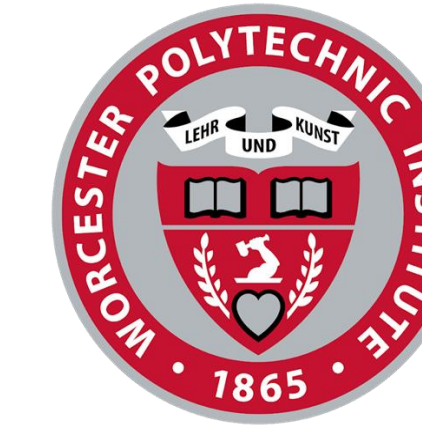


# SCREAM 3.0: Super-elastic Continuum Robot for the Treatment of Laryngeal Tumors

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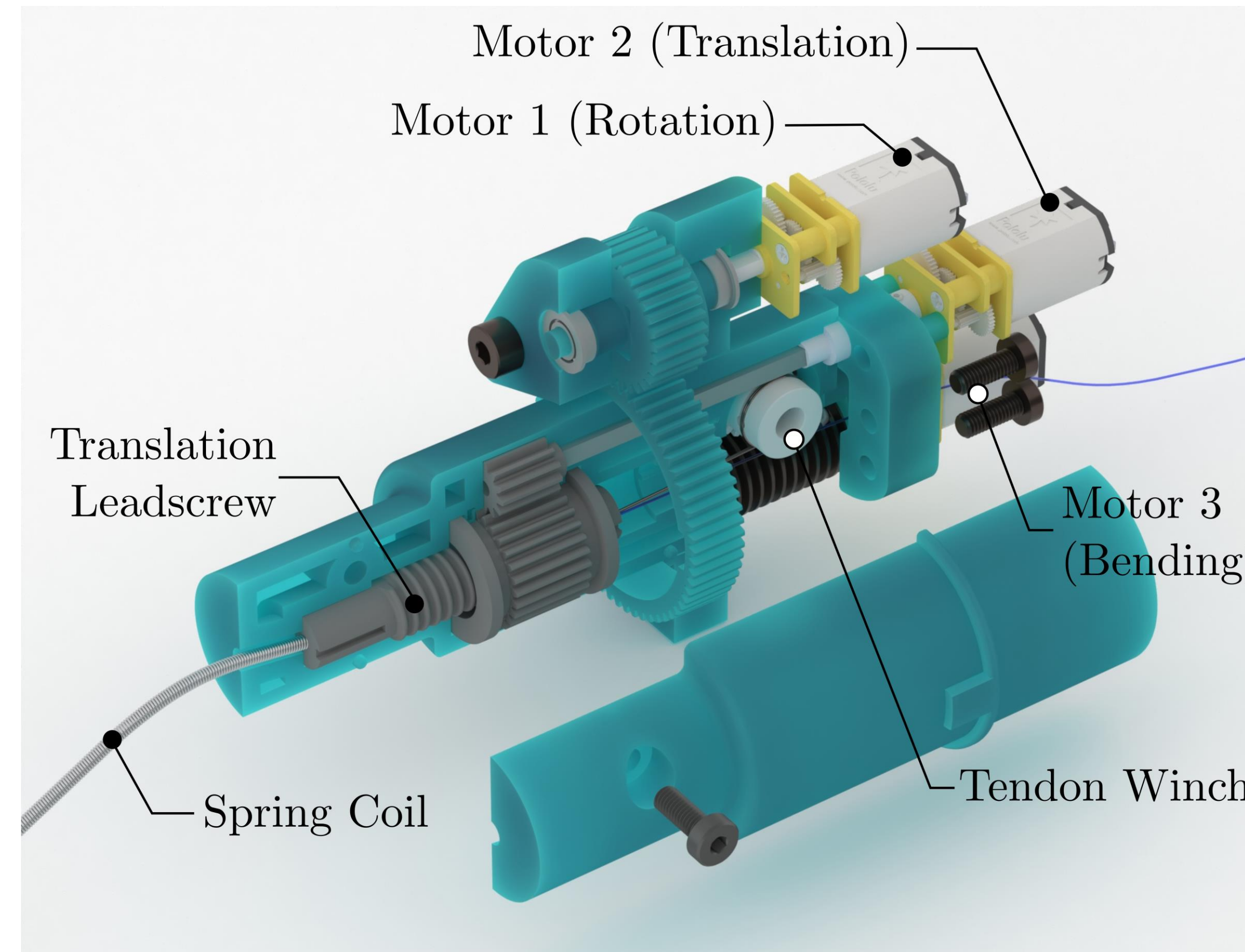
## Background

