

Within the frame of Cleansky2 project reference CFP08-2018-01, Cedrat Technologies has made the demonstration of a compact, powerful, and reliable piezoelectric actuator for locking applications.

In aerospace, landing gear system needs alternative to unlock / downlock current actuator solution:

- A conventional hydraulic actuator supplied by a centralized hydraulic system, which is expensive, complex, and at odds with the current trend to remove hydraulics.
- Electro-mechanical actuators (EMA) are expensive and tend to be complex, - with multiple gearing stages - and prone to environmental failures/contamination as they operate in a harsh environment during flight.

Piezo solution is then proposed to reduce the number of components within the actuator, increase the system reliability and decrease manufacturing costs.



Fig. 1: Inchworm Piezo motor Demonstrator and video

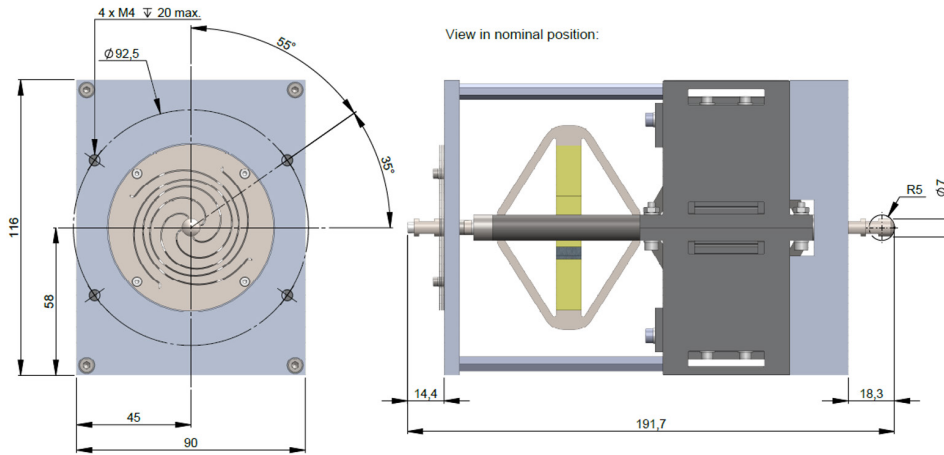
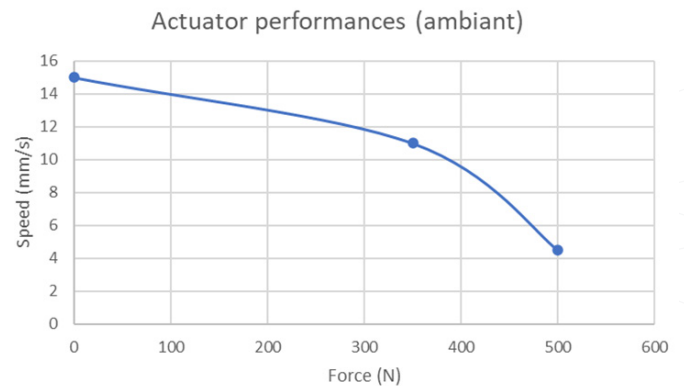


Fig. 2: Inchworm Piezo motor Interface Control Document

The actuator functionalities and performances are assessed on a prototype laboratory to **achieve a TRL4 demonstration:**

REQ.	PERFORMANCES
No load speed	>15 mm.s ⁻¹
350N Loaded speed	>9 mm.s ⁻¹
Stall force	500 N
Stroke	>15mm
Thermal environment	-55 ..+ 70 °C
Parasitic motion	< 25 μm on perpendicular axis
Mass	2.2 kg
Volume	190x116x90 mm

Table 1: Tested Performances and graph



THIS PIEZO MOTOR DEMONSTRATED A POWER TO MASS DENSITY AMONG THE TOP ONE IN THE WORLD.