Advanced Magnet Lab gears up for manufacturing at critical time as nation experiences magnet shortage; Wade Senti follows in late father's footsteps

By Ken Datzman



BBN photo — Adrienne B. Roth

Advanced Magnet Lab is a recognized leader in the development of innovative magnet technologies and magnet–based applications. The company's roots date to 1995. Its customers include businesses involved in data storage, and defense and aerospace firms. From left, the team includes: Jason Kenney, associate; Richard Dubord, senior engineer; and Wade Senti, president and CEO. They are at AML's pilot–staging facility in West Melbourne. Their corporate office is in Melbourne.

MELBOURNE — The United States, under the Trump administration, is looking for ways to reduce dependence on China's near–monopoly of minerals and magnets, as this is viewed as a threat to national security.

After dominating the industry in the 1980s, the U.S. ceded production to China over several decades because of offshoring, low prices, and less stringent environmental regulations. To break China's chokehold, the goal is to push onshore production, secure supply chains, and invest heavily in domestic mining and manufacturing.

There is a critical shortage of rare earth permanent magnets, particularly those containing neodymium. These magnets are essential for motors, sensors, and other technologies.

Permanent magnets, for example, are used in the F–35 Lightning II aircraft, the Virginia and Columbia class submarines, and unmanned aerial vehicles.

"Permanent magnets are also a key part of commercial applications in the United States," said Wade Senti, president and chief executive officer of Advanced Magnet Lab Inc. (AML), a company that develops innovative magnet technologies and magnet–based applications.

Permanent magnets are used in magnetic resonance imaging machines and other commercial medical technologies, industrial equipment, and consumer electronics. A permanent magnet retains its magnetic properties indefinitely, even after removing the external magnetic field.

AML has spent a decade developing some of the most "advanced permanent magnet technology in the world," including leading–edge manufacturing that maximizes the use of existing materials and processes, and enables the use of new, lower–cost materials while meeting or exceeding the most demanding application requirements of electrical machines, such as motors and generators.

The company's "PM–Wire" is a scalable and modular manufacturing process that can produce "non–sintered and sintered permanent magnets at a high rate and high speed," said Senti.

Sintered magnets are made by melting and casting an alloy, then pulverizing it into powder and beating the powder under high pressure to create a strong, dense, and crystalline structure, he said.

Non–sintered, or bonded, magnets consist of magnetic powder mixed with a binder, such as a polymer, and then compression– or injection–molded into shape.

PM–Wire "enables the manufacturing of permanent magnets at high volume, high yield, and low cost, and with better flexibility in shapes and magnetization direction, as compared to conventionally manufactured magnets that currently are produced almost entirely in China."

This process is adaptable to a variety of applications, including those that benefit from magnets in unique configurations and material compositions, such as electric motors.

Dr. Phillippe Masson, an electrical engineer, is the company's chief technology officer. His resume includes having spent six years at Florida State University's Center for Advanced Power Systems. There, he contributed to the development of high–power–density superconducting machines for aircraft propulsion and the numerical modeling of electro–thermal instabilities in superconductors.

AML's customers include large motor and generator companies, businesses involved in data storage, and defense and aerospace firms.

With America's renewed focus on minerals and magnets, AML has seen its visibility skyrocket. The company has been scaling its technology and working with defense–oriented entities to protect America's national security.

"We have seen more interest in AML in the last six weeks than we have seen in years," said Senti. "We have had some significant funding interest and even several 'soft offers' to acquire the company. There is a lot of interest from commercial industry and a lot of interest from private–sector investors. Our plans are to gear up for manufacturing in 2026."

Currently, AML has its corporate office and research and development arm housed in The Ice Plant building on South Harbor City Boulevard.

The three–story building is on the National Register of Historic Places. The building was constructed in 1926 by Florida Power & Light Co. as a 150–ton ice plant. AML also has a pilot–staging facility in West Melbourne that is filled with equipment.

"We are looking for a 40,000– to 50,000–square–foot facility in Brevard for the manufacturing of permanent magnets. We are tapping the expertise of a former board member who has a significant background in advanced manufacturing. We brought him on as a consultant," said Senti.

He added, "For us to be a successful magnet manufacturing company, we want to be involved in material processing. And we are working with many different

Please see Advanced Magnet Lab Inc., page 21

Advanced Magnet Lab Inc.

