

# Robotic Delivery for Your Healthcare Operation

Presented by

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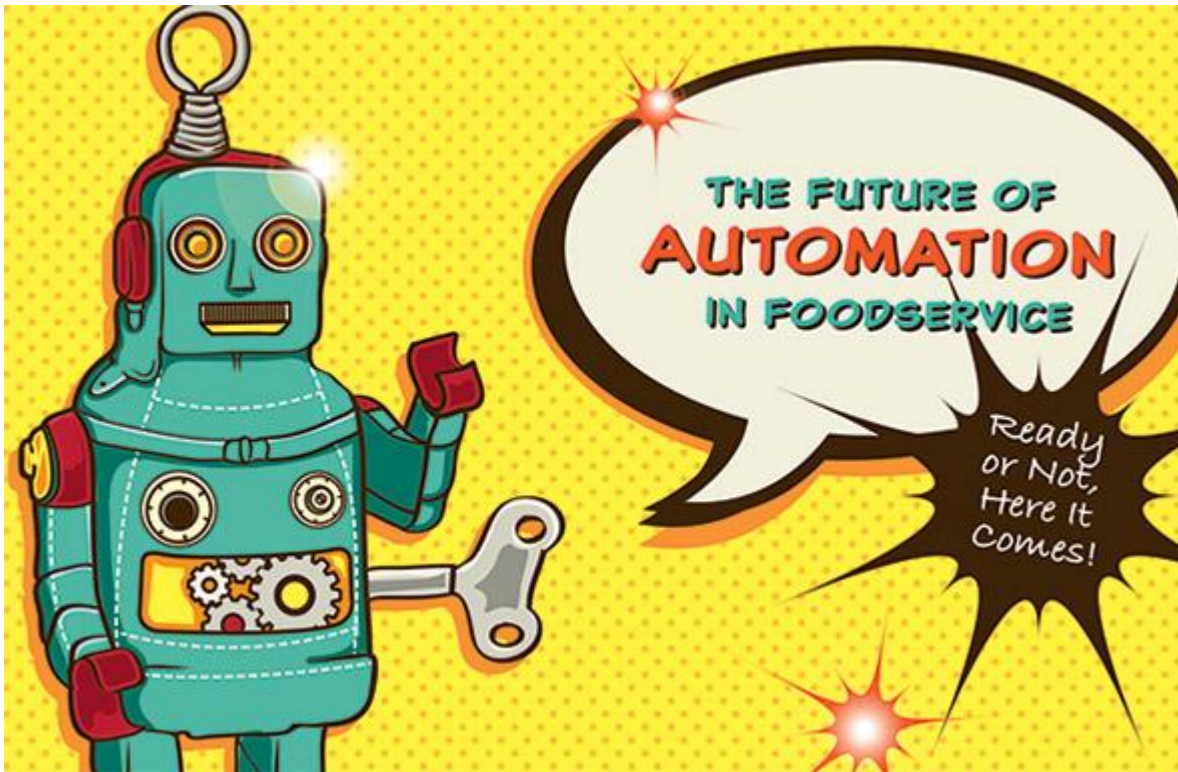
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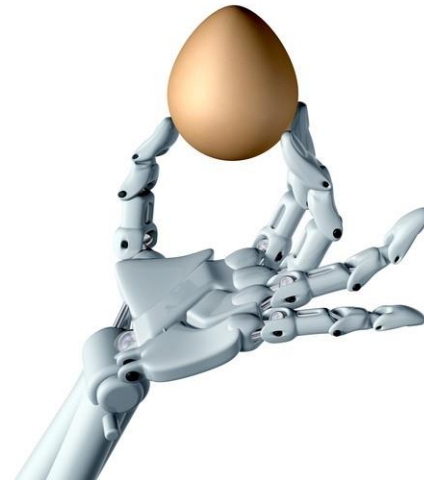
# OBJECTIVES

- ▶ Learn the scope and parameters to utilize mobile robotics in your environments- meal delivery, environmental, laundry and retail venues
- ▶ Understand the efficiencies and ROI to your operations
- ▶ Get a better understanding of the value adds and benefits of using mobile robotics to your employees, patients, residents and facilities.



# DELIVERING MORE AND BETTER FOOD

- ▶ Artificial Intelligence in Foodservice
  - Functional benefit in running your business.
    - Information to improve the execution of the operation, result in better service
    - Improvement in quality, food safety and operating cost.
  - Simplify the life of operator



# LABOR INEFFICIENCIES



Market research done by Dishcraft

- ▶ Restaurant/foodservice industry in crisis. This crisis has several root causes, perhaps the largest of which is a labor retention and labor shortage problem, that is felt most acutely in the dishroom. The dish room specifically is a universal issue that is only getting worse. A boom in eating out has caused food service jobs to increase by 43% since the early 2000s to meet customer demand, with 1.8 million jobs expected to be added in the next 10 years. Yet, despite this growth, the workforce is shrinking due to low wages, fewer undocumented workers, and less people willing to do the job.

