

DRAGON FLYING

*Top hats and ticklers helped prove
the concept of the cabin-class twin.*

BY MARK M. LACAGNINA

The list of initial customers for the ninetieth airplane designed by de Havilland Aircraft Company, Limited, reads like a 1930s-vintage *Who's Who*. Loel Guinness and Lord Beaverbrook each bought one. So did Baron Koenigswater and King Faisal of Iraq. Geoffrey de Havilland and his son, Geoffrey, piloted the prototype D.H. 90 in the 1936 King's Cup Race and placed eighth with an average speed of 143.75 mph.

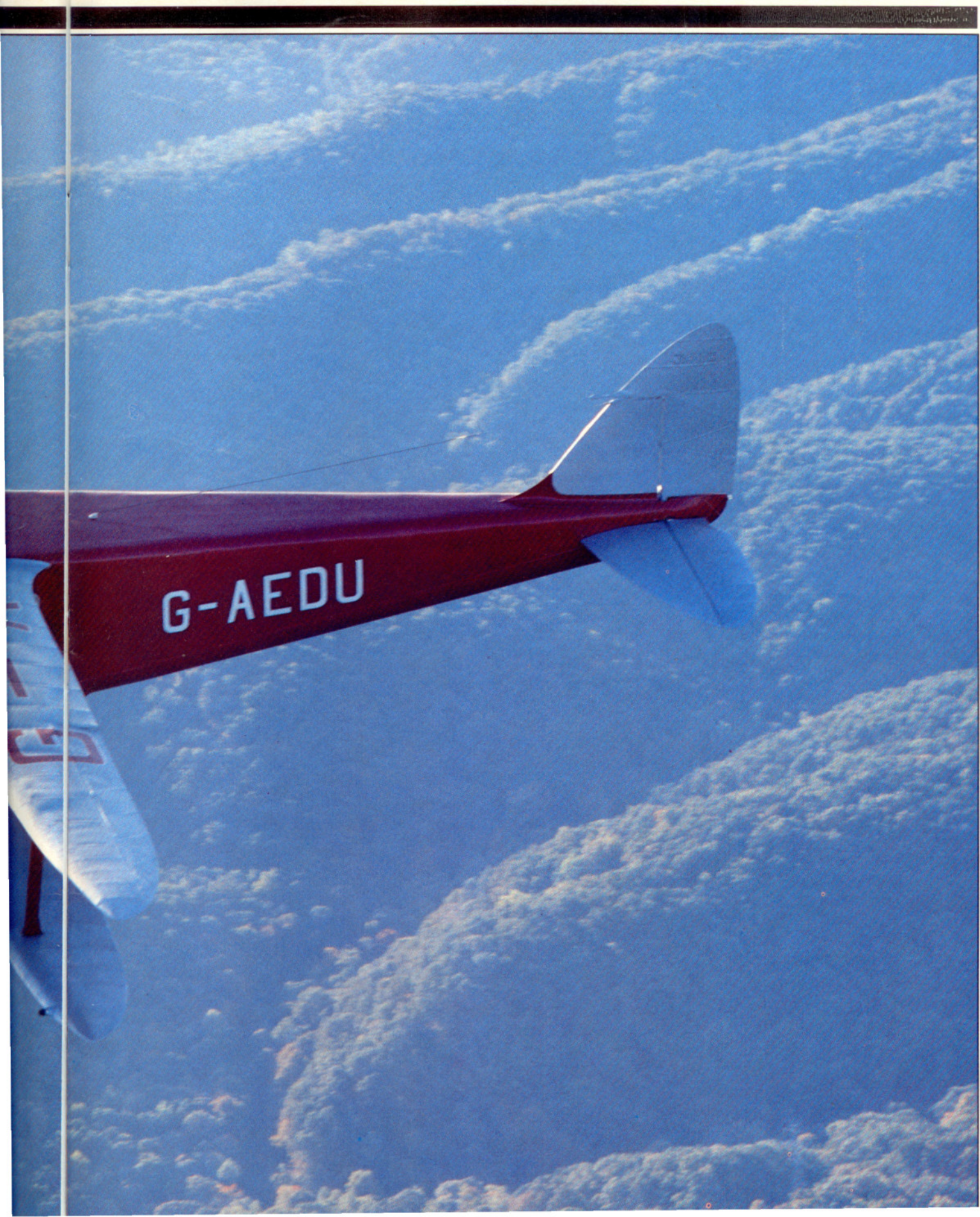
The D.H. 90, dubbed the Dragonfly for its resemblance to the beautiful bi-winged insect, seemed destined to a life of luxury, transporting top-hatted gentlemen and bejeweled ladies in comfort and style.