Continued from page 13

materials in our processes."

Wade Senti was recently promoted by the AML board to his current position and succeeds his father, who died suddenly on Jan. 11 at age 63. Mark Senti was the co–founder and CEO.

Wade Senti, a University of Florida business graduate with in–depth experience in finance, mergers and acquisitions, and business development, joined AML in 2018.

"I worked alongside my father all those years," he said. "I led a lot of our business transactions. My father focused on the technical side of the business while I focused on the financial side of the operation. His passion was robotics and automation. We worked seven days a week at AML."

Mark Senti was a mentor to entrepreneurs in the region and was a technology visionary.

"Mark was a visionary and a born leader," posted Michael Aller, vice president of strategic program development at FloridaMakes.

Mark Senti started his career with Cray Research Inc. as an engineer developing a range of hardware designed for various manufacturing processes.

He earned the Cray Research Leadership and Innovation Award. Mark Senti's honors include being named the Outstanding Young Manufacturing Engineer Award recipient from the Society of Manufacturing Engineers.

Mark Senti became an entrepreneur in 1992 when he co–founded GSMA Systems Inc., an international provider of robotics and factory automation systems based in Palm Bay. GSMA was sold in 2004. A few years later he was leading AML.

AML has been in business since 1995. "But it was reorganized in 2008 by my father and others to pursue the super–conducting magnet industry," said Wade Senti. "Then in early 2018, we started to pursue commercial market opportunities with permanent magnets."

Wade Senti recently traveled to Washington, D.C. to meet with a senior trade advisor in the Trump administration. "We have a good relationship with an advisor in D.C. who has been very helpful. She has significant connections with the government having once worked in the Department of Commerce holding a senior–level position."

Wade Senti said "we had an individual meeting that was one–hour long with this senior trade advisor. We provided information about our company and our strategies, mostly to pitch our proposals we've submitted to the Department of Defense. It was a great conversation. This meeting took place before the federal government announced the MP Materials deal."

MP Materials, a publicly traded company, is America's sole fully integrated rare earth producer, mining materials from its Mountain Pass mine in California and processing them to manufacture advanced permanent magnets which are crucial for modern technology.

Headquartered in Las Vegas, MP Materials has a magnet manufacturing facility in Fort Worth, Texas.

The Department of Defense purchased $400 million in preferred, convertible stock, along with warrants, to become MP Materials' largest shareholder with a 15 percent stake.

Preferred stock pays a fixed dividend and has a higher claim on company assets than common stock in case of bankruptcy.

Stock warrants are usually given as an incentive. The holder has the right to purchase additional shares of the company's common stock at a specified price during a given time period.

MP Materials is not the only deal the government is involved in with public companies. The government acquired a stake in Intel Corp., a semiconductor manufacturer.

The transaction closed Aug. 22. The government invested $8.9 billion in Intel's common stock, with the funds primarily coming from previously awarded but not yet paid grants under the CHIPS and Science Act.

"This White House does things a little differently than previous administrations," said Wade Senti. "When it comes to national security, they play offense. It is an interesting dynamic. America has no time to waste. We need to build the supply chain now."

A McKinsey Co. report predicts that global demand for magnetic rare–earth elements will triple by 2035, driven by the expansion of electric vehicles.

A 2023 report from the U.S. Department of Commerce projected that American consumption of neodymium–iron–boron magnets, a crucial high–performance type, would more than double in the next five years.

Wade Senti said there is a "lot of investment going into artificial intelligence and quantum computing in hopes of finding new magnetic materials."

AML's Dr. Masson attended a seminar put on by the U.S. government's Advanced Research Projects Agency–Energy, or ARPA–E, which operates within the Department of Energy to foster energy independence. It funds high–potential, high–impact energy technologies that are considered "too high risk for private industry to pursue."

Wade Senti said it "was a closed–door session where the participants provided feedback and discussed relevant topics. There was a lot of information presented on finding new magnet materials."

Finding new magnet materials is important to advance technologies such as electric vehicles and renewable energy, diversify supply chains, and reduce reliance on critical, scarce materials like rare–earth elements, he added.

"AML is excited about the future and the opportunities we see ahead of us," said Wade Senti. "We have built strong relationships in the industry. There is a lot of interest in AML and people have been reaching out to us. We are now mobilizing and preparing for our next big step — magnet manufacturing."

