

DHC-2 de Havilland Beaver

Making a silk purse out of a . . . ?

by Budd Davisson



The de Havilland Beaver is one of those airplanes that is nearly impossible to be ambivalent about: You either love it, or you just don't get it. In fact, you can tell where a person's head is at concerning airplanes by making one simple statement: "De Havilland Beavers are cool, aren't they?" If the listener launches off on his own series of positive adjectives, he's one of "us." If he says, "Are you nuts? It's slow, noisy, ugly, greasy, and huge," he isn't one of us, although he has just run down

the list of some of the airplane's more endearing qualities.

Doug DeVries of Kenmore, Washington, is one of those who definitely gets it. However, those who are used to seeing Beavers that have a distinct rode-hard-put-away-wet patina are going to think Doug has his own definition of "it," because even though his is ridden hard, he's riding it in high style and comfort. And it is seldom put away wet.

It's possible that Doug's 1955 Mk.1 Beaver may be one of the most luxurious Beavers in existence. At the very least, it has to be one of the



STEVE SCHULTE

Doug DeVries, center, and his two friends Jim Clark (left) and Steve Samuelson (right) bask in the reflected sunshine from one of the cleanest Beavers flying today.



The Pratt & Whitney R-985 engine powers the Beaver. De Havilland Beaver enthusiasts celebrate the 60th anniversary of the design during 2007. The first flight of the Beaver prototype was on August 17, 1947.



few pristine Beavers that spent at least part of its life looking up at a saltwater surface from the bottom. Although the accident was long before Doug came into the picture, it will be remembered

The cockpit of the Beaver still retains the flavor of the original layout, but a number of modern improvements are incorporated. On the far right, the radio panel is angled inward for better visibility for the pilot, and the center console is dominated by a completely restored de Havilland Canada engine control cluster and a Garmin GPS/multifunction display.



You can carry plenty in a working machine such as this bushplane. A smart-looking Beaver logo is embroidered on the aft bulkhead, with a beefy cargo net installed to keep the baggage where it belongs.

over. Doug doesn't think this actual crash was used in the movie, but the approach was. The airplane was crudely yanked out of the water and then spent a few years as a pile of parts languishing in various locations before Doug DeVries came into the picture.

Doug got into aviation shortly after graduating from Cal Poly with a degree in mechanical engineering.

"A friend took me up, but I was pretty broke and at the time couldn't do much more than take ground school," he says. "A few years later I got my private pilot's license and rented for a year or so before going into partnership in a Grumman Tiger."

Then, as is often the case, career and other interests took precedence. From the beginning he had wanted to get into the medical device field in the hopes of developing something that would benefit people in general. He began focusing on breathing ventilators and eventually became successful enough to get back into aviation.

"I wanted my own airplane and bought a Bonanza, but then saw a Stearman and read Stephen Coonts' *The Cannibal Queen* and thought that kind of open-cockpit touring was something I'd love to do, but kept putting it off. Then, one day I went to the hardware store to get a tool for a repair I was doing on my Bonanza,

and the clerk started asking me questions about what I was doing. Half-hour later, it came out that the clerk had at one time raced P-51 Mustangs at Reno, but in a freak accident got a thistle in his ear while camping in the desert, got permanent vertigo, and lost his medical and flying privileges forever. His story motivated me to start the Stearman project now, as one can lose the privilege to fly in a moment's notice.

"I decided waiting was the wrong thing to do and started looking for a Stearman project."

Doug dragged an incomplete N2S-3 into his shop, and when it rolled out several years later and he flew it to Oshkosh 2000, he took home the Best WWII Trainer trophy. Not too shabby!

"Even while I was doing the Stearman I was dreaming about de Havilland Beavers," he says.

Considering that he lives in Kenmore, Washington, the home of Kenmore Air Harbor, which not only produces EDO floats, but also has been a center for Beaver rebuilding for decades, it only makes sense he could contract Beaver fever. Kenmore has dozens of STCs for the airplane and routinely turns out totally rebuilt Beavers and Otters.

"I've always loved the airplane and decided it would be my next project,

BONNIE KRATZ

as an ignoble end for a movie star—it was in the process of making the 1998 Harrison Ford movie *Six Days, Seven Nights* when disaster struck.

