

Press Release

FORMNEXT 2019

Digital Solutions Empowering Production: BigRep Showcases the Powerful Applications of Industrial AM in a Fully 3D Printed Autonomous Electric Podcar.

BigRep is also presenting industrial application prototypes with partners Bosch Rexroth, AIRBUS and Dassault Systèmes / Introducing four new engineering-grade, certified materials – PLX, PET-CF, PA6/66 and BVOH in cooperation with BASF / Presenting innovative, large-format 3D printers PRO and STUDIO G2 / BigRep booth hall 12.1 / C121

Berlin/Frankfurt am Main, 19 November 2019 - BigRep, the global leader in large-scale 3D printing and additive solutions, today at *formnext*, the world's leading exhibition for additive manufacturing, unveiled a **fully 3D printed, autonomous electric pod car, LOCI**. The groundbreaking design prototype presented is an exciting showcase for a whole range of industrial applications in Additive Manufacturing (AM) today – from rapid prototyping and design to functional end-use transportation created by large-format 3D printers with engineering-grade materials.

The LOCI prototype, which also premieres **BigRep Part DNA™** technology, is the centerpiece of BigRep's full range presentation of digital solutions empowering production, including industrial application prototypes (Bosch Rexroth / AIRBUS / Dassault Systèmes), BigRep new 3D printers such as the **STUDIO G2** and **PRO** and BigRep's **four new advanced materials PLX, PET-CF, PA6/66 and BVOH** for large-format AM.

“We are excited to be once again leading the way in utilizing the full potential of AM applications across industries by presenting the LOCI prototype and other industrial prototypes with, Bosch Rexroth, AIRBUS and Dassault Systèmes,” said BigRep Managing Director Martin Back. “With our large-format 3D printers and new engineering-grade materials, developed together with BASF, we are expanding our additive systems’ capabilities to enable the advanced applications and efficient workflows that create added value for businesses. Taken together, our AM solutions are truly empowering industrial production in aerospace, automotive, rail and many other industries.”

LOCI: The 3D-printed evolution of personalized, sustainable mobility

Taking center stage at *formnext*, the LOCI prototype is a fully **3D printed autonomous electric podcar**, specifically designed as a “last mile transportation solution” in urban environments: airport and train station departures, daily work commutes, campus transport, and local deliveries. LOCI has been envisioned and designed by NOWLAB, the innovation consultancy at BigRep.

“LOCI is more than a vehicle, it’s the evolution of personalized mobility,” said NOWLAB co-founder and BigRep CIO Daniel Buening. “LOCI is an affordable solution for urban transportation, harnessing the agility of AM while also demonstrating the cost-efficient advantages of 3D printing for sustainable AM such as manufacturing personalized products on-site and on-demand.”

Thanks to the flexibility of Additive Manufacturing, unique prototypes or small batches of LOCI can be locally produced on demand without added costs, supplier dependence or long lead times. This eliminates the need for large warehouses and remote production facilities while simplifying logistics and reducing transport. All of this leads to a more sustainable AM production process. Production volumes can be easily upscaled with a fleet of BigRep printers.

Developed using parametric modeling, LOCI utilizes the full potential of AM and its limitless flexibility. The podcar's design can be easily customized for a given location or application; adjusting handling purpose, materials, structural properties, special tires for different terrains, custom branding, and integrated solar power.

In fact, the *formnext* showcase captures three different LOCI iterations: The **Berlin LOCI** model presented is a single-person campus commuter with a sleek design, touch screen media display, surround sound audio, wireless phone/device charging, integrated LED lighting, TPU airless tires, and embedded BigRep Part DNA technology. The **San Francisco LOCI** is a render concept version for urban commuting. Its narrow body can maneuver in traffic, a single right-side door lifts up to cover exiting passengers from rain, and it has two passenger seats. Finally, the **Dubai LOCI** is a render concept version for airport transportation with a high-end luxury feel, solar panels, space for luggage, and rugged tires for desert weather.

