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Desktop Metal Receives Multi-Million Dollar Award From Department of Defense for the Development of High-Volume Manufacturing Process to Mass Produce Cobalt-Free Hardmetal Parts

- *Desktop Metal is a leader in mass production and turnkey additive manufacturing solutions, offering the fastest metal 3D printing technology in the market, up to 100 times the speed of legacy technologies* [(1)]
- *Investigations by the U.S. Army Research Laboratory (ARL) to find a replacement for Cobalt (Co), traditionally used as a metallic binder material for cemented tungsten carbide (WC), has led to the development of a Co-free alternative binder* [(2)]
- *The three-year $2.45 million award will fund the development of a cost-effective, high-volume Additive Manufacturing (AM) process capable of manufacturing the novel Co-free hardmetals into complex, net or near-net shaped parts without the use of any tooling*
- *The project is expected to further progress green sustainable process to manufacture these novel Co-free hardmetals and provide an environmentally friendly method to mass produce metals, alloys, cermets, and composite parts with superior properties for both commercial and DoD applications*

BOSTON--(BUSINESS WIRE)-- Desktop Metal, a leader in mass production and turnkey additive manufacturing solutions, announced today it has been awarded Phase I of a three year $2.45 million dollar project from Department of Defense (DoD) to develop a sophisticated Additive Manufacturing (AM) process capable of mass producing Cobalt-free hardmetals, developed by the U.S. Army. The company's Production System™ with Single Pass Jetting (SPJ™), a proprietary AM technology developed by Desktop Metal, will mass manufacture complex shaped Co-free hardmetal parts without tooling and is expected to lead to the development of a dual use technology with numerous applications in DoD as well as in the civilian sector.

This press release features multimedia. View the full release here: https://www.businesswire.com/news/home/20201007005154/en/

The Desktop Metal Production System™ is designed to be the fastest way to 3D print metal parts at-scale, achieving print speeds up to 100x faster than legacy technologies and delivering thousands of parts per day at costs competitive with traditional manufacturing. (Photo: Business Wire)

This new process has the potential to change the landscape of the carbide hardmetals market

which is projected to grow to $24 billion by 2024[3] and is used in dual use applications including cutting tools, abrasion and chemical resistant nozzles, parts for the oil and gas sector, parts for the chemical and textile industry, tools used in agriculture and mining, steel industry, consumer goods and sporting goods, parts for off-road transportation, aerospace and defense sector, construction, and in tools and dies for chip-less materials forming.

The project is issued to Desktop Metal by the U.S. Army Contracting Command – Aberdeen, Research Triangle Park, on behalf of U.S. Army Research Laboratory to the National Center for Manufacturing Sciences (NCMS) Advanced Manufacturing, Materials & Processes (AMMP) Consortium.

Successful investigations by the U.S. Army in developing a novel iron-based nano material as the matrix in WC-based hardmetals, replacing Cobalt, has resulted in the development of a patented, novel Co-free WC-(Fe-Ni-Zr)-based hardmetals. In tandem with the creation of this promising new material for commercial and DoD applications, the ARL has been in search of a cost-effective, high volume process capable of manufacturing the new Co-free hardmetals into complex, net or near-net shaped parts without the use of any tooling.

Among the goals and requirements of the three-year project include:

- Development of a feedstock and binder system for novel cobalt-free hardmetal;
- Using the Desktop Metal SPJ process to print a sufficient quantity of components of at least 200,000 parts in one day from a single machine; and
- Delivery of a cost analysis for scaling up its advanced SPJ binder jet manufacturing technique to successfully manufacture at least 500,000 prototype pieces.

“The novel Co-free hardmetal grade is expected to yield a high strength, high toughness, high hardness, and high wear resistance material,” said Dr. Nicholas Ku, Materials Engineer, CCDC Army Research Laboratory. “We believe combining this novel material with Desktop Metal’s Single Pass Jetting technology will have major applications not only in the defense sector but also in the commercial sector. Further, we believe this combined method will dramatically improve sustainability, reduce the use of a conflict mineral and provide an environmentally-friendly process to mass produce parts with superior properties.”

