The Noorduyn Norseman

Born for the bush

BY PETER M. BOWERS

The Noorduyn "Norseman" not only has a unique design background, but its operational life was quite different from what was expected. Designed in the United States by a Dutch-born engineer, the bush-plane was manufactured in Canada. Initially, the primary buyers were Canadian civil operators, then it was the Royal Canadian Air Force. After the United States became involved in World War II, the U.S. Army became the principal purchaser and used the airplane worldwide. However, certification for U.S. civil operation did not come until 1946, almost 11 years after the first Norseman flew.

The designer, Robert B.C. Noorduyn, was born in Nijmegen, the Netherlands, in 1893. He was educated in Holland and Germany but was initially employed in the aircraft industry in England during World War I, where he worked closely with another Dutch engineer, Frederick Koolhoven. He finished his British career by helping Koolhoven design the first postwar, "from scratch" British transport, the FK-26.

He joined the Dutch Fokker firm in 1920 and later emigrated to the United States to become general manager of Atlantic Aircraft, the American branch of the Dutch firm, which had to use a different name because the name Fokker was under a cloud due to his wartime activities on behalf of Germany. In 1925, Noorduyn developed the "Universal" model for Fokker. This was a rugged, single-engine, high-wing monoplane suitable for float and ski operation and sold well in Canada for that reason.

Trips into Canada to sell and service Universals convinced Noorduyn that there was a great future for airplanes designed for the bush; those then in use were simply adaptations of established passenger designs in which cargo was limited to what could get through the standard-size door. His belief was backed up by the sales success of the Universal and the improved Super Universal in Canada. That country was the major foreign buyer of both models, and the Super was even built under license in Canada.

Noorduyn wanted to expand the Canadian market with dedicated bush designs. Fokker, however, had his eye on bigger things and felt that the company's future lay in multi-engine transports for the airlines. Disappointed over this rebuff, Noorduyn left Fokker in 1929 to become general manager of Bellanca. There, he was instrumental in getting the basic "Pacemaker" model upgraded to the more powerful "Skyrocket," again with Canadian operations in mind.

The Skyrocket did well and was built in Canada, as was the Fokker Super. However, it was still basically a stock passenger airplane, not a real bush-plane. In spite of its good performance, Skyrocket sales suffered badly during the Depression; sales fell off so sharply that Noorduyn left Bellanca and took a job at Pitcairn, where he developed a four-place cabin autogiro, again with an eye toward Canadian operations.

When the Depression ended Pitcairn's work too, Noorduyn decided to design a dedicated bush-plane on his own. He bought a home in South Burlington, Vermont, and went to work on the design of the Norseman. (There was no intended link with Norway in the name; it simply was indicative of rugged far-north operation and also was alliterative with Noorduyn.)

With a good design on paper, Noorduyn was able to attract Canadian capital for the establishment of a Canadian manufacturing plant. Noorduyn Aircraft, Limited, was established in Montreal in 1934.

The new Norseman was a traditional design and of conventional structure; there was nothing new or untried about it, just designed-in details both to accommodate cargo operation in extreme cold as well as to simplify maintenance in the field. Some of the aircraft's features, such as the wing flaps and controllable-pitch propellers, were relatively new to the type but were well-proven on other designs.

The fuselage and vertical tail were welded steel tubing with fabric covering. The wings used routed, solid-wood spars, and the ribs were wood trusses; the horizontal stabilizer also was wood. The metal-frame ailerons were rigged to droop as much as 15 degrees when the flaps were lowered to reduce landing speed further.

Low-wing cantilever monoplanes were coming on strong in areas where their increased speed gave them a competitive advantage. But the Norseman had high wings with struts, which were a distinct advantage in seaplane operations as the wing could swing in over a dock or low riverbank where a low wing could not. Furthermore, separate and easily removable wing panels were desirable for major field repairs.

The cabin, which normally seated eight, had a slightly enlarged passenger door at the rear of the cabin on the left but also had a removable side panel on the right that had a floor-level width of 46 inches for loading bulk cargo. Also, the rear wall of the cabin could be opened to permit long loads to project into the rear of the fuselage.

The passenger seats, which were either conventional airliner designs or benches, could be removed quickly to provide cargo space. The two pilots sat side by side at optional dual controls in a separate forward

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compartment that had its own access doors on each side.

The landing gear drew heavily on the single-leg cantilever design developed on the contemporary Bellanca models and was extra rugged for ski operations. It turned out that many U.S designs could meet the Canadian requirements for floatplanes easily but could not meet the stiff requirements for skiplanes. Noorduyn took care of this in the design stages and also ensured good operation on floats. He made the vertical tail large enough to eliminate the need for the auxiliary fin often added when most standard landplanes were fitted with floats. In fact, to emphasize the capabilities of the Norseman as a seaplane, the first flight was made on floats.

The initial powerplant was the Canadian-built version of the 420-hp American Wright R-975E-2 Whirlwind radial engine. This was chosen because it operated on 80-octane fuel, which was the only kind then available in northern Canada. Fuel capacity was 100 imperial gallons (125 U.S. gallons) carried in two wing tanks.

