

# MARTIN AIRCRAFT COMPANY

Innovating the world's first practical jetpack with SolidWorks solutions



Mankind has dreamed of flying freely, like a bird, since the beginning of time; not just soaring within the confines of an airplane, helicopter, or rocket—or suspended from a hang glider or balloon—but as a single entity, with the only means of propulsion strapped on one's back. The concept of the jetpack reaches back to the early days of science fiction, yet previous models were unwieldy, unsafe, or unrealistic. That's until Martin Aircraft developed the Martin Jetpack, the world's first practical jetpack.

Creating a jetpack for the mass market has long been Glenn Martin's dream. For the past 30 years, the founder of Martin Aircraft has pursued that goal, culminating in the founding of the New Zealand-based company in 1998. Initially, development progressed slowly, with the company primarily using AutoCAD® 2D tools and outside design contractors. However, Martin decided to move all development onto a 3D design platform in 2008 to accelerate the process. The move resulted in the selection of the Martin Jetpack as one of *Time* magazine's 50 Best Inventions of 2010.

"Upgrading to 3D was more a matter of necessity than a luxury," Martin recalls. "R&D had progressed to the point at which we needed to streamline processes and refine the design. In addition to needing better design, simulation, and visualization tools, the engineers that we hired had experience using one 3D system in particular. That was SolidWorks."

Martin Aircraft selected SolidWorks® solutions to finalize development of the Martin Jetpack, implementing SolidWorks Professional and SolidWorks Premium design software, and SolidWorks Simulation and SolidWorks Flow Simulation analysis tools, in 2008. "Our engineers knew how to use SolidWorks. Our composites partner used SolidWorks. The choice was obvious," Martin says.

*Martin Aircraft used SolidWorks design and simulation tools to develop the Martin Jetpack, the first jetpack created for the mass market.*

#### Challenge:

Accelerate development of the world's first practical jetpack to enable safe, controllable, single-person flight.

#### Solution:

Implement SolidWorks Professional and SolidWorks Premium design software, and the SolidWorks Simulation and SolidWorks Flow Simulation analysis applications, to optimize design, improve prototyping, and shorten development time.

#### Results:

- Cut mold development from three weeks to a day
- Eliminated need for prototype molds
- Accelerated jetpack development
- Named one of *Time* magazine's 50 Best Inventions of 2010

## Accelerating research and development

Since the company moved to SolidWorks software, development of the jetpack has accelerated at a rapid pace. The Martin Jetpack is unique in its use of vector controls and a custom-designed gasoline engine, which drives twin-ducted fans that produce sufficient thrust to lift and stabilize the jetpack during vertical takeoff and landing, enabling sustained flight. It's also less expensive than previous jetpacks and will sell at a price comparable to a high-end motorcycle or car.

As the design nears completion, SolidWorks surfacing and mold development tools have become increasingly important, according to Design Engineer Bill Clemence. "Designing the engine and main structural frame was fairly straightforward, involving generic shapes. Creating the fan blades and housings was another matter. On some parts, everything is a curve, and many are made using composite materials. SolidWorks gave us the surfacing, simulation, and flow simulation tools that we needed to quickly optimize key components," Clemence stresses.

"There's no doubt that SolidWorks has helped us to accelerate development and save time and money," Martin adds. "It's fantastic to have access to a modern tool like SolidWorks, which gives us as a small company the same skills and capabilities as a multinational corporation."

## Streamlining prototyping cycles

One of the key productivity benefits that Martin Aircraft has realized since moving to SolidWorks software is a substantial reduction in the time required to produce composite molds and parts, which has dramatically streamlined the company's prototyping operations. Producing composite parts from a mold used to require a minimum of three weeks. Martin Aircraft can now create molds and parts within 24 hours, and has eliminated the need to produce prototype molds.

"The combination of SolidWorks and our CNC machine allows us to make molds and parts more quickly and accurately," Clemence explains. "Testing multiple variations is an integral part of our design process, and with SolidWorks we can make parts with a very short turnaround."

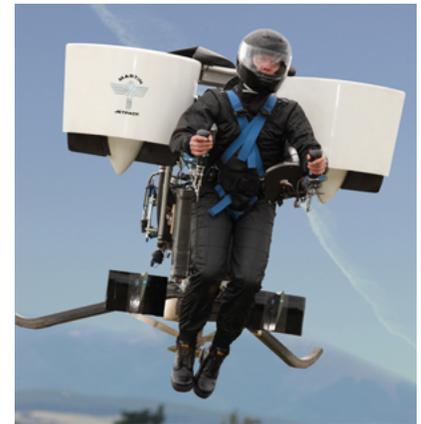
## Making it look good

Because the Martin Jetpack will be sold in leisure and recreational markets—in addition to military, search and rescue, and first responder markets—the design must be aesthetically pleasing. The company also needs to show and demonstrate the design's attractiveness. Using PhotoView 360 rendering and SolidWorks eDrawings® communications tools, Martin Aircraft is able to show cool-looking renderings of the jetpack, as well as detailed engineering views of how it operates.

"We're using the renderings that we created in SolidWorks in our brochures and pamphlets," Martin points out. "When I'm traveling overseas, I use these renderings and eDrawings files to show how the jetpack works in as much detail as necessary. SolidWorks solutions are integral to every facet of the jetpack's development."

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Glenn Martin  
Founding Director and Inventor



Martin Aircraft engineers relied on SolidWorks surfacing and mold development tools to bring the company's unique jetpack design through the final stages of development.



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