Serial number 799 was one of three Beavers used for flying shots in the movie (four more were used for static/studio shots). If you saw the movie, you'll remember the last shot of Ford's character trying to land a Beaver on makeshift floats in the surf, which didn't go well at all. In real life, the airplane was suspended on a cable under a helicopter while it "flew" onto the water. Although in the case of SN799, it flew "into" the water, when it caught a float and flipped



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“The airplane needed total rebuilding from one end to the other because the damage affected almost every part of it. When it was wrecked and they tried to pick it up, they actually broke the spars and folded the wings outboard of the struts. The cabin was badly crushed and compressed at least 6 inches. All of the structure in the top, including the structural channels, was damaged or tweaked, so nothing lined up.

“Most Beavers spend their lives on floats, as did this one, so you expect to find corrosion, especially in the tail, and this one was no different. However, since this one had been submerged for at least a little while, we



had to do some serious investigating to make sure we found all the corrosion. The rear of the fuselage, including the back bulkhead, was pretty bad, but the rest was surprisingly clean, considering its history, which made little difference since so much of the metal had to be replaced anyway to repair damage. They must have hosed it out immediately after pulling it out of the water. However, everything electrical was useless.”

Doug is very much a hands-on restorer and estimates that of the 7,000 man-hours that went into the airplane, at least 4,000 of them are his. He has a complete shop with most machining and sheet metal capabilities right at hand.

“The wings looked unrebuildable until you understand the way Beaver spars are designed; they are built in four sections, not one long piece, so I purchased another set of damaged wings, and between the two sets I was able to piece together the spar structures.”

The good news about the Beaver is that it was specifically designed for a

rough and tumble market that included both civilian and military/governmental bush-type operations. During its nearly 20-year production span (1948-1967) 1,657 airplanes were built, but many of the customers were military or government departments (the U.S. military, among many others, operated hundreds as L-20s), so spares were also produced by the truckload to support them. De Havilland apparently recognized the types of operations in which the airplane was likely to be involved were of a high-risk nature, which meant an unusually large number of airframe components would be consumed as a matter of course. This has worked very much to the advantage of people such as Doug who are putting Beavers into the air that would otherwise appear to be damaged beyond feasible repair. In Doug’s case, without too much trouble he was able to find new, unused structural components for the cabin, along with many other ex-military/government components.

In addition to the NOS (new old stock) and surplus components still

available, Viking Air of Victoria, British Columbia, purchased all of the available production tooling for the airplane and has been producing those replacement parts that aren't readily available. In addition, in February 2006 Viking Air purchased the type certificate for the machine from Bombardier Aerospace, which gives it the exclusive right to manufacture new Beavers. Does that mean we'll be seeing a new generation of DHC-2 Beavers in the future? Given the cost of production and the supply of older airframes, that doesn't seem likely, but anything is possible in aviation.

Even if his airplane hadn't gone swimming, the sheet metal on Doug's bird was typical of Beavers worldwide: It showed the dents and dings that come from being gainfully employed for more than five decades. Beavers have never been relegated to antique status, and nearly all that are still flying are still working for a living. In Doug's case, however, between the saltwater, damage and wear and tear a lot of sheet metal had to go.

He says, "Around 90 percent of the fuselage skins are new along with a lot of internal structure, especially in the cabin area. To straighten the fuselage, I built a jig in accordance with dimensions given in the original de Havilland drawings and used the jig to fix the precise locations of the major attach points, such as the wing connections. And yes, it does fly straight. There are a lot of structural frames and stringers and such in the top of the cabin that were damaged, and if the component needed was a bent-up part and we couldn't find NOS, we just made it new in the shop. Because there was a lot of damage to the wings and we didn't want to install patches, about 75 percent of the wing skins were replaced.

"The cowling was badly crushed, so I sent it to Ray Morin in Quebec, who specializes in rebuilding Beaver components. He did a masterful job on it.

"Beaver landing gears are a little unique because the legs are essentially chromoly boxes that pivot at the bottom of the fuselage. There is no mechanical shock system. Instead, the legs butt up against big rubber blocks. We installed rubber pads that were '337

field approved,' as ours were dried and hard. We did find a crack in one of our gear legs, but that repaired fairly easily.

"There are 10 type-written pages in the logbook, which is actually three three-ring binders (since condensed to a mere single three-ring binder) that describe the repairs."

Once he had repaired the damage and removed the "patina" that 18,000 hours of hard work had left behind, he could start working on the fun stuff.