# DEBATES ABOUT THE GROWTH OF ROBOTICS

With a turnover rate of 74.9%, it is easy to see why owners and managers are frustrated with their human foodservice workers and view robotics as the ideal replacement that never needs a bathroom break and does not complain about its back hurting.





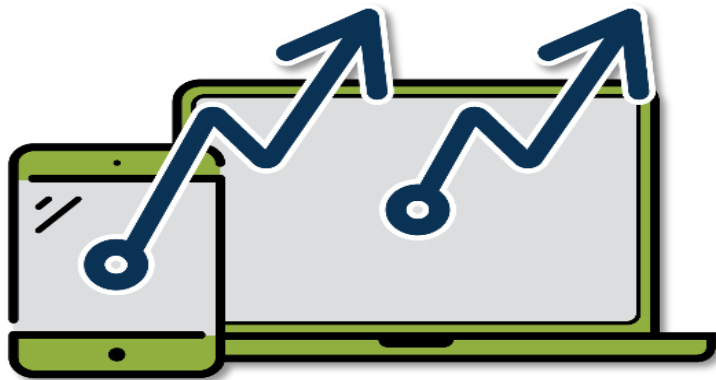
The choice of a robot generation: PepsiCo rolls out campus snackbots



Meal delivery tray robots



# FOODSERVICE OPERATORS ARE ALWAYS LOOKING TO IMPROVE PRODUCTIVITY INNOVATIVE SOLUTIONS PRESENT AN OPPORTUNITY FOR IMPROVEMENT



## Operator Solutions

- Embrace smart equipment
- Take small steps toward emerging technology
- Don't settle for what's available but modify or customize a solution specific to your needs
- Patient Satisfier-time, safer, hotter



# WHY LOOK AT ROBOTICS AND AI?

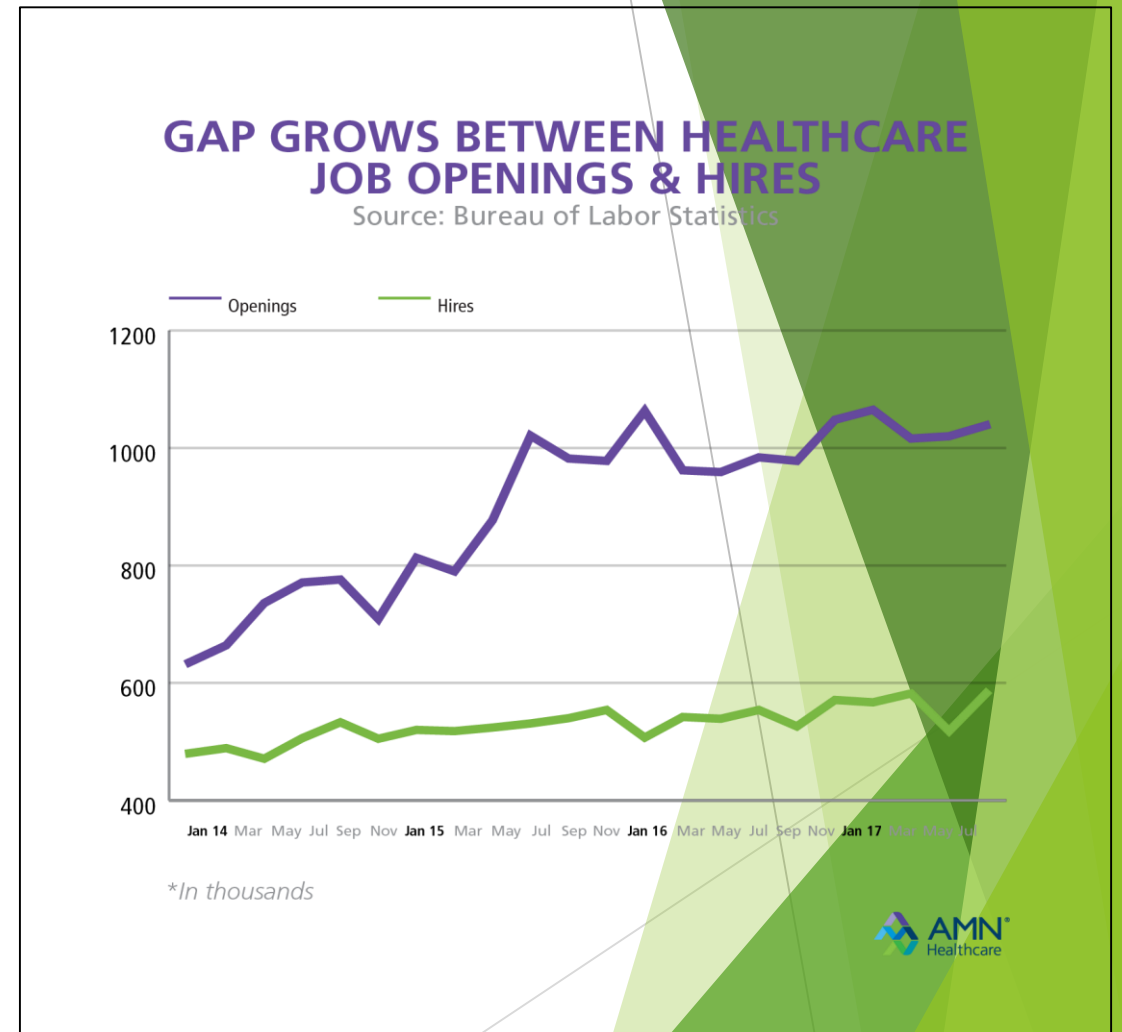
1. LABOR, LABOR, LABOR - Need to control labor costs and anticipate labor shortages that some parts of the country are already experiencing.
  - ▶ Control for direct labor cost and indirect labor cost (e.g. worker's compensation claims)
2. Improve timeliness of service
3. Cost effective expansion of services to day parts currently not service or under served.
4. Reducing food costs and food waste
5. Elevating the customer experience in new ways
6. Employee moral and retention



