# Sensing From Everting Tube Robots

**This technology offers a freely everting tube robot that can sense acoustic signals and pressure changes. It can limit insertion forces and the spread of bacteria in sensitive biological environments.**

### What is the Problem?

Everting tube robots (ETR) (also referred to as vinebots) are flexible robots made from soft and extendable tube materials. Some ETRs are freely everting, meaning that they take the path of least resistance, and some ETRs can be steered with motors or integrated actuators. ETRs have been researched for exploring and navigating small and difficult to reach places. The tube extends by application of air pressure, which causes the tube to elongate by pulling tube material from inside itself. This internal feeding mechanism does not create friction against the environment, which enables these robots to navigate small, irregular, and complicated passageways. Due to the low friction and force that the robot has on the surrounding environment, it has been researched for sensitive environments, such as brain tissue imaging. However, little work on sensing capabilities for ETRs has been done due to the difficulty of integrating sensors on the distal parts of the everted tube, limiting the potential applications and adoption of this technology.

### What is the Solution?

The solution is a freely everting tube robot that can sense acoustic signals and pressure changes. This technology is enabled by sensors on the pressure vessel, which is where the ETR originates. These sensors do not travel with the tube during expansion, and sensors are coupled with algorithms that output pressure and audio data along the length of the tube. This could lead to broader applications such as sensitive medical applications where imaging with endoscopes is not practical, as ETRs can limit insertion forces and the spread of bacteria.

### What is the Competitive Advantage?

Existing ETRs do not have sensing capabilities, limiting the potential applications of this technology. This solution integrates sensing capabilities, which could lead to broader applications such as sensitive medical applications where imaging with endoscopes is not practical, as ETRs can limit insertion forces and the spread of bacteria.

### Patent Information:

### Technology ID

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### Category

Hardware/Robotics
Selection of Available Technologies

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