VISIONARY!
3D METAL PRINTING
Kerstin and Frank Herzog set off more than 15 years ago to explore laser melting of metal in order to conquer the unknown territory of Additive Manufacturing. Full of curiosity and pioneering spirit, the young engineer invented the LaserCUSING® process in 1998 and founded Concept Laser GmbH together with his wife in 2000. In 2002 Oliver Edelmann joined the team. He built up professional sales and marketing structures and continues to direct the department to the present day.

We are proud to announce: when it comes to industrial laser melting of metals, we were the first worldwide.

We learned a lot from our customers and users. We express our thanks for that! Concept Laser now offers everything you need for industrial 3D metal printing: technology, equipment, services, and development.

As down-to-earth entrepreneurs, we live the values of German small and medium-sized enterprises: a long-term orientation in terms of thought and action, responsibility for employees, and consciousness for quality. “Made in Germany” motivates us to excel in the global marketplace. In terms of Additive Manufacturing, we are the technology leader and set trends.

Concept Laser exhibits rapid growth. The will to innovate now drives more than 150 people. Team spirit and pleasant working environment define our corporate culture. We are open for the future!

With a great attitude, we set off on new paths every day and continue our research and development. Join us in the fascinating 3D metal printing world of tomorrow. It will be an exciting journey. We promise.
What works with the familiar plastic sintering technique would also be feasible in the area of metals is what Frank Herzog thought during his studies. As a pioneer of powder-bed based laser melting of metals, he developed the LaserCUSING® process in 1998.

In the millennium year 2000, Kerstin and Frank Herzog founded Concept Laser GmbH with a clear goal in mind: manufacture additive parts – with metals in powder form using series materials.

In 2001, the young engineers presented the world’s first industrial laser melting system for the Euromold trade fair in Frankfurt – to a market which is developing with unexpected dynamics. Analysts such as Roland Berger expect a market expansion of 400% over the next 10 years.

The company’s own steep development curve provides encouragement. We are eager to take the lead in Additive Manufacturing also in the future. Challenge us.

Company data regarding Concept Laser GmbH as of 01/2015

FROM START-UP TO GLOBAL PLAYER

• 1998 Development of the LaserCUSING® process
• 1999 Registration of the first basic patent
• 2000 Foundation of Concept Laser GmbH (Lichtenfels, Germany)
• 2001 Presentation of the first industrial 3D metal printer
• 2002 Delivery of the first systems
• 2011 Revenue growth is between 30 and 50%
• 2014 Revenue grew year on year by 75%
• 2014 Foundation of Concept Laser Inc. (Grapevine, Texas)
• 2015 The team already consists of more than 150 employees
• Worldwide, more than 550 laser melting machines are in use
• Sales and service partner network in some 30 countries around the world
UNIQUE! PASSION FOR LaserCUSING®.

In technical terms, LaserCUSING® refers to Additive Manufacturing with metal, also known as 3D metal printing. The term, composed of the C of CONCEPT Laser and FUSING (melt completely), describes the technology: the melting process generates complex parts layer by layer using 3D CAD data – with layer thicknesses between 15 and 150 µm.

Metal in fine powder form is melted locally using high-energy fiber lasers. Mirror deflection units (scanners) create the part contour by deflecting the laser beam. After cooling, the material solidifies. Construction is carried out by lowering the build plate, adding new powder, and melting again.

What makes the systems special is stochastic control of the slice segments (also called “islands”), which are processed successively. The patented method provides for a significant reduction in tension in the manufacture of very large parts.

The result: metallic precision components that can stand up to high mechanical and thermal loads.

The machine solutions from Concept Laser process commercially available series materials in powder form as well as in-house developments and special materials. Depending on the application, stainless and tool steels, reactive materials such as aluminum or titanium alloys, nickel-based superalloys, and cobalt-chromium alloys are used. Precious metals such as gold or silver alloys for manufacturing jewelry expand the ever-growing range.
WORLD CLASS! LaserCUSING® LEADS THE MOVEMENT WITH A HEAD START IN TERMS OF TECHNOLOGY.

