CIRCULAR MANUFACTURING SYSTEMS PROGRAM (CMSP)

Powered by: **RegioDeal Twente**

The Fraunhofer Innovation Platform for Advanced Manufacturing at the University of Twente (FIP-AM@UT), in collaboration with the regional government and industry partners, has launched the Circular Manufacturing Systems Program (CMSP) to advance sustainable, automated, and efficient production processes. The program strengthens the high-tech manufacturing sector in the eastern Netherlands by promoting circularity across various industries, including energy storage and broader industrial applications.

CMSP focuses on optimising manufacturing through automation, material recovery, and modular product design, fostering collaboration between regional and international partners to drive sustainability and waste reduction. By integrating digital tools and innovative production techniques, the programme enhances efficiency, traceability, and resource management.

A key aspect of CMSP is industrial collaboration. Participating companies gain access to cutting-edge research, technological advancements, and cross-sector knowledge exchange.

Through demonstrators, pilot projects, and training initiatives, FIP-AM@UT ensures that innovations developed within the program are widely adopted, strengthening the region's manufacturing competitiveness and sustainability.

Supported by the RegioDeal Twente, with funding from the Province of Overijssel and the Dutch State, CMSP aims to position Twente as a European hub for advanced manufacturing. The programme stimulates economic growth, attracts talent, and encourages investment in sustainable technologies.

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05_ ELECTRIC SUPERBIKE TWENTE

ElectroCycle
with Electric Superbike Twente

ElectroCycle is a collaboration between the University of Twente, through FIP-AM@UT, and Electric Superbike Twente, exploring new opportunities to **make motor racing more sustainable.** The project targets three key areas: lightweighting components, adopting sustainable materials, and advancing electrification. These efforts align with **UN SDG12 (Ensure sustainable consumption and production patterns**) and **SDG13 - Take urgent action to combat climate change and its impacts.**

Redesigning for Lightweight Performance

The first part focuses on the design and production of the swingarm, a critical and traditionally heavy structural part of the motorcycle. The current swingarm design will be refined using topology optimization, a method that removes unnecessary material while maintaining strength, resulting in a lighter and more efficient structure. The improved structure can bear the applied load cases with the same safety factor. Production will be carried out through additive manufacturing processes such asby Powder Bed Fusion printing technology, which allows for the creation of complex shapes that would be challenging to achieve with conventional manufacturing. The result of this work will be a functional, lightweight swingarm that is validated for racing.

Sustainable Materials for the Tank Cover

The second of these project areas revolves around the design of a mold for the bike's tank cover. In particular, flax fibers will be used to reinforce the part, contributing to a more sustainable choice of materials. Manufacturing the tank cover can introduce challenges in mold design and manufacturing, which are addressed in this project.

Enhancing Electrical Performance

The final area of development focuses on improving the design of the battery connection system, an important step towards further electrification in motor racing. This includes engineering the connector system for efficiency, reliability, and safety in high-power applications. The work also involves designing and fabricating tooling for forming metal components of the connectors, using the 3D printing and CNC machining capabilities at the AMC to produce key tools such as punches and dies.

Together, these work packages combine lightweight design, sustainable materials, and energy-efficient electrical systems, driven by close collaboration between FIP-AM@UT and Electric Superbike Twente to help shape a more sustainable future for motor racing.

Learn more about other CMSP projects on the AMC NU section from InnovatieNU 14th edition!

01_ BattInnovate *with STERN Technologies*

02_ ReLAB *with Riwald Recycling*

03_ ExtraCycles *with Benchmark Electronics*

04_ MoCoSo *with Beckhoff and IMS*

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