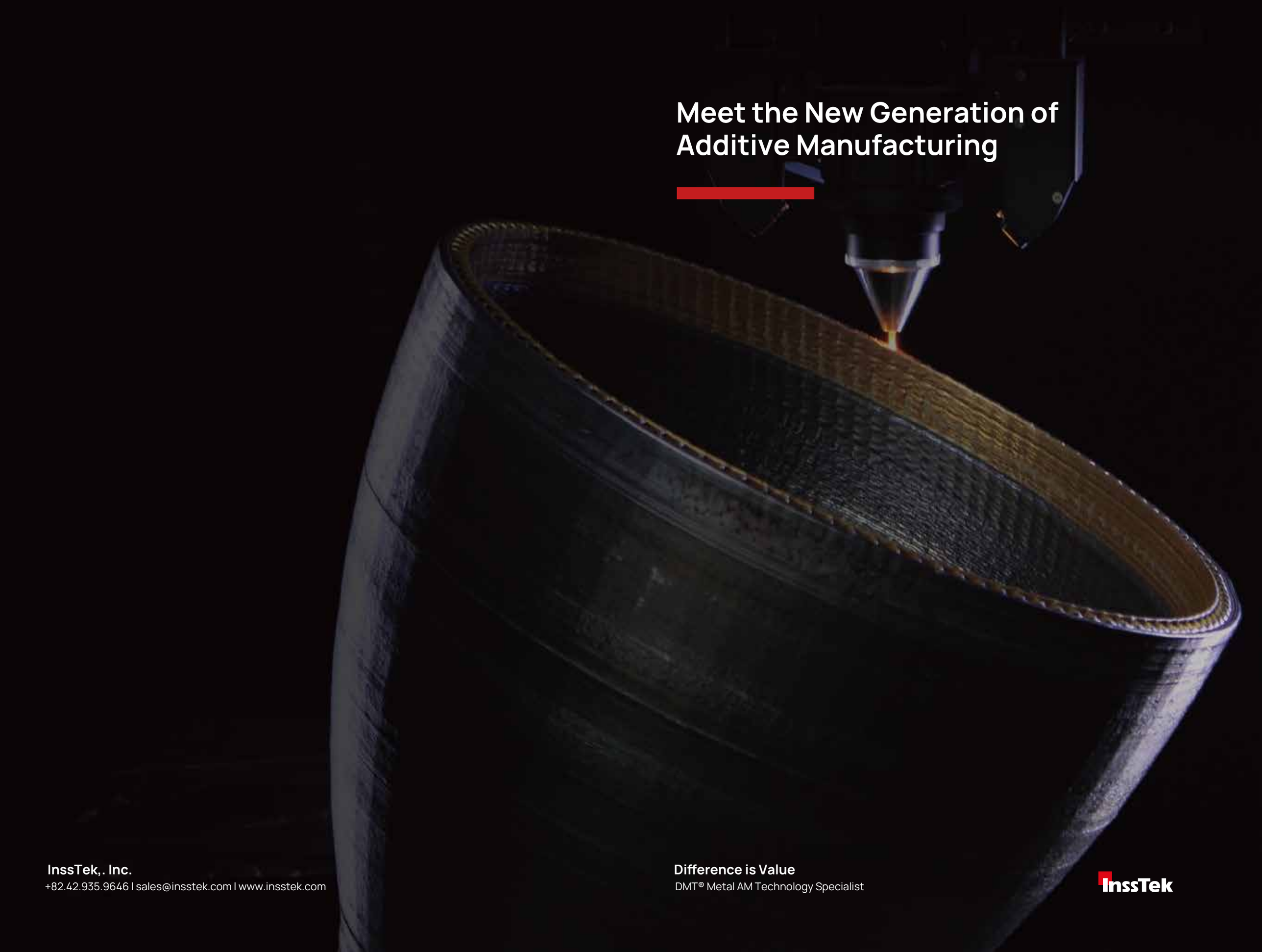
Meet the New Generation of Additive Manufacturing



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Difference is Value
DMT® Metal AM Technology Specialist

InssTek

MX-Fab

DED system with DMT & 5-Axis system

Features

All-in-one fabrication system
5-Axis system & DMT technology
Accurate & stable powder feeding supply by PCM series
Efficient inert gas environment creation
Easy installation
Compact system & superior build volume

DMT | Cartridge Type Optics | Simultaneous 5-axis Control | CVM Powder System

"All-in-one fabrication system"