CHANGE MOVEMENT

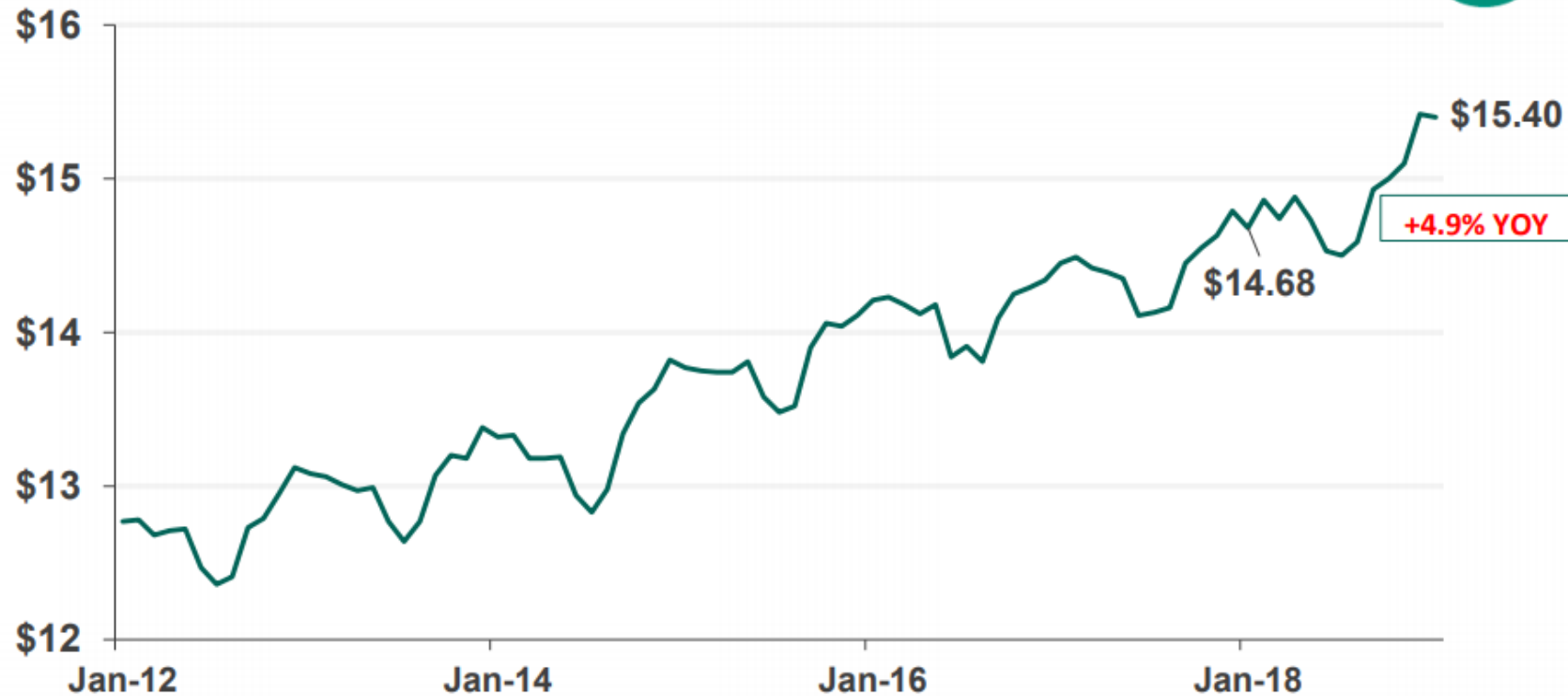
# US HEALTHCARE - LABOR CONSTRAINTS

- **Labor shortages** are becoming problematic. The gap between openings and hires is widening:
  - For example, by 2025 there will be a **shortage of 98,700 medical and lab technologists, 95,000 nursing assistants and 29,400 nurse practitioners** (<https://mercer.healthcare-workforce.us/>)
- **Healthcare spending continues to rise with aging population.** Efficiency and costs are a top priority - yet wages are driving up costs.
- **Healthcare is the largest employer in the US.** Exceeding manufacturing.
- **20.6% turnover rate** of staff in US Healthcare with lower-level jobs turning over more rapidly.



