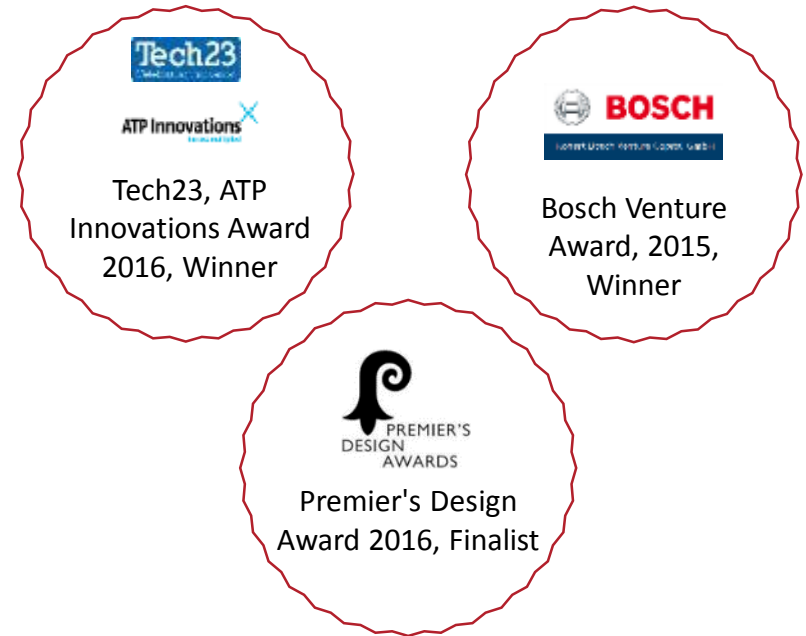


SPEED3D

On demand
High volume
3D metal printing

Steven Camilleri
Chief Technology Officer



3D printing : “the process of converting a digital file to a real object.”

A new era of 3D metal printing –

Supersonic 3D Deposition (SP3D)



Introducing **SPEED3D**

LIGHTSPEE3D

The world's first

Fully integrated

Cold spray

3D printer



SPEE3D

Make metal parts up to 100x faster than traditional casting

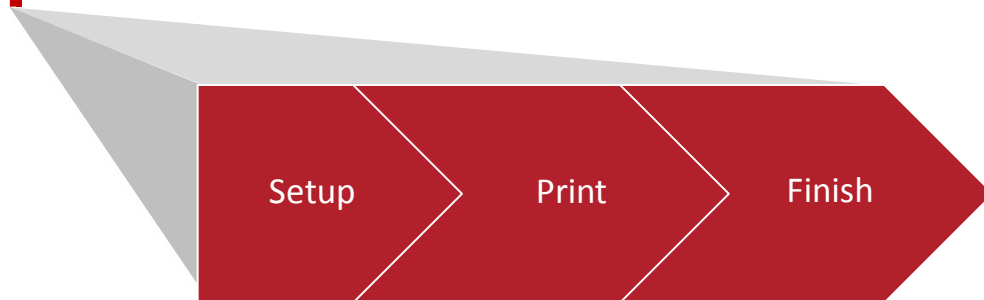
Traditional casting production



Up to
10 weeks

SPEED3D

5 mins – 90 mins



3D printing avoids tooling but doesn't solve need for speed

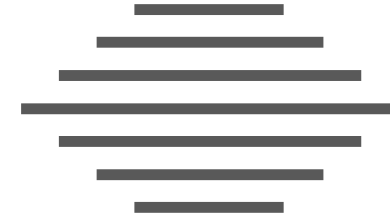
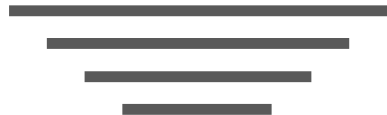
Traditional 3D metal printing

Melt metal, cool, spread a new single layer...

...melt, cool, spread...

