AM WORKSHOP 2019

[Pro]M
MECHATRONICS
PROTOTYPING
FACILITY

Matteo Perini, Ciro Malacarne

ProM Facility Area

Padova - September 20th, 2019

TRENTINOSVILUPPO
BUSINESS DEVELOPMENT AND DESTINATION MARKETING AGENCY

www.trentinosviluppo.it

PROVINCIA AUTONOMA DI TRENTO

TRENTINOSVILUPPO
IMPRESA INNOVAZIONE MARKETING TERRITORIALE

FONDAZIONE BRUNO KESSLER

UNIVERSITÀ DEGLI STUDI DI TRENTO

CONFINDUSTRIA TRENTO

FROM THE IDEA TO THE PRODUCT

]M REINVENT MECHATRONICS PROTOTYPING

- design
- simulation
- prototyping
- testing

AREAS OF ACTIVITY

Reducing development and prototyping time

MECHANICAL
- Additive, Subtractive, Hybrid Manufacturing
- Laser Cutting
- Thermal treatments
- Wire-cut EDM

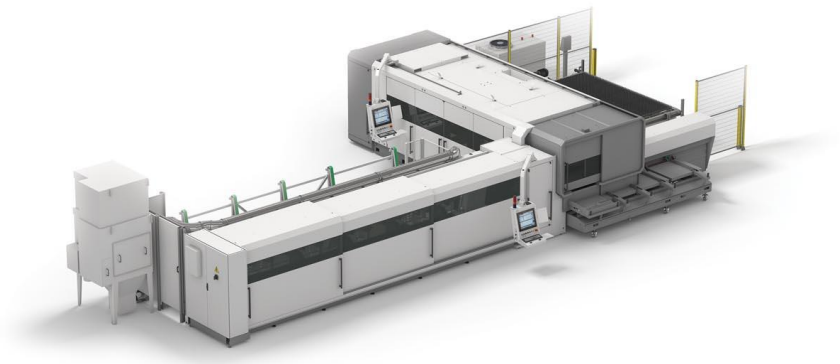
ELECTRONIC
- Firmware and control software prototyping
- Real-time SIL and HIL simulation
- PCB design and testing