# HOURLY WAGES RISING

.. And The Fight For Talent Drives Up Hourly Wages

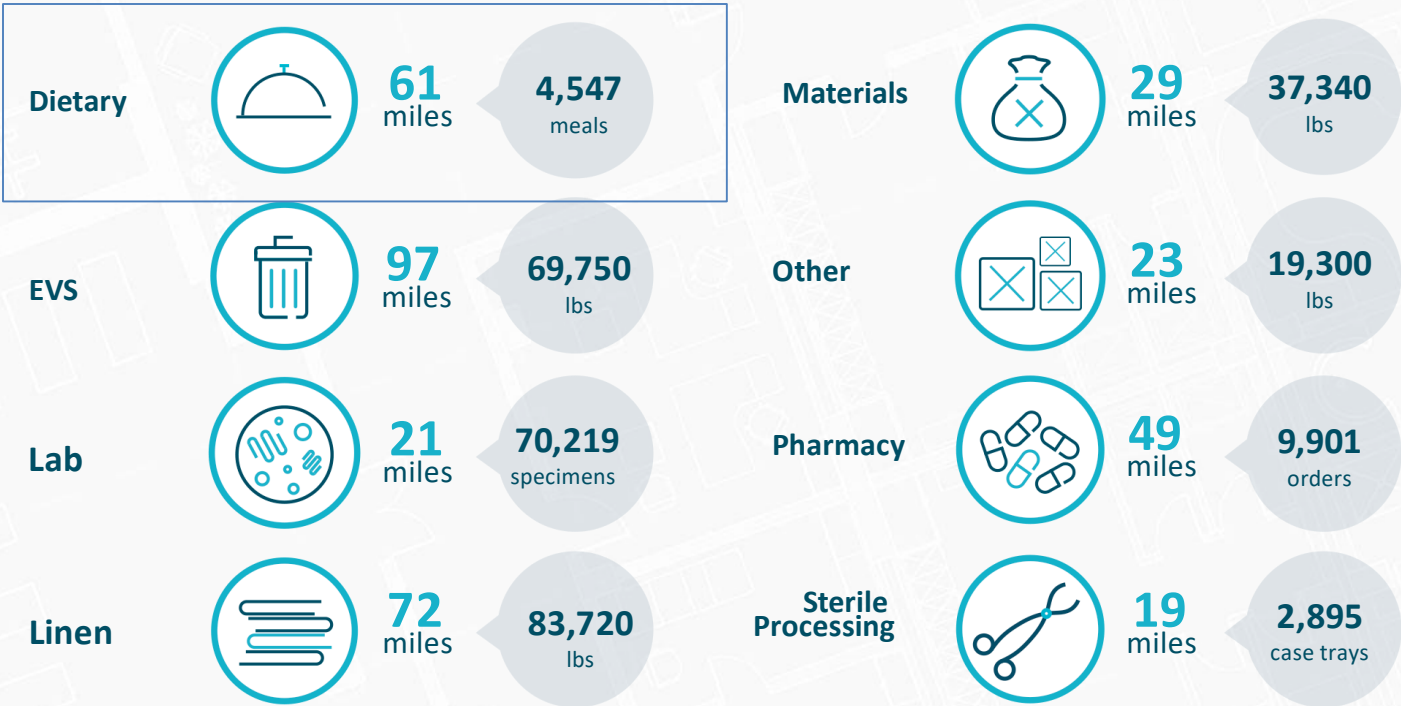


Total U.S., Leisure and hospitality, Accommodation, Average hourly earnings of production and nonsupervisory employees, not seasonally adjusted <https://www.bls.gov/data>

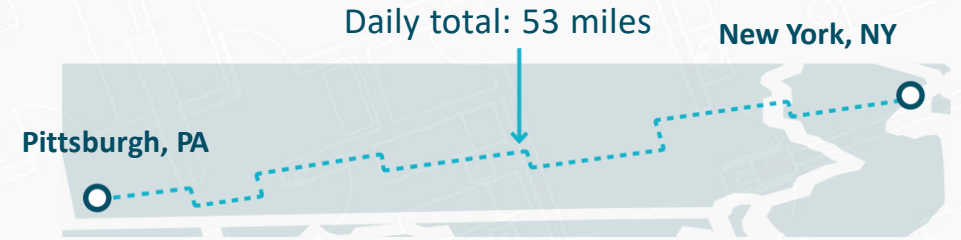
Source: STR Report Feb 2019

# WHAT ABOUT INTERNAL LOGISTICS?

A 200+ bed hospital moves weekly:



Travel distance of moved materials:



Weekly total: **371** miles

**Significant resources expended.  
How are you managing them?**

# LOGISTICAL CHALLENGES OF MANUAL TRANSPORT

- ▶ Volume of Food & Beverage, Supplies, Linen, Trash, Rx, Lab
- ▶ Maintaining Food Quality
- ▶ Long Distances (horizontal and vertical)
  - ▶ Delays in Request to Delivery Time
  - ▶ Long Turn Around Time (TAT)
  - ▶ Wear and Tear on Staff
- ▶ Heavy / Cumbersome Loads
  - ▶ Worker Safety
- ▶ Finding, Hiring & Maintaining Staff
  - ▶ 'Highest and Best Use' of Staff

