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MISSION CRITICAL MANUFACTURING

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DoD's plans to strengthen its supply base*

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Metal Forming Specialist Delivers Rare Combination of Manufacturing Expertise

Connecticut manufacturer AlphaCoin focuses on deep drawing and electroforming for the aerospace and defense industries

In a metal forming factory just off Interstate 84 in southwestern Connecticut, a small manufacturer plies its craft, making parts like leading-edge abrasion strips for rotorcraft composite blades, protective seals for missile wing slots, and erosion sheaths for outer guide vanes on turbine engines.

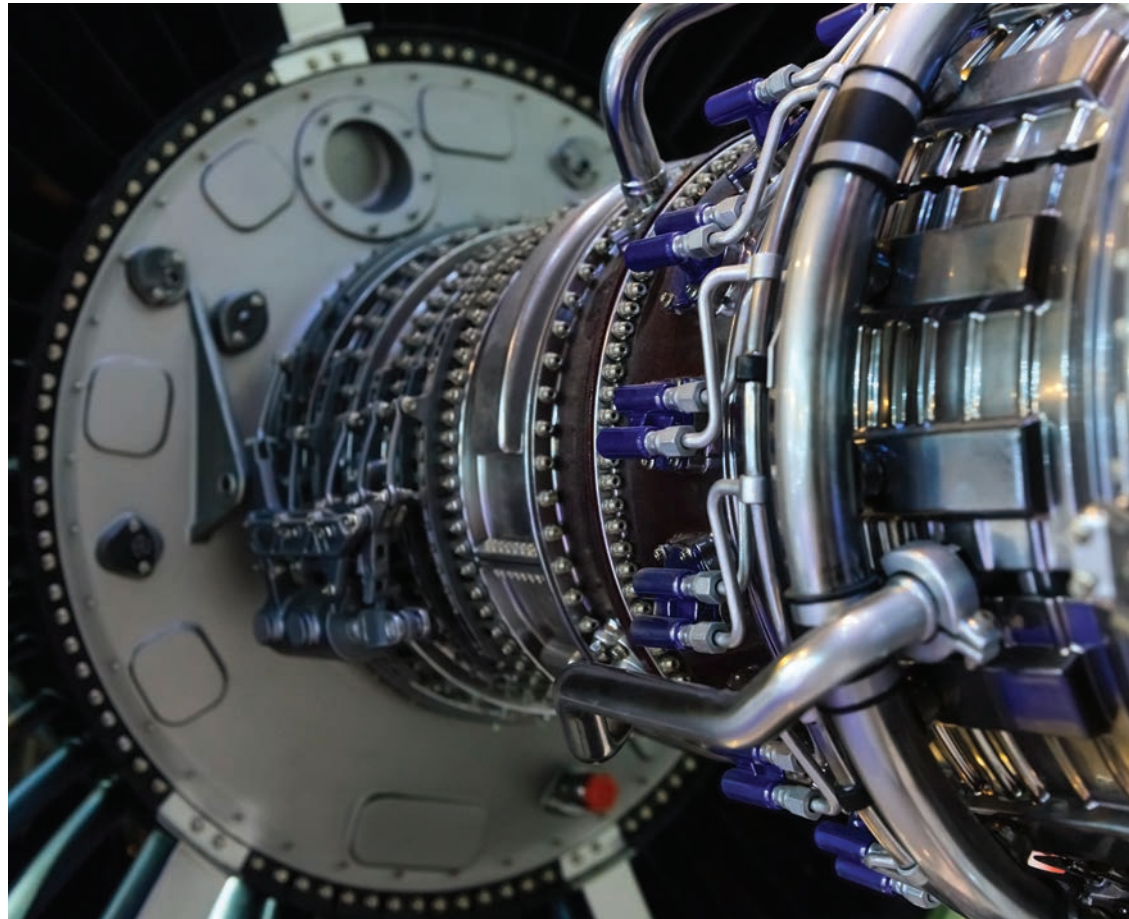
The company, **GAR Electroforming**, is one of three manufacturing firms that make up **AlphaCoin LLC**, a specialty provider of mission-critical components to the aerospace, defense, and medical industries. The trio also includes **Connecticut Coining, Inc.**, a Bethel, Connecticut-based manufacturer of deep-drawn metal parts, and **Gasser & Sons, Inc.**, a Commack, New York firm that also specializes in metal deep drawing. All three of the AlphaCoin companies also offer precision CNC machining.

According to AlphaCoin Vice President John Boscia, it's AlphaCoin's combined offering of deep drawing and electroforming that really piques the interest of aerospace and defense customers.

