IMDEA Materials and Hexagon to develop next-generation metal manufacturing and product design through 10X ICME

LUXEMBOURG – May 20, 2020 – e-Xstream engineering, part of Hexagon's Manufacturing Intelligence division, has announced a partnership with the IMDEA Materials Institute to support the industry's first microstructure modelling for metals within the [10X Integrated Computational Material Engineering (ICME) solution](#).

Integrated Computational Materials Engineering (ICME) is set to disrupt manufacturing as we know it. It is an engineering solution that spans across simulation disciplines and goes one step further in helping to tackle the challenges OEMs face in producing the 'perfect' part, whether that be time, cost or availability of data. It blurs the boundaries between materials engineering, design and manufacturing processes, optimising components through the integration of manufacturing, materials and performance prediction.

Renowned Madrid-based institute [IMDEA Materials](#) will contribute its expertise to improve the accuracy and scope of ICME in modelling metals' microstructure – a largely unexplored area for commercial manufacturing until now. Despite the maturity of metal engineering, most manufacturers do not currently take the material's microstructure into account when building parts, which can severely impact how the part behaves and withstands stress.

With more accurate models, OEMs can improve the quality of their metal components, reduce waste and devise more efficient, connected design and engineering workflows – all while performing the bulk of R&D in simulation to reduce the amount of prototyping and physical testing required. Optimising parts through more effective use of the source material will also help metal suppliers compete with newer materials such as composites and ceramics.

Roger Assaker, CEO of e-Xstream engineering, said: "The breadth and depth of the Hexagon 10X ICME solution is what will help it revolutionise the manufacturing industry. Today, it's driven by polymer-based composites, but with the help of partners like IMDEA Materials – a true pioneer in the field – we intend to apply the benefits of ICME to improve design and innovation using any material that has under-exploited properties and can help manufacturers make better products.

IMDEA Materials performs research into cutting-edge material science and engineering, and is a mark of excellence in material advancement. Its unparalleled insight into the modelling of basic alloys' elasto-plastic behaviour at the crystal level will contribute to metal ICME by improving the Digimat multi-scale modelling that underpins the 10X ICME solution.

Forming and shaping metal parts produces a variety of microstructures across the component, characterised by the grain size, shape and orientation. The integration of IMDEA Materials' models into the 10X ICME ecosystem will equip users with the power to

understand why those structures form, and how they will affect the final part's performance. This intelligence can then be applied to enrich the solution's integrated design, engineering and testing capabilities and help manufacturers make informed choices early in the product's development – for example designing 3D print processes to improve the metal's properties.

Laurent Adam, R&D Director at e-Xstream engineering said: "Under our partnership with IMDEA Materials, we will continue to collaborate to enhance the building blocks for metals ICME. Currently, our R&D is focused on predicting how these advanced metals perform against certain stresses, like creep, as well developing efficient numerical methodologies to account for material degradation."

Ignacio Romero, Director of IMDEA Materials Institute, said: "Until now, ICME has largely been an academic exercise. One of IMDEA's pillars is to collaborate with industry, sharing our knowledge of advanced materials to increase competitiveness and maintain technological leadership, so we are delighted for our results to contribute to the first industrialised ICME solution – an approach our research has shown has great potential to further the manufacturing industry as a whole.

"Our researchers' expertise covers a wide range of simulation techniques at different scales, from the atomic level to the continuum, and is supported by high performance computing capabilities as well as state-of-the-art laboratories for microscopic characterisation and in-situ mechanical testing. We are looking forward to the results of our, Hexagon and e-Xstream's combined competences."

About Hexagon | e-Xstream engineering
Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

e-Xstream engineering, part of Hexagon's Manufacturing Intelligence division, provides Integrated Computational Materials Engineering (ICME) solutions to innovate and optimise product performance using the right materials and manufacturing process for the right application. Learn more at e-Xstream.com. Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 21,000 employees in 50 countries and net sales of approximately 3.9bn EUR. Learn more at hexagon.com and follow us @HexagonAB.

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