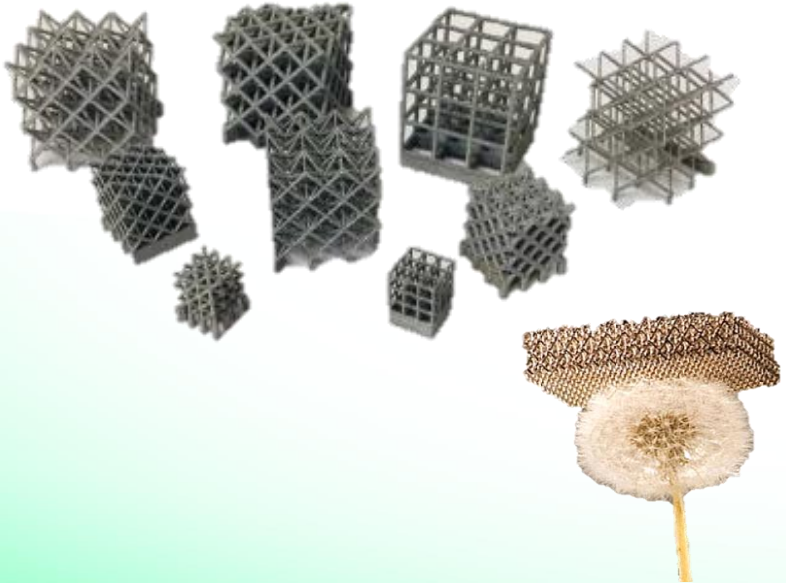
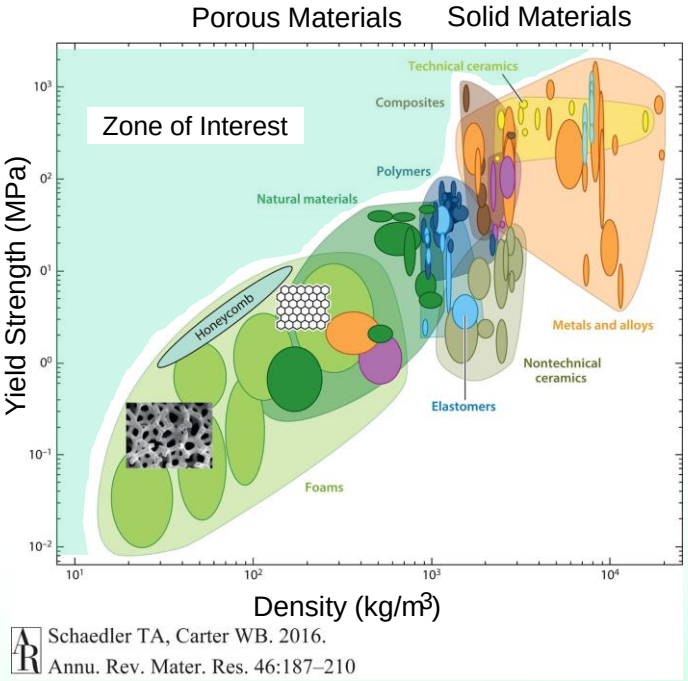

TETMET
Featherlight,
ultrastrong,
*insanely* efficient

## EIFFEL TOWER IS AN EXAMPLE OF A LATTICE STRUCTURE

AT MESO SCALE, THIS IS AN ARCHITECTURED MATERIAL

# ARCHITECTURED MATERIALS CAN OUTPERFORM CONVENTIONAL MATERIALS



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Rayneau-Kirkhope, D., Mao, Y., & Farr, R. (2012). Ultralight fractal structures from hollow tubes. Physical review letters, 109(20), 204301.

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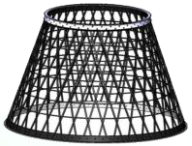
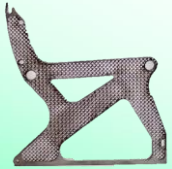
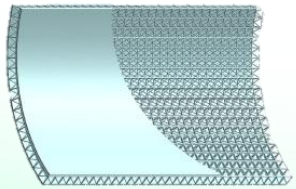
# LATTICE STRUCTURES - COMMON APPLICATIONS

