom-design and fabricate all of the mounting hardware, components and controls for the turbine, and custom-rig them in the hull. The project took approximately two years to complete. A custom three-piece billet aluminum jet pump bowl was designed by Rob Chrunyk at Eagle Powerboats to mate the turbine engine to the jet pump. A 3.25:1 torque-sensing speed reducer was used to couple the output shaft of the turbine to the jet pump. Maximum input speed is 20,000 RPM! The jet pump uses a billet CNC machined, nickel-plated steel impeller.

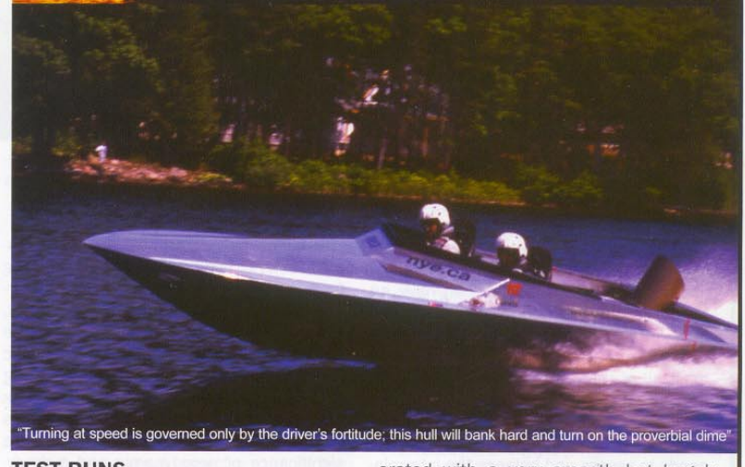
HAND BUILT WITH CANADIAN PRIDE

Mark slowly progressed on his new ride throughout 2000 and into 2001, hand-fabricating the engine mounts, special tools to disassemble the pump and related components, the fuel delivery system, and the controls for the custom dashboard. He even purchased special military surplus helmets and radio communicators so he and his passengers could communicate over the deafening intake noise of the turbine engine. A special disc brake and caliper were fabricated and adapted to fit on the output shaft of the turbine in order to control it for docking and slow-speed maneuvering. The power turbine had to be modified to allow the engine to work properly with the exhaust pointing up; normally, these engines operate with the exhaust pointing to the side. The engine also employs an accessory alternator, driven by a V-belt right from the output shaft. Custom engine mounts and intake screen were designed and fabricated by Mark, and water-jet cut by Mark's buddies at The Waterjet Workshop. Even custom NT (Nye Thermodynamics) logos were custom cut into the mounts, making for a factory-machined look.

In late 2000, the turbine and speed-decreaser gearbox were filled with turbine oil and "spooled-up", making for a successful test run. Then came the arduous task of fitting the engine and gearbox, oil and fuel tanks, and controls and dashboard to the hull. Nye spent most of late 2000 and into 2001 completing the rigging and setup. Friend Art Begin hand-welded, sanded and polished the hull and deck to a mirror finish. The turbine was fitted with an afterburner to provide those special flame-throwing special effects for onlookers.



"Though it has no effect on the boat's operation, the afterburner is an essential part of the Squirt 2's show"



"Turning at speed is governed only by the driver's fortitude; this hull will bank hard and turn on the proverbial dime"

TEST RUNS

Mark's hard work and long hours of planning, designing, fabricating and rigging paid off handsomely. Squirt 2 performed almost flawlessly on it's maiden voyage, experiencing just a few hiccups due to fuel frothing when the boat was operated in rough water. In typical fashion, Nye built a custom fuel deaerator to solve this problem, and it worked perfectly. We got the chance to ride with Mark last summer in Squirt 2, and it was truly an unforgettable experience. Despite it's awesome power and speed, the boat handles very well under Nye's control. Around the docks, the line-lock brake assembly holds the raw turbine's power at the ready as we donned our helmets and communicators; Idling away from the dock, Mark lit the afterburner to wow the crowd on shore. With a thumbs-up, he powered up the turbine using the foot throttle, and we immediately accelerated with a very smooth but hugely powerful rush, the Eagle hull rising onto plane and barreling down the lake as we accelerated on up to just under 100 mph. As for top speed, Nye hadn't had the throttle open for any extended periods of time yet, but felt confident that the Eagle hull and 1370 horsepower under his right foot could easily push him to speeds in the 120+ mph range. Indeed, he was only using between half to three-quarter throttle at 90-plus as we rocketed over wind chop. Handling was incredible; the boat cornered hard and clean even at 85 miles per hour, never skipping or sliding until the wheel was cranked over tightly. What a rush!

-John Tiger Jr.