

# Neo™ for airports

CUSTOMER STORY

Avidbots®

CVG  
CINCINNATI/NORTHERN KENTUCKY  
INTERNATIONAL AIRPORT



Avidbots®



## Contents

- 03 CVG Airport Embraces Smart Robotic Floor Scrubbers to Manage Growth
- 04 Introducing Neo, the Autonomous Floor-Scrubbing Robot
- 05 CVG, the Comeback Kid
- 05 Real-Time Monitoring & Reporting
- 06 Creative Thinking for Housekeeping
- 07 Designed for Safety
- 08 Neo Rolls into CVG
- 09 Onboarding Neo
- 10 Adapting to New Business Models
- 10 Return on Investment
- 11 More Plans for Neo
- 12 About Cincinnati/Northern Kentucky International Airport (CVG)



# CVG Airport Embraces Smart Robotic Floor Scrubbers to Manage Growth

## Neo and the Customer Experience

### Finding Neo

In July 2019, Brian Cobb walked into Changi Airport and stopped in his tracks. Surveying the terminal, he spotted several streamlined boxes autonomously drifting among the distracted passengers. As the Chief Innovation Officer at the Cincinnati/Northern Kentucky International Airport (CVG), he recognized the devices as robotic floor scrubbers. Cobb and his staff recently ran unsuccessful trials of a similar device. Now, strolling through Changi, he observed multiple self-navigating robots effortlessly scrubbing the floors to a high shine. One of the scrubbers featured ornamentation resembling a maid's uniform. Every now and then, someone stopped to snap a selfie with the robot. The scrubbers were an accepted part of operations and a source of delight and curiosity for passengers.

Cobb recalls, "Here I was seeing another scrubber that was really the same base size and specs. I was surprised to see the number of them at work and the consumer interaction. I was intrigued from the get-go."

In Singapore on a leadership exchange to share best practices among airports, including Changi's use of the Avidbots Neo robotic floor scrubber, Cobb learned how the airport had deployed Neo, trained the staff and integrated the robots into everyday operations. He spent time with Avidbots technicians, receiving a crash course on Neo's hardware, software and machine learning functions. As a data evangelist back home, Cobb was most impressed with the reporting capabilities.

"If it can be measured, it can be improved," says Cobb. "What really sold us on this particular unit was the phenomenal dashboarding that comes along with it. It's one thing to have an active unit cleaning and doing what you would expect it to do. But the data analytics capability is really driving decisions."

Energized, Cobb left Singapore convinced that Avidbots had the solution for the housekeeping challenges at CVG.





## Neo Up Close

### Introducing Neo, the Autonomous Floor-Scrubbing Robot

Neo is the product of more than six years of continual improvement. Built from the ground up by Avidbots, Neo is — by any measure — impressive technology. Designed as an autonomous floor-scrubbing robot for high-traffic public and commercial spaces, Neo uses cutting-edge AI, mapping algorithms and vision sensors to safely deliver a high quality, consistent clean with minimal human intervention.

Weighing about 472 kilograms (more than 1,000 lbs) with batteries, the device itself resembles a mini Zamboni. It's a meter long and can carry 112 liters (about 30 gallons) of water contained in separate clean and dirty tanks. It's powered by industrial strength batteries, allowing it to clean continuously for up to six hours. Neo is ruggedly built but surprisingly quiet and nimble, and able to stop on a dime.

Neo's design is only half the story. The AI adaptive software driving the robot is the other half. "Neo's data analytics allow staff to see areas that have not been cleaned," Cobb reports. "Then we can see why the robot is avoiding that area. For instance, there could be a museum piece there, or someone left a bag, or there is a cluster of people gathered. Perhaps it sees the same cluster the next day, so it knows this is a permanent obstacle or a gathering place. Neo logs that information to the profile, learns what to expect and then tends to avoid that area. When needed, staff can set Neo to manual mode for detail cleaning."

Avidbots' proprietary AI software gives the robot the ability to conduct dynamic planning to avoid obstacles and still get the job done — no teaching required — while handling new and moved objects in its environment. Neo finds alternate paths, even for large obstacles requiring significant deviations from the typical cleaning route. Neo's AI and regular software updates from the Cloud mean the robot cleaner improves over time, finding the most efficient means to follow the cleaning plans.





