

# Real-Time IoT in Additive Manufacturing

PILOT PROJECT AIMS TO PRODUCE MORE THAN 10,000 INDIVIDUAL AND SPARE AUTO PARTS PER YEAR

In March 2019, a consortium of 12 partners from across the additive manufacturing, automotive, research and industrial sectors launched the Industrialization and Digitalization of Additive Manufacturing (IDAM) project. At its core, the project addresses the limitations of laser powder bed fusion (LPBF) AM, including the lack of automation and high associated costs, that hinder the technology's adoption for industrial, serial production in industries such as automotive.

The IDAM project was conceived in order to confront and overcome these challenges. The 20 million euro initiative is partially funded by the German Federal Ministry of Education and Research (BMBF), and brings together 12 partners: GKN Powder Metallurgy, BMW Group, Aconity GmbH, Concept Reply GmbH, Myrenne GmbH, Intec GmbH, Kinexon Industries GmbH, Volkmann GmbH, Schmitz Spezialmaschinenbau GmbH, Chair for Digital Additive Production DAP, Fraunhofer Institute for Laser Technology ILT and Technical University of Munich, Chair of Metal Forming and Casting.

Each partner contributes in its specific area of expertise to help establish a pilot line for a fully automated, industrial-ready additive production. The goal of IDAM is to build two pilot lines—one at GKN PM's factory in Bonn, and the other at BMW Group's facility in Munich—to demonstrate a digitalized and IoT-driven production line for 3D printing automotive components. When these pilot lines are up and running, the IDAM consortium aims to produce over 10,000 individual and spare parts per year, as well as at least 50,000 mass-produced components. One of the key points that set IDAM apart from other AM automation concepts is that it is end-user-based rather than supplier-based. The IDAM pilot line will encompass an open architecture, that can be adapted for any LPBF system.

GKN PM is a key member of the IDAM consortium and a host to one of the two pilot lines at its facility in Bonn, Germany. The company is leveraging its extensive knowledge of conventional powder metallurgy serial production as well as its experience with metal additive manufacturing to create an industrialized, automated factory setting.

The modular approach within IDAM enables as well that further AM technologies within GKN's portfolio (e.g. Metal Binder Jetting, Multi Jet Fusion) will be digitally connected and benefit from the new developments. Within the framework of the IDAM project, GKN PM acts as a critical bridge between the various project members, translating process development concepts from the academic side to application-focused strategies on the industry side. GKN PM and BMW also provide vital insight into the qualification process and support the SMEs who are developing the pilot line modules.

"We are now halfway through the IDAM roadmap," says Sebastian Blümer, Technology Manager Laser AM at GKN

Powder Metallurgy. "Currently, we are in the phase of checking the concepts of the pilot line modules. We are preparing to receive the remaining modules by the beginning of 2021, which will give us about a year to test and qualify them. In other words, the digital architecture is almost finished, and we are now looking to the prototype phase. We are eager to get the pilot line modules connected with our internal systems to simulate the IDAM workflow."

Over the past year, the IDAM consortium partners have made progress in the creation of the digitalized AM pilot lines by tackling a range of topics, including pre-printing, printing, and post-printing phases. Among the most critical issues addressed at this stage of the project is the creation of a digital architecture, including digital standards and an IoT-connected overview of the AM process chain. A digital architecture that



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covers the entire AM process is critical to ensure communication between AM process chain modules and achieving the reliability required for serial production.

One of the biggest hurdles in adapting the digital architecture is creating a comprehensive solution for various LPBF systems that all vary in their interfaces to the process chain. The diverse nature of LPBF systems on the market makes it challenging to implement an interface that is both reliable and flexible. GKN PM is currently validating a recently acquired EOS M300-4 quad-laser system, testing out multi-laser exposure strategies, and pushing the system's productivity. The new metal AM system was installed at the company's Bonn facility in May 2020.

As the IDAM project nears its halfway mark, one of the most notable advancements is the identification of a metal powder material by GKN PM that demonstrates excellent potential for industrialization in the automotive market. The material is DP 600, a dual-phase steel whose mechanical properties can be tuned using heat treatment methods.