- **Company foundation**
  Kerstin and Frank Herzog found Concept Laser GmbH
  
- **2000**
  - **Company foundation**
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  - **Hybrid construction**
    For economical production of tool inserts
    Development and patenting of Concept Laser GmbH

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    Development and patenting of Concept Laser GmbH
  - **Stochastic exposure**
    Development of the “island” principle, the unique exposure strategy to reduce tensions in the part
    Patented by Concept Laser GmbH

- **2007**
  - **M2 cusing**
    Product launch
  - **M3 linear**
    Product launch of world’s first industrial 3D metal printing system at Euromold in Frankfurt
  - **Parallel and surface cooling**
    Development and patenting of Werkzeugbau Siegfried Hofmann GmbH

- **1998**
  - **LaserCUSING®**
    Development of the LaserCUSING® process with the first prototype device

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2009

Quality assurance
Launch of the QM quality management system to monitor the build process

QMmeltpool
Launch of the system for melt pool monitoring

Mlab cusing
Product launch of the compact 3D metal printer for the production of direct parts for the dental, medical, and jewelry industry

2010

QMmeltpool
Launch of the system for melt pool monitoring

Mlab cusing
Product launch of the compact 3D metal printer for the production of direct parts for the dental, medical, and jewelry industry

2011

QMcoating
Development of the QMcoating module for monitoring and control of the coating process

2012

X line 1000R
Mlab cusing R
Product launch of machines with the largest and smallest build space for 3D metal printing for processing reactive materials

2014

M2 cusing multilaser
Redesign and further development of the bestseller M2 cusing

2015

QMmeltpool 3D
Position-related real-time monitoring and three-dimensional visualization of the LaserCUSING® process

X line 2000R
Product launch of the machine with the world’s largest build space and the strongest laser power for 3D metal printing

2016

More pioneering innovations follow ...

Multilaser
Introduction of multilaser technology
COMPETENT! THINKING ABOUT THE CUSTOMER IN EVERY PHASE.

Success is created in processes characterized by partnership. We apply ourselves to the task with a great deal of expertise and many years of experience in research and development. This provides security and creates trust.

Customizing comes from a customer orientation. We are happy to accept the challenge of developing systems which are very specifically tailored to a company. Pilot projects allow the comparison of LaserCUSING® technology with conventional technology. In our in-house Application Center, it is possible to experience the process "live."

We choose right software for data preparation together with our customers and we also decide with them which of our machine solutions are best suited for the desired application.

Uncompromising in terms of safety: For projects that are subject to confidentiality, we make separate “approval cells” in specially shielded rooms available to customers. The highest level of quality control: Prior to delivery, every system undergoes a comprehensive approval procedure!

Technology integration, machine training and instruction course, tailored maintenance concepts: In all application questions, we are at your disposal with help and advice. This is service on which you can rely.

• Research and development for 3D metal printing technology
• Design and engineering of the machine technology and peripherals
• “MADE IN GERMANY” Production in Lichtenfels, Germany
• Quality control before delivery
• Customizing of systems, processes, and technologies
• Benchmarking and application development
• Lightweight design and functional integration
• Worldwide sales and service network
INNOVATIVE! RESEARCHING WITH HEART AND MIND.

We make tremendous investments in our core area of Research & Development: More than 50 employees work intensively so that LaserCUSING® technology continues to move forward all the time. This is true to the motto: We live for and from our ideas.

The focus of our work is understanding the specific applications of our customers. Today, we already offer solutions for the requirements of tomorrow: increasing productivity, automation, developing new materials, and industrial applications. Reliable status monitoring of systems as well as solutions for in-line process monitoring also belong to the core areas of research.

RESEARCH & DEVELOPMENT
- More than 30% of the workforce
- 50 patents granted
- Approximately 100 pending patent applications
- Partner of numerous national and international research and development cooperations
- In-house metallography laboratory / material testing
- Technical Center with numerous testing facilities

TASK AREAS
- Technical requirements management
- Software development
- Electrical engineering, control engineering, optics
- Digital in-process management systems
- Materials science, materials engineering, welding engineering, process development, material testing, analytical laboratory
- Industrial project planning, development application
- Construction & engineering
- Simulation
The leading metalworking sectors rely on us – as partners and instigators. 3D metal printing for industrial series production guarantees: reliable processes and cost-effective solutions that demonstrate their efficiency in daily production.

In aerospace, bionic parts are being created with integrated functions and in real lightweight design. Aircraft parts that previously were made up of more than 100 components are manufactured in one step with LaserCUSING®.

Customized, patient-specific implants are changing medical technology and resulting in increased quality of life for many people.

Durable dental prosthesis and filigree jewelry and watch parts are manufactured in the dental and jewelry sectors. The automotive industry uses our expertise for industrial adaptation of powerful engine and exhaust components, and high-precision suppliers in the area of tool and machine design also take advantage of our services.

