Press Release

Japan's service bureaus play critical role in driving the adoption and growth of metal additive

Cincinnati, OH, November 11, 2021 – While metal additive technology is anticipated to grow significantly in the Japanese domestic market in coming years, it is still at an early growth stage.

Key to the domestic growth of metal additive manufacturing are specialist service bureaus who are guiding and educating Japanese manufacturers as they try to deploy the technology to overcome internal hurdles such as defining in-house design processes, select materials and plan for capital equipment investments.

Specialist service bureaus in Japan often act as the first step on the additive journey for manufacturers, allowing them to fully-visualize operations before they fully introducing an in-house system. One such bureau is Japan Additive Manufacturing & Processing Technology (JAMPT), based in Tagajō in Miyagi Prefecture. JAMPT was the country's first specialist metal 3D printing service bureau to provide technological services from metal powder development, prototyping all the way through to mass-production.

The company works closely with aerospace, defense, medical equipment, and automotive sector manufacturers who are planning to deploy metal additive technology. It recently installed the latest GE Additive Concept Laser M2 and runs a total fleet of seven EBM and laser metal 3D printers.

Additive Momentum Accelerates

As the use of metal additive manufacturing grows internationally, spurred on by successes with part consolidation and light weighting, JAMPT's plant manager Shoichi Sato believes that some industries in the country are still catching up.

"While aerospace companies in the US and other countries are installing metal additive components into aircraft engines, here in Japan, we are still often faced with his helping and educating companies how to identify the possible benefits of the technology," said Sato.

"If you take a snapshot of Japanese industry, it is the defense industry – thanks to support from the Acquisition, Technology & Logistics Agency (ATLA), part of the Japanese Ministry of Defense – that is currently progressing further than other industries, in terms of the technological and practical use of additive manufacturing. However, there are encouraging developments underway in the medical equipment industry and the automobile industry, and the number of successful cases and new requirements are progressively growing, little by little."

Based on the scale of Japanese manufacturing industries, additive manufacturing has a great potential for growth.

"In terms of the adoption of metal additive here in Japan, it is become clear that there are specific issues in each industry. Identifying and then solving them, will lead to the growth of the additive manufacturing market. We think we have a good opportunity here at JAMPT, to play an important role and contribute to the additive manufacturing industry as it develops," adds Sato.

Space to Grow

One of the many projects that JAMPT has been involved includes a recent project with JAXA - the Japanese national aerospace and space agency.

"We took part in a project to manufacture components for KOUNOTORI, the unmanned cargo transfer spacecraft for the International Space Station that completed its mission in 2020. JAXA wanted to additively manufacture the attitude control injection nozzle, because conventional machining was problematic in terms of the manufacturing time and weight. During the development of this thruster part, we recommended using Ti-6Al-4V powder and GE Additive's EBM technology," explains Sato.

Using EBM, Sato and the team managed to:

- reduce the manufacturing time for the nozzle by 60%.
- decrease part weight by 64%, by successfully using topology optimization.
- improve material yield significantly, by 30% more than that of the conventional process.

Pushing the Boundaries of Additive

JAMPT supports many companies across a wide variety of industries in introducing metal 3D printing and as a specialist service bureau, has used its metal 3D printers to form many shapes that had been previously thought either impossible or difficult to form. For examples, see image and caption 1 to 5 below.

Investing in R&D

JAMPT was established by a joint investment between KOIWAI Co., Ltd., TOHOKU University Venture Partners Co., Ltd. (THVP-1 fund), and Sojitz Corporation.

KOIWAI Co., Ltd.'s activities involve the advanced technical and functional aspects of metal 3D printing, process control and quality control during the development, manufacturing, test production, and mass production of metal powders. Professor Akihiko Chiba of the Institute for Materials Research, at Tohoku University, supports from an academic point of view while Sojitz Corp. manages and operates the business using its global network, information collection and analysis capabilities.

To respond to its customer requirements, JAMPT is also engaged in R&D to improve the quality of the products produced by additive manufacturing and is currently conducting the predictive and inverse design of residual stress and deformation volumes by compensating residual stress analysis results using experimental data, as well as conducting repeated parameter optimization tests using the experimental design method and other ways to control defects due to the forming parameters.

