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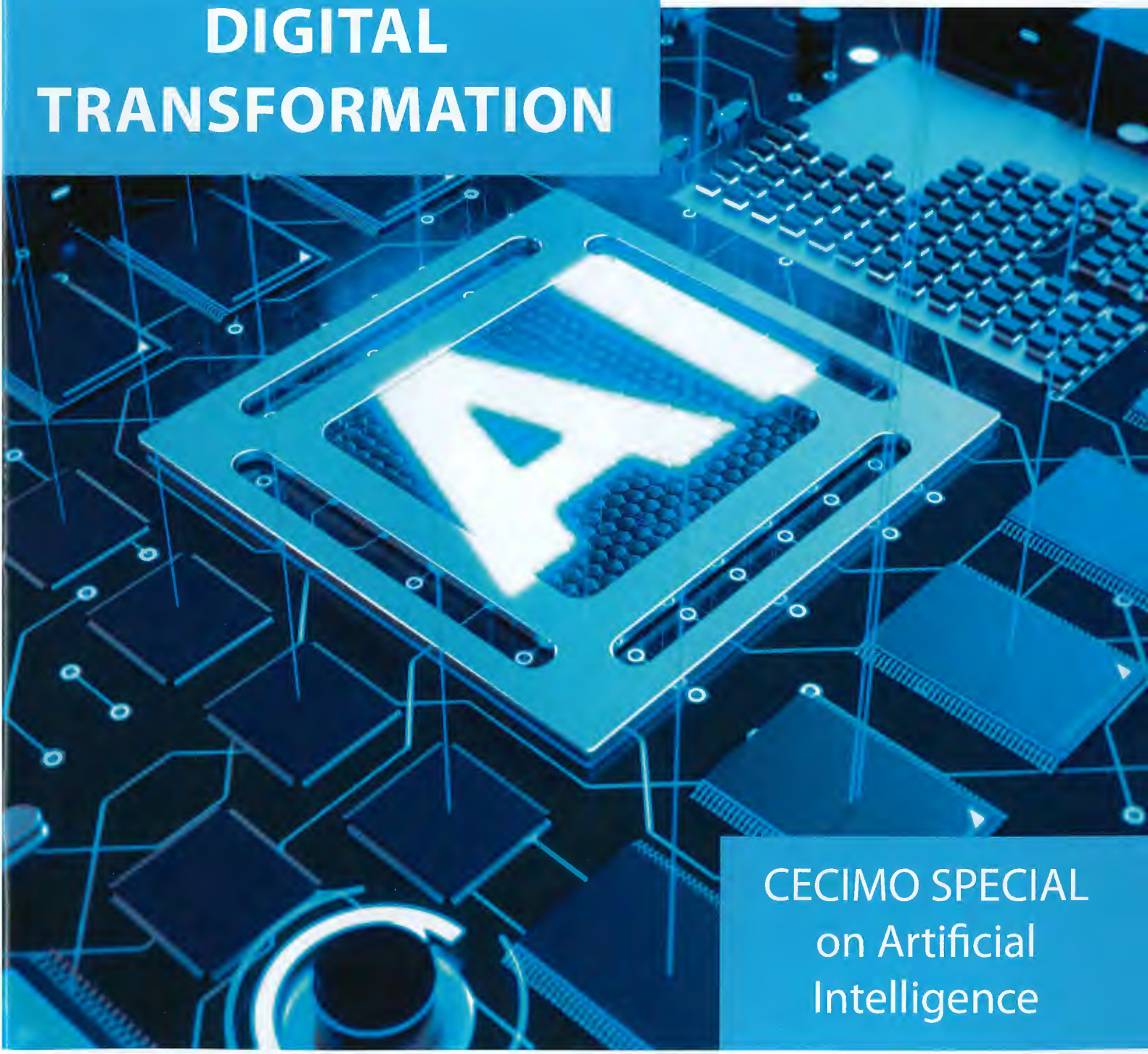
# cecimo magazine

*Where manufacturing begins*

# DIGITAL TRANSFORMATION



## CECIMO SPECIAL on Artificial Intelligence

**Artificial Intelligence**

From science fiction to the factory floor. How do we deploy AI?

