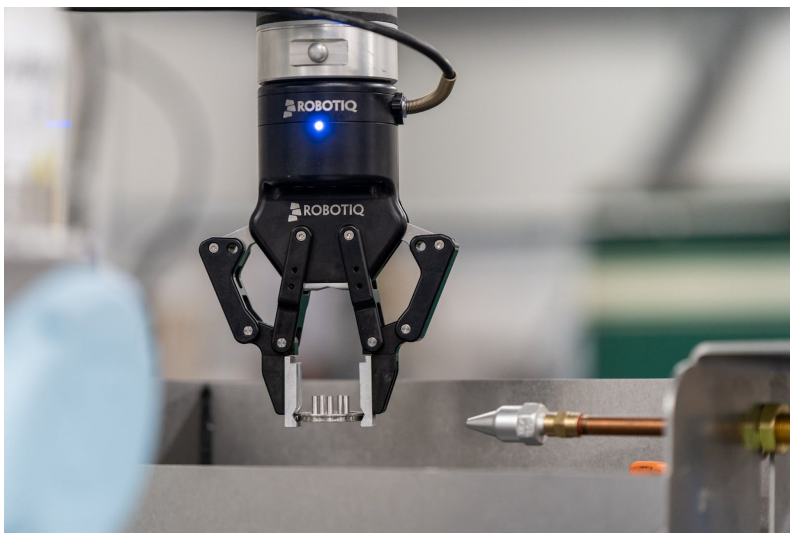




[perfection multiplied]

Increase CNC Machine Uptime with Robotiq's 2F-85 and Wrist Camera

APN manufactures high-precision parts for the aerospace sector in Quebec City, Canada. In order to get more out of their nine CNC machines each day, they automated the parts-handling task with a Universal Robots UR5 and Robotiq 2F-85 Adaptive Gripper and Wrist Camera. After spending a year fine-tuning their first robotic cell, they replicated it eight times in four months.



When speaking about businesses who are unsure whether to implement new technologies such as robots, APN Co-President Yves Proteau is straightforward: “If they continue to hesitate, they might find it hard to merely subsist.” In other words, you must embrace it... or go out of business because of it. Industry 4.0 has been embraced wholeheartedly at APN, a 60-employee machine shop located in the heart of Quebec City’s Technoparc.

When you enter APN’s facility, the pleasant view, welcoming reception desk, spacious offices, and modern cafeteria immediately make it clear you’re visiting a high-tech manufacturer. This impression is solidified when the factory door opens to reveal a modern, highly automated machine shop. In-house operating software operates all machines and maintains communication between them, tons of automation devices simplify each operators’ work, and, most recently, robots have taken their place on the floor.

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Automate CNC Machine Tending

In machine shop world, getting machine uptime to 100% is the ultimate goal for maximizing profitability. APN first thought about investing in collaborative robots in 2016 because it was interested in operating more without additional resources and assigning greater value-added tasks to employees (instead of cleaning and placing parts). As Director of Continuous Improvement Joël Lessard explains, “I didn’t have access to technology that could efficiently detect parts, since our programs process around 300 different parts. Image recognition software is available but it’s quite complex to program. I noticed the Wrist Camera at the Robotiq booth during the 2016 IMTS show. Finally I had discovered a setup that was easy to program and that we could recreate here at APN.” explains.

“We needed some technology that could efficiently detect many parts, since our programs process around 300 different parts. Only the Robotiq Wrist Camera could do it with easy programming.”

Given that Robotiq was also the market leader in collaborative robot grippers, APN also chose to buy the 2F-85, the world’s best-selling gripper for cobots, to handle their 300 different types of parts. Lessard recalls, “Other grippers on the market do not have such a wide stroke. The 2F-85 is very intuitive in terms of force, opening, and activation. For everything pick-and-place-related, you can mount the fingertips however you want. For the lathe, we use one type of fingertip, and for another robot, we use fingertips we designed ourselves. It’s versatile.”



APN’s first cobot project thus began, with young automation engineer William St-Germain joining the team in the early stages. Here’s how he describes their automated sequence: “The machine processes the part. There are sensors at the end of the conveyor which detect the part and tell the robot that a part is coming through. The part then goes down a chute and lands on a tray. From there, the tray wobbles just enough for the part to find its solid surface. After that, the tray

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centers it below the chute. The robot then holds the tray over a backlight.

The Wrist Camera takes a snapshot to detect the edges that will be used to pick the part. The robot picks up the part to clean it and blow air on it, depending on the cleaning cycle. Finally, it places the part in a bin or a small 3D-printed container, positioned so as to show the operator which part needs to be measured.”

Design, Integrate, Operate, Repeat

The team integrated and optimized the application during the first year of the robot’s operation. Then, they were able to replicate it eight times in less than four months. “We learned a lot from the first project. After we’d got it running well, we just cloned it with some minor tweaks,” St-Germain explains.



High-mix low-volume is a big part of APN’s reality. With more than 300 different parts to machine, ease of programming was a key aspect of their automation project KPIs. They’re glad to be able to operate with a single, parametric program. Joël Lessard explains: “If we need to update a cleaning cycle or any other task, we change it once, we upload it, and everything is updated effortlessly for all the other parts that will need a program.”

“We worked on improving our first robot application for a whole year while it was in production. Then we replicated the application eight times in a span of four months.”

With a 15% increase in machine uptime for each of the nine machines, this project earned an ROI within a year. And the operators’ lives were made much easier. Machinist Jean-François Rivest-Gagné told us, “I can perform maintenance while production runs, along with lots of other things. My team leader could say ‘I need your help for ten minutes,’ and it’s no problem! Production is constant, and the robot will keep processing my parts while I’m away.”.

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With KPIs achieved, employees satisfied, and a robotics crew ready for more challenges, cobots are not about to stop joining APN. Engineer St-Germain already has an idea in mind for the next project: “We want to automate the process in which the operator picks up a part from a small 3D-printed container, puts it in a vise, and brings it to another machine for measurement through positioning. The end goal is for the robot to get to the lathe, pick up the part placed there by another robot, bring it to the machine for measurement through positioning, and place it in the machine, where everything is performed automatically.”

These upgrades, APN hopes, will help them stay competitive in the high-precision business of aerospace parts. With a limited amount of qualified personnel available in Quebec City—where the unemployment rate is around 4%—cobots are more than welcome as powerful new teammates, according to Joël Lessard: “Over the past few years, the media has picked up on how robots will help maintain jobs in Quebec rather than steal them (like we used to hear about 20 years ago, for example). This played well in the integration.”

Talk to an expert

About Robotiq

Robotiq’s mission is to free human hands from repetitive tasks. Our tools and know-how simplify collaborative robot applications, so factories can start production faster. Robotiq works with a global network of connected robot experts supporting their local manufacturers.



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robotiq.com | leanrobotics.org
info@robotiq.com

966, chemin Olivier, Suite 500
Lévis, QC, G7A 2N1, Canada

1-418-380-2788
1-888-ROBOTIQ