

The “Last 500ft”

Autonomy Solutions for Public Commercial Spaces

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Developer of BrainOS, the AI technology platform for the development, deployment, and management of autonomous mobile robots

#1 Robotic Technology Provider <i>ABI Research</i>	Top 50 in Artificial Intelligence <i>Forbes</i>	10k+ Robots Deployed	1M+ Autonomous Hours / Miles
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Commercial AMR

Industrial Robots

Industrial Manufacturing Applications



- Non-mobile
- Not autonomous (pre-programmed)
- Requires custom built environment
- Cannot operate around people

Commercial Robots

Automated Guided Vehicles (AGV)



- Mobile
- Semi-autonomous (beacon controlled)
- Requires large infrastructure change
- Operates around trained-users
- Operates in simple environments

Commercial Robots

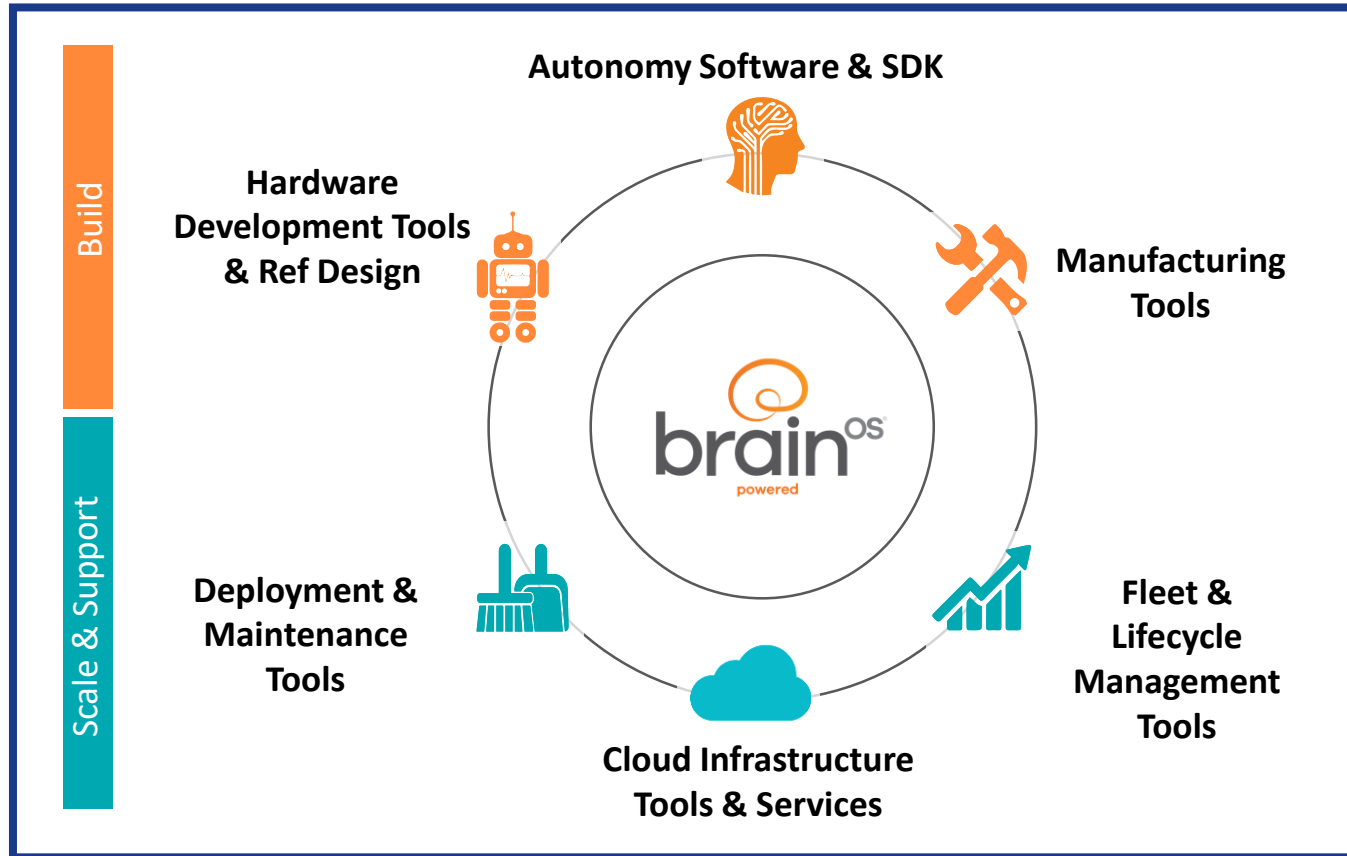
Autonomous Mobile Robots (AMR)



- Mobile
- Fully autonomous
- No infrastructure change
- Operates in public environments
- Operates in dynamic, complex spaces



What is the Brain^{OS} Platform?