Minimally-invasive endoscopic procedures are convenient, economical alternatives for treating medical conditions that usually require traditional surgery, such as laser removal of laryngeal tumors

Available surgical instruments for endoscopic procedures have limited articulation, making some tumor locations impossible to reach. Aiming the laser fiber simultaneously moves physicians' field of view, making the procedure disorienting and sometimes causing the endoscope camera to be completely obscured

We propose developing a miniaturized continuum robot that enables independent steering of the laser fiber. This increases maneuverability of the endoscopic laser and decouples the motion of the laser fiber and the endoscope's camera

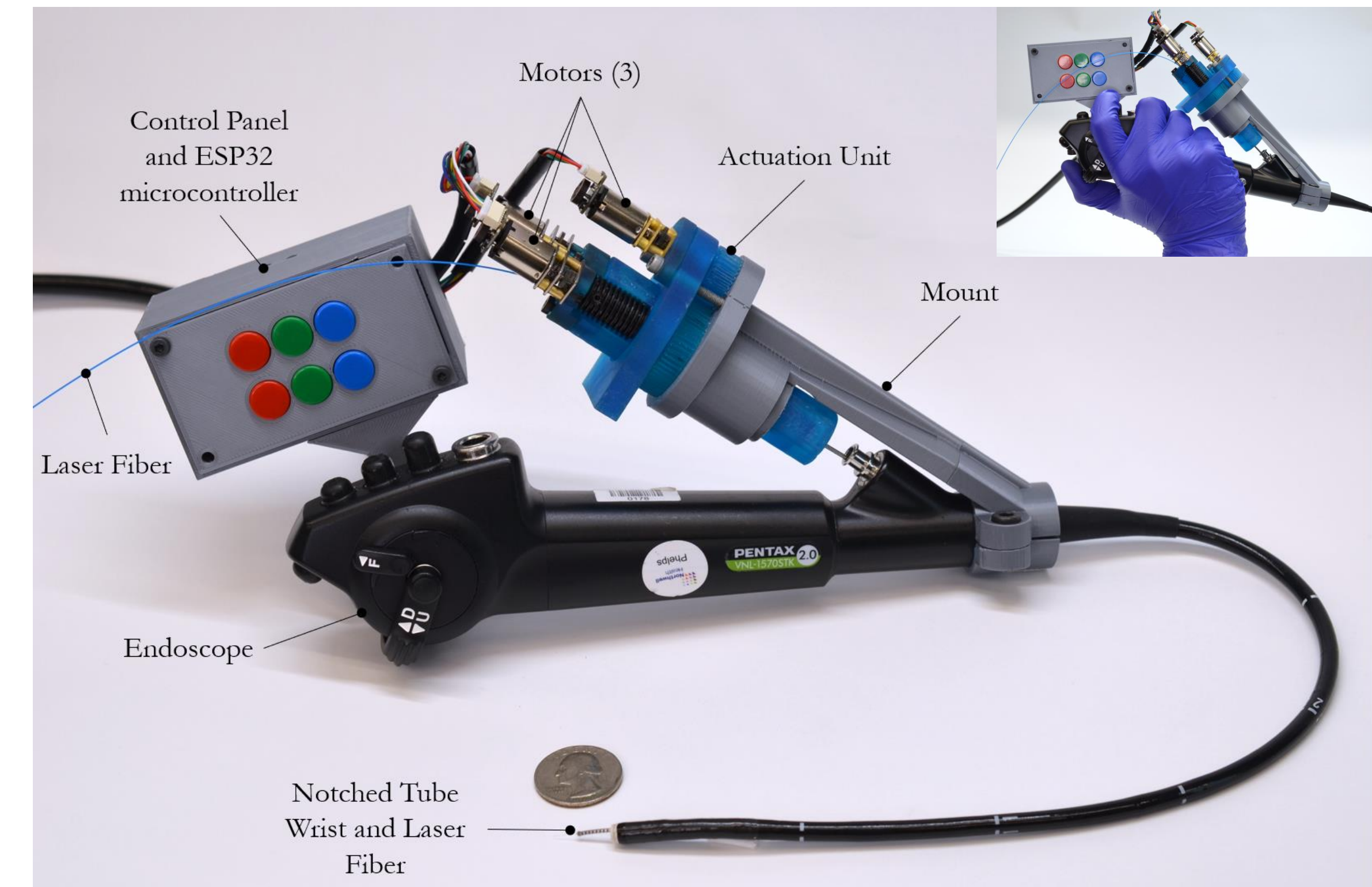
## Actuation Unit



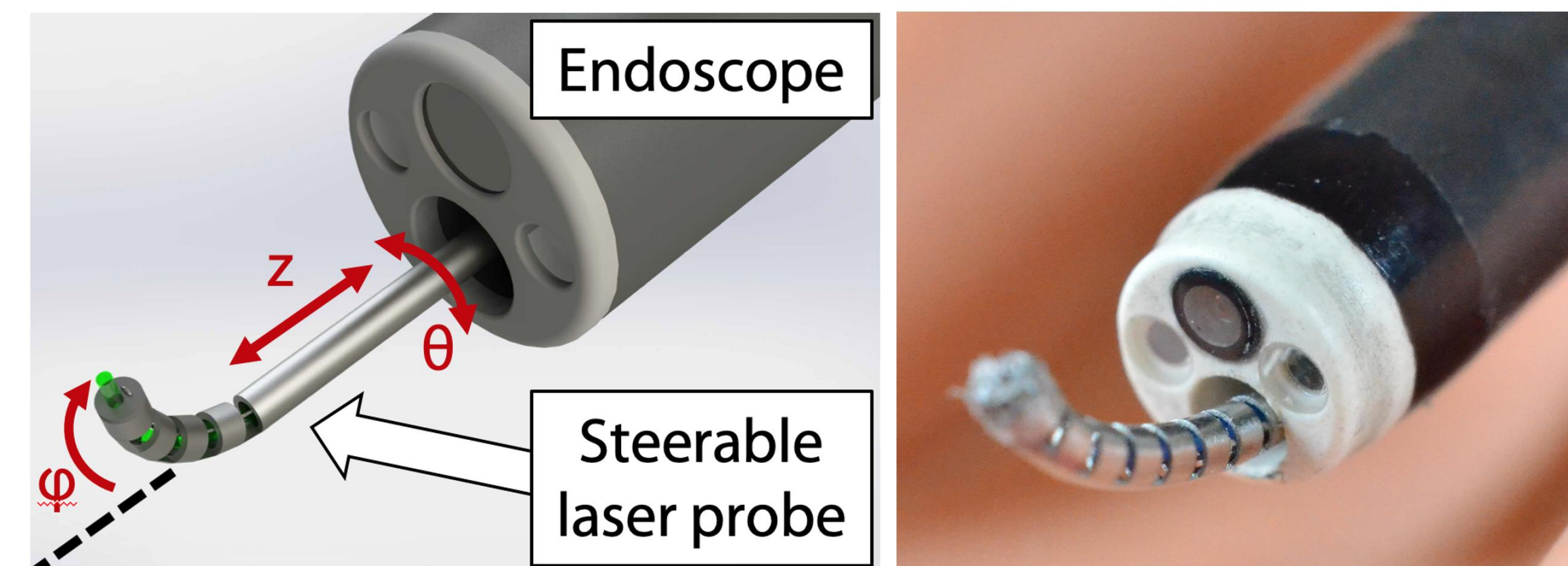
3 DOF Control: Compact actuation unit enables distal tip bending, rotation, and translation of laser fiber