The gas atomized material, which is now being validated

on the EOS M300-4 system, demonstrates an elongation rate of 13% (as-built) up to 22% (with heat treatment), and a tensile strength of 950 MPA (as-built) up to 700 MPA (with heat treatment). These tunable properties make the dual-phase steel material a good candidate for several structural automotive applications, as well as for other applications in the industrial market. Further potential to reduce cost per part can be achieved by using water atomized powders for future applications. ([www.gknpm.com/en/Utilities/connect-with-an-expert/](http://www.gknpm.com/en/Utilities/connect-with-an-expert/))

## McKernin

### JOINS MILAN'S MACHINING & MANUFACTURING AS GEAR SALES DIRECTOR

Milan's Machining & Manufacturing Co Inc. welcomes **Michael McKernin** as the gear sales director. With 35 years in the gear industry, McKernin brings experience in all aspects of gear engineering, manufacturing and sales.

"We are really excited to have Mike on board," said Marko Pecharich, president of Milan's Machining and Manufacturing. "His experience in the gear industry will open new opportunities and provide our company with additional insight into the gear industry."

With a degree in manufacturing engineering technology from Bradley University, McKernin has been involved in all aspects of metalworking and manufacturing, with a strong emphasis on gear manufacturing. McKernin currently serves as the chairman of the Business Management Executive Committee (BMEC) for the American Gear Manufacturers Association (AGMA) — where he oversees the managerial and educational programs along with committee activity for AGMA members in manufacturing.

"I am really excited to work with the whole group at Milan's. The opportunity to help with the growth and expansion of a forward-thinking gear company is a perfect fit for my skill set," McKernin said. "Milan's has been involved in gear manufacturing for decades and recently acquired Allied Gear to open the door for rapid expansion."

With McKernin joining the team, Milan's recently joined AGMA to further promote and capitalize on critical industry resources. As members of AGMA, they will work along side other gear manufacturers to promote growth and diversity in a global supply chain for the power transmission industry and will continue to be leaders and stewards for the future of manufacturing while sharing a robust set of capabilities for customers. ([www.milansmachining.com](http://www.milansmachining.com))



## Solar Atmospheres

### CELEBRATES AS9100 ANNIVERSARY

Solar Atmospheres of Western PA celebrated thirteen years of AS9100 certification. This new era is intricately woven with COVID-19, populous instability and intertwined with increasingly stringent standards, revised industry specifications, and customer requirements.



Even with these new complexities, Solar passed this milestone for more than a decade of accreditation without any major findings. The live audit, which was conducted for the very first time, used a combination of email, telephone and video conferencing to grade Solar's QMS, on recent aerospace work. The comprehensive review addressed recent events as risk and Solar's response as effective.

Melissa Gruszka, quality manager and recent edition to Solar Atmospheres of Western PA, states, "We have a great team that can pull together, under any circumstances, to get work done. Solar maintains the highest standards by keeping safety, quality, and efficiency in check and our customers in the foreground. Solar exercises a proven value system, integral to society, and empowers people, shaping a bright future." ([www.solaratm.com](http://www.solaratm.com))

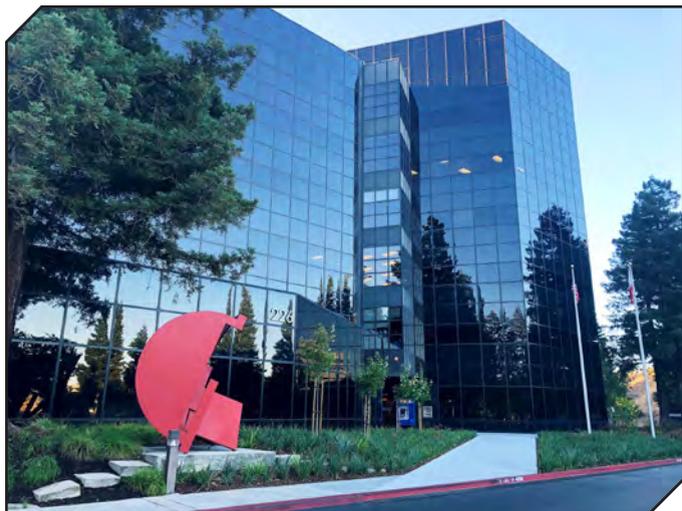
## Heidenhain Corporation

### OPENS EXPANDED WESTERN U.S. HEADQUARTERS

Heidenhain Corporation announces the opening of its newly completed West Coast headquarters. This includes the expansion of its executive, sales and technical support offices, as well as demo facilities in San Jose, CA.