METROLOGY
- CMM
- 3D scanner
- X-Ray Tomography
- Reverse Engineering

ICT and CYBER SECURITY
- Artificial Intelligence
- Deep Learning & HPC
- IoT

MACHINERIES AND EQUIPMENTS

BLM GROUP LC5



DMG MORI CTX 500 ALPHA

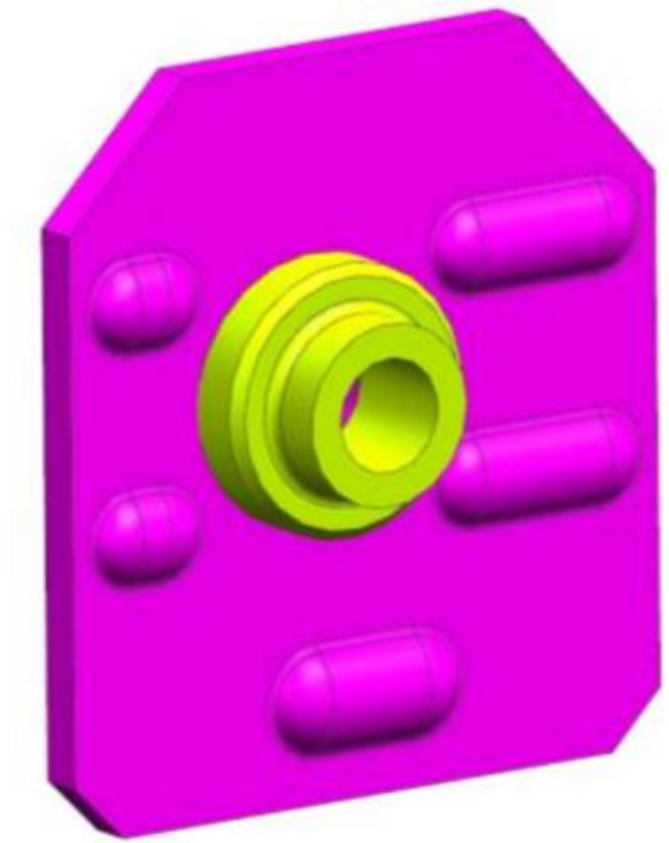
DMG MORI LASERTEC 65 3D

HP JET FUSION 3D 4200

CONCEPT LASER MLAB CUSING R

RENISHAW AM400

