# Modeling & Analysis of Grocery Picking Bots

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The Alphabot "each-picking" system from Alert Innovation is a combination of:

- 3-dimensional mobile robots
- Rack and deck structures that store totes and enable bots to move horizontally and vertically within the system
- Workstations for picking orders and for inducting and dispensing totes
- Control software that orchestrates the overall operation of the system

In 2016, Walmart was considering whether to collaborate with Alert in the development of Alphabot technology for use in its Online Grocery Pickup service. Walmart wanted to use simulation modeling to validate Alert's estimates of the proposed Alphabot technology while it was still in the conceptual design phase.

MOSIMTEC, LLC developed an AnyLogic model to allow Walmart to test a variety of customer demand situations and storage capacities in order to estimate the throughput and turnaround time capabilities of the Alphabot system, even though the system did not physically exist yet. After reviewing results of the simulation model, Walmart executives decided to move forward by collaborating with Alert Innovation to develop the technology.

After the initial simulation engagement, the AnyLogic model was turned over to Alert Innovation, which expanded its functionality to create a powerful engineering decision-support tool. Alert's engineers turned to this model frequently to understand the tradeoffs between performance and cost in making design decisions during the development process. The first commercial-scale instance of this technology is now in operation the Walmart supercenter in Salem, New Hampshire.

The AnyLogic conference presentation will discuss:

1) The background of the Alphabot technology
2) Why simulation was critical to analyze the Alphabot concept
3) How the simulation modeling process was executed when control algorithms did not yet exist
4) The flexibility of the underlying model to analyze all Walmart distribution center profiles
5) How the model continued to be refined and improved after initial prototyping to answer additional design questions