## Lightweighting



## Reinforcements

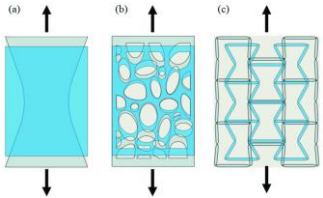



## Energy dissipation

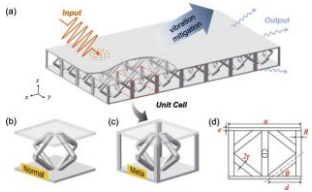


## Scaffolds

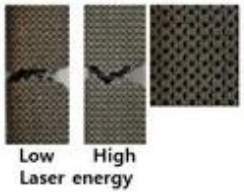

# FROM LATTICE TO ARCHITECTURED MATERIALS THANKS TO SPECIAL GEOMETRIES



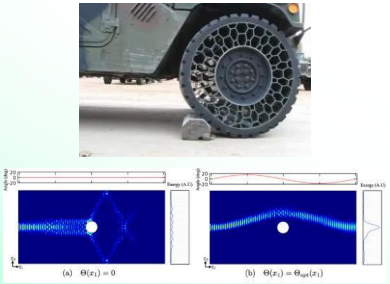
(1) Tuned Poisson ratio



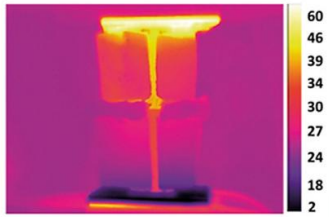

(2) Controlled vibration



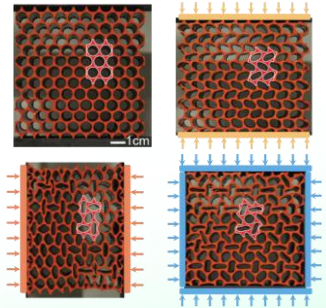

(3) Controlled fracture path



(4) Localised material behaviour




(5) Tuned thermal properties




(6) Instability-induced tuning

(1) Kelkar 2020. Cellular Auxetic Structures for Mechanical Metamaterials: A Review.

(2) Li 2022, Lightweight meta-lattice sandwich panels for remarkable vibration mitigation: Analytical prediction, numerical analysis and experimental validations

(3) Lee 2024, Crack Control in Additive Manufacturing by Leveraging Process Parameters and Lattice Design.

(4) Rosi 2019, Continuum modelling of frequency-dependent acoustic beam focusing and steering in hexagonal lattices

(5) Muñoz Codorníu 2020, Thermal conduction in three-dimensional printed porous samples by high resolution infrared thermography

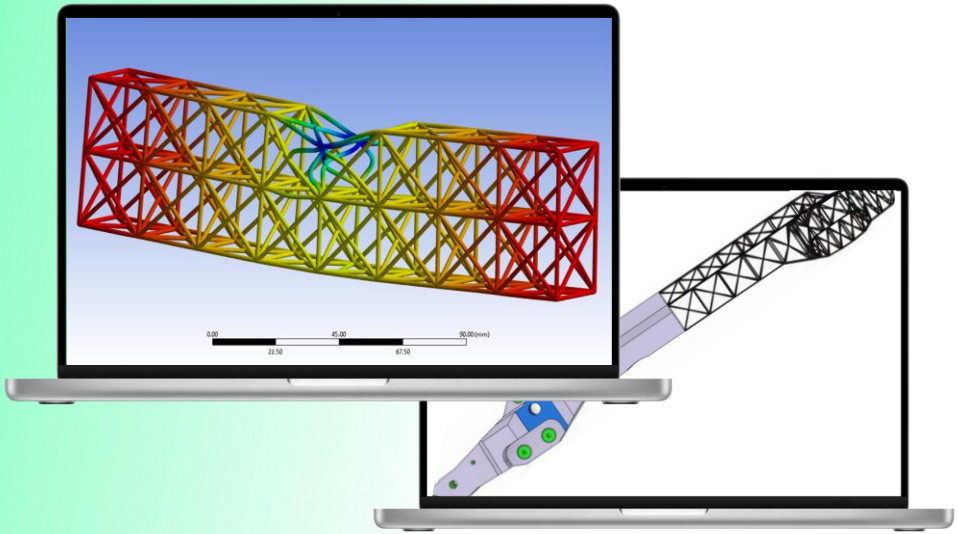
(6) Shan 2014, Harnessing Multiple Folding Mechanisms in Soft Periodic Structures for Tunable Control of Elastic Waves.