Laser Generator & Chiller

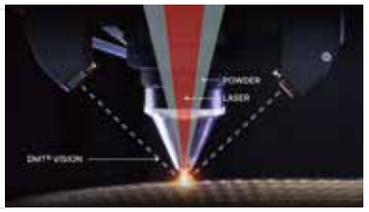
Technical Data

	MX-Fab	MX-Fab Customized
Laser Power Ytterbium Fiber Laser (W)	1,000 (*Max. 2,000)	Available
X / Y / Z Stroke (mm) A / C Stroke (deg)	800 × 1,000 × 700 - 100 ~ + 100 / 360	
Optic Module Beam Diameter (um)	SDM 800 / 1200 / 1600 / 2400 800 / 1200 / 1600 / 2400	
Powder Feeding System	PCM-Multi (Max. 6 hoppers)	
Software (OS / CAM) Feedback System	MX-OS / MiXO Pro DMT® Closed-Loop Control	
Atmosphere Control System (Option)	Gas : Argon(>99.999%) / O_2 Level : ≤ 50ppm	

DMT® Technology

The most precise DED technology

DMT® (Direct Metal Tooling)
InssTek's own technology which developed and categorized as DED (Direct Energy Deposition) technology according to ASTM standards. DMT technology can analyze and control the height of the melt pool in real-time with a vision camera(s).



Applicable materials for DMT®

Titanium	Cp-Ti(Gd2), Ti-6Al-4V(Gd5, Gd23)	Hastelloy	22, 276
Steel	P20, P21, H13	Copper	Cu-Sn, Al-Bronze
Stainless Steel	304L, 316L, 420J2, 2507	Cobalt	CoCr, Stellite 6, 21, 25
Nickel	600, 625, 690, 713, 718, Invar36		

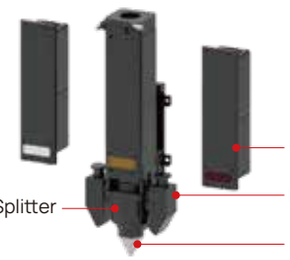
AM-Module

Compact optic and size-changeable beam

Various beam sizes up to 3x are available by replacing optic cartridge(LFM-1) or installing automatic zoom system(LFM-2).

LFM-1

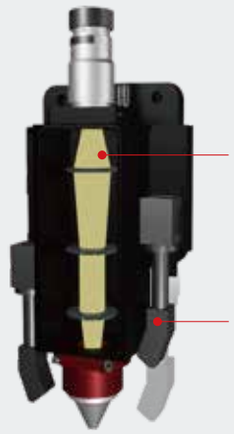
Select 4 different cartridge and change them easily



Optic Cartridge
DMT® Visions
Active Splitter
Ring type Nozzle with Cooling Channel

NEW LFM-2

Automatic zoom optics & moving vision



Zoom Optics
Moving Vision

Technical Data

Type	SDM800	SDM1200	SDM1600	SDM2400
Beam Size (um)	800	1200	1600	2400
Build Speed (cm^3/h)	5.8	16.4	27.4	66.6
Layer Height (um)	250	450	600	900

MX-Lab

DED & material research system

Features

Simple system & easy entrance of DED
Focus on material research
3-Axis system & DMT technology
Accurate & stable CVM Powder Feeding System applied (built-in)
Hexa-Feeding system for multi materials

DMT | Cartridge Type Optics | Simultaneous 3Axis Control | CVM Powder System

"Compact system for easy installation"

CVM Powder Feeding System
Cartridge Type Optics
Laser Generator
E-Box, Stage, Pannel

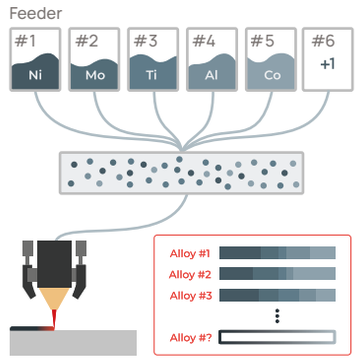
Technical Data

	MX-Lab
Laser Power Ytterbium Fiber Laser (W)	Max. 500
X / Y / Z Stroke (mm)	150 × 150 × 150
Optic Module / Beam Diameter(um)	SDM 400 / 400
Powder Feeding System	Built-in CVM Powder Feeding System (Max. 6 hoppers)
Software (OS / CAM) Feedback System	MX-OS for MX-Lab / Material Designer & MiXO DMT® Closed Loop Feedback Control system
Atmosphere Control System (Option)	Gas : Argon(>99.999%) / O_2 Level : ≤ 50ppm

