

THE FORUM FOR CANADA'S SECURITY AND DEFENCE COMMUNITY

# VANGUARD

www.vanguardcanada.com

AUGUST/SEPTEMBER 2015

## PROCUREMENT

GETTING  
IT RIGHT,  
THE FIRST  
TIME

DEFSEC  
ISSUE

### PLUS:

**NRC'S NATURAL  
LANGUAGE  
TECHNOLOGY:**  
The frontier of social  
media analytics

**BLUEDROP RISING:**  
Boeing gives the Atlantic SME a launchpad

**FROM POLITICS TO PROCUREMENT:**  
CH-148 Cyclone finally lands in Shearwater

**NAVIGATING COMPLEXITY:**  
A tale of three projects



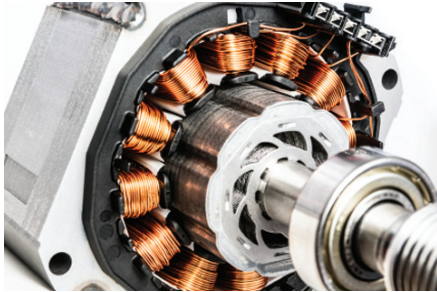




**Nicole Verkindt** is the founder and president of OMX. She is a Board Member of the Canadian Commercial Corporation and was recently appointed to the Board of the Peter Munk School of Global Affairs.



# How Advanced Manufacturing Technology could save the Canadian industrial base



**C**anada prospered with a strong industry through the 1900s, benefitting from reasonably strong tariff barriers. In the all-important auto sector, an agreement with the U.S. required the same number of North American vehicles to be produced in Canada as were sold in Canada.

However, by the 21st century, manufacturing had become a global game, with trade barriers lowered, and the lowest cost global producer winning the market share. Since that time, manufacturing has become much more specialized; small plants now focus on just a few processes with restricted product mandates. Many producers began sourcing parts and components offshore, outsourcing manufacturing especially in dynamic markets like electronics, with products and processes in constant flux.

Today, Canada is paying the price of society's advancement. Job opportunities are shifting to the service sector, but with wages that are approximately \$10,000 lower, on average, than manufacturing jobs. The impact on Canadians' purchasing power is being felt across the country. High capital costs expose manufacturing investments to organized labour's ability to leverage high wage and benefit contracts. The manufacturers that remain are specialized, focusing on a select few products and processes, and supply chain management is king, requiring efficient global sourcing of as many materials and subassemblies as possible.

Of the manufacturing that is still being done in Canada, it's done here because of

local ownership of the technology. Unless it becomes prohibitively expensive, companies headquartered in Canada prefer to manufacture here. Certain industries with high transportation costs find it efficient to locate the manufacturing close to the market, or the raw material resources. Food processing, mattress production, patio furniture (light and awkwardly shaped) and resource processing are good examples.

Today, there has been a considerable movement of onshoring production due to higher transportation costs, currency risks, and service expectations, but arguably those are sustainable business models. Finally, restricted government purchases create an important Canadian manufacturing sector for products like mass transit vehicles and defence equipment.

In the global defence industry, as a result of the National Security Exemption, many countries around the world have their own policies requiring local content. Government procurements requiring ITBs/Value Propositions (offsets), of course, change the paradigm.

Advanced manufacturing technologies represent the future for Canadian manufacturing. Skill levels are going up rapidly, and Canada is well positioned to benefit with an exceptional education system. That being said, there are some downsides. Our high standard of living drives costs up, and the lack of labour flexibility due to termination standards and unionization threatens investment. But highly automated, integrated manufacturing can reduce input costs while maintaining an attractive degree of flexibility to produce highly variable products, even in low volumes. This form of manufacturing relies more on skilled technicians and engineers than on low wage operators, and Canadian wage rates for these individuals are competitive.

Possibly the most interesting direction of advanced manufacturing are small flexible technologies like 3D printing, which may result in the democratization of manufacturing, returning it to the local specialized function of the artisan of the past. If consumers can purchase designs online, and forward them to a local production facility,



*Jordan Kyriakidis, CEO, QRA Corp.*

we could return to the model where the producer delivers directly to the consumer in a high-service, high-quality environment. We've even seen 3D printing proposed on Canadian ships from an active OMX user, Axis Machining.

In the future, competing in Canada will require the best supply chain management tools (shameless OMX plug here): Robotics, Innovative manufacturing equipment, Internet of Things, Visual inspection technology, and many others will all play a role. Perhaps the future will look like a series of smaller factories, employing between 50-100 employees doing high-knowledge, highly specialized, high-value work, while leveraging the latest advanced manufacturing technologies.