MULTI MATERIAL FLANGE FOR AUTOMOTIVE INDUSTRY

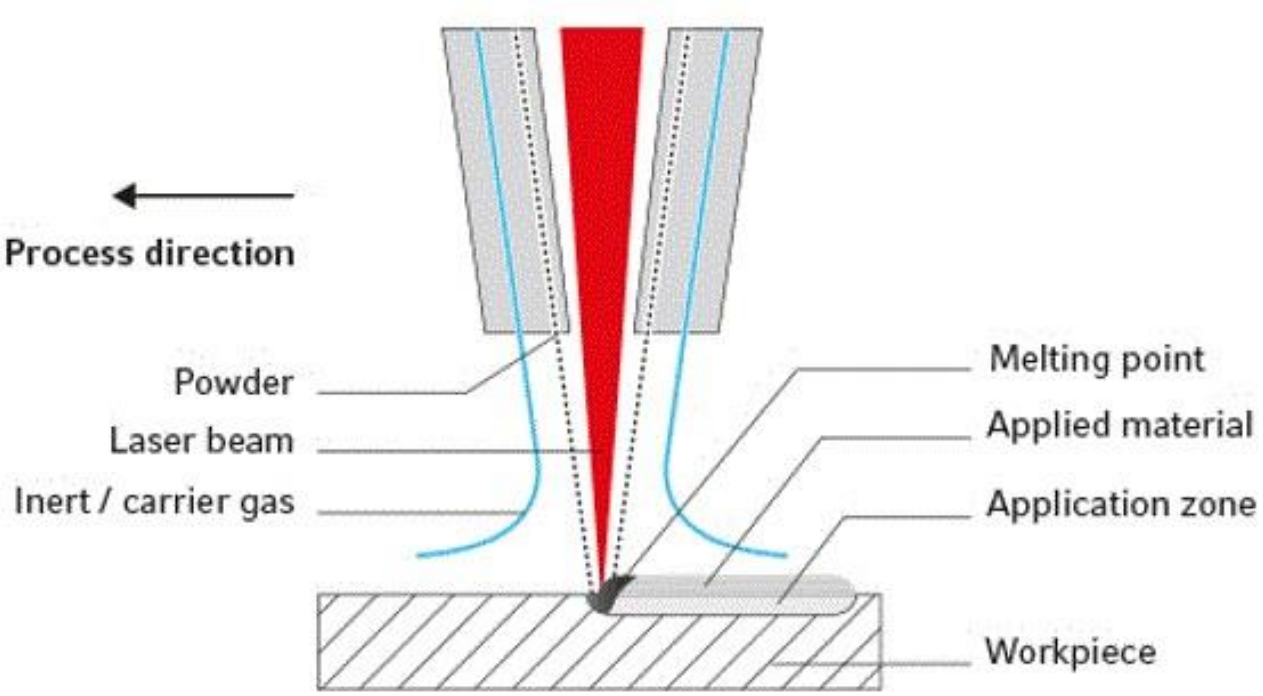


Actual component

- Weldable and tenacious
- Threaded bushing
- Emboss to increase stiffness
- Must withstand heavy loads
- Current manufacturing method: welding of two different pieces

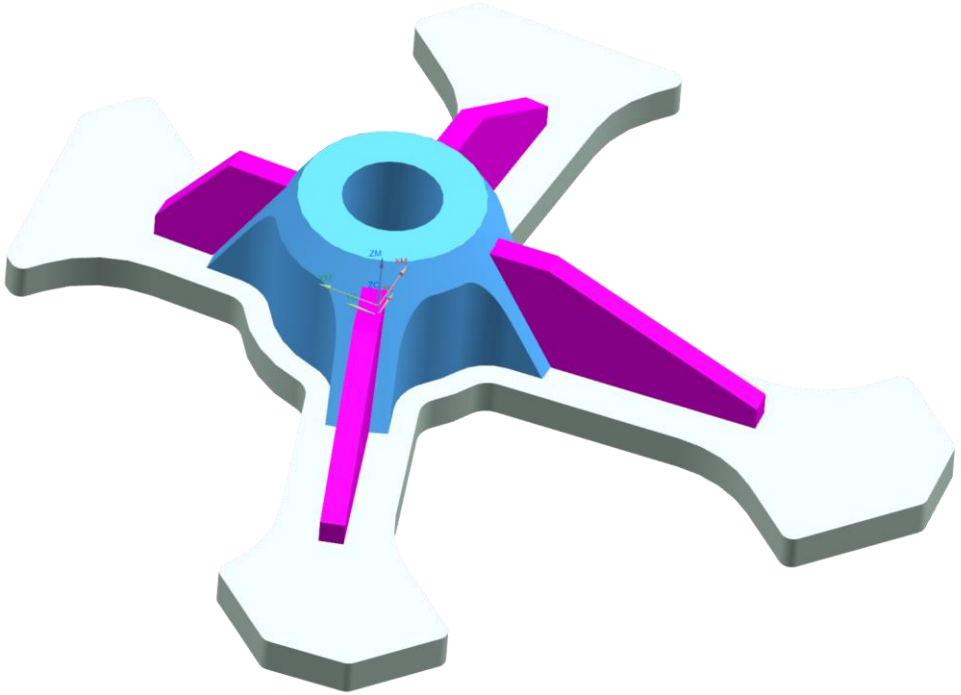
MULTI MATERIAL FLANGE FOR AUTOMOTIVE INDUSTRY

