WaterFlying

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NOT YOUR FATHER'S WIDGEON

ORIGINS OF GREENVILLE

DUCKING OUT OF OSHKOSH

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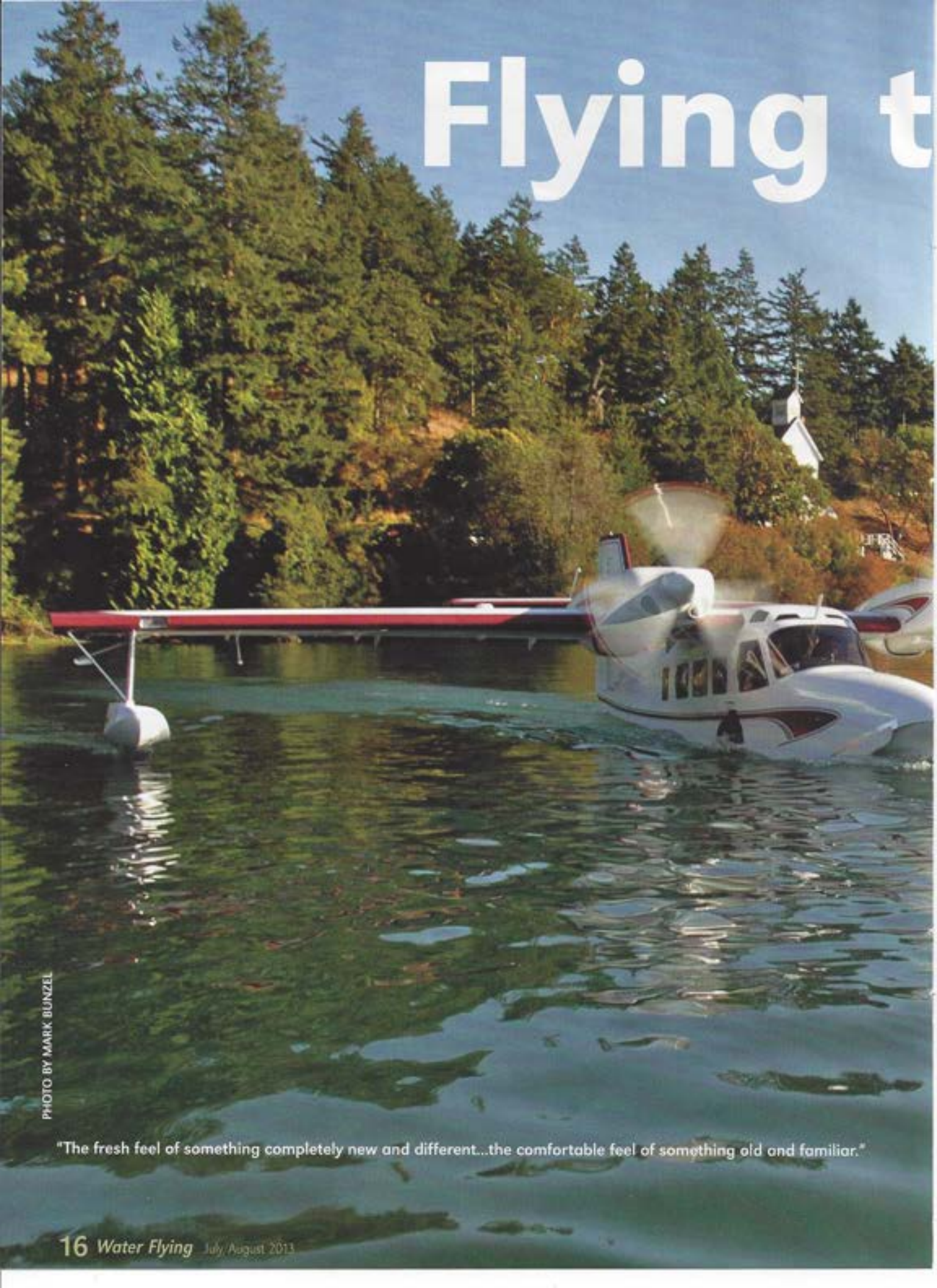


