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**Karoline P Pershell\*** (karoline@srtlabs.com) and **Jamie Haddock**. *How do robots find their way home?: Optimizing Bluetooth beacon placement for robot localization and navigation in indoor spaces*. Preliminary report.

While map apps on mobile devices are excellent for navigating around town, they are not precise enough for use within buildings. Service Robotics & Technologies is currently working on deploying service robots (vacuuming, security, mail delivery) throughout a facility, and the robotic systems must navigate the space based on a pre-made facility map and built-in obstacle avoidance technology. However, a robot still needs to localize itself within the map at regular intervals. Using Bluetooth Low Energy (BLE) beaconing technology for triangulating positions is a promising option for localization. Since signal strength is variable, even at a fixed distance, due to the physics of the signal, reflections based on room dynamics, and inherent inaccuracies in the hardware, we also discuss our choices for filtering noise. Given a map and signal readings from multiple beacons along a path, we extrapolate the BLE signal strength to any point in the map, using signal triangulation to allow the robot to localize. We discuss the process for data simulation and testing, and intended future work in localization and navigation. This work was made possible by the Institute for Mathematics and its Applications 2017 Math-to-Industry Bootcamp. (Received September 26, 2017)