Build: Tools to enable our OEM partners to develop and manufacture autonomous robots at scale

Scale & Support: Tools to deploy and maintain a large fleet of commercial autonomous robots

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Building robots is hard, scaling is even harder



BrainOS Cloud Services

Services, Lifecycle Monitoring, Data APIs + Webhooks

Data Reporting

Customer Portals

OEM Portals

3rd Party Cloud

Universal Wireless LTE Connectivity

BrainOS Client Software

UI

OEM apps

3rd Party apps

UI & App API Framework

Autonomy Apps

Route following

Auto-Coverage

Obstacle detect / avoid

Manufacturing Apps

Calibration tools

Diagnostic tools

Support tools

Deployment Apps

Map and route creation

Self exploration

Expert demonstration

BrainOS Primitives

Odometry Localization Mapping Perception Motion Planning

BrainOS Middleware (daemons, core libs, etc.) + ROS Compatibility Layer

OS (Ubuntu 16.04) with BrainOS Security Layer



Hardware Abstraction Layer (Sensor drivers)

Firmware

Application-specific sensors & peripherals

HW (processor, nav sensors)

Simulation Tools



+ Proven OEM Partners

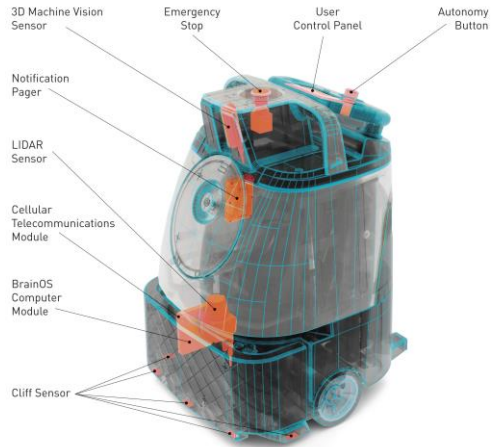


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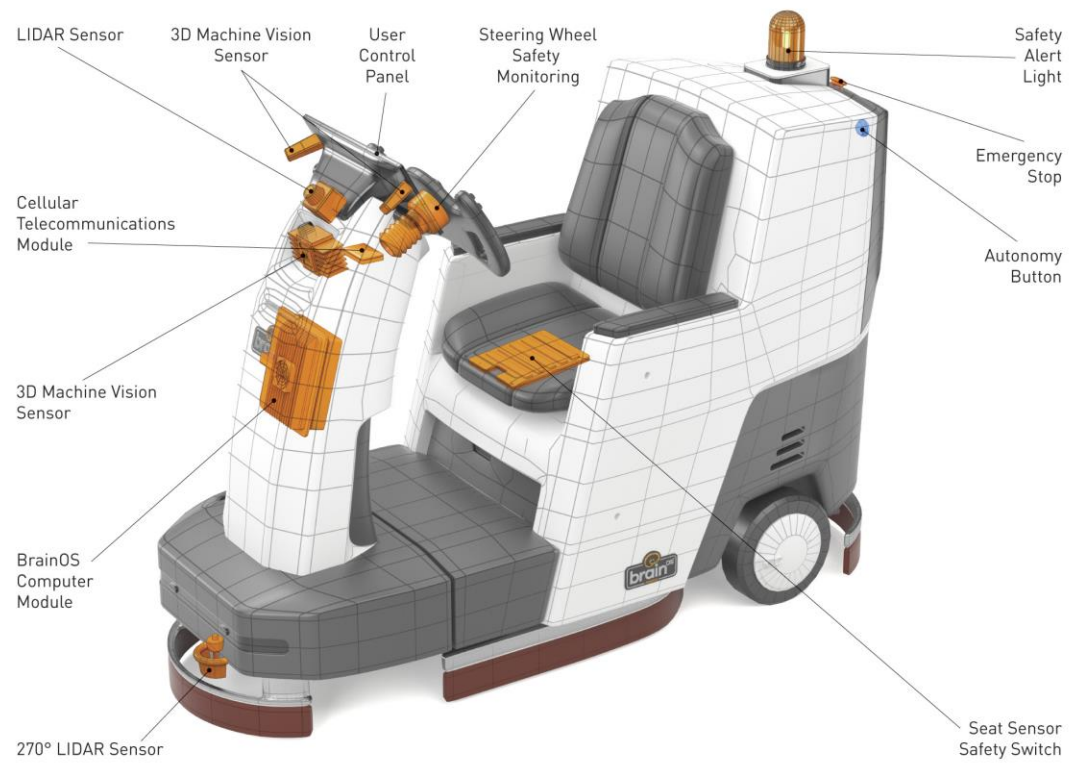
Application Overview