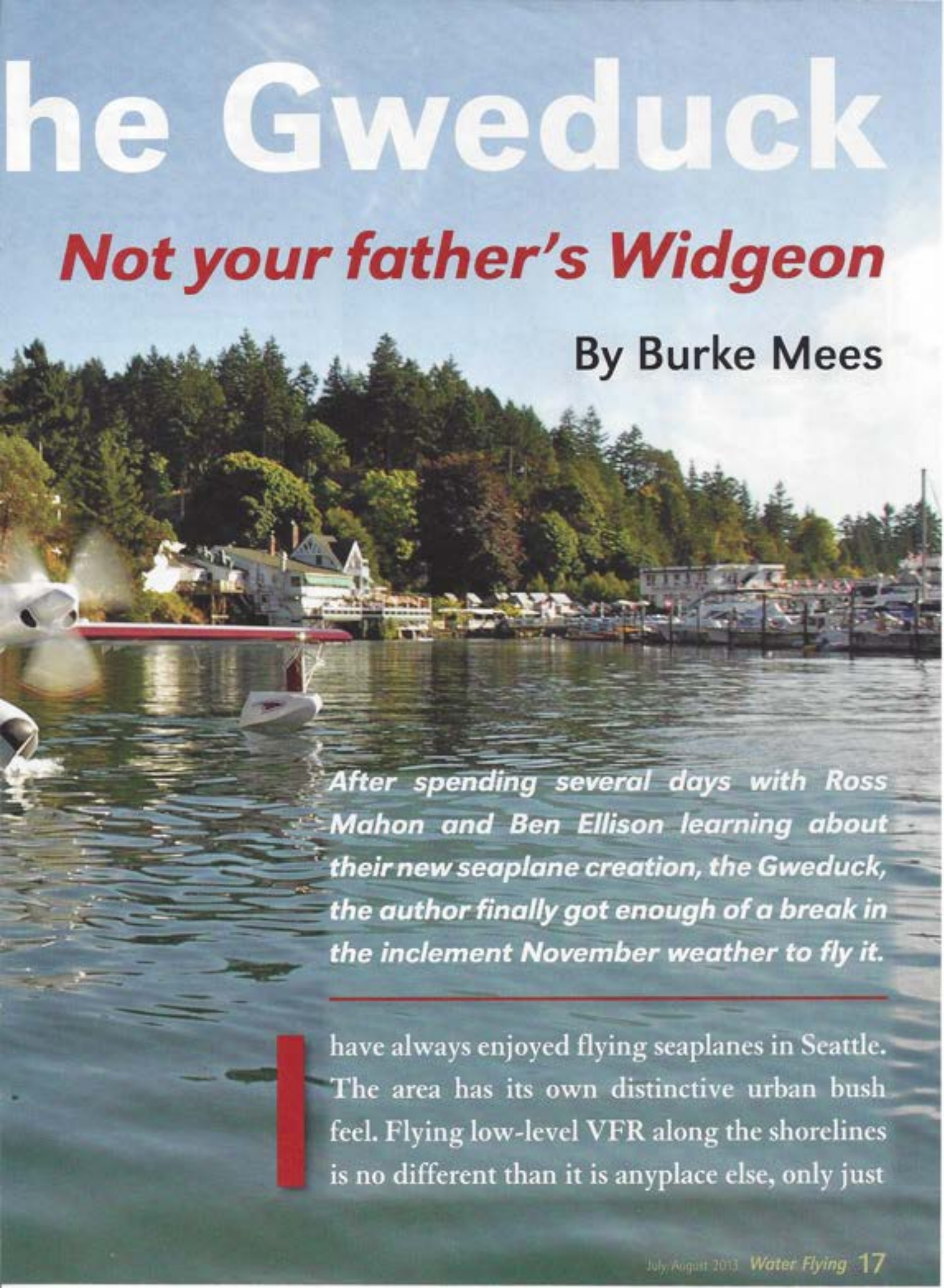
PHOTO BY MARK BUNZEL

"The fresh feel of something completely new and different...the comfortable feel of something old and familiar."

he Gweduck

Not your father's Widgeon

By Burke Mees



After spending several days with Ross Mahon and Ben Ellison learning about their new seaplane creation, the Gweduck, the author finally got enough of a break in the inclement November weather to fly it.