For de Havilland, the D.H. 90 represented a new concept in aircraft design. Essentially a scaled-down version of the workhorse D.H. 89 Rapide, the Dragonfly was a progenitor of the cabin-class twin. Between 1935 and 1938, de Havilland built a total of 66 Dragonflies.

Today, G-AEDU, the twenty-sixth de Havilland 90 built, is the only Dragonfly in the world that still is airworthy. Like many others in its line, G-AEDU did not realize the pampered life of a high-class runabout. The airplane was delivered to Africa in 1936 and served for about 34 years as a bush plane in Mozambique and in South Africa.

Other Dragonflies were used to train pilots and navigators in England, Denmark and Sweden and flew with airlines in Australia, Singapore, Angola, Rumania, Italy and Turkey. The Royal Canadian Mounted Police flew four Dragonflies in its battle against rum-runners off the coast of Nova Scotia.







continued

During World War II, several airplanes were pressed into military service to tow targets. One of them nearly had its tail shot off by overanxious anti-aircraft gunners. The furious pilot managed to land the airplane safely and demanded, in no uncertain terms, that his Dragonfly be equipped with a longer towline.

G-AEDU was retired from bush service in the late 1970s by an American who tried unsuccessfully to restore the airplane in Africa. The disassembled Dragonfly finally was crated about four years ago and sent to England to its new owners, Martin Barraclough and Anthony Haigh-Thomas. The airplane was painstakingly renovated by Cliff Lovell. It was not an easy job; Lovell had to completely rebuild the fuselage, section by section. The Gipsy Major engines were overhauled by the Rollason company. Finishing touches included the original paint scheme—silver wings and bright red fuselage—and a handsome interior of red cloth and leather.

Barraclough took the Dragonfly up for its first flight after the renovation. His logbook entry reads, "Trims slightly nose-heavy. Otherwise, no corrections required." Barraclough and Haigh-Thomas flew the airplane about 20 hours before putting it up for sale at

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the Shuttleworth auction last spring. The Dragonfly—as well as an Aerosport, a Dewoitine and a Pilatus P2—was purchased by Charles A. Osborn Jr., a Louisville, Kentucky, businessman. The other airplanes were disassembled, crated and shipped to the United States, but the Dragonfly was ferried to its new home in Sellersburg, Indiana, by Osborn's chief pilot, Michael R. Simmons. His trip turned out to be an adventure (see "Ferry Tale," p. 69).

G-AEDU is treated like visiting royalty and is well cared for by Osborn and the staff of Hap's Aerial Enterprises, the FBO at Clark County Airport in Sellersburg, a few furlongs from Louisville.

The Dragonfly was hailed by the aviation press in the 1930s as the best looking biplane ever designed by de Havilland. In addition to being smaller and lighter than the rather gargantuan Rapide (5,550 pounds gross, as compared with 4,000 pounds), the Dragonfly has pleasing curves in the top and

bottom portions of its fuselage and fewer external wing struts and bracing wires.

The fuselage of the Rapide—a seven-seat passenger and freight hauler powered by two, 200-hp Gipsy six engines—is a three-ply, flat-sided box. For the Dragonfly, de Havilland fabricated dies in which the plywood sections of the fuselage were pressed into the desired shapes while the cement dried. The result is a very strong, monocoque fuselage.

Two large, spruce spars in the center section of the lower wing and fuselage serve as a cantilever to which the engines and fuel tanks are mounted. This obviated the need for inner struts and bracing wires between the engine nacelles and the top of the fuselage.

The leading edges of the wing and the entire tail assembly are covered with plywood. The only metal components are the engines, cowlings, assorted attachments, boarding step and wing walk, wing struts and wires, internal fuselage braces and the tubular frames within the top-wing-mounted ailerons. Everything else on the aircraft is wood and fabric.

The Dragonfly has two, 130-hp Gipsy Major engines. The four-cylinder engines are inverted. Legend has it that de Havilland flipped the Gipsy Major

over to allow Moth pilots to see over the noses of their airplanes. Behind a fire wall in each nacelle is a 3.5-gallon oil tank. A pilot can count on each of the "dripsy Gipsys" to blow and burn about one quart of oil per hour.

A Gipsy Major burns about six or seven Imperial gallons of petrol each hour in cruise. The wing tanks hold 30 gallons each, and a 25-gallon auxiliary fuel tank is mounted beneath the rear seat.