Typical LITTLE platform application



Typical BIG platform application



The last 500ft

The supply chain ends at the customer, **NOT** the back warehouse.

*“A **supply chain** is a network between a company and its suppliers to produce and distribute a specific product to the final buyer.”
(Investopedia)*

Delivery across broad applications



Retail



Grocery



Delivery / Manufacturing / Warehouse



Apparel



Maintenance

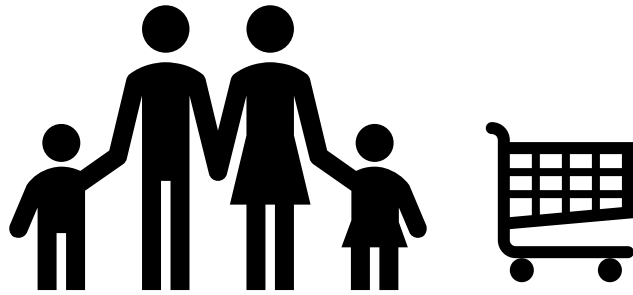


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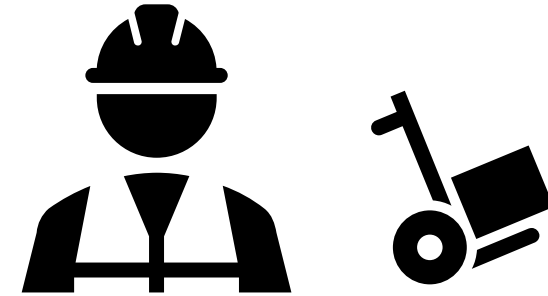
Bridging the Gap

- What is different about operating automated solutions in a public commercial application compared to a controlled industrial environment?