I have always enjoyed flying seaplanes in Seattle. The area has its own distinctive urban bush feel. Flying low-level VFR along the shorelines is no different than it is anyplace else, only just

TERRY DICKENSON

Gweduck more contemporary design avoids the Grumman Widgeon's wild spirit.

MARK BUNZEL

Gweduck team (front to back): Ben and Marty Ellison, and Ross Mahon.

above you there is a steady progression of Boeing jets flying through the Class B airspace, and you occasionally fly over a bridge lit up with a long line of red taillights stuck in one of the city's semi-perpetual traffic jams.

But I was hardly paying attention to any of that. I had my hands on a new seaplane and was just focused on the elemental interaction with the air and water. This is a one-of-a-kind prototype that has been 20 years in the making, and I appreciated these guys giving me the helm.

We took off from Renton airport and immediately found ourselves over the landable waters of Lake Washington. Throughout the flight I noticed an interesting contrast: On the one hand, the airplane has the fresh feel of something completely new and different, but at the same time it has the comfortable feel of something old and familiar. That is hardly surprising since it is a new prototype loosely based on an old classic, the Grumman G20 Widgeon.

SLICK SEAPLANE

In flight the Gweduck has the same good balance, responsive controls, and sporty feel as the original Widgeon. With smooth, rivet-free surfaces and retractable floats, it's a slick seaplane and it doesn't have the drag of a Grumman. Pending the completion of flutter tests, the speed is limited to 130 knots, and to keep from exceeding that you have to pull the Continental IO-540s all the way back to 50 percent power (20 inches and 2000 rpm). As seaplanes go that is a lot of

MARK BUNZEL

Counter-rotating props on the Continental IO-540 engines largely eliminate torque roll to the left on takeoff.

speed for an awfully low power setting, and I suspect that when it is unleashed from that limitation we'll see cruise speeds almost in the wheelplane range.

Of course, I wanted to get it on the water since that's where you get to know the true personality of a seaplane. I started out spending some time making the transition to and from the step, and step taxiing. Here it immediately became apparent that the airplane doesn't have the Widgeon's wild spirit. It doesn't have the same twitchy character that requires constant attention; rather it's a domesticated version of its former self.

Differential engine power provides good steering on the water, but a water rudder helps in docking or when taxiing on one engine.

It climbs onto the step in a relaxed manner, and once there it rides along nicely with just small pitch adjustments to keep the sweet spot. In rough water it doesn't require the dynamic light touch on the elevator that I've come to associate with the Widgeon. It lands best in the traditional flat Grumman step attitude, but you can also get good results from full-stall landings, which is unusual for a hull airplane. I'd like to say that I discovered the secret to flying this airplane, but really it doesn't seem to have any secrets. It just seems to be an honest airplane with an agreeable personality.

I did have an insight into the Gweduck's nature. While the airplane looks like a Grumman, on the water it sometimes behaves more like a floatplane. When it comes to making easy transitions on and off the step, steady handling in rough water or going across boat wakes, and touching down at a wide range of pitch attitudes, the Gweduck exhibits the general good behavior of floatplanes.

I suspect the reason for this is that the Gweduck's hull has some typical floatplane features. It has a full-planing afterbody, which is a standard feature on floatplanes that serves the purpose of limiting the pitch from rising up into the nose-high porpoising range. The Gweduck has a deeper Vee in the hull than you normally see on monohulls, which is more typical of what you see on floats.

Also, the height of the step has been increased to more than two-and-a-half times what it was on the Widgeon, making the step-to-beam proportion more typical of what you see on floats. Whatever the reason, the airplane has some of the good behavior that I normally associate with floatplanes, and this should make it easier for float pilots to transition to the Gweduck.

Another feature that contributes to the airplane's easy nature on the water is counter-rotating propellers. I had never seen these on a twin seaplane before and I didn't really appreciate

their function until I flew the Gweduck.

In wheelplanes the main purpose of counter-rotating props is, usually, to move the right engine's thrust vector inboard for better single-engine handling, but in a monohull seaplane they also eliminate the torque roll at the beginning of the takeoff.

