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Twin Otter Series 400, renewing a friendship

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There's an old song that notes "Everything old is new again" and at first glance, Viking Air's Series 400 Twin Otter project seems to be a flight down memory lane. Why resurrect a type that has been out of production since 1987? Viking CEO, Dave Curtis, is not only a visionary but a patient man too, well versed in the historical, political, economic and technological forces that have shaped the Series 400. This summer, Curtis' efforts were rewarded as Transport Canada presented the amended Type Certificate to Viking at the Farnborough Airshow and deliveries of the Series 400 to eager customers got under way.

The float plane variant of the Twin Otter series 400, operated by Viking Air, who provided the photo.

Curtis explains at the outset that Viking is not offering a refurbished aircraft but a brand new construction with over 800 improvements. For many decades, Victoria based Viking Air had supported de Havilland's worldwide fleet with a range of products from washers to wing-boxes and so were in daily contact with operators. Using this valuable feedback and working with the axiom that 'the best replacement for an old Twin Otter is a new Twin Otter', Viking purchased the rights to the aircraft from Bombardier in 2006 and the Series 400 project was formally launched the following year. Curtis notes that the Twin Otter, in the face of competition from faster, pressurized types, has today become a niche aircraft and so there was insufficient demand or interest for a clean-sheet design and its significant certification costs. The Twin Otter can clear a 50' obstacle in only a 1200' takeoff run and the landing distance is even shorter. He notes "The Twin Otter is not a rocket ship, it's a truck" and describes the strategy of "Taking something that's good and making it better."


The Twin Otter series 400 land plane version

In 1964, de Havilland Canada immediately grasped the potential of Pratt & Whitney Canada's new PT-6 turboprop and set about modifying the DHC-3 Otter to produce the DHC-6 Twin Otter, the aircraft which launched the commuter airline industry. Since regulations did not require a flight attendant for 19-seat aircraft but still mandated multi-engine IFR for commercial passenger operations, the type was immensely popular and to date, the Twin Otter still holds the sales record for this category. The type was continually improved as the years went by and the 1969 Series 300 became the definitive version. Two decades later, amid slowing sales and a global economy battered by 20% interest rates, de Havilland delivered its 844th Twin Otter and all production tooling and jigs were scrapped. In the intervening years however, aviation accountants (a breed as humourless as the hangar cat) were observed to be smiling for once. They discovered that a Twin Otter could generate considerable profit all year while still be increasing in value from one annual balance sheet to the next. Clearly the

market recognized a superb design and while Twin Otters are no longer commonplace at airline alliance hubs, the versatile type is still hard at work in a variety of roles around the world.

The Series 400 retains all the advantages of the 300 and brings modern technology both to the production line and to the end product. CAD-CAM, CNC and laser measured jigs have defined 'A new level of quality' in the airframe itself explains Curtis. Many non-structural components, such as doors, are now made of composite materials while complex features of dubious value, such as the propeller Beta back-up and the 400 Hz AC electrical system, have simply been deleted. Lighting has also been upgraded to LED's but positive attributes such as the ruggedness of the landing gear and cleverness of the flight controls have been retained. (For example, with flap extension on a Twin Otter, the ailerons droop symmetrically while pitch forces are automatically trimmed away.) Power is now provided by the 750 hp PT-6A 34 and a 'hot and high' version with -35 engines is also offered.

As a supplier to the world's operators, Viking well knew that one of the continuing challenges in maintaining veteran Twin Otters was the availability of electro-mechanical flight and engine instruments. For example, some fuel quantity gauges were 12v DC, others were AC, while the avionics came from a variety of OEM sources. All these parts must be stocked to keep a fleet in the air. Viking knew that to cap developmental costs on the project and more importantly to save the customers money over the service life of the Series 400, a switch had to be made to a single-vendor, all-glass cockpit. The popular and reliable Honeywell Primus Apex suite with four interchangeable LCD screens was chosen.

Curtis wryly notes that the idea of 'glass' in a bush plane elicits the most surprise from potential customers but he points out that if the Pentagon specifies similar LCDs for their M-1 tank upgrades, then vibration is hardly a concern. Indeed the 1,000 hour warranty on the screens far exceeds the warranty on the old gyroscopes. As future changes are made to instrument colour banding, or navigational capability is upgraded with features such as synthetic vision, the improvements will be accomplished primarily with software updates, not gutting wiring harnesses in the hangar.

Series 400 wings and fuselages are built in Viking's Victoria BC plant while final assembly takes place at Calgary AB. Preliminary forecasts showed a market of 440 aircraft over a 10 year period and Viking's 500+ workforce is set to deliver 18 to 24 aircraft annually. List price for an EASA certified IFR Series 400 is $4.5m US.

Interest in the Series 400 has emerged from all quarters and recently Viking signed a Memorandum of Understanding with Vityaz Avia about final assembly and deliveries of Russian Series 400's. The maritime patrol version with FLIR, search radar and a military gross weight, called the "Guardian 400" has recently been ordered by the Vietnamese and UAE governments.

The glass cockpit installation in the Twin Otter series 400

Curtis enthuses "We are writing the latest chapter in the long history of de Havilland aircraft in Canada" and the world has taken notice in a big way. Currently, Series 400 order books show a $200m backlog and delivery dates extend to 2014. Viking's customers appear to have taken the words of the old song very much to heart: "We'll order now, what they ordered then. Because everything old, is new again."

www.vikingair.com

Getting up on the step with vortices streaming from the propellors