Desktop Metal Production System

Created by leading inventors of binder jetting and single-pass inkjet technology, the Desktop Metal Production System is designed to be the fastest way to 3D print metal parts at-scale. The Production System leverages patent-pending SPJ technology to achieve print speeds up to 100 times those of legacy powder bed fusion additive manufacturing technologies and deliver up to hundreds of thousands or even millions of parts per year at costs competitive with conventional manufacturing. Whereas conventional binder jetting uses multiple carriages and passes over a build box to complete the steps required to print each layer, bi-directional SPJ on the Production System consolidates these steps into the motion of a single print carriage, dramatically reducing print time and removing wasted motions during printing to increase mechanical efficiency.

Dr. Animesh Bose, Vice President of Special Projects for Desktop Metal, and a Fellow of ASM International and APMI International, will serve as principal investigator of the three-year project. With more than 40 years of experience in the processing of particulate

materials, he is the author of over 125 publications in the area of P/M processing of advanced materials, authored and co-authored four books, and inventor or co-inventor of over 12 patents.

“The success in this project will not only provide the hardmetal community with their eagerly desired Co-free hardmetal solution, but also result in the development of a tool-free processing technique capable of fabricating this class of materials into extremely complex shaped parts at speeds that can rival most other high-volume manufacturing techniques, opening up new horizons in the area of hardmetals and its applications,” said Dr. Bose.

“This effort exemplifies the ability of NCMS and AMMP to link cutting edge technologies of non-traditional defense contractors with government agencies to meet existing needs and requirements,” said NCMS’ CEO Lisa Strama. “We look forward to the lasting impact this initiative will have within AMMP, the Army, and the broader community driving innovative Co-free hardmetal solutions across the services and industry at large.”

About Desktop Metal

Desktop Metal, Inc., based in Burlington, Massachusetts, is accelerating the transformation of manufacturing with an expansive portfolio of 3D printing solutions, from rapid prototyping to mass production. Founded in 2015 by leaders in advanced manufacturing, metallurgy, and robotics, the company is addressing the unmet challenges of speed, cost, and quality to make Additive Manufacturing an essential tool for engineers and manufacturers around the world. Desktop Metal was selected as one of the world’s 30 most promising Technology Pioneers by the World Economic Forum and named to MIT Technology Review’s list of 50 Smartest Companies. For more information, visit www.desktopmetal.com.

Desktop Metal recently signed a definitive business combination agreement with Trine Acquisition Corp. (NYSE: TRNE), a special purpose acquisition company led by Leo Hindery, Jr., and HPS Investment Partners, a global credit investment firm with over $60 billion in assets under management. For more information, visit www.trineacquisitioncorp.com.

About NCMS

The National Center for Manufacturing Sciences (NCMS) is a cross-industry technology development consortium, dedicated to improving the competitiveness and strength of the U.S. industrial base. As a member-based organization, it leverages its network of industry, government, and academia partners to develop, demonstrate, and transition innovative technologies efficiently, with less risk and lower cost. The NCMS is proud to work with the Army Research Laboratory (ARL) and the Advanced Manufacturing, Materials, and Processes (AMMP) program to advance and enable additive manufacturing to create next-generation manufacturing breakthroughs. AMMP will respond to requirements for affordable, complex parts that currently cannot be readily built.

For more information, visit www.ncms.org/ammp.

1. Based on published speeds of binder jetting and laser powder bed fusion systems comparable to the Production System™ available as of August 25, 2020 and using comparable materials and processing parameters.

2. John J. Pittari, III; Steven M. Kilczewski; Jeffrey J. Swab; Kristopher A. Darling; Billy C. Hornbuckle; Heather A. Murdoch; Robert J. Dowding; “Cemented Carbide Containing Tungsten Carbide and Finegrained Iron Alloy Binder”, US 2018/0142331 A1, May 24, 2018.
3. Source: Global Market Insights (https://www.gminsights.com/industry-analysis/tungsten-carbide-powder-market).

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Press Contacts:
Desktop Metal
Lynda McKinney
978-224-1282
lyndamckinney@desktopmetal.com

National Center for Manufacturing Sciences (NCMS)
Pam Hurt
Pam.Hurt@ncms.org

Source: Desktop Metal