3D parts from Concept Laser are an expression of the highest possible quality and are characterized by higher performance, sophistication, and added value.
Additive 3D metal printing has great potential: boundless freedom of design, functional integration, lightweight design and construction with geometry that is closer to the final contour or ready to be installed. The complexity compared to conventional production is thrown into the package for free, so to speak.

Additive parts are available up to 75% faster. In lightweight design up to 70% of weight can be saved - in some cases even more. The tool-free production is virtually without waste and emissions, conserving resources.

LaserCUSING® improves the environmental footprint in production. For this reason, we rightly refer to our sustainable process as GREEN TECHNOLOGY.

Our joint development project with Airbus and the Laser Zentrum Nord clearly shows the advantages: Compared to the conventionally manufactured part, the bionic titanium part “Bracket” is a third lighter and performs better, and is also more economical and environmentally friendly. With 90% less waste, that’s an excellent energy balance!

EFFICIENT! GENERATE BENEFITS LAYER BY LAYER.

<table>
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<tr>
<th>CONVENTIONAL PRODUCTION</th>
<th>ADDITIVE MANUFACTURING</th>
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<tbody>
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<td>Material use</td>
<td>Material waste</td>
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<th>LaserCUSING® ADVANTAGES</th>
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<tr>
<td>• High potential for lightweight design</td>
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<td>• Topology optimization</td>
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<tr>
<td>• Implementation of bionic designs with improved performance criteria</td>
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<tr>
<td>• Optional functional integration (such as cooling) or integral construction</td>
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<td>• One-shot manufacturing</td>
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<td>• Reduction of assembly effort and weak points</td>
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<tr>
<td>• No waste as with conventional machining methods</td>
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<td>• Fast and decentralized availability: “production-on-demand”</td>
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<tr>
<td>• Timely, tool-free production</td>
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<tr>
<td>• No preproduction costs and tool costs</td>
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<td>• Unmanned production 24 h/day</td>
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FINAL PRODUCT: Conventionally manufactured bracket made of aluminum (Al), milled conventionally

FINAL PRODUCT: Additively manufactured bracket made of titanium (Ti), 3D printed
MINI, MIDI, MAXI! THE IDEAL SOLUTION FOR EVERY APPLICATION.

Concept Laser is a leading global provider of 3D metal printing systems. The portfolio includes a wide range of standard and tailored machine concepts.

Safety and ease of use have top priority. The machines are designed in accordance with ATEX directives, with only name-brand components being used. The spatial separation of process and handling chamber ensures easy and secure handling and unmatched ease of operation.

Build space from tiny to really big! In LaserCUSING® machines, application-specific 3D parts with enhanced performance profiles are created in a fully automated digital process.

The latest multilaser technology increases build rate tremendously. This opens up new perspectives in terms of cost-efficiency and makes 3D metal printing into the production strategy of the future.

Our head start over the competition is demonstrated by the X line 2000R® as the largest metal machine currently on the market.
We are expanding in new dimensions in a visionary manner and presenting the additive series manufacturing of “Industry 4.0”: digitally networked and automated.

The 3D metal printing factory of tomorrow integrates three essential requirements: Clever digital networking of machines among themselves, automation of processes, and integration into the production environment. Regional print centers can arise around the globe on a distributed basis. Production-on-demand will fundamentally change spare parts logistics. In the fully automated process, metal parts meeting the highest standards are produced with the same level of documentation everywhere in the world.

Holistic LaserCUSING® system concepts already bring about industrial mass production solutions today – with greater speed and cost-effectiveness. A major contribution to value creation, growth, and competitive advantage.
EXCELLENT! ENTHUSIASM IS UNDERSTOOD EVERYWHERE.

From the heart of Germany, we are setting out on a course of expansion. Since 2014, we have been represented by our subsidiary Concept Laser Inc. in the United States (Grapevine, Texas). A branch office in China is being founded. Partners in some 30 countries worldwide provide professional assistance to our customers. Personal contacts accompany and advise in each phase of the project.

Our service and application department will gladly assist you with expertise, advice, and support as a strong partner. We provide the best possible support in person and online or directly on site.

Our enthusiastic staff make this possible. Within just a few years, the workforce grew by 10 times. We take especially good care of our new professionals and emphasize work-life balance in the company.

Our strategy? Live innovation. Be open-minded, stay curious, promote team spirit, and cultivate friendly and congenial collaboration.

With enthusiasm and passion we provide impetus for advancing 3D metal printing worldwide. A great deal of recognition and numerous awards confirm our commitment:

Products from Concept Laser are an excellent choice!
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Production
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Equality notice
If reference is made only to the female or male person for better readability, this is to be understood as referring to both genders.