Dr. Marc Perron, President of Alizem Inc., a Canadian software IP company specializing in power electronics applications, reflected that his company's strength lies in providing pre-tested blocks of technology coming from world class organizations and allowing customers to quickly integrate them into their products, significantly reducing costs, risk, and time of development for manufacturers. This is a perfect example of a Canadian technology company providing leverage to manufacturing companies to access advanced manufacturing technology quickly, as opposed to investing many years of engineering resources to do so.

The President of Jesse Garant & Associates, Jesse Garant, emphasized that: "In today's technological landscape, the need for a successful inspection and analysis of a part has never been greater." Garant's specialized NDT approach helps defense manufacturers make a qualified decision within a shorter timeframe, providing increased confidence in parts being supplied. Where traditional inspection methods could take weeks, an Industrial CT scan can be completed in a matter of hours, providing instant and accurate results. This process ensures a value-added time and cost-saving solution because it reduces the number of uncertainties and increases productivity while improving standards in quality control. This is advanced manufacturing technology at work.

As companies enter the Internet of Things age (IoT), integration issues due to the increasing systems-of-systems complexity are becoming a big challenge to manage. Users are demanding and expecting that these systems never fail. QRA, a company based in Halifax, Nova Scotia, is building advanced analysis tools that help IoT developers meet these demands by finding errors easily and quickly, creating smarter, stronger, and safer systems. Advanced manufacturing promises to increase the quality, speed, and customizability of the next generation of machines, but with high levels of automation and integration to ensure these systems always operate as expected. By developing the next generation of early-stage analysis tools for complex systems, QRA helps advanced manufacturing companies build products faster, cheaper, and with more confidence.

When it comes to the equipment itself sitting on the floors of these manufacturing facilities, advanced manufacturing trends lean towards investing upfront in the type of equipment that promotes higher efficiency, reliability, and general productivity. Bill Mastronardi, Mandelli Sales Manager in North America, explained that his company has a long history of creating high-quality Horizontal Machining Centers. The combination of rigidity and technological advancements provide the customer the ability to achieve high accuracy while cutting complex profiles on hard materials such as Titanium, all at a reduced cutting time. "These advancements provide greater efficiency," Mastronardi comments, "but also greater opportunity for our customers to secure work that may have been out of reach in the past, making them more competitive in a global market." Inserting technology into a manufacturing process by procuring innovative machinery clearly drives increased productivity and global competitiveness.

Examples of successful Canadian manufacturing businesses can be found across the country, but they all seem to have one thing in common: they specialize, offer high service, and custom solutions.

One of OMX clients, Automated Coatings, clearly attributes its success directly

to its ability to adapt, by bringing in advanced manufacturing technologies to its processes. During the past eight years, the manufacturing sector has been hit very hard with plant closing and relocations offshore. Through innovation and advanced manufacturing, Automatic Coating has been able to shift its business focus in support of the defence industry to recover and grow from the loss of business in its traditional markets.

Advanced manufacturing isn't new, and I am not the first person to have this revelation. I am, however, enthusiastic about the opportunities it can present to Canadian industry and the economy of the future. We hear a lot of grumbling about manufacturing jobs moving offshore, but some, like the government, have clearly caught onto this trend. There has been an explosion of grants for Canadian companies looking to invest in advanced manufacturing. A simple Google search will yield a surprising number of results.

I have always believed that if you are not moving forwards, then you just keep sliding back. "Business is like water skiing," investors often say. "If you stop, you sink." The Canadian manufacturing industrial base slid backwards in the past, and in order to move ahead we must take advantage of technology. Small or large, all Canadian manufacturing businesses need to think seriously about how to leverage available advanced manufacturing technologies, and government funding is a great way to add fuel to the fire to maximize investments.

Companies should also think about structuring 'Value Proposition' projects around investments into these technologies, which will raise Canada's entire industrial base to the next level; the one required to keep the country relevant and ahead of the game. Of course, none of this will happen alone, it must move forward through collaboration and partnerships. OMX, for one, is at the centre of the movement; we are being used by top companies to optimize their supply chains and also source great targets for investments into this wave of advanced manufacturing. The wave that — I believe — will be critical in the future of the Canadian industrial base. ■



Dr. Marc Perron

**Dr. Perron's Canadian tech company, Alizem, provides leverage to manufacturing companies to access advanced manufacturing technology quickly.**