Environment

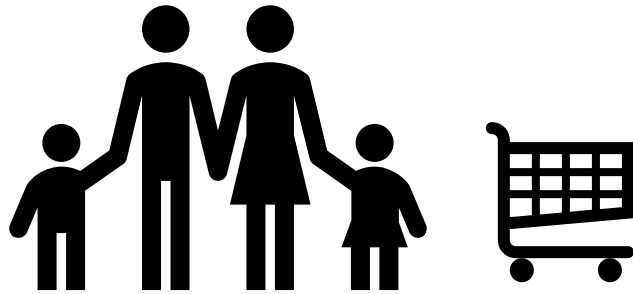


General Public

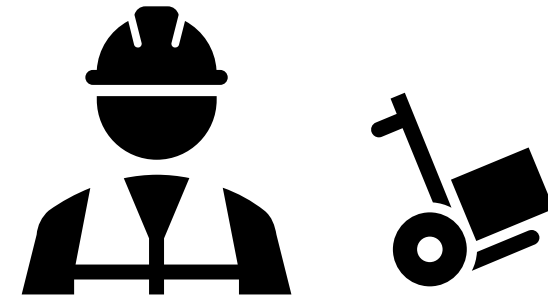


Controlled Interaction

Application



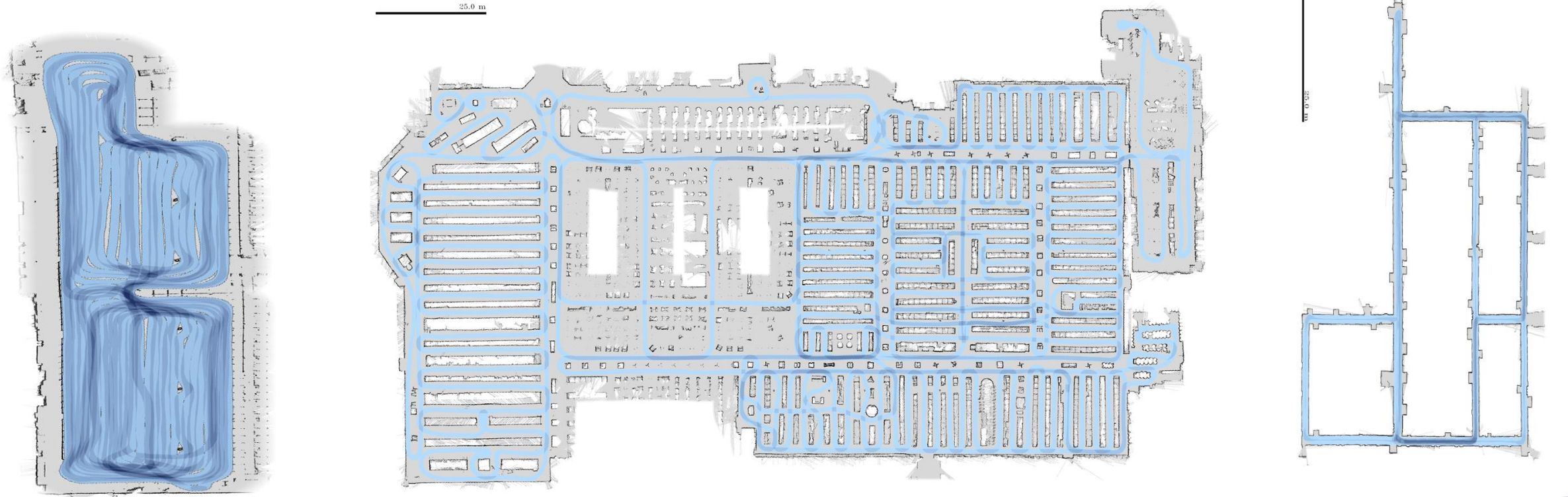
- **No** technical staffing for setup, operation, or maintenance
- Space dedicated to **consumer**



- **Onsite** technical staff for setup, operation, & maintenance
- Space dedicated to **operation**

