BEECHCRAFT WORLD SOCIETY Est. 1968

World Beechcraft

www.worldbeechcraft.com A Publication of the World Beechcraft Society Sept./Oct. 2005

300 Knots *of* Total *Wow!*

Rocket Engineering's Turbine Duke

Oxygen Cylinder Dangers

F35 Rebuild

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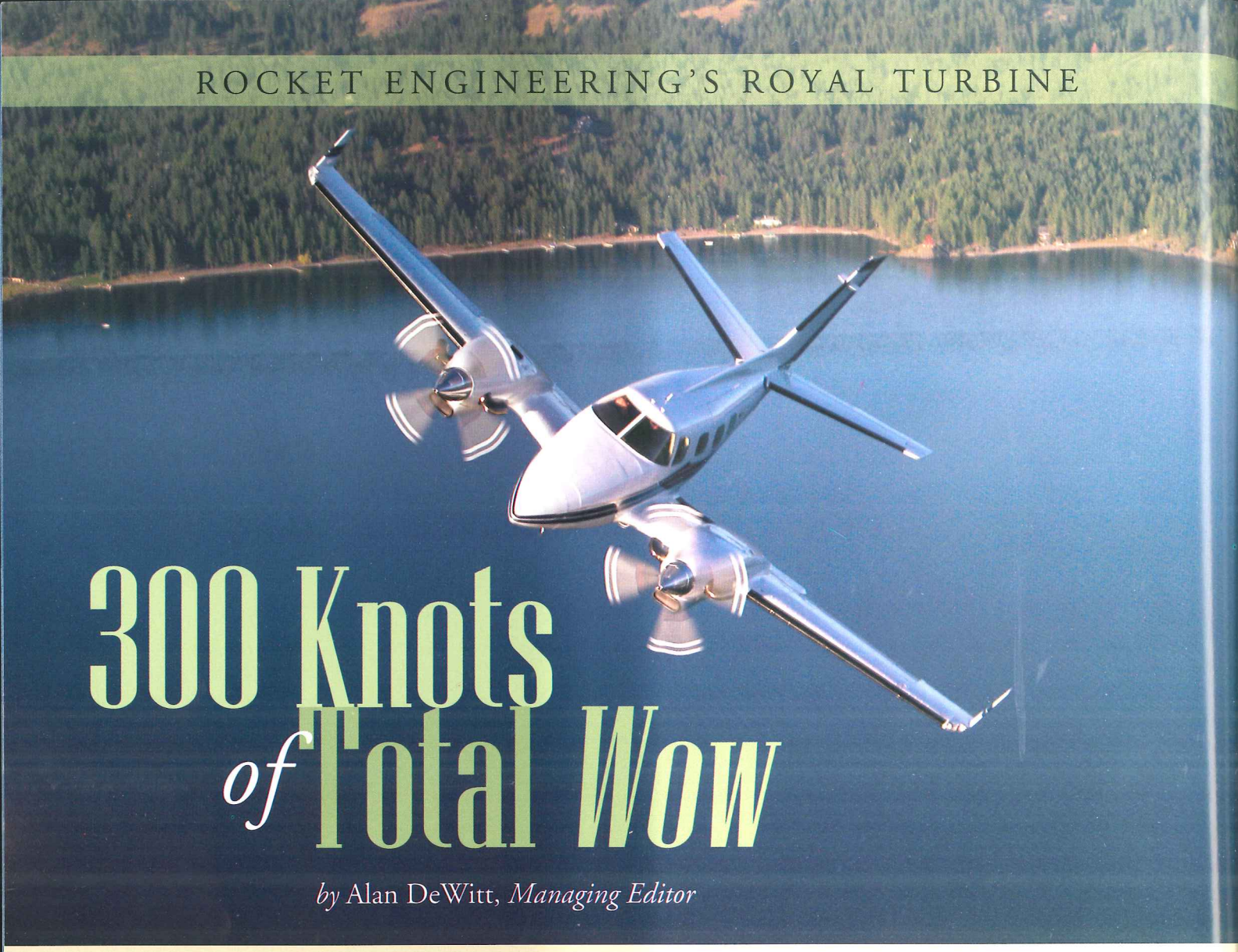


300 Knots of Total Wow

by Alan DeWitt, *Managing Editor*

Strap two Pratt & Whitney turboprops onto a Beech Duke and what do you get? You get your ears pinned back and the ride of your life.

