

INDIVIDUAL GLOBAL  
ADDITIVE SOLUTIONS

GLOBAL

Turning great ideas  
into successful products

## > PROTOTYPING WITH METAL 3D PRINTING

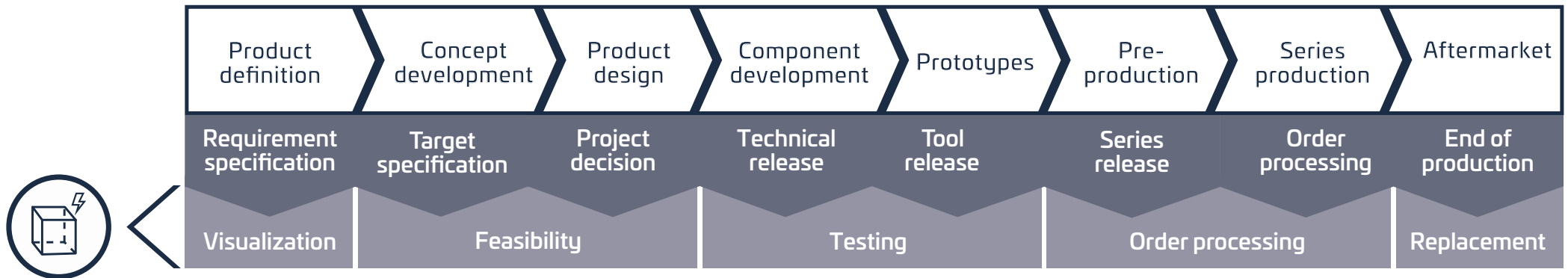
# WHY?

## WHY ADDITIVE MANUFACTURING?

### > Value for our customer

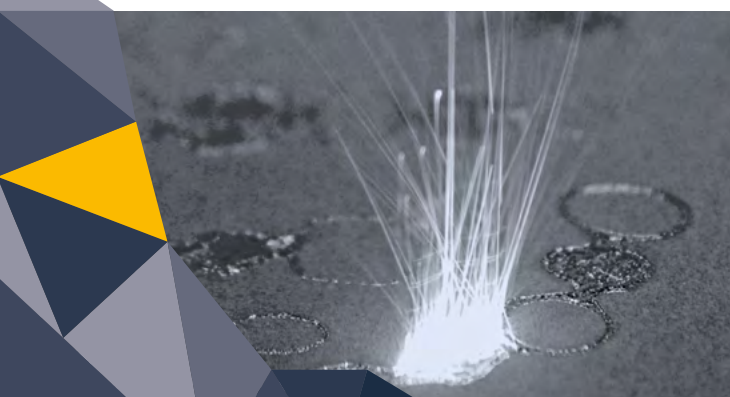
**Turning great ideas into successful products, that is the mission of our customers.**

With prototypes made by Metal 3D printing, we enable you to receive functional and resilient prototypes within a very short lead time of two weeks. This enables you to test factors such as usability, ergonomics, manufacturability and materials. Thereby, you can adapt the function and the design of your components at an early stage in the development process. This saves costs and minimizes the investment risk of your company.



### 3D-PRINTED PROTOTYPES ARE CHARACTERIZED BY

- > Full design freedom
- > Quick time to market
- > No tooling investment
- > GKN Additive as one-stop solution provider

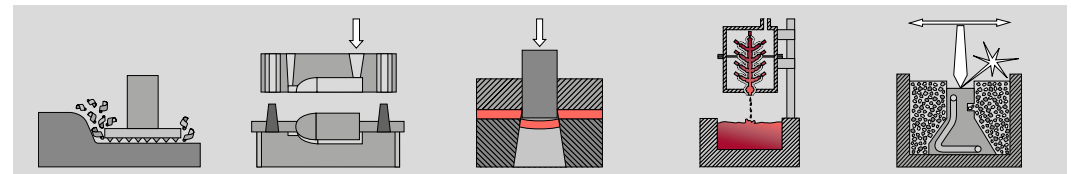


# ISSUES WITH TRADITIONAL PROTOTYPING

## Conventional prototype management reaches its limits in today's engineering development cycles.

In conventional prototyping, there are often problems caused by long waiting times, for example due to bureaucracy or the development of necessary tools.