LOCI's **BigRep Part DNA™** technology is based on NFC chips embedded into the 3D printed parts. This chip can be scanned using a mobile device to identify the part. In the future it can be additionally integrated with sensors to monitor part status and provide maintenance or replacement information – simply scan the part and print a replacement.

Built with just 14 unique parts, LOCI measures 85cm x 146cm x 285cm, with the largest part measuring 1000 x 600 x 700 mm. All parts were printed with a BigRep PRO, BigRep Studio G2, or BigRep ONE additive system. The pod showcases the possibilities of 3D printing and engineering-grade filaments for industrial manufacturing: The body was printed with BigRep's PRO HT, for the airless tires designers opted for TPU, the bumpers were created with PLX, and beams and joints with PA6/66.

Industrial 3D-printed prototypes: Making manufacturing more efficient

In addition to LOCI, BigRep will also present a set of fully 3D-printed prototypes for industrial applications, developed by NOWLAB in cooperation with its industry partners and presenting cost- and time-efficient innovations for Industry 4.0 manufacturing.

The factory of the future requires great flexibility to manufacture customized products and small batches. The **NEXT AGV** (autonomous guided vehicle), an autonomous transport system, developed by BigRep and Bosch Rexroth, are integral to agile, smart production. Contrary to traditional sheet metal molding, the 3D printed Next AGV is manufactured much more efficiently. The base framework of core elements (battery and electronics) are enclosed in a 3D-printed shell that can be easily adapted for flexible industrial applications. Powered by an inductive energy unit running on a power grid, the NEXT AGV can serve as an automated logistics carrier with a load capacity of up to 250 kg. Tools and additional devices such as robots can be mounted onto the platform.

Other key elements of the NEXT AGV are special 3D-printed wheels with two different materials, allowing the platform to perform sideways movements, and an integrated safety feature (Human Detection Antenna), which has also been 3D-printed.

Another BigRep prototype is the **AIRBUS Investment Shipping Case**, a fully 3D-printed solution for delicate equipment transportation. High-quality cases must be certified to transport sensitive equipment, such as aerospace imaging cameras, when they break down or otherwise require maintenance. Traditionally, these are individually manufactured by hand at only a few sites around the world, making their availability and delivery an issue threatening quality and workflow: As a result, wait lists for the containers often exceed two years. BigRep created their solution by designing a template that uses a data-driven process to quickly generate the final, unique design of each container on demand. The cases take advantage of the versatile, dynamic qualities of BigRep's TPU filament, an engineering-grade material that is firm when printed in a thick wall but soft and flexible in thinner compositions – making it highly shock-absorbent. It also enabled a design that can be manufactured as a single piece in an automated process. As a result, the full design and manufacturing process can be reduced to just 60 hours, greatly optimizing the supply chain.

Saving costs: Retrofitted airline seat becomes 3D-printed high-tech comfort

A game-changing prototype presented is BigRep's **Retro Seat**, an original airline seat frame that has been refurbished with AM at NOWLAB and developed in collaboration with Dassault Systèmes, using their 3DEXPERIENCE platform and the industry solution experience "Passenger Experience." The Retro Seat is 50 percent lighter than a traditional airline seat, creating huge benefits for sustainable aircraft engineering and operational costs. The prototype has a fully integrated design, i.e. any bearings or desired electronics, such as inductive charging for wireless smart phone charging, can be integrated during the printing process. The back of the seat's headrest is equipped with both a "Bring your own device" outlet for tablets or other devices and multiple USB ports for passenger convenience. Additionally, the seat offers embedded blue LED light panels for setting the right mood during night flights and the arm rest is equipped with a smart cabinet solution to safely store laptops during take off and landing.

