PRESS RELEASE

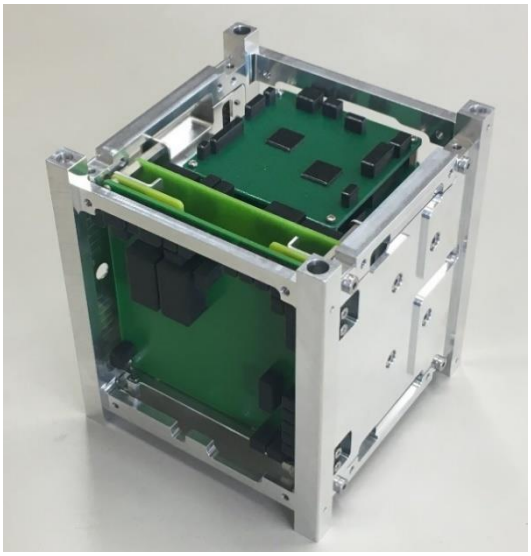
10 October 2019

Ishitoshi Machining Inc.

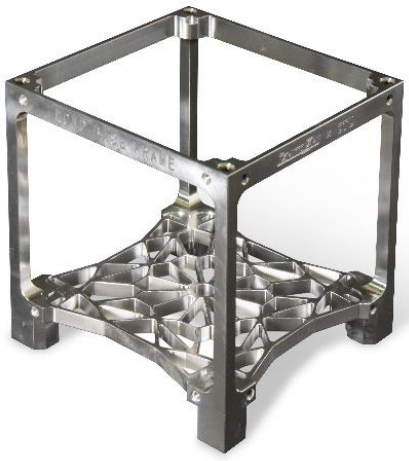
Launch of an artificial satellite, the structural design of which is being supervised by Ishitoshi Machining Inc, maker of molds for Japanese roof tile manufacture.

Originally a manufacturer of molds used in the production of Japanese roof tiles, Ishitoshi Machining Inc. (Head office: Hekinan, Aichi Prefecture, CEO Mitsuyoshi Ishikawa) has commenced developmental support, and supply of components, to the ultra-small satellite program STARS-Me2 currently underway at Shizuoka University (Prof. Masahiro Nohmi, Nohmi Lab, Faculty of Engineering). This satellite is expected to be launched and deployed from the International Space Station (ISS) in 2020.

While supervising the design and manufacture of the structural backbone of the satellite, Ishitoshi Machining Inc. intends to acquire flight heritage for their uniquely developed Mono Base Frame or "MBF", which is machined from a single piece of aluminum. This is a novel business model that sees a small to medium business partnering with a university in order to enter the ultra-small satellite industry.



Mock up of satellite mounted in the MBF



MONO BASE FRAME
MBF

Ishitoshi Machining Inc. is based in Hekinan, Aichi Prefecture where they build molds for use in the Japanese roof tile manufacturing industry, and have recently expanded into the automotive component industry, receiving orders for the fabrication of prototype parts etc. In 2017 they began producing prototypes for the ultra-small satellite industry and subsequently developed the MBF[*1] which is machined from a single block of aluminum.

The MBF complies with a standard of ultra-small satellite known as “CubeSat”. One side of the basic cubic form measures 10 x 10 centimeters, and this unit can be multiplied to produce structures which are two or three times the size (“2U” and “3U”). Satellites constructed on these frames are deployed into space from the ISS and demand for them is growing year by year.

Simple in design, a 1U weighs just 100gm, and because they are carved from a single block of material they combine light weight with high strength, and can be mass produced without sacrificing any of these important quality attributes. They are manufactured to standards of precision that are more stringent than those set out by JAXA[*2] and the precision for single-piece machined components is extremely stable. Users are able to focus on the assembly of their satellite without having to worry about external dimensional issues.

Traditionally products of this nature were built up from multiple components requiring fixation with screws and this made them vulnerable to vibration, as well as necessitating a lengthy dimensional validation processes post-assembly.