The cabin is large and comfortable with two pilots' seats, an armchair next to the right sidewall and a bench seat at the rear of the cabin for two passengers. Above this seat is an escape hatch that opens onto the top of the fuselage.

From the ground to the boarding step is quite a stretch. Savvy pilots probably fashioned makeshift boxes to help their genteel passengers make the jump and lent a hand while their passengers scrambled, with as much dignity as possible, up the rather slippery wing walk. The going was easier once they reached the cabin door, which is very large. Two of King Faisal's harem girls probably could have made it through side by side.

Once a pilot gets a Dragonfly into the air, he has got it made. Getting it there, though, is a challenge. The pilot either needs three arms or must be a

very quick contortionist.

Starting the engines, especially when they are hot, requires some fiddling and sweet talk. Open the "petrol cocks" and close the throttles. Make sure the switches are off and the tailwheel is chocked. Reach into a hole in the back of the right engine nacelle and pull on the small chain inside. This opens a valve to let fuel flow through the fuel pump. With the other hand, open a hatch near the front of the nacelle. Inside, you will find a small lever called the tickler. Pump the tickler up and down about 20 to 50 times to prime the carburetor. When fuel begins running out the bottom of the nacelle and onto your shoe, you will know the engine is tickled enough. Pull the propeller through four times.

If you feel lucky, prime the other engine and race back to the cabin. (Watch that slippery wing walk or you will go nose-first into the venturis.) Crack the throttles, turn on the switches and hit the starter buttons, one at a time.

Chances are, one of the engines will fire up and settle into a pleasant rumble. The other will cough its refusal. Okay, switch off, throttle open. It is probably flooded, so pull the prop through about six more times, and try again.

If the blasted Gipsy refuses to fire

again, swear softly but smile; you do not want to disconcert the guv and his missus. Back to the stubborn one: Remove the lock pin and the long rod that holds the front of the cowl together. Turn two levers and raise the left side of the cowl. Give the Bendix three or four taps with your mallet. (You do carry a mallet in your kit, what?) This should unstick the solenoid. Button up and climb back to the cockpit. *Whumpf!*

A piece of cake, really.

Now comes the hard part: taxiing the bloody thing. This is where you need three hands: one on the side-mounted throttles, one on the brake handle in the left corner of the panel and another one to keep the yoke all the way back (to ensure that the tailwheel stays put).

But since you probably are not a biological curiosity, you must wrap your right arm around the yoke and pull for all you are worth. Your left hand dances between the throttles and the brake handle to keep the biplane headed where you want it to go, more or less. Pull the brake handle all the way out to activate both brakes. Pull it out part way and use the rudder pedals for differential braking. You will have to hang your head out of the side window to keep track of where you are





continued

going. When the airplane is on all three wheels, even "Wilt the Stilt" could not see over that proud nose.

The *Manual of Instructions for Operation, Maintenance and Rigging of the de Havilland Dragonfly (Type D.H. 90)* is long on maintenance and rigging, including detailed, fold-out schematic drawings, but short on operational information. The manual advises the pilot to make sure the split flaps are up for takeoff and reminds him that the airplane will want to swing slightly to the right when power is applied (the fixed-pitch, wooden propellers rotate counterclockwise, as viewed from the cockpit). It also suggests using full flaps, and that "with engines throttled back, the speed of the machine should be reduced to the region of 80 to 85 mph" during approach and landing. That's all. I guess de Havilland expected any pilot worth his salt to be able to fly a Dragonfly by the seat of his pants.

So be it. Line up on the runway and roll a bit to straighten out the fully castoring tailwheel. Those levers flanking the throttles on both sides are the altitude controllers (mixture controls). Make sure they are all the way aft (full rich) for takeoff. A rudder trim knob is underneath your seat; there is no indicator, so you will have to make an educated guess as to the proper setting. The first big lever between the seats is the flap control. Push it all the way forward. Next to it is the elevator trim control. Pull it about halfway back.

You will have to stay on your toes until the tail comes up because airflow to the rudder is blanketed by the aircraft's large cabin. Lift the tail between 45 and 50 mph; rotate at about 75 mph, and climb at about 85 mph. You may need full elevator trim to help

Piloting skill and reliable Gipsy Majors got Michael Simmons and G-AEDU across the ocean.