**LATTICE MATERIALS ARE HARD TO MANUFACTURE EFFICIENTLY**

# We unlock them at scale for the industry

**ENERGY, AERO & DEFENSE - €700B**
**AUTO & CONSTRUCTION - €1500B**

# LICENSING-BASED PRODUCT: OPERATING SYSTEM FOR THE LATTICE VALUE CHAIN



**LDS**
Lattice Design Suite
**DESIGN PLUGINS**
**FOR CAD SOFTWARE**

**ASLM**
Adaptive Spatial Lattice Manufacturing
**CLOUD TOOLCHAINS**
**FOR OFF-SHELF MACHINERY**

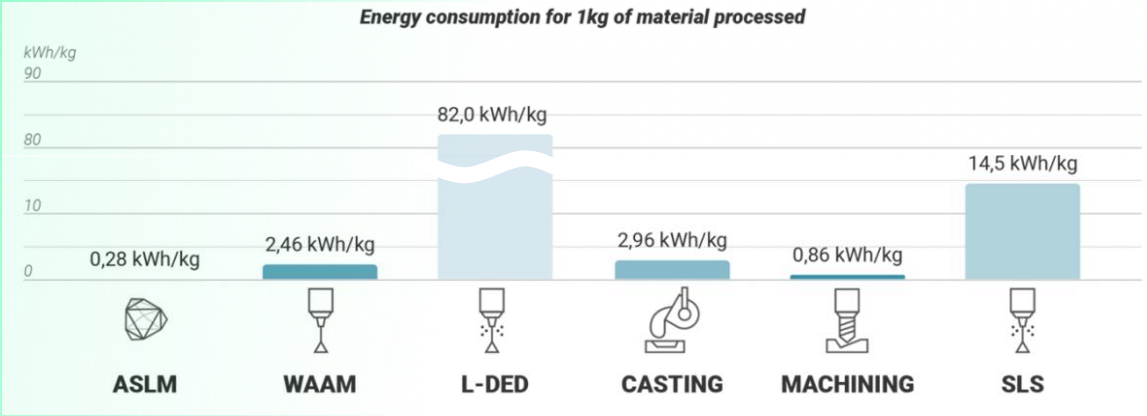
## 1. ADAPTIVE SPATIAL LATTICE MANUFACTURING (ASLM):

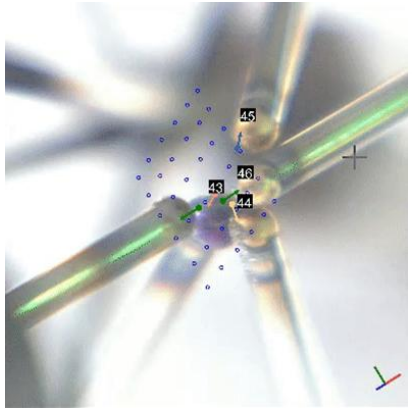
Standard robots produce lattices fast and efficiently

KUKA FANUC Robotics ABB

Circular and cheap metal, polymer or glass wires
structured in a lossless way
outperforming HPM and composites

- low-cost off-shelf equipment
- simple source materials
- extremely low energy use