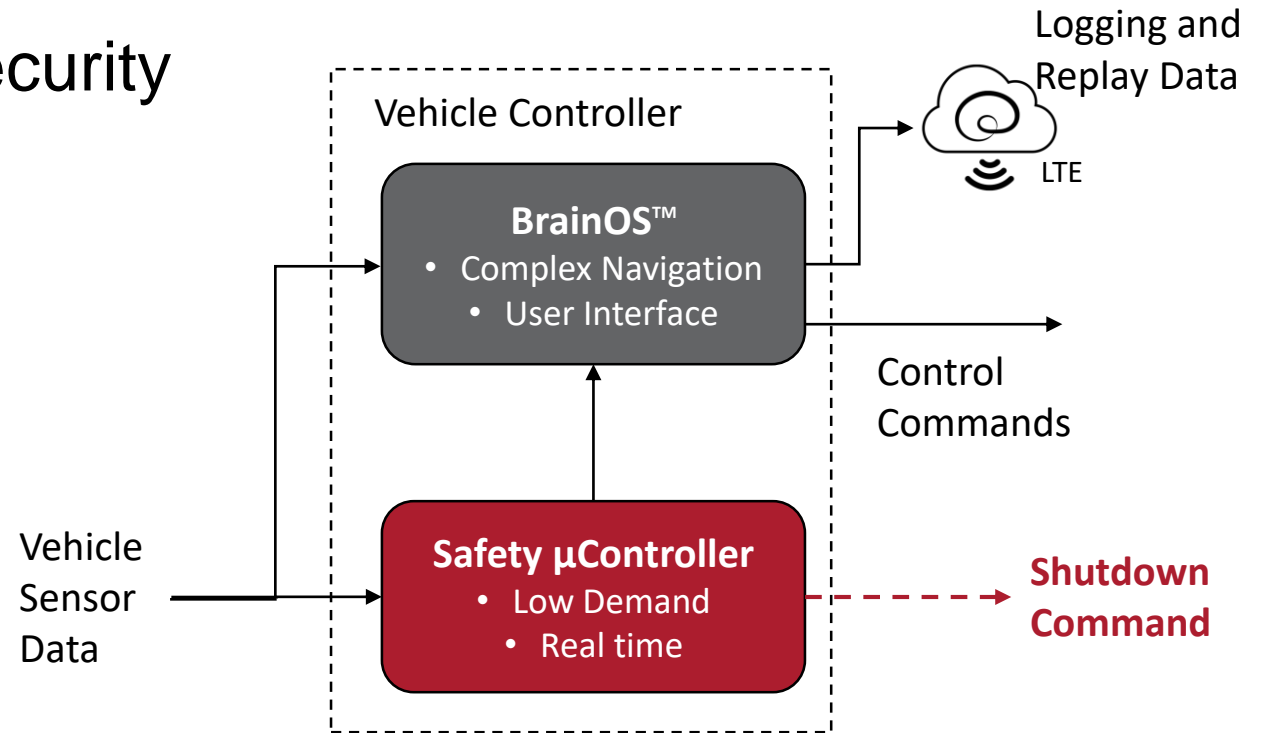
Non-technical setup

- Single pass mapping & routing
- No manual post-processing



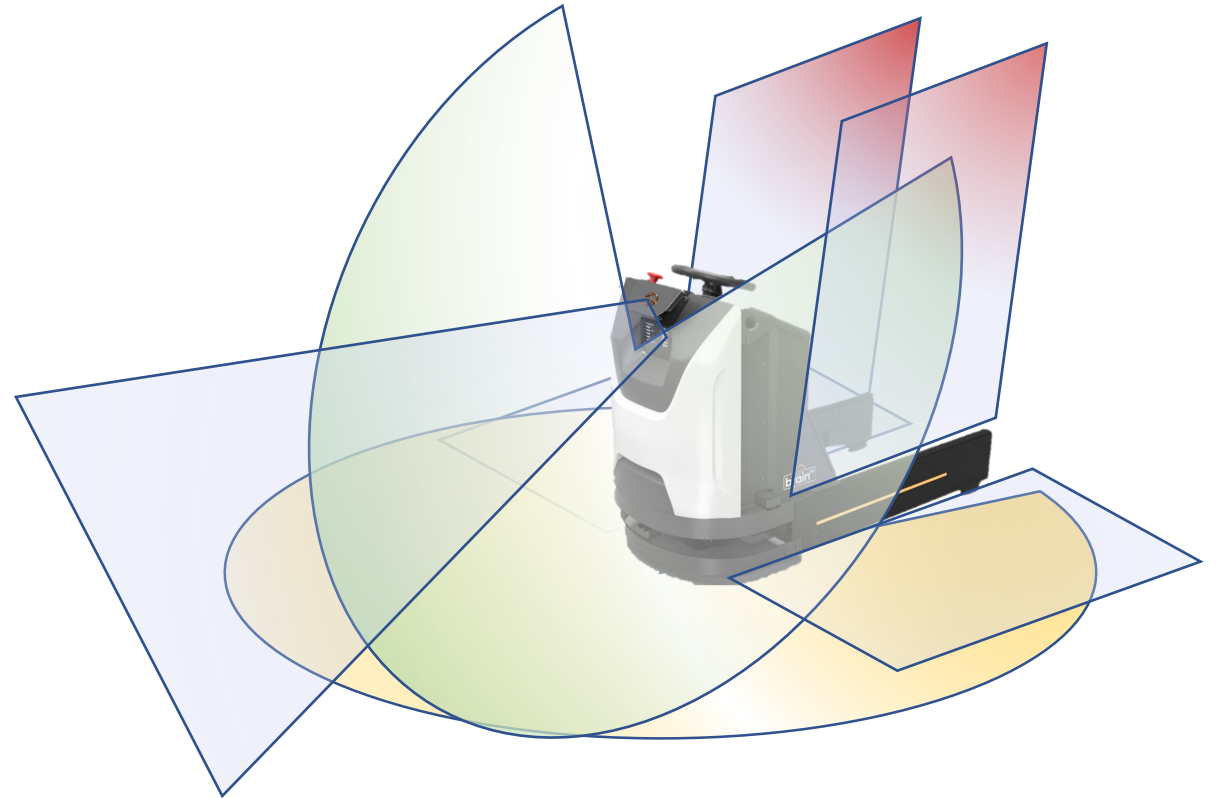
Specialized Safety Control Systems

- Functional safety is application dependent
- Safety ratings are relative to application
- Safety is highly dependent on security