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de Havilland D.H. 90 Dragonfly

Base price £2,650 (1935)

Specifications

Powerplants	2 de Havilland Gipsy Major 1, 130 hp @ 2,100 rpm
Propellers	2 wooden, Schwarz-protected, two-blade, fixed-pitch
Length	31 ft 8 in
Height	9 ft 2 in
Wingspan (upper)	43 ft
Wingspan (lower)	38 ft 6 in
Wing area	288 sq ft
Wing loading	13.9 lb/sq ft
Power loading	15.4 lb/hp
Seats	5
Cabin length	10 ft
Cabin width	4 ft
Cabin height	5 ft
Empty weight	2,500 lb
Gross weight	4,000 lb
Useful load	1,500 lb
Payload w/full fuel, oil	938 lb
Fuel capacity	85 gal
Oil capacity, ea engine	14 qt
Baggage capacity	160 lb, 28 cu ft

Performance

Takeoff distance, ground roll	885 ft
Rate of climb, sea level	775 fpm
Max level speed, sea level	145 mph
Cruise speed @ 1,000 ft, 2,100 rpm	128 mph
Cruise speed @ 1,000 ft, 2,050 rpm	123 mph
Cruise fuel consumption @ 2,050 rpm	12 gph
Maximum range @ 2,050 rpm	885 sm
Service ceiling	15,700 ft
Single-engine service ceiling	2,100 ft
Absolute ceiling	16,000 ft
Landing distance over 50-ft obst	1,020 ft

All specifications are based on manufacturer's calculations.

keep the nose up. (Sorry, Mr. Barraclough, she still flies a bit nose-heavy.)

The Dragonfly is a very stable airplane. The ailerons are heavy and slow to respond, but the elevator and rudder are quite sensitive. Single-engine handling characteristics are good, but performance is marginal. According to the manual, the single-engine service ceiling ranges from 2,100 feet at gross weight to 9,500 feet at 3,000 pounds. I flew as copilot in the Dragonfly on a clear and rather cool morning. With the critical (right) engine throttled back to simulate zero thrust, asymmetric yaw was barely noticeable, but chief pilot Simmons had to give me a lot of power on the left engine so that I could hold altitude. Pilots who operated these airplanes in the tropics must have given their Gipsys a lot of care so the engines would not be petulant at a critical moment. The engines, however, have a reputation for durability.

Turning downwind to base, reduce airspeed to about 85 mph and pull the flap handle about halfway back. You may need to use both hands or enlist your copilot's help, because the handle is quite reluctant to budge. On final, drop full flaps and bleed the airspeed to 75 mph. Three-point landings are prohibited in the Dragonfly. About 17 feet of plywood and spruce separate the tailwheel from the first fuselage bulkhead—not much support to forgive a muffed three-point landing. So, you land on the mains and hold the tailwheel up as long as you can.

G-AEDU is one of only two Dragonflies still in existence. The other, which is now owned by a private collector in Boise, Idaho, was flown by an Australian airline from 1938 through 1963. That Dragonfly was ferried back to England for restoration and then sold to Frank Tallman and Paul Mantz in California. According to its current owner, the airplane is restorable. It is a project that he hopes to complete... someday.

As a stipulation in the sale of G-AEDU, Charles Osborn agreed to keep his Dragonfly in airworthy condition. He currently is gathering the information the Federal Aviation Administration needs to certificate the airplane. But Osborn wants to do more than keep the airplane airworthy; he wants to keep it flying—to let people glimpse, in action, a machine that helped prove the concept of the cabin-class twin. □



Radios? Hardly.

FERRY TALE

When Charles Osborn asked his chief pilot, Michael Simmons, if he would be interested in ferrying Osborn's newly acquired de Havilland Dragonfly across the Atlantic, Simmons thought he was kidding. A 48-year-old, twin-engine biplane is not the ultimate in modern transoceanic transportation. But Simmons realized he was being presented with a once-in-a-lifetime opportunity, and the lure of adventure proved hard to resist.

So, early in June, Simmons was in Southampton, England, facing the task of checking himself out in the big, old taildragger. He did not get off to a good start. The first takeoff attempt resulted in what Simmons describes as a majestic ground loop. The second try was not much of an improvement. The problem was not with the pilot, but the airplane; one engine was producing much more power at full throttle than the other.

The problem was corrected, and Simmons spent six hours practicing crosswind takeoffs and landings, cross-country procedures and, with the help of Royal Air Force pilot instructor Alan Margates, instrument and single-engine procedures.

The Dragonfly's vintage panel—consisting of gyroscopic attitude and heading indicators, airspeed and turn/slip indicators and magnetic and P-2 compasses—was supplemented with Loran and ADF receivers, a nav/com and a transponder. Little did Simmons expect that it would be his watch, the transponder and the airplane's antiquated but reliable P-2 compass that would get him across the ocean.