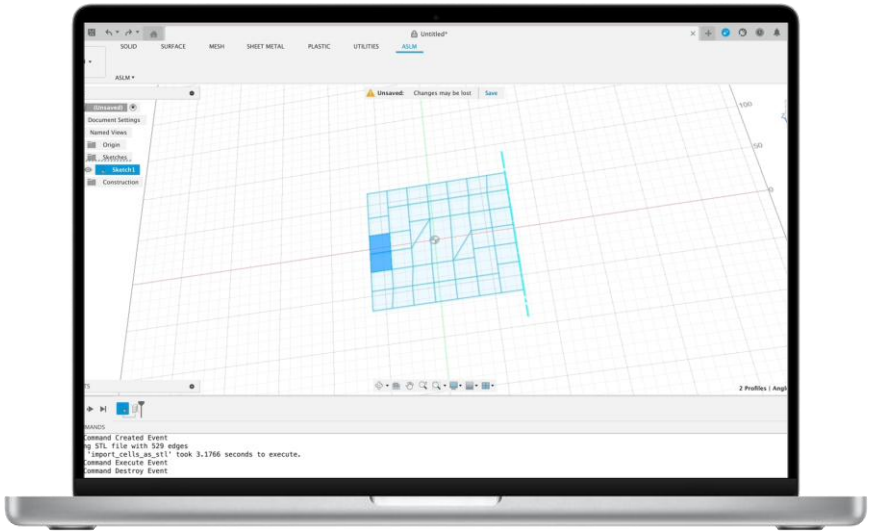


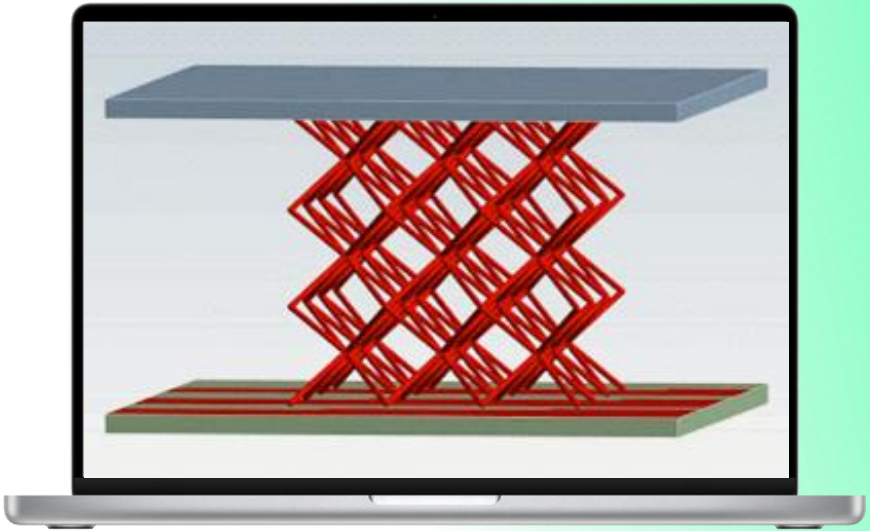



## 2. LATTICE DESIGN SUITE (LDS):

Quickly turn any part into a scale-producible lattice structure

- Plugins for software that engineers already use
- Simple metals outperform composites
- 70+% better strength to weight ratio
- Tune 20+ other properties (stiffness, damping, etc)



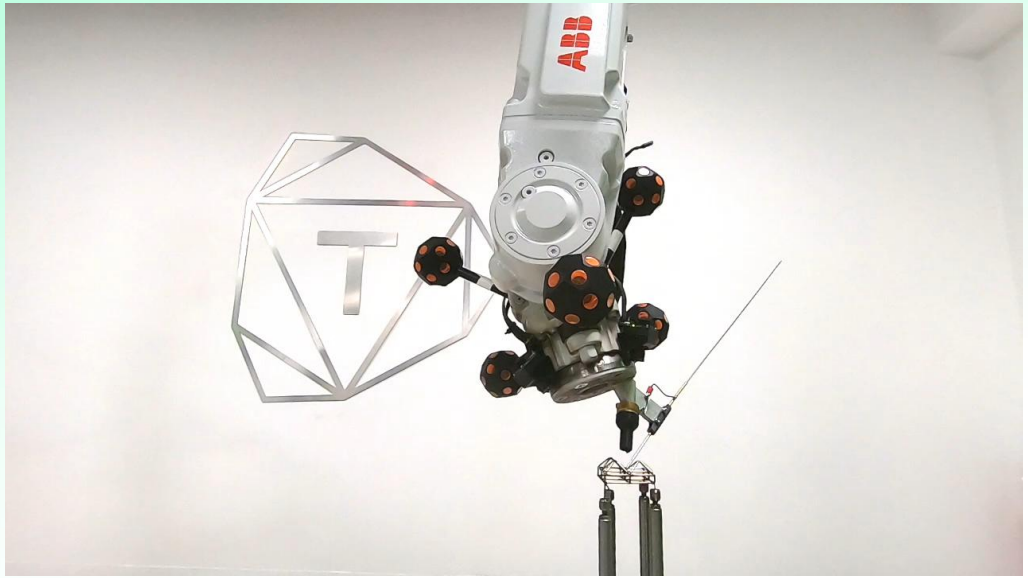



AUTODESK® FUSION 360™

creo®

Ansys

## AND FOR REAL ?




https://drive.google.com/file/d/18E4JqMfxXiqHOojqphywx1gYdYvEXBzU/view?usp=drive_link

