

## ***Testing of Bearing Lubricants for Pointing Applications***

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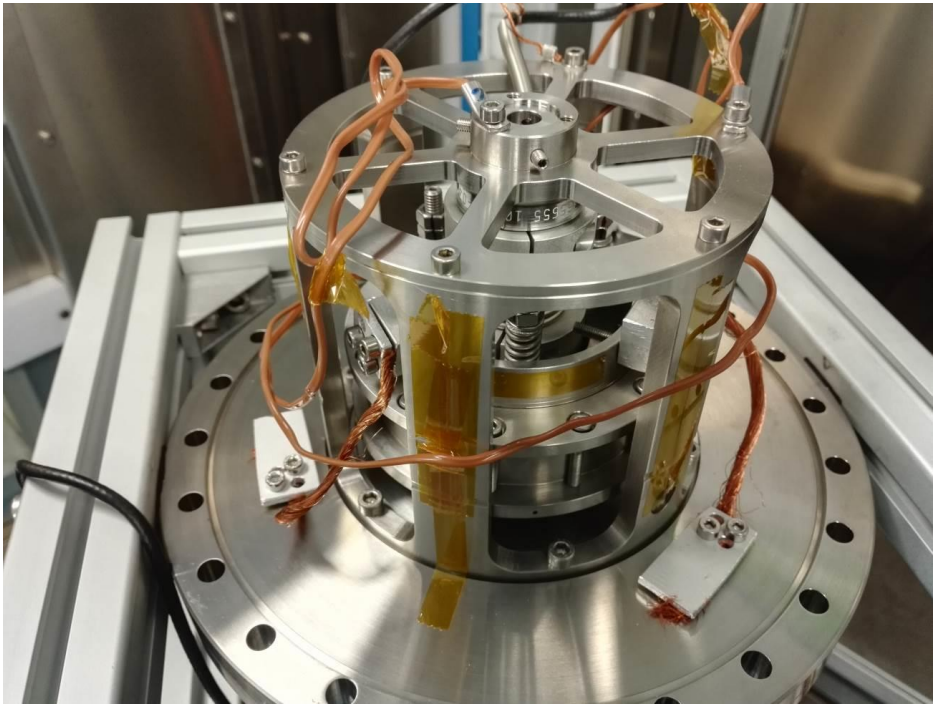
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A development of a compact rotary actuator for an antenna pointing mechanisms with through-hole design was initiated by Honeywell at its Czech site. The initiative aims on offering the ESA and primes competitive actuator completely made of European space qualified components; the activation of cooperation with the Czech academic sector in area of space projects; and establishment of a local manufacturing suppliers chain with the heritage in production for space applications.

The actuator design is based on experience from previous Honeywell efforts to participate as a supplier for ESAs scientific missions. Specific requirement on a high amount of small-angle movements with reversing character introduces the standard design with uncertainties. The most important relates to performance sustainability of bearing lubricant under such boundary conditions for long period of time. A dedicated bearing component level testing was started to support the development and decrease the risk.

The test device was designed in cooperation with Brno University of Technology to run bearings in thermal vacuum environment. Small angle oscillatory motion was introduced to the Pennzane lubricated and a MoS<sub>2</sub> coated angular contact bearings, which friction torque was recorded during the course. The posttest bearing inspection included visual check and the track wear analysis by profilometer. Analyses of recorded friction torque data enabled better understanding of the boundary lubrication effect on bearings operating in simulated space environment. The comparison of the two widely used lubrication approaches helped identify specific behavior of each option with respect to the application and requirements.

The presentation summarizes dedicated bearing component level tests including the results, findings and open questions.



**The Bearing Test Device**