



## Actuators in aviation.

In the aviation industry, a wide range of applications is controlled by actuators. For example, they are used to control and limit velocity and engine speed by adjusting levers and flaps. In many of these actuators, maxon motors can be found.

Actuators convert electrical signals to mechanical movement or other physical variables, such as pressure or temperature and thus play an active role in control systems. For some fields of application, such as aviation, it is important that the actuators achieve very high dynamic forces yet be light weight and fit into small and tight spaces. They also have to withstand ambient conditions such as strong vibrations, heat and cold. The actuators of Sitec Aerospace GmbH are used in most aircraft systems. In other words, these devices can be found in water, oxygen, hydraulic, fuel and air systems. Furthermore, the actuators that are equipped with valves fulfill safety functions by interrupting the flow in case of an emergency. Inside an aircraft, the fresh air is constantly moistened by a humidification system valve.

Sitec aerospace, based in Bad Tölz (Germany) is supplier for the two largest aircraft manufacturers, which are directly or indirectly supplied with actuators and valves by the systems manufacturer. In many aircraft programs of large and small manufacturers, such as the Airbus A350 or Bombardier C series, actuators for various application areas are in use. For safety-relevant aircraft functions, dual-motor actuators are usually used. In aircraft design, important systems are always present two or even three times. This is also the principle followed with the actuators, which are equipped with two drives in case one of the systems has a malfunction. For example, one of these actuators is located at the jet engine and blocks off the fuel supply in the event of fire. This function has to be available under all circumstances and at all times, therefore these actuators are always equipped with two motors.

### High requirements on the technical components

The areas of use for actuators and also for valves in aircraft are very diverse. Accordingly, the actuators and valves have to meet different requirements. For example, heated water valves have to function perfectly at -55 °C and at 85 °C. The motors used have to be equally robust. The most important requirements on the motors are: An optimal volume/performance ratio, low power consumption, temperature resistance, long life, resistance against vibrations and impact, and high corrosion resistance. For the actuators, Sitec uses brushed motors by maxon motor. The maxon DC motors are equipped with powerful permanent magnets. The core of the motor is the globally patented ironless maxon winding. Compared to conventional DC motors, maxon DC motors feature a pure copper winding that rotates without armature iron. As a result to this lightweight rotor, the inertia is very small and the acceleration is very high. There is no magnetic detent; a very positive characteristic for positioning drives, because the rotor can stop in any position. In addition to the electric actuators, maxon motors are also used inside aircrafts. The motors are also part of an electromechanical drive that makes it easier for passengers to close the luggage compartments above the seats.

Customized and robust motors with direct gearing on the shaft and high life span make maxon motors the ideal choice for aviation applications such as those described for Sitec Aerospace.

Author: Anja Schütz, Editor, maxon motor ag

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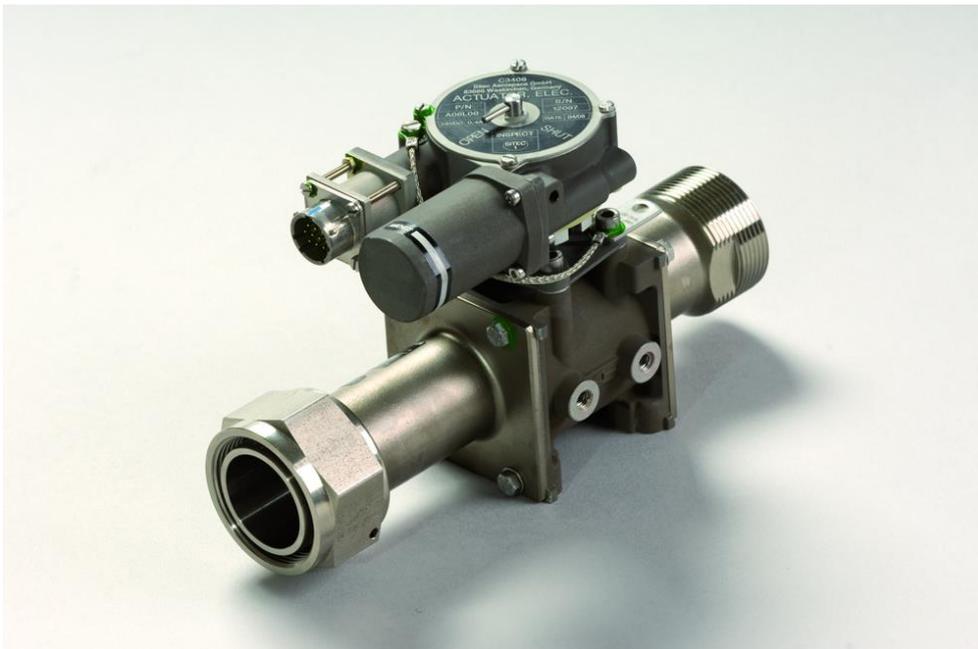


Fig. 1: Sitec Aerospace actuator for aviation. © 2013 Sitec Aerospace



Fig. 2: The headquarters of Sitec Aerospace GmbH in Bad Tölz © 2013 Sitec Aerospace



Fig. 3: Sitec uses maxon's brushless DC motors for its actuators.  
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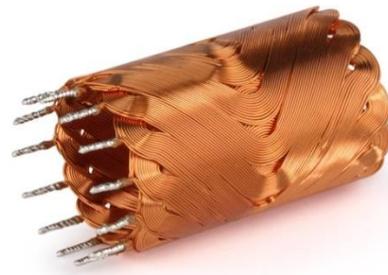


Fig. 4: The core of the motor is the globally patented ironless maxon winding. © 2013 maxon motor ag

For additional information, contact:

maxon motor ag  
Brünigstrasse 220  
Postfach 263  
CH-6072 Sachseln

Telephone +41 41 666 15 00  
Fax +41 41 666 16 50  
Web [www.maxonmotor.com](http://www.maxonmotor.com)

Sitec Aerospace GmbH  
Sitecpark 1  
83646 Bad Tölz

Telephone +49 (0)8041 79577-0  
Fax +49 (0)8041 79577-140  
Web [www.sitec-aerospace.com](http://www.sitec-aerospace.com)