

DEPARTMENT OF THE NAVY
SBIR/STTR TRANSITION PROGRAM
SPOTLIGHT

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Corrdesa Repair Technology Deployed with F-35s

By Jennifer Reisch

Corrdesa LLC's SBIR-developed portable corrosion resistant coating repair technology, Dalistick® non-drip brush plating, is now part of Lockheed Martin's ground support equipment for F-35 squadrons around the world. Corrdesa's equipment reduces turn-around-time for repairs and eliminates exposure to toxic materials.

Over the past seven years, Department of Navy funding from an SBIR (Selective Electroplating Technology Improvement (SETI) Topic N112-154) and SERDP-ESTCP has helped Corrdesa to develop and qualify non-drip brush plating and anodizing repair processes, equipment and tooling. Partnering with DALIC, a French Company, the Dalistick® non-drip brush plating equipment has been tested and further developed to address repair challenges in the U.S. Air Force, U.S. Navy maintenance facilities, and on aircraft carriers, which require safe operations on deck at sea.

Lockheed Martin is purchasing an initial 50 Dalistick® systems for F-35 sustainment and has options for 40 or more per year for the next three years. The fifth generation F-35 is considered the most advanced fighter aircraft in the world and also the greenest. While designed and produced for mission readiness and the warfighter's success, almost all cadmium, chromates, and other toxic materials have been eliminated from construction and maintenance.

"When aircraft go out to a country or a particular squadron all ground support equipment required to sustain that aircraft also gets delivered by Lockheed Martin and we're part of that standard equipment, which allows squadrons to make a limited number of repairs themselves to maintain corrosion-control



Image courtesy of Corrdesa LLC

Corrdesa partnered with DALIC to produce the ruggedized mobile Dalistick® system for ZnNi plating repairs directly on aircraft.

coatings," explained Alan Rose, CEO at Corrdesa. The Dalistick® plating/anodizing unit is designed as a closed-loop system that pumps electrolyte from the bottle through the plating tool where it repairs the aircraft, and back into the bottle for clean, no-touch disposal when it is depleted. This prevents drips from contaminating adjacent equipment, and with no emissions it is safer for technicians. The operator need only clean, smooth and measure the area to be repaired, run the plating tool over the damaged area until the machine shuts off at the predetermined plating thickness, and apply a non-chromate passivate. The aircraft can then be non-chrome primed and painted and put back in the air.

"Our equipment uses a similar chemistry to tank plating but it applies the electroplating locally. The tool can complete an electrical circuit, so

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essentially it's brush plating and you can locally electroplate over dings and scratches," Rose said. The U.S. Naval forces operate in hostile, corrosive locations, placing substantial environmental stress on weapons systems, demanding high performance materials and coatings for their protection. These protective coatings degrade and become damaged. By enabling repair work on the flight line this system significantly reduces turn time for the repair, improving platform readiness by protecting aircraft structures from corrosion.

"Aircraft landing gear is typically made of high-strength steel, dipped in a tank and electroplated with cadmium, then chromate converted, primed and topcoated. Essentially a coating stack exists on a brand-new landing gear, and then in use things get damaged and the paint layer can get dinged or scratched, revealing the cadmium coating and steel underneath. The cadmium coating is sacrificial so it will corrode in preference to the valuable high strength landing gear that obviously you don't want to have damaged. However, cadmium and chromates are both toxic and are being phased out in favor of chromate-free zinc-nickel. So the issue is how to replace a damaged cadmium layer with something that works just as well but is not toxic," explained Rose.

"What Lockheed Martin bought into was this capability to locally fix damaged electroplated coatings. The chemistry that we qualified during the SBIR work is a chromate-free zinc nickel chemistry, so this unit not only does non-drip electroplating but it repairs both zinc nickel and cadmium with non-toxic zinc nickel. There are very stringent qualifications working with Lockheed Martin and it was great working with them in that respect. We did first underestimate the amount of effort required to get the first article out, but we got there."

While the units Lockheed Martin is buying are for the F-35 program the technology would work with any aircraft. Corrdesa has complex simulation capabilities for electrochemical processes and can

design and build needed tools very quickly to deal with repair challenges. The company can simulate a process and design custom tools for particular repairs and then 3-D print the needed tools, creating very short turn times. "We are able to listen to potential customer needs and build them what they need rather than asking them to fit a square peg into a round hole. Some people who've heard of brush plating haven't realized you can do brush anodizing as well. That's really important because with it you can treat the aluminum on planes. This equipment can do both plating and anodizing. It really drives down maintenance time," Rose said.

There have been many challenges along the path to deploying Dalistick® for harsh military environments. "As a small company you are always being pulled. It's so easy to go with the flow and lose sight of the objectives. If you've got long term goals one of the best ways of approaching them can be in mini milestones. We thought very seriously before we decided to participate in the Navy STP and commit to it. You have to know what you're getting into and you have to make the time. But it's not like throwing things over into an empty hole. There are people like business consultants and other advisors to work with who give you that much needed outside perspective. I think everyone needs some kind of coach or mentor outside of the business," Rose said. "I think it's an excellent program. There are a lot of resources. The market research analysis report is really good. I'm working through that and reaching out to some of the contacts."

Based in Tyrone, Ga., Corrdesa uses computer-aided engineering (CAE) simulation tools to develop corrosion-resistant coatings, processes, and equipment to meet customer needs and regulatory and environmental requirements.

For more information visit the company website at <https://www.corrdesa.com>.