Production got under way in Canada in the former Curtiss-Reid airplane factory on Cartierville Airport, and the first Mark I flew on November 14, 1935. It easily passed its certification tests and was sold in January 1936. Production then continued on the Mk.II with the R-975E-3 engine. The Norseman was underpowered with the Wright engine, so only three Mk.IIs were built. A change to the 550-hp Pratt & Whitney SC-1 Wasp C engine resulted in the Mk.III with the desired performance. The Wright-powered models soon were fitted with Wasp C engines and fixed-pitch propellers.

After four Mk.IIIs were built, a change to the 600-hp P&W S3H1 Wasp H engine resulted in the Mk.IV. This had much better performance at the sacrifice of some payload, and approximately 92 were built. Sales increased and included the Royal Canadian Mounted Police and the Royal Canadian Air Force. The RCAF models were used as bomber trainers and for navigator training.

After World War II started in 1939, the Noorduyn plant expanded into new quarters in Montreal East, and in 1940 more capacity was obtained at Cartierville Airport. But at this time, Norseman production was subordinated to the manufacture of "Harvard II" (North American AT-6s) trainers; and 2,775 were built under license.

In 1941, the U.S. Army bought seven Mk.IVs in RCAF trainer configuration and coloring and assigned the designation YC-64. This order was followed by others for a total of 746 Mk.VIs as UC-64A and six as UC-64B. The latter, actually transfers from an RCAF order, were delivered as seaplanes. Other C-64As also were fitted with floats after delivery but remained C-64As. The U.S. military version of the Wasp H, the 600-hp R-1340-AN1, was used to power the airplanes. A few other Mk.VIs were built during the war for high-priority Canadian civilian customers and some UC-64As were supplied to RCAF under World War II's Lend-Lease Act. Four were supplied on Lend-Lease to the Royal Air Force in England, and 14 went to the Royal Australian Air Force.

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To convince potential customers that the Norseman was designed with seaplane operations in mind, the first flight of the Mark I in November 1935 was made on Edo 6235 floats.

Separate doors for pilot and passengers are shown open on the Mk. II (above); the ladder slides into a slot under the cabin floor. The Mk. VI (below) was produced for the Army as UC-64A and a seaplane version, UC-64B.

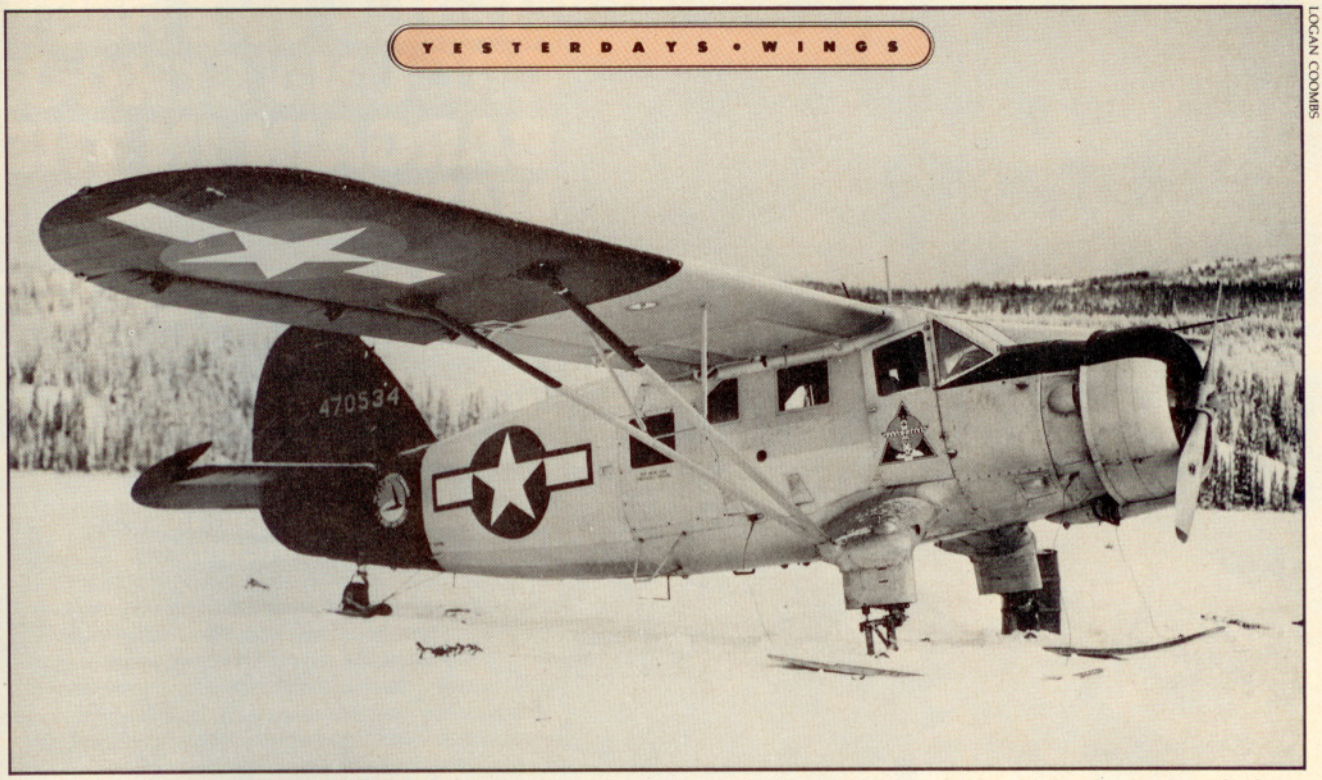
Note that there was no Mk.V at this time. Noorduyn foresaw eventual victory and the resumption of civil production, so he reserved the designation Mk.V for the post-war V-for-Victory model.

