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**Radant President Jean-Claude Surreau
compares the lamination stage of radome
construction to applying wallpaper.**

Photos by Ralph Fuller



Radant Technologies: Up in the Sky and Under the Sea

By Ralph Fuller

Like the U.S. Marines, Radant Technologies, Inc., plays roles in the air and on land and sea. And in space. Also, underwater.

Unlike the marines, Radant works from 255 Hudson Road in Stow, where it has a 75,000 square-foot plant on 43 acres.

“We’re an anomaly in a town better known for apple orchards and golf courses,” says Radant president – and long-time Stow resident – Jean-Claude Surreau. “With a workforce of about 100, we’re the town’s second-largest employer and its largest manufacturer.”

Radant’s major business is building radomes, those bubble-shaped pods that protect radar units and other electronic instruments from the elements. But these aren’t the house-sized buildings that sheltered large radar installations in years gone by. Rather, they’re a broad range of high-strength, lightweight laminate shells, from ash-tray size to about the dimensions of a tool shed. Each is custom-built at the plant to provide maximum protection with as little impact as possible on radiofrequency transmissions.

In recent years, Radant Technologies has expanded to include carbon-fiber reflector antennas that go inside some radomes (mostly for ships and submarines). In 2002 it established a small, separate company, Radant MEMS, Inc., to develop advanced, reliable micro-switches for those antennas. And Radant’s experience with high-strength, low-weight carbon-fiber has produced a side-niche designing and producing parts for exotic automobiles – think custom rear spoilers for Lamborghinis.

But its stock-in-trade continues to be radomes. If you’ve watched live television while traveling on a commercial airliner, you did so with the help of a radome, one on the fuselage that protected the antenna picking up satellite-relayed signals. And if the pilot came on to announce choppy air ahead, you were helped by another radome – the egg-shaped noses of most airliners are radomes housing weather-monitoring radar.

A Radant display features a range of radome and antenna products.



Actually, Radant doesn't make any of those – it concentrates on military applications, nearly all of them for the U.S armed forces. Its products support radar, communications and electronic warfare systems on military aircraft, naval vessels and ground installations. If by chance you've piloted a B-1 Bomber and noticed the same choppy air through that plane's weather system, you almost certainly have benefited from a Radant radome.

And while Radant structures don't go into space themselves, they do protect the surface- and aircraft-based antennas of high-end military satellite communications systems. Radant installations are found at sea on vessels ranging from aircraft carriers to cargo ships.

And on submarines: Over the years Radant has done numerous installations on U.S. Navy submarines. In January the company received a contract for up to \$14.1 million to build communications antenna radomes for as many as 100 submarines over the next five years.

"Radomes are like windshields on cars – protective and transparent to whatever frequency they're designed for," Sureau says. "They may be opaque to light but their materials are designed to let the wavelengths from their internal antennas pass through without interference." Since those wavelengths can be anywhere between 1 and 45 gigahertz, and since the conditions in which they'll be used can vary markedly, the radome for each application is individually engineered and constructed.

"We have three types of employees," Sureau says: "People who are knowledgeable about electromagnetics, those who know about composites and fabrications, and mechanical people who know about structural engineering."

A typical radome is made of fiber-reinforced, thermal-set resins, usually with face sheets – the outer and inner surfaces – of laminated epoxy and with lightweight inner cores that provide rigidity and appropriate spacing between the sheets. The cores may take the forms of honeycomb patterns, foam or lightweight woods like balsa.

"We don't so much develop new materials as we exploit what's out there," Sureau notes. "What we're doing is picking the right combinations of materials to match the transmissions. Sometimes, we find that more material is better than less."

Radant does extensive on-site testing, using resources like an outdoor antenna range on which RF transmissions are sent between a test bay in the plant and a tower 1,600 feet away. An indoor 40-foot antenna range is also used.

A radome begins life in a roll of resin-impregnated fabric, cut to patterns and shaped over molds. Workers add on layers of laminate material, much like applying wallpaper. Once formed, the structure is baked in a giant autoclave to harden and gain strength. Then it's drilled or otherwise modified, tested and, if appropriate, painted.

The result is a very strong, ultra-lightweight single-piece unit. If it's for a submarine, it's still very strong – but very heavy.

Radant Technologies - continued

Mounted atop the periscope or on the sail (what landlubbers would call the conning tower), submarine radomes are reinforced to withstand intense underwater pressures. A special pressure chamber in the Stow factory is used to test submarine products.

Radant has been in business – and in Stow – since 1979. Sureau joined it in 1981, “coming in on the ground floor and eventually taking over ownership,” he says. He and his wife Carole have lived on Boxborough Road since 1985, raising sons Michael and Adam there. Over the years, he’s coached kids’ soccer and he continues to play on the Over-60 soccer team in Harvard and on a New England Regional Tournament team.

Nationally, Sureau says, the manufacture of radomes is dominated by one large company. Radant is prominent in the second tier, and for some markets – especially advanced satellite communications – is number one in the world. He expects Radant to grow substantially in the coming years, he says, and may even have to acquire additional facilities in the area.