COUNTERING TORQUE ROLL

When you apply power at the beginning of the takeoff in a standard hull airplane, the torque rolls the airplane onto the left wing float unless you take action to keep the wings level. We usually counter this torque roll with one of two methods; either starting the takeoff with full right aileron and gradually neutralizing it as the takeoff progresses, or by beginning the takeoff with some left crosswind component to oppose the torque and then gently turning into the wind as the takeoff progresses. In either case this complicates an already busy takeoff.

The Gweduck uses counter-rotating props to largely eliminate this torque roll. Compared to other monohulls, the Gweduck more easily makes a wings-level transition to the step with minimum need for roll corrections.

While working on the water I saw the spray channel in action. This is the Gweduck's solution to the propeller spray damage that is such a problem with the Grummans. Patterned after a feature on the Japanese Shin Meiwa flying boat, this channel captures water splashed up by the bow and channels it along the chine to exit outboard just aft of the propeller.

During displacement taxi, you can see water flowing through the channel's outlet on the side of the hull just behind the engine. Then, as the airplane climbs on the step, most of the spray is contained in the channel and neatly exits through the outlet where it is harmlessly redirected behind the propellers. The channel doesn't completely eliminate the spray issue — some spray gets past the rails at the beginning of the takeoff — but it does a good job at reducing the problem.

I spent some time using the Gweduck's reversing propellers, which is one of my absolute favorite features that you can have on a twin-engine seaplane. Neither the Widgeon nor the Goose have reverse. Reversing propellers serve two purposes on a twin-engine seaplane. First, they increase taxi maneuverability on the water. I brought the Gweduck to a stop, taxied it backwards, and turned the airplane nearly in its own wingspan by having one propeller in forward pitch and the other in reverse. You can't do that in very many seaplanes, and it comes in handy when maneuvering in tight confines or approaching a mooring buoy.

The other use for reverse thrust is to dissipate energy on landing. Certainly this can shorten the landing distance, but the real benefit becomes apparent when landing in rough water or swells. By carefully choosing your spot and going hard into reverse on splashdown, you can dissipate a lot of energy before you slam into the next big wave. This allows you to land in significantly rougher water than you could safely handle without reverse. This is neat stuff, and the world would be a better place if every seaplane had reverse.

The operation of reverse thrust in the Gweduck is different from the standard arrangement. In most airplanes you get to reverse by first closing the throttle levers and then moving them back past a gate or detent. From there you can increase reverse thrust by moving the levers far-

Retractable sponsons provide for generous wingtip clearance when docking or beaching.

ROSS MAHON

ROSS MAHON

Head-on photo shows deep-vee hull and pronounced channels flowing back from bow that keep spray from reaching props on takeoff run.

MARK BUNZEL

Reversing props bring the Gweduck to a quick stop after landing, which is especially useful in rough conditions.

MARK BUNZEL

Full-planing afterbody and tall step height help explain Gweduck's float-plane-like handling on the water.

Spacious cabin looking aft, toward rear bulkhead...

and forward toward cockpit.

ROSS MAHON

ther back, and it is all very easy and intuitive. In the Gweduck, you get to reverse by first closing the throttles, then reaching for two guarded electrical switches on the overhead panel that position the respective prop into reverse pitch, and from there you can increase the reverse thrust by moving the throttles forward.

There is a lockout in the governor to prevent reverse thrust from being selected above 1600 rpm. The operation is not entirely intuitive, and there are a few other awkward things about the system, but none of that is a big deal because what really counts is that you have reverse.

Another thing the Gweduck has that you don't find on the Grummans is a water rudder, and I tried that out. The Grummans rely entirely on differential power for maneuvering on the water, and during normal taxi the Gweduck does just fine that way as well. The water rudder is there mostly for special occasions, such as providing some steering while coasting up to a dock with the engines shut down, or while taxiing on one engine.

For example, if you're starting engines while the airplane is afloat, a water rudder helps keep the airplane straight until you get the second engine started. If you have just made a single-engine water landing, a water rudder makes it possible to maneuver to shore when you could otherwise only turn in circles.

The disadvantage of a water rudder on a hull airplane is that it is one more thing to pay attention to. You can damage things if you leave it down at inappropriate times, such as landing, beaching, or while taxiing down a ramp.

Handsome wood-trimmed panel has a cutout to access bow hatch. Overhead panel has power controls and, partially hidden by prop levers, two guarded switches used to activate electric prop reversers. Once the switches are thrown the throttles are pushed forward to increase reverse thrust.