CLICK ABOVE TO WATCH THE VIDEO

## FOR WHOM ?

1. Space/New Space
   - Launchers : mini/nano
   - Satellite makers

2. Aero/Defense
   - Cabin interior/seats
   - Structural parts

3. Automotive/Rail/Mobility
   - Body-in-white
   - Interior/seats
   - Battery packs

4. Construction
   - Formwork
   - Load-bearing structures

# BENEFITS

## UNIQUE

- No alternative for large scale metal lattices
- Up to 80% weight savings
- Opening up architectured materials

## COST EFFECTIVE AND FRUGAL

- Zero waste
- Low grey energy in the material
- Ultra low energy in the process
- Inexpensive base material

## SCALABLE

- Base material widely available, No dependency to unfriendly sources.
- “Robot agnostic”
- All separate components available off-the-shelf

TETMET

## MAKING VEHICLE PARTS LIGHTER
Saving millions of tons of CO2
in their lifetimes

**Stabiliser bar with tunable stiffness:**
- 71% less mass
- improved handling

**Structural car beam:**
- 70% less mass
- thermal tuning properties

in mobility

**Passenger seat legs:**
- 72% less mass
- 100s of KGs per aeroplane

in aerospace

**Launcher payload adapter:**
- 73% less mass = extra payload
- Vibrations damping = lighter satellites

## UNLOCKING SMARTER MATERIALS
- Reducing nuclear waste
- Enabling simpler machinery
- Decentral mass production

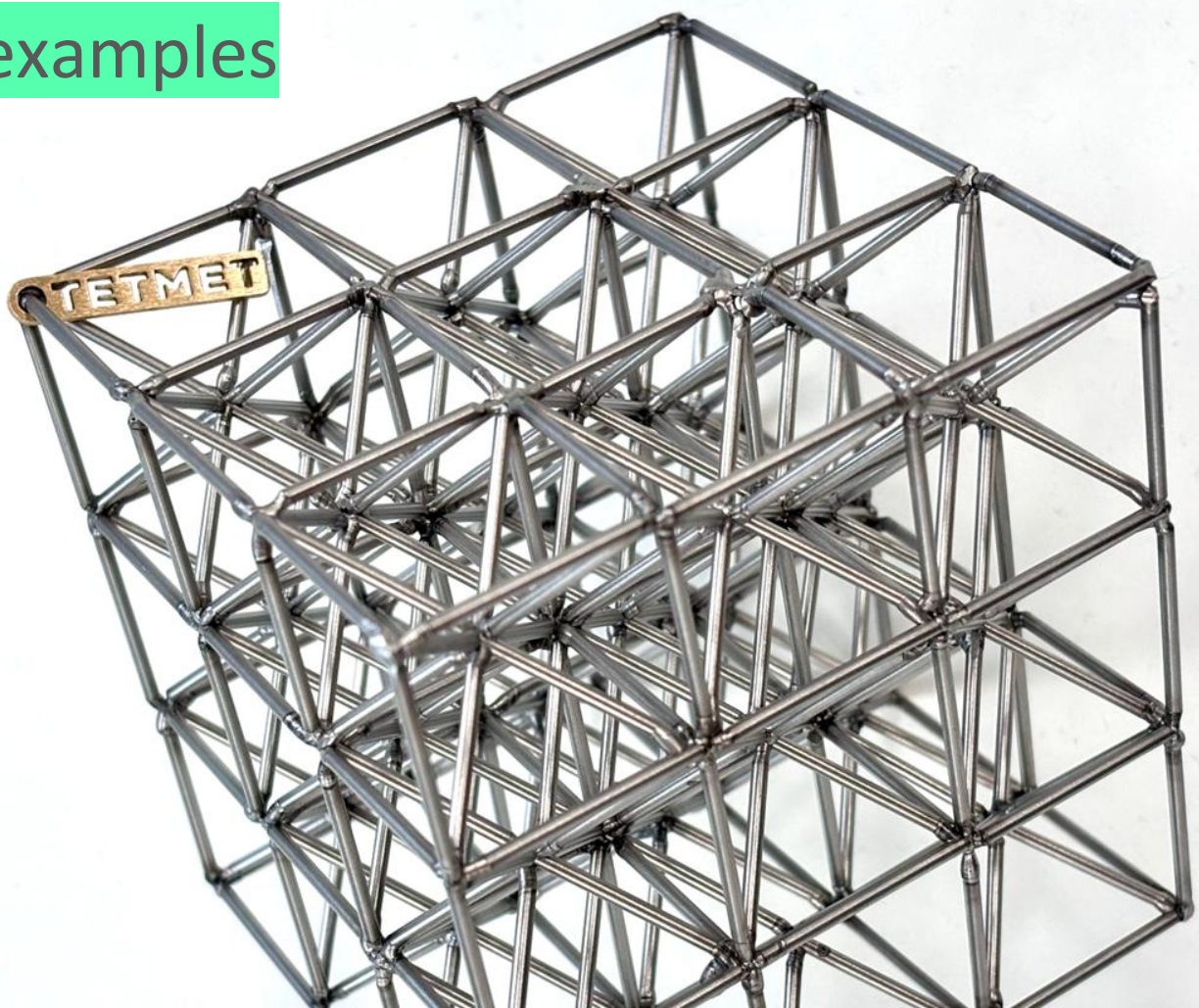
**Nuclear waste contamination:**
- 75% less mass = less nuclear waste