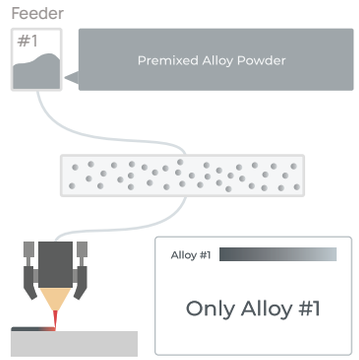
MX-Lab Function

Built-in feeder

The MX-Lab's built-in CVM Powder Feeding System with multiple hoppers are optimized for High Entropy Alloy(HEA) research. It can speed-scan alloys of various compositions when 3D printing is performed, so material research can be carried out quickly.



Live Alloying with Pure Element Powder



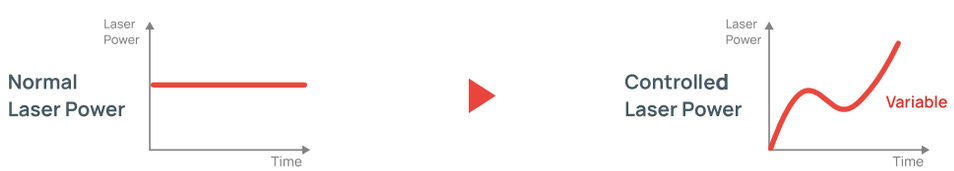
Deposition with Premixed Alloy Powder

Auto Z

The function to automatically adjust the distance between sample and nozzle to WOP(9mm) layer by layer during deposition.

Laser Control

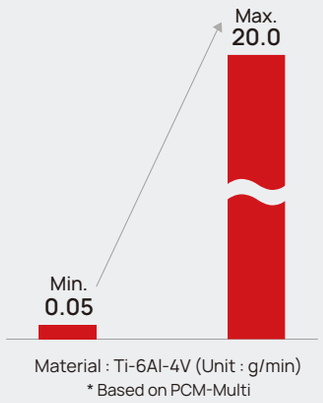
The function to set the appropriate laser power for a material at the desired location based on NC-Code when producing a multi material sample.



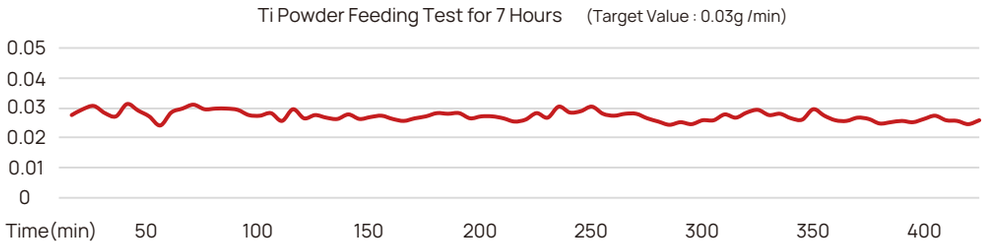
CVM Powder Feeding System

Next step of powder feeding system

CVM (Clogged Vibration Method) system is a new type of powder feeding system. It has impressively stable powder feed rate, semi-permanent life time and broad feeding rate range. Also this system is applicable with gravity powder supply method and direct powder supply method with gas in DED process.



Material : Ti-6Al-4V (Unit : g/min)
* Based on PCM-Multi



* The test was excuted using MX-Lab machine.

Technical Data

	PCM-Multi	PCM-Single
Feeding Rate (g/min)	0.05 ~ 20.0 (based on Ti)	0.5 ~ 10.0 (based on Ti)
Powder Hopper Volume (Liter)	1	2.6
The Number of Feeder	Standard 2 (Max. 6)	1
Feedback System	Sampling	Sampling
Dimension (mm)	800 x 800 x 1200	333 x 372 x 1220
Communication Protocols	RS485	RS485 Analog signal (0 ~ 10V)

PCM Series

Accurate CVM powder feeding system

Stand-Alone and Integrated System

- Easy installation
- Tiny amount of powder can be supplied
- Precise powder volume control & material minimum quantity control
- Patent powder feeding method & unique feedback system
- Real-time feedback with a unique method