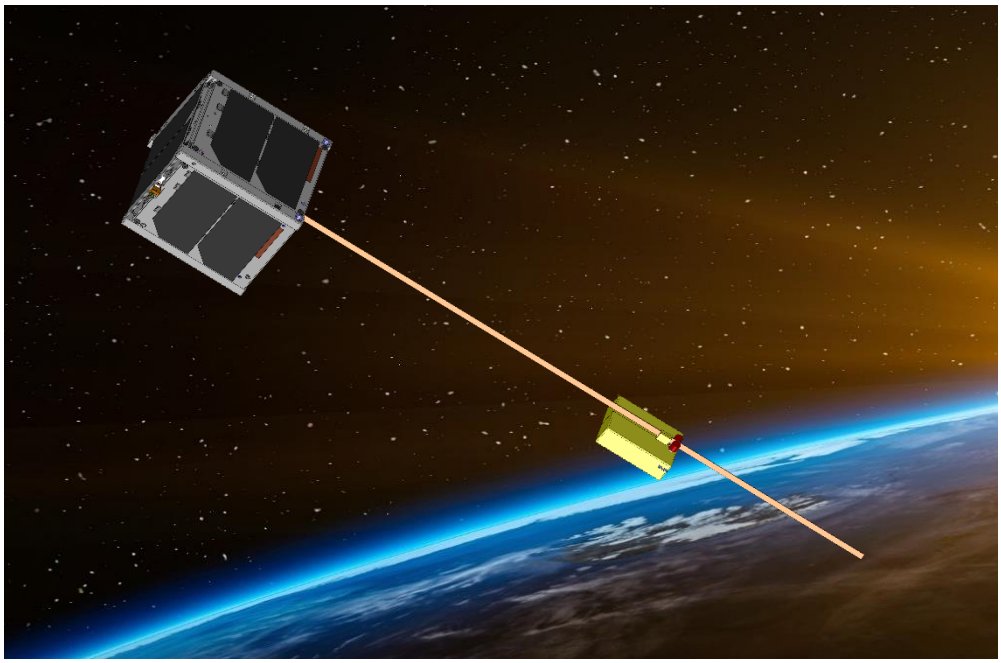
Ishitoshi first introduced their MBF to the industry at the Japan International Aerospace Exhibition and other trade shows in 2018 and while receiving favorable comment on the novelty and innovation, the lack of any actual performance in space remains a hurdle to broader market acceptance.

However the STARS program run by Shizuoka University has carried out several experiments involving the actual launching of artificial satellites, included the placing into orbit in 2018 of an experimental elevator (climber) and cable[*3] - which is unspooled from satellite - to test the basic technology required for a space elevator, the STARS-Me project.

Ishitoshi then approached Shizuoka University offering technical support on the basis that they would supervise the satellite design and components fabrication using the strong and lightweight MBF for the successor model STARS-Me2. Ishitoshi then commenced supply of components to the Shizuoka University Space Elevator project STARS-Me2 in October 2019.

Although there are many examples of SMEs cooperating with universities on development of this industry, this is the first time in Japan that a privately owned company has partnered with a university to launch a satellite with the specific aim of obtaining flight heritage for their own proprietary product in the ultra-small satellite industry.

Commercialization of the MBF will continue, leveraging the actual flight heritage to be obtained in the STARS-Me2 program, while aiming for sales of the product to businesses and groups both within Japan and overseas. Ishitoshi will continue to promote and raise awareness of these activities. This business model is enabling them to diversify their client profile, and become a truly independent subcontracting business in Aichi Prefecture.



Artist’s impression of STARS-Me2

※1 “MBF” stands for “Mono Base Frame”

※2 As an example, JAXA specify parallelism at 0.2 mm, and we achieve 0.05 mm (actual measurements of MBF)

※3 The word “cable” is used here for convenience but the technical term is “tether”.

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