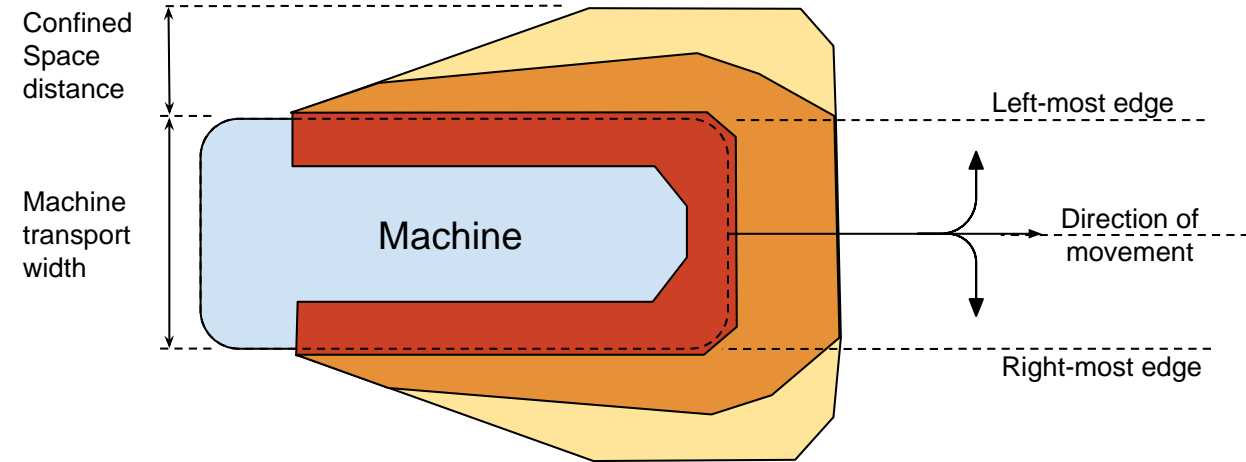
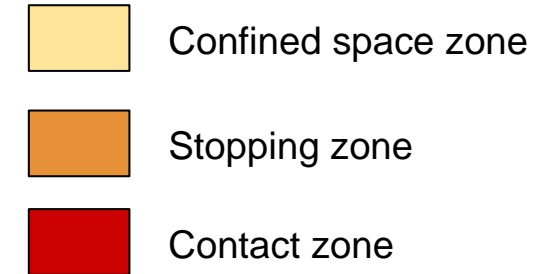
Sensory Fusion

- 3D sensor fusion model
- Fullest coverage
- Redundant
- Tailored sensor-pack
- Active perception
- Blind spot detection