Lack of suitable grounding within the wooden airplane made useless weight of the Loran receiver. The ADF was rendered unreliable by a bad an-

tenna, and the airplane flew too low to allow the navigation receiver to lock onto any of the high-power VOR stations along the route.

A 50-gallon drum lashed onto the rear seat brought the Dragonfly's fuel supply to 130 Imperial gallons. (Weight and balance considerations dictated that only 45 gallons could be carried in the drum.) This gave the Dragonfly an endurance of about 11 hours.

Charles Shontz, a private pilot and a business associate of Osborn, accompanied Simmons about halfway across the ocean. The first leg of the journey took them north to Glasgow, Scotland. The Dragonfly had to buck a 30-knot headwind on final approach to the airport. The airplane's progress over the ground was so slow that it was required to execute 360-degree turns three times to let air carriers complete their approaches.

Simmons and Shontz were held up for more than two hours in Glasgow by a customs agent who did not want to let the Dragonfly leave the United Kingdom. Shontz was able to convince the agent that they were not absconding with a national treasure, and the agent reluctantly waved them on.

The next stop was Stornoway in the Outer Hebrides. From there, the pilots faced their longest overwater leg: 765 nautical miles to Reykjavík, Iceland. They tried to climb above a rising stratus deck and soon found themselves on instruments and in ice. To make matters worse, the left engine began running rough. They descended back through the clouds and at 1,100 feet dead-reckoned their way across the ocean. When a crop of volcanic islands appeared—the only visual fix over the water—Simmons found that he was on course and a bit ahead of schedule. A

now-strong left engine and steadily improving weather conditions further buoyed their spirits.

At Reykjavík, they discovered a bad magneto in the left engine. Simmons had been warned about the Gipsy's mags by de Havilland expert Robert Powell of Louisville, and he had the parts and the special tools aboard to fix it.

Kulusuk, Greenland, was 540 nautical miles over water from Iceland. This time, their dead reckoning got them well north of course, over the ice pack. A helpful DEW-line (distant early-warning radar) operator steered them back on course. Then, a Greenland Air pilot offered to lead the Dragonfly into Kulusuk in his Twin Otter. (The Dragonfly must have been a bit miffed to have this young de Havilland lead it by the nose.)

The weather turned very bad and stayed that way for six days. Shontz had pressing business engagements in Louisville and, bidding Simmons good luck, boarded an air carrier. Simmons spent his downtime at Kulusuk trying to get the ADF to work. The results were marginal.

The weather lifted long enough to allow Simmons to guide the Dragonfly south along the coast of Greenland to Narsarsuaq. He concentrated on his pilotage to pick the correct fjord out of thousands along the coast. Two helicopters followed the Dragonfly to the airport. They had been waiting in adjacent fjords, just in case Simmons picked the wrong one.

Four hours after he landed, the weather again turned sour, and the Dragonfly was grounded for five days. Simmons then headed for Goose Bay, Canada, but reports indicated weather conditions there were deteriorating rapidly. He turned back to Narsarsuaq

and on the next day flew north along the coast to Godthaab.

Simmons planned to fly from Godthaab to Frobisher Bay in Canada. Once underway, though, he found the weather conditions much worse than forecast. The Dragonfly was flying between layers at 3,000 feet when magnetic disturbances began to play havoc with the reliable, old P-2 compass. Simmons was considering declaring an emergency when a C-130 pilot offered to rendezvous and lead him into Cape Dyer on Baffin Island. Simmons accepted the offer.

He found Cape Dyer to be a strange place, indeed. Huskies lounge inside each and every door in the airport buildings. Walk from one building to another, and at least one husky will accompany you. Try to shoo the dog away, and it will growl. The dogs, Simmons learned, serve a useful purpose: They scare away the polar bears. Cape Dyer is located in a migration route, and polar bears are sneaky beasts. They hide their noses in the snow to become almost invisible until you stumble into them. Then, they will tear you apart unless a fearless husky distracts their attention.

The residents of Cape Dyer let *nothing* interfere with their Saturday-afternoon softball games. Simmons played left field during one of these games. By the fourth inning, the fog was so bad he could just barely see the batter. Pretty soon, no one could see anything, let alone keep track of the score.

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But they played a full nine innings, finishing the game at 1 a.m.