## CVG, the Comeback Kid

CVG offers nonstop passenger service to 50+ destinations and, as the global hub for DHL and Amazon Air, is the fastest-growing cargo airport in North America. But, it wasn't always this way.

"CVG had some really dark days not too long ago," admits Cobb.

Until a few years ago, CVG was consistently ranked among the most expensive major airports in the United States. Customers could easily use any of five competing airports within a one-and-a-half-hour drive, typically finding fares up to 50 percent lower. Realizing that running the airport as a business is essential, CVG leadership took aggressive steps to turn the tide. They attracted new airlines, increasing flights to drive competitive fares. Slowly, CVG won passengers back. Over the span of five years, the airport realized unprecedented growth, doubling its customer base from 4.5 million to 9.1 million passengers annually. That pace of growth cannot occur without a strain on staff and resources. Fortunately, anticipating the challenges, CVG made some serious investments in technology solutions and customer experience initiatives.

For decades, IT at traditional airports had operated under the maxim of "do no harm" to the entity. This wariness to develop new systems led to a lack of innovation, leaving American airports ill-equipped to respond to new challenges in aeronautics, cyber-security and customer expectations.

As head of CVG's newly created innovation arm, Cobb's responsibilities include the modernization of information technologies. "When it comes to airport infrastructure and the ability to adapt and adopt, we were late to the game." He explains, "We're bringing IT up to modern standards. We're incorporating technology changes at a logical pace without compromising IT or the customer experience."

## Real-Time Monitoring & Reporting

While Neo is designed to operate autonomously, housekeeping managers can check in on a unit at any time and get a host of useful information using the Avidbots' Command Center web app. The Avidbots' Command Center is an intuitive, always-on, multi-language interface, accessible from any web-enabled device, to monitor and manage robot scrubber fleets in real time. Neo's camera technology, integrated with the SaaS platform, permits approved airport staff to see what Neo sees via live remote monitoring. The full reporting suite provides key metrics to ensure the robot is used to its full potential:

- ▶ Productivity
- ▶ Coverage maps
- ▶ Water usage
- ▶ Individual cleaning plan reports
- ▶ Performance over time
- ▶ ...and more

**What really sold us on this particular unit was the phenomenal dashboarding that comes along with it," says Brian Cobb, CVG Chief Innovation Officer. "It's one thing to have an active unit cleaning and doing what you would expect it to do. But the data analytics capability is really driving decisions".**

# Creative Thinking for Housekeeping

“I’ll hand it to our housekeepers,” says Cobb. “You can only imagine the things they see every day. Considering that we’ve doubled our passenger base within a very short amount of time, that puts additional challenges on the housekeeping side of the house.”

Prior to CVG’s growth spurt, terminals typically closed by 10 p.m. and didn’t open until the next morning. That left the third shift staff ample opportunity to clean public areas. As foot traffic increased and CVG transitioned to an around-the-clock operation, housekeeping no longer had that chance.

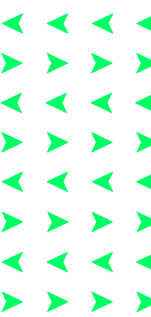
As housekeeping dealt with an influx of passengers, CVG started implementing technology and metrics to improve cleanliness — a key benchmark of customer satisfaction — by installing Internet-of-Things (IoT) sensors in every restroom. CVG Airport now tracks traffic entering and exiting each restroom so housekeeping staff can plan restroom cleaning more effectively. Responsiveness, cleaning efficiency and customer satisfaction spiked. Cobb didn’t stop there:

**“I realize the criticality to what technology can bring. Change is normal. Change should be recognized. If we’re not changing how we do business, chances are our business is going to pass us by.”**

The CVG Airport team explored robotics to supplement housekeeping functions. Building on the successes instituted in other parts of the operation, CVG moved swiftly to embrace the new generation of robots capable of scrubbing the heavily used hard floors in the terminals. The airport put the project out for bid and selected a robotics vendor to pilot the use of autonomous floor scrubbers. During the pilot phase, facilities staff reported one issue after another. It was soon apparent that the engineering was inferior, and the machine leaked constantly. That defect alone surfaced a host of complications — the additional manpower needed to clean up after the device, passenger safety, slip and fall concerns and liability. CVG attempted to use the robotic floor scrubber for a year-and-a-half before finally packing it up and returning it to the manufacturer.

“If you’re going to fail, you better fail fast and fail forward. We became the poster child for trying,” Brian Cobb sighs. “We chose the wrong company.”

