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As innovations and emerging technologies continue to change the face of the construction industry, architects and designers are increasingly turning to tensile membrane structures as a replacement for costly, heavy glass façades, awnings and roof coverings.

Headquartered in Amherst, New York, Birdair Inc. is one of the world’s leading contractors specializing in the design, fabrication and installation of tensile membrane structures. Founded in 1956 by Walter Bird, the company has a strong history of market-changing innovation tracing back to 1972 when the company first introduced Teflon-coated fiberglass to the market.

Birdair has provided tensile membrane roofing to some of the world’s most recognizable sports stadiums, including The O2 Arena in London, World Cup stadiums in both Brazil and South Africa, as well as Arthur Ashe Stadium in Queens, New York, home of the US Open.
Today, with the introduction of new polymer technologies such as ethylene tetrafluoroethylene (ETFE), Birdair is building on that strong history of innovation by bringing an exciting new slate of strong, translucent tensile membrane structures to the market.

**Taking flight**

Bird left his job with Bell Aeronautics in the mid-1950s to form Birdair, working with a small team to develop rapid-deployment command shelters, commercial bulk storage products and removable sports facility covers.

Recognized for his forward-thinking approach even in the earliest days of his career, Bird’s Buffalo, New York home was featured on a 1957 Life Magazine cover showcasing the air-supported pool enclosure he designed and installed as a means of getting the most out of his outdoor pool year-round.

But Bird’s big break came during Expo ’70 when he was tapped to develop a unique low-profile, air-supported roof system for the U.S. Pavilion alongside engineer David H. Geiger. While Birdair lost the Pavilion construction contract to Japan’s Taiyo Kogyo Corporation, the project’s impact on the company’s future turned out to be twofold.
First, the U.S. Pavilion served as a sort of proof of concept, showcasing the advantages of both air-supported structures and PTFE-coated fiberglass for a range of applications. Second, it put Birdair on the radar of Taiyo Kogyo Corporation, which came to acquire Birdair in 1992. The acquisition led to the formation of the world’s largest membrane producer, which now boasts customers on every continent.

Lighter, clearer, safer

Birdair’s roster of ETFE products represents an exciting new niche for the 60-year-old company. As a product that is more translucent than polytetrafluoroethylene (PTFE) offerings and far lighter than glass and steel façade and roofing solutions, ETFE had garnered a lot of attention from customers, designers and architects. “They love the vision you get from it and the fact that we can print a pattern on it to control lighting and shading,” says Dave Capezzuto, vice president of business development at Birdair. “It’s very cost effective in terms of covering large spans without the need for additional steel support.”

With a life span of 25 to 30 years, the ETFE structures are a sustainable and, thanks to their translucence, can even be outfitted with flexible photovoltaic (PV) panels to gather light and generate electricity. “It’s also 100 percent recyclable, very cost-effective and a much more lightweight system,” Capezzuto says. “As flexible PVs get better, I think we’re going to see more and more opportunities to incorporate that into our technology as well.”

The lighter weight and fabric-like properties of ETFE membranes also make the technology particularly well suited for use as an explosion-resistant alternative to traditional roofing and façade solutions. “Right now a lot of U.S. government buildings, airports and mass gathering places are very concerned about what would happen if a bomb went off. What type of debris would they have flying? Well with a film you remove all the glass shrapnel, so you’re starting to see this used in the place of skylights, atriums and canopies,” he says. “I think it’ll get even bigger exposure as time goes on.”

The Birdair team recently installed an ETFE façade at the U.S. Embassy in London. Designed by Philadelphia architecture firm KieranTimberlake, the façade gives the
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At home in the sports arena

As a subsidiary of Taiyo Kogyo Corporation, Birdair has access to manufacturing facilities across the globe and over 100 engineers, giving the company the ability to perform work in virtually any market. “Because of the uniqueness of our products, we also install almost everything that we build. We have construction experts on staff and they fly all over the globe executing these jobs,” says Capezzuto.