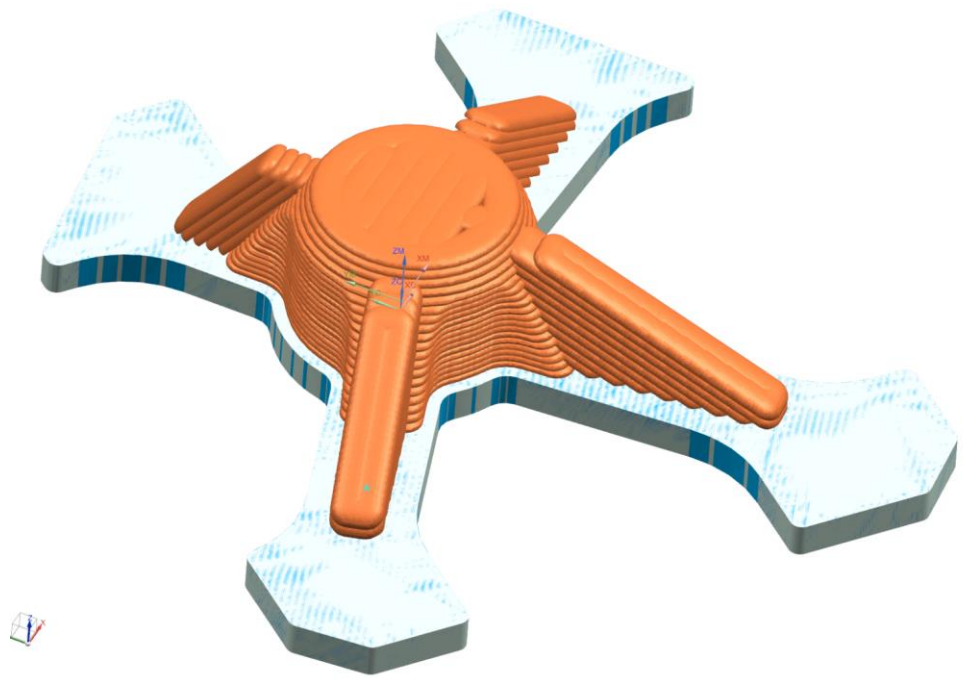
DLD – Direct Laser Deposition



MULTI MATERIAL FLANGE FOR AUTOMOTIVE INDUSTRY

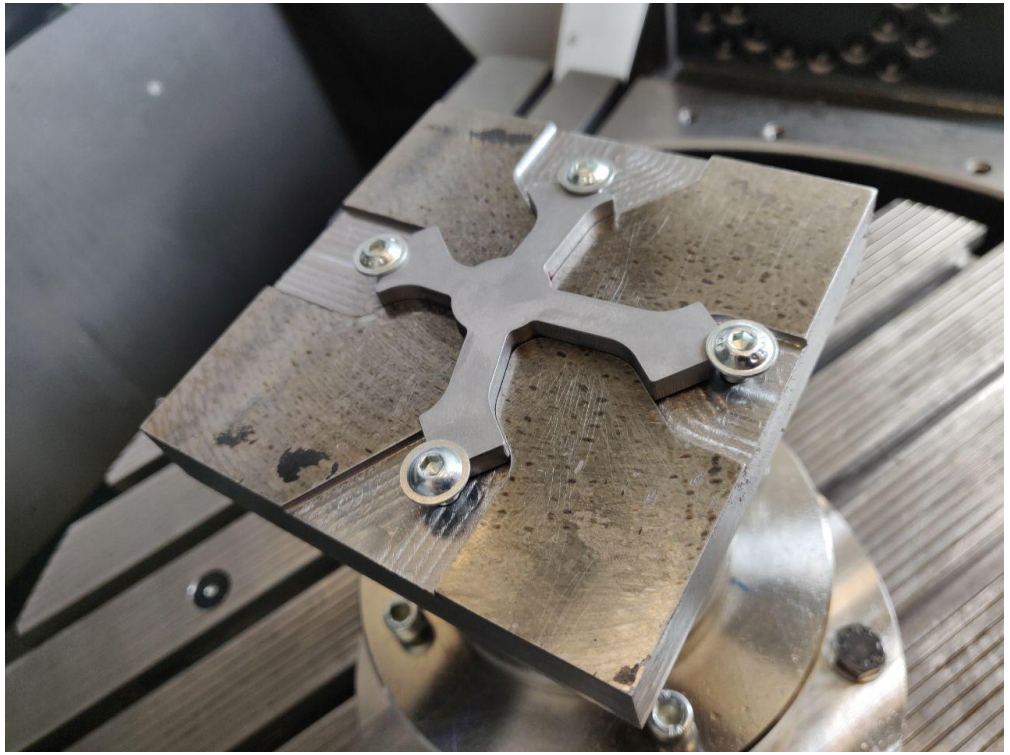
Redesign for DLD





MULTI MATERIAL FLANGE FOR AUTOMOTIVE INDUSTRY

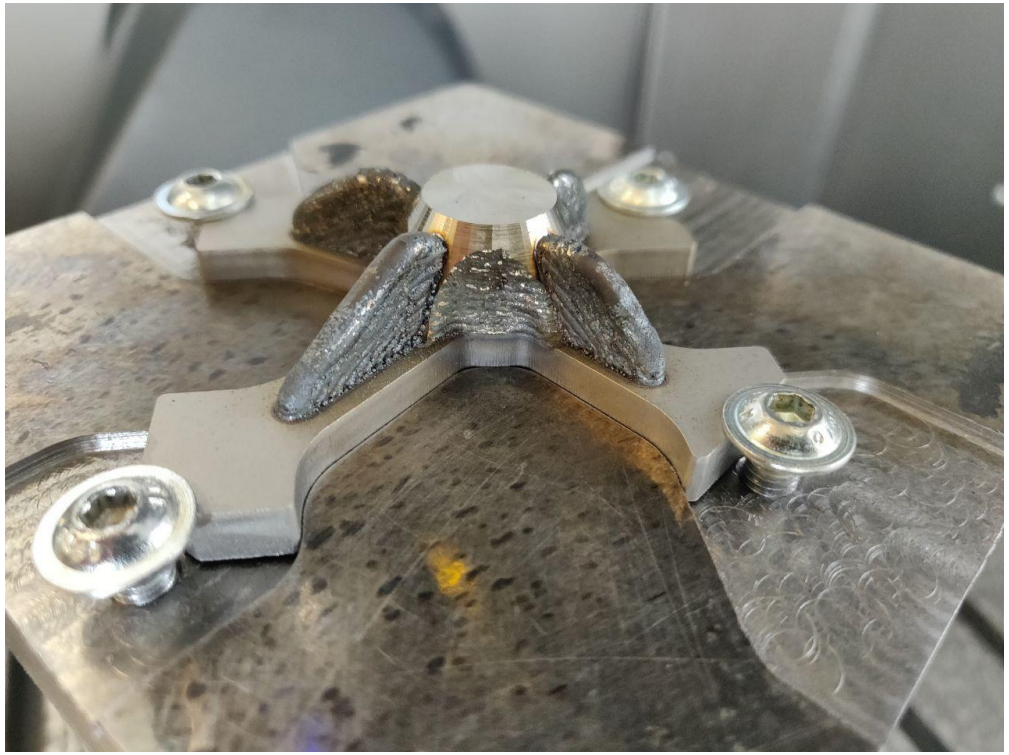
C40 Baseplate (Laser-cutted)