Large-format 3D printers for industrial applications: The BigRep PRO and STUDIO G2

Some of BigRep's additive systems that were used to create LOCI will be present during *formnext*: The **STUDIO G2** and the **PRO** are the company's next-generation German-engineered 3D printers, promising to provide engineers and designers with the ability to create functional prototypes, composite tooling, end-use parts, and small-batch serial production.

BigRep's recently introduced **BigRep STUDIO G2** printer offers unmatched quality and resolution in large-format additive manufacturing. It features a new, fully enclosed and insulated build envelope of 1000 mm x 500 mm x 500 mm, a fast-heating print bed reaching 100°C, and a temperature-controlled filament chamber. Thanks to its dual extruder equipped with two 0.6 mm specialized nozzles, the printer produces detailed results at layer heights as little as 0.1 mm.

Capable of printing with engineering-grade materials, the BigRep PRO will firmly establish 3D printing as an innovative, added value production technology in industries such as automotive, aerospace, consumer goods, manufacturing and more. The BigRep PRO includes the proprietary BigRep MXT®, an exclusive Metering Extruder Technology developed by BigRep, and is equipped with a state-of-the-art Bosch Rexroth CNC motion control system – delivering unprecedented speed, precision, quality, and IoT connectivity to fully integrates with Industry 4.0. The BigRep PRO is specifically designed for 3D printing large-scale industrial parts and features a build envelope of one cubic meter and a large, airtight spool chamber to allow for continuous printing with engineering-grade filaments.

BigRep introducing four new specialized materials for large-format 3D printing

BigRep continues to expand its filament offerings, enabling users to produce large-format parts with advanced, engineering-grade materials. By introducing and supporting four engineering-grade materials – **PLX**, **PET-CF**, **PA6/66** and **BVOH** – that industrial users require, BigRep continues to provide environmentally-friendly and engineering-grade materials to large-format additive manufacturing. These materials are specially designed to take full advantage of our large-format 3D printers' speed, precision and quality, and are the result of combining our continuous, customer-focused experience.

LOCI at a glance

Technical Specs:

- Overall Dimensions: 85cm x 146cm x 285cm
- Number of parts: 14 main parts with additional inserts
- Largest part: 1000 x 600 x 700 mm
- Printed with BigRep PRO, BigRep Studio G2, BigRep ONE

Print Materials: Body: PRO HT / Tires: TPU / Bumpers: PLX / Beams and Joints: PA6/66

Additional Features:

- Electric power / Touch screen media display
- Surround sound audio / Wireless phone/device charging / LED lighting / TPU airless tires
- BigRep Part DNA™ technology

Team Credits:

Co-Founder NOWLAB, BigRep CIO: Daniel Buening

Lead Designer: Marco Mattia Cristofori

Design Team: Mirek Claßen, Lindsay Lawson, Tobias Storz, Angelo Vannicola, Marco Backenhaus

Marketing and Creative: Amir Fattal

San Francisco and Dubai Concept Design: Marco Traverso

For more information on BigRep's debut of new products and technologies, please visit its *formnext* booth (hall 12.1 / C121, Nov. 19-22) or visit www.BigRep.com



About BigRep

BigRep develops the world's largest serial production 3D printers, creating the industry benchmark for large-scale printing with the aim to reshape manufacturing. Its award-winning, German-engineered machines are establishing new standards in speed, reliability and efficiency. BigRep's printers are the preferred choice of engineers, designers and manufacturers at leading companies in the industrial, automotive and aerospace sectors.

Through collaborations with its strategic partners – including Bosch Rexroth, Etihad Airways and Deutsche Bahn – and key investors – including BASF, Koehler, Klöckner and Körber – BigRep continues to develop complete solutions for integrated additive manufacturing systems, as well as a wide range of printing materials on an open-choice source. Founded in 2014, BigRep is headquartered in Berlin with offices in Boston and Singapore. Leading the way in one of the world's key technologies, our multinational engineering teams are highly trained, interdisciplinary and customer-focused.

For additional information, please contact:

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