"I can't think of anybody in the industry that offers deep drawing and electroforming," Boscia told D2P in an interview. "Obviously, many people offer CNC machining, but to offer those two unique metal forming capabilities, I believe, is unmatched in the market, especially at the capacity and with the capabilities that we offer."

At a time when the U.S. Department of Defense is looking to expand its domestic manufacturing supplier base, particularly with small businesses, AlphaCoin is continuing to see strong demand from the defense sector.

Last year, AlphaCoin's GAR Electroforming division in Danbury, Connecticut captured the BAE Systems Partner 2 Win Supplier of the Year Award. The award recognized GAR's exceptional performance and contributions to supply chain success in 2020 for BAE Systems, Inc.'s Electronic Systems sector. BAE Systems is a prominent developer and manufacturer of critical products and



systems that are used to enhance military capability and protect national security.

Design-2-Part caught up with John Boscia recently to talk about AlphaCoin's niche capabilities, including how they're suited to solving the unique production challenges of demanding aerospace and defense customers. Following is a transcript of our conversation, edited for length and clarity.

Design-2-Part: We're interested in hearing about AlphaCoin's capabilities, particularly with tight tolerance parts for the aerospace and defense industries. What factors make AlphaCoin well-suited to meet the needs of these mission-critical sectors?

John Boscia: AlphaCoin's primary focus is the aerospace and defense sectors. We specialize primarily in metal deep drawing and electroforming, and while it is all build-to-print (it is per our customers' drawings and specifications), we develop significant

Photo: AlphaCoin manufactures high-pressure exhaust ducting components for turbine engines. (Photo courtesy AlphaCoin)

processes, or intellectual property of those processes, to create their parts. We don't have design IP; we have process IP, or manufacturing IP, that we retain and then hold very sensitive to the business.

Our two process specialties—deep drawing and electroforming—are very, very unique metal forming capabilities.

Metal deep drawing is similar to stampings. I like to say it's similar to stampings, but on steroids. You're not just bending sheet (sheet stock, sheet metal, whether it's in rolled form, or just flat stock or slugs)—it's stretching the material. It's truly stretching it beyond its elastic limits. It's stretching it and it's processing it through that pressing operation.

Through the processes that we've developed, we're stretching the material, we're heat treating it or annealing it to bring some ductility back into the material, and we're stretching it again to get the desired geometry or desired configuration, depth, et cetera. And obviously, just by mechanical properties of the material itself, it sometimes requires many draws.

It's through those years of doing deep drawing that we've developed the processes to yield a successful part. Again, it's not stamping, but it's stamping to a higher degree in terms of complexity and limits of the material itself.

Electroforming is even more complex and offers more flexibility in the metal forming area. It allows us to create extremely complex shapes, as well as variable wall thickness. That's the real key—the ability to fabricate variable wall thickness type of shelled components, whereas deep drawing is restricted to the material thickness itself. While the material goes through a thinning process through the deep drawing process, it [the wall thickness] is fairly consistent, fairly uniform.

With electroforming, you can specifically create thicker or thinner sections, strategically, throughout the part. It's only limited by the complexity of the mandrel, on which the nickel, nickel-cobalt, or copper is formed through the electrodeposition process. So, it's really very complementary. When we looked to acquire GAR, the electroforming business, it was really seen as a great complementary capability to our deep drawing capability, which is extensive through the two businesses, Gasser and Connecticut Coining.

So it really offers our businesses the ability to satisfy our customer's requirement, or solve a customer's problem, with those metal forming capabilities. If one can't suffice, we're highly confident the other could suffice. It gives us that breadth of capabilities to solve our customers' problems or offer them solutions.

D2P: GAR Electroforming, a division of AlphaCoin, won the BAE Systems Partner-2-Win Supplier of the Year Award for 2020. Can you talk a little bit about what that signifies to potential customers?

JB: Yes, that was an incredible honor. It really shows the capabilities of GAR and the people that make up the business—their abilities to provide a very complex electroformed component in a high-rate volume. It's used on [an advanced weapon system].

It's a very intricate, a very detailed electroforming process that we go through to fabricate it at an exceptionally high rate, consid-

ering it is defense-related. I think it just speaks to the capabilities of the people at GAR Electroforming—not only to engineer such a process, but to execute the manufacturing and delivery at the highest quality that can be achieved.

D2P: You also offer CNC machining. Would you characterize it as precision CNC machining?

JB: Yes, most certainly. We have that vertical integration to complement our metal deep drawing and electroforming because there are some limitations to those metal forming processes. As a result, sometimes they require secondary turning, milling, or grinding—metal cutting type of work. So, the CNC machining truly supports and complements those core competencies of metal deep drawing and electroforming.