Ferro55 added by DLD

MULTI MATERIAL FLANGE FOR AUTOMOTIVE INDUSTRY

Stainless steel ribs



5-axis machining

MULTI MATERIAL FLANGE FOR AUTOMOTIVE INDUSTRY

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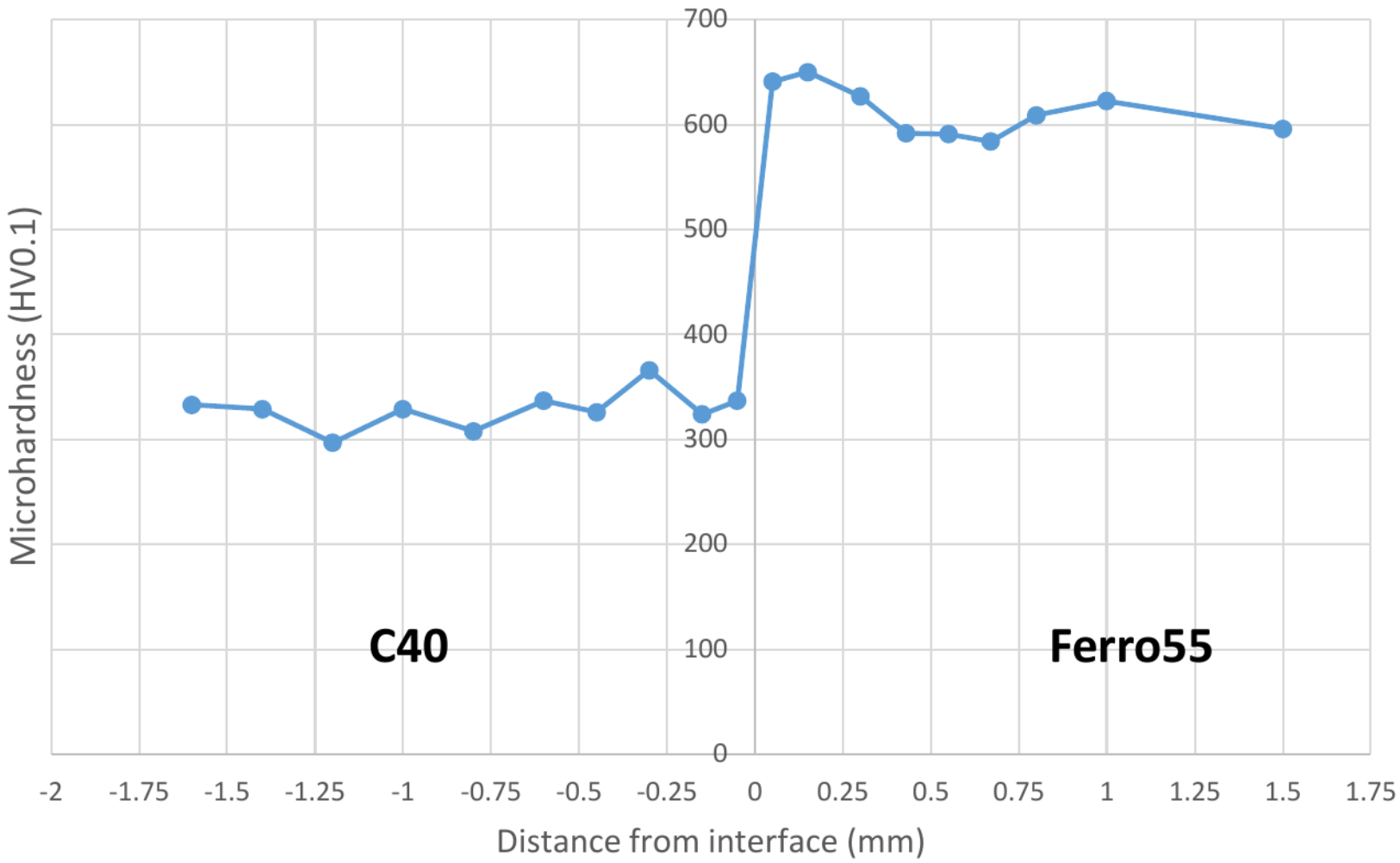
Hardness test