"There is nothing original on the panel. I planned on flying this airplane a lot, not just to fly-ins, so I wanted it as modern and as usable as I could make it. I modeled it in 3-D on the computer in SolidWorks and set it up to optimize the ergonomics from the pilot's position. This included slanting the radio stack toward the pilot so I have a direct view of the radios.

The cockpit still includes the unique Beaver oil system: the dipstick is in the cockpit and you can add oil in flight, something that's probably important when flying an R-985 on long flights.

"We had to get 22 337s for things we modified, ranging from extending the cockpit to installing modern avionics. The entire process worked fairly smoothly because we had an excellent FAA rep that worked with us, rather than against us."

The paperwork on the airframe work may have gone smoothly, but Doug had another paperwork situation that most definitely didn't go smoothly.

"The title paperwork we got with the project didn't actually match the dataplate on our airplane. It showed a serial number which the records showed as being destroyed in Alaska. I could have gone with that and had a lot fewer headaches, but we wanted it as it was when it flew in the movie. On the forward bulkhead of the fuselage, we found an original dataplate that identified this airframe as SN799.

"We needed the FAA to authorize the issuance of a new dataplate, which isn't something they take lightly. We needed proof of what we were saying and that the numbers were correct. Thankfully, Bombardier had all the records, so we sent them serial numbers from a number of the serialized parts,

and they verified that they belonged to SN799. We combined their letter with photos of the airplane in the movie, and the FAA relented and issued authorization for a replacement dataplate.

"I thought long and hard about just staying with the existing SN paperwork, because by opening that can of worms the FAA could just as easily have said that we looked as if we were trying to do something fraudulent (and in fact they did at one point), and we'd have no airplane at all. The real turning point came when a safety inspector came through our shop to take a look at the airplane. He saw how professionally we were approaching the project and that we weren't trying to pull a fast one on them."

Kenmore Air is renown for its expertise on the R-985 Pratt & Whitney, so Doug's decision on who should rebuild the engine was a no-brainer.

"When Kenmore did the engine, we were surprised to find the inside of the engine to be in good condition considering the time it had spent underwater. The original cylinders, which had been full of saltwater, were reused, although they were chromed. Major components replaced were all the pistons, crankshaft, crankcase, blower, rear case, and the impeller shaft assembly.

"We replaced the two-blade prop with a slightly smaller diameter, STC'd, three-blade McCauley, mostly because of noise considerations. I'd be working off Lake Washington, which is ringed with houses, and I didn't like the idea of being 'that noisy floatplane.'"

While Doug was in the rebuilding process he bought another Beaver to fly, which not only got him in the air, but also showed him what he wanted to change in his other airplane during the rebuild. This airplane also opened his eyes to the kinds of adventures he'd like to have in the new airplane. This aircraft was flown to Oshkosh on straight floats in the summer of 2004 and was the main subject of an *EAA Sport Aviation* article titled *Leave the Floats at Home*.

"We heard about a unique airplane tour in Australia called the Great Circle Air Safari that was open only to vin-

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tage airplanes and included 4,000 miles touring the Australian Outback. That sounded like the kind of thing we'd like to do with the new airplane, so we shipped the Stearman to Sydney, where we had barely a day and a half to get the airplane together and fly one test hop before taking off with the rest. See Doug's website, www.VectoredFlight.com, for more information. All profits of DVD sales go to the Royal Flying Doctor Service of Australia.

"The tour had nine airplanes on it that included three Stearmans, Chipmunks, and Tiger Moths. The trip was really different. It was like flying over the red planet of Mars."

Out of that experience came some possible plans for the new airplane in the near future. Amongst them are the following:

- Circumnavigate the entire state of Alaska.
- Explore the North Island of New Zealand.
- Put it on wheels and crisscross South Africa.
- Fly the entire circumference of Australia.
- Thoroughly explore the east coast of Australia.

When asked if he'd do anything differently, were he to tackle another project like this, Doug said, "This took entirely too long. Over six years. My helper could only put about 20 hours a week into it, and I need more help than that. That last year was agonizing because it was so close but not close enough. As it was, we only had nine hours on the Hobbs when we left for Oshkosh.

"My wife, Robbi, has been wonderfully understanding and supportive through this entire process. She actually made it quite easy, which is important. Now maybe we can all enjoy the airplane. I'd also like to thank Rob Richie, director of maintenance and the smartest Beaver guy on the planet of Kenmore Air, for all the advice and support he provided during the restoration of this great aircraft."

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