From Cape Dyer, Simmons flew south to Frobisher Bay and then into Canada, racing a fog bank that was moving in to Kuujuaq (Fort Chimo) almost as quickly (or slowly) as the Dragonfly.

With all of the long water crossings behind him, Simmons felt relieved and expected a rather routine trip down the continent to home.

But there was to be one more unpleasant surprise. The charts for northeastern Canada show a myriad of lakes and little else. Simmons' pilotage was thrown for a loop when he spotted highways, settlements and an airport where none should have been. These apparently are part of a hush-hush hydroelectric project that missed the attention of the cartographers. By the time Simmons had begun to doubt his navigational abilities, a Montreal radar operator explained the situation. The pilot had been right on course.

Simmons arrived back home in Indiana on July 15. The 33-day journey comprised 72 flight hours and about 7,200 miles. A letter from the FAA was awaiting him when he landed. Dutch authorities charged that he had vio-

Dutch aviation regulations by flying in their airspace without a high-frequency (HF) radio. A similar citation was slapped on a Piper Comanche pilot who had made the ocean crossing at about the same time.

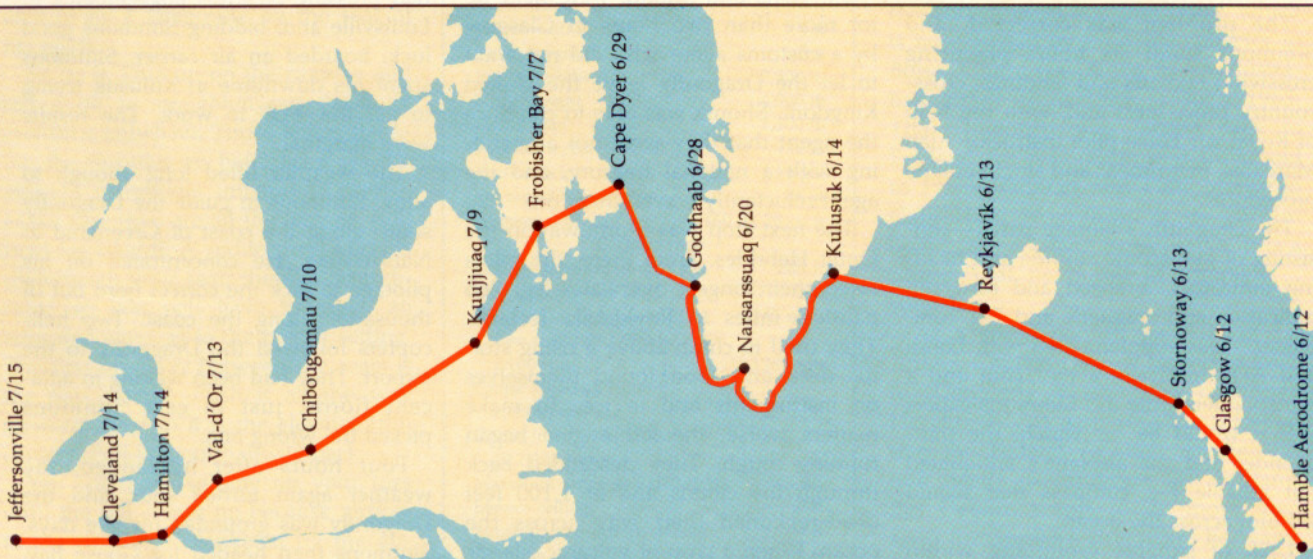
In his defense, Simmons noted several sources he had studied that advise an HF radio is not required if the airplane stays within uncontrolled airspace. This is almost correct. The catch is that if a pilot lands in Greenland, which is controlled by the Dutch, he or she has to have an HF radio.

Realizing that the pilot did not bend the rules intentionally, the FAA let Simmons off with a warning. The agency is considering preparing an advisory circular to clarify equipment requirements for transatlantic crossings.

After relating the story of his Dragonfly adventure to me, Simmons avowed that he had experienced many moments fraught with sheer terror and abject depression. Several times, he faced danger with only his wits and the Gipsy Majors to depend on.

I asked him if he would fly another antique airplane across the ocean, if the opportunity arose. Would he again trade his corporate Beech Duke for an airplane built before he was born and a route that few pilots dare to fly?

Simmons' expression was serious. "Well, I don't know. It depends. . . ." Then he looked out the window at the Dragonfly and smiled. His eyes twinkled as he confessed, "Yes, I probably would." —MML



The 7,200-mile transoceanic odyssey was spiced with sneaky polar bears and the worst summer weather the natives could recall.