## Integration

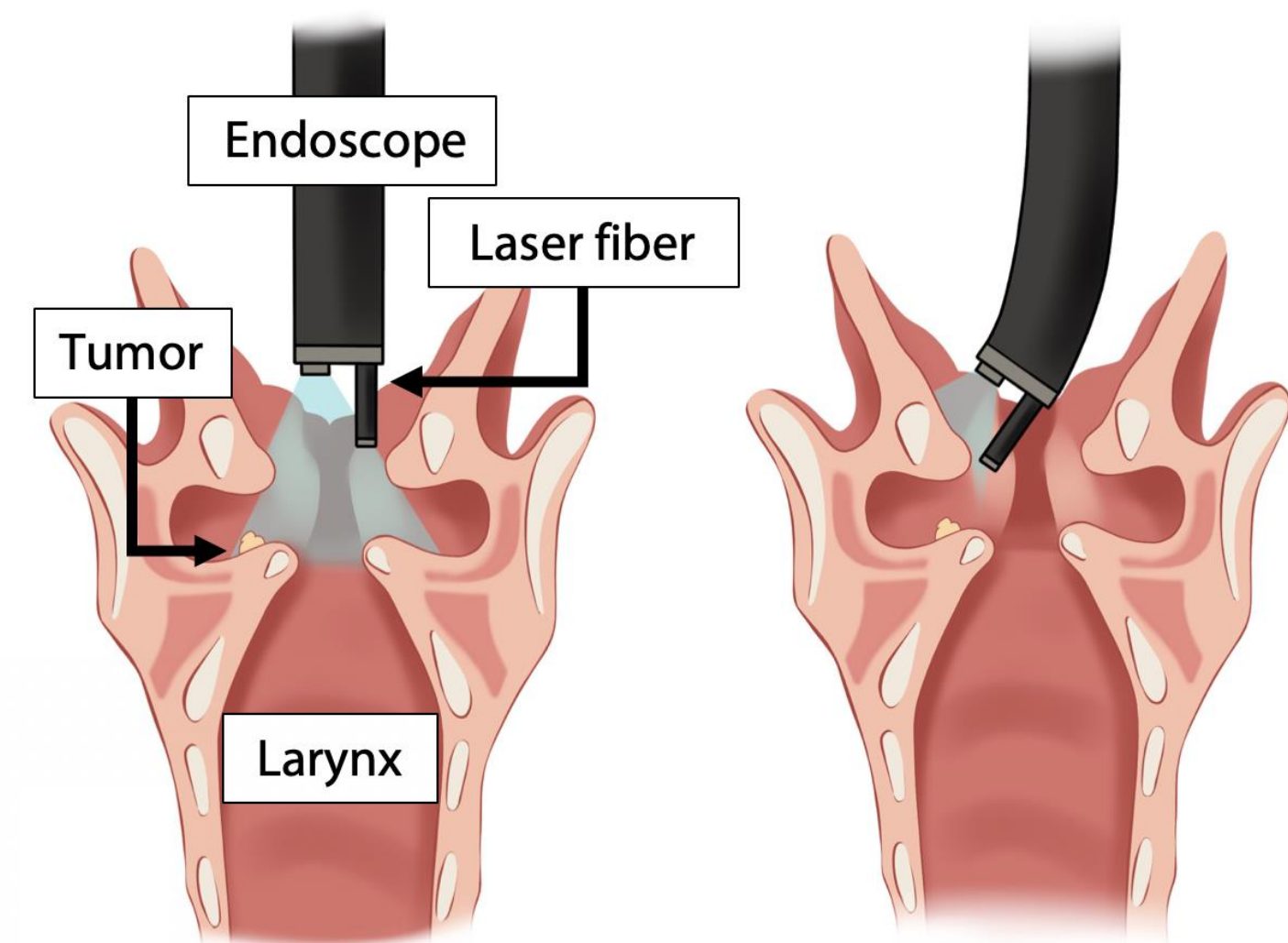
Direct integration of the actuation unit and button panel into the existing surgical workflow is possible due to the compact and lightweight design (130 g with motors)



