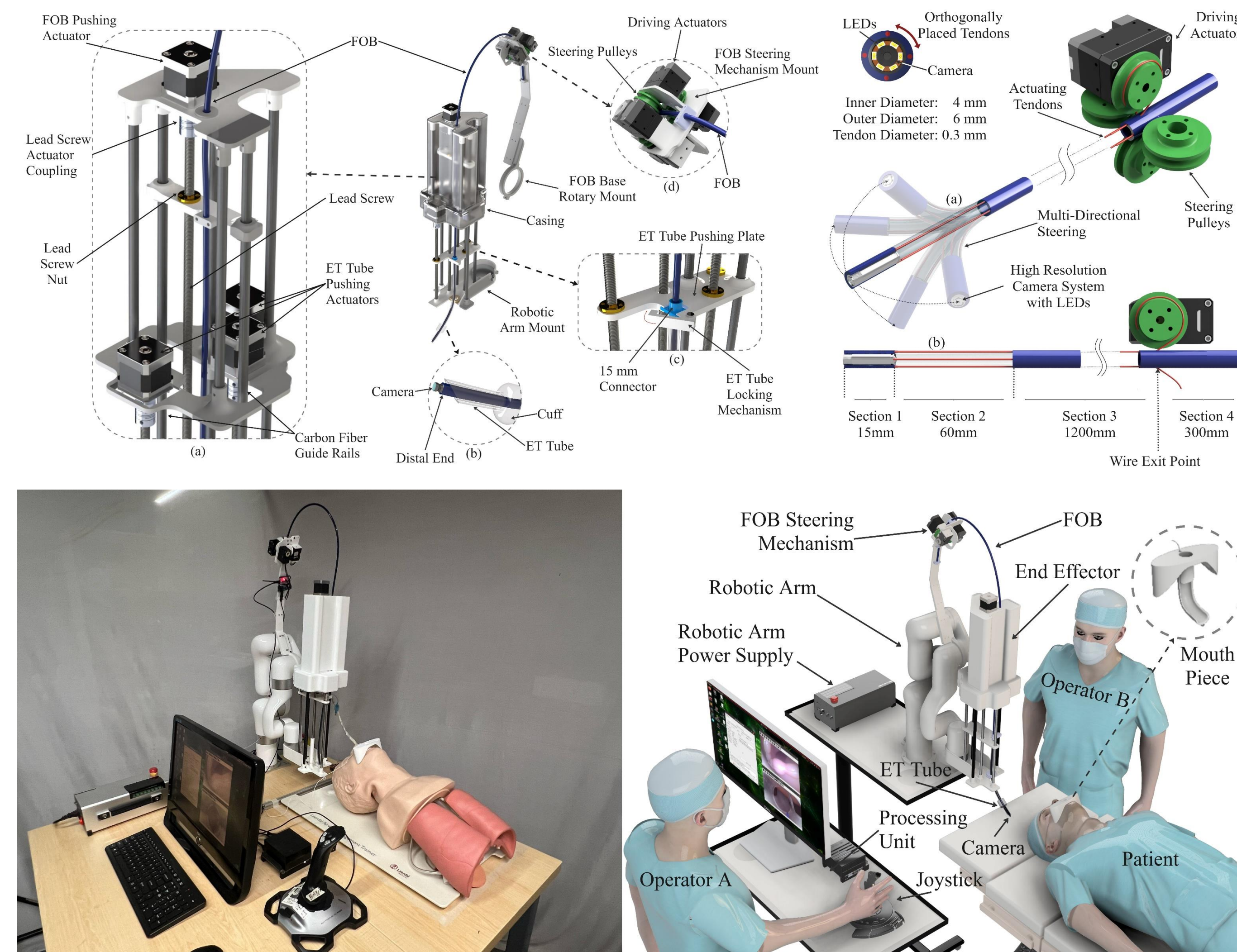# Robotic Intubation System

ABSTRACT

This paper presents the development of a robot assisted intubation system engineered to mitigate the complexities inherent in endotracheal intubation across critical care environments. Current methodologies, including video laryngoscopy and flexible fiberoptic bronchoscopy, demand high levels of expertise and are associated with significant procedural risks. The proposed BRIS employs a synergistic integration of robotics, a deep learning approach, and a camera- augmented mouthpiece, controlled via a precision-engineered joystick mechanism.

METHODOLOGY

It is not ethical or practical to test such novel systems on human patients directly. Therefore, to prove our proposed system and procedure, we performed manual as well as robotic intubation with BRIS on two airway management mannequin from Laerdal and Ambu in a plethora of simple and extreme conditions and recorded the times for all of the intubations. These mannequins are state-of-the art and emulate human like conditions and are used for training in medical universities.

RESULTS

Traditional intubation takes a lot of time to learn, to practice and eventually years before a doctor can comfortably intubate real patients. To determine how fast a user can learn to use the BRIS, we gave tutorials and hands-on training to a batch of five non-medical staff under professional guidance. The learning time was calculated based on how much tutorial time a user took to understand the system before they were comfortable with using it and could perform five successful intubations.

Robotics
Research center

CONCLUSION FUTURE WORKS

This study introduced the BRIS, a novel robotic system integrating real-time visual feedback and a joystick-controlled mechanism, aimed at enhancing endotracheal intubation's safety and efficacy. Future enhancements will involve incorporating clinical feedback, adding oxygen delivery and force feedback for improved functionality and safety, with the aim of establishing this as a standard in airway management.

ACKNOWLEDGMENT