Building Envelope Remote Sensing Drones

GSA

Technology Overview

Heat transfer due to leakage is a significant driver of energy use within buildings, in some instances having the largest impact on heating and cooling loads. Identifying a building envelope's weak points allows for targeted retrofit interventions that reduce energy loss. However, manual assessments of building envelopes are labor-intensive, expensive, prone to human error, and pose safety risks. Drones are agile and can access hard-to-reach places, alleviating some of the typical challenges associated with building envelope assessments.

Building envelope remote sensing drones use infrared sensors to map heat transfer. Data is uploaded to an AI-powered analytics platform to output 2D drawings and 3D models to visualize thermal anomalies and their impacts on potential energy savings. Reports present detailed retrofit recommendations based on the exact location and type of thermal anomaly, allowing for effective energy-saving renovations. The technology meets ASHRAE/ACCA 211 P standards for commercial building energy audits.

Why is GSA Interested?

Building envelope remote sensing drones perform more comprehensive energy audits in less time with fewer costs than manual assessments, which can require installing extensive scaffolding. Pre-flight planning ensures 100% facade coverage and more uniform data collection with consistent imaging angles and distances. The vendor estimates that drones detect 50% more defects than manual evaluations, accounting for human error rates, are 80% less expensive, and 80% faster from data collection to delivery of analytics.

Automated analysis eliminates the need for professional thermographers, expanding the technology's accessibility.

Deployment Potential

Building envelope remote sensing drones add value at every phase of construction by evaluating building performance before a real estate purchase or retrofit, as quality control during construction, and for post-renovation and post-occupancy assessments. The drones can conduct multiple assessments at once, ideal for campuses, large real estate developments, and multi-story buildings.

Green Proving Ground (GPG), in collaboration with the U.S. Department of Energy, is evaluating the real-world performance of building envelope remote-sensing drones in federally owned buildings within GSA's inventory. The technology will be provided by Lamarr.ai and coordinated with other ongoing evaluations of this technology.

The GPG program enables GSA to make sound investment decisions in next generation building technologies based on their real world performance.