# BENEFITS OF AUTOMATION

- ▶ Improved Productivity and Efficiency
  - ▶ Reduced request to delivery time
  - ▶ Total TAT improves
  - ▶ Scheduled deliveries improve throughput
- ▶ Improved Guest/Customer Service Level
  - ▶ Speed, Temp., > Interaction w/ End User
- ▶ Reduction in Injuries
  - ▶ Fewer workers compensation claims
  - ▶ Reduce temp hiring and overtime pay
- ▶ Reduced Labor Challenges
  - ▶ Reallocate Staff
  - ▶ Staff Shortages
- ▶ Increased Worker Satisfaction
  - ▶ Fewer 'non value add' tasks improve moral
  - ▶ Reduction in Workforce Turnover
- ▶ Minimize Impact of Future Growth / New Construction
  - ▶ Maintain Centralized Kitchen w/o adding FTE

# COST BENEFITS

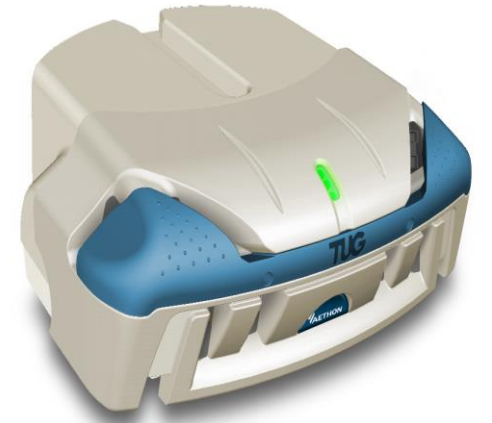
- **Shift Coverage – Cover three times as many shifts as an FTE at a fraction of the cost**
- Improve delivery model while avoiding the cost of additional labor
- Reduce cases of family medical leave and limited duty
- Reduce shift differentials and overtime





# OPERATIONAL BENEFITS

- Increase throughput and decrease turn-around time
- Streamline the delivery workflow, making it more difficult for people to fall away from an established lean process
- Re-allocate labor for improved productivity
- Offer improved service to nurses and patients
- Reduce unproductive time (vacations, sick days, breaks)
- Reduce employee turnover
- Increase information flow
- Proof of Concept for other departments and hospitals within your system



# RESULTS

700+ Bed Hospital

per month



Built new tower  
needed to augment  
food delivery

**8 TUG fleet**

**10,000** deliveries

**1,400** miles



**Avoided hiring 10 FTEs**

# OTHER PRACTICAL RESULTS OF AUTOMATION

- ✓ Hospital added 202 beds with Room Service model w/ <45 minutes delivery time
  - ✓ Leveraging TUGs saved 3.9 FTEs
  - ✓ Staff can connect more facetime with residents, patients and customers
- 
- ✓ Large, academic healthcare institution implemented Room Service model
  - ✓ Reallocated staff
  - ✓ Reduced staff through attrition

# WHAT DOES AUTOMATION LOOK LIKE?

## Autonomous Mobile Robots (AMRs)

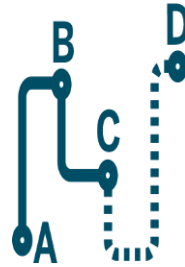


# MOTORIZED, ROBOTIC TRANSPORT - AMRS

- ▶ No Added Infrastructure
- ▶ Automatic Pick Up / Drop Off
  - ▶ Can navigate / deliver into users location
- ▶ Numerous Route Types
  - ▶ Scheduled
  - ▶ Ad Hoc
  - ▶ Milk Run
- ▶ Easily Change Routes
  
- ▶ Can Communicate - Commands / Electronic / Strobes Navigate Unexpected Obstacles
- ▶ Secure Delivery Options
- ▶ Call Elevators / Open Motorized Doors
- ▶ Same TUG, multiple Carts
- ▶ Can Work Multiple Shifts



**Scheduled runs**  
Pre-defined  
schedule



**Milk-run**  
Multi-stop  
routes



**Pull / Ad-hoc**  
User can request  
using handheld  
mobile units

# ROBOTICS FOR PATIENT DINING FOOD DELIVERY



- ▶ Use the robots to take meals to the patient care units
- ▶ Integrated to a new hospital and outpatient complex that opened in 2015
- ▶ Robots were added during construction documents phase
- ▶ 6 dining zones = 6 robots assigned to us during the day