Metal 3d printing gives you the possibility to substitute net shape and complex geometries from conventional manufacturing technologies without tooling costs and an improved time to market.



	MACHINING	SAND (IRON-AL.) CASTING	FINE BLANKING and FORMING	INVESTMENT CASTING	LASER POWDER BED
TOOLING COST	Green hexagon	Yellow hexagon	Red hexagon	Yellow hexagon	Green hexagon
TIME	Yellow hexagon	Red hexagon	Red hexagon	Yellow hexagon	Green hexagon
NET SHAPE	Yellow hexagon	Yellow hexagon	Green hexagon	Yellow hexagon	Yellow hexagon
3-D DESIGN	Red hexagon	Yellow hexagon	Yellow hexagon	Yellow hexagon	Green hexagon
DESIGN FLEXIBILITY	Red hexagon	Red hexagon	Yellow hexagon	Red hexagon	Green hexagon
COMPLEX GEOMETRIES	Red hexagon	Yellow hexagon	Red hexagon	Yellow hexagon	Green hexagon
SIZE DIMENSIONS	800x800x400 (typical)	800x800x600 (typical)	2000x2000x20 (typical)	Min. 100g weight up to 1 kg	420x420x400 (typical)
TOLERANCES	+/- 0,02mm	+/- 2mm	+/- 0,05mm	1% of nominal tolerance	+/- 0,15mm
MATERIALS	All conventional used materials	Ductile cast iron, AISI10Mg	All conventional used sheet metal materials	Ductile cast iron, AISI10Mg	14404 316L, 1.2709 Tool steel, 20MnCr5, CuCr1Zr, AISI10Mg

# ADVANTAGES AND BENEFITS OF GKN'S 3D PRINTED PROTOTYPES



## SPEED

### ADMINISTRATIVE EFFORT



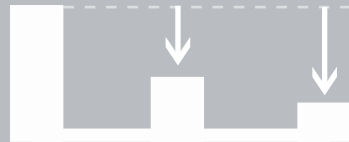
mail



virtual storefront



frame contracts



- > Global print network with local support
- > Immediate printability check with InstAMetal
- > Instant response time and low administrative effort due to



or individually tailored frame contracts



## STANDARDS



- > Global Printnetwork with standardized parameters
- > IATF 16949 & ISO 9001 certificates
- > Topology optimization & Fatigue analysis



## DATA SECURITY



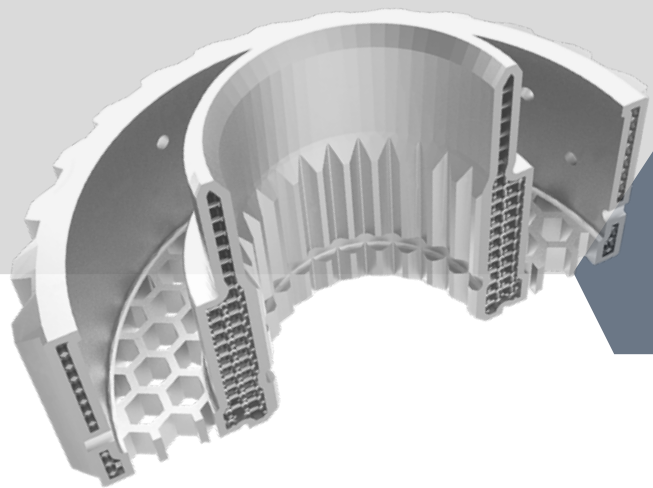
- > Direct digitally connected customer/ GKN systems
- > Guaranteed data security, all data is stored on premise (no cloud/ no external storage locations)



## SUPPORT

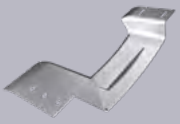
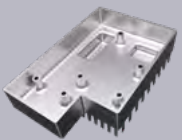
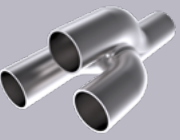