"We completed this project as part of our commitment to continued growth objectives and support of our machine tool, position encoder and stage systems business partnerships with San Francisco Bay Area and western territory customers," said David Doyle, Heidenhain Corporation President and CEO.

This new development includes the consolidation of Heidenhain's Fremont, CA, technical support operation into Heidenhain's expanded San Jose business center offices.



“Proximity to the innovation centers and high-growth markets is important to our long-term future, including within semiconductor capital equipment, life science, automotive, robotics and general automation segments,” said Doyle.

Other recent western territory additions include the opening of Heidenhain offices in the Seattle, Denver and Houston areas. Heidenhain’s John Thormodsgard is newly appointed as Western Sales Director.

Heidenhain’s increased Bay Area presence is another important and measured step in the long history of growth of the Dr. Johannes Heidenhain GmbH group of companies. In North America, Heidenhain Corporation represents nine brands offering various motion control product technologies: Heidenhain, Acu-Rite, Etel, RSF, Numerik Jena, Leine Linde, AMO, IMT and LTN.

“Most importantly, we value the industry relationships that we continue to develop and we welcome our customers to visit us at any of our U.S. office locations, as well as our headquarters in Traunreut, Germany, as soon as conditions allow,” added Doyle. ([www.heidenhain.us](http://www.heidenhain.us))

## Furnaces North America

GOES VIRTUAL FOR HEATTREAT EXPOSITION



Due to COVID-19, FNA 2020 has transitioned into a virtual conference and trade show. This development provides a great opportunity for the heat treat industry to bring the latest technical training, trends, and emerging technology right to their employee’s desktop. Registration for attendees will open August 1. Don’t miss this opportunity to see the latest trends, technology and equipment right from your computer by your entire team. FNA Virtual will feature 3-live webcasts panel discussions, 35 technical sessions and top suppliers in every facet of heat treating. The event takes place September 30–October 2.

([www.furnacesnorthamerica.com](http://www.furnacesnorthamerica.com))

## Gleason

OFFERS STADTFELD’S LATEST BOOK: EDRIVE TRANSMISSION GUIDE

Today Gleason has four major concepts for high reduction transmissions which are ideal for electric vehicles and hybrid cars. Gleason has begun to work with several electric vehicle OEM’s on the integration of these new concepts into production vehicles.

This book *eDrive Transmission Guide* was written and published by Dr. Hermann J. Stadtfeld to give an overview of the most popular conventional eDrive solutions and to present the new Gleason developments to the automotive and transmission manufacturing industry. The book also intends to inspire mechanical and electrical engineering students with the new Gleason concepts in order to gain their interest in the many new tasks engineers will encounter in future concepts of electrically propelled automobiles, challenged by a healthy mix of Battery Electric Vehicles and Hybrids which generate their electricity “on the go.”

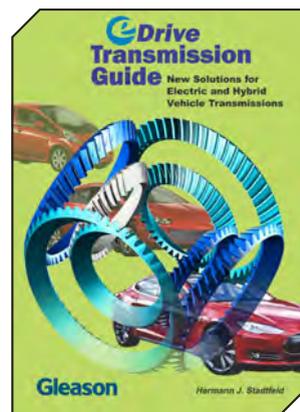
In order to make this book readily available for every interested automotive engineer, the main publication media format is as an e-book. The e-book is available for purchase online. However, it is also possible to read the e-book on the Gleason website. For those with a fondness for having a bound book as reference in their office book shelf, a hard cover version of this book is available as well.

*eDrive Transmission Guide* covers 11 topics on 220 pages and has 153 figures — which provide a better understanding and easier retention of the covered material.