RTF
REAL TIME FEEDBACK SYSTEM

PCM-Multi

Multi material fabrication

Features

Hexa-powder feeding system (Max. 6 hoppers)
Real-time feedback control
Feeding rate range: 0.05~20.0g/min(based on Ti-6Al-4V)
User-configurable mixture proportions for alloys
Minimum quantity powder control
Convenient storage unit

Newly Developed Feeding System

It can supply powder stably and accurately with real-time feedback control

PCM-Single

Suitable for mass production

Features

Single-powder feeding system(1 hopper)
Real-time feedback control
Feeding rate range: 0.5~10.0g/min(based on Ti-6Al-4V)
Continuous quality control function
Steady material supply
High-capacity hopper

MX-Med

Porous coating system

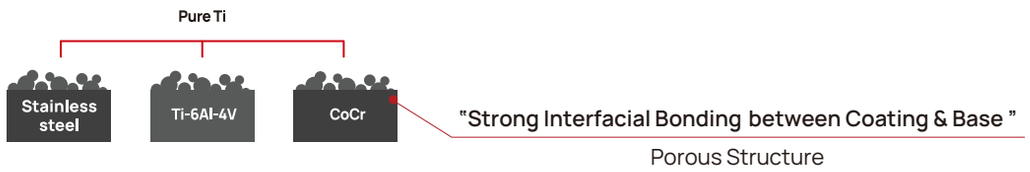
Features

Titanium porous structure application

Technology developed to apply for orthopedic implant surface coating

Used for artificial hip joint(FDA approved) & knee coating

Porous coating | Special Optic Module | Coating AMCAM | 5Axis Simultaneous



Technical Data

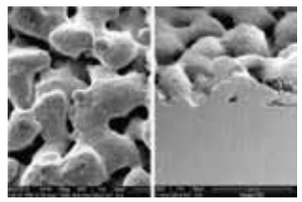
	MX-Med
Laser Power Ytterbium Fiber Laser (W)	Max. 100 (Dual Module available)
X / Y / Z Stroke (mm) A / C1,C2 Stroke	300 × 300 × 230 - 100 ~ + 5 / 360 / 360
Optic Module / Beam Diameter(um)	Porous Coating Module / 200
Powder Feeding System	PCM-Single
Software (OS / CAM)	MX-OS / MiXO Pro
Atmosphere Control System (Option)	Gas : Argon(>99.999%) / O_2 Level : ≤ 50ppm

Metal Porous Coating

Medical Industry

Artificial Joint Coating

InssTek's MPC technology is able to coat pure titanium on various metals. In case of artificial joint, Hip system is made with Ti-6Al-4V and knee systems are made with CoCr. InssTek successfully made Ti porous layer on both Ti-6Al-4V and CoCr products.



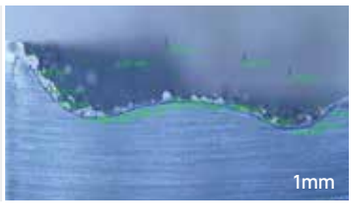
Top Cross section

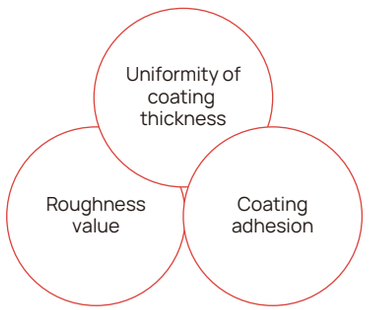
	Stem Component Hip System	Cup Component Hip System	Tibial Component Knee System	Femoral Component Knee System
				
Base Material	Ti-6Al-4V	Ti-6Al-4V	CoCr	CoCr
Coating Material	Pure Ti	Pure Ti	Pure Ti	Pure Ti

