

Description of Additional Supplementary file

Supplementary Movies

Supplementary Movie 1. High-precision scanning based on magnetic actuation. To achieve high-precision scanning, the magnetic field and the scanning trajectory have been first designed, shown as the left two videos. Under the actuation, the probe tip's motion has been captured by the vertical perspective recording system, as shown in the middle X-Z view and Y-Z view. The corresponding endoscopic recording and the image stitching results can be seen in the right side.

Supplementary Movie 2. Interventional imaging within in vitro bronchial tree model. The soft continuum robot is actuated by the applied magnetic field and the back-end advancing platform to successfully access the different end bronchus channels for achieving scanning imaging and finding the red clot.

Supplementary Movie 3. Interventional liquid delivery within in vitro bronchial tree model. The soft continuum robot is actuated by the applied magnetic field and the back-end advancing platform to successfully access the left end bronchus channel for achieving liquid delivery.

Supplementary Movie 4. Interventional laser ablation within in vitro bronchial tree model. The soft continuum robot is actuated by the applied magnetic field and the back-end advancing platform to successfully access the right end bronchus channel for achieving laser ablation.

Supplementary Movie 5. Functional operations within ex vivo porcine lung model. First part: The soft continuum robot is actuated by the applied magnetic field and the back-end advancing platform to successfully access the lower-left end bronchus channel for achieving mucus sampling. Second part: The soft continuum robot is actuated by the applied magnetic field and the back-end advancing platform to successfully access the lower-left end bronchus channel for achieving drug delivery. Third part: The soft continuum robot is actuated by the applied magnetic field and the back-end advancing platform to successfully access the middle-right end bronchus channel for achieving laser ablation.