in many other verticals

# SOME ADDITIONAL USE CASES

- Secondary structures for satellites
- Ultra lightweight solar panels for satellites
- Payload adapter for space launcher (55% mass reduction versus aluminium before optimization)
- Brackets for plane seats
- Structural parts for  light electric vehicle (67% mass reduction versus aluminium, before optimization
- Rear wheel bracket for electric car
- Cross car beam for automotive (74% mass reduction versus aluminium), and other parts in the making for L7E vehicles

# Some examples

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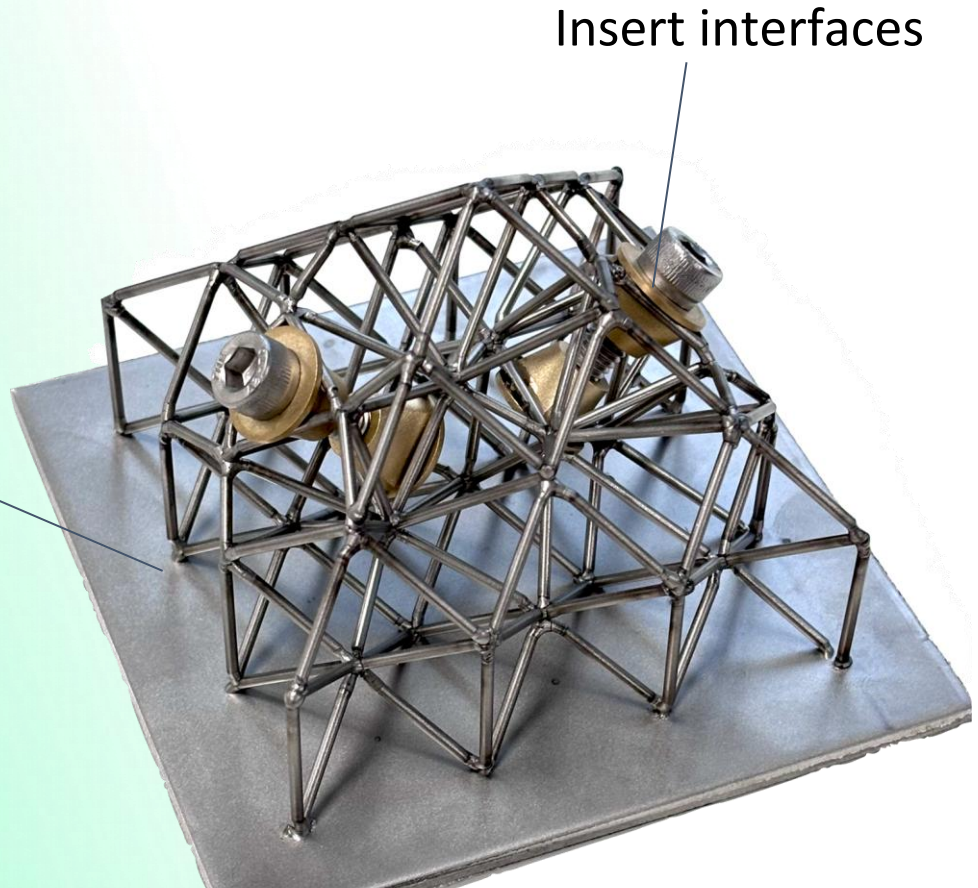

