



A Catalyst for Economic Growth in Maryland: RAMP MD's P3

Five Key Takeaways

1. Regional Additive Manufacturing Partnership of Maryland established by the General Assembly to expand the additive manufacturing industry by leveraging taxpayer-funded additive manufacturing assets at APG
2. Industry poised for enormous growth and Maryland is at leading edge because of concentration of resources and expertise in the state
3. RAMP MD viewed as model public-private partnership by other installations, other states, even other countries
4. Tangible benefits to both government and industry. Over 250 jobs created by RAMP MD industry partners during last four years.
5. RAMP MD builds partnerships with industry, expands additive manufacturing education, conducts awareness and outreach, and ensures a supportive infrastructure

BACKGROUND

RAMP MD's Origin and Purpose

- Maryland's General Assembly chartered RAMP MD in May 2014. Senator J.B. Jennings and Delegate Mary-Dulaney James co-sponsored the legislation (SB889/HB1060), which was signed into law by the Maryland Governor, establishing Maryland as the nation's center of excellence for additive manufacturing, and RAMP MD as the catalyst for industry growth. RAMP MD is funded by grants from Maryland Department of Commerce and event sponsorships. The Board is all volunteer.
- The objective is to stimulate economic growth of new and existing businesses with attendant creation of middle- and high-income advanced manufacturing jobs in the northeastern region of Maryland. The partnership's foundation is the leveraging of the U.S. Army's multi-million-dollar investment in advanced manufacturing equipment at Aberdeen Proving Ground for the benefit of broader economic growth.

OPPORTUNITY

Growing the Additive Manufacturing Industry and the Industrial Base

- The field of additive manufacturing is poised for enormous growth and has the ability to transform manufacturing as we know it. Nationally, the additive manufacturing market has grown from \$1B in 2012, to \$8.8B in 2017, and is expected to grow to \$26.5B by 2021.
- Additive manufacturing represents an enormous growth opportunity for Maryland because of the critical mass of capability that is already located within the state – including defense, aerospace, bio-medical, and other sectors. In particular, the geographic co-location of the biotechnology and additive manufacturing industries positions Maryland to be on the leading



edge of advancements in medical device design prosthetics, wearable technology, and tissue engineering.

- In turn, because of this growth, APG organizations enjoy an expanded industrial base in additive manufacturing, which strengthens the Army's support to the warfighter.

Benefits to Industry

- RAMP MD holds an overarching Cooperative Research and Development Agreement (CRADA) with the Army under which Joint Work Statements are developed for each business partner. These businesses range from medical device developers to guitar manufacturers to car wash technologists.
- The Joint Work Statements can be executed in weeks instead of the months required for a CRADA and because the process is streamlined, very small businesses can participate. This is important because this is where most job growth occurs. Additionally, small businesses can access resources within the federal government typically beyond their reach, on a rapid turn-around and low-cost basis. More than 25 business partners have signed joint work statements and they come from all corners of the state.

Benefits to Government

- The partnership benefits the Army and APG in that it exposes government personnel to new applications of additive manufacturing and private sector best practices, and keeps skills and equipment fine-tuned between mission-related projects. These partnerships also help offset the cost of operating and refreshing equipment that must be ready to serve the warfighter.
- In many cases, joint work statement partnerships have resulted in contracting opportunities for local companies to develop new products for the Army and technology transfer initiatives.
- Through its partnership with RAMP MD, APG has had the opportunity to meet other federal, state, and local governments, in some cases resulting in new partnerships between agencies. Most recently, partnerships were developed with Alcohol, Tobacco and Firearms and the University of Maryland Systems.
- The partnership helps the Army build, develop, and recruit a workforce with advanced skills in additive manufacturing. It also provides workload to fill and level demands on a non-interference basis, while exposing the government workforce to industry drivers and practices related to additive manufacturing.

PATH FORWARD

RAMP MD's Next Steps

- Education: RAMP MD works to expand workforce by working with colleges and school systems to integrate additive manufacturing coursework. This is resulting in educational partnerships among secondary and college institutions and new degree programs. This year, we are working with APG and the state of Maryland to help develop an apprenticeship program that supports the additive manufacturing industry.



- Outreach: RAMP MD has hosted three Symposia featuring the nation’s leading voices in additive manufacturing: “Additive Manufacturing – More Than 3D Printing” in May 2015, “New Frontiers of Bio-Medical Additive Manufacturing” in March 2016, and “3D Aerospace & Defense” in January 2017. Our most recent Symposium was May 16, 2018, and called “Maryland’s 3D Medical Revolution,” which explored how additive is transforming medical and dental care in Maryland. Our next Symposium is April 25/26, 2019, and will focus on the rapidly growing field of metals 3d printing. These Symposia have attracted hundreds of speakers and attendees from a very broad geographic area and from a broad range of industries.
- Partnerships: We will continue to seek out new JWS holders from across Mid-Atlantic to come to Maryland and work with manufacturers to adopt additive manufacturing technologies. Additionally, we will look for new partnership and contractual vehicles for industry to use and work to further streamline transactions between partners.

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RAMP MD STRATEGY FOR EXPANDING THE ADDITIVE MANUFACTURING ECOSYSTEM

Proposed: Private-Public Partnership Manufacturing Apprenticeship and Training Program (P3MAP)

Advanced manufacturing is an important technology sector for Maryland and a catalyst for growth for other sectors of great importance to Maryland, like bio-medical and biohealth. RAMP MD was established in 2014 to help the additive manufacturing industry in Maryland expand. To do this, RAMP MD holds Symposia, and creates private-public partnerships between industry and government organizations.

RAMP MD also has an education component to its mission and is exploring developing a unique apprenticeship program in collaboration with the Army. This is in response to a sizable skills gap in the manufacturing workforce. According to a recent national study by Deloitte, this “skills gap may leave an estimated 2.4 million positions unfilled between 2018 and 2028, with a potential economic impact of 2.5 trillion. Further, the study shows that the positions relating to digital talent, skilled production, and operational managers may be three times as difficult to fill in the next three years.” This is from “The 2018 Deloitte and The Manufacturing Institute Skills Gap and Future Of Work Study,” published in October 2018.

With an unemployment rate hovering around 3% in northeastern Maryland, local manufacturers are hard pressed to find the talent they need. This demand has the potential to limit the growth of manufacturing in Northeastern Maryland, in the state, and across the U.S.

RAMP MD, the Army, and many other organizations are collaborating on drafting a unique apprenticeship program that would contribute about 50 certified manufacturing journeymen each year. This non-profit State of Maryland certified manufacturing apprenticeship and training program, called P3MAP, would be hosted by the RDECOM ECBC Product Development Facility (PDF) at Aberdeen Proving Ground – Edgewood Area, leveraging the enormous capability already on site that supports the Army mission and readiness.

P3MAP is structured to provide economic development value in multiple areas to include:

1. Address the high demand by the industrial base for a technically trained manufacturing workforce
2. Address the national economic and strategic requirement to expand the United States’ Advanced Manufacturing capabilities and workforce
3. Superior manufacturing career opportunities to the underserved, veterans, technical track high school graduates, and mid-career candidates for advanced manufacturing jobs
4. Expanding the industrial base for added defense readiness and operational efficiency and by providing the ability to surge in times of crisis

The P3MAP approach is unique in that after initial launch costs, it is self-funded, has a low barrier for entry for industry, and provides a sustaining wage for participants while they develop initial skills and relevant experience for a middle-income career.