- > Contribute to the customer's design process, incl. recommendation of material selection
- > Experience Days: Identify AM value in the product development (Technology Pitch, Pain points, Cost estimation)



# GKN AM PRODUCTION EXAMPLES

GKN is supporting engineers in transmission development with prototypes made by Metal 3D Printing in order to achieve the optimum result for the customer in the shortest possible time. Based on the experience within the automotive industry and application understanding, GKN has always been able to satisfy the high demands of its customers and in many cases even exceeded their expectations.

	THIN ELEMENTS / STRUCTURES	HOUSINGS	PIPES	FIXTURES/ BRACKETS	HYDRAULIC COMPONENTS	TRANSMISSION PARTS	
STANDARD PROCESS	Stamping / Bending	Casting	Hydro forming / welding	Machining	Fine casting	Machining	
STANDARD DELIVERY	8 weeks	6 weeks	8 weeks	4-6 weeks	12 weeks	6 weeks	
AM DELIVERY	2 weeks	3 weeks incl. machining	2 weeks	2 weeks	3 weeks incl. machining	3 weeks incl. machining	
STANDARD MATERIAL	Different materials	Different al. alloys	Different alloys	Different materials	Stainless steel	Case hardened steel	
MATERIAL	AlSi10Mg, 1.2709, 316L	AlSi10Mg	AlSi10Mg, 316L	AlSi10Mg, 316L	316L	20MnCr5, 316L	
EXAMPLE							

# MATERIAL

## MATERIAL AS THE COST INFLUENCER

### > CASE STUDY

#### Housing

Aluminium die casting

- tool costs: 100 k€
- lead time: 14 weeks

#### Cover

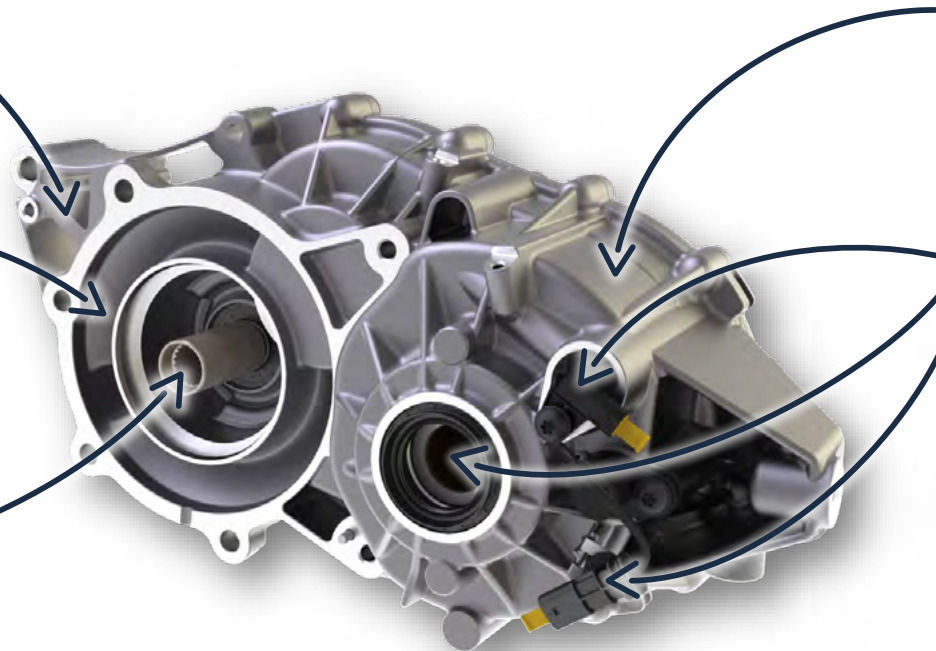
Deep drawn sheet metal

- tool costs: 20 k€
- lead time: 8 weeks

#### Axle

Machined and broaching

- tool costs: 50 k€
- lead time: 8 weeks



#### Helical gears

PM-surface densified

- tool costs: 100 k€
- lead time: 14 weeks

#### Plastic components

Plastic injection moulding

- tool costs: 15 – 50 k€
- lead time: 10 weeks

With AM all these parts could have been produced in just one month instead of minimum 3 months - without tooling costs!