In addition, JAMPT has acquired JIS Q 9100 certification – a quality management system required by manufacturers in the aerospace and defense industries in Japan and is equivalent to the AS 9100 standard used in North America and the EN 9100 standard in Europe.

JAMPT has also formed a technical partnership with Tokyo R&D Co., Ltd., a renowned automotive sector research institute, to provide a Design for Additive Manufacturing (DfAM) support program for automobile manufacturers. The partnership provides various services including proposals for the use of additive manufacturing in the automotive sector and services for other industries, such as structure and strength analyses to manufacture lightweight jigs, tools, and thermal fluid analyses for the thermal management of coils and heatsinks.

Mr. Sato says, "As the adoption of metal 3D printing among our various manufacturing communities, the demand for specialist metal 3D printing service bureaus in Japan is increasing. If you are getting started, encountering challenges with additive manufacturing, please contact us. Let us seek solutions together using our metal additive technology and apply the expertise and knowhow that we have developed."

About GE Additive
GE Additive – part of GE (NYSE: GE) is a world leader in metal additive design and manufacturing, a pioneering process that has the power and potential to transform businesses. Through our integrated offering of additive experts, advanced machines, and quality powders, we empower our customers to build innovative new products. Products that solve manufacturing challenges, improve business outcomes, and help change the world for the better. GE Additive includes additive machine brands Concept Laser and Arcam EBM, along with additive powder supplier AP&C.

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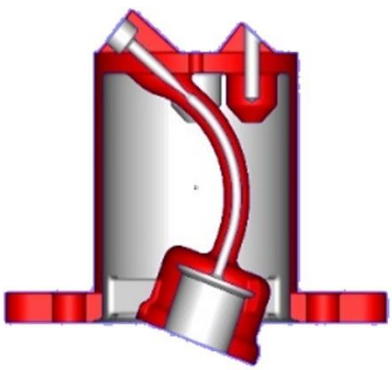
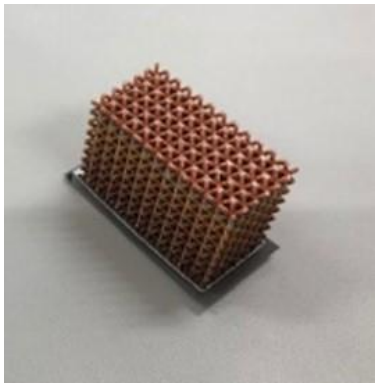
Shoichi Sato, JAMPT plant manager.
(Photo: JAMPT Corporation, GEADPR058)



Attitude control injection nozzle manufactured in Ti-6Al-4V on EBM technology for KOUNOTORI, the unmanned cargo transfer spacecraft for the International Space Station.
(Photos: JAMPT Corporation/KOIWAI Co., Ltd., GEADPR058)

Example 1: Using CoCrMo (a corrosion resistant, hard-to-work material, alloy), an industrial slitter knife has been printed using EBM to make a cutting tool with optimal hardness and toughness for a wide variety of applications from resin films to metal thin films, electrodes, as well as foodstuffs.
(Photos: JAMPT Corporation, GEADPR058)



Example 2: Power devices for EVs need heatsinks. A small sized heatsink component is test-developed for each device. Prototype heatsinks printed in pure copper on the Concept Laser M2.
(Photo: JAMPT Corporation, GEADPR058)

Example 3: Newly developed thin wall, pure copper pipes for induction heating (IH) coils. High-frequency induction quenching coils made of pure copper, a material that is difficult to process by precision bending or welding, are integrally formed using EBM technology. A method for forming thin wall pipes with a wall thickness as thin as 0.5 mm is currently under development.
(Photos: JAMPT Corporation, GEADPR058)

Example 4: Thin wall pipe of a motor sports engine unit. Ti-6Al-4V is printed into a thin wall pipe with a wall thickness of 0.8 mm using EBM. It was put into practical use as an engine pipe for motorsports after passing a 1-MPa high pressure test.
(Photo: JAMPT Corporation, GEADPR058)

Example 5: Prototype formed multilayered combustor (upper part: copper alloy; lower part: stainless steel) printed on the Concept Laser M2.
(Photo: JAMPT Corporation, GEADPR058)

Inside JAMPT's plant.
(Photo: JAMPT Corporation, GEADPR058)

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