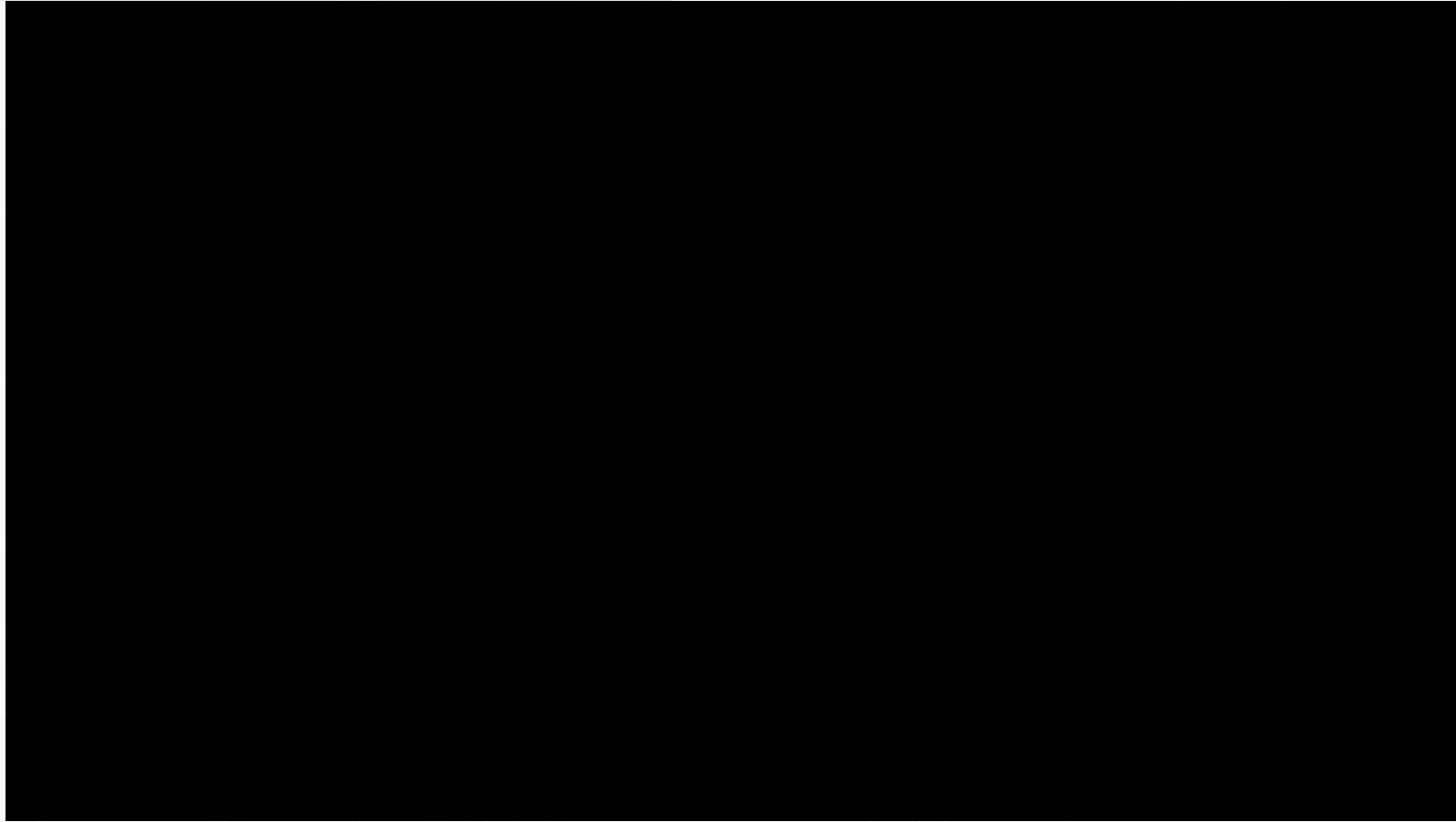
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# IN ACTION

[HTTPS://YOUTU.BE/REEZJFGRAZE](https://youtu.be/reezjfgraze)



# DELIVERY DEPLOYMENT

Department	Intended Use
Hospitality (housekeeping)	Waste, recycling, compost, universal waste
Sterile Processing Dept. (SPD)	Case carts, STAT supplies, scopes, probes
Nutrition and Food Services	Room service, dirty trays, daily floor stock, formula delivery
Pathology / Cytology	OR/Clinic/L&D specimens
Pharmacy	STAT medication, chemo, rounds
Material Services	Ad hoc/restock supplies and equipment
Linen	Delivery of clean linen; uses 3 NFS and 6 Hospitality TUGs off shift
Multi-purpose	Sterile Processing (day) / Linen and Hospitality (night);



# DEPARTMENT COST BENEFIT SNAPSHOT

- ▶ TUGs run approximately 11,440 hours per year for patient dining (2080 hours per year) =
  - ▶ 5.5 FTE productive hours
  - ▶ 1.1 FTE for 7 day per week operations [20%]
  - ▶ 1.1 FTE for non-productive time (e.g. vacations, sick, etc.) [20%]
- ▶ Total labor cost = 7.7 FTE x annualized cost of labor + benefits
- ▶ Annual maintenance and repair cost is budgeted centrally and not to department