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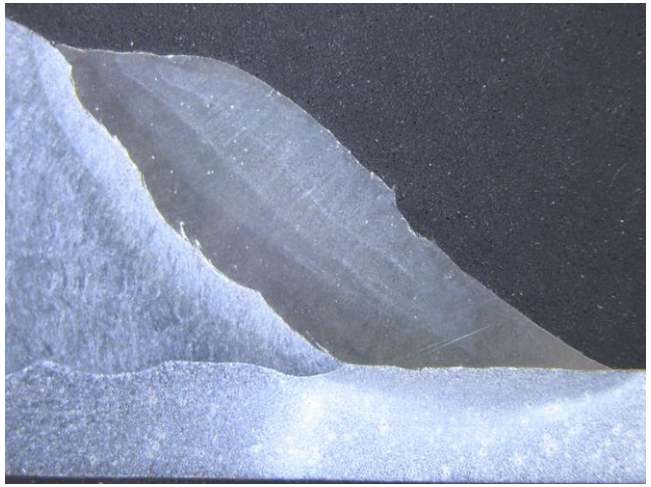
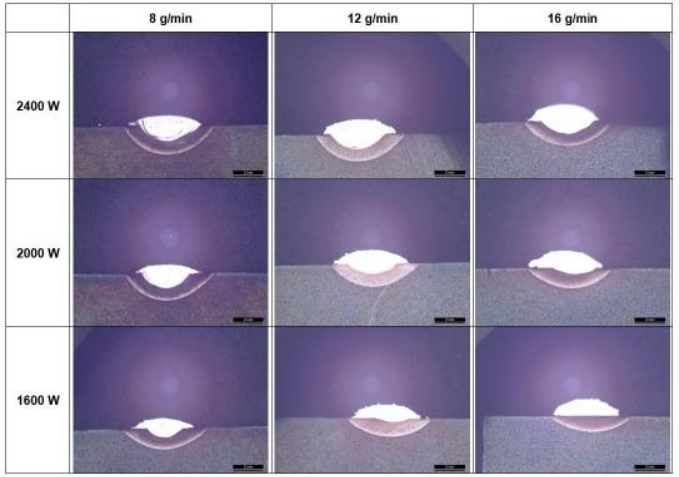
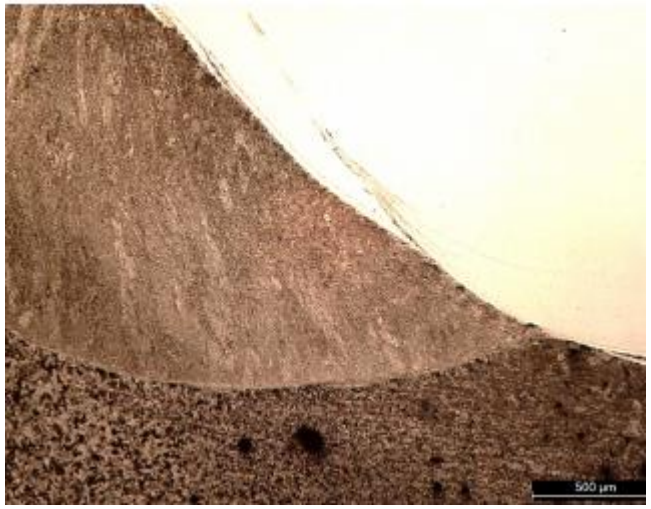
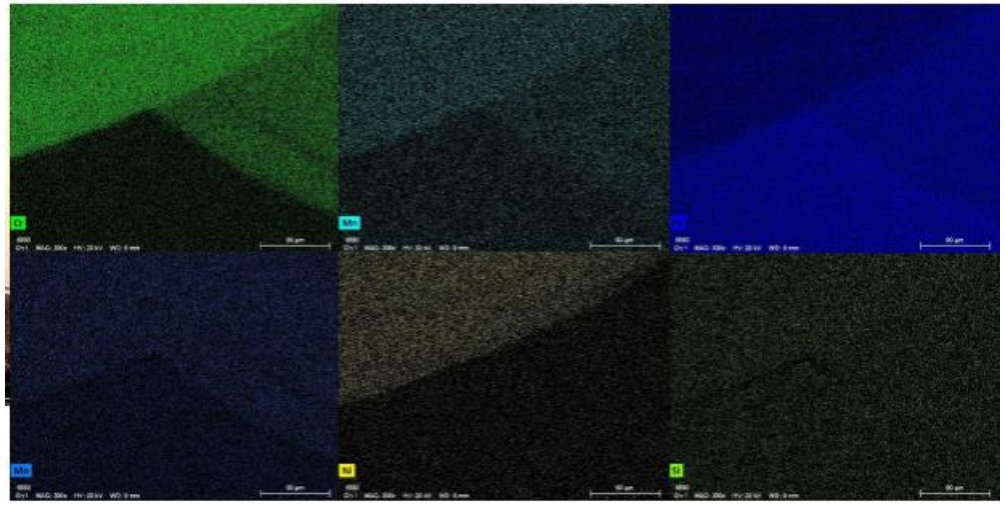
Metallography

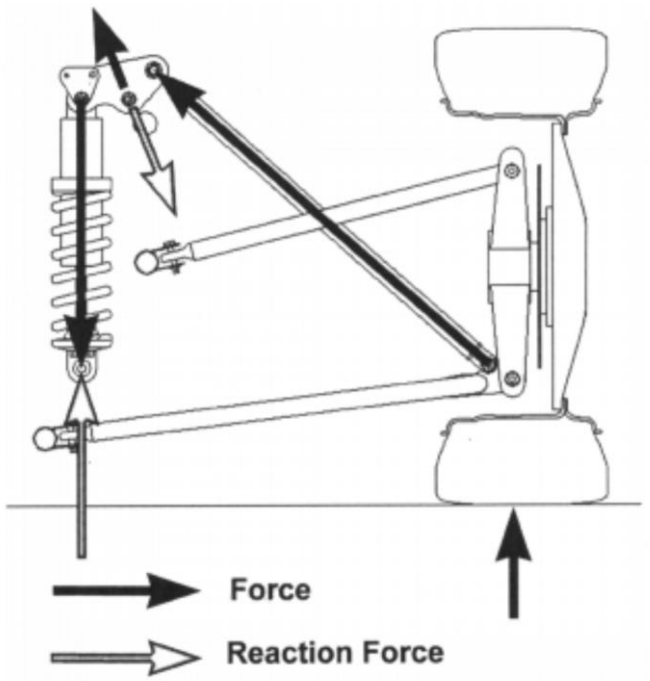








DESIGN FOR AM: A MOTORSPORT APPLICATION



Design of a bell-crank lever (also known as rocker) in a racecar push-rod style suspension system using topology optimization method