While CVG Airport learned from the experience, there was an unintended consequence of the experiment. The 120-strong army of in-house and contract housekeeping staff had witnessed the robot’s performance. They were busy enough already and unlikely to enthusiastically welcome another automated device at the airport.



## Designed for Safety

Airports like CVG are, as Cobb puts it, “24/7 living, breathing entities.” With constant traffic moving through gates and terminals, there is no end to the day. Airport personnel see first-hand examples of Neo’s safety features all the time.

**“I like to keep an eye on the security cameras and see what’s shaking in the airport,” admits Cobb. “People are curious. They don’t see robotics in action every day. I remember watching a gentleman walk up to Neo and just jump in front of it to see what it would do. As you’d expect, it stopped. I watched the man’s wife just shaking her head in the background.”**

Avidbots designers built Neo for safety. Aside from the obstacle avoidance algorithms in the AI, Neo features sensors and cameras to survey its environment, safety bumpers and an array of warning lights. Human operators can easily switch Neo to manual mode at the press of a button.

## Neo Rolls into CVG

As soon as Brian Cobb returned from his leadership exchange, he reconvened the selection committee to share how Neo had successfully integrated into airport cleaning operations in Singapore (as well as Tokyo, Paris, Montreal and others). Refusing to repeat past mistakes, CVG updated their requirements for robotic cleaning based on what they had learned — carefully defining metrics, service levels and Cloud data access. They expedited a new request for bids, awarded the contract to Avidbots and took possession of their new Neo robotic floor scrubber, becoming the first U.S. airport to deploy the unit.

“We ran successful trials in Concourse B,” reports Cobb. “We did it during down times for both passengers and staff. Even though we encourage our people to accept change, we knew housekeeping had just been down this road with the last robot. Neo passed with flying colors.”

As customers became accustomed to Neo, so did CVG’s housekeeping staff. Avidbots representatives came to CVG to familiarize the airport’s leadership and housekeeping teams with all aspects of Neo’s operation. After such a bumpy start with robotics, it was crucial that the team felt confident about the new addition.

**Cobb recalls, “The Avidbots team came in, demonstrated Neo, mapped the initial cleaning areas, then showed our staff — step-by-step — how to operate it. They were heavily engaged from start to finish and that set us up for very successful trials.”**





## Onboarding Neo

Deploying Neo in terminals and concourses takes a bit of planning, but Avidbots technicians work closely with airport operations to make sure Neo is properly set up and ready to clean floors. Together, onsite, Avidbots techs and facilities personnel review every facet of Neo's operation, then guide the machine through the facility — mapping out cleaning plans, setting start and end positions, defining no-go and slow down zones and adjusting granular cleaning settings (such as water pressure) for best results on different floor spaces.

### Neo Onboarding Includes:

▶ Onsite mapping of areas to be cleaned (up to 750,000 ft<sup>2</sup>).



▶ Creation of customized cleaning plans optimized for maximum productivity or coverage.

▶ On-site training with modules tailored for cleaning staff, cleaning supervisors and senior managers — covering hardware, software and maintenance.





# Adapting to New Business Models

Once Neo became an accepted part of the housekeeping team (CVG even had an employee badge printed for Neo), CVG got busy exploring how the robot floor scrubber might improve employee and customer satisfaction. CVG realized that housekeeping staff would naturally have some trepidation when they saw Neo effectively cleaning. Leadership, however, viewed it as a teaching opportunity.

**“Housekeeping is not for the weak stomach or weak of heart,” says Cobb. “But what if we can improve the quality of their jobs by bringing new technology into the space?”**

With a doubling of passenger traffic, CVG Airport was in no position to eliminate jobs — that was clear to everyone. Rather, airport leadership made a conscious decision to use Neo as the catalyst to improve working conditions through technology. Neo provided the opportunity to truly change the role of traditional housekeeping.

CVG looked to another industry — auto manufacturing — and the shift it made to automation over the last 30 years. While staff on the manufacturing line dwindled, those same individuals transitioned to roles handling management, repair and upkeep of an array of hardware and software assets. There was a similar opportunity to develop staff at CVG. Housekeeping was adapting to the new business models created by AI and robotics. CVG was quick to realize that this staff development effort was an investment in both its people and the airport’s future.