## Notched Tube Continuum Wrist



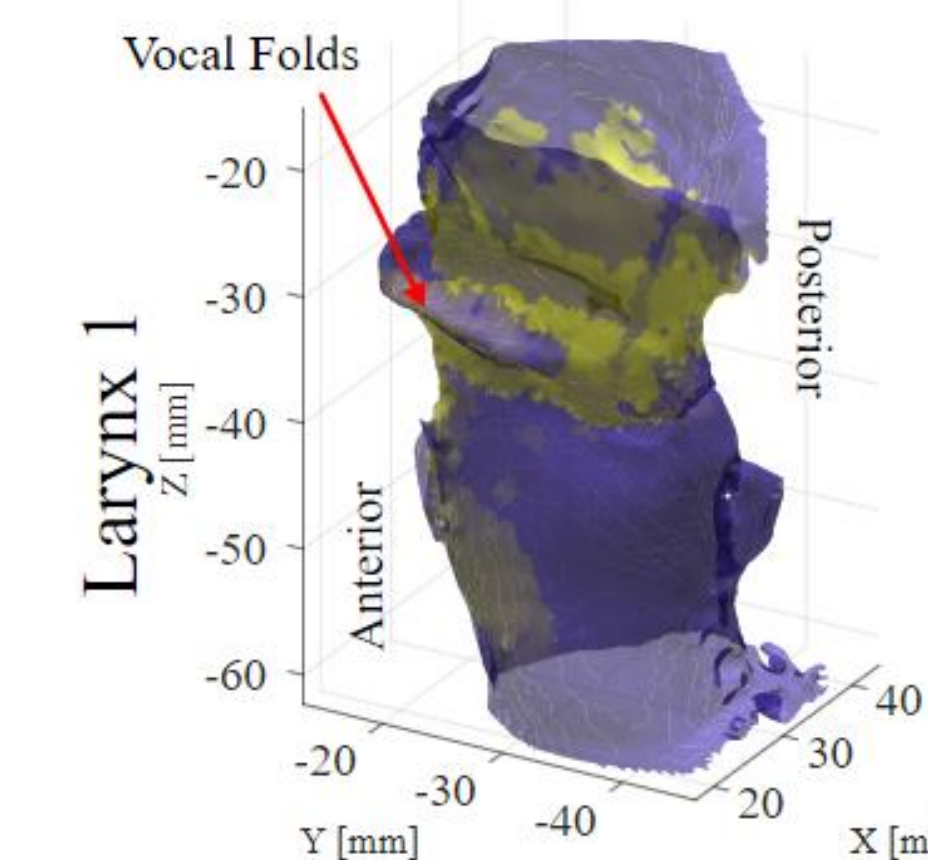
1.1mm diameter notched tube enables bending of the laser fiber in small radii, increasing visualizable surface area and eliminating gaps in treatable tissue



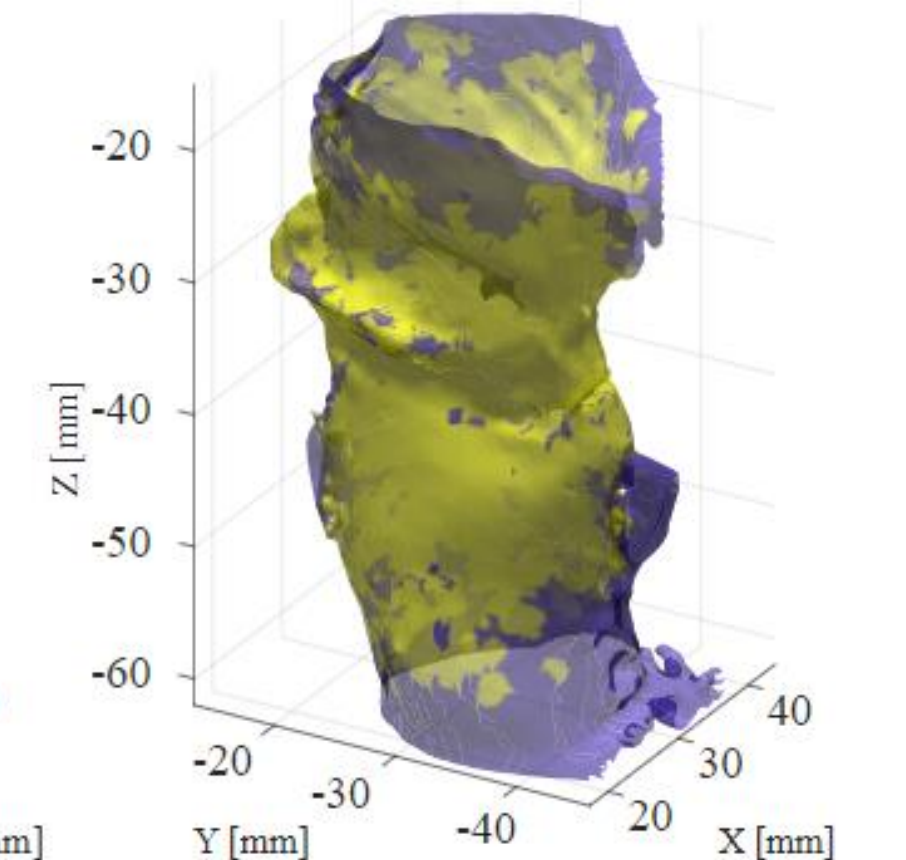
Aiming the laser fiber at tumors located in areas that require extreme bending may result in the endoscope camera becoming completely obscured.

## Results

Non-Steerable Laser Fiber



Steerable Laser Fiber



Unreachable Tissue

Reachable Tissue



Project Video