Semiconductor Industry

Before Coating

After Coating





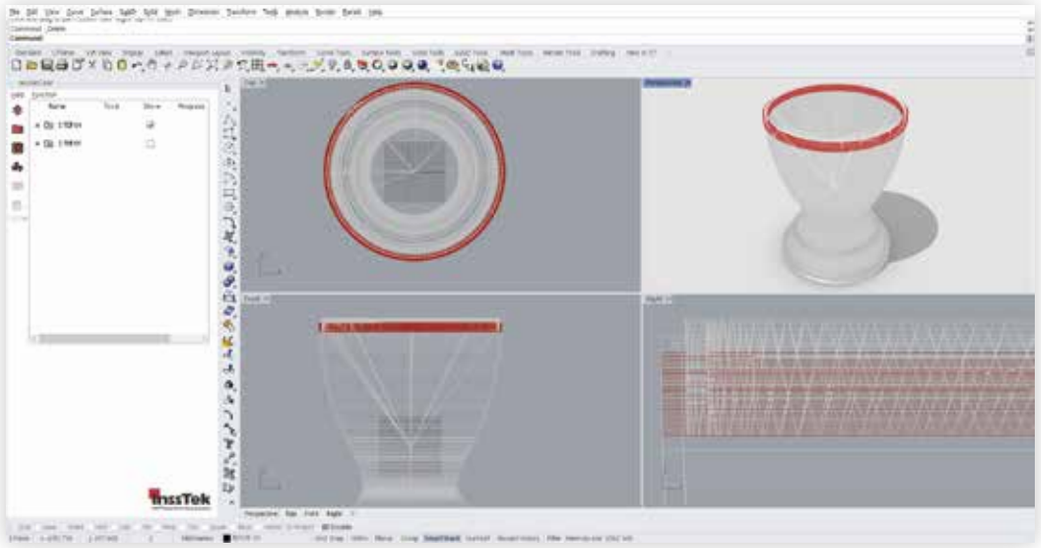
Increase Productivity & Efficiency

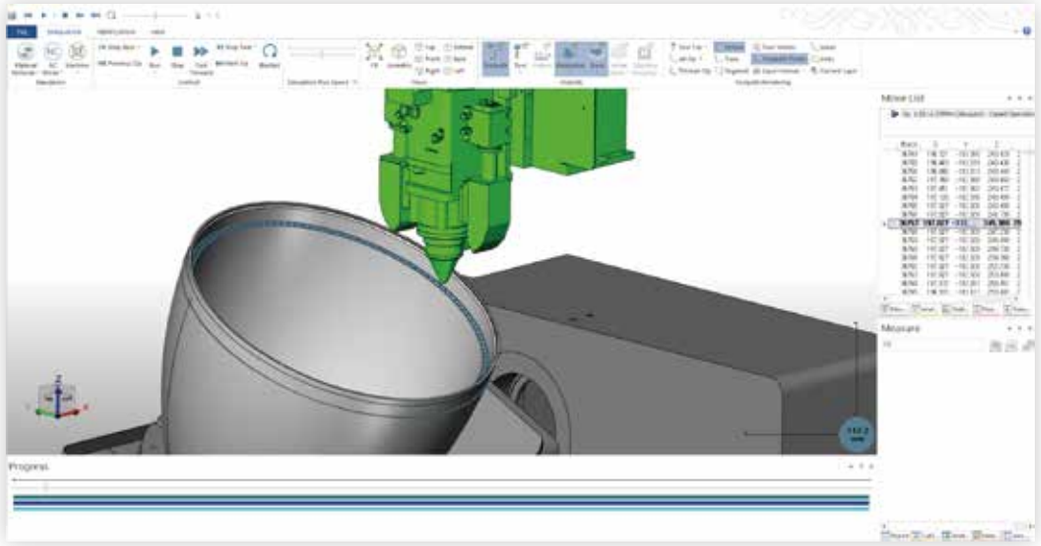
Component in the semiconductor industry

MIXO Pro(AM-CAM Software)

Perfect solution for simultaneous 5-Axis AM CAM

Simultaneous 5-Axis AM-CAM is one of the most important technology of InssTek's DED Additive Manufacturing. Combined with InssTek's years of know-how, MiXO Pro enables us to overcome the limitations of existing DED technology. We are breaking the limits of additive manufacturing.





MiXO Pro for Tool Path Generation & Simulation

MX-Fab

Multi Material Rocket Nozzle

Combining materials advantages

- Material : Outer - IN718
  Inner - Al-Bronze(Cooling Channel)
  Bottom - Nimonic75

MX-Fab

Curved Pipe

Cross-section started from circle, finish with rectangular shape

- Material : SS316L

MX-Fab

FGM Rocket Nozzle

Functionally graded material

- Material : Top - Al-Bronze
  Bottom - SS316L
- Size : Diameter: 420mm / Height: 552mm

MX-Fab

Turbine Vane Ring

Mechanical part for high temperature environment

- Material : Ti-6Al-4V

MX-Fab

Multi Material Valve

Bi-Material technology for anti-corrosion

- Material(2inch Valve)
  : Outer – SS316L
  Inner – SDSS (Super Duplex Stainless Steel)
- Material(3inch Valve)
  : Outer – SS316L
  Inner – Inconel 625