## Return on Investment

Airports can see several measurable cost savings that indicate a Neo robotic floor scrubber can easily pay for itself within 12 to 18 months of purchase.

### Neo projected lifespan

5 years

### Neo fixed and variable cost

Neo unit

Service plan

Software subscription plan

Cleaning supplies

Consumable parts (brushes, floor pads, squeegees, etc.)

### Top cleaning speed

1.35 meters (4.5 feet) per second

### Annualized Neo value

Approximate value of work hours for 1 Neo operating 8 hours daily

\$30,000 per year

### Other potential cost savings

Reduced maintenance cost (versus manned floor scrubbers)

Fewer facility repairs due to human error

Liability

Potential hard and soft costs associated with employee fatigue and repetitive strain

*An Avidbots representative can develop a custom Neo deployment plan and determine the ROI your organization can achieve with Neo autonomous floor-scrubbing robots.*

## More Plans for Neo

The innovation group at CVG has more in store for Neo. Because Neo is so photogenic, it's a bit of a social media phenomenon (just check #comemeetneo). CVG has used that celebrity as an opportunity to partner with the Southern Ohio and Northern Kentucky communities in fun, engaging ways.

"We've invited students from robotics engineering departments to work with Neo. We also reached out to the visual arts programs," reports Cobb.

Why the arts schools? The Neo unit can be outfitted with custom wraps, adorned with any design the owner chooses. CVG is evaluating artistic concept designs from students that may one day grace the robot.

Cobb and his innovation team are excited to work with Avidbots to advance AI robotics in airport operations. "At this point, development really feels unlimited. And that's where our relationship is developing with Avidbots. How can we collaborate to develop the product beyond what it is today?"

On November 13, 2019, CVG deployed their first Neo robotic floor scrubber, and it is now in full use. The airport plans to roll out more units in the main terminal and a new rental car facility that will become operational in 2021. In the meantime, CVG participates in a quarterly customer success survey, consistently ranking high among the 380 airports measured around the globe. Recently, CVG learned that high ranking put it at the very top of North American airports serving five to 15 million passengers, earning a 2019 Airport Service Quality (ASQ) Award from Airports Council International. A point of pride for the team at CVG, those high marks are in no small part due to the cleanliness of the airport.

**"We receive written notes and feedback," explains Cobb. "People say, 'We saw the robot. You really care about cleanliness.' What is heartwarming — to leadership and the individuals responsible for it — is that we are absolutely lauded for our cleanliness. That's hard to accomplish with the number of people coming through our facility. We're exceptionally proud of that. The credit really goes to the housekeeping staff and to Neo, working alongside one another."**





## About Cincinnati/Northern Kentucky International Airport (CVG)

CVG has been serving commercial passengers since 1947. In 2019, more than 9.1 million passengers were served. The airport has more nonstop destinations than any airport in the Tri-State region (Kentucky, Ohio, Indiana), including direct international service to Paris, Toronto, Cabo San Lucas, Cancun, Montego Bay, and Punta Cana. As the 8th largest cargo airport in North America, CVG is home to Amazon Air and DHL's global super hub. The airport is recognized globally as a leader in innovation, deploying solutions that advance the industry in four key areas: clean, connect, secure, and transport. CVG is the only airport in the country to receive Safety Act Designation and Certification from the Department of Homeland Security (DHS), giving the airport the highest level of protections under the Act. [CVGairport.com](http://CVGairport.com) is your award-winning, travel-planning resource with flight status, security wait times, and parking availability.



## Why Avidbots?

Buying an Avidbots Neo isn't just buying a floor scrubber. It's investing in a technological future that can redefine your cleaning function, making it more productive, more cost effective and easier to run. More importantly, our robotics and AI technology open up new opportunities to make your business even more successful. We realize this isn't just about buying a product, or a technology, or even a business proposition. You want to buy into a trusted partner who can take you into the future of automated operations using cutting edge robotics. At Avidbots, we work side-by-side with our customers to earn that trust and realize all the benefits that robotics can bring them.



## About us

Avidbots is a robotics company with a vision to make robots ubiquitous to unlock humanity's potential with a hyperfocus on autonomous cleaning. Our groundbreaking product, the Neo fully autonomous floor scrubbing robot, is deployed around the world and trusted by leading facilities and building service companies. Headquartered in Kitchener, ON, Canada, Avidbots is offering comprehensive service and support to customers on 5 continents.

## Contact us

Learn more about Neo.



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