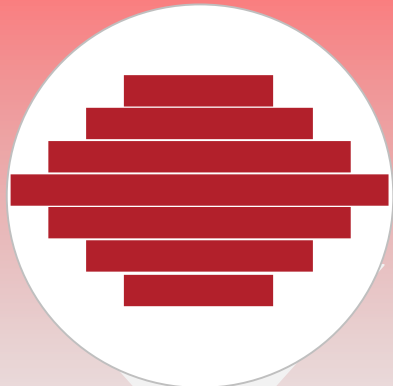
...melt, cool, spread...

...melt, cool, spread...



24 hours to produce single part

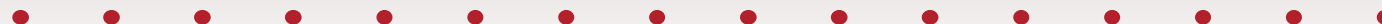
No melting = no delays = single part produced fast



Continuous deposition process

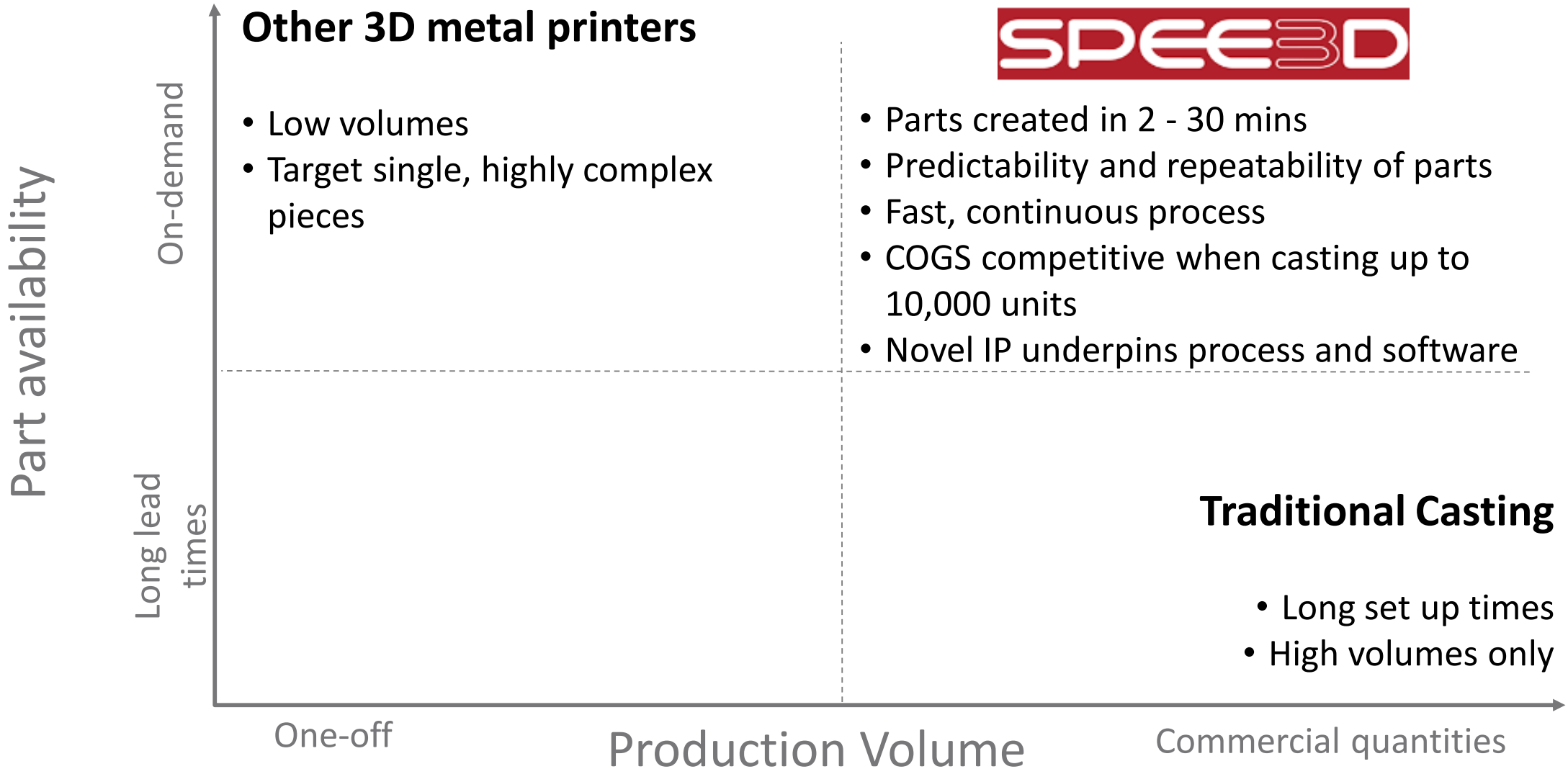


Immediately move to next (or new) part, repeat



24 hours for volume production

