

## **World Premier: First Ever 3D Printed Primary Flight Control Component from Liebherr-Aerospace Flown on an Airbus Aircraft**

**April 2017 – On March 30th 2017, Airbus successfully flew Liebherr-Aerospace’s 3D printed spoiler actuator valve block on a flight test A380. It is the first 3D printed primary flight control hydraulic component flown on an Airbus aircraft.**

The valve block made from titanium powder is part of Liebherr-Aerospace’s spoiler actuator and provides primary flight control functions on board the A380. It offers the same performance as the conventional valve block made from a titanium forging, but it is 35 % lighter in weight and consists of fewer parts. The manufacturing process is less complex and extremely material-efficient compared to the traditional milling process: fine titanium powder is melted and built up layer by layer using laser, which reduces titanium waste to a minimum.

Liebherr-Aerospace developed the 3D printed hydraulic component in close cooperation with Airbus and the Chemnitz University of Technology, Germany. The project was partly funded by the German Federal Ministry of Economic Affairs and Energy. The first flight testing of a 3D printed primary flight control hydraulic component shows that Liebherr-Aerospace and Airbus are pioneering the way aircraft systems will be developed and manufactured in the future. Their continuous investment and research into 3D printing now clearly yields fruit.

Heiko Lütjens, Liebherr-Aerospace & Transportation SAS Managing Director & CTO Flight Control and Actuation Systems, Landing Gear Systems and Hydraulics explains: “We still have quite a way to go until we can introduce 3D printing technology on a broad scale in the aerospace industry. All parts of the process chain – from the powder material, over the laser parameters, the post processing, up to the final product – need to be optimized in order to improve stability, maturity, and economic efficiency. Nevertheless, the potential and vision of 3D printing will change the way future aircraft generations will be developed.”

3D printing, also known as additive manufacturing, has the potential to bring about a fundamental change in the aerospace industry. It reduces the manufacturing complexity, wastes less material, and also offers huge advantages regarding the design of components: as additive manufacturing enables the production of complex shapes, 3D printed components consist of fewer parts than conventional components. New innovative products which are lighter in weight, but of the same quality, can therefore be manufactured much faster. The next generation of additive manufacturing technology will influence the design process of components even more. Liebherr-Aerospace estimate that the resulting weight savings at system level could significantly contribute to a reduction of fuel consumption as well as CO<sub>2</sub> and NO<sub>x</sub> emissions of future aircraft.

Liebherr-Aerospace & Transportation SAS is already working on the next generation of 3D printed hydraulic and electro-mechanic components such as a highly integrated rudder actuator. Unlike the conventionally produced version, the 3D printed component does not feature a separate valve block, neither does it have a separate cylinder housing nor an extra reservoir – all parts are built into one monolithic, compact housing.

### **Liebherr-Aerospace is a leading supplier of systems for the aviation industry**

Liebherr-Aerospace & Transportation SAS, Toulouse (France), is one of eleven divisional control companies within the Liebherr Group and coordinates all activities in the aerospace and transportation systems sectors.

Liebherr-Aerospace is a leading supplier of systems for the aviation industry and has more than five decades of experience in this field. The range of aviation equipment produced by Liebherr for the civil and military sectors includes flight control and actuation systems, landing gear, air management systems as well as gears and gearboxes. These systems are deployed in wide-bodied aircraft, single aisle and regional aircraft, business jets, combat aircraft, military transporters, military training aircraft, civil helicopters and combat helicopters.

Liebherr's aerospace and transportation systems division employs around 5,200 people. It has four aviation equipment production plants at Lindenberg (Germany),

Toulouse (France), Guaratinguetá (Brazil) and Nizhny Novgorod (Russia). These production sites offer a worldwide service with additional customer service centers in Saline, Michigan (USA), Seattle, Washington (USA), Montréal (Canada), Sao José dos Campos (Brazil), Hamburg (Germany), Moscow (Russia), Dubai (UAE), Singapore and Shanghai (People's Republic of China).

### **Caption**

liebherr-A380-spoiler-valve-block.jpg

35 % lighter in weight than the conventional valve block: The 3D printed spoiler actuator valve block made by Liebherr-Aerospace - © Liebherr

liebherr-A380-spoiler-actuator.jpg

Spoiler actuator with 3D printed valve block developed and manufactured by Liebherr-Aerospace - © Liebherr

liebherr-integrated-actuator.png

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### **Contact person**

Ute Braam

Corporate Communications

Phone: +49 8381 46 4403

E-mail: [ute.braam@liebherr.com](mailto:ute.braam@liebherr.com)

### **Published by**

Liebherr-Aerospace & Transportation SAS

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[www.liebherr.com](http://www.liebherr.com)