Shhhh...it's a Secret

My first introduction to the whole idea of a Duke turbine conversion came at the 2004 WBS Convention in San Diego, CA, when I overheard a member talking to one of our supporting vendors, Lynn Amstoy of Rocket Engineering. He asked, "Your Beech B36TC conversion is welcome, but why hasn't anyone converted a Duke to turbine power? You might want to think about it." Lynn only smiled in reply and answered evasively, saying that the subject had come up before and the Duke conversion had been given some consideration.

Later that year Lynn admitted to me that the project was well underway. He swore me to secrecy—but gave no further indication as to the time frame for completion. "You'll see," he said. "I'll let you know."

I bumped into Lynn a few months later at the WBS Convention in Santa Maria (January 2005). In confidence, I was told that Rocket Engineering would release a full report on the Duke by mid-year with certification scheduled for later in the year.

After all the conjecture, suggestion, secrecy and hinting around, no one was more excited to receive a call from Rocket Engineering than I was.

"Will you be at Oshkosh for the unveiling and for a test ride in the Duke turboprop conversion?"

"No," I answered, "I can't be in Wisconsin this year."

"Then how about your own, private demo flight at the shop?"

"Yes. Absolutely. Of course. You betcha. When?"

Anticipation

Rocket Engineering is only a short 2 hour flight to Felts Field Spokane from my home base in Auburn, Washington. They had to finish up in Oshkosh; I had to wrangle my schedule at my printing company. We settled on August 8th at 9:00 am for the big event.

My enthusiam was further whetted by the unbelievable performance figures I'd been given over the phone (see Technical Specifications, page 7). Two Pratt & Whitney PT6A-35 turboprops, delivering 550 shp of sheer muscle from both sides, climbing speed of 4500+ ft/min, and a usable payload of 854 lbs with max fuel and

a speed of 300 or more knots. I tried to imagine a 6-place, twin-propeller driven airplane on steroids, but couldn't get my brain wrapped around it. In my experience, I had no point of comparison.

My excitement increased as the date approached for my visit to Rocket, though I was concerned that inclement weather might get in the way. I'm not instrument rated, so I kept a close watch on the forecast. The day before the appointed visit, a pattern of marine fog and low clouds were expected in the morning hours. I wasn't willing to take even the smallest chance; I decided to leave the evening prior and stay with family in Wenatchee to insure that I would be in the clear for my Duke preview flight.

I took off under spectacularly clear skies to make the journey first to Wenatchee and then on to Felts Field the next day. I puttered along at 5,500 ft at 120 kts GS in a Cessna 172. The modest tailwind helped to push me along, and helped to further push up my level of anticipation. There's nothing like a S-L-O-W flight in a Cessna at 120 kts to prepare you for a magic carpet ride in a Turbine Duke clocking in at 300 kts.

Many of you in the WBS know I'm not a Beechcraft owner. I *aspire* to own one of those wonderful airplanes—in the meantime, I must settle for one of the three Cessnas or the one Piper shared by the association to which I belong. Not that I'm complaining. The slow, dogged journey up and over the Cascade Mountains and across the flat, featureless landscape of Eastern Washington only accentuated the pure adrenaline rush of flying in one of the fastest propeller twins available.

No One Was Expecting Me

I am notorious for being late, but this time I arrived at Rocket Engineering just before 9:00am. I received a warm, welcome handshake from Lynn Amstoy.

"Great to see you again, Alan! What brings you all the way out here to Spokane?"

"I'm here for my demo flight."

"Really? What plane are you interested in?"

"The Turbine Duke. Remember? August 8th? 9:00 am? Demo flight? You and me? Going fast? Does any of this ring a bell?"

"The Turbine Duke? We can't fly the Duke today. It's up on jacks. They're taking it apart as we speak."

"But..."

"Don't worry. I'll get it taken care of. Have some coffee and then we'll take the tour."