SPEE3D offers on-demand, low cost, volume parts manufacture

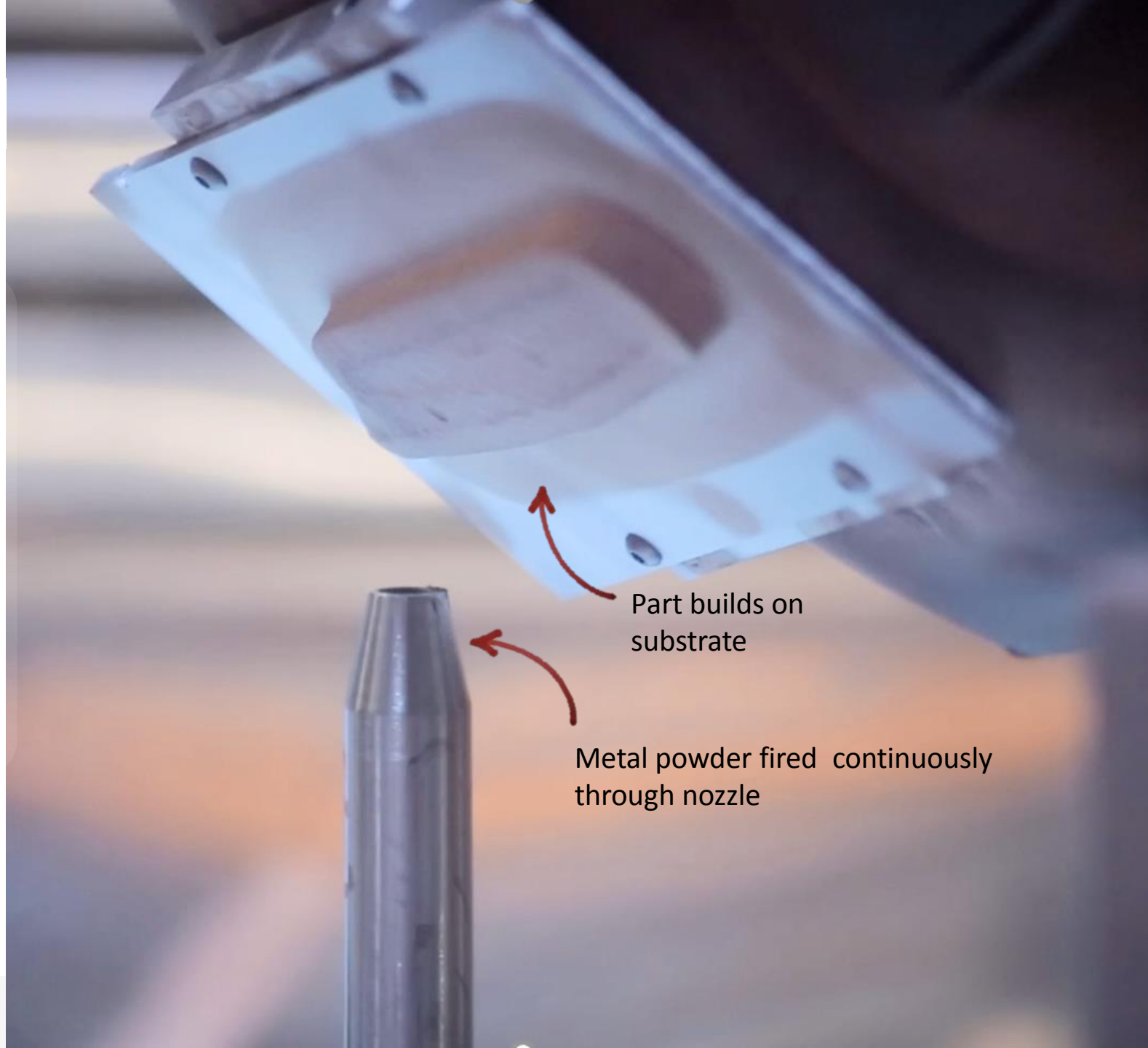


SPEED3D



How do we do it?

**The SP3D process:
produces a full density,
metallurgically bonded
3D component**

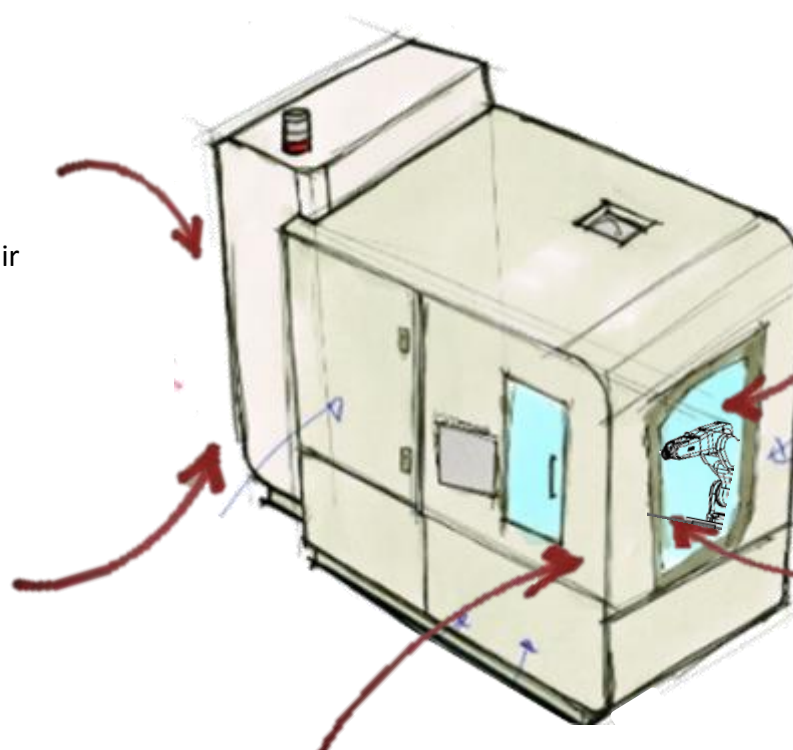


Our proprietary software enhances the capability of the hardware

- 1 Compressed air supply
- Optimised for low cost continuous operation
 - Use of atmospheric air means no bottle replacements, no breathing air safety concerns

- 2 Metal powder
- Readily available
 - LightSPEE3D is optimized for pure and alloyed copper and aluminium

- 3 Proprietary control software
- Precision control of robotic arm and delivery of powder (pressure, temperature & volume)
 - Custom developed CAM software allows for the most efficient build processes

