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DIGITAL TWIN

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# The future in 3D at Worcester



Exciting times for us all in Worcester: the new Materials Solutions (a Siemens Business) factory launched on 12th December. The team here worked

tirelessly to get the new additive manufacturing facility ready and we were all proud to throw open the doors to welcome customers, partners and colleagues from all around Siemens to see exactly what we can do here. Juergen Maier, CEO, Siemens UK was as inspired as everyone else by our factory. He knows that this is a venture with the potential to change the way we work across the whole of our company. As Juergen said, “At Siemens, we believe in the future of digital manufacturing – it’s the fourth industrial revolution. We want to make sure we are a key enabler and creator of that revolution.”

## Step inside a factory fit for the future

The factory itself is a blueprint for the next generation of Siemens facility design and construction. Architects, engineers and designers collaborated to model the development, production and testing facilities we use here. Using this sophisticated virtual prototype, we customised and refined the building and the workflows operating in it to make our production environment flexible, streamlined, efficient and easy to work in. It’s an approach that we’ll replicate around the business, using what we’ve learned from this project. There’s a futuristic feeling when you walk through the main shop-floor, with over 19 industrial metal printers at work and room for over 50. These are commercial grade machines designed to manufacture high quality , high precision parts from metals to exceptionally demanding specifications. It’s a far cry from the plastic prototyping that 3D printers have mostly carried out to date. These

additive manufacturing machines mean business – in fact they mean industry!

## Making products that are in use right now

So what exactly is our state of the art additive manufacturing facility with all its digital wizardry and futuristic machinery going to do to change the world, for Siemens businesses and beyond? Here are five applications of this game-changing technology that I believe are part of the revolution. They are already possible, already happening right here on the factory floor;

1. One-off, custom-designed components Highly specialised tools, parts for one-off engineering projects and even medical devices can all be produced by additive manufacturing. Digital designs can be customised and adapted for specific applications and produced to a highly controllable quality standard.

Although costs are coming down, it's not yet suitable for mass production: and as the saying goes, just because you can print it, doesn't mean you should.

But through industrialization we will be driving costs down enabling more components to be considered.

2. Automotive, rail and aerospace parts Small production runs are more cost-effective for critical parts that are seldom needed. For instance, in railway trains and aeroplanes, vehicles can be in use for over 30 years, so there's a small but very important demand for some replacement components. But it's expensive to maintain the tools and skills needed for traditional production. In

Erlangen, Germany, Siemens Mobility Division is using 3D printing for exactly that purpose. The process can even lead to technical improvements in the recreated metal or plastic parts.

3. On-demand, on-site parts In remote areas, getting industrial parts to site can be difficult, slowing construction, transport or technology projects. Mobile or satellite additive manufacturing facilities could enable operators to print components on demand from CAD digital blueprints stored in the cloud, rather than relying on logistics to source and deliver them. This principle is already being applied in Siemens Mobility, where the Erlangen facility prints on demand instead of storing stock in a warehouse. In future, Siemens will use 3D printers in its rail depots worldwide to speed up maintenance and repairs for speciality plastic components.

4. Gas turbine Components Today our one of our biggest customers is Siemens Power & Gas. Together with Siemens we are designing new components and developing new processes that will enable the next generation of gas turbines to be even more efficient. A serious focus area is in the combustion area of the gas turbine where components can be designed and produced that simply could be not possible without additive manufacturing. In the near future, many other Siemens businesses will source high specification components from us similarly.

5. Legacy industrial components Using reverse engineering we can create the

model for a “digital twin” and manufacture a replacement part precisely using our industrial printers. The same capability can produce components for machines where cast or machined parts are no longer in production. For example, steam engines or other vintage machines. Old technologies like these may be museum pieces for us, but in other parts of the world they’re still used every day. Colleagues at Siemens Industrial Technology have long been trying to restore two rare vintage Ruston cars which were once manufactured on the site in Lincoln and in the 1920’s. Thanks to Materials Solutions, the steering housing and iconic Ruston imp ornament have been accurately recreated to help complete the restoration.



Juergen Maier summed it up brilliantly in his closing words at our launch event. “If I was graduating again today and there was one place I would have wanted to start as a production engineer it would be right here in Material Solutions in Worcester. Because the applications here are incredibly exciting and quite mind-boggling.”

For more information on the Materials Solutions Worcester 3D printing factory visit: <http://materialssolutions.co.uk/>



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