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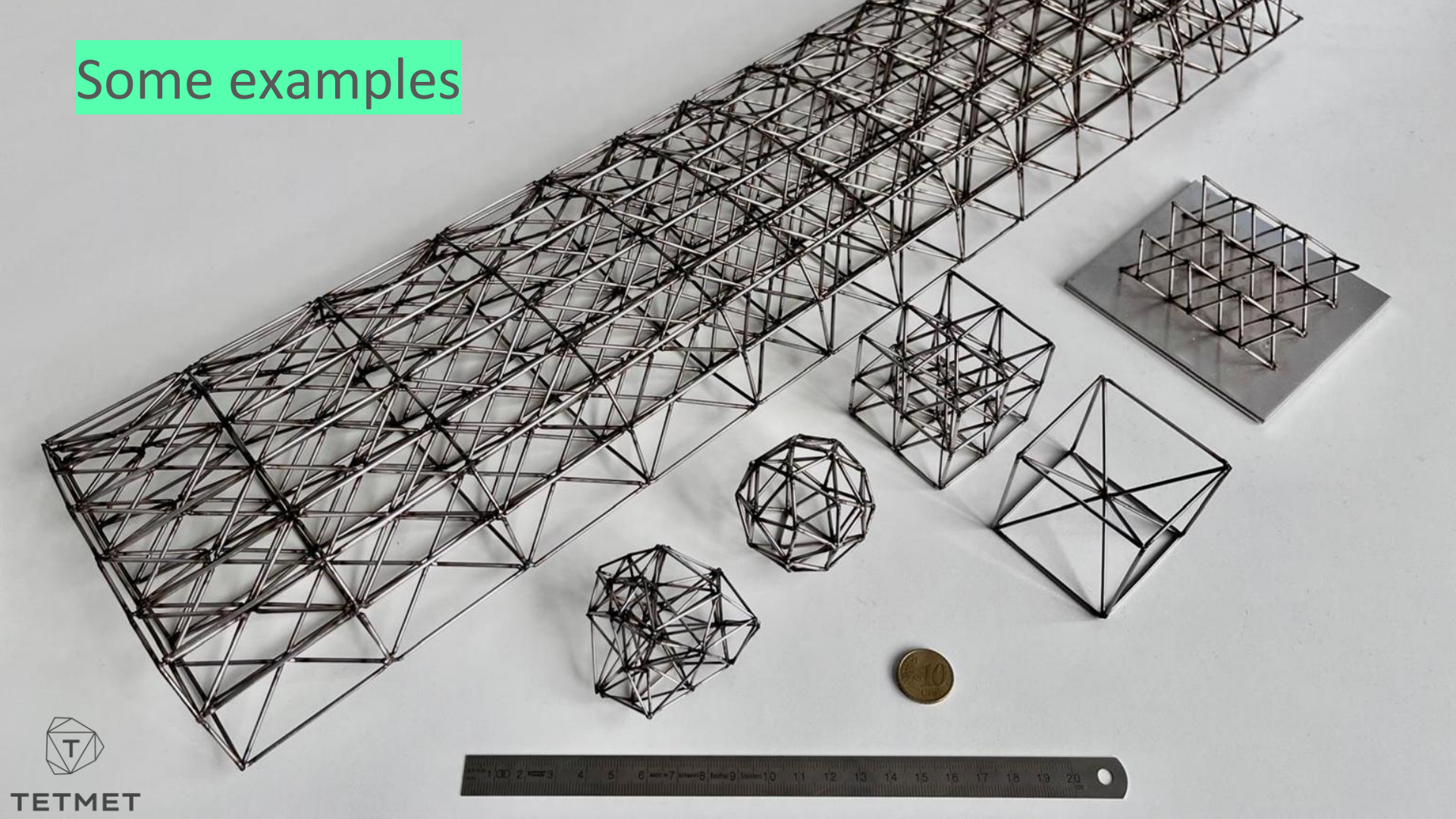

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# Thank You !


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# How to work with us ?

1. Introduction call between project teams – 30 minutes
2. Time to think about use cases – one week
3. Joint workshop (max 2h), looking at your cases
4. If a part is identified, send us 3d file + load cases
5. TETMET carries out a feasibility study
6. GO/no GO on study outcomes

If GO: we will prepare a POC quotation for engineering & testable parts

[All steps at no cost]