D2P: How would you characterize the current demand from the aerospace and defense markets, given what's going on in the world today?

JB: Defense has been pretty strong, even throughout COVID, and it's kept our business on very solid footing as a result. We see defense continuing to pick up as a result of what's going on in Ukraine, as countries that aren't in NATO or, even some that are in NATO, really start to realize that they need to enhance or add robustness to their defense spending to provide the level of security as required. So we see defense not only getting stronger—we think it's going to be a prolonged growth area.

There's still weakness in the commercial aerospace sector, mainly on the twin-aisle airplanes—the triple 7s (777s) or the 767s, or 787s, as well as the A330s and A350s of Airbus. The 747 and A380 are obviously sunseting programs, but nonetheless, those twin-aisle programs are still really struggling due to COVID. The long-range travel hasn't come back as much as the short-range domestic travel, where the use of the A320, the 737, or even the A220 platforms have rebounded. So, while there's still weakness there on the long haul, or the twin-aisle, there's some significant rebound on the short haul, or the single aisle programs.

D2P: What are some of the key technology or economic trends that are impacting the aerospace and defense industries, and how are they influencing the services you provide as a supplier to these markets?

JB: I look at the raw material volatility that's currently ongoing. Cost of raw material has continued to increase with less supply available, so we're seeing tremendous growth in cost of nickel, titanium, all nickel based alloys, et cetera.

But the real benefit of the metal forming capabilities that we have is the economics. When you see a part that's cylindrical or rectangular in shape, but it's a shelled component—meaning it has an external geometry to it, but a very thin wall or a void in the inside—that's a component that is ideally suited for deep drawing or electroforming.

Through the conventional means of manufacturing, or metal removal, you have to start with a bar, or slug, or a billet of material and machine away that internal void, or that internal section, to create that shell of a component. Whereas we draw that from a sheet, so exceptional savings can be had with regard to not only the raw material, but the time it takes to machine out all of that material, as well as the scrap of that material.

Our methods of manufacturing—deep drawing and electroforming—yield very little scrap. So, just by nature of the raw material marketplace, our processes are ideally suited to serve the aerospace and defense market. They continue to remove cost, or minimize cost on some very critical components, whether they're used as rotorcraft abrasion strips, which are electroformed, or en-



gine components, or engine exhaust ducting, or high-pressure exhaust ducting components, which are metal deep drawn.

D2P: When you consider the supply chain disruptions that have occurred over the past couple of years, do you find that OEMs and higher-tier suppliers view your company's status as an AS9100 certified, U.S.-based manufacturer as an advantage when deciding where to source their parts?

JB: Yes, absolutely. I've been on a number of phone calls with customers, and they've initiated what they call North American focused acquisition, or sourcing in North America to minimize those supply chain disruptions. That seems to be a real trend these days, a real focus, to move manufacturing to North America, and to the U.S., specifically, where they have a higher level of reliability of receiving their product, and a higher level of reliability in the delivery of those products. We've seen a real push towards that, and we expect to continue to see that moving forward.

D2P: What advantages does AlphaCoin offer to customers to help mitigate supply chain risks?

JB: In our long history as a business that specializes in metal forming, we've obviously gained significant experience and grown the business to add a lot of capacity and capability. With our technical knowledge of manufacturing in those specific areas of metal forming, we offer solutions to our customers' problems. Our technically skilled people and our manufacturing people can



Leading edge abrasion strips for rotorcraft blades are manufactured by AlphaCoin. (Photo courtesy AlphaCoin)

really offer insight into how to solve a manufacturing problem.

We add value to our customers through our technical competencies and the productivity that we can achieve. The value that we bring to customers is really through the engineering and manufacturing support and expertise that we offer. We do all the design and manufacturing of our tools to create the components that we make for our customers, whether it's metal deep drawing or electroforming. We do that in house, and that's a real value-added service that minimizes time to market and

minimizes cost to our customers.

D2P: Have you seen indications recently that more potential customers are reaching out and seeking your company's capabilities?

JB: Absolutely, and it's a prerequisite to have AS9100 certification and Nadcap certification. Those are prerequisites to do the work in today's marketplace. We're seeing more customers come to us because they recognize our capabilities, they recognize our capacity, and they recognize the fact that we have those kinds of certifications to support them.

We also have the familiarity in dealing with blue chip aerospace and defense customers, so we know how they operate. We're seeing growth with domestically located aerospace and defense companies, as well as European companies and aerospace and defense companies located in the U.K., as well. ■

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