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## Design of an inchworm actuator based on a shape memory alloy wires

The presentation introduces a novel shape memory alloy (SMA)-based inchworm actuator that offers unlimited displacement, in contrast to traditional SMA actuators, which only provide a limited displacement of 1-2% of the length of the shape memory component. The inchworm actuator concept, inspired by the locomotion of an inchworm, facilitates larger displacements through adding up incremental movements. The prototype design features two clamping actuators linked by a feed actuator and measures 74 mm in length, 19 mm in width, and 12 mm in height, theoretically allowing for infinite displacements, constrained only by the feed rail and fatigue. The actuator achieved a maximum positioning speed of 10 mm/min, with a step size of 1 mm and a positional accuracy deviation of 2%. This novel SMA inchworm actuator demonstrates considerable advantages over existing technologies, including a broad range of applicable forces and cost-effectiveness. The presentation will discuss the actuator's design, experimental results, and future optimization directions.