

the tundra

New Thoughts on Utility

Dream Aircraft turns
manufacturing
capacity into aviation
capability



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North of the border—the northern border, that is—folks tend to look at airplanes in a different light. In the lower 48 we see them as convenient transportation. Up where roads are rare and topography hostile, an airplane is quite often the only viable way in and out. It becomes the family sedan, the pickup truck, and on occasion, the lifeline to the outside. For that reason, utility comes first, while convenience is a slow second. Homebuilt designs from Canada often reflect that thought pattern.

Canada has given us a number of utility-based homebuilt designs, with Dream Aircraft's Tundra being the latest. So, what makes this airplane different from the rest? Undoubtedly the biggest difference is that the gestation of the entire concept was grossly different than is usually found in a homebuilt kit project.

Most homebuilt companies are created when a designer or team of designers hits upon a striking idea for an airplane. They recruit a number of individuals with the goal of producing an airplane kit. This means coming up with the funding, developing a facility, equipping the plant with the tooling that is required to work aircraft material, then training people how to use that equipment. Dream Aircraft, however, came into the homebuilt market from the opposite direction.

Dream Aircraft is the brainchild of Yvan Desmarais, president of D&G Manufacturing, a large sheet metal fabrication company that does work for a number of telecommunication and aerospace companies, including Bombardier. Desmarais, a pilot for 20 years and EAA member for 10, has that "up north" consciousness of the utilitarian aspect of aircraft. He looked around at his immense manufacturing capabilities and wondered, "Why not build an airplane?" But, he wasn't quick to jump into it. He spent years researching the available homebuilts as well as analyzing what he personally liked about different types of aircraft.

Although not an aero-engineer by training, Desmarais laid down the basic concept for the aircraft himself and then brought in a number of engineers to provide the critical eye and appropriate calculations. While that was being done he busied himself with setting up the production parameters for the airplane. Since the company was in the sheet metal fabrication business, it went without saying that the airplane would benefit from the CNC and sheet forming capabilities that already existed in-house. It took several years to complete the design and fabricate a prototype, and by that time the manufacturing methods were well in hand. The design would, understandably, evolve and include subtle changes, but the manufacturing process was well developed.

The first prototype flew in May 2001, with the second taking to the air shortly before Desmarais departed for Sun 'n Fun 2004. Between the two

were revisions brought about by experience with the first airplane. Before designers began to consider actually starting production, they investigated changes to be incorporated in the final production version.

Some of the changes included reshaping the vertical tail to make it easier to build. The one-piece, upwardly hinged door was slightly reshaped to make it more convenient for people to board. Designers also installed a double layer floor to cut down on engine noise.

The biggest change was to replace the bungee "V" gear with a spring gear. This was done both to ease manufacturing and to clean up the airplane slightly. The manufacturer is using a gun-drilled Grove gear and Grove wheels on the second prototype, and on the final kits.

The airplane capitalizes on the latest in CNC software, and the kits offer match-hole tooling, meaning all builders have to do is drill the holes to the finished size, debur, dimple/countersink as indicated, and pound the rivets. The airplane, by the way, uses driven rivets rather than pull-type rivets throughout.

An interesting application of state-of-the-art computer technology is in the building manual. The manual makes lavish use of exploded views and cutaways, which are all color-coded to show which rivet type goes where and which components match. If you're not colorblind, you should love this approach, as the presentation is both impressive and colorful.

The airplane itself is designed around the O-320 series of engines and fixed-pitch propellers, although the company says it's okay to use the 235-hp O-540 (O-540-B4B5). The 250-hp version is a definite no-no, and there was no eyewinking when that was said. The company is serious about that.

The gross weight of the airplane at utility category limits is 2,550 pounds (2,800 in normal category when on floats), and with a mini-

mal interior and fixed-pitch prop the empty weight should be about 1,385 pounds, which gives a useful load of 1,165 pounds. This, of course, doesn't include the inevitable "builder-induced weight creep," in which builders pack on items (and weight) the designer never envisioned. This type of thing frustrates designers like Yvan who always see that extra weight as unnecessary and hate the way it robs performance.

He even extends that philosophy when it comes to the decision of whether to hang a constant-speed prop on the airplane. He's not too enthusiastic about hanging an additional 57 pounds out on the crankshaft, even if it would enhance performance. As Yvan has clearly stated, the airplane wasn't designed for speed. It was designed for utility, and designers consider the 125 mph cruise speed and 750 fpm rate of climb at test weights to be more than adequate for the mission.

The company also paid special attention to the airplane's slow speed capabilities, which is one reason it uses a modified Riblett 660.15 airfoil and the more complex Fowler flaps, which most homebuilts avoid. Complexity isn't a problem for Dream Aircraft, however, and this combination gives the airplane a power-off stall speed in the 40-45 mph range. The flaps also reflex, or go up, 10 degrees to fight the never-ending problem of having to compromise on an airfoil.

The same wing that generates enough lift to let an airplane fly slowly will be generating too much lift at cruise speed and the nose of the wing will be down, which causes excess drag. However, by reflexing the flaps, as is done on certificated aircraft such as Maules, some of the lift is dumped, the nose of the airplane comes up, and the airplane is 4 miles per hour faster.

The wing is all aluminum, but notice that it still uses a double "V" strut, rather than the larger single strut most often seen with aluminum

wings. Yvan says they will probably go to a single strut eventually, but right now they are staying with the "V" configuration because it allows them to subtly twist the wing for rigging. Incidentally, the 3 degrees of twist in the wing is engineered into the rivet hole placement, so it will be there automatically when the wing is Clecoed together.

Kits are now in production, and as of late June 2005 13 are under construction, with two that should be flying by EAA AirVenture Oshkosh. A complete standard kit with a tail wheel lists for \$33,563, and a tricycle-gear version is \$36,397. Whether builders order the complete kit or its component parts (tail, wings, etc.), the price is the same.

Dream Aircraft is now working on earning Transport Canada approval of its quick-build kit. In regards to the quick-build kit, Yvan was emphatic when he said the company is going to try its best to build the kits in the United States rather than outsourcing somewhere out of the country.

Starting any new homebuilt company is not necessarily a fun project. It's loaded with questions and costs, with stringent requirements and marketing questions that often have no answers. Dream Aircraft, however, came into the game way ahead of many who travel the same road. It already had a facility, it already had a workforce, and it already knew how to organize a production line.

So, now all the rest of us can do is sit back and watch as this new design evolves into its final form and begins to show up at fly-ins. However, there's a good chance we won't be seeing many of them plying the fly-in routes because they'll be too busy out in the bush doing what a bushplane is supposed to be doing. 

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