



Keeping Our Military on the Cutting Edge

In today's business world, success often depends on the development and utilization of cutting-edge technology. The defense industry has the same need and there's a lot more at stake than the bottom line. New and improved technologies play a large role in strategizing, saving money, reducing environmental impact and most importantly, helping keep troops safer in combat.

Michigan companies are supplying the military with new technologies, while developing those same products for crossover into the mainstream market. Three state businesses—TopDuck Products, LLC; Pure Entropy Technologies, LLC; and AFID Therapeutics, Inc.—represent a variety of strategies being used to address the technological needs of the defense industry.

Gunzilla

For Don Kettles, founder of Lansing-based TopDuck Products, LLC, the inspiration for Gunzilla—a non-toxic gun cleaner, lubricant and protectant—was born out of compassion for troops in combat who struggle to maintain their weapons on the front lines. After speaking to a friend's son serving in the military, he discovered the standard-issue gun cleaner provided to troops is erosive to the skin. During follow-up research, he was told by other members of the military that weapons are often jammed up with sand and dust during combat.

In response to these complaints Kettles developed Gunzilla and began sales and distribution of the product in March 2006. Gunzilla is non-toxic and doesn't harm skin. It is also non-ionic, providing non-stick surfaces that reduce the chance of weapons jamming in dusty or sandy environments. In addition, Gunzilla is more slippery than oil, reducing heat and providing longer life to the weapon. "I get e-mails virtually every day from parents or from soldiers in combat telling me that this is a life-saving product, because the guns don't jam," said Kettles. "In one Marine unit that used only Gunzilla for nine months—40 men fighting in Fallujah, Iraq—they never once had a maintenance-related failure using Gunzilla. Before they got Gunzilla, when they'd come back from their mission, they'd spend half the night—sometimes they'd get hardly any sleep at all—trying to get their guns clean enough to go out the next day. Once they got Gunzilla, they could clean their weapons in 30 minutes and go to bed."

Gunzilla is currently used by military units, federal agencies and law enforcement. A spin-off product is in development for the mainstream market. "It's a non-hazardous product that can be used for everything from freeing up locks to cleaning engines, cleaning metal parts and protecting metal. It has a lot of other applications that are much broader than just the military applications."

High-Def Encryption

The military isn't only in need of weapon-based technology. Troy-based Pure Entropy Technologies has developed a government-level security solution that streams perfectly encrypted data of all types, including high-definition video. "We were aware that there wasn't any currently available encryption solution that does real-time, streaming

high-definition video and that was essentially the challenge," said Pure Entropy Chief Financial Officer Tom DeAgostino. "As a by-product of all of that, we've been able to develop a product that has applications across virtually every commercial and government security sector that we're aware of."

Past video encryption technology not only consumed vast amounts of bandwidth, but also produced low-quality grainy pictures. Pure Entropy's technology is a symmetrical encryption solution that uses up to a 2048-bit key and does not increase bandwidth requirements for streaming data. "We've been told by people we've met with—senior scientists and intelligence agencies—that the code is computationally unbreakable for over 200,000 years," said DeAgostino. "Probably the single most important thing for the military applications is that with the streaming video our application uses virtually no additional bandwidth, and bandwidth is a critical issue for any form of streaming digital data because of the current demands and current availability."

Pure Entropy's technology leaves a small footprint and produces crystal-clear high-definition video. The application can be used in reconnaissance missions, base-to-base communications and any number of other military and governmental security initiatives. Pure Entropy's sister company, Encryption Security Solutions, LLC, provides similar services to the commercial market.

DeAgostino says Pure Entropy's technology and others in development for military use not only contribute to the defense industry, but also to Michigan's economic diversification. "The current situation in our economy, I think, is so much structural as opposed to cyclical," he said. "I think it's absolutely essential for the state to start to diversify its base, and technology is at the cutting edge of revenue-generating enterprises. That's why there's been such a big effort to try to bring new high-tech businesses to the state. The thing that makes us a viable option in that regard is that this product can be used across so many different security sectors and has massive scalability...the potential revenue generated from this is almost unmeasured and with that revenue comes state taxes; it comes with jobs. It brings a significant economic component to this state, which I think is critical."

Renewable Rocket Fuel

While TopDuck Products and Pure Entropy Technologies identified a need within the defense industry and developed technology to address it, Lansing-based AFID Therapeutics saw a need and was able to adapt its current technology for military use. AFID is a successful drug company specializing in chemistry derived from plant biomass materials and is used to develop drugs that treat a variety of diseases such as cancer, autoimmune disorders, bacterial and viral infections, cardiovascular disorders, diabetes, and Alzheimer's. In 2004, Chief Scientific Officer and Founder Dr. Rawle Hollingsworth discovered that AFID's unique chemical technologies also provided an answer to the military's R&D quest for non-fossil, fuel-based rocket fuel.

"I was reading this article; it was a result of some discussions that were ongoing about strategic materials, and I was kind of stunned to find out that we were still sort of struggling with this particular kind of technology," said Dr. Hollingsworth. "It's the kind of thing that we had taken for granted a long time ago because we've been practicing technologies like this on a significant scale for a long time. [I thought,] because it's the same material that we use in our pharmaceutical pipeline and we can get it on scale pretty quickly, why not just move forward with it and fill the breach."

Since AFID already possessed a strong expertise and scale capacity in developing advanced renewable materials, turning to high-energy materials was a smooth segue. The company's rocket fuel technology goes a long way in reducing the military's dependence on foreign oil to power its weaponry and opens doors for wider applications of renewable resources in the future. "Every technology is valued," said Dr. Hollingsworth. "Every technology that addresses to some extent the questions that we have and issues that we have—not just in defense, but basically technologies that help support the infrastructure and integrity of the country as a whole—everyone is going to be looking twice at your technologies to see whether it really does work."

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