Some recent highlights include the upcoming installation of a new ETFE roof and façade system at the Mercedes-Benz Stadium, the new home of the NFL’s Atlanta Falcons. The stadium replaces the Georgia Dome, a project that Birdair actually contributed to back in 1994. For Capezzuto, ETFE projects like this represent an exciting new frontier for the company.

“This is more like a clear technology than a translucent one,” he says. “It’s a really up and coming product that’s been used in Europe for 20 years. It has really taken the U.S. market by storm in the last couple of years and we’re shifting our business model a bit to anticipate that.”

Capezzuto credits the rise of ETFE’s profile in part to the Beijing National Aquatics Center, also known as the Water Cube, which made a splash during the 2008 Olympic Games in China. “I think that was the benchmark project to get the design world excited about ETFE technology,” he says.

The company has completed a number of marquee projects, including installing a new PTFE membrane roof on the Arthur Ashe Stadium in Queens, New York that will otherwise plain building envelope a sense of depth while allowing workers inside an unobstructed view of the London skyline.

ETFE membranes hold particular promise in transforming unsightly parking structures. By stretching a tensile membrane across the façades of such structures, architects and designers can turn what was once a blight on the landscape into a seamless feature of the surrounding environment. “We have some new façade technology where you can take a rather ugly parking structure and turn it into something that enhances the skyline of any city,” says Capezzuto.
allow the US Open to avoid costly weather delays. “The past few years they’ve had problems with weather and when you get to the final day, you have people flying in from all over the world to be there, so now the big four—Wimbledon, The Australian Open, the French Open and the US Open—have all gone to covered facilities so they can control it better,” he says.

A recent project in New Jersey ranks among one of the more unique applications in the company’s history. American Dream Meadowlands is a 4,800,000-square-foot retail and entertainment complex in East Rutherford, New Jersey.

Set to be completed by summer 2017, the complex features over 400 retail stores and 21 restaurants, as well as an NHL-size hockey rink, indoor amusement and water parks, movie theaters, a concert hall and an indoor ski slope. “That’s another exciting project on the books right now with more than 300,000-square-feet of ETFE technology,” says Capezzuto.

**Expertise through experience**

With a new technology such as ETFE, it can be important to ensure that projects are overseen by experts who can help anticipate and head-off any problems that might arise during construction. To this end, Birdair has seen a marked increase in the use of the design-assist approach in recent years as developers do everything they can to ensure that a new technology delivers on its potential.

“You get involved early on with the design team and help them finalize,” Capezzuto says. “We’re starting to see more and more of that as they try to get specialty contractors involved early on so they make sure they’re doing best practices for that roof or façade system.”

While the recession-related construction slump meant a few lean years at Birdair, Capezzuto is confident that the rebounding market and glut of new construction will keep Birdair in a pattern of growth. “We’re going to see a lot of new stadium construction in the near future using both PTFE and ETFE,” he says.

With over 60 years in the business, Birdair has forged a number of vital industry connections throughout the decades. For example, while Capezzuto was anecdotally aware of the relationship between Birdair and Hunt Construction, the full scope of the longstanding relationship didn’t truly come into focus until an assistant put together a short retrospective of the two companies’ intersecting histories.

“I was even surprised. I didn’t even realize how many times we had brushed up against each other,” he says. “We go all the way back to the Syracuse Carrier Dome project in the ‘70s and now we’re working on several different projects with them, including the Arthur Ashe Stadium project.”

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In order to thrive for another 60 years, Birdair has made a concerted effort to bring in younger employees and generate interest in the industry as a whole. To that end the company has sponsored the Solar Decathlon for four years. A project of the U.S. Department of Energy, the Solar Decathlon pits collegiate teams against each other in a bid to design, build and operate solar-powered houses that are not only cost-effective and energy-efficient, but also attractive.

Birdair also hires summer interns from local universities and, as part of Taiyo Kogyo Corporation, holds an annual design competition challenging students to submit a design using Birdair’s tensile membrane technology. “This attracts young talent, but also creates excitement about the technology,” says Capezzuto.

As one of the world leaders in tensile membrane structure technology with an expertise in emerging technologies such as ETFE, Birdair Inc. is well positioned to usher in the next generation of roofing and façade innovation. •