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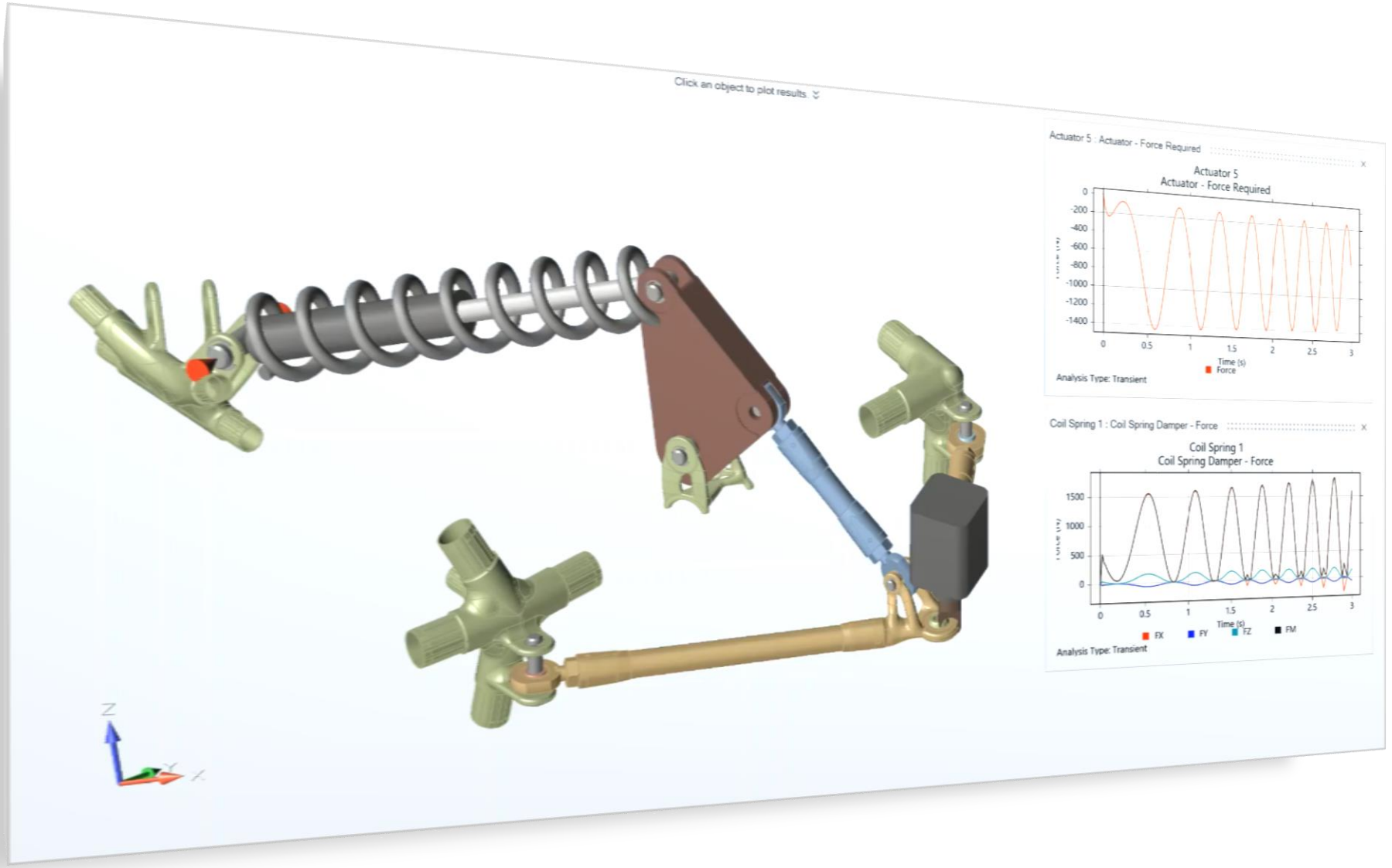