Hospitals

# SAFE TO USE

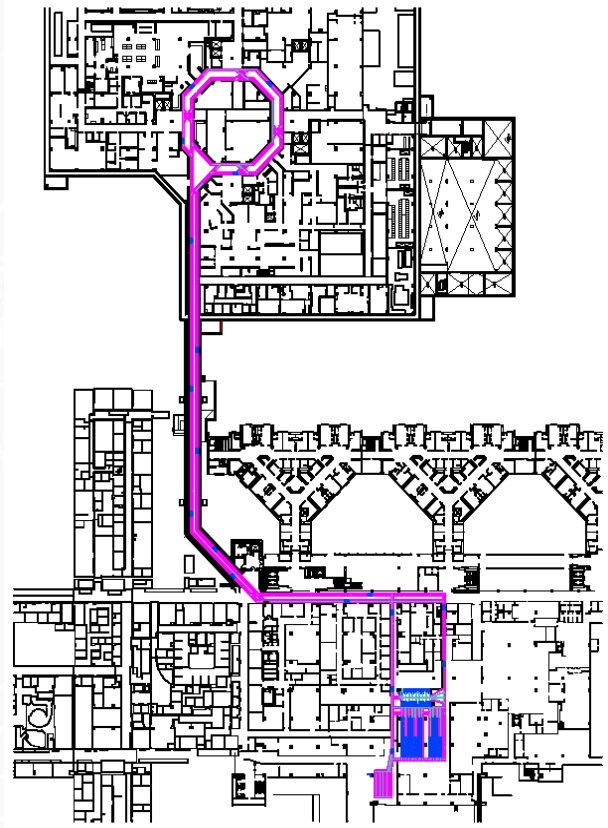
- **Operating safely and successfully in hospitals for over 14 years**
- Utilizes lasers , infrared sensors, and sonar to ensure safe navigation
- Audible feature makes people aware of its presence
- Secure carts
- Facility friendly
- Quiet





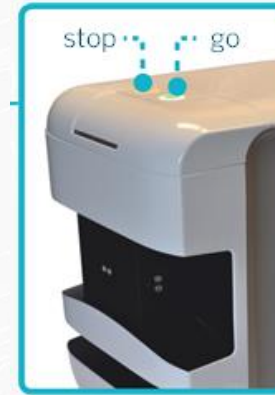
HOW DOES IT WORK ?

# TUG NAVIGATION



- Routes & delivery points programmed on map
- Map loaded on all TUGs and used as real-time model for navigation
- Navigates using laser, sonar, and infrared sensors
- Routes can be seamlessly changed or added

## Simple two button user operation



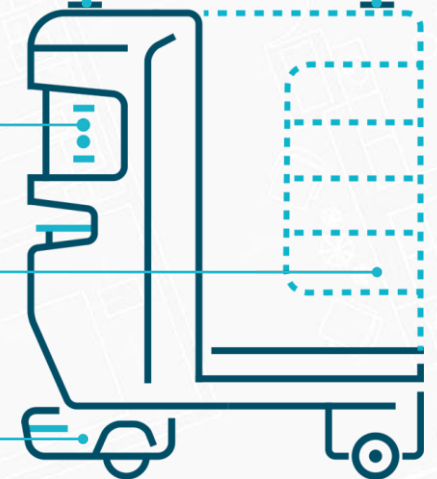
Operator Buttons

Biometric Access

Lasers & Sensors

Bar Code & RFID Enabled

Locomotion & Navigation



## Simple touchscreen operation to dispatch

# MAIN SCREEN - SENDING THE TUG

The screenshot displays the Aethon main screen interface. At the top left is the Aethon logo. To the right of the logo is the text "Help Desk: 1-888-201-9522". Below the logo are four navigation tabs: "Tugs", "Overview", "Reports", and "Administration". The "Tugs" tab is selected. The main area contains four rows, each representing a tug. Each row has a vertical green bar on the left, a tug name in a button, a status box, and two buttons for run counts. The status boxes for "Diane" and "Central Dirty" are highlighted in green, indicating they are ready.

Tug Name	Status	Today's Runs	Yesterday's Runs
Dusty	Navigating on Basement	4	11
Diane	Diane is ready	4	5
Central Dirty	Central Dirty is ready	5	8
OR	Navigating on Basement	6	8

# DESTINATION LOCATIONS



# TUG CAPABILITIES



## Delivers directly to user

Does not need a staging area



## Speaks as it works

Announces movements, deliveries, and pick-ups



## Rides elevators

TUG requests elevator wirelessly.  
Gets on/off autonomously



**Auto-opens doors** Communicates wirelessly to open and close doors



## Secures delivery

Biometric access plus pin code secures access and tracks delivery



## Powerful

Hauls up to 1,000 pounds

## Carts

# TUG VERSATILITY

TUG Head  
(brains & locomotion)



Supports a wide variety of carts





# INNOVATIVE DELIVERY SOLUTIONS



## Bulk Deliveries

- Transport heavy loads (over 1,000 pounds)
- Ideal for room service, trash, EVS, and linens
- Automatic pick-up and drop-off
- Flexibility to utilize multiple types of carts, including retrofitting existing carts



## Specialized deliveries

- Transport specialized, high-value deliveries
- Ideal for medications, lab specimens, blood bank
- Secure biometric carts



## Flexibility

- Limited infrastructure
- Fully autonomous
- Maneuverability in confined spaces
- Capacity to change routes and destinations as needed

# AETHON TUG-COMPATIBLE TRANSPORT CARTS BY LAKESIDE





## THE MARKET LEADER IN AUTONOMOUS MOBILE ROBOTS



Made in the U.S.A.