It turns out that no one had passed the word along about my visit. No matter. On a moment's notice, Lynn quickly had his guys ready the plane. While we waited, he showed me around their very impressive facility. Rocket had at least a dozen aircraft in various stages of conversion: two Dukes, two Bonanzas, and at least eight Piper Malibus. The entire staff was friendly and professional. Everything was clean and efficiently arranged in order to receive, perform and complete the conversions that Rocket Engineering has become known for.

Darwin Conrad, Jeanie Sadler and Warren Wood began converting Malibus and Mirages back in 1997 and since then have upgraded 160 airplanes. This was followed by a conversion for the Beech B36TC (an airplane we saw on display at the San Diego convention in 2004), with 10 airplanes finished to date. Now they've gone and topped themselves again with the Turbine Duke. In total, Beech delivered just under six hundred Dukes between 1974 and 1982. Owners of that model will welcome the turbine conversion, considering the less-than-positive reputation Duke had gained for its orginal TIO-541 engines. Pilots can share with you their frustration for engines rated at a TBO of 1200 hrs, "improved" to 1600 hrs with new crankshafts, cylinders and upgrades, and still so unreliable that the planes spend more time on the ground than in the air. Is it any wonder that the turbine conversion offered by Rocket is so highly anticipated?

Finally Airborne - and Loving it

Darwin Conrad joined us and as soon as the mechanics gave the thumbs up, we loaded up for the demonstration flight in the Duke. The first thing that struck me was the eye-appeal of the airplane. I've always thought that the Duke had excellent lines and looked as as fast as a gazelle sitting on the ground. Rocket's conversion included not only the engines, but a complete makeover of the panel, including all new engine instrumentation, MX20 multi-function display, and GNS530 and 430 navcoms. Outside, a crisp coat of white paint with racing blue stripes, four-blade Hartzell props and proud winglets at the tips of both wings. The Duke looked like it had been built with the turbines attached. The worksmanship and the finish were excellent. All of the conversion parts from mounts to nacelles were engineered and manufactured at Rocket's well-equipped facility. Every inch of chrome glittered in the morning sunlight as we rolled out.

I strapped in the right seat as Darwin completed the preflight and began the startup. We taxied out for departure on runway. I could already feel the smooth power as Darwin ran through the checklist. Missing was the characteristic vibration of the pistons during run-up. Instead, a strong smell of Jet-A, followed by the slow whine of the turbines and then the beefy growl as they warmed up. Darwin brought the power up slowly and then, like a thoroughbred breaking out of the

Built for speed, the Turbine Duke doesn't look half bad, either.

gate, we charged down the runway and into the air.

We lifted off with substantially less than full power (probably around 60-70% initially with the throttle being advanced slowly and in stages). The Duke climbed effortlessly at approximately 130KIAS and at over 4200fpm. At 10,000 we were still climbing over 3500fpm. If I had hair, the momentum would have slicked it back like Brylcreem.

Darwin relinquished control of the aircraft to me while still in a climb. A very short time later I leveled the aircraft at 17,500. The climb rate was still over 2500fpm before I began to level out. At cruise, our TAS settled on 278kts at 17,500ft with a fuel burn of about 62 gph. Darwin usually counts on a 9-minute climb to 25,000ft to get up high and take advantage of the winds and turbine efficiency—no slow climbs to altitude for this machine. It's as easy as pointing the nose up and away you go. No discomfort once you get there. The Royal Turbine allows for cruising in pressurized ease and style.

While airborne I had an opportunity get some answers. The conversion comes in two versions, utilizing either PT6A-35 or A-21 variants. The former provides maximum performance while the latter is preferable for more economical operations and longer range. Beginning with your average Duke, priced between $150,000 and $200,000, the entry-level A-21 conversion adds a cost of $767,000 while the premium upgrade costs $887,000. Still, at a cost of around $1 million dollars, you're into a 300-knot, six-seat, twin-engine high-performance turboprop airplane for less than anything else in its peer group. And you won't be facing any significant engine costs for five years, since Pratt & Whitney warrants the engines for that period of time.