During production of the UC-64s for the U.S. Army, consideration was given, at Army request, to the new Wright R-1300, an 800-hp, seven-cylinder version of the big, nine-cylinder Cyclone. But this was rejected because the engine was too new and had serious mechanical problems. The proven British Alvis "Leonides" engine was considered for a postwar British civil market, but it too was rejected.

By war's end, Noorduyn had completed its military contracts and put the Mk.V into production. This was essentially a civil version of the UC-64A with the military detail removed to allow an increased payload. Float size was now up to the Edo 7170.

Initial sales of the aircraft were good, but they soon suffered from the competition of surplus military models, both Canadian and U.S. Only 55 Mk.Vs were sold. The UC-64A received U.S. Category 2 Certificate 2-578 in 1946. There were 122 of these on the U.S. civil register in January 1949, but there are only six now; there is no record of how many are still in Canada. Noorduyn's son, Robert H. Noorduyn, takes pride in pointing out that since the Norseman was licensed for U.S. civil operation, there has not been an airworthiness directive issued against the airframe.

By early 1936, the once-bustling Noor-



LOGAN COOMBS

This UC-64A sports standard U.S. military markings for Arctic work: red wing panels from the ailerons out, all-red tail surfaces and rear fuselage.

duyn plants were in trouble. The firm was reorganized as Nuclear Enterprises, Limited, to permit the manufacture of non-aircraft products, but this diversification was not successful. In April 1946, the assets of the firm were taken over by Canadian Car & Foundry Company (CanCar), which included aircraft among its products. Production of the Norseman continued in CanCar's St. Laurent plant (north of Montreal) on a very small scale.

CanCar developed an updated Mk.VII in 1951, with metal replacing the wooden components, but it never got beyond the prototype stage. After several years of inactivity, it was destroyed in a hangar fire.

Due to the priority of other work, CanCar phased out the Norseman and sold the rights and tooling to a new company headed by Noorduyn in April 1953. This firm existed mainly to support the existing civil Norseman fleet with spare parts, but a few completely new Mk.Vs were produced through 1959 on a custom basis by Noorduyn Norseman Aircraft, Limited, for a price of $40,000. Altogether, including the experimental CanCar Mk.VII, 923 Norseman aircraft were built.

Newer specialized designs largely have replaced the venerable Norseman now. While there was nothing memorable about its thoroughly conventional appearance, it must be remembered always as the product of a dedicated man's dream, the first successful designed-for-the-purpose Canadian bush-plane. □

Intrigued by airplanes long before his first ride in a Travel Air at age 10, Peter Bowers, AOPA 54408, has since logged more than 4,200 hours.

The postwar Norseman was the Mk.V, V standing for victory. It received an extension to the passenger door, a separate baggage compartment door and a three-blade propeller.

NOORDUYN NORSEMAN

Mk.I—1935		Mk.V—1946
	Specifications	
Canadian Wright R-975E-2 Whirlwind	Powerplant	P&W R-1340-AN1 Wasp
450 hp @ 2,250 rpm (takeoff) 420 hp @ 2,200 rpm (normal)		600 hp @ 2,250 rpm (takeoff) 550 hp @ 2,200 rpm (normal)
51 ft 6 in	Wingspan	51 ft 8 in
32 ft (sea)*	Length	31 ft 9 in (land), 34 ft 3 in (sea)
325 sq ft	Wing area	325 sq ft
18.64 lb/sq ft	Wing loading	22.7 lb/sq ft (land), 23.2 lb/sq ft (sea)
13.46 lb/hp	Power loading	12.33 lb/hp (land), 12.56 lb/hp (sea)
3,380 lb (land), 3,850 (sea)	Empty weight	4,250 lb (land), 4,700 (sea)
6,060 lb	Gross weight	7,400 (land), 7,540 (sea)
	Performance	
160 mph (land), 146 mph (sea)	High speed	165 mph @ 5,000 ft (land), 155 mph (sea)
140 mph (land), 125 mph (sea)	Cruising speed	141 mph @ 5,000 ft (land), 134 mph (sea)
53 mph (land and sea)	Landing speed	68 mph (land and sea)
900 fpm (land), 820 fpm (sea)	Initial climb	5,000 ft in 7 min (land), 9,000 ft in 7 min (sea)
16,000 ft (land), 15,200 ft (sea)	Service ceiling	17,000 ft (land), 14,000 ft (sea)
500 sm (land)	Range	464 sm (land)†, 442 sm (sea)

*Landplane length not given in factory figures. †With 15% reserve on 100 imperial gallons.