Motion Analysis

- Simulate real world loads and connections

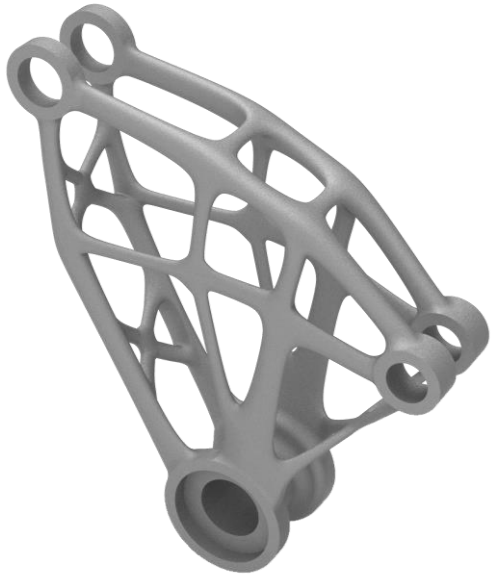
Targets

- Maximize stiffness
- Maximize frequency

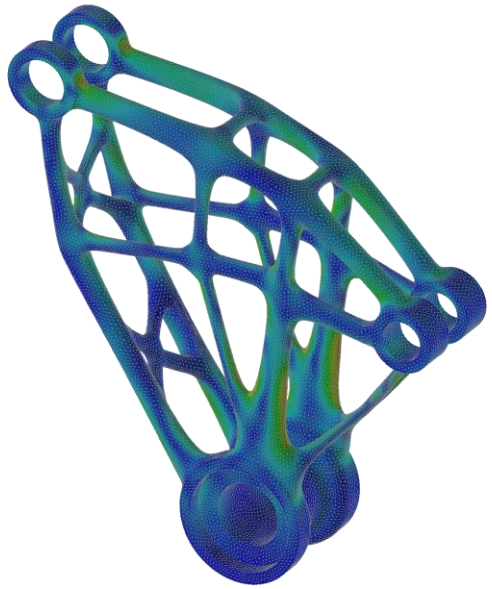
DESIGN FOR AM: A MOTORSPORT APPLICATION

Design for SLM

- 3 separate components
- Weight: 220 grams



- Single component
- Weight: 115 grams



- Weight: - 48%
- Stiffness: +25%

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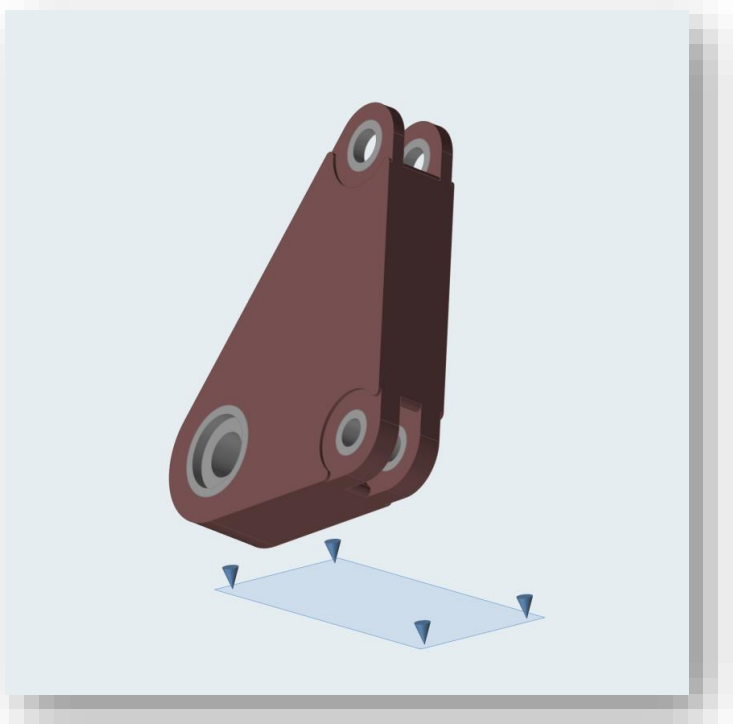
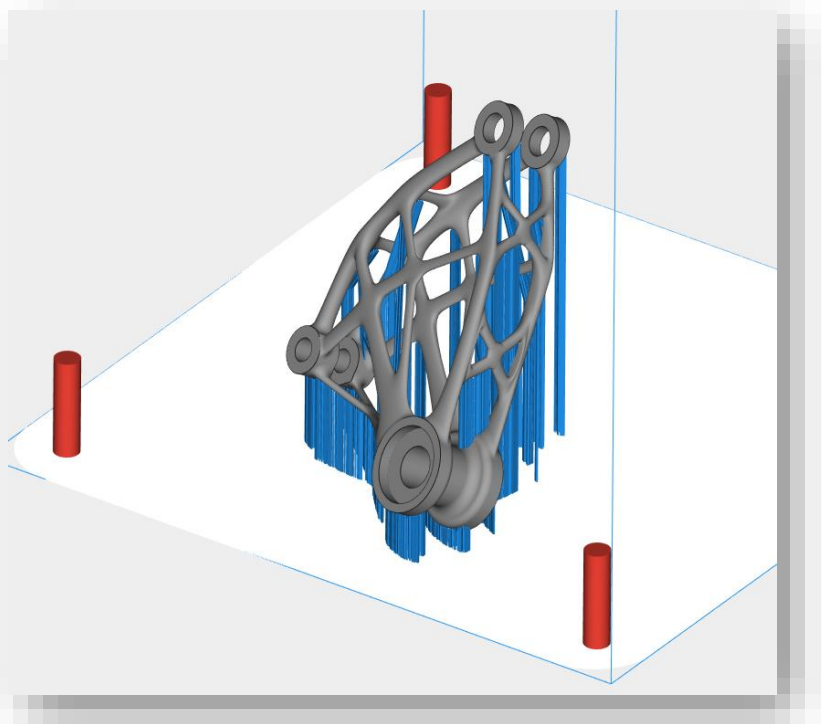


Manufacturing constraints

- Overhang angle: 30°
- Material: Titanium alloy (Ti6Al4V)
- Layer thickness 30 µm



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Video credit: E-AGLE TRENTO RACING TEAM

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THANK YOU

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