



Precise Air-sealing Robot for Inaccessible Spaces

Description

There are approximately 50 million residential and commercial buildings in the U.S. built before 1980. 90% of those will still be standing in 2050. The U.S. must retrofit at a rate of 4% per year, or 1,722,116 buildings per year, 4x the current global retrofit rate. Weatherizing residential buildings in which attic and crawlspaces are inaccessible, crowded with obstacles, and contain hazardous materials. To address these challenges, we developed Precise Air-sealing Robot for Inaccessible Spaces (PARIS), which can traverse over ceiling joists, create a 3D feature map existing conditions via sensor-fusion, and seal identified gaps with spray foam sealant. The platform will be available commercially for under \$10,000 and its autonomy will allow workers to complete other retrofit tasks while PARIS is in operation. PARIS has been validated increasingly more challenging testbeds. PARIS helps building retrofit companies to shorten weatherization project completion times by augmenting their crew with a mapping, inspection, and air sealing robot providing access to areas beyond reach. PARIS contributes to the objective of the E-ROBOT Prize by (i) removing human workers from hazardous attic crawlspaces, 2) generating a 3D feature map to identify gaps in need of air-sealing, and 3) leveraging control of spray foam sealant for targeted air-sealing.

Partners

Massachusetts Clean Energy Center (MassCEC), Boston, MA, Website: <https://www.masscec.com>

Revise, Home Energy Assessment Company, Haverhill, MA, Website: <https://www.callrevise.com>

Boston Engineering Corporation, Waltham, MA, Website: <https://www.boston-engineering.com>

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