MARK BUNZEL

The Composite Alternative

In addition to the Gweduck, there are two other all-composite amphib designs that currently are flying as prototypes, and are on the verge of going into production.

The Dornier Seaplane Company is introducing the CD-2 Seastar, a 10,000-pound, twin-turbine (PT-6)-powered composite monohull amphib that will be a standard-category production airplane. Like the Gweduck, the Seastar is a modern remake of an old design; it is based on the Dornier Wal that dates back to the 1920s. For a complete review of the Seastar, see the Nov/Dec 2009 issue of *Water Flying*, which you can find at www.dorniersea-plane.com under the News tab.

The ICON A5 is an all-new composite amphib coming out of Southern California. It will be a two-seat personal airplane in the Light Sport category. Many of the people involved in the ICON have previously worked with Burt Rutan's Scaled Composites. The company's website is www.iconaircraft.com.

Aerocet floats paved the way for composite materials in water flying. When they were first coming onto the scene about two decades ago, a lot of people were skeptical about the suitability of composites to withstand the demands and abuse of the seaplane environment, but since then they have more than proven themselves in the field.

At this point, composite materials and construction techniques seem to have reached maturity, and their potential is just beginning to be realized in hull seaplane construction.

Since the water rudder retracts into the bottom of the air rudder, any damage to the water rudder could potentially affect the air rudder.

CHECKLIST DISCIPLINE

This calls attention to the fact that the Gweduck requires a professional level of checklist discipline on the part of the pilot. In addition to the water rudder, the landing gear and wing floats must always be in the appropriate position, and the airplane can be unforgiving about any mistakes here.

I spent most of my time in the Gweduck on the water, and I didn't quite have a chance to see everything I would have liked. For example, I didn't get around to flying it on one engine, but I have no doubt that an airplane that does 130 knots at 50 percent power would do just fine on one engine.

I didn't have a chance to dock the airplane, but I did taxi it in the docking configuration, heeled over on one wing with the wing floats retracted, and I found that it handles just fine that way.

So far I've commented on the kind of things that stand out in the course of an afternoon of flying, but one of the most noteworthy things about the Gweduck isn't something you notice on a single flight. In fact, if you're not paying attention you might never really notice it. I'm referring to the absence of salt-water airframe corrosion.

Eliminating corrosion is like preventing accidents: it's a thankless job, since success is measured by bad things not happening. I suspect that years from now, Gweduck owners will come to take it for granted and won't realize how remarkable it is that the annual inspection doesn't cost a fortune. Many people probably aren't consciously aware of just how big of a deal this is, but it is not lost on me. Nor will it be lost on anyone who has operated metal seaplanes in the salt and knows how long they can be out of service while taking care of corrosion issues during the annual. This is one of the airplane's strongest features.

So when can you get a Gweduck? It will be available as an experimental home-built kit, and they are ramping up production for the first five airplanes. Mahon and Ellison currently are looking for a launch customer who will work in partnership with the manufacturer in putting together the first kit. The manufacturer is Composite Creations in Bend, Oregon, which has experience building composite parts for the Lancair.

Even though the Gweduck will be in the Experimental category, many

aspects of production will comply with FAR 23 manufacturing standards for certified airplanes, and this may lay the groundwork to produce the Gweduck as a certified airplane sometime in the future. They seem to be going about this with the same attention to detail that has characterized the entire project, and are anticipating ways to provide for owner's needs when it comes to builder assistance, training, and various other issues.

The price for the kit is $350,000, but by the time it is completely finished you'd probably be into it for about twice that amount. To put that in perspective, consider that you can spend that much on a new single-engine aluminum amphib that doesn't have nearly the capabilities of the Gweduck.

The traditional Grumman design has always had a niche in the coastal areas of the North Pacific, and now it looks like the Gweduck is poised to step into that role. It will fit in anyplace where there is a need for a rugged hull airplane with multiengine reliability in a corrosion-free package. I'll look forward to seeing it in Alaska.

Burke Mees is an experienced commercial seaplane pilot, instructor, and check airman, and a pilot for a major U.S. airline. He is a frequent contributor to Water Flying.

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