If you're in the market for the conversion, plan on 90 days—give or take—for final delivery. You might also want to plan on a parade of pilots coming over to take a look at your spectacular new airplane.

My Return to Reality

It was 95 degrees when I took off into a 10kt headwind. I climbed to 8500ft and then to 10500ft to stay cool. After the exhileration of flying the Duke, it was definitely anti-climactic to fly 2 hours and 10 minutes back to Auburn in a Cessna. Although, I had plenty of time to calculate how long it would have taken in the Duke - a mere 50 minutes to travel the 203nm from Spokane to my front door.

It gave me time to think about other things as well. I thought about my hosts at Rocket Engineering, Lynn, Darwin, and the others. I thought about their go-the-extra-mile so I could fly the Duke even though I would never be able to buy one in a million years—or a million dollars. Of course, they knew I would be writing this article—free publicity and all. But could they have known how I would react once I flew in their plane? Could they have known what I'd write in this magazine? Could they have predicted what I would say to all the Duke and Bonanza owners out there who dream about a turbo-prop conversion?

Oh, yes. They knew exactly what I was going to say. Wow. –

Top: Lucky airplanes awaiting conversion in the Rocket hangar.

Middle: Cabin class comfort throughout.

Bottom: Fully decked-out panel.

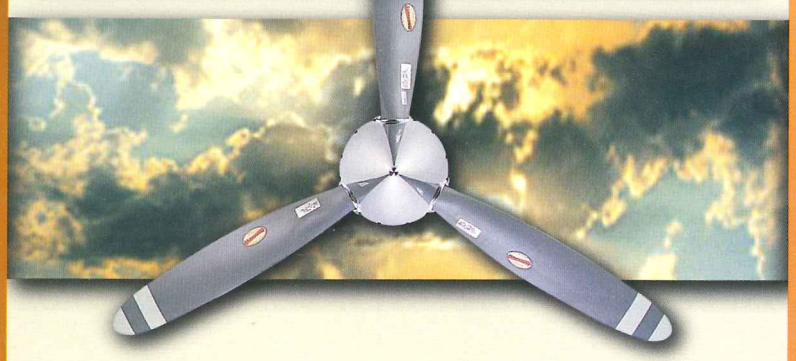
This angle shows an excellent view of the winglets and Rocket Engineering logo.

Turbine Duke Specifications*

Engine 2 (new)	Pratt & Whitney PT6A-35
Hartzell or MT Prop	4 blade
TBO	3600 hrs
HSI	3600 hrs
Passenger seats	6
Length	29'3"
Heighth	8'5"
Wingspan	37'10"
Max Ramp Wt.	7039 lbs
Max Take-off Wt.	7000 lbs
Standard Empty Wt.	4430 lbs
Max Useful Load	2609 lbs
Max Usable Fuel	262 gals/1755 lbs
Payload @ Max Fuel	854 lbs
Ceiling (certified)	30,000 ft
Takeoff Runway (50' Obs)	1400 ft
Landing Runway (50' Obs)	1200 ft
Max Climb Rate	4250 ft/min
Time to Climb @ 25,000 ft	9 min
High Speed Cruise	
25,000' + 7'C hot day	291+ ktas
Fuel Flow	76 gph
Long Range Cruise	
28,000'	285+ ktas
Fuel Flow	68 gph
Max VFR Range, no wind	1100 nms
High Speed Cruise	
18,000'	265 ktas
Fuel Flow	68 gph

*All Specifications and performance are based on preliminary flight test data.

HARTZELL PROP CONVERSIONS FOR BEECHCRAFT



Improvements over two-bladed props:

• Better take-off and climb performance. • Lower noise levels.
• Smoother operation. • Improved appearance.

Improvements over two and other three-bladed props:

• Longer TBO than many McCauley props (2,400 hour/6 year).
• Elimination of oil-fill and 400 hour inspection requirements on Bonanzas.

All kits include a 3-bladed propeller unless otherwise noted.

33 Bonanza/Debonair
(2 & 3-blade)

35 Bonanza
(2 & 3-blade)

36, A36 & B36TC Bonanza

Travel Air
(2-blade)

55 Baron
(2 & 3-blade)

58 Baron

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