**Filling the skills' gap**

How do we develop the right skills to drive innovation?

**New CECIMO President**

CECIMO's priorities by Dr Roland Feichtl, new CECIMO President

# Winner Designs of the Additive Manufacturing Challenge 2018

## Aidro Hydraulics wins with a design of 3D printed hydraulic manifold: a real application for Fluid Power.

by Valeria Tirelli, CEO, Aidro, Winner of the professional category of the Additive World Design for Additive Manufacturing Challenge

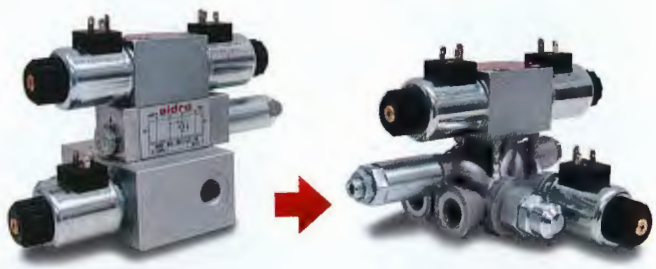
With over 35 years expertise in the field of fluid power, Aidro Hydraulics now uses Additive Manufacturing to create innovative hydraulic solutions with a high level of design freedom and complex shapes. Indeed, Valeria Tirelli, CEO at Aidro, said "we participated in the Additive World Design Challenge because we love the idea of realising the impossible thing and the previously unrealised projects, due to the limitations of traditional manufacturing processes. With additive manufacturing, we can create highly customised hydraulic components that are smaller, lighter, and often with higher efficiency or performance than those built using conventional techniques." This is the case of our winning design of hydraulic system for mobile application.

Aidro Hydraulics started the design for AM thinking about the functions of the hydraulic system and the working features, such as the pressure at 350 bar and the maximum oil flow of 60 lit/min. The traditional components have been completely redesigned to minimise weight and space, with a high level of design freedom. In fact, 3D printing overcomes the limitations of traditional manufacturing by positioning flow channels precisely where they are needed and in a variety of shapes and sizes.

Moreover, because of its ability to build internal features and passageways, additive manufacturing is well suited for the design and manufacturing of hydraulic systems. The internal channels of the hydraulic manifold are optimised for greater flow within a smaller space. Furthermore, the potential for leaks is eliminated because auxiliary drillings (hole plugs) are not needed, as in the CNC milled hydraulics.

Compared to the conventional manifold, the new design has approximately 70% weight reduction and a smaller size (30% reduction), that make it suitable to be integrated into mobile systems.

Aidro Hydraulics won the jury over with the massive applicability and commercial viability of their design of a hydraulic system. ■



from Traditional PRODUCTION

to Metal 3D PRINTING

### FUNCTIONALLY INTEGRATED GEAR AND SHAFT

by Yogeshkumar Katrodiya, Student at the Fraunhofer Institute, Winner of the student category of the Additive World Design for Additive Manufacturing Challenge

For many years we have seen the same design of gear and shaft, which is one of most common industrial part for many sectors. But now it is possible to redesign every industrial product without compromising its functions and taking advantage of design freedom from Additive Manufacturing Technologies. In a gearbox, providing enough lubricant, which is used for cooling the gears, consumes a large amount of power. And also another limitation of the gearbox is heavy weight due to higher number of components.

To overcome this problem, Applying Topology optimisation approach on gear and shaft, with the help of SolidThinking Inspire software, makes the gear and shaft 50% lighter than the original weight. And for providing enough lubricant with low power consumption, the Helix shape of conformal cooling channels introduces into gear and shaft, which drawn fluid from one end of the shaft to the gear teeth. This unique shape of channels helps lubricant to spread around the channels' wall, while the gear and shaft are rotating. The complexity of this part shows what will be possible with Additive Manufacturing Technologies in the near future. ■