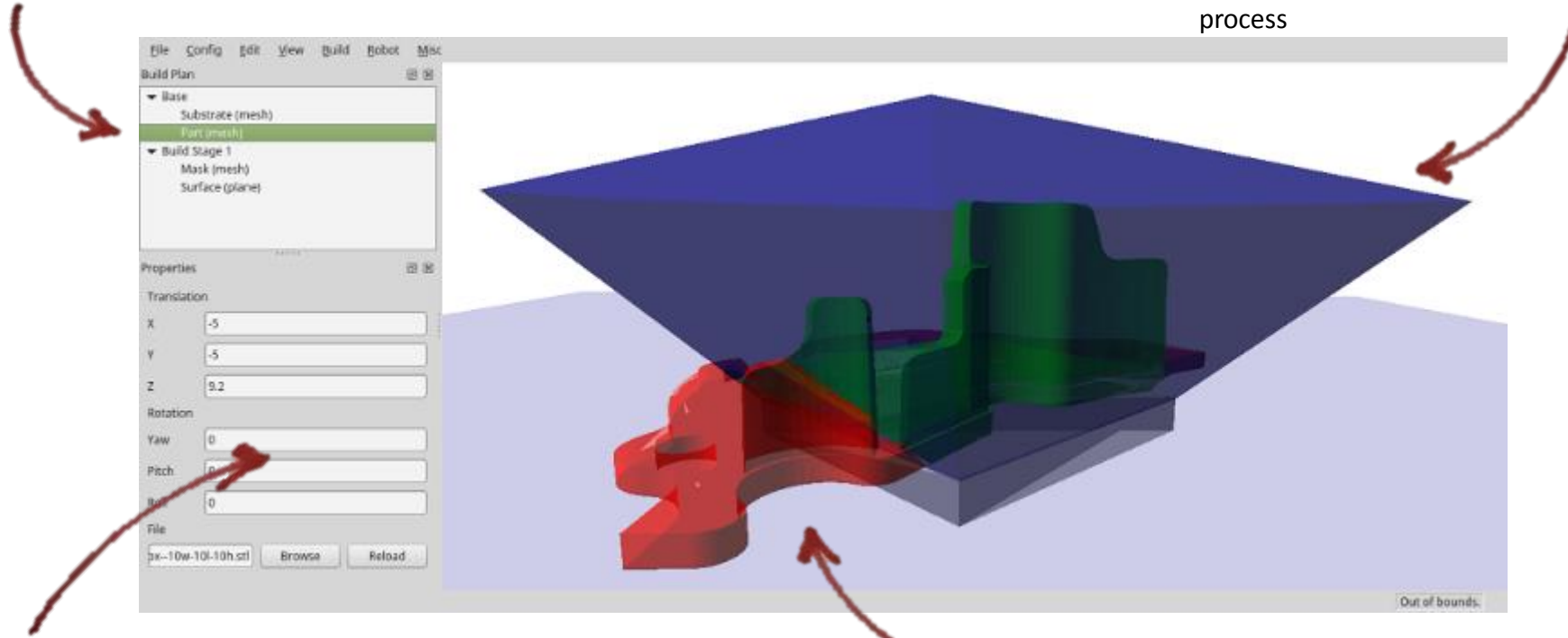


- 6 Finishing
- Part removed from machine, can be handled immediately
 - Conventional heat treatment can further improve part strength
- 5 Robotic arm / part bed
- Shape forms as powder particles fuse on impact with the bed and each other
- 4 Powder spray nozzle
- Rocket nozzle used to propel metal powder particles at supersonic speed onto substrate
 - Fixed to the base of the machine

SPEE3D Genesys CAM software

- 1 Process staging
- Modern, CAD like control of fabrication process

- 2 Full process simulation
- Detailed simulation of complete SP3D spray up process



- 3 Process optimisation
- Allows addition of supports
 - Allows specification of construction order

- 4 Live preview
- Real time evaluation of print feasibility and best orientation

ALPHA1 (α_1)– the first qualified printing material

First SP3D printing material

- 6061 aluminium alloy composition
- Targeting automotive applications
- Properties equivalent to cast
- Low anisotropy



Completely free-formed automotive part
SP3D printed from α_1

LightSPEE3D solves three problems

1

Just in time, localised manufacturing

- Cost effective for up to 10,000 parts
- Reduce inventory burden
- Localised, or on-site
- Facilitates new product development
- Example – Tier1 automotive component manufacturing, industrial manufacturing.

2

Part replacements

- Worn, missing or broken parts
- On-site rapid printing of single parts
- Software + minimal set up time = flexibility
- Examples - remote mine operators, industrial manufacturing, defence

3

Rapid prototyping

- New product created from any CAD design - immediately produced
- Ideal for testing of more than very small number of parts
- Repeatability to scale production



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