### Over 19 million deliveries to date



Currently operating in over 200 hospitals in the US and abroad



Sole source provider for US government VA hospitals



Experience implementing Tugs in *all* departments



Customer base includes major teaching hospitals



Experience in new construction and retrofits



Specialize in implementing highly flexible solutions

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Founded in 2004

HQ in Pittsburgh, PA

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# OUR HEALTHCARE CUSTOMERS



20 TUGs  
54 miles/day  
5 buildings  
230 deliveries/day  
9 floors traveled  
6 departments  
144 delivery stops



15 TUGs  
27 miles/day  
3 buildings  
300 deliveries/day  
15 floors traveled  
4 departments  
156 delivery stops



5 TUGs  
19 miles/day  
5 buildings  
85 deliveries/day  
12 floors traveled  
3 departments  
68 delivery stops



8 TUGs  
400 deliveries/day  
3 buildings  
35 miles/day  
9 floors traveled  
1 department  
39 delivery stops



7 TUGs  
14 miles/day  
2 buildings  
71 deliveries/day  
12 floors traveled  
2 departments  
43 delivery stops



4.6 TUGs  
41.7 delivery stops  
2.4 buildings  
58.4 deliveries/day  
7.3 floors traveled  
2.2 departments



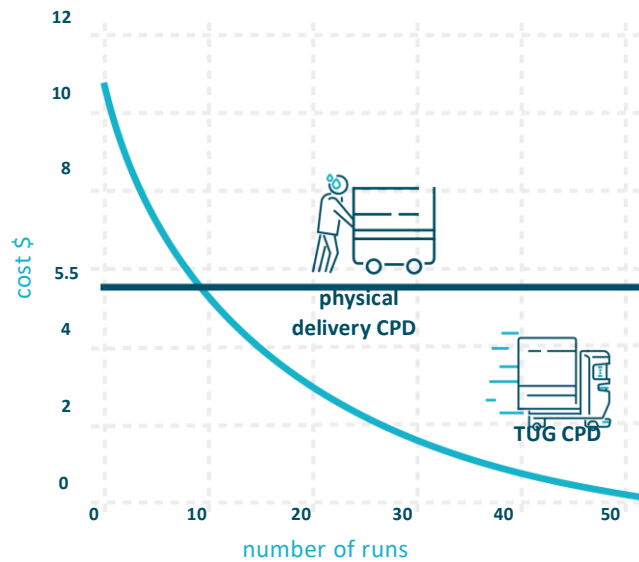
25 TUGs  
400 delivery stops  
3 buildings  
13 departments  
18 floors traveled



17 TUGs  
285 deliveries/day  
4 buildings  
40 miles per day  
8 floors  
5 departments  
277 delivery stops

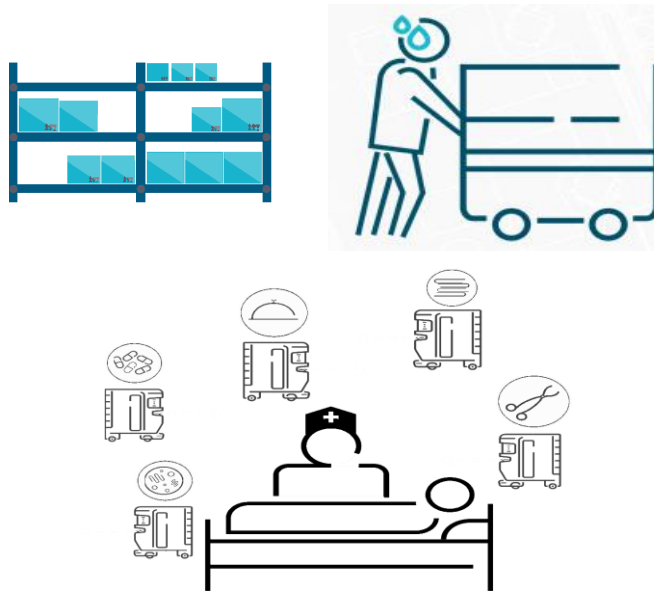
# VALUE OF AUTOMATING DELIVERY

## Lower Cost Per Delivery/Movement



Lowers cost per delivery by 50%-80% (CPD)

## Improve Efficiency



Improves delivery efficiency from various departments to the Point of Care

## Increase Worker safety & satisfaction



Reduces workforce turnover and improves worker satisfaction

# THINGS TO CONSIDER

- ▶ **Space restraints.** In healthcare environments, space is often limited; flexibility, multifunctional.
- ▶ **Efficiencies.** Robotic Meal delivery. Using Robotics to improve the consistent quality experience. Barista robots, Service Robots. Use time and motion models to assess effectiveness to meet service and delivery goals.
- ▶ **Quality Improvement.** Identify the way to improve existing processes in order to increase throughput and decrease costs.
- ▶ **The experience.** Consumers demand more and more elevated dining experiences, safe food, timely service, consistent quality - and healthcare environments are no exception. Patient satisfaction scores - and revenue - depend on it.
- ▶ **Communication.** Make sure departments understand their processes with robots. Open communication between various departments-facilities, foodservice, etc.

QUESTIONS???



THANK YOU FOR ATTENDING OUR WEBINAR.

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