# WE GUIDE YOU FROM FIRST STEP

## > Standardized AM Prototyping

### Conversion of your initial situation into our AM Framework

#### 1. AM INTRODUCTION

- > Consultation with AM Sales Engineer
- > Experience Day/Training (optional)

#### 2. TEST PERIOD

- > GKN AM Prototyping „AM Conventional“

#### 3. FRAME CONTRACTS

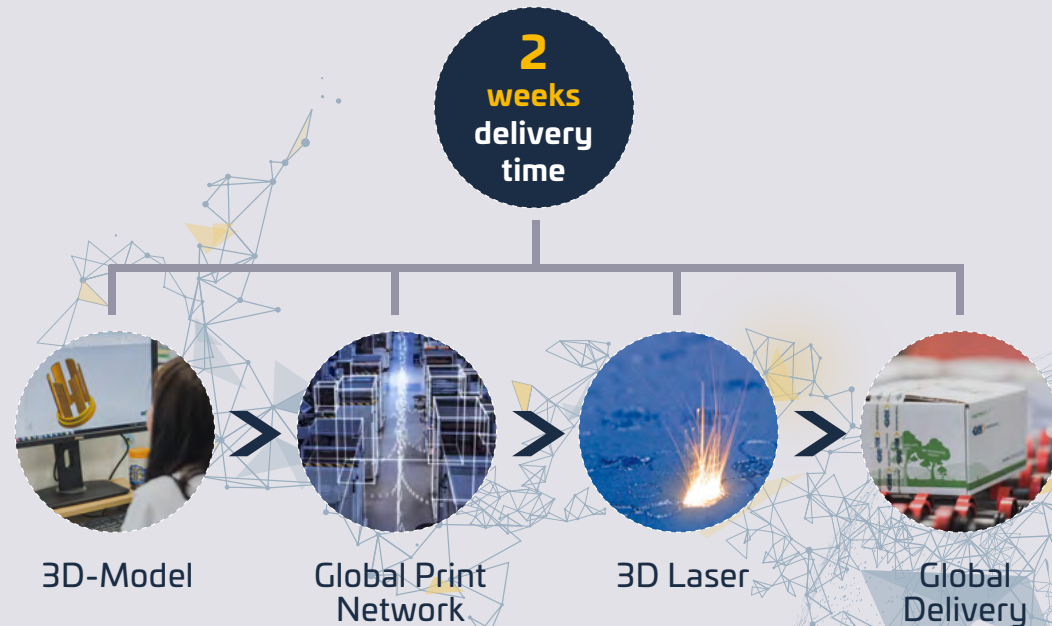
- > cm<sup>3</sup>-model (volume contract)

#### 4. SYSTEM CONNECTION

- > Direct connection to GKN-MES
- > Lowest administration effort

#### 5. SOP

### Standardized AM Prototyping framework



3D-Model

Global Print  
Network

3D Laser

Global  
Delivery

Flexible & individual production orders with monthly total invoicing

## About GKN Additives

GKN Additive is a digital manufacturer of metal AM parts and materials for prototypes, medium series and the aftermarket. Our AM production plants are embedded in Industry 4.0, backed by an intelligent global print network for maximum efficiency and prompt delivery to our customers. What sets us apart is our history.

GKN Additive builds on GKN Powder Metallurgy's dual expertise in powder production and metal processing to drive industrialization across the whole Additive Manufacturing value chain.

From advanced metal powders to design and manufacturing services, we drive new technologies to the limit to make technology simpler, faster and more accessible.

## Connect with us

### Kevin Schmidt

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### Markus Bürger

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## To learn more about GKN Additive, visit:

[gknpm.com/additive](http://gknpm.com/additive)



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