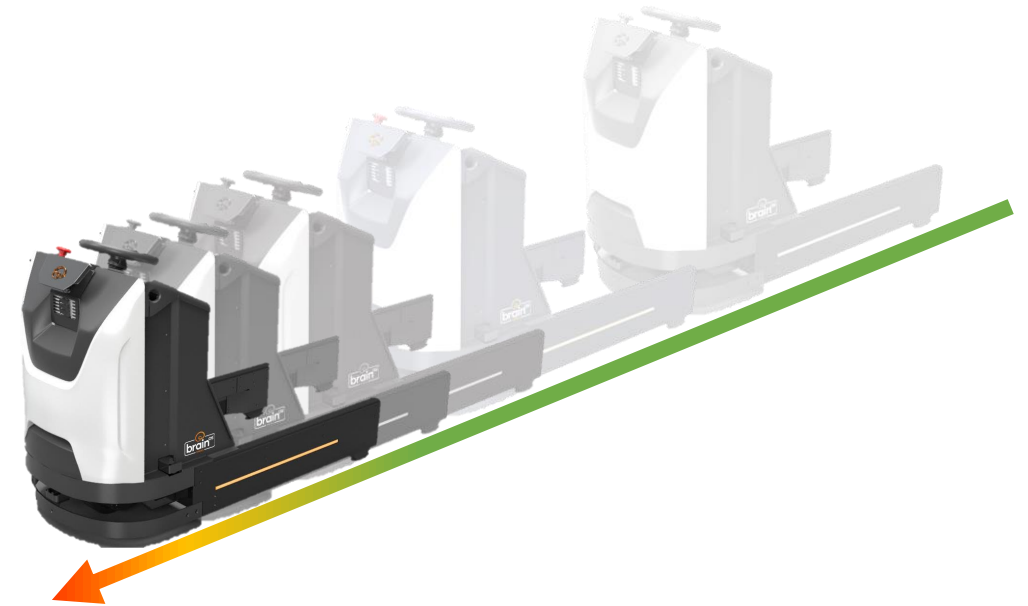
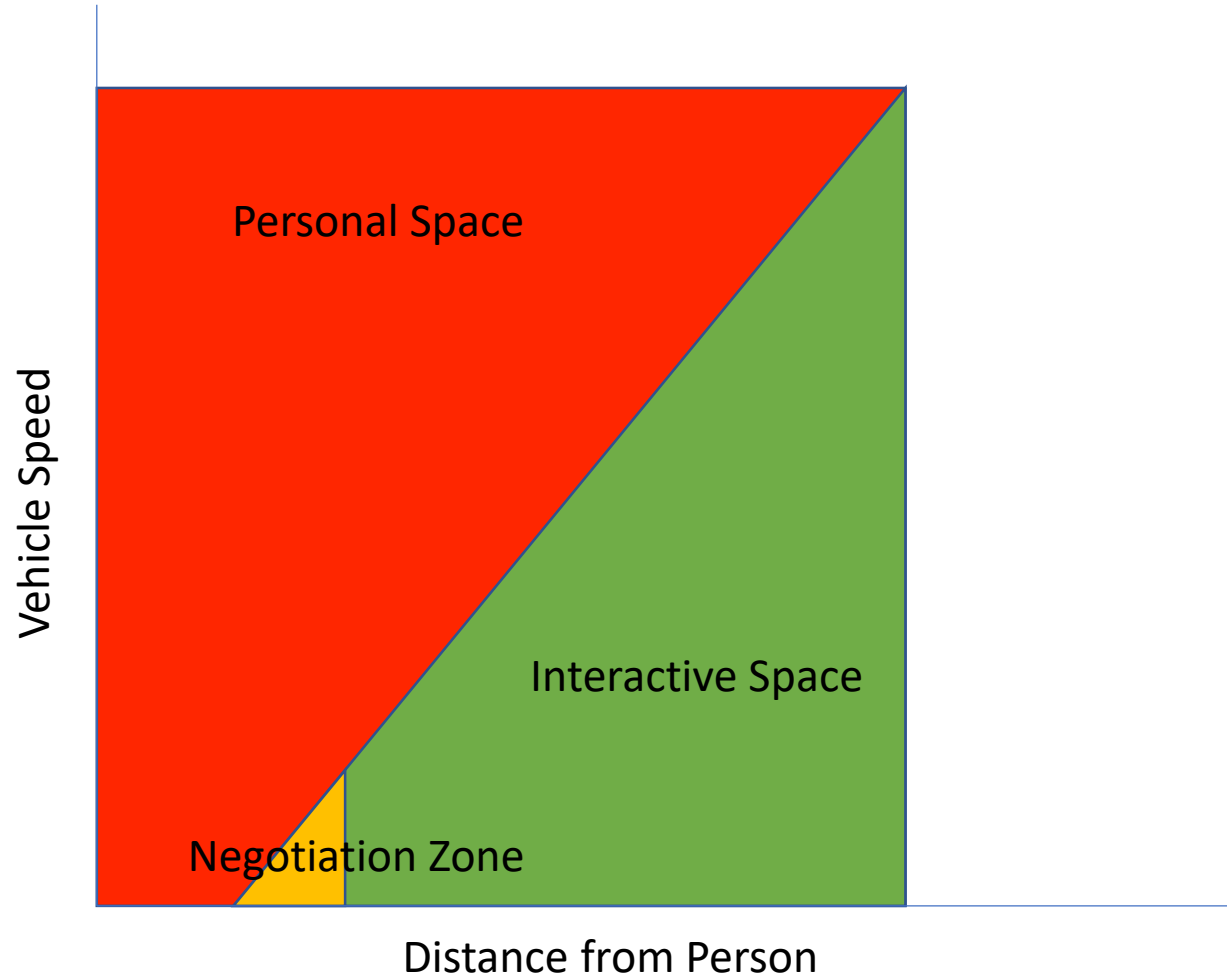


Operational Zones

- Dynamic
- Speed limited



Behavior Model, Perceived Safety is Real Safety



Commercial AMR benefits, Industrial applications

- Flex manufacturing & warehousing
 - Easy non-technical setup
 - No infrastructure
- Lean manufacturing & Kaizen events
 - No reset costs
 - No downtime



Lite Industrial Carts



Powering Autonomous Robots



Empowering Their Builders



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For more information:

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Website: www.braincorp.com

Or visit MODEX Booth # 1013

Thank You