The content is divided in 6 parts:

- Introduction to Electric Vehicle Transmissions
- Automotive Drive Concepts
- Super Reduction Hypoid eDrives
- Reversed Pericyclic Transmissions
- Double Differentials as Ultra-High Speed Reducer
- Psychoacoustic applied to eDrives

([www.gleason.com/en/products/training/gleason-library-fundamentals-and-advanced-gear-technology](http://www.gleason.com/en/products/training/gleason-library-fundamentals-and-advanced-gear-technology))



# Haas Multigrind

## MOVES OFFICE TO NORTH CAROLINA

Haas Multigrind LLC, a provider of CNC grinding centers, celebrated the relocation of their US office from Indiana to Charlotte, North Carolina on August 1st, 2020. The 6,500 square feet facility includes office, classroom and conference space, a machine demonstration area and spare parts warehouse.



“This move represents an exciting development for Haas Multigrind, and it demonstrates our strong commitment to existing and prospective customers and strategic partners in the Americas,” said Harry Schorner, general manager of Haas Multigrind LLC. “We are pleased that the new location will enable us to better serve our customers, with better proximity to a major airport and better access to talent to fill key positions within the organization.” ([www.multigrind.com/en](http://www.multigrind.com/en))

# Schunk

## ANNOUNCES NEW VICE PRESIDENT OF TOOLHOLDING AND WORKHOLDING SALES

Schunk is proud to announce the promotion of **Allan Logan** to vice president of sales, toolholding and workholding.

Logan has more than 20 years of territory sales and team management experience in the metalworking industry. He started his career in account management for cutting tools and abrasives before holding various roles as sales engineer, aerospace industry specialist, and



regional sales manager.

Logan quickly rose to the challenge of exceeding sales goals and leading focused sales teams in the field of manufacturing and machining solutions. Since joining Schunk in 2018 as the director of sales for Eastern US, Logan has managed a group of regional sales managers across 20 states. His team has been responsible for incremental sales growth in the last two years.

([www.schunk.com](http://www.schunk.com))

# Michigan Metrology

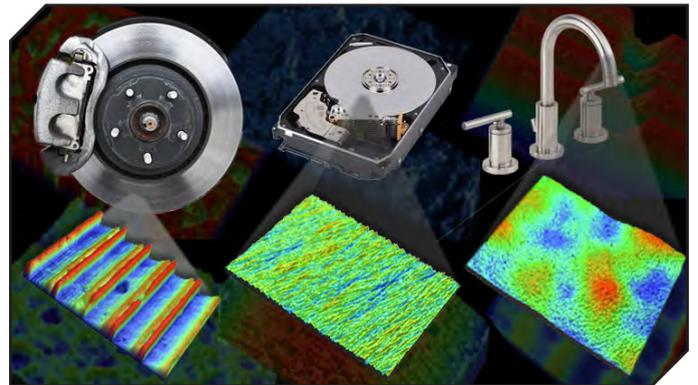
## OFFERS ONLINE COURSES IN SURFACE ROUGHNESS, TEXTURE AND TRIBOLOGY

Michigan Metrology, experts in solving problems related to surface texture, wear, finish and friction, are now offering courses in surface texture analysis, friction and wear in online formats.

“These courses are designed for scientists, engineers and technicians working in medical devices, automotive, aerospace, materials, polymers, and other fields,” said Don Cohen, Ph.D., who presents the courses. “We have been holding classes in surface metrology and tribology for over fifteen years. Presenting the classes online will make this fundamental material available to a wider audience of people who cannot easily travel to attend the training in person.”

The Surface Roughness/Texture and Tribology courses cover measuring roughness, waviness and form, an introduction to surface measurement instruments, an overview of data analysis techniques and tools, fundamentals of lubrication and more.

A 4-hour version of the class is available via the online training site Udemy. This version of the course offers a thorough introduction to the topics above in a self-paced, downloadable format.



Dr. Cohen will also be hosting a 2-day class, live online via Webex, in a professional learning environment. The class offers a deep dive into the course topics, with access to the instructor for real-time questions about how the material applies to particular applications.

As a third option Dr. Cohen presents the course in an online format customized for individual companies, as a cost-effective means to train multiple team members dispersed across the country or world. ([www.michmet.com/classes.htm](http://www.michmet.com/classes.htm))